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STUDY MATERIAL

PROFESSIONAL PROGRAMME

**FINANCIAL TREASURY  
AND FOREX  
MANAGEMENT**

MODULE 2

PAPER 5



**THE INSTITUTE OF  
Company Secretaries of India**

**IN PURSUIT OF PROFESSIONAL EXCELLENCE**

Statutory body under an Act of Parliament

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## FINANCIAL, TREASURY AND FOREX MANAGEMENT

The company secretaries by virtue of their expertise in the corporate laws and procedure are in eminently suitable position to:

- (a) Present to the Board of Directors, the financial, legal and personnel aspects of modernisation, expansion, diversification of the existing projects of new projects;
- (b) Obtain the decision from the Board; and
- (c) Interact effectively with the financial institutions in the process of procuring the finance.

The legal aspects of finance are becoming increasingly important and a Company Secretary is expected to successfully and effectively handle, amongst other things, important aspects such as management of public issues, syndication of loans, obtaining project approvals, raising of finance through public deposits and debentures or bonds etc. All these essentials require expert knowledge of diverse and complex procedures involved. Realising that the services of a Company Secretary could be of immense use in this important area, it was thought necessary to include this paper with a view to equip the students with the requisite fundamentals of the Financial Management.

It has been the endeavour to provide a blend of theoretical concepts and practical orientation. Topics, such as, raising finance from financial institutions, dividend policies, etc. requiring legal expertise and procedural knowledge have been written with a legal bias. Topics such as, project appraisal, financial planning, portfolio management and securities analysis, working capital management and capital budgeting decisions, treasury management, forex management, commodity exchange and derivatives have been written keeping in view the financial management principles and the practical utility. Ample number of practical problems and case studies have been added to aid the student in their learning process.

Though efforts have been made to provide a self-contained study material yet it may require regular supplementation as the subject is of a dynamic and fast changing nature. Students are advised to update their knowledge continuously by reading economic dailies, financial magazines and journal and other relevant literature including reference and suggested readings on the subject. Students are expected to learn the art of applying the principles of financial management to real business situations and for this case studies in the area of finance would prove to be of immense use.

The legislative changes made upto June 30, 2017 have been incorporated in the study material. However, it may so happen that some developments might have taken place during the printing of the study material and its supply to the students. The students are therefore, advised to refer to the e-bulletin and other publications for updation of the study material.

Although care has been taken in publishing this study material, yet the possibility of errors, omissions and/or discrepancies cannot be ruled out. This publication is released with an understanding that the Institute shall not be responsible for any errors, omissions and/or discrepancies or any action taken in that behalf.

Should there be any discrepancy, error or omission noted in the study material, the Institute shall be obliged if the same are brought to its notice for issue of corrigendum in the Student Company Secretary e-bulletin. In the event of any doubt, students may write to the Directorate of Professional Development, Perspective Planning and studies in the Institute for clarification at [academics@icsi.edu](mailto:academics@icsi.edu).

# SYLLABUS

## MODULR II, PAPER 5: FINANCIAL, TREASURY AND FOREX MANAGEMENT (100 Marks)

**Level of Knowledge:** Expert Knowledge

**Objective:** *To acquire expert knowledge of practical aspects of the management and techniques of financial, treasury and forex management.*

### Detailed Contents:

#### 1. Economic Framework

##### 1. Nature and Scope of Financial Management

Nature, Significance, Objectives and Scope (Traditional, Modern and Transitional Approach), Risk-Return and Value of the Firm, Financial Distress and Insolvency, Financial Sector Reforms and their Impact, Functions of Finance Executive in an Organisation

##### 2. Capital Budgeting

Time Value of Money, Planning and Control of Capital Expenditure, Capital Budgeting Process Techniques of Capital Budgeting- Discounted and Non- Discounted Cash Flow Methods, Choice of Methods Capital Rationing; Risk Evaluation and Sensitivity Analysis, Simulation for Risk Evaluation Linear Programming and Capital Budgeting Decisions – under Constraints and with Multiple Objectives using Mathematical Programming Models, Inflation, Uncertainty and Evaluation using Statistical Decision Theory, Analysis of Capital Budgeting, Decisions- Some Case Studies

##### 3. Capital Structure

Meaning and Significance, Capital Structure vis-à-vis Financial Structure; Planning and Designing; Optimal Capital Structure, Determinants of Capital Structure; Capital Structure and Valuation - Theoretical Analysis, EBIT - EPS Analysis, EBITDA Analysis (Earnings before Interest, Tax, Depreciation and Amortization), Risk and Leverage; Measures of Operating and Financial Leverage, Effects of Leverage on Shareholders' Returns

##### 4. Cost of Capital

Meaning; Factors Affecting Cost of Capital ,Measurement of Cost of Capital, Weighted Average Cost of Capital, Marginal Cost of Capital

##### 5. Financial Services

Meaning, Significance, Scope and Structure of Financial Services, Types of Financial Services- Merchant Banking, Securitization of Debt, Loan Syndication, Housing Finance, Custodial and Advisory

##### 6. Project Finance

Project Planning - Preparation of Project Report, Project Appraisal under Normal, Inflationary and Deflationary Conditions, Project Appraisal by Financial Institutions - Lending Policies and Appraisal, Norms by Financial Institutions and Banks; Loan Documentation, Project Review and Control; Social Cost and Benefit Analysis of Project. (UNIDO Approach), Term Loans from Financial Institutions and Banks; Lease and Hire Purchase Finance; Venture Capital Funds; Private Equity; International Finance and Syndication of Loans, Deferred Payment Arrangements; Corporate Taxation and its Impact on Corporate Financing, Financing Cost Escalation



## **7. Dividend Policy**

Introduction; Types, Determinants and Constraints of Dividend Policy Forms of Dividend Different Dividend Theories - Walter's Model, Gordon's Model and Modigliani-Miller Hypothesis of Dividend Irrelevance Dividend Policy - Practical and Legal Constraints Corporate Dividend Practices in India

## **8. Working Capital**

Meaning, Types, Determinants and Assessment of Working Capital Requirements, Negative Working Capital Operating Cycle Concept and Applications of Quantitative Techniques Management of Working Capital - Cash, Receivables, Inventories; Financing of Working Capital; Banking Norms and Macro Aspects Factoring and Forfeiting

## **9. Security Analysis and Portfolio Management**

**Security Analysis** - Measuring of Systematic and Unsystematic Risk, Fundamental Analysis (Economic, Industry and Company), Technical Approach and Efficient Capital Market Theory

**Portfolio Management** - Meaning, Objectives; Portfolio Theory -Traditional Approach; Fixed and Variable Income Securities, Markowitz Portfolio Theory; Modern Approach - CAPM Model; Economic Value Added, Sharpe Single & Multi Index Model; Arbitrage Pricing Theory (APT); Risk Adjusted Measure of Performance

## **10. Derivatives and Commodity Exchanges- An Overview**

## **11. Treasury Management**

Meaning, Objectives, Significance, Functions and Scope of Treasury Management, Relationship between Treasury Management and Financial Management; Role and Responsibilities of Chief Finance Officer Tools of Treasury Management; Internal Treasury, Controls; Environment for Treasury Management, Liquidity Management, Regulation, Supervision and Control of Treasury Operations, Implications of Treasury on International, Banking

## **12. Forex Management**

Nature, Significance and Scope of Forex Management, Foreign Exchange Market and its Structure, Foreign Exchange Rates and its Determination, Exchange Rate Quotes; Types of Exchange Rates; Forex Trading; Currency Futures and Options, Foreign Exchange Risk Exposures and their Management; Exchange Rate Forecasting; Risk in Foreign Exchange Business

## **13. Practical Problems and Case Studies**

## LIST OF RECOMMENDED BOOKS

### MODULE 2

#### PAPER 5 : FINANCIAL, TREASURY AND FOREX MANAGEMENT

The students may refer to the given books and websites for further knowledge and study of the subject :

#### READINGS

1. M.Y. Khan & P.K. Jain : Financial Management – Text and Problems; Tata McGraw Hill Publishing Co. Ltd., New Delhi.
2. Prasanna Chandra : Financial Management – Theory & Practice; Tata McGraw Hill Publishing Co. Ltd., New Delhi.
3. I.M. Pandey : Financial Management (2005); Vikas Publishing House Pvt. Ltd., New Delhi.
4. R.P. Rustagi : Strategic Financial Management – Taxmann Publication Pvt. Ltd.
5. R. Charles Moyer,  
James R. McGuign &  
William J. Kretlow : Contemporary Financial Management; West Publishing Company.
6. Rajiv Srivastava &  
Anil Mishra : Financial Management, Oxford University Press
7. J.B. Gupta : Strategic Financial Management – Taxmann Publication Pvt. Ltd.
8. Ravi M. Kishore : Strategic Financial Management – Taxmann Publication Pvt. Ltd.

## ARRANGEMENT OF STUDY LESSONS

Study Lesson No.	Topic
1.	Nature and Scope of Financial Management
2.	Capital Budgeting
3.	Capital Structure Decisions
4.	Cost of Capital
5.	Financial Services
6.	Project Finance
7.	Dividend Policy
8.	Working Capital
9.	Securities Analysis and Portfolio Management
10.	Derivatives and Commodity Exchanges – An Overview
11.	Treasury Management
12.	Forex Management
13.	Practical Problems and Case Studies

# CONTENTS

## FINANCIAL, TREASURY AND FOREX MANAGEMENT

### LESSON 1

#### NATURE, SIGNIFICANCE AND SCOPE OF FINANCIAL MANAGEMENT

Meaning of Finance	2
Definition of Finance	2
Definition of Business Finance	2
Definition of Financial Management	2
Nature, Significance and Scope of Financial Management	2
Investment Decisions	3
Financing Decisions	4
Dividend Decisions	5
Decision Criteria	5
Objectives of Financial Management	7
Profit Maximisation	7
Wealth Maximisation	8
Profit Maximization Versus Shareholder Wealth Maximization	9
Economic Value-Added (EVA)	9
Value of Firm-Risk And Return	11
Liquidity	11
Profitability	13
Costing and Risk	14
Financial Distress and Insolvency	16
Financial Management as Science or Art	16
Functions of Financial Executives	17
Financial Sector – Role and Functions	18
Financial Sector Reforms in India – Background	19
Financial Sector Reforms in India: Philosophy and Strategy	19
Pre-requisites for Reforms in Financial Sector	20
Salient Features of Financial Sector Reforms in India	20
Policy Framework	20
Improvement in Financial Health	22

	<i>Page</i>
Institutional Strengthening	22
Financial Sector Reforms – Present Scenario	22
Financial Sector Legislative Reforms Commission, 2011	25
Purpose of formation	25
FSLRC moots single regulator	25
Consumer protection	25
Financial Regulatory Architecture Act	26
Judicial review	26
Financial Sector Reforms: Some Criticisms	26
Financial Management – A New Look	26
LESSON ROUND-UP	27
SELF-TEST QUESTIONS	28

## LESSON 2

### CAPITAL BUDGETING

Introduction	30
Definitions	30
Time Value of Money	30
Introduction	30
Why Rs. 1 received today worth more than 1 Rs. Received after a time period	31
Use of Time Value of Money	31
Future Value of a lump sum	31
Present Value of a cash flow stream	32
Net Present Value	32
Capital Budgeting- Planning and Control of Capital Expenses	33
Need for Capital Investment	33
Investment Decisions – Management Perspective	34
Importance of Capital Budgeting	35
Factors Influencing Investment Decision	35
Rationale of Capital Budgeting Decisions	36
Kinds of Capital Budgeting Decisions	37
Planning of Capital Expenditure	37
Capital Expenditure Control	38
Capital Rationing	38

	<i>Page</i>
Capital Budgeting Process	39
Investment Criteria	41
The Payback Method	41
The Average Accounting Rate of Return (ARR) Method	43
Discounted Cash Flow (DCF) Method	45
Comparison of Net Present Value and Internal Rate of Return Approach	51
Points of Differences	51
Points of Similarities	52
Choice of Methods	53
Limits on Investment	53
Risk Evaluation and Sensitivity Analysis	54
Risk Evaluation	54
Sensitivity Analysis	57
Simulation for Risk Evaluation	58
Linear Programming and Capital Budgeting Decisions	58
Application of Linear Programming Model	59
Primal	59
Dual Problems	61
Some Case Studies	69
LESSON ROUND-UP	77
SELF-TEST QUESTIONS	78

### LESSON 3

#### CAPITAL STRUCTURE

Meaning, Definition and Significance of Capital Structure	82
Meaning of Capital Structure	82
Definition of Capital Structure	82
Significance of capital structure	83
Capital Structure vis-a-vis Financial Structure	83
Planning and Designing of Capital Structure	85
Attributes of a Well Planned Capital Structure	85
Designing a Capital Structure	85
Optimal Capital Structure	85
Factors Influencing Capital Structure	86

	<i>Page</i>
Factors Affecting the Choice of Capital Structure	87
Capital Structure and Valuation	89
Capital Structure Theories	89
Criticism of MM Hypothesis	95
MM Hypothesis with Corporate Taxes	95
Empirical evidence Against MM Hypothesis	95
EBIT - EPS Analysis	95
EBITDA Analysis (Earnings before Interest, Tax, Depreciation and Amortization),	98
Analysis with EBITDA	98
Limitations of EBITDA	98
Measures of Operating and Financial Leverage	99
Definition of Leverage	99
Types of Leverage	99
Operating Leverage	99
Degree of Operating Leverage	100
Uses of Operating Leverage	101
Financial Leverage	101
Degree of Financial Leverage	101
Alternative Definition of Financial Leverage	101
Uses of Financial Leverage	102
Distinguish between Operating Leverage and Financial Leverage	103
Financial BEP	104
Indifference Point	104
Combined Leverage	104
Degree of Combined Leverage	104
Working Capital Leverage	105
Effects of Leverage on Shareholders' Returns	106
Risk and Leverage	107
Relationship between Financial Risk and Financial Leverage	110
Some Case Studies	110
LESSON ROUND-UP	113
SELF-TEST QUESTIONS	114

## LESSON 4

### COST OF CAPITAL

Cost of Capital	116
Meaning of Cost of Capital	116
Definitions of the term cost of Capital	116
Assumption of Cost of Capital	116
Classification of Cost of Capital	116
Explicit and Implicit Cost	117
Average and Marginal Cost	117
Historical and Future Cost	117
Specific and Combine Cost	117
Importance of Cost of Capital	117
Factors Determining the Firm's Cost of Capital	118
Controllable Factors Affecting Cost of Capital	119
Uncontrollable Factors Affecting the Cost of Capital	119
Measurement of Cost Of Capital	119
Cost of Debt (Kd)	119
Cost of debt which are issued at Discount	120
Cost of Bond/Debentures redeemable after certain period	121
Cost of Equity Capital	123
Weighted Average Cost of Capital	125
Marginal Cost of Capital (MCC)	127
Cost of Capital and its Implications in Budgeting Decisions	128
Implications in Budgeting Decisions	128
Some Case Study	128
LESSON ROUND-UP	131
SELF-TEST QUESTIONS	133

## LESSON 5

### FINANCIAL SERVICES

Financial System	136
Meaning of Financial Services	136
Functions of financial services	137



	<i>Page</i>
Characteristics and Features of Financial Services	137
Scope of Financial Services	138
Structure of Financial Services Sector	139
Corporate Financial Services	140
Personal Financial Services	140
Significance of Financial Services	141
Merchant Banking Services	142
History of Merchant Banking in India	142
Types of Merchant Banking Organizations	143
Functions of Merchant Banking Organizations	143
Loan Syndication	144
Estimating Capital Requirements	145
Locating the various sources of finances	146
Loan Application	146
Syndication for working capital requirements	146
Securitization of Debt	146
Participants of the securitisation process	147
Housing Finance Services	149
Institutional Infrastructure of Housing Finance Sector in India	150
Housing Development Finance Corporation Limited (HDFC)	150
Main Objectives of HDFC	150
Types of Loans Offered	150
Special Features of HDFC	151
Housing and Urban Development Corporation of India (HUDCO)	151
Objectives	151
Housing Programmes	151
National Housing Bank (NHB)	152
The principal objectives of the NHB	152
The principal activities of NHB	152
New Development in Housing Finance	153
Impediments in Housing Finance	153
Custodial and Advisory Services	155
Depository System in India	155

	<i>Page</i>
Benefits of depository system	156
Types of Advisory Services	157
Regulation of The Financial Services Sector	157
LESSON ROUND-UP	157
SELF-TEST QUESTIONS	158

## LESSON 6

### PROJECT PLANNING

Project Planning	162
What is Project Planning?	162
Importance of the Project Plan	162
Preparation of Project Report	164
Format of Project Report	166
Project Appraisal under Normal Conditions	167
Project Appraisal under Inflationary Conditions	168
Project Appraisal under Deflationary Conditions	169
Project Appraisal by Financial Institutions	170
The Project	170
Lending Policies and Appraisal Norms by Financial Institutions and Banks	174
Loan Policy	175
Capital adequacy	176
Lending Exposure Limits	177
Exposure norms for Commercial banks in India	177
Lending Rates	178
Loan Documentation	178
Loan Agreement of Financial Institutions	179
Usual conditions in Loan Agreement	179
Project Review and Control	184
Project review is a very important aspect of entire project life.	184
Differentiating Monitoring, Evaluation and Control	184
Examples of Monitoring Indicators	185
Examples of Evaluation Indicators	185
Social Cost and Benefit Analysis of Project	187
Two approaches for SCBA	187

	<i>Page</i>
UNIDO Approach of Social Cost benefit Analysis	188
Little – Mirrlees (L-M) Approach	188
Difference between UNIDO and L-M Approach	189
Different Sources of Finance	189
Term Loans from Financial Institutions and Banks	189
Financial Leverage and Term Loan	189
Features of a Term Loan:	190
Lease Finance	190
Finance Lease	190
Operating Lease	191
Hire-Purchase	191
Venture Capital	192
Private Equity	192
Types of Private Equity	193
Structure of Private Equity	193
Characteristics of Private Equity	193
Deferred Payment Arrangements	193
International finance and syndication of loans	194
New International Instruments	194
Syndicated Euro Currency Loans	194
Main Objectives of Syndication (Borrowers' point of view)	195
Lenders' point of view	195
Corporate Taxation and the Impact on Corporate Financing	195
Financing Cost Escalation	196
LESSON ROUND UP	196
SELF TEST QUESTIONS	197

## LESSON 7

### DIVIDEND POLICY

Introduction	200
Types of Dividend Policies	200
Determinants/Constraints of Dividend Policy	201
Types of Dividend/Form of Dividend	202
Theories of Dividend	203

	<i>Page</i>
Legal Aspects of Dividends	210
Transfer of Unpaid/Unclaimed Dividend to Investor Education and Protection Fund	211
Corporate Dividend Practices in India	212
Some Case Studies	212
LESSON ROUND-UP	217
SELF-TEST QUESTIONS	217

## LESSON 8

### WORKING CAPITAL

Meaning of Working Capital -The Basic Concept	220
Types of Working Capital	220
Determinants of Working Capital	221
Factors Influencing the Amount of Cash, Receivables and Inventories	223
Factors affecting holding of cash in an organisation	223
Factors affecting the investment in receivables	223
Factors affecting the investment in Inventories	224
Assessment of Working Capital	224
Negative Working Capital	224
Current Assets and Fixed Assets Financing	225
Operating Cycle Concept and Application of Quantitative Techniques	226
Requirement Of Funds, For The Various Items Of Current Assets	232
Quantitative Techniques for Forecasting Working Capital Needs	234
Techniques for Allocation of Working Capital	235
Financing of Working Capital	235
Working Capital – A Policy Decision	236
Control of Working Capital	237
Working Capital Leverage	237
Ways to Improve Working Capital Position	237
Control of Working Capital	240
Cash Management	240
Motives for holding cash	240
Level of cash holding	241
Components of cash and bank balances	242
Nature of Bank Balances	243

	<i>Page</i>
Strategy for effective cash management	243
Inventory Management	244
Benefits versus Costs	245
Extent and Quantum of Inventory Management	245
Strategy for Inventory Management	245
Managing the Inventory Level	246
Receivables Management	247
Illustration	248
How do firms ensure realisations?	248
Desirable Level of receivables	248
Control of Bad debts	252
Banking Norms and Macro Aspect of Working Capital Management	252
Different Committee of RBI for working capital management	253
Other Issues Involved in the Management of Working Capital	259
Accounting Policies of Firms for Working Capital Management	261
Accounting policies of Firm A	261
Accounting policies of firm B	261
Accounting policies of firm C	262
Comments on Accounting Policies	262
Factoring Services	262
Origin of Factoring Services	262
Definition and functions – Factoring Services	263
Factoring vs. Accounts Receivable Loans	263
Factoring vs. Bill Discounting	263
Mechanics of Factoring	263
Other Techniques for Control of Working Capital	266
Case Studies	267
LESSON ROUND-UP	272
SELF-TEST QUESTIONS	273

## **LESSON 9**

### **SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT**

The Concept of Security Analysis	276
What are Securities	276

	<i>Page</i>
Risks and its Types	277
Return of the Security	278
Total Return	278
Approaches to Valuation of Security	279
Case Study	280
Fundamental Approach to Valuation	282
Analysis of the economy	284
Industry Level Analysis	284
Company Analysis	285
Technical Analysis	285
Dow Jones Theory	286
Graph of Bullish Phase	286
Graph of a Bearish Phase	287
Tools of Technical Analysis	287
1. Technical Charts	287
Line Chart	287
Patterns created by charts	288
Limitations of charts	288
2. Technical Indicators	288
Alternative Approaches To Valuation	289
Portfolio Management	291
Portfolio Analysis	291
Risk in investment situation	292
Changing the Coefficient of Correlation	295
Markowitz Model	296
Simple Markowitz Portfolio Optimization	297
The Risk Penalty	297
Standard Deviation	298
Limitation of Markowitz Model	298
Capital Asset Pricing Model	299
Security Market Line	302
Economic Value Added	304
Profits allocate resources	304

	<i>Page</i>
Definition of Economic Value Added	305
Sharpe Single and Multi Index Models	305
Sharpe Index Model	305
Single-Index Model	306
Multi-Index Models	306
Simple Sharpe Portfolio Optimization	306
Arbitrage Pricing Theory	307
Risk Adjusted Measure of Performance	309
The Ratio Defined	309
Return (rx)	309
Risk-Free Rate of Return (rf)	309
Standard Deviation [StdDev(x)]	309
Using the Sharpe Ratio	310
Case Studies	310
Risk Premium for Equity	310
LESSON ROUND-UP	313
SELF-TEST QUESTIONS	314

## **LESSON 10**

### **DERIVATIVES AND COMMODITY EXCHANGES – AN OVERVIEW**

Introduction	318
Concept of Derivatives	318
What are Derivatives?	319
Characteristics of Derivatives	320
Participants in the Derivatives Market	320
Types of Derivative Markets	320
Exchange Traded Derivative Markets	320
Over-The-Counter (OTC)	321
Types of Markets	321
Forward Contract	322
Differences between spot contract and forward contract	322
Advantages of forward markets	322
Problems in case of a forward contract/Limitations of forward contract	323
How to eliminate limitations of forward contracts	323

	<i>Page</i>
Moving beyond forward contracts	324
Futures Contract	324
Pricing of Futures	324
Difference between Forwards and Futures	325
Options Contract	326
What is a premium in Option market	326
Series of Options	327
Options Derivatives	327
Tools of Options Derivatives	327
Difference between Futures and Options	328
Swaps	328
The comparative advantage argument	328
An Example	329
Swaption	331
Properties of Swaption	331
Development of Derivatives Market in India	331
Equity Derivatives	332
Classification of Equity Derivatives	332
Stock Index Futures	333
Terminology commonly used terms in the Index Futures market:	333
Calculation of Index Value	333
Stock Indices in India	334
Financial Derivatives	334
Forex derivatives	334
Classification of Forex Derivatives	335
Advantages of Forex Derivatives	335
Interest Rate Derivatives	335
Classification of Interest Rate Derivatives	335
Advantages of Interest Rate Derivatives	336
Interest Rate Futures (IRFs) In India	336
Credit Derivatives	336
Types of Credit Derivatives	337
Benefits from Credit Derivatives	338



	<i>Page</i>
Some Modern Credit Derivatives	338
Trading, Clearing and Settlement of Derivatives on Stock Exchanges	339
Settlement of Futures Contracts	341
Settlement of Options Contracts	341
Margins in settle of Future Options Contracts	342
Mark-to-Market settlement of index futures	342
Initial Margin	342
Risk Management System – Role of NSCCL	342
NSE-SPAN	343
Margins	343
Parallel Risk Management System (PRISM)	344
Commodities Market	345
Need for commodity trading	346
Advantages of Commodity Trading	346
Commodity Markets in India	346
Structure of Commodity Market	346
Commodities traded in commodity Method	347
Leading Commodity Exchanges in India	347
Participants in Commodity Futures	347
Types of Commodity Derivatives	348
Advantages of commodity trading	348
Disadvantages of commodity trading	348
Commodity Derivatives vs. Financial Derivatives	348
LESSON ROUND-UP	349
SELF-TEST QUESTIONS	350

## LESSON 11

### TREASURY MANAGEMENT

Introduction- Treasury Management	352
Objectives of Treasury Management	352
Role of Treasury Management and benefits	354
Significance of Treasury Management Function	356
Functions and Scope of Treasury Management	357
Relationship between Treasury Management and Financial Management	363

	<i>Page</i>
Difference between Financial Management and Treasury Management	364
Treasury Organization: Picking the Right Model	366
Organisation Models: Dimensions	366
Role and Responsibilities of Treasury Manager	367
Role of a treasury manager	367
Tools of Treasury Management	369
Environment for Treasury Management	371
Role of Information Technology in Treasury Management	371
Liquidity Management vis-a-vis Treasury Management	372
Regulation & Supervision of Treasury Operation	373
Treasury Control Mechanism	373
Insider Dealings	374
Treasury Operations in Banking	374
Present Status of Treasury Management in India	375
LESSON ROUND-UP	378
SELF-TEST QUESTIONS	378

## LESSON 12

### FOREX MANAGEMENT

Introduction	382
Nature of Forex Management	382
Scope of Forex Management	383
Significance of Forex Management	384
Forex Manager and his Skills	384
Foreign Exchange Market and its Structure	385
Organisation of Foreign Exchange Market in India	386
Participant in Forex Market	387
Authorised Money Changers	387
Authorised Dealers in Foreign Exchange	387
Foreign Exchange Dealers' Association of India	387
Why Participate in the Foreign Exchange Market	388
Mechanics of Forex Trading	389
How Trading Works	390

	<i>Page</i>
More Trading Terminology	391
Relationship between Spot and Forward Rates	392
Inter-relationship of different variables in Foreign exchange transactions	393
Exchange Rate Quotations and Arbitrage	394
Two Point Arbitrage	394
Three Point Arbitrage	395
Covered Interest Arbitrage	396
Foreign Exchange Rates	397
Factors Affecting Foreign Exchange Rates	398
Exchange Rate Quotes:	400
Determination of Exchange Rates	401
Forex Trading; Currency Futures and Options	402
Currency Derivatives Trading	402
Participates in the Currency Futures market	403
How do Exchange Traded Currency Futures enable hedging against Currency risk?	403
How Does Currency Derivatives Trading Work?	403
Foreign Exchange Currency Options	404
Exchange traded currency options	404
Advantages of Currency Options	404
Features of currency option contracts	405
Factors influencing Currency Options Prices	405
Options Strategy for Traders	405
Foreign Exchange Risk Exposures and their Management	405
Exposure of Foreign Exchange Risk	406
Transaction Exposure	406
Translation Exposure	408
Economic Exposure	409
General Protection Measures for Foreign Exchange Risk Exposure Management	411
Exchange Rate Forecasting	413
Risk in Foreign Exchange Business	414
Pegging of Currency	414
Some Case Studies	415
LESSON ROUND-UP	420
SELF-TEST QUESTIONS	421

PRACTICAL QUESTIONS AND CASE STUDIESPRACTICAL QUESTIONS AND CASE STUDIES	423
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**TEST PAPER**

Test Paper	520
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# Lesson 1

## Nature, Significance and Scope of Financial Management

### LESSON OUTLINE

- Introduction
- Nature, Significance, Objectives and Scope (Traditional, Modern and Transitional Approach)
- Risk-Return and Value of the Firm
- Financial Distress and Insolvency
- Financial Sector Reforms and their Impact
- Functions of Finance Executive in an Organisation
- LESSON ROUND UP
- SELF TEST QUESTIONS

### LEARNING OBJECTIVES

Finance management means the management of finance of a business or organization in order to achieve financial objectives. In an organization the key objectives of financial management would be to create wealth for business, generate cash and gain maximum profits from the investments of the business considering the risks involved.

Good financial management is very important for an organisation. It brings economic growth and development through investments, financing, and dividend and risk management decision which help companies to undertake better projects. Lack of financial management in business will lead to losses and closure of business.

The object of the study is to enable the students understand –

- Nature, Significance, and Scope of Financial Management
- Financial Management Decision-Investment, Financial and Dividend
- Decision Making Process
- Objective of Financial Management
- Economic Value Added – real growth of the organization
- Liquidity and Profitability
- Financial Distress and Insolvency
- Role and Function of Financial Executive
- Financial Sector Reforms-Role and Function in an economy

***If you want to rear financial blessings, you have to sow financially.***

***Joel Osteen***

***Thoughtful financial planning can easily take a backseat to daily life.***

***Suze Orman***

## MEANING OF FINANCE

Finance may be defined as the art and science of managing money. It includes financial service and financial instruments. Finance is also referred as the provision of money at the time when it is needed. Finance function is the procurement of funds and their effective utilization in business concerns.

The concept of finance includes capital, funds, money, and amount. But each word is having unique meaning. Studying and understanding the concept of finance become an important part of the business concern.

## DEFINITION OF FINANCE

**Webster's** Ninth New Collegiate Dictionary defines finance as 'the Science on study of the management of funds' and the management of fund as the system that includes the circulation of money, the granting of credit, the making of investments, and the provision of banking facilities.

## DEFINITION OF BUSINESS FINANCE

According to the **Wheeler**, "Business finance is that business activity which concerns with the acquisition and conversation of capital funds in meeting financial needs and overall objectives of a business enterprise". According to the **Guthmann** and **Dougall**, "Business finance can broadly be defined as the activity concerned with planning, raising, controlling, administering of the funds used in the business".

In the words of **Parhter** and **Wert**, "Business finance deals primarily with raising, administering and disbursing funds by privately owned business units operating in nonfinancial fields of industry".

Corporate finance is concerned with budgeting, financial forecasting, cash management, credit administration, investment analysis and fund procurement of the business concern and the business concern needs to adopt modern technology and application suitable to the global environment.

## DEFINITION OF FINANCIAL MANAGEMENT

Financial management is an integral part of overall management. It is concerned with the duties of the financial managers in the business firm. The term financial management has been defined by **Solomon**, "It is concerned with the efficient use of an important economic resource namely, capital funds".

**Howard and Upton** : Financial management "as an application of general managerial principles to the area of financial decision-making.

**Weston and Brigham** : Financial management "is an area of financial decision-making, harmonizing individual motives and enterprise goals".

**Joseph and Massie** : Financial management "is the operational activity of a business that is responsible for obtaining and effectively utilizing the funds necessary for efficient operations.

Thus, Financial management is mainly concerned with the effective funds management in the business. In simple words, Financial management as practiced by business firms can be called as Corporate Finance or Business Finance.

## NATURE, SIGNIFICANCE AND SCOPE OF FINANCIAL MANAGEMENT

In modern times, we cannot imagine a world without the use of money. In fact, money is the life-blood of the present day world and all our economic activities are carried out through the use of money. For carrying on business we need resources which are pooled in terms of money. It is used for obtaining physical resources, carrying out productive activities and business operations affect sales and pay compensation to suppliers of

resources, physical as well as monetary. Hence financial management is considered as an organic function of a business and has rightly become an important one.

A group of experts defines Financial Management as simply the task of providing funds needed by the business or enterprise on terms that are most favourable in the light of its objectives. The approach, thus, is concerned almost exclusively with the procurement of funds and could be widened to include instruments, institutions and practices through which to raise funds. It also covers the legal and accounting relationship between a company and its sources of funds. Financial Management is certainly broader than procurement of funds and there are other functions and decisions too.

Other set of experts assume that finance is concerned with cash. Since every business transaction involves cash directly or indirectly, finance may be assumed to be concerned with everything that takes place in the conduct of a business. Obviously, it is too broad.

The third set of people whose point of view has been widely accepted considers Financial Management as procurement of funds and their effective utilisations in the business; though there are other organisations like schools, associations, government agencies etc., where funds are procured and used. Financial Management has not only to see that funds can be raised for installing plant and machinery at a cost; but it has also to see that additional profits adequately compensate for the costs and risks borne by the business while setting up the project.

Thus from the point of view of a corporate unit, financial management is related not only to 'fund-raising' but encompasses wider perspective of managing the finances for the company efficiently. In the developed state of a capital market, raising funds is not a problem; the real problem is to put the capital resources to efficient use through effective financial planning, financial organisation and financial control and to deal with tasks like ensuring the availability of funds, allocating them for different uses, managing them, investing funds, controlling costs, forecasting financial requirements, doing profit planning and estimating rate of return on investment and assessment of working capital etc.

Financial Management, to be more precise, is, thus concerned with investment, financing and dividend decisions in relation to objectives of the company. Such decisions have to take care of the interests of the shareholders. They are upheld by maximisation of shareholders' wealth which depends upon increase in the net worth capital invested in the business plus ploughed back profits for growth and prosperity of the company. It is for such reasons that the market is prepared to pay a lower or higher price for the shares of some company or the other. Nature of Financial Management therefore can be judged by the study of the nature of investment decisions, nature of financing decisions and the nature of dividend decisions.

## **INVESTMENT DECISIONS**

Investment ordinarily means utilisation of money for profits or returns. This could be done by creating physical assets with the money and carrying on business or purchasing shares or debentures of a company or sometimes, though erroneously, purchasing a consumer durable like building. In an economy, money flows from one type of business to another depending upon profits expected or in a capital market securities of a concern are purchased or sold in the expectation of higher or lower profits or gains. However within a firm, a finance manager decides that in which activity resources of the firm are to be channelised, and more important who should be entrusted with the financing decisions. A marketing manager may like to have a new show room, a production manager a new lathe and a personnel manager higher wages for labour, which may lead to regular and efficient production. Over and above, the top management may like to enter an entirely new area of production like a textile company entering electronics. All these are the ventures which are likely to increase profits. But resources are limited. Hence, the problem of accepting one proposal and leaving other.

Capital budgeting is a major aspect of investment decision making process. Investment decisions and capital budgeting are considered as synonymous in the business world. Investment decisions are concerned with the

#### 4 PP-FT&FM

question whether adding to capital assets today will increase the revenue of tomorrow to cover costs. Thus investment decisions are commitments of monetary resources at different times in expectation of economic returns in future. Choice is required to be made amongst available resources and avenues for investment. As such investment decisions are concerned with the choice of acquiring real assets, over the time period, in a productive process. In making such a choice consideration of certain aspects is essential viz., need for investment, factors affecting decisions, criteria for evaluating investment decisions and selection of a particular alternative from amongst the various options available.

Investment decisions have, thus, become the most important area in the decision making process of a company. Such decisions are essentially made after evaluating the different proposals with reference to growth and profitability projections of the company. The choice helps achieve the long term objectives of the company i.e., survival and growth, preserving market share of its products and retaining leadership in its production activity. The company likes to avail of the economic opportunity for which investment decisions are taken viz., (1) expansion of the productive process to meet the existing excessive demand in local market, exploit the global market, and to avail of the advantages and economies of the expanded scale of production. (2) replacement of an existing asset, plant and machinery or building, necessary for taking advantages of technological innovations, minimising cost of production by replacing obsolete and worn out plants, increasing efficiency of labour, etc. (3) The choice of equipment establishes the need for investment decisions based on the question of quality and latest technology. (4) Re-allocation of capital is another area of investment, to ensure asset allocation in tune with the production policy. (5) Mergers, acquisitions, re-organisations and rehabilitation are all concerned with economic and financial involvement and are governed by investment decisions.

Thus, investment decisions encompass wide and complex matters involving the following areas:

- capital budgeting
- cost of capital
- measuring risk
- management of liquidity and current assets
- expansion and contraction involving business failure and re-organisations
- buy or hire or lease an asset.

Factors affecting investment decisions are essentially the ingredients of investment decisions. Capital is a scarce resource and its supply cost is very high. Optimal investment decisions need to be made taking into consideration such factors as are given below viz. (1) Estimation of capital outlays and the future earnings of the proposed project focusing on the task of value engineering and market forecasting; (2) availability of capital and considerations of cost of capital focusing attention on financial analysis; and (3) a set of standards by which to select a project for implementation and maximising returns therefrom focusing attention on logic and arithmetic.

### FINANCING DECISIONS

Financing decision is the next step in financial management for executing the investment decision once taken. A look at the balance-sheet of a sample company indicates that it obtains finances from shareholders ? ordinary or preference, debentureholders on long-term basis, financial institutions as long-term loans, banks and others as short-term loans and the like. There are variations in the provisions governing the issue of preference shares, debentures, loan papers, etc. Financing decisions are concerned with the determination of how much funds to procure from amongst the various avenues available i.e. the financing mix or capital structure. Efforts are made to obtain an optimal financing mix for a particular company. This necessitates study of the capital structure as also the short and intermediate term financing plans of the company.

In more advanced companies, financing decision today, has become fully integrated with top-management



policy formulation via capital budgeting, long-range planning, evaluation of alternate uses of funds, and establishment of measurable standards of performance in financial terms.

Financial decision making is concerned more and more with the questions as to how cost of funds be measured, proposals for capital using projects be evaluated, or how far the financing policy influences cost of capital or should corporate funds be committed to or withheld from certain purposes and how the expected returns on projects be measured.

Optimal use of funds has become a new concern of financing decisions and top managements in corporate sector are more concerned with planning the sources and uses of funds and measuring performance. New measurement techniques, utilising computers, have facilitated efficient capital allocation through financing decisions.

Application of computers, in the area of financial management has made it possible to handle a large number of operations particularly of repetitive nature. Ranging from routine record-keeping activities like accounting, computers are now being used in inventory management, budgeting, capital investment decisions, evaluating uncertainties in decision making, cost estimation, information analysis, security analysis, etc. Processing of accounting data including general ledger information and trial balance and preparing income statement and balance sheet has been rendered easy through the use of computers in financial planning and control. Analysis of funds flow, cash flow and income statement and balance sheet is done through the use of computers. A great variety of computer analysis are available for forecasting financial needs and making the best choice from amongst the various sources of finance. Thus, the nature of financial decisions and the process therefor has undergone a considerable change with the introduction of computer technology in financial management.

The computer has made making efficient investment decisions and financing decisions easy. These decisions are jointly made as an effective way of financial management in corporate units. No doubt, the purview of these decisions is separate, but they affect each other. Financial decisions, as discussed earlier, encompass determination of the proportion of equity capital to debt to achieve an optimal capital structure, and to balance the fixed and working capital requirements in the financial structure of the company. This important area of financing decision making, aims at maximising returns on investment and minimising the risk. The risk and return analysis is a common tool for investment and financing decisions for designing an optimal capital structure of a corporate unit. It may be mentioned that debt adds to the riskiness of the capital structure of a firm.

## **DIVIDEND DECISIONS**

The dividend decision is another major area of financial management. The financial manager must decide whether the firm should distribute all profits or retain them or distribute a portion and retain the balance. Theoretically, this decision should depend on whether the company or its shareholders are in the position to better utilise the funds, and to earn a higher rate of return on funds. However, in practice, a number of other factors like the market price of shares, the trend of earning, the tax position of the shareholders, cash flow position, requirement of funds for future growth, and restrictions under the Companies Act etc. play an important role in the determination of dividend policy of business enterprise.

## **DECISION CRITERIA**

Decision criteria depends upon the objective to be achieved through the instrumentality of decision making process. The main objectives which a business organisation pursues are maximisation of return and minimisation of costs.

A fair decision criterion should distinguish between acceptable and unacceptable proposals and solve the problem of selection of the best alternatives from amongst the various alternatives available in a given situation to achieve

## 6 PP-FT&FM

the above objectives. A fair decision criterion should follow the following two fundamental principles i.e. (1) the “Bigger and Better” principle; (2) “A Bird in Hand is Better than Two in the Bush” principle. The first principle suggests that bigger benefits are preferable to smaller ones; whereas the second one suggests that early benefits are preferable to later benefits.

Both the above principles are based on the assumption “other things being equal” which is a rare reality. But in practice the decision process very much adheres to these principles particularly in the areas of capital budgeting decisions and determining the cost of capital in project financing proposals.

Decision criteria in financial management can be studied under two separate heads viz. The criteria for investment decisions; and the criteria for the financing decisions.

Criteria for investment decisions are mainly concerned with planning and control of capital expenditure through budgeting process following the tools of analysis viz. ? pay back period, accounting rate of return, discounted cash flow methods e.g., net present value method, etc. We shall discuss these methods for evaluating investment decisions in detail in the study relating to capital budgeting. However, the essence and the inherent spirit in these techniques is based on logic which helps in the decision making process.

As a matter of fact, these techniques have been founded on the following decision criteria:

**1. Urgency:** The use of ‘urgency’ is treated as criterion for selection of investment projects in many corporate units/business enterprises/government set up. Urgency is assessed on the following basis:

- (a) it provides sufficient justification for undertaking a project;
- (b) it provides immediate contribution for attainment of objectives of the project; and
- (c) it maximises profits.

Although urgency as criterion lacks objectivity, being non-quantifiable, yet it definitely provides a ordinal ranking scale for selection of projects on preferential pre-exemption basis.

**2. Pay back:** Time is of essence while selecting this criterion for investment decisions. The decision is taken on the basis of quickness in pay off of the investments. Pay back simply measures the time required for cash flows from the project to return the initial investment to the firm’s account. Projects, on the basis of this criterion, having quicker pay backs are preferred.

Pay back decision criterion does not follow the principles laid down above viz. “the bigger and better” and “bird in hand”. It ignores the first principle completely as it does not take into account the cash flows after investment has been recovered. It also does not satisfy entirely the second principle as it assigns zero value to the receipts, subsequent to recovery of the amount.

**3. Rates of return:** It provides another decision criterion based on accounting records or projected statements to measure profitability as annual percentage of capital employed. Rate of return is arrived at following two different methods for treating income in the analysis which give different results. In the first case, average income generated from investment is taken after deduction of depreciation charge. In second case, the original cost is taken as denominator rather than average investment. This gives the simple yearly rate of return. This is based on “bigger and better” principle. This criterion can be applied either against average investment in the year selected for study or simply against initial cost.

**4. Undiscounted benefit-cost ratio:** It is the ratio between the aggregate benefits and the cost of project. Benefits are taken at face value. The ratio may be “gross” or “net”. It is “gross” when calculated with benefits without deducting depreciation. In the net version, depreciation is deducted from benefits before computing the results. Both ratios give identical ranking. Net ratio equals the gross ratio minus 1.0. This relationship makes it simple to calculate gross ratio and then to arrive at net ratio.

This criterion is compatible with the “bigger and better” principle. But it does not follow the second principle of

“bird in hand” as early receipts are given identical weights to later receipts in the project’s life.

**5. Discounted benefit-cost ratio:** This ratio is more reliable as it is based on present value of future benefits and costs. It may also be gross or net like the one discussed earlier. It takes into account all incomes whenever received and to this extent complies with “bigger and better” principle. Early receipts are given more weight than late receipts on account of introduction of discount factor.

This ratio satisfies the requirements of both the principles and is a good criterion for decision making.

**6. Present value method:** This concept is useful as a decision criterion because it reveals the fact that the value of money is constantly declining as a rupee received today is more in value than the rupee at the end of a year. Besides, if the rupee is invested today it will fetch a return on investment and accumulate to Re. 1 (1+i) at the end of ‘n’ period. Hence a rupee received at the end of ‘n’ period is worth  $1/(1+i)^n$  now. Investment decisions require comparison of present value with the cost of assets, and if the present value exceeds the cost, the investment is rendered acceptable.

Another off-shoot of this criterion is net present value method which is closely related to cost-benefit ratio. It takes into account all income and its timing with appropriate weights. Here difference of present value of benefits and costs is considered as against the ratio in cost-benefit analysis. This criterion is useful for acceptance of projects showing positive net present value at the company’s cost of capital rate. It can be used for choosing between mutually exclusive projects by considering whether incremental investment yields a positive net present value.

**7. Internal rate of return:** It is a widely used criterion for investment decisions. It takes interest factor into account. It is known as marginal efficiency of capital or rate of return over cost. It stipulates rate of discount which will equate the present value of the net benefits with the cost of the project. This method satisfies both these principles.

The criteria used in financing decisions, with particular reference to capital structure of a corporate unit can be discussed here precisely.

The capital structure of a corporate unit contains two important parameters viz., the owners’ capital known as equity and the debt which represents interest of debentureholders in the assets of the company. The factors responsible for inclusion of debt in the capital structure of a company are tax-savings, easier to sell, lower cost of floatation and services, lower cost of capital, the advantage of leverage, no dilution of equity and probable loss of control, logical to consolidate and fund short-term indebtedness by a bond issue, advantageous in the inflationary trends of rising interest rates and improvement in financial ratios.

There is no alternative for a company to equity financing to meet its requirement for funds. Debt can be raised by a company only on an adequate equity base which serves as a cushion for debt financing. The study of effect of leverage is the main focus point to determine the best mix of debt and equity sources of funds. It is, therefore, desired to consider this criterion for financing decision making in relation to leverage and cost of capital.

## OBJECTIVES OF FINANCIAL MANAGEMENT

Financial management of any business firm has to set goals for itself and to interpret them in relation to the objective of the firm. Broadly, there are only two alternative objectives a business firm can pursue viz.

- (a) Profit maximisation;
- (b) Wealth maximisation.

### (a) Profit Maximisation

Profit maximisation is considered as an important goal in financial decision-making in an organisation. It ensures

## 8 PP-FT&FM

that firm utilizes its available resources most efficiently under conditions of competitive markets. But in recent years, under the changed corporate environment, profit maximisation is regarded as unrealistic, difficult, inappropriate and socially not much preferred goal for business organisation. Profit maximisation as corporate goal is criticised by scholars mainly on the following grounds:

- (i) It is vague conceptually.
- (ii) It ignores timing of returns.
- (iii) It ignores the risk factor.
- (iv) It may tempt to make such decisions which may in the long run prove disastrous.
- (v) Its emphasis is generally on short run projects.
- (vi) It may cause decreasing share prices.
- (vii) The profit is only one of the many objectives and variables that a firm considers.

### **(b) Wealth Maximisation**

Presently, maximisation of present value (or wealth) of a course of action is considered appropriate operationally flexible goal for financial decision-making in an organisation. The net present value or wealth can be defined more explicitly in the following way:

$$W = \frac{A_1}{(1+K_1)} + \frac{A_2}{(1+K_2)} + \frac{A_3}{(1+K_3)} + \frac{A_4}{(1+K_4)} + \dots + \frac{A_n}{(1+K_n)} - C_0 = \frac{\sum A_t}{\sum (1+K)^t} - C_0$$

Where  $A_1, \dots, A_n$  represent the stream of benefits expected to occur if a course of action is adopted.  $C_0$  is the cost of that action and  $K$  is the appropriate discount rate, and  $W$  is the Net present worth or wealth which is the difference between the present worth or wealth of the stream of benefits and the initial cost.

The management of an organisation maximises the present value not only for shareholders but for all including employees, customers, suppliers and community at large. This goal for the maximum present value is generally justified on the following grounds:

- (i) It is consistent with the object of maximising owners economic welfare.
- (ii) It focuses on the long run picture.
- (iii) It considers risk.
- (iv) It recognises the value of regular dividend payments.
- (v) It takes into account time value of money.
- (vi) It maintains market price of its shares.
- (vii) It seeks growth in sales and earnings.

However, profit maximisation can be part of a wealth maximisation strategy. Quite often two objectives can be pursued simultaneously but the maximisation of profit should never be permitted to overshadow the objectives of wealth maximisation.

The objective of the firm provides a framework for optimal decision making in the area of business management. The term 'objective' should be used in the sense of 'decision criteria' for taking decisions involved in financial management. It means that what is relevant is not overall objective of the business but operationally useful criterion against which the investment, financing and dividend policy decisions are to be judged. Another point to note in this context is that objective provide a 'normative' framework. In other words, it implies that the focus is

on what a firm should try to achieve and on policies that it should follow if the objectives are to be achieved.

Profit maximization is basically a single-period or, at the most, a short-term goal. It is usually interpreted to mean the maximization of profits within a given period of time. A firm may maximize its short-term profits at the expense of its long-term profitability and still realize this goal. In contrast, shareholder wealth maximization is a long-term goal shareholders are interested in future as well as present profits. Wealth maximization is generally preferred because it considers (1) wealth for the long-term, (2) risk or uncertainty, (3) the timing of returns, and (4) the shareholders' return. The following table provides a summary of the advantages and disadvantages of these two often conflicting goals.

**Profit Maximization Vs. Shareholder Wealth Maximization**

<b>Goal</b>	<b>Objective</b>	<b>Advantages</b>	<b>Disadvantages</b>
Profit maximisation	Large amount of profits	<ol style="list-style-type: none"> <li>1. Easy to calculate profits</li> <li>2. Easy to determine the link between financial decisions and profits</li> </ol>	<ol style="list-style-type: none"> <li>1. Emphasizes the short term</li> <li>2. Ignores risk or uncertainty</li> <li>3. Ignores the timing of returns</li> <li>4. Requires immediate resources</li> </ol>
Shareholder wealth maximisation	Highest market value of common stock	<ol style="list-style-type: none"> <li>1. Emphasizes the long term</li> <li>2. Recognizes risk or uncertainty</li> <li>3. Recognizes the timing of returns</li> <li>4. Considers return</li> </ol>	<ol style="list-style-type: none"> <li>1. Offers no clear relationship between financial decisions and stock price</li> <li>2. Can lead to management anxiety and frustration</li> </ol>

### **Economic Value-Added (EVA)**

Economic value added (EVA) is the after tax cash flow generated by a business minus the cost of the capital it has deployed to generate that cash flow. Representing real profit versus paper profit, EVA underlines shareholder value, increasingly the main target of leading companies strategies. Shareholders are the players who provide the firm with its capital; they invest to gain a return on that capital.

The concept of EVA is well established in financial theory, but only recently has the term moved into the mainstream of corporate finance, as more and more firms adopt it as the base for business planning and performance monitoring. There is growing evidence that EVA, not earnings, determines the value of a firm. There is difference between EVA, earnings per share, return on assets, and discounted cash flow, as a measure of performance.

Earnings per share tells nothing about the cost of generating those profits. If the cost of capital (loans, bonds, equity) as say, 15 per cent, then a 14 per cent earning is actually a reduction, not a gain, in economic value. Profits also increase taxes, thereby reducing cash flow.

Return on assets is a more realistic measure of economic performance, but it ignores the cost of capital. Leading firms can obtain capital at low costs, via favourable interest rates and high stock prices, which they can then

invest in their operations at decent rates of return on assets. That tempts them to expand without paying attention to the real return, economic value-added.

Discounted cash flow is very close to economic value-added, with the discount rate being the cost of capital.

There are two key components to EVA. The net operating profit after tax (NOPAT) and the capital charge, which is the amount of capital times the cost of capital. In other words, it is the total pool of profits available to provide cash return to those who provided capital to the firm. The capital charge is the product of the cost of capital times the capital tied up in the investment. In other words, the capital charge is the cash flow required to compensate investors for the riskiness of the business given the amount of capital invested. On the one hand, the cost of capital is the minimum rate of return on capital required to compensate debt and equity investors for bearing risk—a cut-off rate to create value and capital is the amount of cash invested in the business, net of depreciation (Dierks and Patel, 1997). In formula form,

$$\text{EVA} = (\text{Operating Profit}) - (\text{A Capital Charge})$$

$$\text{EVA} = \text{NOPAT} - (\text{Cost of Capital} \times \text{Capital})$$

However, in practical situations there are adjustments to both NOPAT and the capital employed to reduce non-economic accounting and financing conventions on the income statement and balance sheet.

These are adjustments that turn a firm's accounting book value into an economic book value, which is more accurate measure of the cash that investors have put at risk in the firm and upon which they expect to accrue some returns. These adjustments turn capital-related items into more accurate measures of capital and include revenue- and expense-related items in NOPAT, thus better reflecting the financial base upon which investors expect to accrue their returns. Furthermore these adjustments are made to address the distortions suffered by traditional measures, such as return on equity, earnings per share and earnings growth, that change depending upon the generally accepted accounting principles adopted or the mix of financing employed.

Implementing EVA in a company is more than just patting one additional row in the income statement. It is of course some kind of change process which should be given some management effort. However, if right actions are taken straight from the beginning then implementing EVA should be one of the easiest change process that a company goes through. The actions might include e.g.:

- Gaining the understanding and commitment of all the members of the management group through training and discussing and using this support prominently during the process.
- Training of the other employees, especially all the key persons.
- Adopting EVA in all levels of organization.

However, there are a few common mistakes that are often taken in implementing or using EVA. Most of them are bound up with either misunderstanding and thus misusing the concept at upper levels or not training all the employees to use EVA and thus not using the full capacity of the concept. These common mistakes include defining capital costs intentionally wrongly (usually too high for some reason), using EVA only in the upper management level and investing too little in training of employees.

Although EVA is a value based measure, and it gives in valuations exactly same answer as discounted cash flow, the periodic EVA values still have some accounting distortions.

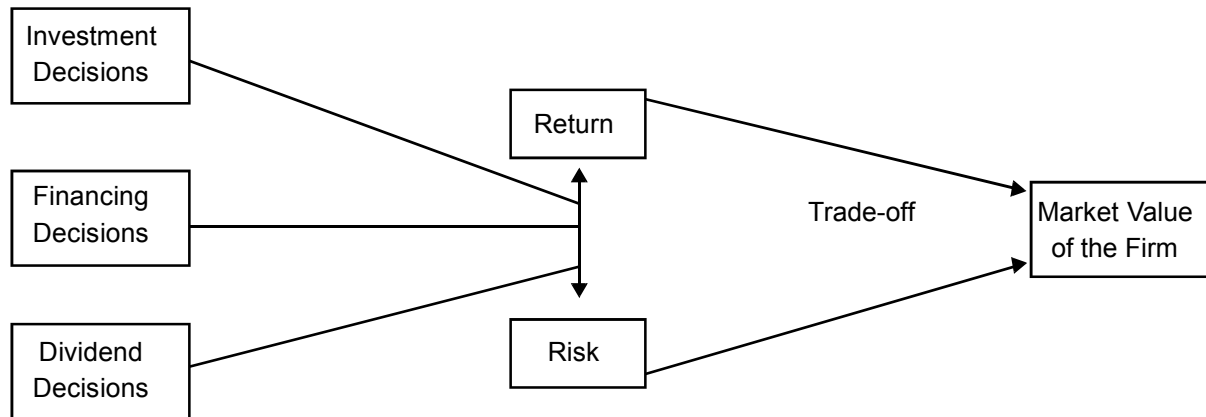
That is because EVA is after all an accounting-based concept and suffers from the same problems of accounting rate of returns (ROI etc.). In other words, the historical asset values that distort ROI distort EVA values also.

In EVA valuations, the historical asset values (book value) are irrelevant and only the cash flows are left to give the end result.

## VALUE OF FIRM-RISK AND RETURN

The financial manager tries to achieve the proper balance between the considerations of 'risk and return' associated with various financial management decisions to maximise the market value of the firm.

It is well known that 'higher the return, other things being equal, higher the market value; higher the risk, other things being equal, lower the market value'. In fact, risk and return go together. This implies that a decision alternative with high risk tends to promise higher return and the reverse is also true. The figure demonstrates the relationship between market value of the firm, return and risk, on the one hand and financial management decisions on the other.



## LIQUIDITY

It is an important concept in financial management and is defined as ability of the business to meet short-term obligations. It shows the quickness with which a business/company can convert its assets into cash to pay what it owes in the near future. According to Ezra Solomon, it measures a company's ability to meet expected as well as unexpected requirements of cash to expand its assets, reduce its liabilities and cover up any operating losses. Liquidity, as a decision criterion, is widely used in financial management. It is used for managing liquid resources or current assets or near cash assets so as to enhance the effectiveness with which they are utilised with a view to minimising costs. It also focuses attention on the availability of funds. Enhancement of liquidity enables a corporate body to have more funds from the market.

While using liquidity as a decision criterion, the management makes use of ratios. They give a bird's eye view of the current liquidity position or shortages thereof. A company will like to have liquid resources for transaction purposes, as a precautionary measure and for speculative opportunities. The management's attitude towards these i.e., transaction motive, precautionary motive and speculative motive (taking advantage of lower prices of raw materials etc., in the market) is an important determinant of a company's liquidity position.

Liquidity is assessed through the use of ratio analysis. Liquidity ratios provide an insight into the present cash solvency of a firm and its ability to remain solvent in the event of calamities.

Current Ratio which is the ratio of current assets to current liabilities, is widely used by corporate units to judge the ability to discharge short-term liabilities covering the period upto one year. The interpretation of the current ratio is that 'higher the ratio, greater is the ability of the firm to pay off its bills'.

Nevertheless, it is a crude ratio and does not take into account the difference amongst different categories of assets. For example, inventory may not be turned into cash as quickly as Account Receivables. The main difficulty that arises in treating inventory as a quick item is that unless one has ensured about the quality, condition and marketability of the inventory it may be impossible to turn it into cash immediately at the estimated

## 12 PP-FT&FM

value. Therefore, to assess quick liquidity position, inventory is excluded while calculating Quick Ratio. The ingredients of current assets while computing the Quick Ratio are cash, marketable securities and receivables. Besides cash, the other two items are near cash and at very short notice can easily be converted into cash. Therefore, for taking financial decisions particularly for assessing cash position of the company and its ability to discharge current obligations, Quick Ratio is frequently relied upon. Nevertheless, the main shortcoming of the Quick Ratio is that it ignores inventories and concentrates on cash, marketable securities and receivables in relation to current obligations although inventory is also a basic input in current ratio without which company's decision process cannot be complete.

Liquidity ratio enables a company to assess its Net Working Capital. Working Capital is denoted by the combination of current assets or current liabilities of a company, and for calculation of net working capital we deduct current liabilities from current assets. Having done so we are left with the ready money in our hands to meet day to day needs of the business. If we still want to know as to how much is available with the company per rupee of sales then Net Working Capital is divided by sales.

Tailor-made measurement can be devised for calculating liquidity ratio in different situations. For example, the principle of liquidity can be extended to study liquidity of receivables (or inventories) separately to enable the executives to take decisions about the collection period of bills.

Liquidity of receivables is assessed through Average Collection Period (ACP). ACP tells us the average number of days receivables are outstanding i.e., the average time a bill takes to convert into cash. The inverse to this ratio is Receivables Turnover Ratio (RTR). Either of the two ratios can be used as both depict the slowness of recovery, but the readings are different. For financial decisions and to use liquidity as criterion the average collection period ratio is used, and receivables turnover ratio is used to help in taking corrective steps for maintaining the optimum liquid position for the company at any given time to avoid risk of losing goodwill and chances of bankruptcy. The ratio, in short, reveals the following results:

- (1) Too low an average collection period may suggest excessively restricted credit policy of a company.
- (2) Too high an average collection period (ACP) may indicate too liberal a credit policy. A large number of receivables may remain due and outstanding, resulting in less profits and more chances of bad debts.

Average collection period and receivables turnover ratio should be compared to the average age of accounts payable or accounts payable turnover ratio. Though adequate liquidity could be maintained by accelerating collections and deferring payments, yet this has its own limitations and drawbacks. It affects the credit standing of the company in business and banking circles.

In the same spirit, decisions are made to maintain a proper inventory level in the company. For the purpose, it becomes essential to assess the liquidity of inventory. Inventory Turnover Ratio i.e., cost of goods sold divided by average annual inventory, shows the rapidity with which inventory is turned into receivables through sales. The higher the ratio, the more efficient is the inventory management system of the company.

To conclude, liquidity, as a decision criterion is an important tool in financial management. Financial decisions are affected by liquidity analysis of a company in the following areas:

1. Management of cash and marketable securities;
2. Credit policy of a firm and procedures for realisation;
3. Management and control of inventories;
4. Administration of fixed assets;
5. Taking decisions for efficient use of current assets at minimum cost; and
6. Decisions to keep the company's position on sound basis to avoid eventualities.



The above analysis of liquidity suggests evaluation of current assets of a company. On liabilities side also, liquidity position is analysed and managed through assessment of long and medium term debts of the company, and the arrangements for their repayments. This is done purely from the precautionary point of view so that the company could be saved from the risk of bankruptcy for non-payment of its debt to the lenders.

## PROFITABILITY

Profitability as a decision criterion is another important tool in financial management for taking decisions from different angles after evaluating the performance of the company in different spheres. For example, if it becomes essential for the company to examine profit per unit of sale then it is done by estimating profitability per rupee of sales. It is used as a measure of comparison and standard of performance. Similarly, there could be other ratios.

Because different users look at the profitability of a company from different angles, they use different ratios. Short-term creditors, long-term lenders, equity shareholders, investors, etc. all are interested in profitable operations of a concern. They use the ratios which best suit their requirements. Profitability can be related to sales or to total capital employed or to net worth of the company. But then different figures for profits are taken into account.

Profitability to sales ratio, reflects the company's ability to generate profits per unit of sales. If sales lack sufficient margin of profit, it is difficult for the business enterprise to cover its fixed cost, including fixed charges on debt, and to earn profit for shareholders. From investors point of view profits are compared by the investors as percentage to the capital employed in the business enterprise. Absence of adequate profitability ratio on sales reflects the company's inability to utilise assets effectively. This is analysed through the asset turnover ratio.

One of the important profitability ratios is profits on equity – profit figure after interest, before dividend and taxes, drawn from the profit and loss account is related to the equity of the shareholders as shown in balance sheet. This is an indicator of profits earned on funds invested by the owners. It is an indicator of actual returns received by them. This ratio may assume two forms:

- (1) 
$$\frac{\text{Earning available to common shareholders}}{\text{Total Equity}}$$
- (2) 
$$\frac{\text{Net income after tax}}{\text{Total Equity}}$$

[The ratio at (2) is used where the company has no preference shareholders].

Profit margin is another measure of viewing profitability. The revenue bearing property of sales can be easily assessed from the profit margin. It is derived by dividing operating income from business by sales. This ratio indicates the efficiency of operations as well as how products are priced. Inadequacy of profit margin is an evidence of company's inability to achieve satisfactory results. Pricing decisions are made by financial executives in consultation with the marketing departments of the company. Policy decisions relating to increase or decrease in price are taken in respect of different products keeping in view the competitiveness of the market. Profit margin ratio is constantly used by business executives for this purpose. To look into the cash generating capacity of sales, gross profit margin is used by deducting the cost of goods sold from sales and dividing by sales.

The gross profit margin ratio indicates the profits relative to sales after deduction of direct production cost. It indicates efficiency of production operations and the relationship between production costs and selling price.

The difference between the above two ratios i.e. gross profit margin and net profit margin ratios is that general and administrative expenses are excluded while computing gross margin. Thus net profit margin ratio is calculated as under:

$$\text{Net Profit Margin (NPM)} = \frac{\text{Net Profit after Taxes}}{\text{Sales}}$$

NPM ratio is an indicator of company's ability to generate profits after paying all taxes and expenses. Decline in this ratio reflects the presence of either higher expenses relative to sales or higher tax burden on the company, affecting its profitability adversely. For assessment of profitability as a decision criterion return on investment (ROI) is a frequently used ratio.

**Return on Investment:** This is an important profitability ratio from the angle of shareholders and reflects on the ability of management to earn a return on resources put in by the shareholders. The beauty of the ROI ratio is that earning of the company can be viewed from different angles so as to take decisions on different causes responsible, to reduce or to enhance the profitability of the company. One way of finding out rate of return on assets employed in the company is to find the ratio of earnings before interest and taxes (EBIT) to capital employed. This ratio indicates operating income to the assets used to produce income.

Another way of computing the ratio of return is through the assets turnover ratio and margin of profit which gives the same results, as EBIT to capital employed. It may be seen from the following:

$$\frac{\text{EBIT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}} = \frac{\text{EBIT}}{\text{Assets}}$$

A high ratio indicates efficient use of assets and low ratio reflects inefficient use of assets by a company.

Another off-shoot of profitability ratio is the times interest earned ratio, which gives a clue to the interest bearing capacity of the income character of business operations. This ratio relates operating profits to fixed charges created by the company's borrowings, and provides an indication of margin of safety between financial obligations and Net income after tax. A company may earn profits but may find it difficult to make payments of excess interest charges or may face inability to meet such obligations. EBIT should be 5 to 6 times interest charges as a satisfactory guideline for this ratio. Lenders, particularly banks and financial institutions, greatly rely on this ratio particularly in profitability assessment through projections of income of the borrower in the coming years after investment of borrowed funds.

In this way we find that profitability as decision making criterion in financial management, is crucial for business managers. Business works as a system comprised of sub-systems. Different criteria assess different aspects and assist in viewing different situations which have an aggregate impact on business activity, and therefore form the basis of financial management.

## COSTING AND RISK

In financial management, costing relates to the system adopted for assessing cost of capital from various sources viz., equity and preference shares, debentures/bonds, long-term borrowings from financial institutions, etc. Equity capital is owner's money employed in the business whereas borrowed funds are creditors' funds carrying an interest obligation and repayment schedule. There are thus, risks involved if interest is not paid or on account of default in repayment of principal. It is ordinarily expected that every rupee obtained on loan enhances the chances of increasing the returns on owners' capital and the net worth. The rate of interest on borrowed funds is usually lower than the returns expected by the investors or risk-takers in the business. Moreover, interest paid is deductible for tax purposes. The following illustration gives an idea of the phenomenon stated above:

	<i>Company A</i>	<i>Company B</i>
Total Capital	₹ 100	₹ 100
Owners' capital	₹ 100	₹ 50
Borrowed capital	NIL	₹ 50

Rate of earnings	20%	20%
Rate of interest	—	15%
Earnings before interest and taxes	₹ 20	₹ 20
Interest paid	—	₹ 7.50
Earnings before taxes	₹ 20	₹ 12.50
Taxes at 50%	₹ 10	₹ 6.25
Earnings after taxes	₹ 10	₹ 6.25
Percentage of earnings on owners' funds	10%	12.5%

But if the company is not able to earn sufficient returns, the returns on owners' funds are reduced and risk increases. Using borrowed funds or fixed cost funds in the capital structure of a company is called financial gearing. High financial gearing will increase the earnings per share of a company if earnings before interest and taxes are rising, as compared to the earnings per share of a company with low or no financial gearing. It may be understood that leverage and gearing are used interchangeably. (The former is used in the USA and the latter in U.K.). So at times when the economy is doing well, the shareholders of a highly geared company will do better than the shareholders of a low geared company. However, if the company is not doing well, when its profits before interest and taxes are falling, the earnings per share of highly geared company will fall faster than those of the low geared company. The higher this level of financial gearing, the greater the risk. Those who take risk should appreciate that in difficult times their reward will be below average but in good times they will receive above average rewards. The lower the levels of financial gearing, the more conservative are the financial policies of the company and the less will be deviations over time to earnings per share.

Risk is associated with fixed charges in the shape of interest on debt capital. Higher the fixed charges, the greater the chance that it will not be covered by earnings and so greater the risk. Large companies financed by heavy borrowings, need to continue to produce and search for new markets for their output. Any internal disturbance or external constraint that may hamper the company's production and sales will reduce inflow of funds but fixed interest charges have to be paid. A study of the effects of capital gearing on cost of capital is quite important for financial decisions. Given that a company has to minimise the cost of capital, it should fix up a level of gearing where its cost of capital is minimum.

As against the traditional theory of capital structure suggesting that the average cost of capital depends on the level of gearing, the alternative theory on cost of capital as propounded by Modigliani and Miller argues that the cost of capital is independent of the capital structure. The essence of the Modigliani and Miller argument is the arbitrage process. Should the value of two firms with identical incomes and the same risk class ratios vary (which would be possible under the traditional theory) the investors would arbitrage so as to make the market value of the two firms equal. A key assumption of the model is that the investors can arbitrage between companies, and between loan and equity capital, without increasing the risk of their individual investment portfolios.

Despite all the above theoretical explanations the fact remains that debt is associated with risk which enhances with increase in the leverage. There are two major reasons for this increased risk viz., (1) interest is a fixed charge and is required to be paid by the company whether or not it earns profits; and (2) a substantial decrease in liquidity or increased demands from creditors for payment if the company has higher proportion of debt capital in its capital structure. For these reasons, the risk of a company not being able to meet its obligations is greater than in the case of a company in which the proportion of borrowed sum is substantially smaller.

Distinction may be made between different types of risk to which an enterprise is exposed in the business environment.

The risk which we have discussed is financial risk that arises in relation to owners' return created by the utilization

of funds in the enterprise particularly fixed cost securities i.e. debt and preference shares. Financial risk is distinguished from “business risks” which is associated with the chance of loss due to variability of return, in general, created by the enterprise and as such it is known as operating risk. It is concerned with EBIT (earning before interest and taxes) whereas financial risk is concerned with EAIT (earning after interest and taxes). If there is preference capital then the financial risk is concerned with earnings available to ordinary (equity) shareholders after dividends have been paid to preference shareholders. Financial risk encompasses the risk of possible insolvency and the variability in the earnings on equity. In case the enterprise does not employ debt or preference capital there will be no financial risk and over all risk for the firm will be low. It is only because of application of debt financing, that overall risk increases and originates into financial risk to equity holders.

Besides, there are other types of risk which are related to investment decisions and not cost of financial sources viz., purchasing power risk, market risk, interest rate risk, social or regulatory risk and other risks. Purchasing power risk affects all investors. The risk is associated with changes in the price level on account of inflation. Under inflationary conditions, the purchasing power of money decreases over time, and the investor is faced with the possibility of loss on account of investments made to the extent of inflation. Under inflationary conditions, therefore, the real rate of return would vary from the nominal rate of return (viz., the percent return on the face value of investment made). Interest rate risk is concerned with holders of the bonds due to changes in interest rates. These bonds are high quality bonds not subject to business or financial risk but their prices are determined by there prevailing level of interest rates in the market. As a result, if interest rate falls, the price of these bonds will rise and vice versa. The risk is more in case of long-term bonds because the rate of interest may fluctuate, over a wider range as compared to a short-term bond. As regards social and regulatory risks, they arise due to harsh regulatory measures like licensing, nationalisation, price controls limiting profits, etc. Other types of risks may depend upon the nature of investment. Detailed discussion is not required at this stage.

## FINANCIAL DISTRESS AND INSOLVENCY

Generally the affairs of a firm should be managed in such a way that the total risk – business as well as financial – borne by equity holders is minimised and is manageable, otherwise, the firm would obviously face difficulties. In managing business risk, the firm has to cope with the variability of the demand for its products, their prices, input prices, etc. It has also to keep a tab on fixed costs. As regards financial risk, high proportion of debt in the capital structure entails a high level of interest payments. If cash inflow is inadequate, the firm will face difficulties in payment of interest and repayment of principal. If the situation continues long enough, a time will come when the firm would face pressure from creditors. Failure of sales can also cause difficulties in carrying out production operations. The firm would find itself in a tight spot. Investors would not invest further. Creditors would recall their loans. Capital market would heavily discount its securities. Thus, the firm would find itself in a situation called distress. It may have to sell its assets to discharge its obligations to outsiders at prices below their economic values i.e. resort to distress sale. So when the sale proceeds is inadequate to meet outside liabilities, the firm is said to have failed or become bankrupt or (after due processes of law are gone through) insolvent.

Failure of a firm is technical if it is unable to meet its current obligations. The failure could be temporary and might be remediable. When liabilities exceed assets i.e. the net worth becomes negative, bankruptcy, as commonly understood, arises. Technical bankruptcy can be ascertained by comparing current assets and current liabilities i.e. working out current ratio or quick ratio. On the other hand, solvency ratios indicate long term liquidity i.e. the ability of the firm to discharge its term-liabilities. Examples of solvency ratios are Debt to Equity ratio, Debt to total Funds Ratios, and Interest coverage ratio. Trend analysis should be made for the past three to five years to pick up signals of bankruptcy, if any.

## FINANCIAL MANAGEMENT AS SCIENCE OR ART

**Financial Management is a subject within the compass of social science as it deals with people. Its nature is nearer to applied sciences as it envisages use of classified and tested knowledge as a help in practical affairs and solving business.**

Theory of financial management is based on certain systematic principles, some of which can be tested in mathematical equations like the law of physics and chemistry. Financial management contains a much larger body of rules or tendencies that hold true in general and on the average. The use of computers, operations research, statistical techniques and econometric models find wide application in financial management as tools for solving corporate financial problems like budgeting, choice of investments, acquisition or mergers etc. This takes the financial management nearer to treatment as a subject of science. Nevertheless, there remains a wide scope for application of value judgement in financial decisions making. Most practical problems of finance have no hard and fast answers that can be worked out mathematically or programmed on a computer. They must be solved by judgement, intuition and the “feel” of experience. Thus, despite its frequent acceptance as an applied science, finance remains largely an art. Because, according to George A. Christy and Peyton Foster Roden (Finance: Environment and Decisions) knowledge of facts, principles and concepts is necessary for making decisions but personal involvement of the manager through his intuitive capacities and power of judgement becomes essential. This makes financial management and managing a company's finance both an art and a science. It requires a feel for the situation and analytical skills alongwith a thorough knowledge of the techniques and tools of financial analysis and the know-how to apply them and interpret the results.

A very interesting presentation has been made by Weston in his book “Methodology in Finance”. The finance functions are mainly three viz., planning, organisation and financial control. In each of these finance functions elements of science and art can be observed. Wherever methodology is to be applied in decision making in all these areas, the subject matter becomes a science confronted with the framework of techniques and tools. On the other hand, when the question of choice to make selection out of the alternative results arises the subject matter becomes an art requiring human skills for value judgement. For example, in planning function there are certain goals, which may be short-term goals or long-term goals. Each falls within the area of art. Another parameter of planning is estimating funds, which may again be short-term or long-term involving techniques and skills. When involvement to techniques is there the subject matter remains science and when the skills are required to be interpreted, the subject matter becomes an art. It so happens in all aspects of planning, organisation and control.

Thus, in the entire study of financial management whether it is related to investment decision, financing decisions i.e. deciding about the sources of financing, or dividend decision, there is a mixture of science as well as art. When techniques for analytical purposes are used it is science and when choice in appreciation of the results is made it is an art. Thus, people will like to call financial management as science as well as art. But it is better if we say that the discipline of financial management has both the aspects of science as well as art; where there is theory of systematic knowledge it is science and where there is application it is art.

## FUNCTIONS OF FINANCIAL EXECUTIVES

To achieve the objective of the financial management i.e. to maximise the owner's wealth, the financial executives have to perform variety of tasks to discharge their responsibilities. With the evolution of finance from being mere a descriptive study to the one that is highly developed discipline, the role of financial managers has also undergone a sea change. His areas of responsibilities now extend far beyond keeping records, reports, the firm's cash position, paying bills and obtaining funds, and he is now concerned with and is fully involved in the decision making processes to decide investment of funds in assets, determining the best mix of financing and dividends in relation to overall valuation of the firm. The responsibilities of the financial manager are linked to the goal of ensuring liquidity, profitability or both and is also related to the management of assets and funds of any business enterprise. When the Financial Manager is involved in management of asset, he is performing the role of the decision-maker and when he is managing funds, he is performing the staff function. In the light of different responsibilities of the financial manager, he performs mainly the following duties:

**1. Forecasting of Cash Flow:** This is necessary for the successful day to day operations of the business so that it can discharge its obligations as and when they arise. In fact, it involves matching of cash inflows against

outflows and the manager must forecast the sources and timing of inflows from customers and use them to pay the liability.

**2. Raising Funds:** The Financial Manager has to plan for mobilising funds from different sources so that the requisite amount of funds are made available to the business enterprise to meet its requirements for short term, medium term and long term.

**3. Managing the Flow of Internal Funds:** Here the Manager has to keep a track of the surplus in various bank accounts of the organisation and ensure that they are properly utilised to meet the requirements of the business. This will ensure that liquidity position of the company is maintained intact with the minimum amount of external borrowings.

**4. To Facilitate Cost Control:** The Financial Manager is generally the first person to recognise when the costs for the supplies or production processes are exceeding the standard costs/budgeted figures. Consequently, he can make recommendations to the top management for controlling the costs.

**5. To Facilitate Pricing of Product, Product Lines and Services:** The Financial Manager can supply important information about cost changes and cost at varying levels of production and the profit margins needed to carry on the business successfully. In fact, financial manager provides tools of analysis of information in pricing decisions and contribute to the formulation of pricing policies jointly with the marketing manager.

**6. Forecasting Profits:** The Financial manager is usually responsible for collecting the relevant data to make forecasts of profit levels in future.

**7. Measuring Required Return:** The acceptance or rejection of an investment proposal depends on whether the expected return from the proposed investment is equal to or more than the required return. An investment project is accepted if the expected return is equal or more than the required return. Determination of required rate of return is the responsibility of the financial manager and is a part of the financing decision.

**8. Managing Assets:** The function of asset management focuses on the decision-making role of the financial manager. Finance personnel meet with other officers of the firm and participate in making decisions affecting the current and future utilisation of the firm's resources. As an example, managers may discuss the total amount of assets needed by the firm to carry out its operations. They will determine the composition or a mix of assets that will help the firm best achieve its goals. They will identify ways to use existing assets more effectively and reduce waste and unwarranted expenses.

The decision-making role crosses liquidity and profitability lines. Converting the idle equipment into cash improves liquidity. Reducing costs improves profitability.

**9. Managing Funds:** Funds may be viewed as the liquid assets of the firm. In the management of funds, the financial manager acts as a specialised staff officer to the Chief Executive of the company. The manager is responsible for having sufficient funds for the firm to conduct its business and to pay its bills. Money must be located to finance receivables and inventories, to make arrangements for the purchase of assets, and to identify the sources of long-term financing. Cash must be available to pay dividends declared by the board of directors. The management of funds has therefore, both liquidity and profitability aspects. If the firm's funds are inadequate, the firm may default on the payment of liabilities and may have to pay higher interest. If the firm does not carefully choose its financing methods, it may pay excessive interest costs with a subsequent decline in profits.

## FINANCIAL SECTOR – ROLE AND FUNCTIONS

In any economy, the financial sector plays a major role in the mobilisation and allocation of savings. Financial institutions, instruments and markets which constitute the financial sector act as conduit for the transfer of financial resources from net savers to net borrowers, i.e., from those who spend less than they earn to those who spend more than they earn.

The financial sector performs this basic economic function of intermediation essentially through four transformation mechanisms:

- (i) Liability-asset transformation (i.e., accepting deposits as a liability and converting them into assets such as loans);
- (ii) Size-transformation (i.e., providing large loans on the basis of numerous small deposits);
- (iii) Maturity transformation (i.e., offering savers alternate forms of deposits according to their liquidity preferences while providing borrowers with loans of desired maturities); and
- (iv) Risk transformation (i.e., distributing risks through diversification which substantially reduces risks for savers which would prevail while directly in the absence of financial intermediation).

The process of financial intermediation supports increasing capital accumulation through the institutionalisation of savings and investments and as such, fosters economic growth. The gains to the real sector of the economy, therefore, depend on how efficiently the financial sector performs this basic function of financial intermediation.

A distinction is often made in the literature between operational efficiency and allocational efficiency; while the former relates to transaction costs, the latter deals with the distribution of mobilised funds among competing demands. Sustained improvements in economic activity and growth are greatly enhanced by the existence of a financial system developed in terms of both operational and allocational efficiency in mobilising savings and in channelling them among competing demands. In addition, functional efficiency of a financial system must be judged in terms of (a) the soundness of the appraisals as measured by the level of overdues, (b) the resource cost of specific operations, and (c) the quality and speed of delivery of services. Both operational and allocational efficiency, to a large extent, are influenced by market structure and the regulatory framework, and on both grounds the Central Bank has an important role to play in developing economy like India.

### **Financial Sector Reforms in India – Background**

The financial sector reforms (initiated in 1991) currently underway in India must be seen as a component, of the overall scheme of structural reforms. The overall package is aimed at enhancing the productivity and efficiency of the economy as a whole and also increasing international competitiveness. The reforms are comprehensive in scope covering besides financial sector reforms, several other components of economic policy including, liberalisation and deregulation of domestic investment, opening up to key infrastructure areas hitherto reserved for the public sector for private sector participation, opening up the economy to foreign competition by reducing protective barriers such as import controls and high tariff, encouraging direct foreign investment as source of technology upgradation and also as a source of non-debt finance for investment, reform of the public sector to impart greater efficiency of operations and reform of the tax system to create a structure with moderate rates of tax, broader base of taxation and greater ease of administration. All these reforms are closely inter-related, and progress in one area helps to achieve objectives in others. Since the reforms are being introduced in a phased manner the extent of progress differs from area to area. Importance of the financial sector reforms such as structured package needs to be delineated clearly. Structural reforms in areas such as industrial and trade policy can succeed only if resources are redeployed towards more efficient producers which are encouraged to expand under the new policies. This reallocation is possible only if the financial system plays a crucial supportive role. The reforms in the banking sector and in the capital markets are aimed precisely at achieving this primary objective.

The Indian financial system comprises an impressive network of banks and financial institutions and a wide range of financial instruments. There is no doubt that there has been a considerable widening and deepening of the Indian financial system in the last decade.

### **Financial Sector Reforms in India: Philosophy and Strategy**

The ongoing financial sector reforms aim at promoting a diversified, efficient and competitive financial sector



with the ultimate objective of improving the allocative efficiency of available resources, increasing the return on investments and promoting an accelerated growth of the real sector of the economy.

According to Economic Development Institute of the World Bank while dealing with structure reforms and development of financial system has specified the following key areas of reforms:

- Reforms of structure of financial systems;
- Policies and Regulations to deal with insolvency and illiquidity of financial intermediaries;
- The development of markets for short and long term financial instruments;
- The role of institutional elements in development of financial systems;
- The links between financial sector and the real sectors, particularly in the case of restructuring financial and industrial institutions or enterprises.
- The dynamics of financial systems management in terms of stabilisation and adjustment, and
- Access to International Markets.

More specifically, the financial sector reform in India seeks to achieve the following:

- (i) suitable modifications in the policy framework within which various components of the financial system operate, such as rationalisation of interest rates, reduction in the levels of resources, pre-emptions and improving the effectiveness of directed credit programmes.
- (ii) improvement in the financial health and competitive capabilities by means of prescription of prudential norms, recapitalisation of banks, restructuring of weaker banks, allowing freer entry of new banks and generally improving the incentive system under which banks function;
- (iii) building financial infrastructure relating to supervision, audit, technology and legal framework; and
- (iv) upgradation of the level of managerial competence and the quality of human resource of banks by reviewing relating to recruitment, training, and placement.

### **Pre-requisites for Reforms in Financial Sector**

There are certain 'commandments' for pre-requisites for systemic reform of the financial sector. First and foremost, macroeconomic stabilisation is a must during the reform process. Fiscal and external policies must support monetary policy in maintaining the overall macro-economic balance. Secondly, during the reform period, prudential regulation must be introduced and adhered to in order to help safeguard against a financial crisis and prevent the undermining of monetary control and macro-economic adjustment. Thirdly, the Government must simultaneously implement wide-ranging reforms in other sectors, specially those which require support from the financial system to get the best results.

### **SALIENT FEATURES OF FINANCIAL SECTOR REFORMS IN INDIA**

In conformity with the broad philosophy and strategy for reforms, salient features of the financial sector reforms in India could be analysed under three broad categories:

- (a) Policy framework,
- (b) Improvement in financial health, and
- (c) Institutional strengthening.

#### **(a) Policy Framework**

The external factors bearing on the profitability of the banking system related to the administered structure of



interest rates, high levels of pre-emptions in the form of reserve requirements and credit allocation to certain sectors. Easing of these external constraint constitutes a major part of the reform agenda.

### ***(i) Interest Rate Policy***

The reform of the interest rate regime constitutes an integral part of the financial sector reforms. For long, an administered structure of interest rates was in vogue. The purpose behind this structure was largely to direct implicit subsidy to certain sectors and enable them to obtain funds at concessional rates of interest. An element of cross subsidisation automatically got built into a system where concessional rates of interest provided to some sectors were compensated by higher rates charged to other non-concessional borrowers. The regulation of lending rates, ipso factor, led to the regulation of the deposit rates mainly to keep the cost of funds to banks in reasonable relation to the rates at which they are required to lend. This systems of setting the interest rates through administrative fiat became extremely complex and was characterised by detailed prescriptions on the lending as well as the deposit side.

In recognition of the problems arising from administrative control over the interest rates, such as, market fragmentation, inefficient allocation of resources, and the like. Several attempts were made since the mid-1980s to rationalise the level and structure of interest rates in the country. Initially, steps were taken to develop the domestic money market and freeing of the money market rates. The rates of interest offered on Government securities were progressively raised so that the government securities were progressively raised so that the Government borrowing could be carried out a market-related rates. The rates at which the corporate entities could borrow from the capital market were also freed.

In respect of banks, a major effort was undertaken to simplify the administered structure of interest rates. In September 1990, a process of simplification was undertaken by reducing the number of slabs for which lending rates had hitherto been prescribed. Until some time ago, the Reserve Bank was prescribing a minimum lending rate, two concessional rates of lending for small borrowers and a maximum deposit rate. The rationalisation in the structure of interest rates culminated in the Reserve Bank abolishing and minimum lending rate in October 1994 and leaving banks to determine their prime lending rates. On the deposit side, since July, 1996 the Reserve Bank prescribes only a maximum rate for deposits upto one year.

A gradual approach has thus far been adopted in reforming the interest rates structure in India. Care has been taken to ensure that banks and financial intermediaries do not have incentives which tempt them to lend at high rates of interest assuming higher risks. A major safeguard in this regard has been the prescription of prudential norms relating to provisioning and capital adequacy. These combined with higher standards of operational accountability and appraisal of credit risks would ensure that banks lend prudently and with care.

### ***(ii) Pre-emption of Deposits***

In the past, the cash reserve ratio (CRR) and the statutory liquidity ratio (SLR) had to be maintained at high levels because of rising fiscal and monetised deficits. Reduction in these deficits is now the stated goal of fiscal policy and several steps have already been taken in this direction. As the containment of deficits occurs, reductions in the reserve requirements are being effected. These measures will help to increase the lendable resources available with the banking industry. It must be noted, however, that being an instrument of monetary control, CRR will continue to be used flexibly, depending on the monetary situation.

### ***(iii) Directed Credit***

In respect of directed lending, it is prescribed that 40 per cent of the net bank credit should go to certain sectors?the priority sector?such as agriculture, small scale industry and small businesses and the programmes for poverty alleviation. Give the imperfections of the credit market, credit allocation for certain sectors becomes necessary in the Indian context. The prescription of 40 per cent of net bank credit to the priority sector as well as prescription of two concessional rates of interest applicable for small loans have been retained. Since the bulk of borrowers with such credit needs fall within the priority sector, they will continue to obtain bank finance at

concessional rates. Priority sector borrowers with credit needs of higher amounts will however, be governed by the general interest rate prescriptions. This will ensure that a certain proportion of bank credit goes to the designated sector and to the needy borrowers, without unduly affecting the viability and profitability of banks.

### **(b) Improvement in Financial Health**

Another major element of the financial sector reforms has been the introduction of prudential norms and regulations aimed at ensuring the safety and soundness of the financial system, imparting greater transparency and accountability in operations and restoring the credibility of and confidence in the Indian financial system. Prudential norms serve two primary purposes? first, they bring out the true position of a bank's loan portfolio and secondly, they help to arrest its deterioration. In the absence of an effective prudential framework, the reform process can run into difficulties. Introduction of prudential regulations as part of the reform process is therefore a must. Prudential reforms introduced in India relate to income recognition, asset classification, provisioning for bad and doubtful debts and capital adequacy. A proper definition of income is essential in order to ensure that banks take into account income which is actually realised. Banks have now been given a clear definition of what constitutes a 'non-performing' asset and instructions have been issued that no interest should be charged and taken to income account on any 'non-performing' asset. The definition of 'non-performing' asset is also being tightened over a time. Banks are now required to make provisions on advances depending on the classification of assets into the four broad groups: (i) standard assets, (ii) sub-standard assets, (iii) doubtful assets, and (iv) loss assets. The provisioning requirement ranges from 10 per cent to 100 per cent depending on the category of the asset. Banks have now fully met with the new provisioning requirements.

### **(c) Institutional Strengthening**

Along with relaxing the external constraints and introducing the prudential norms, a major effort has been to strengthen the banking system in general, and public sector banks, in particular, through appropriate institution building measures of (i) recapitalisation, (ii) improving the quality of loan portfolio, (iii) instilling a greater element of competition and (iv) strengthening the supervisory process.

A more competitive environment is also being created. Banks are already facing competition from non-bank finance companies primarily on the lending side and from mutual funds and other similar institutions on the deposit side. They, therefore, need to gear themselves up to meet this challenge. But significantly, banks are also facing competition from within their industry. New banks are now being set up in the private sector, although the challenge from these new banks will for some time be minimal. The improvement in the efficiency of the public sector banks will have to come from within and from the need to improve their profitability. Banks with strong balance sheets are now going to the capital market and raising funds. This will also make them accountable to a wider base of shareholders resulting in better performance.

A strong system of supervision is essential for a sound banking system. There has to be an alert mechanism for monitoring compliance with prudential regulation and directives of the Reserve Bank and other regulatory agencies. The system of external supervision of banks has been revamped with the setting up of a separate Board for Financial Supervision (BFS) within Reserve Bank, concentrating exclusively on supervisory issues. The Board will ensure compliance with regulations and guidelines in the areas of credit management, asset classifications, income recognition, capital adequacy, provisioning and treasury operations. Supervision, however, can at best be a second line of defence; the main mechanism of compliance and control must operate within the financial institutions.

## **Financial Sector Reforms – Present Scenario**

### ***Financial Sector Regulations***

With increasing financial sector liberalisation and emergence of financial conglomerates, financial sector stability has emerged as a key objective of the Reserve Bank. In this context, the recent emphasis in the regulatory framework in India on ensuring good governance through "fit and proper" owners, directors and

senior managers of the banks infuses a qualitative dimension to the conventional discharge of financial regulation through prescribing prudential norms and encouraging market discipline. In totality, however, these measures interact to produce a positive impact on the overall efficiency and stability of the banking system in India.

The thrust of the Reserve Bank's financial sector policies is on strengthening the health of financial institutions as well as on improving the efficiency of financial markets. Policy initiatives encompassed the adoption of international standards and codes in the banking system, strengthening urban cooperative banks (UCBs) and non-banking financial companies (NBFCs) and improvement in customer services. The Reserve Bank undertook several initiatives to improve corporate governance in the banking system.

The Reserve Bank continued to stress the need to improve customer services by banks to ensure that the benefits of financial liberalization percolate to the widest sections of society. Several measures were undertaken to further improve the functioning of the money, the debt and the foreign exchange markets. Internal technical groups on the money market, the Government securities market and the foreign exchange market were set up to chart a medium-term framework for the future course of market development in the context of the ongoing changes in the institutional framework and market dynamics.

In the capital market, policy initiatives are directed towards further broadening and deepening the markets, achieving better investor protection and making the market investor friendly.

In regard to capital flows, India has adopted a policy of active management of the capital account. The compositional shifts in the capital account towards non-debt flows since the early 1990s have been consistent with the policy framework, imparting stability to the balance of payments. The substitution of debt by non-debt flows also gives room for manoeuvre since debt levels, particularly external commercial borrowings, have been moderate. There is also the cushion available from the foreign exchange reserves. Since non-debt creating flows are dominating, the emphasis is on encouraging inflows through foreign direct investment and enhancing the quality of portfolio flows by strict adherence to what may be described as 'Know Your Investor' principle. Prudential regulations over financial intermediaries, especially over banks, in respect of their foreign exchange exposures and transactions are a dynamic component of management of the capital account as well as financial supervision.

India has made significant progress in financial liberalization since the institution of financial sector reforms in 1992 and this has been recognized internationally. India has chosen to proceed cautiously and in a gradual manner, calibrating the pace of capital account liberalization with underlying macroeconomic developments, the state of readiness of the domestic financial system and the dynamics of international financial markets. Unlike in the case of trade integration, where benefits to all countries are demonstrable, in the case of financial integration, a "threshold" in terms of preparedness and resilience of the economy is important for a country to get full benefits. A judgmental view needs to be taken whether and when a country has reached the threshold and financial integration should be approached cautiously, preferably within the framework of a plausible roadmap that is drawn up by embodying the country-specific context and institutional features. The experience so far has shown that the Indian approach to financial integration has stood the test of time.

The optimism generated by the recent gains in microeconomic performance warrants a balanced consideration of further financial liberalisation. At this stage, the optimism generated by impressive microeconomic performance accompanied with stability has given rise to pressures for significantly accelerating the pace of external financial liberalization. It is essential to take into account the risks associated with it while resetting an accelerated pace of a gradualist approach. The recent experience in many countries shows that periods of impressive macroeconomics performance generate pressures for speedier financial liberalization since everyone appears to be a gainer from further liberalization, but the costs of instability that may be generated in the process are borne by the country, the government and the poorer sections. Avoiding crisis is ultimately a national responsibility. The approach to managing the external sector, the choice of instruments and the timing and sequencing of policies are matters of informed judgment, given the imponderables.

The overall approach to the management of India's foreign exchange reserves in recent years reflects the changing composition of the balance of payments and the 'liquidity risks' associated with different types of flows and other requirements. The policy for reserve management is thus judiciously built upon a host of identifiable factors and other contingencies. Taking these factors into account, India's foreign exchange reserves continue to be at a comfortable level and consistent with the rate of growth, the share of external sector in the economy and the size of risk-adjusted capital flows.

The financial system in India, through a measured, gradual, cautious, and steady process, has undergone substantial transformation. It has been transformed into a reasonably sophisticated, diverse and resilient system through well-sequenced and coordinated policy measures aimed at making the Indian financial sector more competitive, efficient, and stable. Concomitantly, effective monetary management has enabled price stability while ensuring availability of credit to support investment demand and growth in the economy. Finally, the multi-pronged approach towards managing capital account in conjunction with prudential and cautious approach to financial liberalization has ensured financial stability in contrast to the experience of many developing and emerging economies. This is despite the fact that we faced a large number of shocks, both global and domestic. Monetary policy and financial sector reforms in India had to be fine tuned to meet the challenges emanating from all these shocks. Viewed in this light, the success in maintaining price and financial stability is all the more creditworthy.

As the economy ascends a higher growth path, and as it is subjected to greater opening and financial integration with the rest of the world, the financial sector in all its aspects will need further considerable development, along with corresponding measures to continue regulatory modernization and strengthening. The overall objective of maintaining price stability in the context of economic growth and financial stability will remain.

India's financial system holds one of the keys, if not the key, to the country's future growth trajectory. A growing and increasingly complex market-oriented economy, and its rising integration with global trade and finance, require deeper, more efficient and well-regulated financial markets.

The Government of India Constituted a High Level Committee on Financial Sector Reforms on 17th August 2007, under the Chairmanship of Shri Raghuram Rajan, Professor, Graduate School of Business, University of Chicago, with a view to outlining a comprehensive agenda for the evolution of financial sector indicating especially the priorities and sequencing decisions. The terms of Reference of the Committee were as under:

- (i) To identify emerging challenges in meeting the financing needs of the Indian economy in the coming decade and to identify real sector reforms that would allow those needs to be more easily met by the financial sector;
- (ii) To examine the performance of various segments of the financial sector and identify changes that will allow it to meet the needs of the real sector;
- (iii) To identify changes in the regulatory and supervisory infrastructure that can better allow the financial sector to play its role, while ensuring that risk are contained; and
- (iv) To identify changes in the other areas of the economy-including in the conduct of monetary and fiscal policy, and the operation of legal system and the education system-that could help the financial sector function more effectively.

The Committee on Financial Sector Reforms delivered its Draft report to India's Planning Commission in April 2008. The report shows that recognizing the deep linkages among different reforms, including broader reforms to monetary and fiscal policies, is essential to achieve real progress.

The report has three main conclusions. First, the financial system is not providing adequate services to the majority of Indian retail customers, small and medium-sized enterprises, or large corporations. Government ownership of 70% of the banking system and hindrances to the development of corporate debt and derivatives markets have stunted financial development. This will inevitably become a barrier to high growth. Second, the

financial sector – if properly regulated, but unleashed from government strictures that have stifled the development of certain markets and kept others from becoming competitive and efficient—has the potential to generate millions of much-needed jobs and, more important, have an enormous multiplier effect on economic growth. Third, in these uncertain times, financial stability is more important than ever to keep growth from being derailed by shocks, especially from abroad.

### **FINANCIAL SECTOR LEGISLATIVE REFORMS COMMISSION, 2011**

The Finance Minister in his Budget speech of 2011-2012 announced the formation of FSLRC to rewrite and harmonise financial sector legislations, rules and regulations. The resolution notifying the FSLRC was issued by the government in March 2011.

Chaired by Justice BN Srikrishna, the Commission has a diverse mix of expert members drawn from the fields of finance, economics, public administration, law, etc.

#### **Purpose of formation**

FSLRC was formed as most legal and institutional structures of the financial sector in India had been created over a century. Many financial sector laws date back several decades, when the financial landscape was very different from that seen today.

There are over 61 Acts and multiple rules and regulations that govern the financial sector. For example, the SEBI (Securities and Exchange Board of India) Act does not give the regulator powers to arrest anyone but tasks it with penalising all market related crimes stiffly. The Reserve Bank of India (RBI) Act and the Insurance Act are of 1934 and 1938 period, respectively.

The Commission was formed to review and recast these old laws in tune with the modern requirements of the financial sector. FSLRC plans to eliminate 25 of the current 61 laws that currently govern the financial sector and amend many others.

#### **FSLRC moots single regulator**

The FSLRC submitted its report in March 2013. It came up with its recommendation spread over two volumes and 439 pages. The Commission has proposed an Indian Financial Code Bill 2013 to create a Unified Financial Authority (UFA) and bring about reforms in financial sector regulations. The panel suggested that SEBI, IRDA, PFRDA (Pension Fund Regulatory and Development Authority) and the Forward Markets Commission (FMC) be merged under one regulator—UFA.

However, RBI (Reserve Bank of India) will continue to be the banking regulator. The new UFA would subsume watchdogs for insurance, capital markets, pension and commodities while letting the RBI continue its supervisory role over the banking industry.

#### **Consumer protection**

According to FSLRC, all financial laws and regulators are intended to protect the interest of consumers. Hence, a dedicated forum for relief to consumers and detailed provisions for protection of unwary customers against mis-selling and defrauding by smaller print etc has been recommended.

The FSLRC report proposes certain basic rights for all financial consumers. For lay investors, the report proposes additional set of protections. The Commission has recommended some amendments to existing laws and new legislations. These changes will have to be carefully brought about accordingly.

Some basic protections consumers would expect include that financial service providers must act with due diligence. It is essential to protect investors against unfair contract terms, unjust conduct and protection of personal information. The FSLRC report also recommends fair disclosure and redressal of investor complaints by financial service providers.

### Financial Regulatory Architecture Act

The proposed regulatory structure will be governed by the Financial Regulatory Architecture Act that will ensure a uniform legal process for the financial regulators. The finance ministry will unify the regulatory structure before tweaking the legislative structure. It may take two years for the report to be implemented in a phased manner.

### Judicial review

The panel has recommended judicial review of regulations. The report has suggested a sunset clause of 10 years. In other words, the laws would be reviewed every 10 years. The committee also recommended giving required attention to debt management and setting up a financial redressal agency and a financial stability and development council.

### FINANCIAL SECTOR REFORMS: SOME CRITICISMS

It is not surprising that the sweeping nature of the financial sector reforms has evoked some criticism. While the banking community and the customer in general have welcomed the changes that have been ushered in, criticisms mainly emanated from those who are enclined to certain ideological moorings. Internationally, a trenchant critic of financial sector reforms has been Joseph Stiglitz, who has argued that financial markets are vulnerable to “market failure” more than any other market and therefore, government intervention in financial market is imperative. He writes, that there exists form of government intervention that will not only make these (financial) markets function better but will also improve the performance of the economy. The need for intervention in financial markets is not denied by any one. All advocates of financial sector reforms have pleaded that deregulation should be accompanied if not preceded by putting in place a rigorous set of prudential standards to be met by financial institutions. As John Crow Former Governor of the Bank of Canada said, “deregulation does not mean desupervision”. Internationally accepted common standards for income recognition, provision and capital adequacy have come into force in almost all countries.

Financial Sector reforms in India is basically criticised on the grounds of slow pace of reforms and non-implementation of capital account convertibility. In this context eminent Ford Economist Paul Krugman has recently rightly pointed out, India had avoided the worst of the Asian crisis because existing restrictions discouraged inflows and out flows of short term capital. India should close down its weak banks, impose serious capital requirements on the strong one, and leave the currency convertibility programme where it is. Thus, India which has been slow to open up for right things, has fortunately also been slow to open up to the wrong things. Reforms are premised on two critical factors. Krugman emphasised, education and infrastructure – both left much to be desired in India. Having introduced liberalisation, it was incumbent on India to address these two areas of failure. The failure presents the country with greater opportunities, provided the right lessons were learnt. Recently eminent economist Prof. Amartya Sen, a noble laureate while supporting the programme of reforms in India has suggested to concentrate on two issues i.e. primary education.

### FINANCIAL MANAGEMENT – A NEW LOOK

Financial management in India has also changed substantially in scope and complexity in view of recent government policy. Some of the changes include introduction of new financial instruments and transactions like options and future contracts, foreign currency swaps, and interest rate swaps, GDR (Global Depository Receipts), Euro Issues, globalization of capital markets, finance mix, liberalisation measures taken by government etc. All these have emphasised the need for effective and efficient use of corporate financial resources.

Under the changed circumstances, financial management covers the following:

- (a) **Raising the funds:** Apart from Indian Public and Financial Institutions, companies have started raising funds etc. in the international markets by way of Euro Issues and from International Financial Institutions



etc. Foreign currency loans are availed from foreign banks due to globalization. Foreign Institutional Investors (FII) have also started participation in India's equity market due to liberalisation of the economy.

**(b) Investment Decisions:** Presently, investment decisions of firms are not confined to Indian territory but spread over globally. Foreign investors are encouraged. Hence the competitions in India as well as from abroad have made the financial management more complex and foreign exchange management has become highly specialised area in financial management. The time value of money coupled with exchange rate fluctuations make the decision making exercise more complex and compelled the decision makers to make the use of various sophisticated management techniques like probability theory, capital rationing, linear programming, goal programming and sensitivity analysis to overcome the problems.

**(c) Dividend Decisions:** In view of wealth maximisation of firm, the internal generation of funds are not paid out by way of dividend or issue of bonus shares. They are utilised by companies in portfolio management by floating mutual funds etc. In order to avoid scams, the Government has established new institutions like SEBI, NSE, Stock Holding Corporation of India etc. It further increases the scope of financial management and makes it more complex.

However, in true sense, as such there is no change in scope of financial management in India because it still aims at maximising value of shares. Basically, it is extension in earlier coverage.

### LESSON ROUND-UP

- Financial Management deals with procurement of funds and their effective utilizations in the business and concerned with investment, financing and dividend decisions in relation to objectives of the company.
- Investment decisions are essentially made after evaluating the different proposals with reference to growth and profitability projections of the company.
- Financing decisions are concerned with the determination of how much funds to procure from amongst the various avenues available i.e. the financing mix or capital structure.
- Dividend decision is to decide whether the firm should distribute all profits or retain them or distribute a portion and retain the balance.
- Profit maximization ensures that firm utilizes its available resources most efficiently under conditions of competitive markets.
- Wealth maximization means the management of an organization maximizes the present value not only for shareholders but for all including employees, customers, suppliers and community at large.
- Economy value added is the after cash flow generated by a business minus the cost of capital it has deployed to generate that cash flow.
- Liquidity means ability of the business to meet short-term obligations. It shows the quickness with which a business/company can convert its assets into cash to pay what it owes in the near future.
- Profitability ratio reflects on the ability of management to earn a return on resources put in by the shareholders evaluating the performance of the company in different spheres
- Financial reform in India is aimed at enhancing the productivity and efficiency of the economy as a whole and also increasing international competitiveness

1. Discuss the nature and scope of Financial Management.
2. What is justification for the goal of maximising the wealth of shareholders?
3. Critically examine the goals of maximisation of profit and maximisation of return on equity.
4. "The goal of profit maximisation does not provide us with an operationally useful criterion." Comment.
5. Financial management has changed substantially in scope and complexity in recent decades. How do you account for this trend? In what directions has emphasis in the field been shifted?
6. "Investment, financing and dividend decisions are interrelated". Comment.
7. What criteria should you adopt in making financial decisions in your company? Discuss with reference to the costing of funds decisions.
8. Write short notes on:
  - (a) Liquidity;
  - (b) Profitability;
  - (c) Costing and risk;
  - (d) Financial distress.
9. Discuss the responsibilities of a financial executive in a corporation.

[illegible]



# Lesson 2

## Capital Budgeting

### LESSON OUTLINE

- Time Value of Money
- Planning and Control of Capital Expenditure
- Capital Budgeting Process
- Techniques of Capital Budgeting- Discounted and Non- Discounted Cash Flow Methods,
- Choice of Methods
- Capital Rationing;
- Risk Evaluation and Sensitivity Analysis,
- Simulation for Risk Evaluation
- Linear Programming and Capital Budgeting Decisions – under Constraints and with Multiple Objectives using Mathematical Programming Models,
- Inflation, Uncertainty and Evaluation using Statistical Decision Theory
- Analysis of Capital Budgeting, Decisions- Some Case Studies
- LESSON ROUND UP
- SELF TEST QUESTIONS

### LEARNING OBJECTIVES

Capital Budgeting is one of core and most difficult task of a finance manager. In capital budgeting cum investment appraisal decision, a finance manager is to co-ordinate with project managers, bankers and promoters to get different data for his analysis. Capital budgeting requires use of various techniques including statistical techniques.

The object of the study lesson is to enable the students to understand:

- Need and importance of Capital Budgeting
- Factors Including Investment Decision
- Kinds of Capital Budgeting Decisions
- Planning of Capital Expenditure
- Capital Expenditure Control
- Capital Rationing
- Capital Budgeting Process
- Various methods of Capital Budgeting.
- Risk Evaluation and Sensitivity Analysis
- Simulation for Risk Evaluation
- Cost of Capital and its implications in Capital Budgeting decisions.

## INTRODUCTION

The word Capital refers to be the total investment of a company of firm in money, tangible and intangible assets. Whereas budgeting as defined by “**Rowland** and **William**” is the art of building budgets. Budgets are the blue print of a plan and action expressed in quantities and manners.

The examples of capital expenditure includes :

1. Purchase of fixed assets such as land and building, plant and machinery, good will, etc.
2. The expenditure relating to addition, expansion, improvement and alteration to the fixed assets.
3. The replacement of fixed assets.
4. Research and development project.

## DEFINITIONS

According to the definition of **Charles T. Horngreen**, “capital budgeting is a long-term planning for making and financing proposed capital outlays”.

According to the definition of **G. C. Philippatos**, “capital budgeting is concerned with the allocation of the firms source financial resources among the available opportunities”.

The consideration of investment opportunities involves the comparison of the expected future, streams of earnings from a project with the immediate and subsequent streams of earning from a project, with the immediate and subsequent streams of expenditure”.

According to the definition of **Richard** and **Green law**, “capital budgeting is acquiring inputs with long-term return”.

According to the definition of **Lyrich**, “capital budgeting consists of planning development of available capital for the purpose of maximizing the long-term profitability of the concern”.

## TIME VALUE OF MONEY

### Introduction

One of the most fundamental concepts in finance is that money has a “time value.” That is to say that money in hand today is worth more than money that is expected to be received in the future. The reason is straightforward: A rupee that you receive today can be invested such that you will have more than a rupee at some future time.

Suppose “A” win a Prize in a contest and he has got two options.

**A.** Receive ₹10,000 now

OR

**B.** Receive ₹10,000 in three years

Which option should A “choose?”

If A is a rational person he would choose to receive ₹10,000 now. After all, three years is a long time to wait. Why would any rational person defer payment into the future when he or she could have the same amount of money now? For most of us, taking the money in the present is just natural. So at the most basic level, the time value of money demonstrates the concept of time value:

“A rupee today is worth more than a rupee tomorrow.”

The time value of money serves as the foundation for all other notions in finance. It impacts business finance, consumer finance, and government finance. Time value of money results from the concept of interest.

### Why ₹ 1 received today worth more than ₹ 1 Received after a time period

There are four primary reasons why a rupee to be received in the future is worth less than a rupee to be received immediately.

1. Presence of positive rates of inflation which reduce the purchasing power of rupees through time. Suppose Rate of petrol about one year back was ₹ 65 per litre and now it is 76 per litre. This may be observed that in this example purchase power of rupee in terms of petrol purchased has decreased from  $1/65$  to  $1/76$ .
2. A rupee today is worth more today than in the future because of the opportunity cost of lost earnings — that is, it could have been invested and earned a return between today and a point in time in the future.
3. Thirdly, all future values are in some sense only **promises**, and contain some uncertainty about their occurrence. As a result of the risk of default or non-performance of an investment, a rupee in hand today is worth more than an expected rupee in the future.
4. Finally, human preferences typically involve impatience, or the preference to consume goods and services now rather than in the future.

### Use of Time Value of Money

Some standard calculations based on the time value of money are:

**Present Value:** Present value refers to the current worth of a future sum of money or stream of cash flows given a specified rate of return. Present Value of a cash flow is calculated on the basis of formula as given below

$$PV = \text{Cash Flow} / (1+r)^t$$

Here  $r$  refers to required rate of return and  $t$  refers to the period.

#### Example

Find Present Value of ₹ 80,000 to be received after five years when required rate of return is 10%

$$\begin{aligned} \text{Present Value} &= 80000 / (1+0.10)^5 \\ &= ₹ 49,674 \end{aligned}$$

Assume in the same example, the rate of return is 15%,

$$\begin{aligned} \text{Present Value will be} &= 80000 / (1+0.15)^5 \\ &= 39,774 \end{aligned}$$

The above calculation shows, higher the discount rate, the lower the present value of the future cash flows.

### Future Value of a lump sum

Future value of a lump sum refers to the value after a certain period of time at the given rate of interest.

It may be calculated by under given formula

$$FV_t = CF_0 * (1+r)^t \text{ OR } FV_t = PV * (1+r)^t$$

Where  $FV_t$  = Future Value after a period  $t$

$R$  = Rate of return

$PV$  = Present Value

**Example.** Find present value of maturity value of ₹ 10,000 which has been given on 15% interest for five years while required rate of return is 10%.

### 32 PP-FT&FM

FV of ₹ 10,000 @ 15% after five years = ₹ 10,000 (1+0.15)<sup>5</sup> = ₹ 20,113.57

Present Value of ₹ 20,113.57 which is to be received after 5 years =

₹20,113.57/ (1+0.10)<sup>5</sup> = ₹ 12,488.94

#### Present Value of a cash flow stream

It refers to the present value of a series of cash flows occurred in different years.

#### Example

Find Present Value of cash flows to be accrued as given below when required rate of return is 10% –

Period	1	2	3	4
Cash Flow in ₹	80,000	70,000	50,000	30,000

Present Value = ₹ 80,000/(1+0.10)<sup>1</sup> + ₹ 70,000/(1+0.10)<sup>2</sup> + ₹ 50,000/(1+0.10)<sup>3</sup> + ₹ 30,000/(1+0.10)<sup>4</sup> = ₹ 1,88,635

#### Net Present Value

Net Present Value is the difference between the sum total of present values of all the future cash inflows and outflows:

Algebraically:

$$NPV = \frac{R_1}{(1+K)^1} + \frac{R_2}{(1+K)^2} + \dots + \frac{R_n}{(1+K)^n} + \frac{W_n}{(1+K)^n} + \frac{S_n}{(1+K)^n} - C$$

If cash outflow is also expected to occur at some time other than initial investment (non-conventional cash flows) then formula would be

$$NPV = \left[ \frac{R_1}{(1+K)^1} + \dots + \frac{R_n}{(1+K)^n} + \frac{S_n}{(1+K)^n} + \frac{W_n}{(1+K)^n} \right] - \left[ C_0 + \frac{C_1}{(1+K)^t} + \dots + \frac{C_n}{(1+K)^n} \right]$$

NPV = Net Present Value

R = Cash inflow at different time period

K = Rate of discount or cost capital

t = 1 = first period in the sum

N = The last period in the sum

S<sub>n</sub> = Salvage value

W<sub>n</sub> = Working capital

C = Cost of investment plus Working Capital

#### Example

A Company has Invested ₹ 8,00,000 in a business and expected a series of cash flow as per under given details

Year	Cash Flow in ₹	Additional Cash outflow
1	2,50,000	Nil
2	4,20,000	1,05,000
3	3,50,000	Nil
4	2,50,000	10,000

At the end of fourth year company made a sale of scrap for ₹ 2,40,000 and realized ₹ 30,000 from working capital. Find Net Present Value (NPV) if required rate of return is 10%

Present Value of Cash Flows = ₹  $\{(2,50,000 / (1+0.10)^1 + 4,20,000 / (1+0.10)^2 + 3,50,000 / (1+0.10)^3 + 2,50,000 / (1+0.10)^4 + 2,40,000(1+0.10)^4 + 30,000(1+0.10)^4\}$  = ₹ 11,92,507

Present Value of Cash Out Flows = ₹  $\{(8,00,000 / (1+0.10)^1 + 1,05,000 / (1+0.10)^2 + 10,000(1+0.10)^4\}$  = ₹ 8,93,607

Net Present Value = Present Value of Cash Inflow- Present value of Cash Outflows

= ₹ 11,92,507- ₹ 8,93,507= ₹ 2, 98,900.

## CAPITAL BUDGETING- PLANNING AND CONTROL OF CAPITAL EXPENSES

In modern times, the efficient allocation of capital resources is a most crucial function of financial management. This function involves organisation's decision to invest its resources in long-term assets like land, building facilities, equipment, vehicles, etc. All these assets are extremely important to the firm because, in general, all the organisational profits are derived from the use of its capital in investment in assets which represent a very large commitment of financial resources, and these funds usually remain invested over a long period of time. The future development of a firm hinges on the capital investment projects, the replacement of existing capital assets, and/or the decision to abandon previously accepted undertakings which turns out to be less attractive to the organisation than was originally thought, and divesting the resources to the contemplation of new ideas and planning. For new projects such as investment decisions of a firm fall within the definition of capital budgeting or capital expenditure decisions.

Capital budgeting refers to long-term planning for proposed capital outlays and their financing. Thus, it includes both raising of long-term funds as well as their utilisation. It may, thus, be defined as the "firm's formal process for acquisition and investment of capital." To be more precise, capital budgeting decision may be defined as "the firms' decision to invest its current fund more efficiently in long-term activities in anticipation of an expected flow of future benefit over a series of years." The long-term activities are those activities which affect firms operation beyond the one year period. Capital budgeting is a many sided activity. It contains searching for new and more profitable investment proposals, investigating, engineering and marketing considerations to predict the consequences of accepting the investment and making economic analysis to determine the profit potential of investment proposal. The basic feature of capital budgeting decisions are:

- (1) current funds are exchanged for future benefits;
- (2) there is an investment in long-term activities; and
- (3) the future benefits will occur to the firm over series of years.

## NEED FOR CAPITAL INVESTMENT

This is the logical question and the answer to that is rather easy. The following factors give rise to the need for capital investments:

- (a) Wear and tear of old equipments.
- (b) Obsolescence.
- (c) Variation in product demand necessitating change in volume of production.
- (d) Product improvement requiring capital additions.
- (e) Learning-curve effect.
- (f) Expansion.
- (g) Change of plant site.

- (h) Diversification.
- (i) Productivity improvement.

Some of these factors are self-explanatory. However, we add a few explanatory lines on a few of these factors. Obsolescence occurs when alternative methods of equipments for performing a function become available which are significantly better either in terms of quality of newness of the product or plant safety. In a high consumption economy like U.S.A. this problem is acute. In an economy like India, the problem of obsolescence is still rare. Only in certain investments for manufacturing export products (e.g. garments, jute goods, cotton textiles), this problem exists. Product improvements require changes in equipments and this problem is also not an important factor in influencing capital investment decisions in India, expecting changes special product qualities like radios, transistors, televisions etc. Learning curve consideration influences capital decisions in the sense that new equipments might be such as to cut down learning time and effect considerable saving on training expenses. For reasons such as expansion, new sources of raw materials, new markets, labour conditions, transportation or termination of a lease, an entire plant may have to be relocated. The cost of removing a plant is enormous and management may decide to undertake modernisation through a complete new layout and equipment purchases. Many progressive companies seek out new markets and new products. They may even like to acquire another company for purpose of diversification. All these require major capital investments. In some industries, wage escalation may force management to acquire labour-saving equipment machinery to effect saving on wages and at the same time improve productivity.

### INVESTMENT DECISIONS – MANAGEMENT PERSPECTIVE

Usually, in investment problems, much attention is focussed on how to choose among alternative projects, so that one is tempted to believe that this constitutes the only problem in capital decisions. However, if we examine carefully, it is easy to realise that choice among alternatives is only one facet albeit the important facet of the problem from the top management perspective. The other facets are implementation and control as applied to all phases of capital investment, and these are important aspects because in the ultimate analysis, the top management is accountable to Board of directors and owners for the success or failure of investment plans.

Let us examine in brief how investment decisions are influenced by management perspective. Obviously, we have to start with the company objectives which provide the broad guidelines to policies, plans and operations. A possible objective might be to maximise return on investment in which case the management might seek to minimise investment by selecting only a few capital projects that yield the highest returns. On the other hand, the objective may be to maximise sales volume and in that case all capital investment that yield a net profit (may be small) would be made without undue concern. If the management is guided by a growth objective, expansionary investment involving high capital cost would be undertaken.

Within the board company objectives, top management also reviews the competitive position of the company and if the competition is sharper, the management looks out continuously to evaluate and upgrade the equipments to achieve greater efficiency at least cost. In big companies, the management sets out policies to guide lower levels of management in the search for evaluation of and initiation of capital projects.

Top management has also to keep watch on company funds which finance investments. It cannot allow funds to lie idle just because suitable project is not at hand. The cost of idle funds is substantial and hence the need for looking out for suitable investment opportunities. If such opportunities exist then the management must spare funds and if existing funds are inadequate it should raise funds externally. It should be remembered that if there is no profitable investment opportunity within the company, the dividend policy of the company should be liberal. Funds for capital investment must be arranged on a long-term basis otherwise borrowings short and investing long can lead to lack of liquidity and consequent troubles. The major sources of long-term funds are long-term borrowing, new equity capital (sale of stock) and retained earnings. Sometimes, a change in the inventory system also releases funds by effecting reduction in inventory to be carried. The selection of the right source of funds is again influenced by management's own belief and value judgement and such other factors like outsider control, dilution of equity, price earnings ratio, cost of funds etc.

And finally, the top management is usually concerned with implementation and control aspects of investment projects. Specific responsibilities are to be assigned to specific individuals or cells and progress reports have to be carefully studied. In big projects, improved methods like programme evaluation review technique (PERT) or critical path method (CPM) may be used.

### IMPORTANCE OF CAPITAL BUDGETING

Capital budgeting decisions are of paramount importance in financial decision. So it needs special care on account of the following reasons:

- (1) **Long-term Implications:** A capital budgeting decision has its effect over a long time span and inevitably affects the company's future cost structure and growth. A wrong decision can prove disastrous for the long-term survival of firm. It leads unwanted expansion of assets, which results in heavy operating cost to the firm. On the other hand, lack of investment in asset would influence the competitive position of the firm. So the capital budgeting decisions determine the future destiny of the company.
- (2) **Involvement of large amount of funds:** Capital budgeting decisions need substantial amount of capital outlay. This underlines the need for thoughtful, wise and correct decisions as an incorrect decision would not only result in losses but also prevent the firm from earning profit from other investments which could not be undertaken.
- (3) **Irreversible decisions:** Capital budgeting decisions in most of the cases are irreversible because it is difficult to find a market for such assets. The only way out will be to scrap the capital assets so acquired and incur heavy losses.
- (4) **Risk and uncertainty:** Capital budgeting decision is surrounded by great number of uncertainties. Investment is present and investment is future. The future is uncertain and full of risks. Longer the period of project, greater may be the risk and uncertainty. The estimates about cost, revenues and profits may not come true.
- (5) **Difficult to make:** Capital budgeting decision making is a difficult and complicated exercise for the management. These decisions require an over all assessment of future events which are uncertain. It is really a marathon job to estimate the future benefits and cost correctly in quantitative terms subject to the uncertainties caused by economic-political social and technological factors.

### FACTORS INFLUENCING INVESTMENT DECISION

We shall now study the factors, which have specific or general relevance to capital investment decisions. We have realised already that capital investment decisions are not governed by one or two factors, because the investment problem is not simply one of replacing an old equipment by a new one, but is concerned with replacing an existing process in a system with another process which makes the entire system more effective. We discuss below some of the relevant factors that affects investment decisions:

- (i) **Management outlook:** If the management is progressive and has an aggressive marketing and growth outlook, it will encourage innovation and favour capital proposals which ensure better productivity or quality or both. In some industries where the product being manufactured is a simple standardised one, innovation is difficult and management would be extremely cost conscious. In contrast, in industries such as chemicals and electronics, a firm cannot survive, if it follows a policy of 'make-do' with its existing equipment. The management has to be progressive and innovation must be encouraged in such cases.
- (ii) **Competitor's Strategy:** The competitors' strategy regarding capital investment exerts significant influence on the investment decision of a company. If competitors continue to install more equipment and succeed in turning out better products, the existence of the company not following suit would be seriously

threatened. This reaction to a rival's policy regarding capital investment often forces decision on a company.

- (iii) **Opportunities created by technological change:** *Technological* changes create new equipment which may represent a major change in process, so that there emerges the need for re-evaluation of existing capital equipment in a company. Such changes may justify new investments. Sometimes the old equipment which has to be replaced by new equipment as a result of technical innovation may be downgraded to some other applications. A proper evaluation of this aspect is necessary, but is often not given due consideration. In this connection, we may note that the cost of new equipment is a major factor in investment decisions. However, the management should think in terms of incremental cost, not the full accounting cost of the new equipment because cost of new equipment is partly offset by the salvage value of the replaced equipment. In such analysis an index called the disposal ratio becomes relevant.

$$\text{Disposal ratio} = \frac{\text{Salvage value} / \text{Alternative use value}}{\text{Installed cost}}$$

- (iv) **Market forecast:** Both short and long run market forecasts are influential factors in capital investment decisions. In order to participate in long-run forecast for market potential critical decisions on capital investment have to be taken.
- (v) **Fiscal incentives:** Tax concessions either on new investment incomes or investment allowance allowed on new investment decisions, the method for allowing depreciation deduction allowance also influence new investment decisions.
- (vi) **Cash flow Budget:** The analysis of cash-flow budget which shows the flow of funds into and out of the company, may affect capital investment decision in two ways. First, the analysis may indicate that a company may acquire necessary cash to purchase the equipment not immediately but after say, one year, or it may show that the purchase of capital assets now may generate the demand for major capital additions after two years and such expenditure might clash with anticipated other expenditures which cannot be postponed. Secondly, the cash flow budget shows the timing of cash flows for alternative investments and thus help management in selecting the desired investment project.
- (vii) **Non-economic factors:** A new equipment may make the workshop a pleasant place and permit more socialising on the job. The effect would be reduced absenteeism and increased productivity. It may be difficult to evaluate the benefits in monetary terms and as such we call this as non-economic factor. Let us take one more example. Suppose the installation of a new machine ensures greater safety in operation. It is difficult to measure the resulting monetary saving through avoidance of an unknown number of injuries. Even then, these factors give tangible results and do influence investment decisions.

## RATIONALE OF CAPITAL BUDGETING DECISIONS

The rationale behind the capital budgeting decisions is efficiency. A firm has to continuously invest in new plant or machinery for expansion of its operations or replace worn out machinery for maintaining and improving efficiency. The main objective of the firm is to maximise profit either by way of increased revenue or by cost reduction. Broadly, there are two types of capital budgeting decisions which expand revenue or reduce cost.

- 1. Investment decisions affecting revenue:** It includes all those investment decisions which are expected to bring an additional revenue by raising the size of firm's total revenue. It is possible either by expansion of present operations or the development of new product in line. In both the cases fixed assets are required.
- 2. Investment decisions reducing costs:** It includes all those decisions of the firms which reduces the total costs and leads to increase in its total earnings i.e. when an asset is worn out or becomes outdated,



the firm has to decide whether to continue with it or replace it by new machine. For this, the firm evaluates the benefit in the form of reduction in operating costs and outlays that would be needed to replace old machine by new one. A firm will replace an asset only when it finds it beneficial to do so. The above decision could be followed decisions following alternative courses: i.e. Tactical investment decisions to strategic investment decisions, as briefly defined below.

3. **Tactical investment decisions:** It includes those investment decisions which generally involves a relatively small amount of funds and does not constitute a major departure from what the firm has been doing in the past.
4. **Strategic investment decisions:** Such decisions involve large sum of money and envisage major departure from what the company has been doing in the past. Acceptance of strategic investment will involve significant change in the company's expected profits and the risk to which these profits will be subject. These changes are likely to lead stock-holders and creditors to revise their evaluation of the company.

## KINDS OF CAPITAL BUDGETING DECISIONS

Generally the business firms are confronted with three types of capital budgeting decisions (i) the accept-reject decisions; (ii) mutually exclusive decisions; and (iii) capital rationing decisions.

**(i) Accept-reject decisions:** Business firm is confronted with alternative investment proposals. If the proposal is accepted, the firm incur the investment and not otherwise. Broadly, all those investment proposals which yield a rate of return greater than cost of capital are accepted and the others are rejected. Under this criterion, all the independent prospects are accepted.

**(ii) Mutually exclusive decisions:** It includes all those projects which compete with each other in a way that acceptance of one precludes the acceptance of other or others. Thus, some technique has to be used for selecting the best among all and eliminates other alternatives.

**(iii) Capital rationing decisions:** Capital budgeting decision is a simple process in those firms where fund is not the constraint, but in majority of the cases, firms have fixed capital budget. So large number of projects compete for these limited budget. So the firm ration them in a manner so as to maximise the long run returns. Thus, capital rationing refers to the situations where the firm have more acceptable investments requiring greater amount of finance than is available with the firm. It is concerned with the selection of a group of investment out of many investment proposals ranked in the descending order of the rate of return.

## PLANNING OF CAPITAL EXPENDITURE

From the above discussion, it is evident that capital budgeting is concerned with activities ranging from planning the availability, allocation and control of expenditure of long-term as well as short-term investment funds.

Planning of capital expenditure could be done to finance the capital expenditure plans of the company for short-term or long-term periods and hence the long-term plan budget and short-term plan budget.

**A. As regards long-term plan budget,** the period covered under the planning is three to five or more years. The planning for such expenditure assumes a composite form involving all aspects of economic forecasts for the outlook of entire industry in which the company performs with its unit and forecast for the company with probable or expected coverage of market share. On the basis of this forecast plant managers estimate their prospective capital expenditure, the marketing managers plan their market shares, the personnel managers assess the requirements for manpower and technical hands to achieve targeted production results, and the finance managers plans, for the funds to be made available for investment taking into consideration the above requirements. The long-range capital budget is continually revised with changing economic conditions, the marketing environment, structure of wages and the inflationary pressures in the economy. It is flexible in nature and oriented towards a long-range growth planning for the company.

**B. As regards short-period Capital budgeting**, involving short-range planning for funds, it covers expenditure for a short duration involving the period covered within one or two years. It does not involve large capital expenditure but covers temporary need for funds for different departments within the company depending upon the degree of urgency, profitability and savings to be achieved with reference to the capital costs to be incurred. Short run capital expenditure plans get converted into long-term plans of capital expenditure. Short-term capital expenditure plan is known as operating budget and is concerned with revenues and expenses related to firms daily operations.

Significance of planning for capital expenditure is derived only with major investment proposals and the use of funds over a long period. The most important factor affecting the planning horizon is the rate of change in technology in the industry. The advancement in technology may warrant capital investment for short as well as long period depending upon the changing pace of technology and technological obsolescence: long-term plan, however, helps the company to analyse its need and directions into the distant future involving a technological change.

### CAPITAL EXPENDITURE CONTROL

Planning and control are inter-linked and consecutive steps for the successful implementation of any programme. Planning done for incurring capital expenditure is followed by control devices to assess the divergencies between the expected and achieved results. Control for capital expenditure is expressed keeping in view the above objective.

It may be recalled that capital expenditure is classified into three main forms viz.:

- (1) expenditure made to reduce costs;
- (2) expenditure made to increase revenue;
- (3) expenditure which is justified on non-economic grounds.

Which exercise control over capital expenditure in any of the above categories, the capital expenditure analysis should concentrate on three types of outlays viz.: (1) Major projects, (2) Routine expenditure, and (3) Replacement.

As regards major projects, strategic investment may be made for expansion of productive capacity or achieving product innovation or preparing barriers against capital fluctuations. In the second type of outlay, routine expenditure may be working condition improvement, maintenance expenditure, competition oriented expenditure etc. Thirdly, replacement need may arise to avoid capital wastage for existing equipment to check its disposal value or it may be obsolescence replacement. In all circumstances, proper attention is to be devoted in analysing the need for the capital expenditure so that it would be curtailed to the minimum required.

One important aspect of control device is to match the demand schedule for the capital for the company and the supply of capital from different sources. Demand comes for capital from all departments and it is at this level control could be exercised to keep the demand at the bare minimum required for the objective inherent in capital investment decisions. Supply of capital, on the other hand, is a scarce commodity and the company has to incur expenditure for availing it. This necessitates for the finance manager to exercise economy in capital expenditure so that optimum benefit could be obtained with the use of scarce capital sources. This establishes the need for capital rationing to impose constraints on capital expenditure under prevailing market conditions and place self-imposed constraints to check the funds being raised from outside agencies like borrowings. Thus, the device of capital rationing is adopted to control capital expenditure.

### CAPITAL RATIONING

The firm may put a limit to the maximum amount that can be invested during a given period of time, such as a year. Such a firm is then said to be resorting to capital rationing. A firm with capital rationing constraint attempts to select the combination of investment projects that will be within the specified limits of investments to be made during a given period of time and at the same time provide greatest profitability.

Capital rationing may be effected through budget ceiling. A firm may resort to capital rationing when it follows the policy of financing investment proposals only by ploughing back its retained earnings. In that case, capital expenditure in a given period cannot exceed the amount of retained earnings available for reinvestment. Management may also introduce capital rationing when a department is authorised to make investments upto a limit beyond which investment decisions will be made by higher level management.

Capital rationing may result in accepting several small investment proposals then accepting a few large investment proposals so that there may be full utilisation of budget ceiling. This may result in accepting relatively less profitable investment proposals if full utilization of budget is a primary consideration. Similarly, capital rationing also means that the firm foregoes the next most profitable investment falling after the budget ceiling even though it is estimated to yield a rate of return much higher than the required rate of return. Thus, capital rationing does not lead optimum results.

## CAPITAL BUDGETING PROCESS

It is a complex process which may be divided in the following phases:

**I. Identification of Potential Opportunities:** Mere identification or possible alternatives is not all that is required in any search for investment proposals. The best proposal needs to be discovered and considered. Capital expenditure proposals should come from different segments of the enterprise. Personnel working at different levels in the organisation should be encouraged to participate in the discovery of best available proposals for capital outlays within the limits of their authority, knowledge and experience. It is better if management establishes well-defined guidelines for searching investment proposals so that no useful idea remains uncommunicated and no redundant proposal pass through the processing stage.

Proposals regarding capital expenditure do not originate at the level of the controller or the budget committee. The requirements for fixed-assets expenditure are forwarded by the managers of different operating units or departments. It is, however, better if such proposals are accompanied by commercial and technical assumptions on which these are based and duly supported with details relating to the following matters;

- (a) Market potential for the product and yearly sales forecasts for different years.
- (b) Raw material requirements and their supply position.
- (c) Technical details relating to physical facilities and flow diagrams.
- (d) Financial implications.

Capital expenditure proposals may also originate at the top management level of the company. The Chief Executive may carry out survey relating to physical facilities, new market, development of new products, stage of technology and the like. Such efforts may lead to discovery of certain useful alternatives which should be screened and evaluated in the same way as originating at lower levels.

**II. Establishing the Criteria:** Economic performance like return on investment as calculated in a number of ways under different methods furnishes the most important criterion used for evaluating fixed assets investment proposals. But here also the technique to be used for evaluating economic performance should be clearly defined and communicated. There are also occasions when non-economic criteria like competition, risk, legal requirements, and social responsibilities become the over-riding considerations in evaluating different investment proposals. But it does not mean that criteria once established holds good under all circumstances and for all times to come. Relevance and reliability of criteria should be continuously reviewed.

**III. Screening and co-ordination:** At this stage, all those proposals which are conflicting and do not deserve further consideration are rejected so that only useful alternatives are analysed in detail. Economic evaluation generally plays an important role in the screening process. Along with screening, there is also the need for blending together and unifying different capital projects under the total capital expenditure programme. In this way, conflicting and duplicate proposals would be eliminated and taken together all of them contribute to the

accomplishment of some higher objectives. Co-ordination will be greatly facilitated in different proposals for capital outlays are related to each other.

**IV. Evaluating Investment Proposals:** It would be useful if different proposals are properly classified and diagnosed before their evaluation. Investment proposals may be classified on the basis of the degree of risk involved or the extent to which they are postponable. In terms of reasons for the expenditure, the proposals may be classified whether they result in replacements, betterments or additions to assets. In the process, certain mutually exclusive and conflicting proposals will be eliminated. If the firm enjoys sufficient resources to finance all the remaining projects which are profitable, ranking them in order of preference is not a serious problem. But in reality, the number of proposals are generally larger than the amount of funds available with the firm, and the controller wants to recommend only the most desirable of them. As a matter of fact, some of the good proposals are also rejected even when they are profitable.

Return on investment in the underlying consideration for economic evaluation and techniques dealing with this kind of appraisal have received wide publicity in the literature covering planning and control of fixed assets expenditures. However, a number of non-economic criteria like social responsibilities and emergencies should be accorded with due consideration while appraising different investment projects. At the same time, certain appraisal technique should not be accepted blindly, simply because they are more sophisticated and are expressed numerically. The underlying assumption of different techniques should be adequately looked into and their reliability and suitability under a given situation thoroughly tested.

**V. Budgeting Capital Expenditure:** Capital budgeting refers to the process of planning the investment of funds in long-term assets of the enterprise. Its purpose is to help management control capital expenditure. With the help of capital budgeting, management is able not only to reject poor investment decisions but also to select, in order of priority the projects which are most profitable and consistent with the objectives and targets set.

Additions, replacement and betterments require additional funds to be committed to long-term assets, and are thus included in the capital budget which is typically prepared for a year. Capital budget is a snapshot of the plan and projects for the coming year for which approval is sought. Capital budget should be flexible so as to eliminate some of the projects already included but allow addition of new projects that deserve consideration. Inclusion of certain projects in the capital budget and its approval by the management does not mean that actual expenditure has been authorised. Rather, it offers an opportunity to look at each project even from the view point of the total organisation. There is also the need of reconcile capital budget with other budgeting activities of the enterprise for example, cash revenue and expense budgets.

**VI. Controlling Projects in Process:** Another important aspect of planning and control of capital outlays is to devise a procedure to exercise control over projects while in process. Controlling of projects in process generally falls within the purview of the financial manager. He is concerned with laying down the procedure to ensure that completion satisfies the norms with respect to cost, time and purpose of expenditure. Variations from approved plans together with reasons should promptly be reported to responsible authorities for deviations. The observations and up-to-date progress report provide sufficient information to the management about the exact stage and status of all major projects. "Programme Evaluation and Review Technique" (PERT) and "Critical Path Scheduling" (CPS) are the newly developed and sophisticated techniques often used by large undertakings to plan and control the firm and cost of construction.

**VII. Follow-up and Performance Report:** The project manager or the manager originating the investment proposal, is responsible for submitting its completion report on the basis of which management normally proceeds to carry out the post completion audit. Follow up implies comparing and reporting actual results with the projected result of investment proposal so as to evaluate the performance and outcome in proper perspective. It is required, however, that procedures and format of follow-up should be clearly defined and communicated. Frequency and duration of audit should also be clearly indicated. Audit personnel should also be provided with broad guidelines as to the extent of economic and non-economic evaluation they are expected to carry out.

A project below a certain size may be audited locally by the staff of the departmental manager. But projects

involving a number of departments or above a certain size should be audited by a certain group. The latter approach claims uniformity, efficiency and detailed review of the project as its main advantages. The post-completion audit helps management in a number of ways:

- (a) to validate the existing capital expenditure, planning and control procedures and methods;
- (b) to evaluate results;
- (c) to highlight reasons for projects failure; and
- (d) to judge soundness of proposals originating at different levels in the organisation.

## INVESTMENT CRITERIA

A sound and systematic investment criteria is absolutely necessary to appraise the economic worth of an investment proposal. It is because of the fact that huge sums of scarce financial and other resources are to be sunk almost irrevocably within a limited span of time for which returns and rewards are uncertain and expected to accrue over a long period of time in the future. A sound investment criteria at least should provide the following:

1. a means of distinguishing between acceptable and non-acceptable projects;
2. ranking of projects in order of their desirability;
3. choice among several alternatives;
4. a criteria which is applicable to any conceivable investment project independent of others;
5. recognising the fact that the bigger benefits are preferable to smaller one and early benefits are preferable to later benefits;
6. helping to choose among mutually exclusive projects, one which maximises the shareholders wealth.

A wide variety of techniques are used for evaluating investment proposals. The most commonly used techniques are as follows:

- The Payback Method
- The Average Rate of Return Method
- Discount Cash Flow Method
  - (A) Net Present Value Method (NPV)
  - (B) Internal Rate of Return Method (IRR)
  - (C) Profitability Index (PI) or Benefit Cost Ratio (BC).

Every method is designated with some purpose in view and as such different methods are not equally useful to every firm and under all circumstances. However, proper understanding of these techniques will help the management to determine the most suitable technique to be used and thus make better investment decisions keeping in view the business situation, particular requirements of the firm and nature of investment proposals.

## The Payback Method

This technique estimates the time required by the project to recover, through cash inflows, the firm's initial outlay. Beginning with the project with the shortest payout period, different projects are arranged in order of time required to recapture their respective estimated initial outlays. The payback period for each investment proposal is compared with the maximum period acceptable to management and proposals are then ranked and selected in order of those having minimum payout period.

While estimating net cash inflows for each investment proposal, the following considerations should be borne in mind:

- (i) Cash inflows should be estimated on incremental basis so that only the difference between cash inflows of the firm with and without the proposed investment project is considered.
- (ii) Cash inflows for a project should be estimated on an after-tax basis.
- (iii) Since non-cash expenses like depreciation do not involve any cash outflows, estimated cash inflows from a project should be adjusted for such items.

Let us consider an example. Say, a project requires ₹ 25,000 as initial investment, and it will generate an annual cash inflow of ₹ 5,000 for ten years then pay back period will be five years, calculated as follows:

$$\begin{aligned} \text{Pay back period} &= \frac{\text{Initial Investment}}{\text{Annual cash inflows}} \\ &= \frac{\text{Rs. 25,000}}{\text{Rs. 5,000}} = 5 \text{ years} \end{aligned}$$

The annual cash inflow is calculated by taking into account the amount of net income on account of the asset (or project) before depreciation but after taxation.

Sometimes there are projects where the cash inflows are not uniform. In such a case cumulative cash inflows will be calculated and by interpolation exact payback period can be calculated. For example if the project need an initial investment of ₹ 25,000 and the annual cash inflow for five years are ₹ 6,000, ₹ 9,000, ₹ 7,000, ₹ 6,000 and ₹ 4,000 respectively. The pay back period will be calculated as follows:

Year	Cash inflow ₹	Cumulative cash-inflow ₹
1.	6,000	6,000
2.	9,000	15,000
3.	7,000	22,000
4.	6,000	28,000
5.	4,000	32,000

It is evident from the above table that in 3 years ₹ 22,000 has been recovered and ₹ 3,000 is left of initial investment of ₹ 25,000. It indicates that payback period is between 3 to 4 years calculated as follows:

$$\begin{aligned} \text{Pay back period} &= 3 \text{ years} + \frac{3,000}{6,000} \\ &= 3.5 \text{ years.} \end{aligned}$$

#### **Decision Rule for Payback Method:**

Accept the project if the payback period calculated for it is less than the maximum set by the management. Reject the project if it is otherwise. In case of multiple projects, the project with shorter payback period will be selected. In essence, payback period shows break-even point where cash inflows are equal to cash out flows. Any inflows beyond this period are surplus inflows.

#### **Advantages of Payback Method:**

1. It is easy to calculate and investment proposals can be ranked quickly.
2. For a firm experiencing shortage of cash, the payback technique may be used with advantage to select investments involving minimum time to recapture the original investment.
3. The payout method permits the firm to determine the length of time required to recapture through cash flows, the capital expenditure incurred on a given project and thus helps it to determine the degree of risk involved in each investment proposal.

4. This is ideal in deciding cash investment in a foreign country with volatile political position and a long-term projection of political stability is difficult.
5. This is, likewise, more preferred in case of industries where technological obsolescence comes within short period; say electronic industries.

**Disadvantages of Payback Method:**

1. The payback method ignores the time value of money and treats all cash flows at par. Thus, projects A and B with the following cash flows are treated equally:

Years	Cash Flows	
	Project A ₹	Project B ₹
1.	5,000	2,000
2.	4,000	3,000
3.	3,000	4,000
4.	2,000	5,000
<b>Investment</b>	14,000	14,000

Although Pay Back period is 4 years for both the projects, project A is preferable since it recovers larger amount of money during the initial years.

The pay back method, therefore, ignores the fact that amount of cash received today is more important than the same amount received after say, 2 years.

2. The payback method does not consider cash flows and income that may be earned beyond the payout period.
3. Moreover, it does not take into account the salvage or residual value, if any, of the long-term asset.
4. The payback technique ignores the cost of capital as the cut-off factor affecting selection of investment proposals.

**Suitability of using Payback Period of Method :**

Payback period method may be successfully applied in the following circumstances:

- (i) where the firm suffers from liquidity problem and is interested in quick recovery of fund than profitability;
- (ii) high external financing cost of the project;
- (iii) for projects involving very uncertain return; and
- (iv) political and economic pressures.

It may, therefore, be said that payback period is defined as the measure of projects liquidity and capital recovery rather than its profitability.

**The Average Accounting Rate of Return (ARR) Method**

This method is designated to consider the relative profitability of different capital investment proposals as the basis for ranking them – the fact neglected by the payout period technique. Since this method uses accounting rate of return, it is sometimes described as the financial statement method. Rate of return is calculated by dividing earnings by capital invested. The numerator, i.e., earnings can be interpreted in a number of ways. It might mean income after taxes and depreciation, income before taxes and depreciation, or income after taxes but before depreciation. Since both numerator and denominator carry different meanings. It is not surprising if

one comes across a number of variations of the average rate of return method. However, the two common variations are:

**(a) Average Rate of Return in Original Investment:**

$$= \frac{\text{Net earnings after Depreciation and Taxes}}{\text{No. of years project will last}} \div \text{Original Investment}$$

**(b) Average Rate of Return on Average Investment:**

$$= \frac{\text{Net earnings after Depreciation and Taxes}}{\text{No. of years project will last}} \div \text{Average Investment}$$

Average investment is estimated by dividing the total of original investment and investment in the project at the end of its economic life by 2. The approach of dividing average annual after-tax earnings of the project by its original investment makes no attempt to incorporate the fact of gradual recovery of investment over time, hence tends to undertake the average rate of return. The average investment approach on the other hand, gives best result when original investment is evenly recovered over the economic life of the project which may not always be the case.

**Decision Rule for Average of Rate of Return Method:**

Normally business firm determine rate of return. So accept the proposal if

$$\text{ARR} > \text{Minimum rate of return (cut off rate)}$$

and Reject the project if

$$\text{ARR} < \text{Minimum rate of return (cut off rate)}$$

In case of more than one project, where a choice has to be made, the different projects may be ranked in descending or ascending order of their rate of return. Project below the minimum rate will be dropped. In case of project yielding rate of return higher than minimum rate, it is obvious that project yielding a higher rate of return will be preferred to all.

**Advantages of Average Rate of Return Method:**

- (i) Earnings over the entire life of the project are considered.
- (ii) This method is easy to understand, simple to follow. Accounting concept of income after taxes is known to every student of accountancy.

**Disadvantages of Average Rate of Return Method:**

- (i) Like the payback technique, the average return on investment method also ignore the time value of funds. Consideration to distribution of earnings over time is important. It is to be accepted that current income is more valuable than income received at a later date.
- (ii) The method ignores the shrinkage of original investment through the process of charging depreciation allowances against earnings. Even the assumption of regular recovery of capital over time as implied in average investment approach is not well founded.
- (iii) The average rate of return on original investment approach cannot be applied to a situation where part of the investment is to be made after the beginning of the project.

**Suitability of using ARR Method:**

If the project life is not long, then the method can be used to have a rough assessment of the internal rate of return. The present method is generally used as supplementary tool only.

**Comparison between Average Rate of Return and Payback Method:**

The average rate of return method and its comparison with payback method may be illustrated as follows:



Suppose there are two investment proposals A and B each with capital investment of ₹ 20,000 and depreciable life of 4 years. Assume that following are the estimated profit and cash inflows when annual straight line depreciation charged is ₹ 5,000.

Period	Project A		Project B	
	Book Profits ₹	Net Cash Inflows ₹	Book Profits ₹	Net Cash Inflows ₹
1.	4,000	9,000	1,000	6,000
2.	3,000	8,000	2,000	7,000
3.	2,000	7,000	3,000	8,000
4.	1,000	6,000	4,000	9,000
<b>Total</b>	10,000	30,000	10,000	30,000
Average rate of return on original investment	12.5%		12.5%	

If evaluated in terms of average rate of return method, the two projects are equally favourable. However, project A is more favourable than project B since it provides larger cash inflows in the initial period (i.e. Quicker Payback).

### Discounted Cash Flow (DCF) Method

The traditional techniques like the Payback period or Accounting rate of return takes no account of the time value of the money. But money received today is much more valuable than the some money received later. Present inflationary conditions magnify the difference. This is the principal fact that modern analysis technique like Discounted Cash flow have incorporated to improve on the past procedures. Under this method, the cash flow discounted at the projects discount rate to the present time, is a present value. Analysis concentrate on the incremental cash flow of a project. Discounted cash flow method involves following steps:

1. Computation of cash flows i.e. both inflows and out flows (preferably after tax) over the life of the project.
2. Applying the discount factor to the cash flows.
3. Totalling discounted cash-inflows and comparing it with discounted cash outflows.

Broadly, there are three discounted cash flow methods for evaluating capital investment proposals i.e.

- A. Net Present Value Method
- B. Internal Rate of Return Method
- C. Profitability Index or Benefit Cost (B/C) Ratio Method.

#### A. Net Present Value Method

The net present value method is understood to be the best available method for evaluating the capital investment proposals. Under this method, the cash outflows and inflows associated with each project are ascertained first. Cash inflows are worked out by adding depreciation to profit after tax arising to each project\*. Since the cash outflows and inflows arise at different point of time and cannot be compared, so both are reduced to the present values at the rate of return acceptable to the management. The rate of return is either cost of capital of the firm or the opportunity cost of capital to be invested in the project. The assumption under this method remain that cash inflows are reinvested at the same discount rate.

In essence, Net Present Value is the difference between the sum total of present values of all the future cash inflows and outflows:

**Algebraically:**

$$NPV = \frac{R_1}{(1+k)^1} + \frac{R_2}{(1+k)^2} + \dots + \frac{R_n}{(1+k)^n} + \frac{W_n}{(1+k)^n} + \frac{S_n}{(1+k)^n} - C$$

$$NPV = \sum_{t=1}^N \frac{R_t}{(1+k)^t} + \frac{S_n + W_n}{(1+k)^n} - C$$

If cash outflow is also expected to occur at some time other than initial investment (non-conventional cash flows) then formula would be

$$NPV = \left[ \frac{R_1}{(1+k)^1} + \dots + \frac{R_n}{(1+k)^n} + \frac{S_n}{(1+k)^n} + \frac{W_n}{(1+k)^n} \right] - \left[ C_0 + \frac{C_1}{(1+k)^t} + \dots + \frac{C_n}{(1+k)^n} \right]$$

$$NPV = \sum_{t=1}^N \frac{R_t}{(1+k)^t} + \frac{S_n + W_n}{(1+k)^n} - \sum_{t=1}^N \frac{C_t}{(1+k)^t} - C_0$$

NPV = Net Present Value

R=Cash inflow at different time period

K=Rate of discount or cost capital

t=1 = first period in the sum

N=The last period in the sum

$S_n$ =Salvage value

$W_n$ =Working capital

C=Cost of investment plus Working Capital

**Decision Rule of using DCF Method:**

If NPV > Zero : Accept the project

NPV < Zero : Reject the project

NPV = Zero : Firm is indifferent to accept or reject the project.

**Advantages of DCF Method:**

- (i) Income over the entire life of the project is considered.
- (ii) The method takes into account time value of money.
- (iii) The method provides clear acceptance so interpretation is easy.
- (iv) When projects involves different amount of investment, the method may not provide satisfactory answers.

**Disadvantages of DCF Method:**

- (i) As compared with the first two methods, the present value approach is certainly more difficult to understand and apply.

- (ii) An additional difficulty in this approach is encountered when projects with unequal lives are to be evaluated.
- (iii) It is difficult to determine the firm cost of capital or appropriate rate of discount.

### ***Suitability of DCF Method:***

Net present value is the most suitable method in those circumstances where availability of resources is not a constraint. The management authority can accept all those projects having Net Present Value either Zero or positive. This method shall maximise shareholders wealth and market value of share which is the sole aim of any business enterprise.

### ***B. Internal Rate of Return (IRR)***

The internal rate of return refers to the rate which equates the present value of cash inflows and present value of cash outflows. In other words, it is the rate at which net present value of the investment is zero. If the Net Present Value is positive, a higher discount rate may be used to bring it down to equalise the discount cash inflows and vice versa. That is why Internal Rate of Return is defined as the break even financing rate for the project.

The necessary steps to be followed in applying this method are:

- (i) Project the net cash benefit of an investment during the whole of its economic life. Future cash flows should be estimated after taxes, but before depreciation and interest.
- (ii) Determine the rate of discount that equates the present value of its future cash benefits to its present investment. The rate of discount is determined by the method of trial and error.
- (iii) Compare the rate of discount as determined above with the cost of capital or any other cut-off rate, and select proposals with the highest rate of return as long as the rate is higher than the cost of capital or cut off rate.

Assuming conventional cash flows, mathematically the Internal Rate of Return is represented by that rate of, such that

$$C = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \dots + \frac{CF_n}{(1+r)^n} + \frac{S_n}{(1+r)^n} + \frac{W_n}{(1+r)^n}$$

$$C = \sum_{t=1}^n \frac{CF_t}{(1+r)^t} + \frac{S_n}{(1+r)^n} + \frac{W_n}{(1+r)^n}$$

$$C = \sum_{t=1}^n \frac{CF_t}{(1+r)^t} + \frac{S_n + W_n}{(1+r)^n}$$

$$O = \sum_{t=1}^n \frac{CF_t}{(1+r)^t} + \frac{S_n + W_n}{(1+r)^n} - C$$

For non-conventional cash flows the equation would be

$$C = \sum_{t=1}^n \frac{CF_t}{(1+r)^t} + \frac{S_n + W_n}{(1+r)^n} - \sum_{t=1}^n \frac{C_1}{(1+k)^t}$$

$r$  = the internal rate of return

$CF_t$  = cash inflows at different time periods

$S_n$  = salvage value

## 48 PP-FT&FM

$W_n$  = working capital adjustment

$C$  = cash outlays at different time periods

$k$  = cut off rate, the rate below which a project will not be accepted, which is normally the cost of capital

**Decision Rule:**

If Internal Rate of Return i.e.

$r > k$  (cut off rate) Accept the investment proposal

$r < k$  Reject the investment proposal

$r = k$  Indifferent

In case of several investment proposals the projects may be ranked according to their Internal Rate of Return, the project with highest Internal Rate of Return, is ranked first and so on. Acceptance of more than one project may follow in order of priority.

### **Computation of Internal Rate of Return:**

The computation of Internal Rate of Return is relatively complicated and difficult compared to Net Present Value. One has to follow trial and error exercise to ascertain Internal Rate of Return ( $r$ ) which equates the cash inflows and outflows of the investment proposals. Under net present value,  $k$  is known, but under this method it is worked out.

Initially the Internal rate of return ( $r$ ) may give

$NPV > 0$   $r > k$  (higher rate will be tried)

$NPV = 0$   $r = k$

$NPV < 0$   $r < k$  (lower rate will be tried)

To calculate the exact figure, we use the method of interpolation i.e.

$$IRR(r) = r_L + \left[ \frac{PV_{CFAT} - PV_C}{DPV} \right] \times Dr$$

or

$$= r_H - \left[ \frac{PV_C - PV_{CFAT}}{DPV} \right] \times Dr$$

$r_L$  = The lower rate of discount.

$PV_{CFAT}$  = Calculated present value of cash inflow.

$PV_C$  = Present value of cash outlay.

$DPV$  = Difference in calculated present value.

$Dr$  = Difference in rate of interest.

$r_H$  = The higher rate of discount.

Let us illustrate the method in two different situations:

(i) Uniform cash inflows

(ii) Non-uniform cash inflows.

### **Example**

Let us consider a project where initial investment is ₹ 18,000. The annual cash flow will be ₹ 5,600 for a period of 5 years. The internal rate of return can be computed by computing the factor as under

$$F = I/C$$

where,

F = Factor to be located

I = Initial investment

C = Average cash inflow

$$= \frac{18,000}{5600} = 3.214$$

After the factor is calculated as above, it is located in the different Annuity table on the line representing the number of years corresponding to the economic life of the project.

In above example, according to annuity table, factor closest to 3.21 for five years are 3.2 (16% discount rate) and 3.199 (17% discount rate). Net Present Value for both the rates are as follows:

Rate of Discount ₹	16%	17%
Total Present Value	₹ 5,600 × 3.274 = ₹ 18,334.40	₹ 5,600 × 3.199 = ₹ 17,914.40
Less: initial outlay	₹ 18,000.00	₹ 18,000.00
NPV	+ ₹ 334.40	(-) ₹ 85.60

Since Net Present Value is greater than zero i.e. ₹ 334.40 at 16% rate of discount, we need a higher rate of discount to equalise Net Present Value with total outlay. On other hand, Net Present Value is less than zero i.e. (-) ₹ 85.60 at 17% rate of discount we need lower rate. So the above exercise shows that internal Rate of Return lies between 16% and 17%. To find out the exact figure, the interpolation can be used i.e.

$$IRR = r_L + \frac{PV_{CFAT} - PV_C}{\Delta PV} \times Dr$$

$$r_L = 16$$

$$PV_{CFAT} = + ₹ 18,334.40$$

$$PV_C = ₹ 18,000$$

$$DPV = ₹ 420$$

$$Dr = 1$$

$$IRR = 16 + \frac{₹334}{₹420} \times 1 = 16 + .8$$

$$= 16.8$$

Alternatively it can be worked out by using higher rate of return.

Under uneven cash inflow, the calculation of internal rate of return is a tedious job. The process of Internal Rate of Return can be understood with the help of following illustration i.e. Company A is proposed to instal a new machine costing ₹ 16,200 having an economic life of 3 years. The annual Cash inflow shall be ₹ 8,000, 7,000 and 6,000 in the respective 3 years. Calculate Internal Rate of Return.

To compute internal rate of return, the trial and error method has been followed.

$$\text{Average cash inflow} = \frac{\text{Rs. } 8,000 + ₹7,000 + ₹6,000}{3} = ₹ 7,000$$

$$F = \frac{I}{C} = \frac{₹16,200}{₹7,000} = 2.314$$

According to annuity table factor closest to 2.314 for 3 years are 2.322 (14%) and 2.246 (16%). Broad results are given in the following table:

Year	Cash in flow ₹	Rate of Discount (14%)	PV ₹	Rate of Discount (16%)	PV ₹	Rate of Discount	PV ₹ (15%)
1.	8,000	0.877	7,016	.862	6,896.08	.870	6,960
2.	7,000	0.769	5,383	.743	5,201.00	.756	5,292
3.	6,000	0.675	4,050	.641	3,846.00	.658	3,948
			16,449		15,943		16,200
Less: Cash outlay			16,200		16,200		16,200
NPV			+249		-257		0

From the above table, it is quite clear that net present value is zero with 15% rate of discount, so it is the true internal rate of return.

#### **Advantages of IRR Method:**

- (i) The discounted cash flow (IRR) takes into account the time value of money.
- (ii) It considers cash benefits, i.e. profitability of the project for the whole of its economic life.
- (iii) The rate of discount at which the present value of cash flows is equated to capital outlay on a project is shown as a percentage figure. Evidently, this method provides for uniform ranking and quick comparison of relative efficiency of different projects.
- (iv) This method is considered to be a sophisticated and more reliable technique of evaluating capital investment proposals.
- (v) The objective of maximising of owner's welfare is met.

#### **Disadvantages of IRR Method:**

- (i) The discounted cash flow is the most difficult of all the methods of project evaluation discussed above.
- (ii) An important assumption implied in this method is that incomes are reinvested (compounding) over the project's economic life at the rate earned by the investment. This assumption is correct and justified only when the internal rate of return is very close to the average rate of return earned by the company on its total investments. To the extent internal rate of return departs from the typical rate of earnings of the company, results of this method, will be misleading. Thus, when the internal rate of return on a project is computed to be 30% while company's average rate of return is 15%, the assumption of earning income on income at the rate of 30% is highly unrealistic. From this point of view the assumption of the net present value method that incomes are reinvested at the rate of discount (cost of capital) seems to be more reasonable.
- (iii) The rate may be negative or one or may be multiple rate as per calculations. When a project has a sequence of changes in sign of cash flow, there may be more than one internal rate of return.

#### **C. Profitability Index (PI)**

Profitability Index is defined as the rate of present value of the future cash benefits at the required rate of return to the initial cash outflow of the investment. Symbolically, Profitability Index is expressed as

$$PI = \frac{\sum_{t=1}^n \frac{A_t}{(1+k)^t}}{C}$$

$A_t$  = Present value of cash inflows.

$K$  = rate of return

$C$  = initial cash outlay

$t$  = time period.

The above ratio is an indicator of the profitability of the project. If the ratio is equal to or greater than one, it shows that project has an expected yield equal to or greater than the discount rate. If the index is less than one, it indicates that project has an expected yield less than the discount rate.

#### **Decision Rule:**

If  $PI > 1$  Accept the Project,  $PI = 1$  indifferent,  $PI < 1$  Reject the project.

In the event of more than one alternatives, projects may be ranked according to their ratio – the project with the highest ratio should be ranked first and *vice versa*.

#### **Advantages of PI Method:**

- (1) Profitability Index method gives due consideration to the time value of money.
- (2) Profitability Index method satisfies almost all the requirements of a sound investment criterion.
- (3) This method can be successfully employed to rank projects of varying cash and benefits in order of their profitability.

#### **Disadvantages of PI Method:**

- (1) This method is more difficult to understand and compute.
- (2) This method does not take into account the size of investment.
- (3) When cash outflows occur beyond the cement period Profitability Index Ratio criterion is unsuitable as a selection criterion.

### **COMPARISON OF NET PRESENT VALUE AND INTERNAL RATE OF RETURN APPROACH**

The net present value and internal rate of return, two widely used methods are the species of the same genus i.e. Discount cash flow method, yet they are different from each other on various points.

The broad points of difference between the two are as follows:

#### **Points of Differences**

**1. Interest Rate:** Under the net present value method rate of interest is assumed as the known factor whereas it is unknown in case of internal rate of return method.

**2. Reinvestment Axiom:** Under both the methods, it is assumed that cash inflows can be re-invested at the discount rate in the new projects. However, reinvestment of funds, at cut-off rate is more possible than internal rate of return. So net present value method is more reliable than internal rate of return method for ranking two or more projects.

**3. Objective:** The net present value method took to ascertain the amount which can be invested in a project so that its expected yields will exactly match to repay this amount with interest at the market rate. On the other hand, internal rate of return method attempts to find out the rate of interest which is maximum to repay the

invested fund out of the cash inflows.

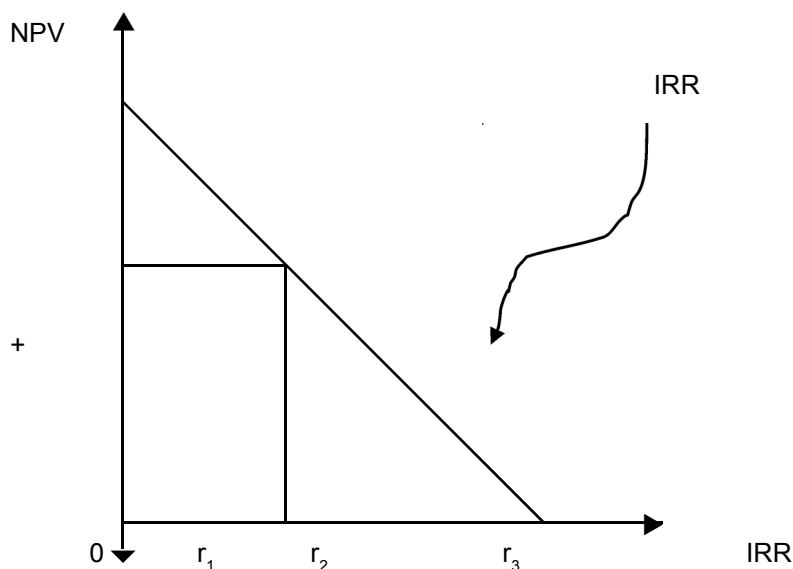
### Points of Similarities

IRR will give the same results as NPV in terms of acceptance or rejection of investment proposals in the following circumstances:

1. Projects having conventional cash flows i.e. a situation where initial investment (outlay or cash outflow) is followed by series of cash inflows.
2. Independent Investment Proposals: Such proposal, the acceptance of which does not exclude the acceptance of others.

The reasons for the consistent results under net present value and internal rate of return method in above two cases are simple and logical. According to the net present value method the rule is that an investment proposal will be accepted if it has positive net present value ( $NPV > 0$ ) which is possible only when actual rate of return is more than cut off rate. It is supported by internal rate of return method. In those case internal rate of return is more than required rate of return ( $r > k$ ). When the net present value is  $= 0$  or internal rate of return  $r = k$  the project may be accepted or rejected. So the proposal which have positive net present value will also have a higher than required rate of return.

The following diagram depict  $NPV > 0$  corresponding to  $IRR (r) > k$



If NPV is positive, it indicates  $r > k$  (cost of capital) and *vice versa*.

Points of conflict between net present value and internal rate of return cannot avoid certain situations where the results given by both the methods are in conflict to each other. This is so in the case of mutually exclusive investment proposals which result in non-acceptance of others. There are two types of mutually exclusive proposals:

1. **Technical:** It refers to proposals having different profitabilities and selection of that which is most profitable.
2. **Financial:** It is the exclusiveness due to limited fund. A firm will select only those proposal which is most profitable rather than accepting all proposals yielding more than minimum acceptable level. The conflict of results under two methods may be due to following reasons:

1. Size-disparity problem



2. Time-disparity problem
3. Unequal expected lives.

### **Comparative Study of results under alternative Discounted Cash Flow Method**

We can summarise the relationship among net present value, internal rate of return and profitability index methods regarding decision rules as follows:

Proposal	Net Present Value	Internal rate of return (r)	Profitable Index(PI)
Accept	(1) Positive	$> k$	$> 1$
Indifferent	(2) Zero	$= k$	$= 1$
Reject	(3) Negative	$< k$	$< 1$

Given the above relationship, any discounted cash flow criterion may be employed where investment proposals are independent and there is no capital budget constraints. In such a situation, the set of projects selected by all the criterion would be the same though there may be differences in internal ranking. In the real world, however, firms are faced with mutually exclusive proposals and limited availability of funds. On account of the imperfections, all the projects with (NPV)  $> 0$ , (IRR)  $> k$ , and (PI  $> 1$ ) can be accepted.

### **CHOICE OF METHODS**

The business enterprise is confronted with large number of investment criteria for selection of investment proposals. It should like to choose the best among all. Specially, it is the choice between Net Present Value and Internal Rate of Return Method because these are the two methods which are widely used by the firms. If a choice must be made, the Net Present Value Method generally is considered to be superior theoretically because:

- (i) It is simple to operate as compared to internal rate of return method;
- (ii) It does not suffer from the limitations of multiple rates;
- (iii) The reinvestment assumption of the Net Present Value Method is more realistic than internal rate of return method.

On the other hand, some scholars have advocated for internal rate of return method on the following grounds:

1. It is easier to visualise and to interpret as compared to Net Present Value Method.
2. It suggests the maximum rate of return and even in the absence of cost of capital, it gives fairly good idea of the projects profitability. On the other hand, Net Present Value Method may yield incorrect results if the firm's cost of capital is not calculated with accuracy.
3. The internal rate of return method is preferable over Net Present Value Method in the evaluation of risky projects.

### **Limits on Investment**

The evaluation techniques discussed above help management to appraise and rank different capital investment proposals in terms of their economic benefits. But does it mean that management will accept all projects promising some economic benefit? The most probable answer seems to be in negative. For one thing, no firm enjoys infinite capital supply at a point of time when investment decisions have to be made. Ability to generate funds internally and to raise them externally is not without limits. Next, there are also occasions when quantitative factors of economic evaluation need to be supplemented with a number of qualitative considerations like employee relations, competitive position, environmental and social responsibility and public relations. Moreover, there are some valid reasons for establishing some minimum acceptable rate of return below which management will not accept any investment proposal even if resources would

remain unutilised for sometime. The rate of return below which no investment should ordinarily be accepted is known as the cut off rate or the hurdle rate. Establishing the levels of hurdle rate enables the organisation to make investment decisions and maintain consistency in the actions of different people in the organisation. Further, by indicating the hurdle rate management communicates throughout the organisation its expectation as to the minimum rate of return.

The cut off rate may be established by any of the following methods:

1. By the method of intuition;
2. By the historical rate of return;
3. By the weighted average cost of capital;
4. By the cost of funds to be used to finance a given project.

The method used to establish a hurdle rate should be carefully selected keeping in view the overall objectives of the enterprise, its environment and opportunity cost of funds required to be invested in a given project.

## RISK EVALUATION AND SENSITIVITY ANALYSIS

### Risk Evaluation

Risk analysis gives management better information about the possible outcomes that may occur so that management can use their judgement and experience to accept an investment or reject it. Since risk analysis is costly, it should be used relatively in costly and important projects.

Risk and uncertainty are quite inherent in capital budgeting decisions. This is so because investment decisions and capital budgeting are actions of today which bear fruits in future which is unforeseen. Future is uncertain and involve risk. The projection of probability of cash inflows made today are not certain to be achieved in the course of future. Seasonal fluctuations and business cycles both deliver heavy impact upon the cash inflows and outflows projected for different project proposals. The cost of capital which offers cut-off rates may also be inflated or deflated under business cycle conditions. Inflation and deflation are bound to effect the investment decision in future period rendering the degree of uncertainty more severe and enhancing the scope of risk. Technological developments are other factors that enhance the degree of risk and uncertainty by rendering the plants or equipments obsolete and the product out of date. Tie up in the procurement in quantity and/or the marketing of products may at times fail and frustrate a business unless possible alternative strategies are kept in view. The case of Kudermukh Iron Ores Ltd. which had a firm tie-up with the Govt. of Iran is an example. All these circumstances combined together affect capital budgeting decisions.

It is therefore necessary to allow discounting factor to cover risk. One way to compare risk in alternative proposals is the use of Standard Deviation. Lower standard deviation indicates lower risk. However, wherever returns are expressed in revenue terms the co-efficient of variation gives better measurement for risk evaluation. Both Standard Deviation and co-efficient of variation can be arrived at by using following formula:

$$\text{Standard Deviation} = \sqrt{\frac{\sum f(x - \bar{x})^2}{\sum f}}$$

$$\text{Co-efficient of Variation} = \frac{\text{Standard Deviation}}{\text{Mean}} \times 100$$

Both standard deviation and co-efficient of variation require to be adjusted with the discount rate with which the project investments are evaluated. According to the degree of standard deviation or co-efficient of variation, the investment proposals shall be termed as highly risky or less risky investments. Less risky projects shall be afforded highest priority in investment or capital budgeting decisions.

Risk adjusted discount rates are used in investment and budgeting decisions to cover time value of money and the risk. According to new thinking, discounting and risk considerations are treated separately. The method which is used for this purpose is known as Certainty Equivalent Method (CE). The riskness of the project is handled by adjusting the expected cash flow and not the discount rate. The certainty equivalent in a year represent the cash-flows that investors would be satisfied to receive for certain period i.e. certainty equivalent converts the projects expected cash flow for this year into a certain amount investors consider equivalent to the project calculated cash flow for the year. Net Present Value of these cash flows is calculated with risk free interest rate as the discounting factor. Both the methods i.e. Risk adjusted discount rate and certainty equivalent methods are good for Risk Evaluation. The essential difference in the two methods is that the risk adjusted discount rate method account for risk by adjusting the discount rate in the denominator of the expected net present value formula, while the certainty equivalent method accounts for risk by adjusting the expected cash flow in the numerator of the expected net present value formula.

For evaluating risk, *payback method* provide crude account for risk differences by altering payback requirements i.e. instead of four year payback requirements, the firm may require three year payback for a proposed new product line that the firm feels is riskier investment. Shortening payback is similar to raising the discount rate.

**Decision tree technique** is another method which many corporate units use to evaluate risky proposals. A decision tree shows the sequential outcome of a risky decision. A capital budgeting decision tree shows the cash flows and net present value of the project under differing possible circumstances.

For example, a company 'X' has an opportunity to invest in equivalent schemes that will last for two years and will cost ₹ 1,00,000 initially and has the following estimated possible cash flow after tax (CFAT)

Year

One: 30% chance that (CFAT) will be ₹ 40,000/-

40% chance that (CFAT) will be ₹ 60,000/-

30% chance that (CFAT) will be ₹ 80,000

Two: CFAT are conditional to those of year one.

The estimated conditional CFAT's and probabilities are as under:

If 1st year CFAT = ₹ 40,000		If 1st year CFAT = ₹ 60,000		If 1st year CFAT = ₹ 80,000	
2nd year CFAT	Probability	2nd year CFAT	Probability	2nd year CFAT	Probability
20,000	0.2	70,000	0.3	80,000	0.1
50,000	0.6	80,000	0.4	1,00,000	0.8
80,000	0.2	90,000	0.3	1,20,000	0.1

From the above data we may plan the decision as under:

					Decision Tree			Expected
	Prob-ability	CFAT Year 1 (₹)	Probability	CFAT Year 2 (₹)	CFAT at 15%	(a) NPV at 15% ₹	(b) Joint Probability	NPV a x b (₹)
	.3	40,000	0.2	20,000	49,920	- 50,080	0.06	- 3,005
			0.6	50,000	72,600	- 27,400	0.18	- 4,932
			0.2	80,000	95,280	- 4,720	0.06	- 283
Cash outlay 1,00,000	.4	60,000	0.3	70,000	1,05,120	5,120	0.12	614
			0.4	80,000	1,12,680	12,680	0.16	2,029
			0.3	90,000	1,20,240	20,240	0.12	2,428
	.3	80,000	0.1	80,000	1,30,080	30,080	0.03	902
			0.8	1,00,000	1,45,200	45,200	0.24	10,848
			0.1	1,20,000	1,60,320	60,320	0.03	1,810
							1.00	10,411

**Note:** Present value of cash inflows are worked out on the basis of three decimal points.

The above decision tree shows possible CFAT outcomes in each year and the probabilities associated with these outcomes. The decision tree shows nine distinct paths, or combinations of outcomes that the project would take if accepted. One possibility is that one year's CFAT is ₹ 40,000 and the second year's CFAT is ₹ 20,000. This is worst combination of outcomes that could occur. The company X would have paid ₹ 1,00,000 for a CFAT stream of ₹ 40,000 and ₹ 20,000 in years one and two respectively. If the company X determined that an appropriate discount rate for this project is 15%, the NPV of the worst path is -₹ 50,080. By looking at the decision tree figure, the best path for the firm is  $CFAT_1 = ₹ 80,000$  and  $CFAT_2 = ₹ 1,20,000$ . The NPV at 15% of that path is ₹ 60,320. The decision tree shows NPV of each of the nine possible CFAT paths in the tree at discount rate of 15%. The expected net present value ( $\overline{NPV}$ ) of the problem depicted by the decision tree is the weighted average of net present values of all the paths:

$$\overline{NPV} = \sum_{j=0}^N (\text{Prob}_j) (NPV_j)$$

Where  $NPV_j$  = net present value of the jth path

$\text{Prob}_j$  = the probability of the jth path occurring

N = number of possible paths

The probability of a path occurring is called its joint probability. It is equal to the product of the probabilities along with the path.

In the decision tree calculations the last column shows the calculation of expected  $\overline{NPV}$  which is the weighted average of individual path NPVs where the weights are the path probabilities.  $\overline{NPV}$  for example is ₹ 10,411 and project should be accepted.

For short period projects the above technique is good but for long period projects it becomes more complicated with the multiplication of paths, for the number of possibilities. In the above case, there had been 9 paths for 2 years, but for the 3 years these could be  $(3 \times 3 \times 3) = 27$  paths and like wise the increase of path complicates the diagram and calculations.

## Sensitivity Analysis

Capital budgeting remain unrealistic in the circumstances when despite a set of reliable estimates of return, outlays, discount rate and project life time uncertainty surrounds some of all of these figures. Sensitivity analysis is helpful in such circumstances.

It is a computer based device. Sensitivity analysis has been evolved to treat risk and uncertainty in capital budgeting decisions. The analysis is comprised of the following steps: (1) Identification of variables; (2) Evaluation of possibilities for these variables; (3) Selection and combination of variables to calculate NPV or rate of return of the project; (4) substituting different values for each variables in turn while holding all other constant to discover the effect on the rate of return; (5) Comparison of original rate of return with this adjusted rate to indicate the degree of sensitivity of the rate to change in variables; (6) subjective evaluation of the risk involved in the project.

The purpose of sensitivity analysis is to determine how varying assumptions will effect the measures of investment worth. Ordinarily, the assumptions are varied one at a time i.e. cash flows may be held constant with rate of discount used to vary; or discount rate is assumed constant and cash flow may vary with assumed outlay; or the level of initial outlay may change with discount rate and annual proceeds remaining the same.

In the context of NPV, sensitivity analysis provides information regarding the sensitivity of the calculated NPV to possible estimation errors in expected cash flows, the required rate of return and project life.

Suppose, a proposed project has an initial estimated cost (after tax) of ₹ 75,000 and an estimated expected cash flow (after tax) stream of ₹ 20,000 per year for seven years. The estimated 'k' is 15%.

$$\overline{\text{NPV}} = - ₹ 75,000 + (₹ 20,000) (\text{Annuity at 15\% for 7 years})$$

$$= - ₹ 75,000 + (₹ 20,000) (4.160)$$

$$= ₹ 8,200$$

The project should be accepted.

The project would show different results with expected annual cash flow (after tax) being ₹ 17,000 per year instead of ₹ 20,000 as stated above, then:

$$\overline{\text{NPV}} = - ₹ 75,000 + (₹ 17,000) (4.160)$$

$$= - ₹ 4,280 \text{ (negative value)}$$

This giving an indication to give a second thought to the project acceptance.

Samuel and Wilkies in "Management of Company Finance" opine that sensitivity analysis does not make any decisions of itself. It is a practicable procedure that presents derived information in particularly revealing way. The method is usually applied to each possible project as it arises. It could be used for the total company activities – existing investments plus new proposals, but such a grand exercise would detract from the essential simplicity of the method and not be warranted for all the largest projects. When all the sensitivity data have been assembled a judgement has then to be made as to whether the picture presented is acceptable or not. In this decision the management may subjectively estimate the likelihood of each scenario, or they may play safe and consider only the worst possibilities. It is unlikely that the market as a whole would have access to the same volume and quality of information as that given by the sensitivity analysis – and this would have to be done by intelligent guess too.

A sensitivity analysis is particularly helpful in large projects that would have a substantial impact on the company's operations.

## SIMULATION FOR RISK EVALUATION

Simulation is known as simulated sampling or more fully Monte-Carlo simulation is as much an art as a technique. It has been described as “what to do when all else fails”. Some investment projects may depend on so many stochastic variables that analytical results are unobtainable. In simulation a mathematical model is constructed and artificial data is fed. The desired parameters of the system are then determined from the output of the mode. Simulation like sensitivity analysis is not an optimising technique. It merely provides a convenient representation of reality in some more advanced work than can be used to improve NPV by adjusting certain variables under the decision makers control (like advertising expenditure). There are two important things in simulation viz. the construction of the model and the judgement of changes to be made to controllable variables. This method involves use of computers to determine the distribution of the internal rate of return or net present value. Suppose the company has estimated project probability distribution for initial investment, annual sales and operating costs, life and salvage value, the simulation proceeds as follows:

1. Randomly select a value of each variable from its distribution;
2. Take these values and other given information (tax rates, type of depreciation used and so on) and calculate the projects IRR or NPV;
3. Repeat steps one and two many times; and
4. Prepare the IRR or NPV distribution.

This is the result of the simulation. From the information used to prepare the distribution the analyst can determine the standard deviation of the projects IRR which is used in determining the project risk.

Simulation is an expensive device and suits only to those projects involving heavy capital expenditure. Simulation is advantageous to corporate project proposal selections for the reason that it shows all possible outcomes associated with the project including identification of possible extremely bad outcomes which might happen if the project is accepted.

## LINEAR PROGRAMMING AND CAPITAL BUDGETING DECISIONS

Linear programming is a mathematical technique concerned with optimal solution to problems of business world. The areas of frequent use of this technique are product lines and production processes, transportation, routing, and meeting product specifications. Most profitable use of scarce resources could be planned through the technique in production lines and processes. Similarly, substantial savings can be affected by using the technique in movement of goods and planning the routes which entail minimum payments towards cost. In meeting product specifications least cost combinations could easily be sorted out through this technique. Business firms have been constantly using the technique for solving such like problems. The application of the programming technique is now being frequently tried in capital budgeting problems and investment allocation processes. The technique is useful in sorting out allocation problems as the resources are limited and cannot be used beyond a fixed quantity. Choice is to be made for allocation for best use to maximise contribution or to minimise cost.

The area of application of programming techniques in investment decision making is that of capital rationing where the approach has been fixed for seeking solution to the problem when there are more desirable investments than there are funds available for such investment and a solution of the best choice is involved. Efforts are made to find the set of investments through time that maximises the present value of future dividends. Feasible solution could be reached at for making joint investment in certain projects for yielding higher returns by taking into consideration the opportunity cost of funds.

## APPLICATION OF LINEAR PROGRAMMING MODEL

### Primal

Presuming that the company is to maximise the present value of the dividends of the company and that there is no adjustment of risk, the capital budgeting problem can be solved by maximising the present value of the dividends generated by the investments. Assuming further that there are no limitations set on dividend policy other than that dividends should be non-negative and the rate of interest is to be used for discounting the dividends to be default-free market rate. Subsequently, a risk adjustment would be added to or subtracted from the resulting present value of the investment and the condition for investing the funds in short-term securities will be relaxed. It is assumed that all investments are continuous and the IRRs of all investments considered are larger than the cost of new funds. To maximise the present value of the dividend we present the notation in matrix as under:

Maximise  $Z = a'D$

Subject to

$$Cx + D \leq M$$

$$X, D \geq 0$$

where:

$a$  = time-value-factors vectors ( $a'$  is a row vector)

$D$  = dividend vector

$C$  = matrix of cash flows (outlays are positive and inflow are negative), the rows are the cash flows of each period and the columns are the cash flows of each investment.

$M$  = column vector of cash available from outside sources.

$X$  = column vector indicating the number of units invested in each investment.

The above is the primal model and can be presented in summation notation as under assuming different investments and a planning horizon of  $T$  periods:

$$\text{Maximise } Z = \sum_{t=0}^T a_t D_t$$

Subject to

$$\sum_{j=1}^J C_{jt} X_j + D_t \leq M_t$$

$$t = 0, 1, \dots, T$$

$$X_j, D_t \geq 0$$

The above formula can be tested in a problem where a company has a capital budget limited to ₹ 10,000 and has following investment opportunities  $X_1$  and  $X_2$  in period 1 and 2 with time value of money as 0.5 and internal rate of return for opportunity  $X_1$ , as 10% and for opportunity  $X_2$  as 14% generating cash flow as under:

	$X_1$	$X_2$
Period 1	0	₹ 11,400
Period 2	12,100	–

There is possibility that the cash flow generated in period 1 are re-employed in period 2 in another opportunity  $X_3$ . The above facts can be presented as under:

Period	Cash flows	Investments	In Rupee
	$x_1$	$x_2$	$x_3$
0	-10,000	-10,000	0
1	0	11,400	-11,400
2	12,100	0	12,540

Assuming risk free rate of interest being 5% then

$$a^1 = (a_0, a_1, a_2)$$

$$= (1.05^0 \ 1.05^{-1} \ 1.05^{-2})$$

$$D^1 = (D_0 \ D_1 \ D_2)$$

$$C = \begin{bmatrix} 10,000 & 10,000 & 0 \\ 0 & -11,400 & +11,400 \\ -12,000 & 0 & -12,540 \end{bmatrix}$$

Since  $x_1$  is equal to 1 then one unit or ₹ 10,000 is invested  $J = 1$ ; and financing of ₹ 10,000 is available only at time 0, so  $M' = (10,000 \ 0 \ 0)$

This leads to the primal model as under:

$$\text{Maximize } Z = a^1 D = (1.05^0 \ 1.05^{-1} \ 1.05^{-2}) \begin{bmatrix} D_0 \\ D_1 \\ D_2 \end{bmatrix}$$

Subject to

$$\begin{bmatrix} 10,000 & 10,000 & 0 \\ 0 & -11,400 & +11,400 \\ -12,000 & 0 & -12,540 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} D_0 \\ D_1 \\ D_2 \end{bmatrix} \leq \begin{bmatrix} 10,000 \\ 0 \\ 0 \end{bmatrix}$$

$$x_j, D_t \geq 0$$

Completing the matrix multiplication,

$$\text{Maximize } Z = \sum_{t=0}^2 a_t D_t = \sum_{t=0}^2 (1.05)^{-t} D_t$$

Subject to

$$10,000x_1 + 10,000x_2 + 0x_3 + D_0 \leq 10,000$$

$$0x_1 - 11,400x_2 + 11,400x_3 + D_1 \leq 0$$

$$-12,100x_1 + 0x_2 - 12,540x_3 + D_2 \leq 0$$

If–

$$x_1 = D_0 = D_1 = 0$$

$$x_2 = 1$$

$$x_3 = 1$$

$$D_2 = 12,540$$



the value of objective function is  $Z = 1.05^{-2} \times 12,540 = ₹ 11,347$ , with the above, the constraints are satisfied. No other solution is better.

### Dual Problems

The above explanation is devoted to primal linear programming problem, a maximization case but it could be the minimization case also. Such pairs of problems with maximization and minimization problems are called dual linear programming problems.

Dual linear programming has become important because of certain reasons, according to Baumol, these reasons are viz. (1) Duality yield a number of powerful theorems which add substantially to our understanding of linear programming. (2) Duality analysis has been very helpful in the solution of programming problems. Indeed as we shall see, it is frequently easier to find the solution of a programming problem by first solving its associated dual problem. (3) The dual problem turns out to have an extremely illuminating economic interpretations which incidentally shows that old fashioned marginal analysis is always implicitly involved in the search for an optimal solutions of a linear programming problems.

With the given problem to maximise the results as under, we can go to solve a minimisation problem covering opposite aspects of the problems. Suppose maximisation problems with given constraints is as under:

$$\begin{aligned} \text{Maximize } Z &= P_1Q_1 + P_2Q_2 + \dots + P_nQ_n \\ \text{Subject to } &= a_{11}Q_1 + a_{12}Q_2 + \dots + a_{1n}Q_n \leq C_1 \\ &\dots\dots\dots \\ &a_{m1}Q_1 + a_{m2}Q_2 + \dots + a_{mn}Q_n \leq C_m \\ &Q_1 \geq 0, \dots\dots\dots Q_n \geq 0 \end{aligned}$$

The above is the primal problem and it has its dual as under:

$$\begin{aligned} \text{Minimize } a &= C_1V_1 + C_2V_2 + \dots + C_mV_m \\ \text{Subject to } &= a_{11}V_1 + a_{21}V_2 + \dots + a_{m1}V_m \geq P_1 \\ &\dots\dots\dots \\ &a_{1n}V_1 + a_{2n}V_2 + \dots + a_{mn}V_m \geq P_n \\ &V_1 \geq 0, V_2 \geq 0, \dots\dots\dots V_m \geq 0 \end{aligned}$$

From the above, one thing is obviously clear that we have changed the word 'maximize' to 'minimize' and substituted symbol  $\leq$  to  $\geq$ . For unit profits  $P_1, P_2, \dots, P_n$  we took the capacity figure  $C_1, C_2, \dots, C_n$ . Original variables  $Q_1, Q_2, \dots, Q_n$  has been substituted by a new set of variables  $V_1, V_2, \dots, V_m$ . The order in which the constant appears in inequalities has been reversed and instead of reading them across we would read now down. Where  $a_{12}$  was formerly the second constant in the first inequality, would now make it first constant in the second inequality and so on. These steps of converting a primal into dual are summarized below by Baumol:

- “(1) If the primal problem involves maximization, the dual involves minimization, and *vice versa*;
- (2) If the primal involves  $>$  signs, the dual involves  $<$  signs and *vice versa*;
- (3) The profit constraints  $P_j$  in the primal model replace the capacity constraints  $C_j$ , and *vice versa*;
- (4) In the constraint inequalities the co-efficients which were found by going left to right are positioned in the dual from top to bottom, and *vice versa*;
- (5) A new set of variables appears in dual;

- (6) Neglecting the number of non-negativity conditions, if there are  $n$  variables and  $m$  inequalities in the primal model, in the dual there will be  $m$  variables and  $n$  inequalities.”

The dual of the problem is the original linear programming problem itself. So, the problem which was primal could be dual and *vice versa*.

To illustrate the above discussion, we take a simplified illustration in an advertising budgeting problem which aims to minimize the cost of reaching 30 million potential customers of whom 23 million are required to have an income of over ₹ 5,000 per year. Suppose the relevant data are those shown in the following table:

	Cost per Ad. (₹ '000')	Audience ('000')	Audience with income over ₹ 5,000 ('000)
Newspaper	28	1	0.6
T.V.	400	9	2
Radio	20	0.8	0.7

Newspaper advertisement reaches 1 million readers where as T.V. programme covers 9 million viewers. Let the  $N$ ,  $T$  and  $R$  respectively represent the newspaper, television, and radio advertisements budgeted, our programme is then:

Minimize Ad. Cost =  $28N + 400T + 20R$

Subject to :

$$N + 9T + 0.8R \geq 30 \text{ Required Audience size}$$

$$0.6N + 2T + 0.7R \geq 23 \text{ (required income)}$$

$$N \geq 0, T \geq 0, R \geq 0$$

The above primal is converted into dual problem as under:

Minimize

$$30v_1 + 23v_2$$

Subject to

$$v_1 + 0.6v_2 \leq 28$$

$$9v_1 + 2v_2 \leq 400$$

$$0.8v_1 + 0.7v_2 \leq 20$$

$$v_1 \geq 0, v_2 \geq 0$$

From the above, it is evident that primal involved 3 variables and 2 ordinary constraints whereas the dual involved 2 variables and 3 constraints. No change has occurred in inequalities on non-negativity conditions i.e. both in the primal and in the dual problems each variable is required to be greater than or equal to zero.

If we turn the above ordinary constraints into equations, we have to rewrite the problem with slack variables in the same shape as discussed in the beginning of this section.

From the literature available on financial management evidence can be gathered whether the linear programming technique are being widely used for capital budgeting decisions. However, for academicians interest remain widely recognised for a keen desire to use the techniques of linear programming in budgeting decisions. With the use of computers, the multinational companies and American giant business enterprises are making use of these techniques.

### Capital budgeting Techniques under uncertainty:

Risk can be defined as the chance that the actual outcome will differ from the expected outcome. Uncertainty relates to the situation where a range of differing outcome is possible, but it is not possible to assign probabilities to this range of outcomes. The two terms are generally used interchangeably in finance literature. In investment appraisal, managers are concerned with evaluating the riskiness of a project's future cash flows. Here, they evaluate the chance that the cash flows will differ from expected cash flows, NPV will be negative or the IRR will be less than the cost of capital. In the context of risk assessment, the decision-maker does not know exactly what the outcome will be but it is possible to assign probability weightage to the various potential outcomes. The most common measures of risk are standard deviation and coefficient of variations. There are three different types of project risk to be considered:

1. **Stand-alone risk:** This is the risk of the project itself as measured in isolation from any effect it may have on the firm's overall corporate risk.
2. **Corporate or within-firm risk:** This is the total or overall risk of the firm when it is viewed as a collection or portfolio of investment projects.
3. **Market or systematic risk:** This defines the view taken from a well-diversified shareholders and investors. Market risk is essentially the stock market's assessment of a firm's risk, its beta, and this will affect its share price.

Due to practical difficulties of measuring corporate and market risk, the stand-alone risk has been accepted as a suitable substitute for corporate and market risk. There are following techniques one can use to deal with risk in investment appraisal.

### Statistical Techniques for Risk Analysis:

- (a) Probability Assignment
- (b) Expected Net Present Value
- (c) Standard Deviation
- (d) Coefficient of Variation
- (e) Probability Distribution Approach
- (f) Normal Probability Distribution

#### (a) Probability Assignment:

The concept of probability is fundamental to the use of the risk analysis techniques. It may be defined as the likelihood of occurrence of an event. If an event is certain to occur, the probability of its occurrence is one but if an event is certain not to occur, the probability of its occurrence is zero. Thus, probability of all events to occur lies between zero and one.

The classical view of probability holds that one can talk about probability in a very large number of times under independent identical conditions. Thus, the probability estimate, which is based on a large number of observations, is known as an objective probability. But this is of little use in analyzing investment decisions because these decisions are non-repetitive in nature and hardly made under independent identical conditions over time. The another view of probability holds that it makes a great deal of sense to talk about the probability of a single event without reference to the repeatability long run frequency concept. Therefore, it is perfectly valid to talk about the probability of sales growth will reach to 4%, the probability of rain tomorrow or fifteen days hence. Such probability assignments that reflect the state of belief of a person rather than the objective evidence of a large number of trials are called personal or subjective probabilities.

**(b) Expected Net Present Value:**

Once the probability assignments have been made to the future cash flows, the next step is to find out the expected net present value. It can be found out by multiplying the monetary values of the possible events by their probabilities. The following equation describes the expected net present value.

$$ENPV = \sum_{i=0}^n \frac{ENCF_t}{(1+k)^t}$$

Where ENPV is the expected net present value, ENCF<sub>t</sub> expected net cash flows in period t and k is the discount rate. The expected net cash flow can be calculated as follows:

$$ENCF_t = NCF_{jt} \times P_{jt}$$

Where NCF<sub>jt</sub> is net cash flow for jth event in period t and P<sub>jt</sub> probability of net cash flow for jth event in period t.

For example, A company is considering an investment proposal costing ₹ 7,000 and has an estimated life of three years. The possible cash flows are given below:

**Expected net present value**

*All amount in ₹*

Cash flow In Year 1	Prob.	Expected Value	Cash flow in Year 2	Prob.	Expected Value	Cash flow in Year 3	Prob.	Expected Value
2000	0.2	400	3000	0.4	1200	4000	0.3	1200
3000	0.5	1500	4000	0.3	1200	5000	0.5	2500
4000	0.3	1200	5000	0.3	1500	6000	0.2	1200
		<b>3100</b>			<b>3900</b>			<b>4900</b>

If we assume a risk free discount rate of 10%, the expected NPV for the project will be as follows:

Year	ENCF in ₹	PV@10%	PV in ₹
1	3100	0.909	2817.9
2	3900	0.826	3221.4
3	4900	0.751	3679.9
		ΣPV	9719.2
		Less : NCO	7000
		ENPV	2719.2

**(c) Standard Deviation:**

The assignment of probabilities and the calculation of the expected net present value include risk into the investment decision, but a better insight into the risk analysis of capital budgeting decision is possible by calculating standard deviation and coefficient of variation.

Standard deviation(s) is an absolute measure of risk analysis and it can be used when projects under consideration are having same cash outlay. Statically, standard deviation is the square root of variance and variance measures the deviation about expected cash flow of each of the possible cash flows. The formula for calculating standard deviation will be as follows:

$$s = \sqrt{\frac{1}{n} \sum_{i=1}^n (CF_i - \overline{CF})^2}$$

Thus, it is the square root of the mean of the squared deviation, where deviation is the difference between an outcome and the expected mean value of all outcomes and the weights to the square of each deviation is provided by its probability of occurrence. For example, the standard deviation of following project X and Y is as follows:

Table 2.8

**PROJECT-X (Standard deviation)**

$$CF_i - \overline{CF}$$

All Amount in ₹

CF	$\overline{CF}$	$(CF_i - \overline{CF})$	$(CF_i - \overline{CF})^2$	Pi	$(CF_i - \overline{CF})^2 \text{ Pi}$	$\sigma$
4000	6000	-2000	4000000	0.1	400000	
5000	6000	-1000	1000000	0.2	200000	
6000	6000	0	0	0.4	0	
7000	6000	1000	1000000	0.2	200000	
8000	6000	2000	4000000	0.1	400000	
					1200000	1095

**PROJECT Y (Standard deviation)**

All Amount in ₹

CF	$\overline{CF}$	$(CF_i - \overline{CF})$	$(CF_i - \overline{CF})^2$	Pi	$(CF_i - \overline{CF})^2 \text{ Pi}$	$\sigma$
12000	8000	4000	16000000	0.1	1600000	
10000	8000	2000	4000000	0.15	600000	
8000	8000	0	0	0.5	0	
6000	8000	-2000	4000000	0.15	600000	
4000	8000	-4000	16000000	0.1	1600000	
					4400000	2098

In the above example, Project Y is riskier as standard deviation of project Y is higher than the standard deviation of project X. However, the project Y has higher expected value also so the decision-maker is in a dilemma for selecting project X or project Y.

**(d) Coefficient of Variation:**

If the projects to be compared involve different outlays/different expected value, the coefficient of variation is the correct choice, being a relative measure. It can be calculated using following formula:

$$CV = \frac{\text{Standard deviation or } \sigma}{\text{Expected Value CF}}$$

For example, the coefficient of variation for the above project X and project Y can be calculated as follows:

$$CV (X) = \frac{1095}{6000} = 0.1825$$

$$CV (Y) = \frac{2098}{8000} = 0.2623$$

The higher the coefficient of variation, the riskier the project. Project Y is having higher coefficient so it is riskier than the project X. It is a better measure of the uncertainty of cash flow returns than the standard deviation because it adjusts for the size of the cash flow.

**(e) Probability Distribution Approach:**

The researcher has discussed the concept of probability for incorporating risk in capital budgeting proposals. The concept of probability for incorporating risk in evaluating capital budgeting proposals. The probability distribution of cash flows over time provides valuable information about the expected value of return and the dispersion of the probability distribution of possible returns which helps in taking accept-reject decision of the investment decision.

The application of this theory in analyzing risk in capital budgeting depends upon the behaviour of the cash flows, being (i) independent, or (ii) dependent. The assumption that cash flows are independent over time signifies that future cash flows are not affected by the cash flows in the preceding or following years. When the cash flows in one period depend upon the cash flows in previous periods, they are referred to as dependent cash flows.

**(i) Independent Cash Flows over Time:** The mathematical formulation to determine the expected values of the probability distribution of NPV for any project is as follows:

$$NPV = \sum_{i=0}^n \frac{CF_t}{(1+k)^t} - CO$$

where CF<sub>1</sub> is the expected value of net CFAT in period t and I is the risk free rate of interest.

The standard deviation of the probability distribution of net present values is equal to ;

$$s = \sqrt{\sum_{i=0}^n \frac{s t^2}{(1+k)^{2t}}}$$

where σ<sub>t</sub> is the standard deviation of the probability distribution of expected cash flows for period t, σ<sub>t</sub> would be calculated as follows:

$$s t = \sqrt{\sum_{i=0}^m (CF_n - \overline{CF}_t)^2 P_n}$$

Thus, the above calculation of the standard deviation and the NPV will produce significant volume of information for evaluating the risk of the investment proposal. For example, The standard deviation of the probability distribution of net present

values under the assumption of the independence of cash flows over time for the above mentioned example of expected net present values can be calculated as follows:

## Probability distribution approach

Year 1

CF in ₹	$\overline{CF}$ in ₹	$(CF_t - \overline{CF})$ ₹	$(CF_t - \overline{CF})^2$ in ₹	Pi	$(CF_t - \overline{CF})^2$ Pi in ₹	$\sigma$
2000	3100	-1100	1210000	0.2	242000	
3000	3100	-100	10000	0.5	5000	
4000	3100	900	810000	0.3	243000	
					490000	700
Year 2						
3000	3900	-900	810000	0.4	324000	
4000	3900	100	10000	0.3	3000	
5000	3900	1100	1210000	0.3	363000	
					690000	831
Year 3						
4000	4900	-900	810000	0.3	243000	
5000	4900	100	10000	0.5	5000	
6000	4900	1100	1210000	0.2	242000	
					490000	700

$$s = \sqrt{\sum_{i=0}^n \frac{s^2 t^2}{(1+i)^{2t}}} = \sqrt{\frac{(700)^2}{(1.10)^2} + \frac{(831)^2}{(1.10)^2} + \frac{(700)^2}{(1.10)^2}}$$

$$= ₹ 1073.7$$

where  $s$  is the standard deviation of the probability distribution of possible net cash at 2 flows and is the variance of each period.

**(ii) Dependent Cash Flows:** If cash flows are perfectly correlated, the behavior of cash flows in all periods is alike. This means that if the actual cash flow in one year is a standard deviations to the left of its expected value, cash flows in other years will also be a standard deviations to the left of their respective expected values. In other words, cash flows of all years are linearly related to one another. The expected value and the standard deviation of the net present value, when cash flows are perfectly correlated, are as follows:

$$\overline{NPV} = \sum_{i=0}^n \frac{\overline{CF}_t}{(1+i)^t} \quad s(NPV) = \sum_{i=1}^n \frac{s^2 t}{(1+i)^t}$$

Where,

NPV = Expected Net Present Value

CF<sub>t</sub> = Expected Cash Flow for year "t"

i = Risk-free interest rate

$\sigma \text{NPV} = \text{Standard deviation of Net Present Value}$

$\sigma t = \text{Standard deviation of the cash flow for year } t$

For example, if we calculate NPV and sNPV for an investment project requiring a current outlay of Rs 10,000, assuming a risk free interest rate of 6 per cent. The mean

and standard deviation of cash flows, which are perfectly correlated, are as follows:

Year	Cft (₹)	$\sigma t$
1	5,000	1,500
2	4,000	1,000
3	5,000	2,000
4	3,000	1,200

$$\overline{NPV} = \frac{5000}{(1.06)^1} + \frac{4000}{(1.06)^2} + \frac{3000}{(1.06)^3} - 10,000 = \text{Rs. } 3,121$$

$$s(\overline{NPV}) = \frac{1,500}{(1.06)^1} + \frac{1,000}{(1.06)^2} + \frac{2,000}{(1.06)^3} + \frac{1,200}{(1.06)^4} = \text{Rs. } 3,121$$

**(f) Normal Probability Distribution:**

The normal probability distribution can be used to further analyze the risk in investment decision. It enable the decision maker to have an idea of the probability of different expected values of NPV, that is, the probability of NPV having the value of zero or less, greater than zero and within the range of two values for example, within the range of ₹ 2,000 and ₹ 3,000 etc. If the probability of having NPV zero or less is low, eg. .01, it means that the risk in the project is negligible. Thus, the normal probability distribution is an important statistical technique in the hands of decision makers for evaluating the riskiness of a project.

The area under the normal curve, representing the normal probability distribution, is equal to 1 (0.5 on either side of the mean). The curve has its maximum height at its expected value i.e. its mean. The distribution theoretically runs from minus infinity to plus infinity. The probability of occurrence beyond 3 s is very near to zero (0.26 per cent).

For any normal distribution, the probability of an outcome falling within plus or minus.

- 1  $\sigma$  from the mean is 0.6826 or 68.26 per cent,
- 2  $\sigma$  from the mean is 95.46 per cent,
3.  $\sigma$  from the mean is 99.74 per cent.



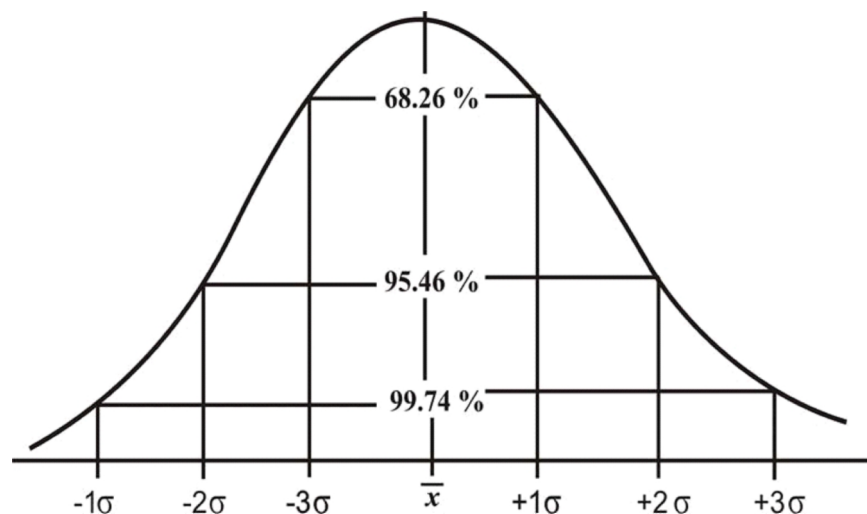


Figure 2.4

For example, If one needs to calculate for the above mentioned example the probability of the NPV being zero or less, the probability of the NPV being greater than zero and the probability of NPV between the range of ₹ 1500 and ₹ 3000, it can be calculated as follows using normal distribution.

**Probability of the NPV being zero or less:**

$$Z = \frac{X - \bar{X}}{s} = \frac{0 - 2719.2}{1073.7} = -2.533$$

According to Table Z, the probability of the NPV being zero is = 0.4943, therefore, the probability of the NPV being zero or less would be 0.5-0.4943=0.0057 i.e. 0.57 per cent.

**Probability of the NPV being greater than zero:**

As the probability of the NPV being less than zero is 0.57 per cent, the probability of the NPV being greater than zero would be 1-0.0057=0.9943 or 99.43 per cent.

**Probability of NPV between the range of ₹ 1,500 and ₹ 3,000:**

$$Z_1 = \frac{1,500 - 2,719.2}{1,073.7} = -1.13$$

$$Z_2 = \frac{3000 - 2719.2}{1073.7} = -0.26$$

The area as per Table Z for the respective values of -1.13 and 0.26 is 0.3708 and

0.4803 respectively. Summing up, we have 0.8511 i.e., there is 85.11 per cent probability of NPV being within the range of ₹ 1500 and ₹ 3000.

## SOME CASE STUDIES

### 1. NPV and Payback Period Analysis

*An Entrepreneur has approached you with an opportunity to lend ₹ 25,000 for his newly established home healthcare business. Funds would be used to lease a delivery vehicle, purchase supplies, and provide working capital. Terms of the proposal are that you would receive ₹ 5,000 at the end of each year in interest with the full*

₹ 25,000 to be repaid at the end of a ten-year period.

- A. Assuming a 10% required rate of return, calculate the present value of cash flows and the net present value of the proposed investment.
- B. Based on this same interest rate assumption, calculate the cumulative cash flow of the proposed investment for each period in both nominal and present-value terms.
- C. What is the payback period in both nominal and present-value terms?
- D. What is the difference between the nominal and present-value payback period? Can the present-value payback period ever be shorter than the nominal payback period??

### Solution

A : The present value of cash flows and the net present value of the proposed investment can be calculated as given below:

Year	Cash Flow in ₹	Present Value Interest Factor	Present Value Cash Flow ₹
0	(25,000)	1.0000	(25,000)
1	5,000	0.9091	4,545
2	5,000	0.8264	4,132
3	5,000	0.7513	3,757
4	5,000	0.6830	3,415
5	5,000	0.6209	3,105
6	5,000	0.5645	2,822
7	5,000	0.5132	2,566
8	5,000	0.4665	2,333
9	5,000	0.4241	2,120
10	5,000	0.3855	1,928
Cost of Capital	10.0%		
Present Value of Benefits	₹ 30,723		
Present Value of Cost	₹ 25,000		
Net Present Value	₹ 5,723		

B. The cumulative cash flow of the proposed investment for each period in both nominal and present-value terms is:

Year Flow	Cash Interest Factor	Present Value Cash Flow	Present Value Cash Flow	Cumulative PV Cash Flow	Cumulative
0	(₹ 25,000)	1.0000	(₹25,000)	(₹25,000)	(₹25,000)
1	5,000	0.9091	4,545	(20,000)	(20,455)
2	5,000	0.8264	4,132	(15,000)	(16,322)
3	5,000	0.7513	3,757	(10,000)	(12,566)
4	5,000	0.6830	3,415	(5,000)	(9,151)
5	5,000	0.6209	3,105	0	(6,046)
6	5,000	0.5645	2,822	5,000	(3,224)
7	5,000	0.5132	2,566	10,000	(658)
8	5,000	0.4665	2,333	15,000	1,675
9	5,000	0.4241	2,120	20,000	3,795
10	5,000	0.3855	1,928	25,000	5,723
Payback Period		5 years			
Present Value Payback Period		8.28 years ( = 8 + ₹ 658/₹2,333).			

C. Based on the information provided in part B, it is clear that the cumulative cash flow in nominal rupees reached ₹0 at the end of Year 5. This means that the nominal payback period is 5 years. The cumulative cash flow in present-value rupees exceeds ₹0 when the Year 8 interest payment is received. This means that the present-value payback period is roughly 8 years. If cash flows were received on a continuous basis, the present-value payback period would be 8.28 years ( = ₹ 658/₹ 2,333).

D. Assuming a positive rate of interest, the present-value payback period is always longer than the nominal payback period. This stems from the fact that present-value dollars are always less than nominal dollars, and it therefore takes longer to receive a fixed dollar amount back in terms of present-value dollars rather than in nominal terms.

**Qns No 2: Decision Rule Conflict.** Balwinder has been retained as a management consultant by Square Pants, Inc., a local specialty retailer, to analyze two proposed capital investment projects, projects X and Y. Project X is a sophisticated working capital and inventory control system based upon a powerful personal computer, called a system server, and PC software specifically designed for inventory processing and control in the retailing business. Project Y is a similarly sophisticated working capital and inventory control system based upon a powerful personal computer and general-purpose PC software. Each project has a cost of ₹10,000, and the cost of capital for both projects is 12%. The projects = expected net cash flows are as follows

**Solution:**

Years	Expected Net Cash Flows in ₹	
	Project X	Project Y
0	(10,000)	(10,000)
1	6,500	3,500
2	3,000	3,500
3	3,000	3,500
4	1,000	3,500

## 72 PP-FT&FM

- Calculate each project = s nominal payback period, net present value (NPV), internal rate of return (IRR), and profitability index (PI).
- Should both projects be accepted if they are interdependent?
- Which project should be accepted if they are mutually exclusive?
- How might a change in the cost of capital produce a conflict between the NPV and IRR rankings of these two projects? At what values of  $k$  would this conflict exist?
- Why does a conflict exist between NPV and IRR rankings?

### Solution

#### A. Payback:

To determine the nominal payback period, construct the cumulative cash flows for each project:

Cumulative Cash Flow in ₹		
Year	Project X	Project Y
0	(10,000)	(10,000)
1	(3,500)	(6,500)
2	(500)	(3,000)
3	2,500	500
4	3,500	4,000

$$\text{Payback} = 2 + \frac{\text{Rs. } 500}{\text{Rs. } 3,000} = 2.17 \text{ years}$$

$$\text{Payback} = 2 + \frac{\text{Rs. } 3,000}{\text{Rs. } 3,500} = 2.86 \text{ years}$$

#### Net Present Value

All amount in INR

Years	Expected Net Cash Flows in ₹		Present Value Factor @ 12%	Cash Flow in ₹	
	Project X	Project Y		Project X	Project Y
0	(10,000)	(10,000)	1.0000	(10,000)	(10,000)
1	6,500	3,500	0.8929	5,803.57	3,125.00
2	3,000	3,500	0.7972	2,391.58	2,790.18
3	3,000	3,500	0.7118	2,135.34	2,491.23
4	1,000	3,500	0.6355	635.52	2,224.31
Net Cash Flow 966.01		630.72			

#### Internal Rate of Return (IRR):

To solve for each project = s IRR, find the discount rates that set NPV to zero:

$$IRR_X = 18.0\%.$$

$$IRR_Y = 15.0\%.$$

*Profitability Index (PI):*

$$\text{Profitability Index} = \frac{\text{Present Value}}{\text{Initial Investment}}$$

$$\text{Profitability Index (X)} = \frac{\text{Rs. } 10,966.01}{\text{Rs. } 10,000} = 1.10$$

$$\text{Profitability Index (Y)} = \frac{\text{Rs. } 10,630.72}{\text{Rs. } 10,000} = 1.06$$

B. Using all methods, project X is preferred over project Y. Because both projects are acceptable under the *NPV*, *IRR*, and *PI* criteria, both projects should be accepted if they are interdependent.

C. Choose the project with the higher *NPV* at  $k = 12\%$ , or project X.

D. To determine the effects of changing the cost of capital, plot the *NPV* profiles of each project. The crossover rate occurs at about 6% to 7%. To find this rate exactly, create a project, which is the difference in cash flows between projects X and Y:

Years	Differential Cash flow between Project X and Y (in ₹ )
0	0
1	3,000
2	(500)
3	(500)
4	(2,500)

Then find the *IRR* of Project :

$$IRR = \text{Crossover Rate} = 6.2\%.$$

Thus, if the firm's cost of capital is less than 6.2%, a conflict exists, because

$$NPV_Y > NPV_X \text{ but } IRR_X > IRR_Y.$$

E. The basic cause of conflict is the differing reinvestment rate assumptions between *PV* and *IRR*. The conflict occurs in this situation because the projects differ in their cash flow timing.

**Qns No 3: Decision Rule Criteria.** The net present value (*NPV*), profitability index (*PI*), and internal rate of return (*IRR*) methods are often employed in project valuation. Identify each of the following statements as true or false, and explain your answers.

- The *IRR* method can tend to understate the relative attractiveness of superior investment projects when the opportunity cost of cash flows is below the *IRR*.
- A  $PI = 1$  describes a project with an  $NPV = 0$ .
- Selection solely according to the *NPV* criterion will tend to favor larger rather than smaller investment projects.
- When  $NPV = 0$ , the *IRR* exceeds the cost of capital.
- Use of the *PI* criterion is especially appropriate for larger firms with easy access to capital markets.

**Solution**

- A. False. The *IRR* method implicitly assumes reinvestment of net cash flows during the life of the project at the *IRR* and will overstate the relative attractiveness of superior investment projects when the opportunity cost of cash flows is below the *IRR*. If, for example, a project has a projected *IRR* = 22%, but cash flows thrown off during the life of the project can only be reinvested at, say, 15%, then the true *IRR* for the project will be less than 22% and its relative attractiveness will be overstated using the *IRR* method.
- B. True. The  $PI = PV \text{ Cash Flows} / \text{Cost}$ , and  $NPV = PV \text{ Cash Flows} - \text{Cost}$ . Therefore, when  $PV \text{ Cash Flows} = \text{Cost}$ ,  $PI = 1$  and  $NPV = 0$ .
- C. True. Selection according to the *NPV* criterion will tend to favor larger as opposed to smaller investment projects.
- D. False. The *IRR* is the interest rate that equates the *PV* cash flows with the investment cost of a project.  $NPV = PV \text{ Cash Flows} - \text{Cost}$ , when cash flows are discounted at an appropriate risk-adjusted cost of capital,  $k$ . Therefore, when  $IRR = k$ ,  $NPV = 0$ .
- E. False. Larger firms with easy access to capital markets maximize the value of the firm through the process by selecting projects according to the *NPV* criterion. Smaller firms, which face capital budget constraints forcing rejection of some  $NPV > 0$  projects, can best employ scarce capital through use of the *PI* criterion.

**Question No 4:**

Mr. Jagdish owns a Drug Store, **located** in Maliwara Ghaziabad. The drug store sells pharmaceuticals, cosmetics, toiletries, magazines, and various novelties. The most recent annual net income statement of drug store is as follows:

	Amount in ₹
Sales revenue	1,800,000
Total costs	
Cost of goods sold	1,260,000
Wages and salaries	200,000
Rent	120,000
Depreciation	60,000
Utilities	40,000
Miscellaneous	30,000
Total	1,710,000
Net profit before tax	90,000

Drug Store's sales and expenses have remained relatively constant over the past few years and are expected to continue unchanged in the near future. To increase sales, Drug Store is considering using some floor space for a small soda fountain. Drug Store would operate the soda fountain for an initial three-year period and then would reevaluate its profitability. The soda fountain would require an incremental investment of ₹20,000 to lease furniture, equipment, utensils, and so on. This is the only capital investment required during the three-year period. At the end of that time, additional capital would be required to continue operating the soda fountain, and no capital would be recovered if it were shut down. The soda fountain is expected to have annual sales of ₹100,000 and food and materials expenses of ₹20,000 per year. The soda fountain is also expected to increase wage and

salary expenses by 8% and utility expenses by 5%. Because the soda fountain will reduce the floor space available for display of other merchandise, sales of non-soda fountain items are expected to decline by 10%.

- A. Calculate net incremental cash flows for the soda fountain.
- B. Assume that Drug Store has the capital necessary to install the soda fountain and that he places a 12% opportunity cost on those funds. Should the soda fountain be installed? Why or why not?

### Solution

- A. The relevant annual cash flows from the proposed soda fountain are:

	Amount in ₹
Incremental revenue (A)	100,000
<b>Increment Cost</b>	
Food and materials	20,000
Wages and salaries ( $₹200,000 \times 0.08$ )	16,000
Utilities ( $₹40,000 \times 0.05$ )	2,000
Opportunity Cost: Profit contribution lost on regular sales	
$= 0.1(₹ 18,00,000 - ₹12,60,000)$	54,000
<b>Total incremental cost (B)</b>	92,000
Net incremental annual cash flow (A – B)	8,000
Incremental investment	20,000

- B. No, the NPV for the proposed soda fountain should be calculated to determine the economic viability of the project.

$$\begin{aligned}
 \text{NPV} &= (\text{Incremental annual cash flow})(\text{PVIFA}, N = 3, i = 12\%) - ₹20,000 \\
 &= ₹8,000(2.4018) - ₹20,000 \\
 &= -₹785.60 \text{ (A loss)}
 \end{aligned}$$

Because  $\text{NPV} < 0$ , Drug Store should not undertake the soda fountain investment project.

**Question No 5:** Cash Flow Analysis. The Future India Press is analyzing the potential profitability of three printing jobs put up for bid by the Department of Revenue:

	Job A	Job B	Job C
Projected winning bid (per unit)	₹ 5.00	₹ 8.00	₹ 7.50
Direct cost per unit	₹ 2.00	₹ 4.30	₹ 3.00
Annual unit sales volume	₹ 8,00,000	₹ 6,50,000	₹ 4,50,000
Annual distribution costs	₹ 90,000	₹ 75,000	₹ 55,000
Investment required to produce annual volume	₹ 50,00,000	₹ 52,00,000	₹ 40,00,000

Assume that

- (1) The company's marginal city-plus-state-plus-Corporate tax rate is 50%;
- (2) Each job is expected to have a six-year life; (3) the firm uses straight-line depreciation; (4) the average cost of capital is 14%; (5) the jobs have the same risk as the firm's other business; and (6) the company has already spent ₹60,000 on developing the preceding data. This ₹60,000 has been capitalized and

will be amortized over the life of the project.

- A. What is the expected net cash flow each year? (Hint: Cash flow equals net profit after taxes plus depreciation and amortization charges.)
- B. What is the net present value of each project? On which project, if any, should Future India Press (FIP) bid?
- C. Suppose that FIP's primary business is quite cyclical, improving and declining with the economy, but that job A is expected to be countercyclical. Might this have any bearing on your decision?

### Solution

- A. The ₹60,000 spent on job cost development is a sunk cost. This cost must, however, be accounted for in the tax calculation as a ₹10,000 per year non-cash expense. The annual net cash flow calculations are:

*Amount in ₹*

	Job A	Job B	Job C
Projected winning bid (per unit)	5.00	8.00	7.50
Deduct direct cost per unit	2.00	4.30	3.00
Profit contribution per unit	3.00	3.70	4.50
Times annual unit sales volume	8,00,000	6,50,000	4,50,000
Profit contribution per year	24,00,000	24,05,000	20,25,000
Deduct annual distribution costs	90,000	75,000	55,000
Cash flow before amortization, depreciation and taxes	23,10,000	23,30,000	19,70,000
Deduct amortization charges	10,000	10,000	10,000
Cash flow before depreciation and taxes	23,00,000	23,20,000	19,60,000
Deduct depreciation	8,33,333	8,66,667	6,66,667
Cash flow before taxes	14,66,667	14,53,333	12,93,333
Deduct taxes	7,33,333	7,26,667	6,46,667
Cash flow	7,33,333	7,26,667	6,46,667
Add back depreciation plus amortization	8,43,333	8,76,667	6,76,667
Net annual cash flow	15,76,667	16,03,333	13,23,333
Investment required to produce annual volume	50,00,000	52,00,000	40,00,000
Job cost development	60,000		
Job life (years)	6		
Tax rate	50%		

- B. The NPV calculations are:



Amount in ₹

	Job A	Job B	Job C
Net annual cash flow	15,76,667	16,03,333	13,23,333
Times PVIFA	3.8887	3.8887	3.8887
Present value of annual net cash flows	61,31,185	62,34,881	51,46,045
Deduct initial investment cost	50,00,000	52,00,000	40,00,000
Net present value (NPV)	11,31,185	10,34,881	11,46,045
Relevant discount rate		14%	
Job life (years)		6	

Job C is the most profitable, and therefore is the most attractive because NPVC

> NPVA > NPVB. However, NPV > 0 for each job and each project is attractive.

C. Risk for the firm is reduced through diversification. If job A is counter-cyclical, then it is least risky, other things being equal, and could be attractive on the basis of both its risk and return characteristics.

### LESSON ROUND-UP

- Capital Budgeting refers to long-term planning for proposed capital outlays and their financing. Capital Budgeting may also be defined as “the firms’ decision to invest its current fund more efficiently in long-term activities in anticipation of an expected flow of future benefit over a series of years.
- Capital Rationing helps the firm to select the combination of investment projects that will be within the specified limits of investments to be made during a given period of time and at the same time provide greatest profitability.
- Pay Back technique estimates the time required by the project to recover, through cash inflows, the firms initial outlay.

$$\text{Pay back period} = \frac{\text{Initial Investment}}{\text{Annual cash inflows}}$$

- Average Rate of Return method is designated to consider the relative profitability of different capital investment proposals as the basis for ranking them – the fact neglected by the payout period technique.
- Average Rate of Return

$$= \frac{\text{Net earnings after Depreciation and Taxes}}{\text{No. of years project will last}} \div \frac{\text{Investment}}{\text{Original Investment of Average}}$$

- Net Present Value: The cash outflows and inflows associated with each project are ascertained first and both are reduced to the present values at the rate of return acceptable to the management. The rate of return is either cost of capital of the firm or the opportunity cost of capital to be invested in the project.

$$\text{NPV} = \sum_{t=1}^N \frac{R_t}{(1+k)^t} + \frac{S_n + W_n}{(1+k)^n} - \sum_{t=1}^N \frac{C_t}{(1+k)^t} - C_0$$

- Internal Rate of Return: The internal rate of return refers to the rate which equates the present value of cash inflows and present value of cash outflows.

$$C = \sum_{t=1}^n \frac{CF_t}{(1+r)^t} + \frac{S_n + W_n}{(1+r)^n} - \sum_{t=1}^n \frac{C_1}{(1+k)^t}$$

- Profitability Index (PI): Profitability Index is defined as the rate of present value of the future cash benefits at the required rate of return to the initial cash outflow of the investment.

$$PI = \frac{\sum_{t=1}^n \frac{A_t}{(1+k)^t}}{C}$$

- Sensitivity Analysis treats risk and uncertainty in capital budgeting decisions.
- Cost of equity capital is the minimum return that the investors would like to get on their investments in Company's Shares.
- Composite cost of Capital is calculated as combined weighted average of the cost of all different sources of capital

### SELF-TEST QUESTIONS

*(These are meant for re-capitulation only. Answers to these questions are not to be submitted for evaluation)*

1. Define capital budgeting and examine the need for capital budgeting.
2. Explain different methods of appraising project profitability. Which method is considered to be the best?
3. Distinguish between Internal Rate of Return and Net Present Value techniques. Which method would you recommend for evaluating investment? Explain.
4. (a) Capital Budgeting models are used to evaluate a wide variety of capital expenditure decisions. Comment on this statement and enunciate some of the important expenditure decisions to which capital budgeting technique can be applied.

(b) The Susan Co. is contemplating either of two mutually exclusive projects. The data with respect to each are given below. The initial investment for both is equal to their depreciable value. Both will be depreciated straight line over a five-year life.

	Project A (₹)	Project B (₹)
Initial Investment	1,00,000	1,40,000
Year	Profits after taxes	
1	10,000	25,000
2	15,000	25,000
3	20,000	25,000
4	25,000	25,000
5	35,000	25,000

- (i) Calculate the 'net present value' and 'benefit-cost ratio' for each project.
- (ii) Evaluate the acceptability of each project on the basis of above mentioned two techniques.
- (iii) Select the best project, using NPV and benefit-cost ratios and comment on the resulting rankings.





# Lesson 3

## Capital Structure

### LESSON OUTLINE

- Meaning and Significance of Capital Structure
- Capital Structure vis-à-vis Financial Structure
- Planning and Designing
- Optimal Capital Structure
- Factors affecting Capital Structure of a Company
- Determinants of Capital Structure
- Capital Structure and Valuation
- Theories of Capital Structure
- EBIT - EPS Analysis
- EBITDA Analysis (Earnings before Interest, Tax, Depreciation and Amortization)
- Measures of Operating and Financial Leverage
- Effects of Leverage on Shareholders' Returns
- Risk and Leverage
- LESSON ROUND UP
- SELF TEST QUESTIONS

### LEARNING OBJECTIVES

Capital Structure of a company is very important for company survival. If the capital structure of a company is not optimized, then it becomes difficult for a company to get sustain i.e. sometime it have to face the lack of capital, sometime it has to bear the high interest. So in view of above, it becomes very important for a finance manager to ensure that the firm's capital structure is as per the market and organisation condition. The object of the Lesson is to enable the students to understand:

- Nature, scope and significance of capital structure
- Factors influencing Capital Structure
- Capital structure vis a vis Financial structure
- Planning and designing of capital structure
- Optimal Capital Structure
- Capital Structure & Valuation
- Capital Structure theories
- Leverage – Operating leverage, financial leverage, combined leverage
- EBIT-EPS Analysis
- Effect of leverages on return on equity

***The optimal capital structure indicates the best debt-to-equity ratio for a firm that maximizes its value. Putting it simple, the optimal capital structure for a company is the one which proffers a balance between the idyllic debt-to-equity ranges thus minimizing the firm's cost of capital***

## MEANING, DEFINITION AND SIGNIFICANCE OF CAPITAL STRUCTURE

### Meaning of Capital Structure

By the term capital structure we mean the structure or constitution or break-up of the capital employed by a firm. The capital employed consists of both the owners' capital and the debt capital provided by the lenders. Debt capital is understood here to mean the long term debt which has been deployed to build long term assets. Apart from the elements of equity and debt in the capital structure, a firm could have quasi equity in the form of convertible debt.

### Definition of Capital Structure

The following definitions clearly initiate, the meaning and objective of the capital structure.

According to the definitions of **Gerstenberg**, "Capital Structure of a company refers to the composition or make up of its capitalization and it includes all long-term capital resources".

According to the definition of **James C. Van Horne**, "The mix of a firm's permanent long-term financing represented by debt, preferred stock and common stock equity".

According to the definition of **Prasana Chandra**, "The composition of a firm's financing consists of equity, preference and debt".

Capital Structure of a firm is a reflection of the overall investment and financing strategy of the firm. It shows how much reliance is being placed by the firm on external sources of finance and how much internal accruals are being used to finance expansions etc. Capital structure can be of various kinds as described below:

#### 1. Horizontal Capital Structure

In a Horizontal capital structure, the firm has zero debt components in the structure mix. The structure is quite stable. Expansion of the firm takes in a lateral manner, i.e. through equity or retained earning only. The absence of debt results in the lack of financial leverage. Probability of disturbance of the structure is remote.

#### 2. Vertical Capital Structure

In a vertical capital structure, the base of the structure is formed by a small amount of equity share capital. This base serves as the foundation on which the super structure of preference share capital and debt is built. The incremental addition in the capital structure is almost entirely in the form of debt. Quantum of retained earnings is low and the dividend pay-out ratio is quite high. In such a structure, the cost of equity capital is usually higher than the cost of debt. The high component of debt in the capital structure increases the financial risk of the firm and renders the structure unstable. The firm, because of the relatively lesser component of equity capital, is vulnerable to hostile takeovers.

#### 3. Pyramid shaped Capital structure

A pyramid shaped capital structure has a large proportion consisting of equity capital and retained earnings which have been ploughed back into the firm over a considerably large period of time. The cost of share capital and the retained earnings of the firm is usually lower than the cost of debt. This structure is indicative of risk averse conservative firms.

#### 4. Inverted Pyramid shaped Capital Structure

Such a capital structure has a small component of equity capital, reasonable level of retained earnings but an ever increasing component of debt. All the increases in the capital structure in the recent past have been made through debt only. Chances are that the retained earnings of the firm are shrinking due to accumulating losses. Such a capital structure is highly vulnerable to collapse.

### Significance of capital structure

Capital structure is significant for a firm because the long term profitability and solvency of the firm is sustained by an optimal capital structure consisting of an appropriate mix of debt and equity. The capital structure also is significant for the overall ranking of the firm in the industry group. The significance of the capital structure is discussed below:

#### **1. It reflects the firm's strategy**

The capital structure reflects the overall strategy of the firm. The strategy includes the pace of growth of the firm. In case the firm wants to grow at a faster pace, it would be required to incorporate debt in its capital structure to a greater extent. Further, in case of growth through acquisitions or the inorganic mode of growth as it is called, the firm would find that financial leverage is an important tool in funding the acquisitions.

#### **2. It is an indicator of the risk profile of the firm**

One can get a reasonably accurate broad idea about the risk profile of the firm from its capital structure. If the debt component in the capital structure is predominant, the fixed interest cost of the firm increases thereby increasing its risk. If the firm has no long term debt in its capital structure, it means that either it is risk averse or it has cost of equity capital or cost of retained earnings less than the cost of debt.

#### **3. It acts as a tax management tool**

The capital structure acts as a tax management tool also. Since the interest on borrowings is tax deductible, a firm having healthy growth in operating profits would find it worthwhile to incorporate debt in the capital structure in a greater measure.

#### **4. It helps to brighten the image of the firm**

A firm can build on the retained earnings component of the capital structure by issuing equity capital at a premium to a spread out base of small investors. Such an act has two benefits. On the one hand, it helps the firm to improve its image in the eyes of the investors. At the same time, it reduces chances of hostile take-over of the firm.

### CAPITAL STRUCTURE VIS-A-VIS FINANCIAL STRUCTURE

In engineering, structure refers to different parts of a building and thus in financial terms, financial structure refers to all the components of finance in an organization. In simple terms, financial structure consists of all assets, all liabilities and the capital. The manner in which an organization's assets are financed is referred to as its financial structure. There are some similarities between capital structure and financial structure. However, there are many differences also that will be highlighted in this article.

If you take a look at the balance sheet of a company, the entire left hand side which includes liabilities plus equity is called the financial structure of the company. It contains all the long term and short term sources of capital. On the other hand, capital structure is the sum total of all long term sources of capital and thus is a part of the financial structure. It includes debentures, long term debt, preference share capital, equity share capital and retained earnings. In the simplest of terms, capital structure of a company is that part of financial structure that reflects long term sources of capital.

Consider the balance sheet of a company :

Particulars	Note No.	Amount as at 31 <sup>st</sup> March, 2012	(Amt. in ₹) Amount as at 31 <sup>st</sup> March, 2011
1	2	3	4
<b>I EQUITY AND LIABILITIES</b>			
(1) <b>Shareholders' funds</b>			
(a) <b>Share Capital</b>		2,00,000	
(b) <b>Reserve and Surplus</b>	1	72,000	
(2) <b>Current liabilities</b>		1,28,000	
(a) Trade payable		1,28,000	
(b) Provision for income Tax		60,000	
TOTAL		4,60,000	
<b>II. ASSETS</b>			
(1) <b>Non current-assets</b>			
(a) Fixed Assets			
(b) Preliminary expenses	2	8,000	
(2) <b>Current Assets</b>			
(a) inventories		48,000	
(b) Trade receivable		88,000	
(c) Cash at bank		52,000	
TOTAL		4,60,000	

In the above illustration, the total liabilities size of ₹ 4,60,000 is the financial structure of the firm while the long term block of ₹ 2,72,000 is the capital structure. We can also say that that the total financial structure minus the current liabilities structure gives us the capital structure.

We can enunciate the following differences between financial structure and capital structure:

- Capital structure relates to long term capital deployment for creation of long term assets. Financial structure involves creation of both long term and short term assets.
- Capital structure is the core element of the financial structure. Capital structure can exist without the current liabilities and in such cases;
- Capital structure shall be equal to the financial structure. But we cannot have a situation where the firm has only current liabilities and no long term capital.
- The financial structure of a firm is considered to be a balanced one if the amount of current liabilities is less than the capital structure net of outside debt because in such cases the long term capital is considered sufficient to pay current liabilities in case of sudden loss of current assets.
- Components of the capital structure may be used to build up the level of current assets but the current liabilities should not be used to finance acquisition of fixed assets. This would result in an asset liability mismatch.



## PLANNING AND DESIGNING OF CAPITAL STRUCTURE

Just as planning and design of a physical structure is important, the same holds true for capital structure as well. A well thought out plan for the capital structure supplemented by a careful design ensures that prime goal of the firm, i.e. maximisation of the shareholder wealth is easily achieved.

Planning of the capital structure is a preliminary activity and it might commence as early at the time of incorporation of the firm. Once the firm is established, the next logical step is to move in the direction of implementation of the project. For meeting the cost of the project, the means of finance are to be arranged. Hence the need for timely and early planning of the capital structure.

### Attributes of a Well Planned Capital Structure

A sound or appropriate capital structure should have the following features:

**Return:** The capital structure of the company should be most advantageous. Subject to other considerations, it should generate maximum returns to the shareholders without adding additional cost to them.

**Risk:** The use of excessive debt threatens the solvency of the company. To the point debt does not add significant risk. It should be sued, otherwise its use should be avoided.

**Flexibility:** The capital structure should be flexible. It should be possible for a company to adapt its capital structure with a minimum cost and delay if warranted by a changed situation. It should also be possible for the company to provide funds whenever needed to finance its profitable activities.

**Capacity:** The capital structure should be determined within the debt capacity of the company and this capacity should not be exceeded. The debt capacity of a company depends on its ability to generate future cash flows. It should have enough cash to pay creditors' fixed charges and principal sum.

**Control:** The capital structure should involve minimum risk of loss of control of the company. The owners of closely-held companies are particularly concerned about dilution of control.

### Designing a Capital Structure

After planning the capital structure, we are faced with the issue of its design. Design takes off from where the plan ends. Planning establishes the broad parameters of the structure. It is left for the design to fill in the minor details. While designing a capital structure, following points need to be kept in view:

1. **Design should be functional:** The design should create synergy with the long term strategy of the firm and should not be dysfunctional. It should facilitate the day to day working of the firm rather than create systematic bottlenecks.
2. **Design should be flexible:** The capital structure should be designed to incorporate a reasonable amount of flexibility in order to allow for temporary expansion or contraction of the share of each component.
3. **Design should be conforming statutory guidelines:** The design should conform to the statutory guidelines, if any, regarding the proportion and amount of each component. The limits imposed by lenders regarding the minimum level of owners' equity required in the firm should be complied with.

## OPTIMAL CAPITAL STRUCTURE

Is there an optimal capital structure for a firm? By the term optimal capital structure we mean a particular arrangement of various components of the structure which is just in tune with the both the long term and short term objectives of the firm. A combination less or more than the optimal combination would be less than satisfying. Hence a sub-optimal combination would affect the achievement of the goal of maximisation of the shareholders' wealth.

But can we plan and design an optimal capital structure? For designing such a structure, one would need the following information:

- The requirement of capital of the firm
- Availability of different components
- Cost of these components
- Rate of return from investment

It has to be further kept in mind that the above information should be exact information. In reality it is not possible to have the exact information on all the above four parameters. Secondly whatever information is available is for a particular period. Thus we have to design the structure in a static set-up which makes the design devoid of all flexibility.

The real world of business, however, is a dynamic world with ever changing demand and supply of various components of the capital structure. Hence we can not formulate the optimal capital structure in a static framework. The process has to be carried out in a dynamic framework of interdependent investment and financing decisions that yield optimal values within the constraints at the time and place when the decisions were made. We can, therefore, say that the optimal capital structure is an ideal situation which can function as the benchmark of performance for a firm. But this benchmark is invincible and the firm can expect to achieve moderated or toned down versions of this benchmark depending upon dynamics of each project.

### FACTORS INFLUENCING CAPITAL STRUCTURE

A company can finance its operations both through equity and debt. These two types of financing require servicing. Interest is paid on debt and return is to be provided to stockholders in the form of equity. Interest paid being 100% tax-deductible, provides the company a tax shield. Let us take an example to compare two modes of financing:

Particulars	Firm 'A'	Firm 'B'
Equity Capital	1000	2000
Debt	1000	nil
Turnover	2000	2000
Cost of Goods Sold	1200	1200
Other expenses	100	100
Interest	150	0
Profit Before Tax	550	700
Tax @40%	220	280
Profit after tax	330	420
Dividend	100	200
Retained Earning	230	220

We have two firms A and B entailing same investment of ₹ 2000 lacs. Firm A has equal mix of debt and equity financing while firm B has only equity financing. Rate of interest is 15% p.a. Tax rate is 40% and rate of dividend is 10%. A comparison of bottomline in both the cases shows that firm B has a higher profit before tax but lower retained earning because of higher tax outgo and higher dividend payment. In case the management of the firm is keen on internal accruals, a mix of equity and debt would be better suited but if the management is considering profit after tax as the key criterion, then the firm should avoid taking on debt.

## Factors Affecting the Choice of Capital Structure

Under the capital structure, decision the proportion of long-term sources of capital is determined. Most favourable proportion determines the optimum capital structure. That happens to be the need of the company because EPS happens to be the maximum on it. Some of the chief factors affecting the choice of the capital structure are the following:

### (1) Cash Flow Position:

While making a choice of the capital structure the future cash flow position should be kept in mind. Debt capital should be used only if the cash flow position is really good because a lot of cash is needed in order to make payment of interest and refund of capital.

### (2) Interest Coverage Ratio-ICR:

With the help of this ratio an effort is made to find out how many times the EBIT is available to the payment of interest. The capacity of the company to use debt capital will be in direct proportion to this ratio.

It is possible that in spite of better ICR the cash flow position of the company may be weak. Therefore, this ratio is not a proper or appropriate measure of the capacity of the company to pay interest. It is equally important to take into consideration the cash flow position.

### (3) Debt Service Coverage Ratio-DSCR:

This ratio removes the weakness of ICR. This shows the cash flow position of the company.

This ratio tells us about the cash payments to be made (e.g., preference dividend, interest and debt capital repayment) and the amount of cash available. Better ratio means the better capacity of the company for debt payment. Consequently, more debt can be utilised in the capital structure.

### (4) Return on Investment-ROI:

The greater return on investment of a company increases its capacity to utilise more debt capital.

### (5) Cost of Debt:

The capacity of a company to take debt depends on the cost of debt. In case the rate of interest on the debt capital is less, more debt capital can be utilised and vice versa.

### (6) Tax Rate:

The rate of tax affects the cost of debt. If the rate of tax is high, the cost of debt decreases. The reason is the deduction of interest on the debt capital from the profits considering it a part of expenses and a saving in taxes.

For example, suppose a company takes a loan of 0ppp 100 and the rate of interest on this debt is 10% and the rate of tax is 30%. By deducting 10/- from the EBIT a saving of in tax will take place (If 10 on account of interest are not deducted, a tax of @ 30% shall have to be paid).

### (7) Cost of Equity Capital:

Cost of equity capital (it means the expectations of the equity shareholders from the company) is affected by the use of debt capital. If the debt capital is utilised more, it will increase the cost of the equity capital. The simple reason for this is that the greater use of debt capital increases the risk of the equity shareholders.

Therefore, the use of the debt capital can be made only to a limited level. If even after this level the debt capital is used further, the cost of equity capital starts increasing rapidly. It adversely affects the market value of the shares. This is not a good situation. Efforts should be made to avoid it.

**(8) Floatation Costs:**

Floatation costs are those expenses which are incurred while issuing securities (e.g., equity shares, preference shares, debentures, etc.). These include commission of underwriters, brokerage, stationery expenses, etc. Generally, the cost of issuing debt capital is less than the share capital. This attracts the company towards debt capital.

**(9) Risk Consideration: There are two types of risks in business:****(i) Operating Risk or Business Risk:**

This refers to the risk of inability to discharge permanent operating costs (e.g., rent of the building, payment of salary, insurance installment, etc),

**(ii) Financial Risk:**

This refers to the risk of inability to pay fixed financial payments (e.g., payment of interest, preference dividend, return of the debt capital, etc.) as promised by the company.

The total risk of business depends on both these types of risks. If the operating risk in business is less, the financial risk can be faced which means that more debt capital can be utilised. On the contrary, if the operating risk is high, the financial risk likely occurring after the greater use of debt capital should be avoided.

**(10) Flexibility:**

According to this principle, capital structure should be fairly flexible. Flexibility means that, if need be, amount of capital in the business could be increased or decreased easily. Reducing the amount of capital in business is possible only in case of debt capital or preference share capital.

If at any given time company has more capital than as necessary then both the above-mentioned capitals can be repaid. On the other hand, repayment of equity share capital is not possible by the company during its lifetime. Thus, from the viewpoint of flexibility to issue debt capital and preference share capital is the best.

**(11) Control:**

According to this factor, at the time of preparing capital structure, it should be ensured that the control of the existing shareholders (owners) over the affairs of the company is not adversely affected.

If funds are raised by issuing equity shares, then the number of company's shareholders will increase and it directly affects the control of existing shareholders. In other words, now the number of owners (shareholders) controlling the company increases.

This situation will not be acceptable to the existing shareholders. On the contrary, when funds are raised through debt capital, there is no effect on the control of the company because the debenture holders have no control over the affairs of the company. Thus, for those who support this principle debt capital is the best.

**(12) Regulatory Framework:**

Capital structure is also influenced by government regulations. For instance, banking companies can raise funds by issuing share capital alone, not any other kind of security. Similarly, it is compulsory for other companies to maintain a given debt-equity ratio while raising funds.

Different ideal debt-equity ratios such as 2:1; 4:1; 6:1 have been determined for different industries. The public issue of shares and debentures has to be made under SEBI guidelines.

**(13) Stock Market Conditions:**

Stock market conditions refer to upward or downward trends in capital market. Both these conditions have their influence on the selection of sources of finance. When the market is dull, investors are mostly afraid of investing in the share capital due to high risk.

On the contrary, when conditions in the capital market are cheerful, they treat investment in the share capital as the best choice to reap profits. Companies should, therefore, make selection of capital sources keeping in view the conditions prevailing in the capital market.

#### (14) Capital Structure of Other Companies:

Capital structure is influenced by the industry to which a company is related. All companies related to a given industry produce almost similar products, their costs of production are similar, they depend on identical technology, they have similar profitability, and hence the pattern of their capital structure is almost similar.

Because of this fact, there are different debt-equity ratios prevalent in different industries. Hence, at the time of raising funds a company must take into consideration debt-equity ratio prevalent in the related industry.

### CAPITAL STRUCTURE AND VALUATION

There is a theme that the capital structure should be conducive to increase in valuation of the firm. By valuation, we mean that the market value or the realisable value of the owners' equity should increase. This can happen in case value of both components of the shareholders' equity, i.e. share capital and retained earnings increases.

Value of the share capital is reflected in the market value of the firm in case the shares are traded on the stock exchange. This market value, under ideal conditions, is indicative of the inherent value and is different from both the face value and the book value. The capital structure should be such as maximises the inherent value of the firm.

Retained earnings also have a book value, i.e. the value at which these earnings are carried in the books of the firm. The inherent value of the retained earnings depends upon the future returns which these earnings can generate for the owners. As earnings of the firm increase, its valuation also increases. Earnings can increase either directly through increased level of operations of the firm or indirectly through decrease in cost of capital of the firm. The direct increase in earnings is dependent upon the investment decisions and the changes in capital structure have no explicit bearing upon these earnings. Capital structure plays an important part in increase in earnings brought about by change in cost of different components of the structure.

### CAPITAL STRUCTURE THEORIES

There are basically three approaches to capital structure decision:

1. Net Income Approach
2. Net Operating Income Approach
3. Modigliani Miller Approach

#### 1. Net Income Approach

According to this approach there is a relationship between capital structure and the value of the firm and therefore, the firm can affect its value by increasing or decreasing the debt proportion in the overall financial mix. The Net Income Approach makes the following assumptions:

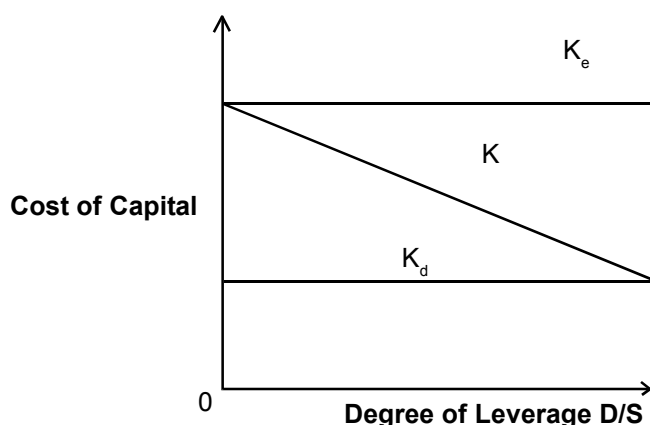
1. The total capital requirement of the firm is given and remains constant.

2.  $K_d$  is less than  $K_e$ .
3. Both  $K_d$  and  $K_e$  remain constant and increase in financial leverage i.e., use of more and more debt financing in the capital structure does not affect the risk perception of the investors.

Under this approach, the cost of debt capital,  $K_d$  and the cost of equity capital  $K_e$  remains unchanged when  $D/S$ , the degree of leverage, varies. Here  $S$  stands for total capital employed ( $= D + E$ ). The constancy of  $K_d$  and  $K_e$  with respect to the degree of leverage means that  $K$  the average cost of capital, measured by the following formula declines as the degree of leverage increases.

$$K = K_d \times \frac{D}{(D + E)} + K_e \times \frac{E}{(D + E)}$$

This happens because when the degree of leverage increases,  $K_d$  which is lower than  $K_e$  receives a higher weight in the calculation of  $K$ . This can also be illustrated by a graph as shown below:



As our assumption is that the cost of debt and equity capital would not change with the change in the level of leverage,  $K$  is seen to go down with the increasing proportion of debt in the capital.

Let us take a company that has an investment of ₹ 2,00,000 and a net operating income of ₹ 50,000. It is considering two scenarios: (1) no debt and (2) equal levels of debt and equity of ₹ 1,00,000 each. Let us say that the company finds out that the cost of equity is 12% and the cost of debt is 8%.

Calculations show that equity earnings would be ₹ 50,000 and ₹ 42,000 respectively in the two scenarios and shown below. As the return expected on equity is 12%, we can say that this profit is 12% and therefore the market value of equity would be such that this return becomes 12% on the same. This means that the market value of equity would be ₹ 4,16,667 and ₹ 4,50,000 respectively in the two scenarios. Adding the market value of debt and the market value of equity gives us the total value of the firm in the market.

Equity	Scenario 'A'	Scenario 'B'
Equity	2,00,000	1,00,000
Debt	0	1,00,000
Cost of Equity	12%	12%
Cost of Debt	8%	8%
Net operating income	50,000	50,000
Interest on Debt	0	8,000
Equity earnings	50,000	42,000

Market value of equity	4,16,667	3,50,000
Market value of debt	0	1,00,000
Total Value of firm	4,16,667	4,50,000

Average cost of capital Scenario A:  $8\% \times (0/2,00,000) + 12\% \times (2,00,000/2,00,000) = 12\%$

Scenario B:  $8\% \times (1,00,000/4,50,000) + 12\% \times (3,50,000/4,50,000) = 11.10\%$

There are two points to be noted here

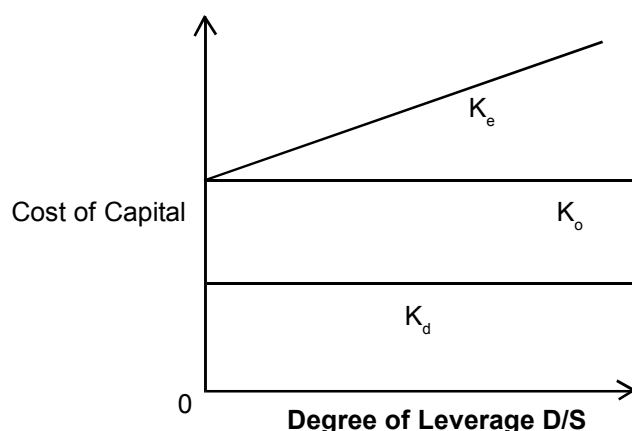
1. As the cost of capital decreases the value of the firm would go up as it is dependent upon the return expected and the cost of capital. Inverse relationship exists between the value of the firm and cost of capital for any given level of return.
2. This means that as we increase the level of debt in the company, the value of the firm would go up even further. This would mean that the companies would like to employ as much debt as possible.

## 2. Net Operating Income Theory

Net operating income approach is opposite to the Net income approach. According to NOI Approach, the market value of the firm depends upon the net operating profit or EBIT and the overall cost of capital. The financing mix or the capital structure is irrelevant and does not affect the value of the firm. the NOI Approach makes the following assumptions:

1. The investors see the firm as a whole and thus capitalize the total earnings of the firm to find the value of the firm as a whole.
2. The overall cost of capital  $K_o$  of the firm is constant and depends upon the business risk which also is assumed to be unchanged.
3. The cost of debt,  $K_d$ , is also taken as constant.
4. The use of more and more debt in the capital structure increases the risk of the shareholders and thus results in the increase in the cost of equity capital i.e.,  $K_e$ . The increase in  $K_e$  is such as to completely offset the benefits of employing cheaper debt, and
5. There is no taxes.

Under NOI Approach the relationship between the leverage and cost of capital has been represented in the Figure below:



Let us repeat the example we discussed earlier in net income approach. Let us take a company that has an investment of ₹ 2,00,000 and net operating income of ₹ 50,000. It is considering two scenarios: 1) no debt and 2) equal levels of debt and equity of ₹ 100,000 each. Let us assume that the company finds out that the overall cost of capital is 10% and the cost of debt is 8%.

As the return expected on total capital is 10 per cent, therefore the market value of total capital would be such that this return becomes 10 per cent on the same. This means that the market value of capital would be ₹ 5,00,000 in both the scenarios as our assumption in this case is that the total market value remains constant. Also the value of debt would also remain constant as the cost of debt remains constant. This means that the equity capitalization can be calculated by subtracting the market value of debt from the total market value of the firm. Then the return on equity divided by the market capitalization of equity would give us the cost of equity.

Equity	Scenario 'A'	Scenario 'B'
Equity	2,00,000	1,00,000
Debt	0	1,00,000
Cost of Debt	8%	8%
Net operating income	50,000	50,000
Overall Capitalization rate	10%	10%
Total market value	5,00,000	5,00,000
Interest on debt	0	8,000
Debt capitalization rate	0.08	0.08
Market value of debt	0	1,00,000
Market value of equity	5,00,000	4,00,000

There are two points to be noted here:

- As the cost of total capital and debt is constant, the cost of equity would go up or down with increasing or decreasing leverage, i.e., the amount of debt in the capital structure.
- This means that as we increase the level of debt in the company, the value of the firm doesn't change and the company does not benefit by taking on debt. This would mean that the companies would like to employ as much equity as possible so as to reduce the risk of the company.

### 3. Modigliani - Miller Theory

In 1958, Franco Modigliani and Merton Miller (MM) published a theory of modern financial management – they concluded that the value of a firm depends solely on its future earnings stream, and hence its value is unaffected by its debt/equity mix. In short, they concluded that a firm's value stems from its assets, regardless of how those assets are financed. In other words, a variant of the net operating income approach discussed above.

In their paper, MM began with a very restrictive set of assumptions, including perfect capital markets (which implies zero taxes). And then they used an arbitrage proof to demonstrate that capital structure is irrelevant. Under their assumptions, if debt financing resulted in a higher value for the firm than equity financing, then investors who owned shares in a leveraged (debt-financed) firm could increase their income by selling those shares and using the proceeds, plus borrowed funds, to buy shares in an unleveraged (all equity-financed) firm. The simultaneous selling of shares in the leveraged firm and buying of shares in the unleveraged firm would drive the prices of the stocks to the point where the values of the two firms would be



identical. Thus, according to MM Hypothesis, a firm's stock price is not related to its mix of debt and equity financing.

Modigliani and Miller have restated and amplified the net operating income position in terms of three basic propositions. These are as follows:

### Proposition – I

The total value of a firm is equal to its expected operating income (PBIT when tax = 0) divided by the discount rate appropriate to its risk class. It is independent of the degree of leverage.

$$V_l = V_u = \frac{\text{EBIT}}{K_{ol}} = \frac{\text{EBIT}}{K_{ou}}$$

Here the subscript l is used to denote leveraged firm and subscript u is used to denote unleveraged firm.

Since the V (Value of the firm) as established by the above equation is a constant, then under the MM model, when there are no taxes, the value of the firm is independent of its leverage. This implies that the weighted average cost of capital to any firm is completely independent of its capital structure and the WACC for any firm, regardless of the amount of debt it uses, is equal to the cost of equity of unleveraged firm employing no debt.

### Proposition – II

The expected yield on equity,  $K_e$  is equal to  $K_o$  plus a premium. This premium is equal to the debt – equity ratio times the difference between  $K_o$  and the yield on debt,  $K_d$ . This means that as the firm's use of debt increases its cost of equity also rises, and in a mathematically precise manner.

### Proposition – III

The cut-off rate for investment decision making for a firm in a given risk class is not affected by the manner in which the investment is financed. It emphasizes the point that investment and financing decisions are independent because the average cost of capital is not affected by the financing decision.

### Example

Let us take the case of two firms X and Y, similar in all respects except in their capital structure. Firm X is financed by equity only; firm Y is financed by a mixture of equity and debt. The financial parameters of the two firms are as follows:

**Financial Particulars of Firms X and Y**

(Amount in ₹)

Particulars	Firm X	Firm Y
Total Capital Employed	10,00,000	10,00,000
Equity Capital	10,00,000	6,00,000
Debt	Nil	4,00,000
Net operating Income	1,00,000	1,00,000
Debt Interest	0	20,000
Market value of debt	0	4,00,000
Equity earnings	1,00,000	80,000
Equity capitalization rate	10%	12%

Market value of equity	10,00,000	6,66,667
Total market value of the firm	10,00,000	10,66,667
Average cost of capital	10%	9.37%
Debt-Equity ratio	0	0.6

From the above particulars, it can be seen that the value of leveraged firm Y is higher than that of the unleveraged firm. According to Modigliani Miller approach, such a situation cannot persist because equity investors would do well to sell their equity investment in firm Y and invest in the equity of firm X with personal leverage. For example, an equity investor who owns 1% equity in firm Y would do well to:

- Sell his equity in Firm Y for ₹ 6,667
- Borrow ₹ 4,000 at 5% interest on personal account and
- Buy 1.0667% of the equity of firm X with the amount of ₹ 10,667 that he has.

Such an action will result in the following income:

<b>Particular</b>	<b>(₹)</b>
Income on investment in firm X	1066.70
Less: Interest (4000 x 0.5%)	<u>200.00</u>
Net Income	<u>866.70</u>

This net income of ₹ 866.7 is higher than a net income of ₹ 800 foregone by selling 1 percent equity of firm Y and the leverage ratio is the same in both the cases.

When investors sell their equity in firm Y and buy the equity in firm X with personal leverage, the market value of equity of firm Y tends to decline and the market value of equity of firm X tends to rise. This process continues until the net market values of both the firms become equal because only then the possibility of earning a higher income for a given level of investment and leverage by arbitrage is eliminated. As a result of this the cost of capital for both the firms is the same.

The above example explained that due to the arbitrage mechanism the value of a leveraged firm cannot be higher than that of an unleveraged firm, other things being equal. It can also be proved that the value of an unleveraged firm cannot be higher than that of leveraged firm, other things being equal.

Let us assume the valuation of the two firms X and Y is the other way around and is as follows:

(Amount in ₹)

<b>Particulars</b>	<b>Firm X</b>	<b>Firm Y</b>
Debt Interest	0	20,000
Market Value of debt		
(Debt capitalisation rate is 5%)	0	4,00,000
Equity earnings	1,00,000	80,000
Equity Capitalisation rate	8%	12%
Market value of equity	12,50,000	6,66,667
Total Market value	12,00,000	10,66,667

If a situation like this arises, equity investors in firm X would do well to sell the equity in firm X and use the proceeds partly for investment in the equity of firm Y and partly for investment in the debt of firm Y. For example, an equity investor who owns 1 percent equity in firm X would do well to:

- Sell his 1% equity in firm X for ₹ 12,500
- Buy 1.01% of the equity and debt in firm Y involving an outlay of ₹ 12,500

Such an action will result in an increase of income by ₹ 172 without changing the risk shouldered by the investor. When investors resort to such a change, the market value of the equity of firm X tends to decline and the market value of the equity of firm Y tends to rise. This process continues until the total market value of both the firms becomes equal.

### CRITICISM OF MM HYPOTHESIS

If the MM theory was correct, managers would not need to concern themselves with capital structure decisions, because such decisions would have no impact on stock prices. However, like most theories, MM's results would hold true only under a particular set of assumptions. Still, by showing the conditions under which capital structure is irrelevant, MM provided important insights into when and how debt financing can affect the value of a firm.

### MM Hypothesis with Corporate Taxes

In 1963, MM added corporate taxes to their model. With corporate taxes considered, a firm's stock price was shown to be directly related to its use to debt financing – higher the percentage of debt financing, the higher the stock price. Under the MM with tax theory, firms should use virtually 100% debt financing. The reason for this result is the corporate tax structure – returns to stockholders come from after-tax earnings, but returns to creditors are paid before tax. The effect of this tax treatment is that more of a company's operating income is left for investors when more debt financing is used.

### Empirical evidence Against MM Hypothesis

In spite of the MM arguments, firms do not usually use anywhere close to 100% debt financing. In an attempt to modify MM's model to make it more consistent with actual behaviour, many of their assumptions were relaxed in papers by other authors. In particular, the possibility of financial distress drastically changed the MM results. In the modified model, tax savings cause the value of a firm to rise as more and more debt is used, but at some point (the optimal structure), the value of the firm begins to fall with additional debt because the tax benefits are more than offset by the increasing costs of potential financial distress.

The MM model as modified to include financial distress suggests to managers .

- that a certain amount of debt is good
- that too much debt is bad, and
- that there is an optimal amount of debt for every firm.

Thus, the modified MM theory, which is called the trade-off theory of capital structure, provides useful insights into the factors that affect a firm's optimal capital structure. Here the marginal costs and benefits of debt financing are balanced against one another, and the result is an optimal capital structure that falls somewhere between zero and 100% debt.

### EBIT - EPS Analysis

One widely used means of examining the effect of leverage is to analyse the relationship between earnings before interest and taxes (EBIT) and earnings per share (EPS). The use of EBIT – EPS analysis indicates to management the projected EPS for different financial plans. Generally, management wants to maximise EPS if

doing so also satisfies the primary goal of financial management - maximisation of the owner's wealth as represented by the value of business, i.e. the value of firm's equity. If the firm attempts to use excessive amounts of debt, shareholders (who are risk-averse) may sell their shares, and thus its price will fall. While the use of large amount of debt may result in higher EPS, it may also result in a reduction in the price of the firm's equity. The optimum financial structure for a firm (that is, the use of debt in relationship of equity and retained earnings as sources of financing) should be the one which maximises the price of the equity.

Given the importance of earnings per share (EPS) as a measure of a firm performance, analysis of the impact of financing alternatives on EPS is an important first step. Essentially, the method involves the comparison of alternative methods of financing under various assumptions as to EBIT.

Let us assume that a firm has a capital structure of ₹ 100000. The equity capital is of ₹ 100 each and debt carries rate of interest of 10% p.a. We further assume that the firm has the following combination of components of this structure:

Case No.	Equity (%)	Debt (%)
1.	100	0
2.	75	25
3.	50	50
4.	25	75

For calculating the impact on EPS of various levels of EBIT, we take five values of ₹ 5000, ₹ 7,500, ₹ 12,500 and ₹ 15,000. The tax rate is assumed to be 40 %.

**(a) If EBIT is ₹ 5,000**

Debt Level (%)	0	25	50	75
EBIT	5,000	5,000	5,000	5,000
Intt.	0	2,500	5,000	7,500
PBT	5,000	2,500	0	2,500
Tax	2,000	1,000	0	0
PAT	3,000	1,500	0	2,500
Equity	1,00,000	75,000	50,000	25,000
EPS	3.0	2.0	0	1.0

We find that with increasing level of debt in the capital structure, the EPS decreases.

**(b) If EBIT is ₹ 7,500**

Debt Level (%)	0	25	50	75
EBIT	7,500	7,500	7,500	7,500
Intt.	0	2,500	5,000	7,500
PBT	7,500	5,000	2,500	0
Tax	3,000	2,000	1,000	0

PAT	4,500	3,000	1,500	0
Equity	1,00,000	75,000	50,000	25,000
EPS	4.5	4.0	3.0	0

In this case also, the EPS decreases with increasing level of debt.

**(c) If EBIT is ₹ 10,000**

Debt Level (%)	0	25	50	75
EBIT	10,000	10,000	10,000	10,000
Intt.	0	2,500	5,000	7,500
PBT	10,000	7,500	5,000	2,500
Tax	4,000	3,000	2,000	1,000
PAT	6,000	4,500	3,000	1,500
Equity	1,00,000	75,000	50,000	25,000
EPS	6.0	6.0	6.0	6.0

At this level of EBIT, the EPS remains unchanged irrespective of any change in the capital structure.

**(d) If EBIT is ₹ 12,500**

Debt Level (%)	0	25	50	75
EBIT	12,500	12,500	12,500	12,500
Intt.	0	2,500	5,000	7,500
PBT	12,500	10,000	7,500	5,000
Tax	5,000	4,000	3,000	2,000
PAT	7,500	6,000	4,500	3,000
Equity	1,00,000	75,000	50,000	25,000
EPS	7.5	8.0	9.0	12.0

Now we see that EPS increases with increasing level of debt.

**(e) If EBIT is ₹ 15,000**

Debt Level (%)	0	25	50	75
EBIT	15,000	15,000	15,000	15,000
Intt.	0	2,500	5,000	7,500
PBT	15,000	12,500	10,000	7,500
Tax	6,000	5,000	4,000	3,000
PAT	9,000	7,500	6,000	4,500
Equity	1,00,000	75,000	50,000	25,000
EPS	9.0	10.0	12.0	18.0

If we increase the EBIT further, the impact on EPS is better still.

We can conclude from the above illustration that the firm should resort to financing its operations through debt only beyond a threshold or indifference level in order to benefit from tax breaks provided by interest on borrowings. In other words, debt is suitable if the EBIT is expanding rapidly. If the operations are shrinking, it should change its capital structure immediately in favour of equity capital.

The EBIT-EPS analysis of the above illustration can be summarised in the form of following table :

	Debt Levels (%)			
	0	25	50	75
EBIT	EPS at above levels			
5,000	3.0	2.0	0	1.0
7,500	4.5	4.0	3.0	0
10,000	6.0	6.0	6.0	6.0
12,500	7.5	8.0	9.0	12.0
15,000	9.0	10.0	12.0	18.0

The indifference point of a firm (EBIT of ₹ 10000 in this case) varies from firm to firm but normally it approximates the breakeven point.

### EBITDA ANALYSIS (EARNINGS BEFORE INTEREST, TAX, DEPRECIATION AND AMORTIZATION),

EBITDA, an acronym for “earnings before interest, taxes, depreciation and amortization,” is an often-used measure of the value of a business. EBITDA is calculated by taking net income and adding interest, taxes, depreciation and amortization expenses back to it. EBITDA is used to analyze a company's operating profitability before non-operating expenses (such as interest and “other” non-core expenses) and non-cash charges (depreciation and amortization).

#### Analysis with EBITDA

EBITDA enables analysts to exclude the impacts of non-operating activities and focus on the outcome of operating decisions. Non-operating activities include interest expenses, tax rates, and large non-cash items such as depreciation and amortization.

By removing the non-operating effects, EBITDA gives investors the ability to focus on the profitability of their operations. This type of analysis is particularly important when comparing similar companies across a single industry for example.

#### Limitations of EBITDA

Factoring out interest, taxes, depreciation and amortization can make even completely unprofitable firms appear to be fiscally healthy. The use of EBITDA as measure of financial health made these firms look attractive. EBITDA numbers are easy to manipulate. If fraudulent accounting techniques are used to inflate revenues and interest, taxes, depreciation and amortization are factored out of the equation, almost any company may appear to be profitable and great.

Operating cash flow is a better measure of how much cash a company is generating because it adds non-cash charges (depreciation and amortization) back to net income and includes the changes in working capital that also use or provide cash (such as changes in receivables, payables and inventories). These working capital factors are the key to determining how much cash a company is generating. If investors do not include changes

in working capital in their analysis and rely solely on EBITDA, they will miss clues that indicate whether a company is losing money because it isn't making any sales.

Despite various shortcomings, there are some good reasons for using EBITDA.

1. The first factor to consider is that EBITDA can be used as a shortcut to estimate the cash flow available to pay debt on long-term assets, such as equipment and other items with a lifespan measured in decades rather than years. Dividing EBITDA by the amount of required debt payments yields a debt coverage ratio. Factoring out the "ITDA" of EBITDA was designed to account for the cost of the long-term assets and provide a look at the profits that would be left after the cost of these tools was taken into consideration.
2. Another factor is that EBITDA estimate to be reasonably accurate, the company under evaluation must have legitimate profitability. Using EBITDA to evaluate old-line industrial firms is likely to produce useful results. This idea was lost during the 1980s, when leveraged buyouts were fashionable, and EBITDA began to be used as a proxy for cash flow. This evolved into the more recent practice of using EBITDA to evaluate unprofitable dotcoms as well as firms such as telecoms, where technology upgrades are a constant expense.
3. EBITDA can also be used to compare companies against each other and against industry averages. In addition, EBITDA is a good measure of core profit trends because it eliminates some of the extraneous factors and allows a more "apples-to-apples" comparison.

Ultimately, EBITDA should not replace the measure of cash flow, which includes the significant factor of changes in working capital. Remember "cash is king" because it shows "true" profitability and a company's ability to continue operations.

## MEASURES OF OPERATING AND FINANCIAL LEVERAGE

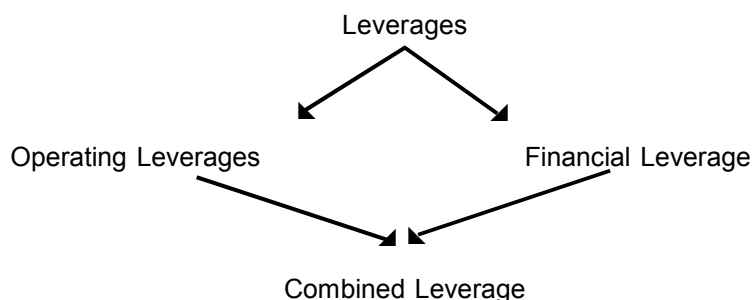
The term leverage refers to an increased means of accomplishing some purpose. Leverage is used to lifting heavy objects, which may not be otherwise possible. In the financial point of view, leverage refers to furnish the ability to use fixed cost assets or funds to increase the return to its shareholders.

### Definition of Leverage

**James Horne** has defined leverage as, "the employment of an asset or fund for which the firm pays a fixed cost or fixed return.

### Types of Leverage

Leverage can be classified into three major headings according to the nature of the finance mix of the company.



The company may use finance or leverage or operating leverage, to increase the EBIT and EPS.

## OPERATING LEVERAGE

The leverage associated with investment activities is called as operating leverage. It is caused due to fixed operating expenses in the company. Operating leverage may be defined as the company's ability to use fixed

operating costs to magnify the effects of changes in sales on its earnings before interest and taxes. Operating leverage consists of two important costs viz., fixed cost and variable cost. When the company is said to have a high degree of operating leverage if it employs a great amount of fixed cost and smaller amount of variable cost. Thus, the degree of operating leverage depends upon the amount of various cost structure. Operating leverage can be determined with the help of a break even analysis.

Operating leverage can be calculated with the help of the following formula:

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{Operating Profit}}$$

### Degree of Operating Leverage

The degree of operating leverage may be defined as percentage change in the profits resulting from a percentage change in the sales. It can be calculated with the help of the following formula:

$$\text{DOL} = \frac{\text{Percentage change in profits}}{\text{Percentage change in sales}}$$

#### Exercise:

From the following selected operating data, determine the degree of operating leverage. Which company has the greater amount of business risk? Why?

Amount in ₹

	Company A ₹	Company B ₹
Sales	25,00,000	30,00,000
Fixed costs	7,50,000	15,00,000

Variable expenses as a percentage of sales are 50% for company A and 25% for company B.

#### Solution

#### Statement of Profit

Amount in ₹

	Company A	Company B
Sales	25,00,000	30,00,000
Variable cost	12,50,000	7,50,000
Contribution	12,50,000	22,50,000
Fixed cost	7,50,000	15,00,000
Operating Profit	5,00,000	7,50,000

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{Operating Profit}}$$

$$\text{Company 'A' Operating Leverage} = \frac{12,50,000}{5,00,000}$$

= 2.5

Similarly Company B Operating Leverage would be 3



### Comments

Operating leverage for B Company is higher than that of A Company; B Company has a higher degree of operating risk. The tendency of operating profit may vary proportionately with sales, is higher for B Company as compared to A Company.

### Uses of Operating Leverage

Operating leverage is one of the techniques to measure the impact of changes in sales which lead for change in the profits of the company. If any change in the sales, it will lead to corresponding changes in profit. Operating leverage helps to identify the position of fixed cost and variable cost.

Operating leverage measures the relationship between the sales and revenue of the company during a particular period. Operating leverage helps to understand the level of fixed cost which is invested in the operating expenses of business activities. Operating leverage describes the overall position of the fixed operating cost.

### FINANCIAL LEVERAGE

A leverage activity with financing activities is called financial leverage. Financial leverage represents the relationship between the company's earnings before interest and taxes (EBIT) or operating profit and the earning available to equity shareholders.

Financial leverage is defined as "the ability of a firm to use fixed financial charges to magnify the effects of changes in EBIT on the earnings per share". It involves the use of funds obtained at a fixed cost in the hope of increasing the return to the shareholders. "The use of long-term fixed interest bearing debt and preference share capital along with share capital is called financial leverage or trading on equity".

Financial leverage may be favourable or unfavourable depends upon the use of fixed cost funds.

Favourable financial leverage occurs when the company earns more on the assets purchased with the funds, then the fixed cost of their use. Hence, it is also called as positive financial leverage.

Unfavourable financial leverage occurs when the company does not earn as much as the funds cost. Hence, it is also called as negative financial leverage.

Financial leverage can be calculated with the help of the following formula:

$$FL = \frac{OP}{PBT}$$

Where

FL = Financial leverage

OP = Operating profit (EBIT) PBT = Profit before tax.

### Degree of Financial Leverage

Degree of financial leverage may be defined as the percentage change in taxable profit as a result of percentage change in earnings before interest and tax (EBIT). This can be calculated by the following formula

$$DFL = \frac{\text{Percentage change in taxable Income}}{\text{Percentage change in EBIT}}$$

### Alternative Definition of Financial Leverage

According to **Gitmar**, "financial leverage is the ability of a firm to use fixed financial changes to magnify the effects of change in EBIT and EPS".

$$FL = \frac{EBIT}{EPS}$$

## 102 PP-FT&FM

Where

FL = Financial Leverage

EBIT = Earnings before Interest and Tax

EPS = Earnings Per share.

### Exercise

A Company has the following capital structure.

	₹
Equity share capital	1,00,000
10% Prof. share capital	1,00,000
8% Debentures	1,25,000

The present EBIT is ₹ 50,000. Calculate the financial leverage assuring that the company is in 50% tax bracket.

### Solution

Statement of Profit	₹
Earnings before Interest and Tax (EBIT) or operating profit	50,000
Interest on Debenture (1,25,000 × 8 × 100)	10,000
Earnings before Tax (EBT)	40,000
Income Tax	20,000
Profit	20,000

$$\begin{aligned}\text{Financial leverage} &= \frac{\text{Operating Profit (OP)}}{\text{Profit before Tax (PBT)}} \\ &= \frac{50,000}{40,000} \\ &= 1.25\end{aligned}$$

### Uses of Financial Leverage

Financial leverage helps to examine the relationship between EBIT and EPS.

Financial leverage measures the percentage of change in taxable income to the percentage change in EBIT. Financial leverage locates the correct profitable financial decision regarding capital structure of the company. Financial leverage is one of the important devices which is used to measure the fixed cost proportion with the total capital of the company. If the firm acquires fixed cost funds at a higher cost, then the earnings from those assets, the earning per share and return on equity capital will decrease. The impact of financial leverage can be understood with the help of the following exercise.

### Exercise 3

XYZ Ltd. decides to use two financial plans and they need ₹ 50,000 for total investment.

Particulars	Plan A	Plan B
Debenture (interest at 10%)	₹ 40,000	₹10,000
Equity share (₹ 10 each)	₹ 10,000	₹40,000
Total investment needed	₹ 50,000	₹ 4,000
Number of equity shares	50,000	1,000

The earnings before interest and tax are assumed at ₹ 5,000, and 12,500. The tax rate is 50%. Calculate the EPS.

### Solution

When EBIT is ₹ 5,000

Particulars	Plan A	Plan B
Earnings before interest and tax (EBIT)	₹ 5,000	₹ 5,000
Less : Interest on debt (10%)	₹ 4,000	₹ 1,000
Earnings before tax (EBT)	₹ 1,000	₹ 4,000
Less : Tax at 50%	₹ 500	₹ 2,000
Earnings available to equity shareholders.	₹ 500	₹ 2,000
No. of equity shares	1,000	4,000
Earnings per share (EPS) Earnings/No. of equity shares	₹ 0.5	₹ 0.5

When EBIT is ₹ 12,500

Particulars	Plan A	Plan B
Earnings before interest and tax (EBIT)	₹ 12,500	₹ 12,500
Less : Interest on debt (10%)	₹ 4,000	₹ 1,000
Earnings before tax (EBT)	₹ 8,500	₹ 11,500
Less : Tax at 50%	₹ 4,250	₹ 5,750
Earnings available to equity shareholders.	₹ 4,250	₹ 5,750
No. of equity shares	1,000	4,000
Earnings per share (EPS) Earnings/No. of equity shares	₹ 4.25	₹ 1.44

### DISTINGUISH BETWEEN OPERATING LEVERAGE AND FINANCIAL LEVERAGE

Sl. No	Operating Leverage	Financial Leverage
1	Operating leverage is associated with investment activities of the company.	Financial leverage is associated with financing activities of the company.
2	Operating leverage consists of fixed operating expenses of the company.	Financial leverage consists of operating profit of the company.
3	It represents the ability to use fixed operating cost.	It represents the relationship between EBIT and EPS

4	Operating leverage can be calculated by	Financial leverage can be calculated by
5	A percentage change in the profits resulting from a percentage change in the sales is called as degree of operating leverage.	A percentage change in taxable profit is the result of percentage change in EBIT.
6	Trading on equity is not possible while the company is operating leverage.	Trading on equity is possible only when the company uses financial leverage.
7	Operating leverage depends upon fixed cost and variable cost.	Financial leverage depends upon the operating profits.
8	Tax rate and interest rate will not affect the operating leverage.	Financial leverage will change due to tax rate and interest rate.

### Financial BEP

It is the level of EBIT which covers all fixed financing costs of the company. It is the level of EBIT at which EPS is zero.

### Indifference Point

It is the point at which different sets of debt ratios (percentage of debt to total capital employed in the company) gives the same EPS.

### COMBINED LEVERAGE

When the company uses both financial and operating leverage to magnification of any change in sales into a larger relative changes in earning per share. Combined leverage is also called as composite leverage or total leverage.

Combined leverage expresses the relationship between the revenue in the account of sales and the taxable income.

Combined leverage can be calculated with the help of the following formulas:

$$CL = OL \times FL$$

### Degree of Combined Leverage

The percentage change in a firm's earning per share (EPS) results from one percent change in sales. This is also equal to the firm's degree of operating leverage (DOL) times its degree of financial leverage (DFL) at a particular level of sales.

$$\text{Degree of contributed coverage} = \frac{\text{Percentage change in EPS}}{\text{Percentage change in sales}}$$

### Exercise 4

Kumar Company has sales of ₹ 25,00,000. Variable cost of ₹ 12,50,000 and fixed cost of ₹ 50,000 and debt of ₹ 12,50,000 at 8% rate of interest. Calculate combined leverage.

**Solution****Statement of Profit***Amount in ₹*

Sales	25,00,000
Less: Variable cost	15,00,000
Contribution	10,00,000
Less: Fixed cost	5,00,000
Operating Profit	5,00,000

Combined leverage = Operating leverage x Financial leverage

**Calculation of operating leverage**

$$\frac{\text{Contribution}}{\text{Operating Profit}} = \frac{10,00,000}{5,00,000} = 2$$

**Calculation of financial leverage**

Earning before Interest and Tax (EBIT)	₹ 5,00,000
Less: Interest on Debenture ( 8% of 12,50,000)	₹ 1,00,000
Earnings before Tax	₹ 4,00,000

$$\begin{aligned} \text{Financial Leverage} &= \frac{EBIT}{EBT} \\ \text{Financial Leverage} &= \frac{5,00,000}{4,00,000} \\ &= 1.25 \end{aligned}$$

Combined leverage = 2 × 1.25 = 2.5

**WORKING CAPITAL LEVERAGE**

One of the new models of leverage is working capital leverage which is used to locate the investment in working capital or current assets in the company.

Working capital leverage measures the sensitivity of return in investment of charges in the level of current assets.

$$\text{Working Capital Leverage} = \frac{\text{Percentage Change in ROI}}{\text{Percentage Change in Working capital}}$$

If the earnings are not affected by the changes in current assets, the working capital leverage can be calculated with the help of the following formula.

$$\text{Working Capital Leverage} = \frac{CA}{TA + DCA}$$

where,

CA = Current Assets

TA = Total Assets

DCA = Changes in the level of Current Assets

### Exercise 7

The following information is available for two companies.

You are required to compare the sensitivity earnings of the two companies for 30% charge in the level of their current assets.

### Solution

$$\text{Working Capital Leverage} = \frac{CA}{TA + DCA}$$

	X Ltd.	Y Ltd.
Fixed Assets	₹ 4,00,000	₹ 1,00,000
Current Assets	₹ 10,00,000	₹ 4,00,000
Total Assets	₹ 14,00,000	₹ 14,00,000
Earnings before interest and taxes	₹ 1,50,000	₹ 1,50,000

$$\begin{aligned}\text{Working Capital Leverage for Company X} &= \frac{10,00,000}{14,00,000 - 3,00,000} \\ &= \frac{10,00,000}{11,00,000} \\ &= 0.90\end{aligned}$$

$$\begin{aligned}\text{Working Capital Leverage for Company Y} &= \frac{4,00,000}{14,00,000 - 1,20,000} \\ &= \frac{4,00,000}{12,80,000} \\ &= 0.3125\end{aligned}$$

## EFFECTS OF LEVERAGE ON SHAREHOLDERS' RETURNS

Financial plan is one of the vital decisions of a firm because a financial plan affects the market value, cost of capital and shareholders return of a firm. The Proportion of Debt to Equity in the financial plan of a firm is called leverage. Since optimal debt ratio influences a firm's market value and shareholder's return, different firms use different debt ratio at different levels to maximize market value and shareholders return. Leverage has statistically significant effect on the shareholders' return and proper management of leverage can maximize the value of EPS

### 1. Operating Leverage Effect : % Change of EBIT is more than % Change in Sale

If % change of earning before interest and tax is more than % change in sale, this operating leverage will effect ROE positively because at this level, per unit fixed cost will decrease and small increase in sale will boost EBIT. If EBIT will increase, ROE will also increase. After dividing % Change of EBIT with % changes in sales. We can take ratio of it and it indicates, how will change EBIT if changes will be done in sales. 2:1 of operating leverage means if 100% sales will increase 200% EBIT will increase. As interest is fixed cost, so with this ROE will increase.

#### A. Situation: High Operating Leverage:

Too high operating leverage is not good, it may be high risky.

**B. Situation: Low Operating Leverage:**

Low operating leverage may be useful when sale market is fluctuating.

**2. Operating Leverage Effect : % Change of EBIT is less than % Change in Sale**

Now see also second face when % changes of EBIT is less than % changes in sales, it means 200% sale will increase, 100% EBIT will increase if operating leverage is 1:2. This situation is less effective for enhancing ROE.

**3. Effect of Financial Leverage on ROE**

If we have to check real effect of leverage on ROE, we have to study financial leverage. Financial leverage refers to the use of debt to acquire additional assets. Financial leverage may decrease or increase return on equity in different conditions.

**A. Situation: High Financial Leverage:**

Financial over-leveraging means incurring a huge debt by borrowing funds at a lower rate of interest and utilizing the excess funds in high risk investments in order to maximize returns.

**B. Situation: Low Financial Leverage:**

Financial low-leveraging means incurring a low debt by borrowing funds. It may affect positively, if decrease the value of bought asset with this low debt.

**4. Effect of High Operating leverage and High Financial Leverage**

It will increase ROE but it is high risky also.

**5. Effect of Low Operating leverage and High Financial Leverage**

It is optimum combination for bringing optimum return on equity.

**RISK AND LEVERAGE**

Risk is the probability that the future revenue streams of a firm shall show a variation from the expected figures. The variation is normally on the negative or the lower side because a positive variation reduces the investment risk and a reduction of risk is always welcome.

For linkage with leverage, we can divide risk into two broad categories, i.e. business risk and financial risk. Business risk pertains to risks associated with day to day operations of the firm. For example, decisions made regarding purchase of raw materials, manufacturing expenses and administrative expenses change the business risk profile of the firm. These decisions have an impact upon the operational profitability of the firm, i.e. the profits before interest and taxes. Financial risk, on the other hand, is associated with introduction of fixed interest bearing debt obligations in the capital structure of the firm. These obligations create a prior charge on EBIT before distribution of post tax profits among the owners.

The distinction between business risk and financial risk can be clarified through the following illustration:

**ABC Company Limited**  
**Profit and Loss Statement for the year ended 31.03.2012**

(Amount in ₹ Lacs)

(a) Net Sales	8,500	
(b) Cost of goods Sold	5,000	(1)
(c) Gross Profit	3,500	
(d) Selling Expenses	1,500	(2)
(e) EBIT	2,000	(3)

Business risk is associated with the impact of item no. (3) above of changes in item nos. (1) and (2). The “Cost of goods sold” item consists of cost of raw materials, labour cost, factory rent and other manufacturing expenses. Out of these elements, labour cost and factory rent are fixed costs while the rest are variable depending upon the level of sales. Now if the fixed costs are increased the expectation would be that the sales would rise in anticipated proportion. However if the sales do not rise as anticipated, business risk of the firm increases.

Uptill now we have assumed that the firm has no debt and as such, no interest cost. Let us assume that the firm raises debt with yearly interest payment of ₹ 500 lacs. The Profit & loss account would now be extended as shown below:

Sr. No	Particulars	Amount	
(a)	EBIT	2,000	
(b)	Interest	500	(4)
(c)	Profit before tax	1,500	
(d)	Tax @ 40%	600	
(e)	Profit after Tax	900	(5)

Now item no. (5) i.e. profit after tax is dependent on interest payments which are fixed. If EBIT decreases as a result of changes in items (1) and (2) and item no. (4) remains the same, the venture would become riskier as an additional element of financial risk has been built in. The change in risk profile of the firm has been caused by change in its leverage. The changes in fixed labour costs and factory rent are referred to as changes in operating leverage while the changes in fixed interest costs are described as changes in financial leverage.

A firm has operating leverage when it can expand output and sales without a proportionate increase in fixed costs. Let us assume that in our earlier illustration, cost of sales has the following break-up:

Cost of raw materials	₹ 2,500
Labour Cost	₹ 500
Factory rent	₹ 500
Other manufacturing costs	₹ 1,500

Labour cost and factory rent are fixed costs for running the factory for manufacturing, say, 1,00,000 units of the product. The firm now plans to expand the capacity to 2,00,000 units in the same factory by increasing the number of factory labour and installation of new machinery. The profit and loss account under the two levels of capacity would now read as under:

Amount in ₹

Sr. No.	Particulars	Capacity (100000 units)	Capacity (200000 units)
1.	Net Sales	8,500	17,000
2.	Cost of raw material	2,500	5,000
3.	Labour cost	500	1,000
4.	Factory rent	500	500
5.	Other mfg. Costs	1,500	2,500
6.	Gross profit	3,500	8,000



7.	Selling Expenses	1,500	2,500
8.	EBIT	2,000	5,500
9.	Tax @ 40%	800	2,200
10.	Profit after tax	1,200	3,300

We see that while net sales have increased by 100%, the EBIT has increased by 175%, thanks to the operating leverage provided by the fixed factory rent and the fixed component of manufacturing expenses and selling expenses, which we assume to be ₹ 500 lacs each.

Now, if due to recessionary conditions, capacity utilisation of the factory is reduced to 50% and 40% in two subsequent years respectively, profitability of the firm would change as under:

*Amount in ₹*

<i>Sr. No</i>	<i>Particulars</i>	<i>Capacity 50%</i>	<i>Capacity 40%</i>
1.	Net Sales	8,500	6,800
2.	Cost of raw material	2,500	2,000
3.	Labour cost	1,000	1,000
4.	Factory rent	500	500
5.	Other mfg. Costs	1,500	1,300
6.	Gross profit	3,000	2,000
7.	Selling Expenses	1,500	1,300
8.	EBIT	1,500	700
9.	Tax @ 40%	600	280
10.	Profit after tax	900	420

We see that the fall in EBIT is much sharper than the decline in sales. This has happened due to operating leverage.

Let us assume that the firm decides to move from rented factory premises to own premises. This is achieved by borrowing a sum of ₹ 15 crores from the bank carrying fixed interest of 12% p.a. The capacity is also simultaneously doubled. The comparative profit & loss figures shall now read as under:

*Amount in ₹*

<i>Sr. No.</i>	<i>Particulars</i>	<i>Original Capacity</i>	<i>Double Capacity</i>
1.	Net Sales	8,500	17,000
2.	Cost of raw material	2,500	5,000
3.	Labour cost	500	1,000
4.	Other mfg. Costs	1,500	2,500
5.	Gross profit	4,000	8,500
6.	Selling Expenses	1,500	2,500

7.	EBIT	2,500	6,000
8.	Interest	180	180
9.	Profit before tax	2,320	5,820
10.	Tax @ 40%	928	2,328
11.	Profit after tax	1,392	3,492

By creating financial leverage, the firm has not only ensured rise in EBIT but in PAT as well. But at the same time, it has increased its financial risk, i.e. the risk of default on repayment of loan amount and the interest on loan.

Now let us see how financial leverage impacts the performance of the firm in recessionary conditions:

Amount in ₹

Sr. No.	Particulars	Original Capacity	Double Capacity
1.	Net Sales	8,500	6,800
2.	Cost of raw material	2,500	2,000
3.	Labour cost	1,000	1,000
4.	Other mfg. Costs	1,500	1,300
5.	Gross profit	3,500	2,500
6.	Selling Expenses	1,500	1,300
7.	EBIT	2,000	1,200
8.	Interest	180	180
9.	Profit before tax	1,820	1,020
10.	Tax @ 40%	728	408
11.	Profit after tax	1,112	612

We can see that in case of financial leverage, the impact on PAT upon reduction in capacity utilisation is much severe. The degree of financial leverage can be calculated by the rate of change of PAT for a one percent change in sales.

### Relationship between Financial Risk and Financial Leverage

As the financial leverage increases, the breakeven point of the company increases and the company now has to sell more of its product (or service) in order to break even. High financial leverage increases the risk to banks and other lenders because of the higher probability of bankruptcy and the risk to stockholders because greater losses may be incurred if the company goes bankrupt. Increase in financial leverage increases, the risk to stockholders because the higher leverage will cause greater volatility in earnings and greater volatility in the stock price.

### SOME CASE STUDIES

**Example No. 1:** Calculate the operating, financial and combined leverage under situations 1 and 2 and the financial plans for X and Y respectively from the following information relating to the operating and capital structure of a company, and also find out which gives the highest and the least value ? Installed capacity is 5000 units. Annual Production and sales at 60% of installed capacity.

Selling price per unit ₹ 25

Variable cost per unit ₹ 15

**Fixed cost:**

Situation 1 : ₹ 10,000

Situation 2 : ₹ 12,000

Capital structure:

	Financial Plan	
	X(₹)	Y (₹)
Equity	25000	50000
Debt (10%^)	50000	25000
	75000	75000

**Solution**

Annual production and sales 60% of 5,000 = 3000 Unit

Contribution per Unit ₹

Selling Price 25

Per Unit Variable Price 15 Per Unit

10 Per Unit

Total contribution is 3000 Units×₹ 10=₹ 30,000

**Computation of leverage.**

Amount in ₹

	PLAN- X		PLAN- Y	
	Situation 1	Situation 2	Situation 1	Situation 2
Contribution	30,000	30,000	30,000	30,000
Fixed cost	10,000	12,000	10,000	12,000
operating Profit or EBIT	20,000	18,000	20,000	18,000
Interest on Debts				
10% of 50,000	5,000	5,000		
10% of 25,000			2,500	2,500
Earnings before Tax	15,000	13,000	17,500	15,500
Operating Leverage ( Contribution/EBIT)	1.50	1.67	1.5	1.67
Financial Leverage ( EBIT/EBT)	1.33	1.38	1.14	1.16
(iii) Combined leverage ( CL X FL)	2.00	2.30	1.71	1.94
	2.00	2.31	1.71428571	1.94

Highest and least value of combined leverage. Highest Value = 2.30 under situation 2 plan X. Least Value = 1.71 under situation 1 plan Y.

**Example No. 2.** XYZ' company has a choice of the following three financial plans. You are required to calculate the financial leverage in each case

	Plan I	Plan II	Plan III
Equity capital	₹ 2,000	₹ 1,000	₹ 3,000
Debt	₹ 2,000	₹ 3,000	₹ 1,000
EBIT	₹ 400	₹ 400	₹ 400

Interest @10% per annum on debts in all cases.

**Solution**

Amount in ₹

	Plan I	Plan II	Plan III
EBIT	400	400	400
Less Interest-(I)	200	300	100
EBT	200	100	300
FL (EBIT/EBT)	2	4	1.33

**Example No. 3.** Calculate operating leverage and financial leverage under situations A, B and C and financial plans 1, 2 and 3 respectively from the following information relating to the operating and financial leverage which give the highest value and the least value.

Installed capacity (units)	1,200
Actual production and sales (units)	800
Selling price per unit (₹)	15
Variable cost per unit (₹)	10
Fixed costs (₹) Situation A	1,000
Situation B	2,000
Situation C	3,000

	Financial Plan		
Sources of Fund	1	2	3
Equity	₹ 5,000	₹ 7,500	₹ 2,500
Debt	₹ 5,000	₹ 2,500	₹ 7,500
Cost of debt	12 per cent		

**Solution**

Amount in ₹

	A	B	C
S – VC	4,000	4,000	4,000
EBIT	3,000	2,000	1,000
Degree of Operative Leverage = (S – VC)/EBIT	1.33	2	4

**FINANCIAL LEVERAGE**

<b>Situation A</b>	1	2	3
EBIT	3,000	3,000	3,000
Less : Interest	600	300	900
EBT	2,400	2,700	2,100
Financial Leverage	1.25	1.11	1.43

**Situation B**

EBIT	2,000	2,000	2,000
Less : Interest	600	300	900
EBT	1,400	1,700	1,100
Financial Leverage	1.43	1.18	1.82

**Situation C**

EBIT	1,000	1,000	1,000
Less : Interest	600	300	900
EBT	400	700	100
Financial Leverage	2.5	1.43	10

**LESSON ROUND-UP**

- Capital Structure of a firm is a reflection of the overall investment and financing strategy of the firm. It shows how much reliance is being placed by the firm on external sources of finance and how much internal accruals are being used to finance expansions.
- Optimal capital structure means arrangement of various components of the structure in tune with both the long-term and short term objectives of the firm.
- The three Capital Structure Theories are—Net Income Approach, Net Operating Income Approach and Modigliani Millar Approach.
- Net income approach provides that the cost of debt capital,  $K_d$  and the cost of equity capital  $K_e$  remains unchanged when the degree of leverage, varies.
- Net Operating Income approach states that cost of the capital for the whole firm remains constant, irrespective of the leverage employed in the firm.
- Modigliani and Miller have restated the net operating income position in terms of three basic propositions:
 

Proposition I – The total value of a firm is equal to its expected operating income divided by the discount rate appropriate to its risk class.

Proposition II – The expected yield on equity,  $K_e$  is equal to  $K_o$  plus a premium.

Proposition III – The cut off rate for investment decision making for a firm in a given risk class is not affected by the manner in which the investment is financed.



# Lesson 4

## Cost of Capital

### LESSON OUTLINE

- Meaning of Cost of Capital
- Factors Affecting Cost of Capital
- Measurement of Cost of Capital
  - (a) Cost of redeemable debt
  - (b) Cost of irredeemable debt
  - (c) Cost of irredeemable preference shares
  - (d) Cost of redeemable Preference Share
  - (e) Cost of Equity
- Weighted Average Cost of Capital
- Marginal Cost of Capital
- LESSON ROUND UP
- SELF TEST QUESTIONS

### LEARNING OBJECTIVES

Cost of capital is a very important which decides the fate of various investment decisions. Cost of capital is an integral part of investment decision as it is used to measure the worth of investment proposal provided by the business concern. It is used as a discount rate in determining the present value of future cash flows associated with capital projects. Cost of capital is also called as cut-off rate, target rate, hurdle rate and required rate of return. When the firms are using different sources of finance, the finance manager must take careful decision with regard to the cost of capital; because it is closely associated with the value of the firm and the earning capacity of the firm.

The objective of this lesson is to enable the students to learn about

- The factors affecting the cost of capital of accompany
- Calculation of cost of capital of for different sources of finance
- Calculation of Weighted Cost of Capital
- Calculation of Marginal cost of Capital

***Cost of a capital of a company is not only important Capital Budgeting decisions but it very important in deciding the capital structure of a company and various important financial decisions.***

## COST OF CAPITAL

The cost of capital is the required rate of return that a firm must achieve in order to cover the cost of generating funds in the marketplace. It is used to evaluate new projects of a company as it is the minimum return that investors expect for providing capital to the company, thus setting a benchmark that a new project has to meet.

### Meaning of Cost of Capital

Cost of capital is the rate of return that a firm must earn on its project investments to maintain its market value and attract funds.

Cost of capital is the required rate of return on its investments which belongs to equity, debt and retained earnings. If a firm fails to earn return at the expected rate, the market value of the shares will fall and it will result in the reduction of overall wealth of the shareholders.

### Definitions of the term cost of Capital

The following important definitions are commonly used to understand the meaning and concept of the cost of capital.

According to the definition of **John J. Hampton** "Cost of capital is the rate of return the firm required from investment in order to increase the value of the firm in the market place"

According to the definition of **Solomon Ezra**, "Cost of capital is the minimum required rate of earnings or the cut-off rate of capital expenditure".

According to the definition of **James C. Van Horne**, Cost of capital is "A cut-off rate for the allocation of capital to investment of projects. It is the rate of return on a project that will leave unchanged the market price of the stock".

According to the definition of **William and Donaldson**, "Cost of capital may be defined as the rate that must be earned on the net proceeds to provide the cost elements of the burden at the time they are due".

### Assumption of Cost of Capital

Cost of capital is based on certain assumptions which are closely associated while calculating and measuring the cost of capital. It is to be considered that there are three basic concepts:

- A. It is not a cost as such. It is merely a hurdle rate.
- B. It is the minimum rate of return.
- C. It consists of three important risks such as zero risk level, business risk and financial risk. Cost of capital can be measured with the help of the following equation.

$$K = r_j + b + f.$$

Where,

K = Cost of capital.

$r_j$  = The riskless cost of the particular type of finance. b = The business risk premium.

f = The financial risk premium.

## CLASSIFICATION OF COST OF CAPITAL

Cost of capital may be classified into the following types on the basis of nature and usage:



- A. Explicit and Implicit Cost.
- B. Average and Marginal Cost.
- C. Historical and Future Cost.
- D. Specific and Combined Cost.

### Explicit and Implicit Cost

The cost of capital may be explicit or implicit cost on the basis of the computation of cost of capital.

Explicit cost is the rate that the firm pays to procure financing. This may be calculated with the help of the following equation;

$$C_{lo} = \frac{\sum_{t=1}^n \frac{CO_t}{(1+C)^t}}$$

Where,

$C_{lo}$  = initial cash inflow

$C$  = outflow in the period concerned

$N$  = duration for which the funds are provided

$T$  = tax rate

Implicit cost is the rate of return associated with the best investment opportunity for the firm and its shareholders that will be forgone if the projects presently under consideration by the firm were accepted.

### Average and Marginal Cost

Average cost of capital is the weighted average cost of each component of capital employed by the company. It considers weighted average cost of all kinds of financing such as equity, debt, retained earnings etc.

Marginal cost is the weighted average cost of new finance raised by the company. It is the additional cost of capital when the company goes for further raising of finance.

### Historical and Future Cost

Historical cost is the cost which has already been incurred for financing a particular project. It is based on the actual cost incurred in the previous project.

Future cost is the expected cost of financing in the proposed project. Expected cost is calculated on the basis of previous experience.

### Specific and Combine Cost

The cost of each sources of capital such as equity, debt, retained earnings and loans is called as specific cost of capital. It is very useful to determine the each and every specific source of capital.

The composite or combined cost of capital is the combination of all sources of capital. It is also called as overall cost of capital. It is used to understand the total cost associated with the total finance of the firm.

## IMPORTANCE OF COST OF CAPITAL

Computation of cost of capital is a very important part of the financial management to decide the capital structure of the business concern.

1. **Importance to Capital Budgeting Decision;** Capital budget decision largely depends on the cost of

capital of each source. According to net present value method, present value of cash inflow must be more than the present value of cash outflow. Hence, cost of capital is used to capital budgeting decision.

2. **Importance to Structure Decision:** Capital structure is the mix or proportion of the different kinds of long term securities. A firm uses particular type of sources if the cost of capital is suitable. Hence, cost of capital helps to take decision regarding structure.
3. **Importance to Evolution of Financial Performance:** Cost of capital is one of the important determining which affects the capital budgeting, capital structure and value of the firm. Hence, it helps to evaluate the financial performance of the firm.
4. **Importance to Other Financial Decisions:** Apart from the above points, cost of capital is also used in some other areas such as, market value of share, earning capacity of securities etc. hence; it plays a major part in the financial management.

## FACTORS DETERMINING THE FIRM'S COST OF CAPITAL

Cost of capital, like all other costs, is a variable term, subject to changes in a number of factors. The various factors that play a part in determination of cost of capital are described below: There are four main factors which mainly determine the cost of Capital of a firm.

General economic conditions, the marketability of the firm's securities (market conditions), operating and financing conditions within the company, and the amount of financing needed for new investments. Now we will discuss each one of them.

### Factor 1: General Economic Conditions

General economic conditions determine the demand for and supply of capital within the economy, as well as the level of expected inflation. This economic variable is reflected in the risk less rate of return. This rate represents the rate of return on risk- free investments, such as the interest rate on short-term government securities. In principle, as the demand for money in the economy changes relative to the supply, investors alter their required rate of return. For example, if the demand for money increases without an equivalent increase in the supply, lenders will raise their required interest rate. At the same time, if inflation is expected to deteriorate the purchasing power of the euro, investors require a higher rate of return to compensate for this anticipated loss.

### Factor 2: Market Conditions

When an investor purchases a security with significant risk, an opportunity for additional returns is necessary to make the investment attractive. Essentially, as risk increases, the investor requires a higher rate of return. This increase is called a risk premium. When investors increase their required rate of return, the cost of capital rises simultaneously. If the security is not readily marketable when the investor wants to sell, or even if a continuous demand for the security exists but the price varies significantly, an investor will require a relatively high rate of return. Conversely, if a security is readily marketable and its price is reasonably stable, the investor will require a lower rate of return and the company's cost of capital will be lower.

### Factor 3: Operating and Financing Decisions

Risk, or the variability of returns, also results from decisions made within the company. Risk resulting from these decisions is generally divided into two types: business risk and financial risk. Business risk is the variability in returns on assets and is affected by the company's investment decisions. Financial risk is the increased variability in returns to common stockholders as a result of financing with debt or preferred stock. As business risk and financial risk increase or decrease, the investor's required rate of return (and the cost of capital) will move in the same direction.

### Factor 4: Amount of Financing

The last factor determining the corporation's cost of funds is the level of financing that the firm requires. As the financing requirements of the firm become larger, the weighted cost of capital increases for several reasons. For instance, as more securities are issued, additional flotation costs, or the cost incurred by the firm from issuing securities, will affect the percentage cost of the funds to the firm. Also, as management approaches the market for large amounts of capital relative to the firm's size, the investors' required rate of return may rise. Suppliers of capital become hesitant to grant relatively large sums without evidence of management's capability to absorb this capital into the business. This is typically "too much too soon". Also, as the size of the issue increases, there is greater difficulty in placing it in the market without reducing the price of the security, which also increases the firm's cost of capital.

### Controllable Factors Affecting Cost of Capital

These are the factors affecting cost of capital that the company has control over

#### (1) Capital Structure Policy

A firm has control over its capital structure, and it targets an optimal capital structure. As more debt is issued, the cost of debt increases, and as more equity is issued, the cost of equity increases.

#### (2) Dividend Policy

Given that the firm has control over its payout ratio, the breakpoint of the marginal cost of capital schedule can be changed. For example, as the payout ratio of the company increases, the breakpoint between lower-cost internally generated equity and newly issued equity is lowered.

#### (3) Investment Policy

It is assumed that, when making investment decisions, the company is making investments with similar degrees of risk. If a company changes its investment policy relative to its risk, both the cost of debt and cost of equity change.

### Uncontrollable Factors Affecting the Cost of Capital

These are the factors affecting cost of capital that the company has no control over:

#### (1) Level of Interest Rates

The level of interest rates will affect the cost of debt and, potentially, the cost of equity. For example, when interest rates increase the cost of debt increases, which increases the cost of capital.

#### (2) Tax Rates

Tax rates affect the after-tax cost of debt. As tax rates increase, the cost of debt decreases, decreasing the cost of capital.

## MEASUREMENT OF COST OF CAPITAL

### Cost of Debt (Kd)

Cost of Debt refers to the cost of long Term debentures/bond. Short term debts are ignored in calculating the cost of debt assuming that either short term debt plays insignificant part in determining the cost of debt or that the interest on short term debt is balanced by interest on short term receivables

Cost of Debt is calculated after tax because interest payments are tax deductible for the firm. Cost of capital is denoted by the term Kd

$K_d \text{ after taxes} = K_d (1 - \text{tax rate})$

**Example 1**

If the cost of debt for Cowboy Energy Services is 10% (effective rate) and its tax rate is 40% then:

$$\begin{aligned} K_d \text{ after taxes} &= K_d (1 - \text{tax rate}) \\ &= 10 (1 - 0.4) = 6.0 \% \end{aligned}$$

**Example 2**

Jain & Co sells a new issue of 6% irredeemable debentures to raise ₹ 100,000 and realizes the full face value of ₹ 100. The company falls in 40% tax bracket. Debts are issued at par. Find Cost of Capital

**Solution**

Before tax cost of debt = Interest / Sale value or Interest / Principal being issued at par

$$6,000 / 1,00,000 * 100 = 6\%$$

Cost of debt after tax =  $(1 - T) * \text{before tax cost of debt}$

$$= (1 - 0.40) * 6\%$$

$$= 0.036 \text{ or } 3.6\%$$

Cost of debt which are issued at premium

**Example 3**

Jain & Co sells a new issue of 6% 1000 irredeemable debentures of ₹ 100 each @ 10 % premium. The company falls in 40% tax bracket. Find Cost of Capital

**Solution**

Sale value or net proceeds from sale of Debentures (SV) = ₹  $(1,000 * 100 + 1,000 * 100 * 10\%)$

$$= ₹ 1,10,000$$

$$K_d = I (1 - T) / SV$$

Where:

$K_d$  = cost of debt after tax

SV = Sale value of debentures

T = Tax rate

I = Annual interest payment

$$\text{Cost of debt} = 6,000 / 1,10,000 * (1 - 0.40) = 3.27\%$$

**Cost of debt which are issued at Discount****Example 4**

Jain & Co sells a new issue of 6% 1000 irredeemable debentures of ₹ 100 each @ 10 % Discount. The company falls in 40% tax bracket. Find Cost of Capital

**Solution**

Sale value or net proceeds from sale of Debentures (SV) = ₹  $(1,000 * 100 - 1,000 * 100 * 10\%)$

$$= ₹ 90,000$$

$$K_d = I (1 - T) / SV$$

$$\text{Cost of debt} = 6,000 / 90,000 * (1 - 0.40) = 4\%$$

### Cost of Bond/Debentures redeemable after certain period

#### Cost of Redeemable debt:

In case of debentures redeemable after a certain period of time, cost of debt is calculated taking the average of sale value and redemption value. It is calculated by under given formula

$$K_d (\text{before tax}) = (I + [RV - SV] / n) / (RV + SV) / 2$$

Where:

I = Annual fixed interest

RV = Redeemable Value of debenture net of commission and floatation costs, if any.

SV = Sale Value of debentures net of discount or premium.

N = Term of debt till maturity

### After tax cost of Redeemable debt :-

$$K_d (\text{after tax}) = K_d (\text{before tax}) * (1 - T)$$

#### Example 5

A firm issues debentures worth ₹ 1,00,000 and realizes ₹ 98,000 after allowing 2% commission to brokers. They carry an interest rate of 10% and are due for maturity at the end of 10th year. The company has 40% tax bracket.

#### Solution

Redeemable value = ₹1,00,000; Sale value = ₹ 98,000. Annual interest (I) = ₹ 10,000

$$\text{Cost of debt} = ((10,000 + [1,00,000 - 98,000] / 10) / [(1,00,000 + 98,000) / 2])$$

$$\text{Cost of debt (after tax)} = 6.18\%$$

#### Example 6

X Limited issues its Bond at par @ ₹1,000 per bond. These bonds will mature after 20 years at par and bears coupon rate of 10%. Coupons are annual. The bond will sell for par but flotation costs amount to ₹ 50 per bond.

What is the pre-tax and after-tax cost of debt for X Limited?

#### Solution

Present realization from sale of 1 Bond = ₹ 950

Annual Interest = ₹ 100

Maturity value after 20 Years = Rs 1000

Let Pre tax cost of debt is  $K_d$

Present Value of realization from Bond = P. V. of interest for 20 Years @  $k_d$  + P.V of Redemption Value @  $K_d$

$$950 = 100(PVIFA 20, K_d) + 1000(PVIF 20, K_d)$$

Using a financial calculator:

$$K_d = 10.61\%$$

After-tax cost of debt:

$$K_d = K_d (1 - T)$$

$$K_d = .1061 (1 - .34)$$

$$K_d = .07 = 7\%$$

## B. COST OF PREFERENCE SHARE CAPITAL

Preference shares represent a special type of ownership interest in the firm. They are entitled to a fixed dividend, but subject to availability of profit for distribution. The preference share holders have to be paid their fixed dividends before any distribution of dividends to the equity shareholders. Their dividends are not allowed as an expense for the purpose of taxation. In fact, the preference dividend is a distribution of profits of the business. Dividends are paid out of profits after taxes so the cost of preference shareholder is after tax only.

Preference shares can be divided into:

1. Irredeemable preference shares
2. Redeemable preference shares

### (1) Cost of Irredeemable preference shares

Irredeemable preference shares are those shares issuing by which the company has no obligation to pay back the principal amount of the shares during its lifetime. The only liability of the company is to pay the annual dividends. The cost of irredeemable preference shares is:

$$K_p (\text{cost of pref. share}) = \frac{\text{Annual dividend of preference shares}}{\text{Market price of the preference stock}}$$

#### **Example 7**

Calculate the cost of 10% preference capital of 10,000 preference shares whose face value is ₹100. The market price of the share is currently ₹ 115.

#### **Solution**

$$\text{Annual dividend} = 10\% \text{ of } ₹ 100 = ₹10 \text{ per share}$$

$$K_p = ₹ 10 / ₹ 115 = 8.7\%$$

#### **Cumulative preference shares:**

In case of cumulative preference shares, the market price of the preference stock will be increased by such amount of dividend in arrears. Cumulative preference shares are those shares whose dividends will get accumulated if they are not paid periodically. All the arrears of cumulative preference shares must be paid before paying anything to the equity share holders.

#### **Non-cumulative preference shares:**

These are preference shares whose dividends do not get carried forward to the next year if they are not paid during a year.

If the company issues new preference shares,

#### **The cost of preference capital would be:**

$$K_p = \text{Annual dividend} / \text{Net proceeds after floatation costs, if any.}$$

**Example 8:** A limited company issues 8% preference shares which are irredeemable. The face value of share is ₹100 but they are issued at ₹105. The floatation cost is ₹3 per share, calculate cost of capital.

#### **Solution**

$$\text{Net proceed} = ₹(105-3) = ₹ 102$$

$$K_p = (8/102) * 100 = 7.84\%$$

## (2) Cost of Redeemable preference shares

Redeemable preference shares are those shares which have a fixed maturity date at which they would be redeemed.

$$\text{Cost of Redeemable preference shares} = K_p = \frac{D + (RV - SV) / N}{(RV + SV) / 2}$$

Where  $K_p$  = Cost of preference Shares

RV- Redemption value

SV= Sale value

N= No of years to Maturity

D= Annual Dividend

**Example 9:** A company issues 10,000, 8% preference shares of ₹100 each redeemable after 20 years at face value. The flotation costs are ₹3 per share find cost of capital.

### Solution

Redeemable value = ₹100;

Sale value = ₹100 - ₹3 = ₹97

Annual dividend = ₹8 per share.

$$K_p = \frac{8 + (100 - 97) / 20}{(100 + 97) / 2} = 8.27\%$$

## COST OF EQUITY CAPITAL

Equity Capital is the money invested by the promoters in the firm. The return which promoters get is of two kinds:

- Periodic Payments in the form of dividends. This is an explicit return.
- The capital appreciation which they might get by selling the shares at the increase in the market value of the shares. This return is an implicit return. The market value is an indicative measure of the return to the investors when they wish to redeem their investment

The cost of equity capital is the minimum rate of return that a company must earn on the equity financed portion of its investments in order to maintain the market price of the equity share at the current level. The cost of equity capital is rather difficult to estimate because there is no definite commitment on the part of the company to pay dividends. However, there are various approaches for computing the cost of equity capital. They are:

### 1. CAPM model

This is a popular approach to estimate the cost of equity. According to the SML, the cost of equity capital is:

$$K_e = K_{rf} + \beta (K_m - K_{rf})$$

Where:

$K_e$  = Cost of equity

$K_{rf}$  = Risk-free rate

$K_m$  = Equity market required return (expected return on the market portfolio)

$\beta$  = beta - Systematic Risk Coefficient.

**Example 10:**

Calculate the cost of equity capital for a company whose Risk-free rate =10%, equity market required return =18% with a beta of 0.5.

**Solution**

$$\begin{aligned} K_e &= 0.10 + 0.5(0.18 - 0.10) \\ &= 0.14 \text{ or } 14\%. \end{aligned}$$

## 2. Bond Yield Plus Risk Premium Approach

This approach is a subjective procedure to estimate the cost of equity. In this approach, a judgmental risk premium to the observed yield on the long-term bonds of the firm is added to get the cost of equity.

Cost of equity = Yield on long-term bonds + Risk Premium.

**Example 11**

Given, the yield on debt is 10% and the risk premium as 5%, calculate the cost of equity.

**Solution**

$$\text{Cost of equity} = 0.10 + 0.05 = 0.15 \text{ or } 15\%.$$

Firms that have risky and consequently high cost of debt will also have risky and consequently high cost equity. Thus it makes sense to base the cost of equity on a readily observable cost of debt. The disadvantage or a challenge to this approach is the determination of the risk premium. There is no objective way to determine it and hence many financial analysts look at the operating and financial risks of the business and arrive at a subjectively determined risk premium that ranges between 2 percent and 6 percent.

## 3. Dividend Growth Model Approach

The price of an equity stock depends ultimately on the dividends expected from it. It can be represented as follows:

$$P_0 = \frac{D_1}{(1+R)} + \frac{D_2}{(1+R)^2} + \frac{D_3}{(1+R)^3} + \dots$$

Where:

$P_0$  = Current price of the stock

$D_1$  = Expected dividend at the end of year 1

$D_2$  = Expected dividend at the end of year 2 and so on..

$t$  = Year  $t$

$r$  = Equity shareholders' required rate of return

If the dividends are expected to grow at a constant rate of  $g\%$  per year, then the equation becomes:

$$P_0 = \frac{D_1(1+G)}{(1+R)} + \frac{D_2(1+G)}{(1+R)^2} + \frac{D_3(1+G)}{(1+R)^3} + \dots$$

Simplifying this equation, we get:  $P_0 = D_1/(r-g)$

and solving for  $r$ , we get  $r = D_1/P_0 + g$

**Example 12**

A company has issued 5,000 equity shares of ₹ 100 each. Its current market price is ₹ 95 per Share and the



current dividend is Rs, 4.5 per share. The dividends are expected to grow at the rate of 6%. Compute the cost of equity capital.

**Solution**

Here,  $D_1 = ₹4.5 + \text{growth rate } 6\% = ₹4.77 \text{ per share}$

$P_0 = ₹95$

$K_e = \frac{₹4.77}{₹95} + 6\% = 0.11 \text{ or } 11\%$

#### 4. Earnings-Price Ratio approach

According to this approach, the cost of equity capital is:

$K_e = \frac{E_1}{P_0}$

Where:

$E_1$  = Expected earnings per share for the next year

$P_0$  = Current market price per share

$E_1 = (\text{Current EPS}) * (1 + \text{growth rate of EPS})$

**Example 13**

A company has currently 10,000 equity shares of ₹100 each and its' earnings are ₹150,000. Its' current market price is ₹112 and the growth rate of EPS is expected to be 5%. Calculate the cost of equity.

**Solution**

Current EPS =  $\frac{\text{Earnings available for equity shareholders}}{\text{Number of equity shares}}$   
 $= ₹150,000 / 10,000 \text{ shares} = ₹15 \text{ per share.}$

$E_1 = ₹15 + 5\% = ₹15.75 \text{ per share}$

$K_e = ₹15.75 / ₹112 = 0.14 \text{ or } 14\%.$

#### Weighted Average Cost of Capital

The weighted average cost of capital (WACC), as the name implies, is the weighted average of the costs of different components of the capital structure of a firm. WACC is calculated after assigning different weights to the components according to the proportion of that component in the capital structure.

**Example No 14**

Kritika Limited is currently financed with ₹1, 000,000 of 7% bonds, and ₹2, 000,000 of common stock. The stock has a beta of 1.5, and the risk free rate is 4%, and the market risk premium is 3.5%. The marginal tax rate for a corporation of AKL's size is 35%. What is Kritika Limited WACC?

**Solution**

Ration of Debt to Total Capital =  $10,00,000 / (10,00,000 + 20,00,000)$   
 $= 1/3$

Ration of Common stock to total capital =  $20,00,000 / (10,00,000 + 20,00,000)$   
 $= 2/3$

Cost of Equity:

$$E(R_i) = R_f + \beta_{im} = x (E(R_m) - R_f) \rightarrow 4\% + 1.5 \times 3.5 \rightarrow 9.25$$

$$\text{Cost of debt} = 0.07(1-0.35) = 0.455 \text{ or } 4.55\%$$

$$\text{WACC} = (4.55\% \times 1/3) + (9.25\% \times 2/3)$$

$$= 0.076833$$

### Example No 15

A firm is considering a new project which would be similar in terms of risk to its existing projects. The firm needs a discount rate for evaluation purposes. The firm has enough cash on hand to provide the necessary equity financing for the project.

Also, the firm has 10,00,000 common shares outstanding current price ₹ 11.25 per share. Next year's dividend expected to be ₹1 per share firm estimates dividends will grow at 5% per year.

It has 1,50,000 preferred shares outstanding. The current price of preference share is ₹9.50 per share and dividend is ₹0.95 per share. if new preferred are issued, they must be sold at 5% less than the current market price (to ensure they sell) and involve direct flotation costs of ₹0.25 per share

It has a total of ₹100,00,000 (par value) in debt outstanding. The debt is in the form of bonds with 10 years left to maturity. They pay annual coupons at a coupon rate of 11.3%. Currently, the bonds sell at 106% of par value. Flotation costs for new bonds would equal 6% of par value.

The firm's tax rate is 40%. What is the appropriate discount rate for the new project?

### Solution:

Market value of common = 11.25(1000000)	=	₹ 1,12,50,000
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Market value of preferred = 9.50(150000)	=	₹ 14,25,000
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Market value of debt = 10000000(106%)	=	₹ 1,06,00,000
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Total value of firm	=	₹ 2,32,75,000
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Cost of Equity:

$$\begin{aligned} r &= \frac{\text{Div}_1}{P} + g \\ &= \frac{1}{11.25} + 0.05 \\ &= 0.1389 \end{aligned}$$

Cost of Preference Share Capital

$$\begin{aligned} r &= \frac{\text{Div}}{\text{net } P} \\ &= \frac{0.95}{9.50(1 - 0.05) - 0.25} \\ &= 0.1083 \end{aligned}$$

Cost of debt:

Net price = 106% - 6% = 100% of par value

Net price = par

Therefore, cost of debt = coupon rate

$r = 11.3\%$

Therefore:

$$\begin{aligned} \text{WACC} &= \left( \frac{11250000}{23275000} \right) (0.1389) + \left( \frac{1425000}{23275000} \right) (0.1083) + \left( \frac{10600000}{23275000} \right) (0.113) (1 - 0.4) \\ &= 0.1046 \\ &= 10.46\% \end{aligned}$$

### Marginal Cost of Capital (MCC)

MCC can be defined as the cost of additional capital introduced in the capital structure since we have assumed that the capital structure can vary according to changing requirements of the firm.

The following illustration shows how marginal cost of capital can be calculated:

Let us assume that the capital structure of the firm has been expanded by addition to various components. The addition has been ₹ 2,000 lacs for debt, ₹ 1,000 lacs for preference capital, ₹ 2,000 lacs for equity capital and ₹ 6,000 lacs for retained earnings. The cost of each component of the capital structure after addition would be the weighted average of the old and new values of the component:

Component	Existing Value	Cost (%)	Additional Value	Cost (%)	Weighted Average Cost (%)
Debt	4,000	14	2,000	16	14.6
Pref. Capital	1,000	9	1,000	12	10.5
Equity Capital	1,000	15	2,000	20	18.34
Ret. Earnings	4,000	18	6,000	18	18.00

Having calculated the weighted cost of each component, we calculate the weighted average cost of the entire capital structure now:

Component	Weight (%)	Cost (%)	Weighted Cost
Debt	28.57	14.6	$14.6 \times 0.29 = 4.23$
Preference capital	9.52	10.5	$10.5 \times 0.0952 = 1.00$
Equity capital	14.28	18.34	$18.34 \times 0.1428 = 2.62$
Retained earnings	47.62	18	$18 \times 0.4762 = 8.57$
Total	$\text{WACC} = 4.23 + 1.00 + 2.62 + 8.57 = 16.42\%$		

Marginal cost of addition is  $16.42 - 15.2 = 1.22\%$ . The return on investment has to be more than the revised weighted average cost of capital in order to ensure that the investors stay invested.

## COST OF CAPITAL AND ITS IMPLICATIONS IN BUDGETING DECISIONS

Investment decisions are directly related to financial decisions influenced by cost of capital. Management of a company is always anxious to maximise return on investments with a view to ensure that cost of capital is covered although management may alternatively decide to minimise investment which may yield highest returns for reasons of high risk involved or it may decide to maximise investments for obtaining highest growth through expansion of the productive processes. Management is guided by such considerations as:

- (1) Opportunities created by technological change requiring replacements, necessitating expansion or taking up new activities.
- (2) Competition strategies to avail of economic opportunities, investment being planned by them and the threat which may arise to the existing or proposed market shares of the firm;
- (3) Short-term and long-term market forecasts with reference to sales, revenue proceeds, net profits etc.;
- (4) Incentives offered by the state to promote investment in particular areas of production required for meeting urgent local needs of the nation or for exporting to earn foreign exchange etc. Nevertheless, the management of a corporate enterprise while preparing capital outlays prepares the particulars of the expected receipts (cash inflows) generated from the activity through such investment. Both are compared over-time and for optimum decision receipts should cover cost of financing the capital outlays. As such investment or capital budgeting decisions are directly linked with the cost of capital.

Before dealing with the application of cost of capital budgeting decisions, it is considered necessary to apprise the readers of the sources of capital and the cost of capital and its significance in investment decisions in the following paragraphs:

## IMPLICATIONS IN BUDGETING DECISIONS

Despite the above objections, cost of capital is used as the basis to evaluate investments whose cash flows are perfectly correlated with the cash flows from the company's present assets. With perfect co-relation between the two sets of cash flows risk is the same. But if the timing of the cash flows is not also the same, the same discount rate cannot be used for both investments. But weighted average cost of capital represents an averaging of all risks of the company and can be used to evaluate investments in much the same manner that the pay-back method. It gives some insight and guidance and to that extent it is good to be used. Present value of an investment can be computed using a weighted average cost of capital and this can be compared with present values calculated using the other discount rates. It may be that an investment with a positive present value should be rejected because of its risk characteristics or that an investment with a negative present value using the weighted average cost of capital should be accepted. All this will differ from situation to situation and case to case. Nevertheless, evaluation of capital investment projects requires some basis which could serve as the minimum rate of return which a project should generate. In such cases, weighted cost of capital could serve as an accepted discounting rate for evaluating investment decisions as no project will be acceptable which does not generate funds equal or greater to the cut-off rate represented by weighted cost.

## Some Case Study

**Exercise 1:** Identify each of the following statements as true or false, and explain your answers.

- A. Information costs both increase the marginal cost of capital and reduce the internal rate of return on investment projects.
- B. Depreciation expenses involve no direct cash outlay and can be safely ignored in investment-project evaluation.
- C. The marginal cost of capital will be less elastic for larger firms than for smaller firms.
- D. In practice, the component costs of debt and equity are jointly rather than independently determined.

E. Investments necessary to replace worn-out or damaged equipment tend to have low levels of risk.

### SOLUTION

- A. True:** The need to gather information concerning the creditworthiness of borrowers increases the interest rates charged by creditors. Similarly, the task of information gathering in the investment project evaluation process reduces the IRR from those projects.
- B. False:** Even though depreciation expenses involve no direct cash outlay, they must be explicitly considered in investment project evaluation because they affect corporate cash outlays for income tax payments.
- C. False:** The marginal cost of capital will tend to be more elastic for larger as opposed to smaller firms. Large firms tend to have easy access to capital markets given their relatively long operating history, and substantial resources. On the other hand, the marginal cost of capital can increase rapidly (be quite inelastic) for smaller firms which, for example, face capital constraints due to scarce managerial talent.
- D. True:** The component costs of debt and equity tend to be jointly as opposed to independently determined. Higher levels of debt, for example, will usually increase the perceived level of risk for debt holders and equity holders alike, and, therefore, raise the interest rate charged by creditors and the rate of return requirement of stockholders.
- E. True:** Investments necessary to replace worn out or damaged equipment have highly predictable returns and low levels of risk.

### Exercise 2

ABC Ltd. has the following capital structure.

	₹
Equity (expected dividend 12%)	10,00,000
10% preference	5,00,000
8% loan	15,00,000

You are required to calculate the weighted average cost of capital, assuming 50% as the rate of income-tax, before and after tax.

### Solution

Sources of Funds	Amount in ₹	After Tax Cost of Capital	Weights	Cost
Equity	10,00,000	12%	33.33%	3.99
Preference	5,00,000	10%	16.67	1.67
8% Loan	15,00,000	4%	50.00	2.00
				7.66%

Weight average cost of capital = 7.66%

**Exercise 3**

A company has on its books the following amounts and specific costs of each type of capital.

<i>Type of Capital</i>	<i>Book Value</i>	<i>Market Value</i>	<i>Specific Costs (%)</i>
	₹	₹	
Debt	4,00,000	3,80,000	5
Preference	1,00,000	1,10,000	8
Equity	6,00,000	9,00,000	15
Retained Earnings	2,00,000	3,00,000	13
	13,00,000	16,90,000	

Determine the weighted average cost of capital using:

- (a) Book value weights, and
- (b) Market value weights.

How are they different? Can you think of a situation where the weighted average cost of capital would be the same using either of the weights?

**Solution****A. Computation of Weighted Average Cost of Capital using book value**

<b>Source of Funds</b>	<b>Amount</b>	<b>Cost % (X)</b>	<b>Weighted Cost</b>
Debt	4,00,000	5	20,000
Preference Shares	1,00,000	8	8,000
Equity Shares	6,00,000	15	90,000
Retained Earnings	2,00,000	13	26,000
	$\Sigma W = 13,00,000$		$\Sigma XW = 1,44,000$

$$K_w = \frac{\Sigma XW}{\Sigma W}$$

$$K_w = \frac{1,44,000 \times 100}{13,00,000}$$

$$= 11.1\%$$

**B. Computation Weighted Average Cost of Capital using Market Value**

Source of Funds	Amount	Cost % (X)	Weighted Cost
Debt	3,80,000	5	19,000
Preference Shares	1,10,000	8	8,800
Equity Shares	9,00,000	15	13,500
Retained Earnings	3,00,000	13	39,000
	$\Sigma W = 16,90,000$		$\Sigma XW = 2,01,800$

$$K_w = \frac{\Sigma XW}{\Sigma W}$$

$$K_w = \frac{2,01,800}{16,90,000} \times 100 = 11.9\%$$

**LESSON ROUND-UP**

- The cost of capital is a term used in the field of financial investment to refer to the cost of a company's funds (both debt and equity), or, from an investor's point of view "the shareholder's required return on a portfolio company's existing securities"
- Cost of capital is used to evaluate new projects of a company and it is the minimum return that investors expect for providing capital to the company.
- For an investment to be worthwhile, the expected return on capital must be greater than the cost of capital. The cost of capital is the rate of return that capital could be expected to earn in an alternative investment of equivalent risk.
- Cost of capital may be classified into the following types on the basis of nature and usage:
  - (a) Explicit and Implicit Cost.
  - (b) Average and Marginal Cost.
  - (c) Historical and Future Cost.
  - (d) Specific and Combined Cost.
- There are four main factors which mainly determine the cost of Capital of a firm. General economic conditions, the marketability of the firm's securities (market conditions), operating and financing conditions within the company, and the amount of financing needed for new investments.
- There are factors affecting cost of capital that the company has control over and includes Capital Structure Policy, Dividend Policy, Investment Policy etc.
- There are some factors affecting cost of capital that the company has not control over and these factors includes Level of Interest Rates, Tax Rates.
- Cost of Debt is calculated after tax because interest payments are tax deductible for the firm. Cost of capital is denoted by the term  $K_d$ .  
 $K_d \text{ after taxes} = K_d (1 - \text{tax rate})$

- Irredeemable preference shares are those shares issuing by which the company has no obligation to pay back the principal amount of the shares during its lifetime. The only liability of the company is to pay the annual dividends. The cost of irredeemable preference shares is:

$$K_p (\text{cost of pref. share}) = \frac{\text{Annual dividend of preference shares}}{\text{Market price of the preference stock}}$$

- Redeemable preference shares are those shares which have a fixed maturity date at which they would be redeemed. The cost of redeemable preference shares is calculated by under given formulae.

$$\text{Cost of Redeemable preference shares} = \frac{K_p = D + (RV - SV) / N}{(RV + SV) / 2}$$

Where  $K_p$  = Cost of preference Shares

RV- Redemption value

SV= Sale value

N= No of years to Maturity

D= Annual Dividend

- The cost of equity capital is the minimum rate of return that a company must earn on the equity financed portion of its investments in order to maintain the market price of the equity share at the current level. The cost of equity capital is rather difficult to estimate because there is no definite commitment on the part of the company to pay dividends. However, there are various approaches for computing the cost of equity capital. They are:

- CAPM model : This is a popular approach to estimate the cost of equity. According to the SML, the cost of equity capital is:

$$K_e = K_{rf} + \beta (K_m - K_{rf})$$

Where:

$K_e$  = Cost of equity

$K_{rf}$  = Risk-free rate

$K_m$  = Equity market required return (expected return on the market portfolio)

$\beta$  = beta- Systematic Risk Coefficient.

- Bond Yield Plus Risk Premium Approach

This approach is a subjective procedure to estimate the cost of equity. In this approach, a judgmental risk premium to the observed yield on the long-term bonds of the firm is added to get the cost of equity.

$$\text{Cost of equity} = \text{Yield on long-term bonds} + \text{Risk Premium.}$$

- Dividend Growth Model Approach

The price of an equity stock depends ultimately on the dividends expected from it. According to this approach  $P_0 = D_1 / (r - g)$  and  $r = D_1 / P_0 + g$ . here

$P_0$  = Current price of the stock

$D_1$  = Expected dividend at the end of year 1

$r$  = Equity shareholders' required rate of return



$g$  = Growth rate

– Earnings-Price Ratio approach

According to this approach, the cost of equity capital is:

$$K_e = \frac{E_1}{P_0}$$

Where:

$E_1$  = Expected earnings per share for the next year

$P_0$  = Current market price per share

$E_1 = (\text{Current EPS}) * (1 + \text{growth rate of EPS})$

- The weighted average cost of capital (WACC), as the name implies, is the weighted average of the costs of different components of the capital structure of a firm. WACC is calculated after assigning different weights to the components according to the proportion of that component in the capital structure.
- Marginal Cost of Capital (MCC) can be defined as the cost of additional capital introduced in the capital structure since we have assumed that the capital structure can vary according to changing requirements of the firm.

### SELF-TEST QUESTIONS

(These are meant for re-capitulation only. Answers to these questions are not to be submitted for evaluation)

1. What is cost of capital? Define cost of capital.
2. Cost of capital computation based on certain assumptions. Discuss. Explain the classification of cost.
3. Mention the importance of cost of capital. Explain the computation of specific sources of cost of capital.
4. How overall cost of capital is calculated? Explain various approaches for calculation of cost of equity.
5. Rama Company issued 1,20,000 10% debentures of ₹ 10 each at a premium of 10%. The costs of floatation are 4%. The rate of tax applicable to the company is 55%. Complete the cost of debt capital. (Ans. 4.26%)
6. Siva Ltd., issued 8,000 8% debentures for ₹ 100 each at a discount of 5%. The commission payable to underwriters and brokers is ₹ 40,000. The debentures are redeemable after 5 years. Compute the after tax cost of debt assuming a tax rate of 60%. (Ans. 3.69%)
7. Suraiya Limited issued 4,000 12% preference shares of ₹ 100 each at a discount of 5%. Costs of raising capital are ₹ 8,000. Compute the cost of preference capital. (Ans. 12.90%)



# Lesson 5

## Financial Services

### LESSON OUTLINE

- Meaning of Financial Services
- Significance of Financial Services
- Scope and Structure of Financial Services,
- Types of Financial Services
  - Merchant Banking,
  - Housing Finance,
  - Securitization of Debt
  - Loan Syndication
  - Custodial and Advisory
- LESSON ROUND UP
- SELF TEST QUESTIONS

### LEARNING OBJECTIVES

Financial Services is a very important vertical of Financial system. To deal with various participants of Financial system, it is important to know about different financial services provided by these participants. In a country like India Financial Services Industry is in growing stage and it is high growth potential area.

The object of the study is to enable the student to understand:

- The meaning of Project Planning
- Meaning of Financial System & Its different components
- Meaning of Financial services, its scope and significance
- Structure of Financial Services Sector
- Merchant Banking Services
- Loan Syndication
- Securitization
- Housing Finance
- Custodial Services
- Regulation of Financial Services Sector

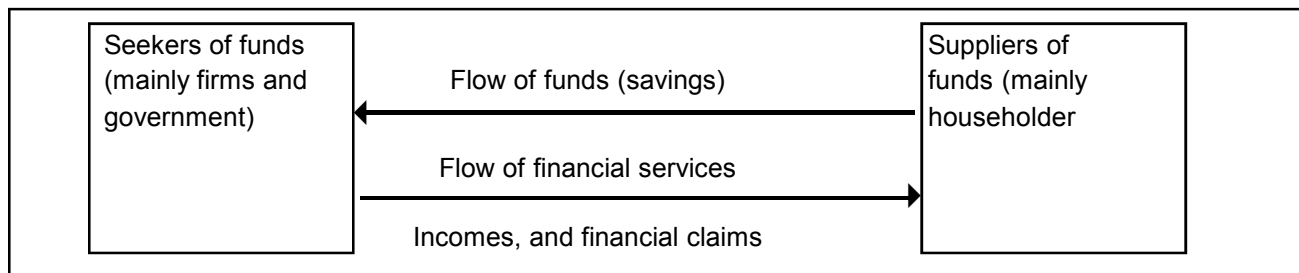
***Future of Financial services is very bright in developing country like India but for using various financial services in an efficient manner Financial literacy will be the key.***

***Unknown***

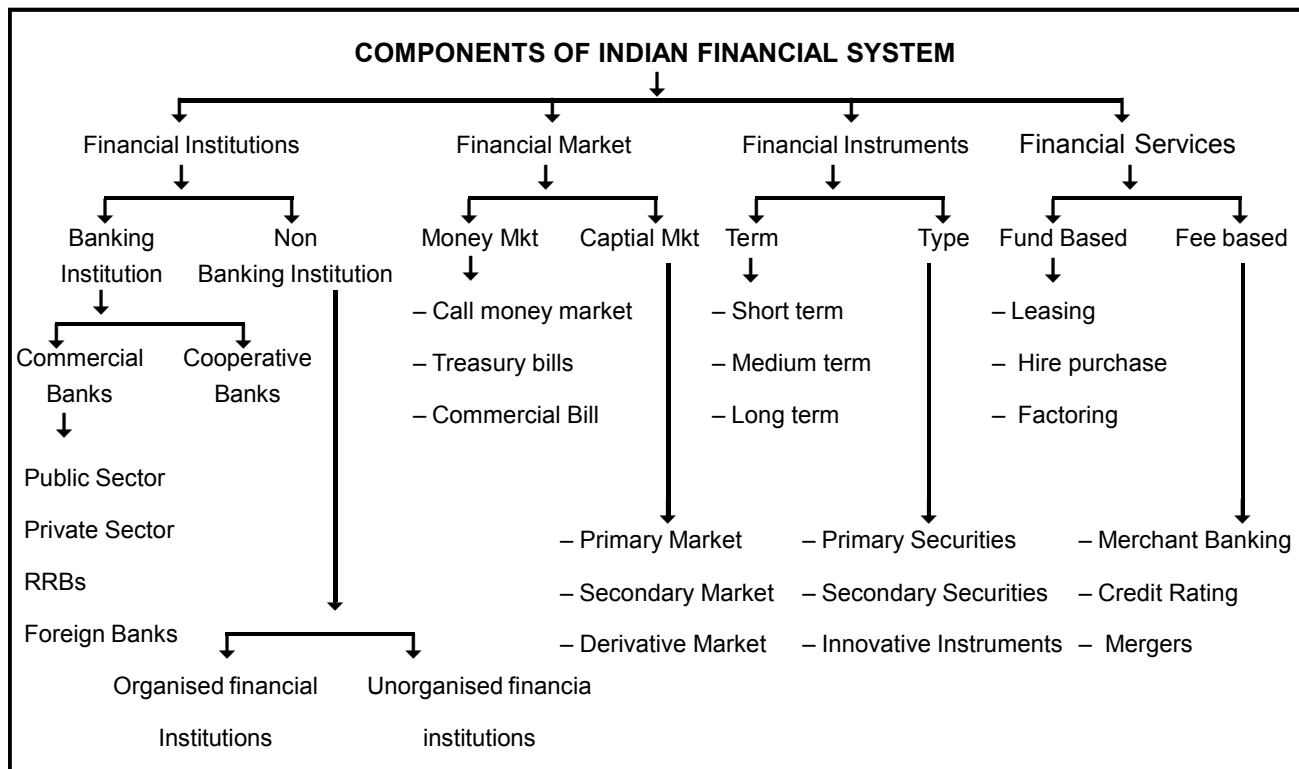
## FINANCIAL SYSTEM

The economic development of a nation is reflected by the progress of the various economic units, broadly classified into corporate sector, government and household sector. While performing their activities these units will be placed in a surplus/deficit/balanced budgetary situations.

There are areas or people with surplus funds and there are those with a deficit. A financial system or financial sector functions as an intermediary and facilitates the flow of funds from the areas of surplus to the areas of deficit. A Financial System is a composition of various institutions, markets, regulations and laws, practices, money managers, analysts, transactions and claims and liabilities.



Financial System of any country consists of financial markets, financial intermediation (which includes financial institutions and financial services) and financial instruments or financial products.



Since this lesson is concentrated on financial services, we will make elaborate discussion about 'Financial Services'.

## MEANING OF FINANCIAL SERVICES

Financial services refer to services provided by the financial institutions in a financial system. The finance

industry encompasses a broad range of organizations that deal with the management of money. Among these organizations are Asset Management Companies like leasing companies, merchant bankers and Liability Management Companies like discounting houses and acceptance houses, and further general financial institutions like banks, credit card companies, insurance companies, consumer finance companies, stock exchanges, and some government sponsored enterprises. The term 'Financial Services' in a broad sense means "mobilising and allocating savings." Thus, it includes all activities involved in the transformation of savings into investment

### Functions of financial services

1. Facilitating transactions (exchange of goods and services) in the economy.
2. Mobilizing savings (for which the outlets would otherwise be much more limited).
3. Allocating capital funds (notably to finance productive investment).
4. Monitoring managers (so that the funds allocated will be spent as envisaged).
5. Transforming risk (reducing it through aggregation and enabling it to be carried by those more willing to bear it).

### Characteristics and Features of Financial Services

**(i) Customer-Specific:** Financial services are usually customer focused. The firms providing these services, study the needs of their customers in detail before deciding their financial strategy, giving due regard to costs, liquidity and maturity considerations. Financial services firms continuously remain in touch with their customers, so that they can design products which can cater to the specific needs of their customers. The providers of financial services constantly carry out market surveys, so they can offer new products much ahead of need and impending legislation. Newer technologies are being used to introduce innovative, customer friendly products and services which clearly indicate that the concentration of the providers of financial services is on generating firm/customer specific services.

**(ii) Intangibility:** In a highly competitive global environment brand image is very crucial. Unless the financial institutions providing financial products and services have good image, enjoying the confidence of their clients, they may not be successful. Thus institutions have to focus on the quality and innovativeness of their services to build up their credibility.

**(iii) Concomitant:** Production of financial services and supply of these services have to be concomitant. Both these functions i.e. production of new and innovative financial services and supplying of these services are to be performed simultaneously.

**(iv) Tendency to Perish:** Unlike any other service, financial services do tend to perish and hence cannot be stored. They have to be supplied as required by the customers. Hence financial institutions have to ensure a proper synchronization of demand and supply.

**(v) People based services:** Marketing of financial services has to be people intensive and hence it's subjected to variability of performance or quality of service. The personnel in financial services organisation need to be selected on the basis of their suitability and trained properly, so that they can perform their activities efficiently and effectively.

**(vi) Market Dynamics:** The market dynamics depends to a great extent, on socioeconomic changes such as disposable income, standard of living and educational changes related to the various classes of customers. Therefore financial services have to be constantly redefined and refined taking into consideration the market dynamics. The institutions providing financial services, while evolving new services could be proactive in visualizing in advance what the market wants, or being reactive to the needs and wants of their customers.

## SCOPE OF FINANCIAL SERVICES

Financial services cover a wide range of activities. They can be broadly classified into two, namely:

- (i) Traditional. Activities
- (ii) Modern activities.

### **(i) Traditional Activities**

Traditionally, the financial intermediaries have been rendering a wide range of services encompassing both capital and money market activities. They can be grouped under two heads, viz.

**(a) Fund based activities:** The traditional services which come under fund based activities are the following:

- Underwriting or investment in shares, debentures, bonds, etc. of new issues (primary market activities).
- Dealing in secondary market activities.
- Participating in money market instruments like commercial
- Papers, certificate of deposits, treasury bills, discounting of bills etc.
- Involving in equipment leasing, hire purchase, venture capital, seed capital,
- Dealing in foreign exchange market activities. Non fund based activities

### **(b) Non-fund based activities**

Financial intermediaries provide services on the basis of non-fund activities also. This can be called 'fee based' activity. Today customers, whether individual or corporate, are not satisfied with mere provisions of finance. They expect more from financial services companies. Hence a wide variety of services, are being provided under this head. They include:

- Managing the capital issue — i.e. management of pre-issue and post-issue activities relating to the capital issue in accordance with the SEBI guidelines and thus enabling the promoters to market their issue.
- Making arrangements for the placement of capital and debt instruments with investment institutions.
- Arrangement of funds from financial institutions for the clients' project cost or his working capital requirements.
- Assisting in the process of getting all Government and other clearances.

### **(ii) Modern Activities**

Beside the above traditional services, the financial intermediaries render innumerable services in recent times. Most of them are in the nature of non-fund based activity. In view of the importance, these activities have been in brief under the head 'New financial products and services'. However, some of the modern services provided by them are given in brief hereunder.

- Rendering project advisory services right from the preparation of the project report till the raising of funds for starting the project with necessary Government approvals.
- Planning for M&A and assisting for their smooth carry out.
- Guiding corporate customers in capital restructuring.
- Acting as trustees to the debenture holders.
- Recommending suitable changes in the management structure and management style with a view to achieving better results.

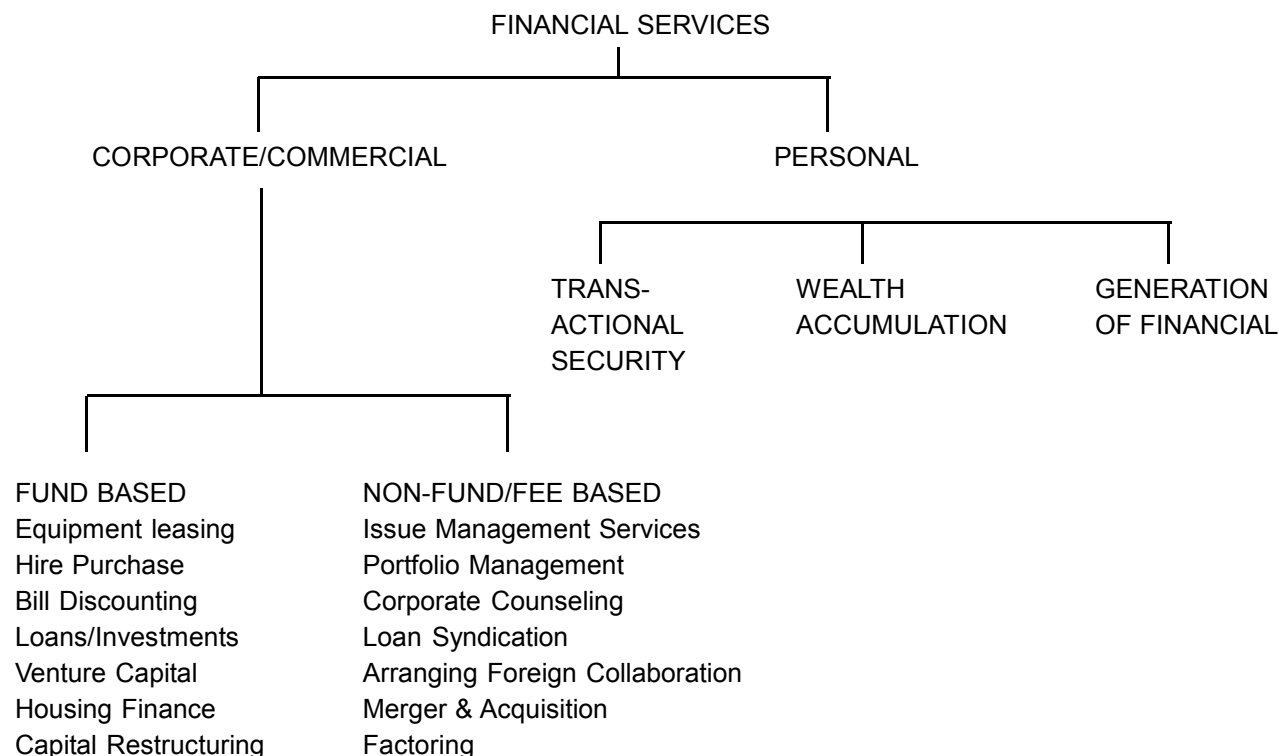
- Structuring the financial collaborations / joint ventures by identifying suitable joint venture partners and preparing joint venture agreements.
- Rehabilitating and restructuring sick companies through appropriate scheme of reconstruction and facilitating the implementation of the scheme.
- Hedging of risks due to exchange rate risk, interest rate risk, economic risk, and political risk by using swaps and other derivative products.
- Managing In- portfolio of large Public Sector Corporations.
- Undertaking risk management services like insurance services, buy-back options etc.
- Advising the clients on the questions of selecting the best source of funds taking into consideration the quantum of funds required, their cost, lending period etc.
- Guiding the clients in the minimization of the cost of debt and in the determination of the optimum debt-equity mix.
- Promoting credit rating agencies for the purpose of rating companies which want to go public by the issue of debt instrument.
- Undertaking services relating to the capital market, such as 1) Clearing services, 2) Registration and transfers, 3) Safe custody of securities, 4) Collection of income on securities

## STRUCTURE OF FINANCIAL SERVICES SECTOR

Financial services industry encompasses a considerable range and depth of activities and includes not only the traditional financial intermediaries such as commercial banks, insurance companies, mutual funds and unit trusts etc. but also the special purpose financial institutions or development banks, regulatory bodies and divisions and affiliates of non-financial firms which provide financial services such as loan, accepting deposits, transferring funds etc. In essence, it involves any service industry dealing in transactions of money based services and products.

Thus, while the major players of the financial services industry comprise of the financial intermediaries and institutions, what is new is their customer-orientation as manifested in provision of a wide spectra of services to commercial and personal finance segments. An illustrative, and by no means exhaustive, list of financial services would include: acceptances, brokerage, credit cards, credit information, credit rating, deposit acceptance, deposit insurance and other insurance, discounting and re-discounting, factoring, financial and performance guarantees, funds transfer, credit, hire purchase and installment credit, leasing, loan syndicating, managing capital issues, merchant banking, portfolio management, refinancing, safe deposit vaults, stock holding, technical and economic consultancy, underwriting etc.

The chart below illustrates the various financial services across the two major market segments, viz., the corporate/ commercial financial services and the personal financial services:



### Corporate Financial Services

The financial needs of the Corporate/Commercial sectors are so varied, complex and large that these put a great demand on financial industry's expertise in effectively meeting them. Their needs may include:

- (a) The need for money in short term, medium term and long term;
- (b) The need to earn a return on money held in short term, medium term and long term;
- (c) The need to move money domestically as well as internationally;
- (d) The need to manage trading as well as non-trading risks;
- (e) The need for information;
- (f) The need for advice or expertise.

### Personal Financial Services

The personal financial services industry offers three basic, generic products and service benefits to individual savers, borrowers and investors:

1. Transactional products and services.
2. Wealth accumulation products and services.
3. Products and services generating financial security.

Transactional products and services range from bank cheque-book accounts through standing orders, direct debits and automatic teller machine (ATM) facilities to the provision of branded credit cards offering the facility of payment and housing and consumer loan. Wealth accumulation products and services revolve around savings which are represented by a diverse range of savings and deposit accounts, units, investment in corporate securities etc. Generation of financial security centre around pension/providend funds, insurance etc.



## SIGNIFICANCE OF FINANCIAL SERVICES

Financial services are fundamental to economic growth and development. Banking, savings and investment, insurance, and debt and equity financing help private citizens save money, guard against uncertainty, and build credit, while enabling businesses to start up, expand, increase efficiency, and compete in local and international markets. For the poor, these services reduce vulnerability and enable people to manage the assets available to them in ways that generate income and options – ultimately creating paths out of poverty.

The financial services sector is the largest in the world in terms of earnings, comprised of a wide range of businesses including merchant banks, credit card companies, stock brokerages, and insurance companies, among others. These large firms have the expertise, reputation, and geographic reach to have significant direct impact and, through engagement and example, to change the way entire markets operate. They are using increasingly deliberate strategies to expand economic opportunity through business models that serve poor individuals and SMEs as clients. They are also developing initiatives to build human and institutional capacity and using their experience and influence to shape policy frameworks in the regions in which they work.

Despite their potential, to date the impact of large commercial banks on expanding economic opportunity has remained limited in the developing world, where a vicious cycle of insufficient information, inappropriate products, inadequate infrastructure, and inflexible regulatory environments has kept costs, and therefore prices, high, limiting companies' markets to clients within the top tiers of the economic pyramid.

One of the most critical obstacles to financial inclusion is informality. The poor often live and work in the informal sector, lacking legal ownership of land, homes, and businesses. Some one billion people worldwide live in informal settlements in urban areas alone, meaning that they cannot use their land or their homes as collateral on a loan; often they lack addresses they could associate with a bank account or credit application. Entrepreneurs can face high fees, inefficient and sometimes corrupt procedures, and burdensome regulation that essentially make it too costly to incorporate legally, forcing many small and start-up enterprises to remain in the informal or extra-legal sector. The results are telling. Of 1.1 billion people in India, only 30 million are formally employed; of 8.8 million in Bolivia, only 400,000 are formally employed. The remainder largely operates their own micro-enterprises without the legal recognition required to obtain traditional lines of credit, enforce contracts, or declare bankruptcy.

Informality contributes to insufficient market information for financial institutions. Because most of the poor have never held checking or savings accounts, taken bank loans, or entered into legal contracts, it can be difficult and costly for commercial financial institutions to determine what assets they have, what kinds of services they might need, or what levels of risk they might represent. Banking system regulations, such as interest rate caps, directed lending, and high reserve requirements discourage them further still.<sup>6</sup> As a result, in developing countries, only 26% of citizens have even basic checking or savings bank accounts.<sup>7</sup> Worldwide, only one billion of 6.5 billion people have bank accounts.

In recent years, however, two major trends have drawn attention to the potential market opportunity associated with low-income individuals and small businesses, catalyzing increased innovation and experimentation around these challenges and enabling promising business models to emerge.

First, against a backdrop of 30 years' practical experience, widespread publicity around the United Nations' International Year of Microcredit in 2005 and Muhammad Yunus' receipt of Nobel Peace Prize in 2006 have increased overall public awareness of microfinance. Awareness has led to growing recognition of two important facts:

- The poor are able to pay (often very high interest rates) for financial services, and
- They present no greater credit risk than the average higher-income borrower. In fact, many microfinance institutions have better repayment rates than traditional commercial finance institutions.

Increasing acceptance of microfinance has, in turn, laid the groundwork for an increasing focus on “meso-finance,” or small and medium enterprise finance – loans and investments larger than micro-loans, but smaller than would be profitable for a large, commercial financial institution to make.

Second, remittances from developed to developing countries, sent home by migrants, have reached sizes and growth rates too large for the major commercial players to ignore. The World Bank has shown that these flows totaled some \$199 billion in 2006, more than twice the amount in 2001. And this figure includes only transfers through official channels. Available household surveys suggest that unrecorded flows through informal channels may add 50 percent or more to this estimate.

Almost all multinational banks now have microfinance initiatives, and the challenge has become moving their commitments and activities into mainstream business operations where they can scale to match the enormous global demand.<sup>12,13</sup> Another challenge is to expand the focus from microfinance to meso-finance, roughly defined as financing in the \$50,000 to \$1 million range, which would enable small and start-up businesses to grow to levels where they could begin taking advantage of economies of scale and creating significant numbers of jobs.

## **MERCHANT BANKING SERVICES**

Merchant banking services strengthen the economic development of a country as they act as sources of funds and information for corporations. Considering the way the Indian economy is growing, the role of merchant banking services in India is indispensable. Mobilisation of funds from the capital market by way of public issues/offers for sale of equity shares, preference shares, debentures, bonds and other innovative instruments is a specialized task. The success of public issues of capital is so crucial for corporate existence and image that by sheer necessity corporate clients look up to the financial services sector. Procurement of funds is not the end objective for which corporate efforts have to be exhausted, principle of management by exception too suggests that corporate efforts and experience be utilised for the achievement of the objectives of the enterprise.

A merchant banker is any person who is engaged in the business of issue management either by making arrangements regarding selling, buying or subscribing to securities or acting as manager/consultant/advisors or rendering corporate advisory service in relation to such issue management. As far as new issue management in India is concerned, during the first half of the 1990s, the managing agents for a particular corporate house or group used to manage public issues and raise capital from the market with the help of stock brokers. With the abolition of managing agency system, the financial services sector has taken upon itself the task of providing public issues related services to its corporate clients.

## **History of Merchant Banking in India**

The formal beginning of the merchant banking services in India began in 1967 when the Reserve Bank of India provided license to the Grindlays Bank. The Grindlays Bank was engaged in capital issue management and it provided diverse financial services to the emerging section of entrepreneurs, especially those belonging to the small and medium enterprise sector.

Citibank started the merchant banking services in 1970 and the State Bank of India followed the same in 1972. After few years, the national merchant banks started collaborating with their counterparts in different countries to start their merchant banking divisions abroad.

Subsequent period, too, witnessed substantial growth in public limited companies providing range of services. Besides, involvement of large number of agencies requiring co-ordinated approach and supervision, close competition for funds in capital market, increasing consciousness for public interest to protect investors and consequent stringency of legislation etc. necessitated for merchant bankers a definite role in management of public issues. In view of the overwhelming importance of merchant bankers in the process of capital issues, it is now mandatory that all public issues should be managed by merchant banker(s) functioning as the lead manager(s).

### Types of Merchant Banking Organizations

According to the Securities and exchanges Board of India, four categories of the merchant banking organizations exist in the country:

- Institutional based merchant banking organizations operate as subsidiaries of private financial institutions or those recognized by the state or central governments.
- Banker based organizations are those that operate as divisions or subsidiaries of the nationalized commercial banks or the foreign banks functioning in the country.
- The third category consists of qualified brokers who provide skilled merchant banking services like portfolio management.
- The private merchant banking organizations work as sole proprietorships, private limited, public limited or partnership companies.

### Functions of Merchant Banking Organizations

Broadly, the various services offered by merchant bankers include: corporate counselling; project Counselling and pre-investment studies; capital re-structuring; credit syndication and project finance; issue management and underwriting; portfolio management; non-resident investment counselling and management; acceptance credit and bill-discounting; advising on mergers, amalgamations and take-overs, arranging off-shore finance; fixed deposit brokering; and relief to sick industries.

With regard to issues management capital can be raised through various types of instruments by corporates, for which it has to conform to SEBI stipulations. Here, the obligations of the lead merchant banker(s) fall into four groups: (i) pre-issue, (ii) post-issue and (iii) compliance with other requirements (iv) operational guidelines prescribed by SEBI.

The pre-issue obligations of the merchant banker(s) relate to due diligence, requisite fee, submission of documents, appointment of intermediaries, underwriting, making public the offer document, despatch of issue material, no-complaints certificate, mandatory collection centres, authorised collection agents, advertisement for rights post-issues, appointment of compliance officer, and an abridged prospectus.

The major post-issue obligations relate to association with allotment procedure, post-issue monitoring reports, redressal of investors grievances, coordination with intermediaries, post-issue advertisements, basis of allotment in over-subscribed issues, other responsibilities and a certificate regarding realisation of stockinvests.

The compliance by merchant banker(s) to other issue management requirements pertain to listing of pure debt/convertible issues by unlisted infrastructure companies, capital structure, firm allotment and reservations, terms of issue, restriction on further capital issues, period of subscription, price band, retention of oversubscription, underwriting, updation of the offer document, compliance officers, incentives to prospective shareholders, new financial instruments, issue of debentures bearing interest below bank rate, requirement of monitoring agency, safety net/buyback arrangement, utilisation of funds, option to receive securities in a dematerialised form, issue opening date and presentation of financials in case of change of denomination.

The compliance requirements of merchant banker(s) in relation to operational guidelines cover submission of the draft and final offer document, instruction(s) on post-issue obligations, issue of penalty points and so on.

Thus merchant bankers undertake the following activities:

- (a) Managing of public issue of securities;
- (b) Underwriting connected with the aforesaid public issue management business;

- (c) Managing/Advising on international offerings of debt/equity i.e. GDR, ADR, bonds and other instruments;
- (d) Private placement of securities;
- (e) Primary or satellite dealership of government securities;
- (f) Corporate advisory services related to securities market including takeovers, acquisition and disinvestment;
- (g) Stock broking;
- (h) Advisory services for projects;
- (i) Syndication of rupee term loans;
- (j) International financial advisory services.

The activities of the merchant bankers in the Indian capital market are regulated by SEBI (Merchant Bankers) Regulations, 1992 notified by SEBI in exercise of the powers conferred by Section 30 of SEBI Act, 1992 after approval of the Central Government.

## LOAN SYNDICATION

Loan syndication involves obtaining commitment for term loans from the financial institutions and banks to finance the project. Basically it refers to the services rendered by merchant bankers in arranging and procuring credit from financial institutions, banks and other lending and investment organisation or financing the client project cost or working capital requirements. In a service, it is project finance service.

Loan syndication is infact a tie up of term loans from the different financial institutions. The process of loan syndication involves the following steps:

1. Firstly, where the borrower directly submits the loan application to the lead financial institutions for a particular industry, the loan syndication gets automatically arranged through the lead institution who on its own would like the other financial institutions to participate in the financial assistance to the borrower. In this case, borrower need not approach the different financial institutions.
2. Secondly, where the borrower engages a merchant bank for arranging the loan syndication, then it becomes the duty of the merchant bank to approach the financial institutions before making a formal application to ascertain the possibilities of getting loan for a particular industry from the financial institutions. On getting the positive response, the merchant bank submits the formal information or applications form to the financial institution for the loan on behalf the borrower. The merchant banker also makes an indepth study of the investment proposal before taking up the project for loan syndication.

The process of loan syndication involves the formalities such as:

- (1) Preparation of project details,
- (2) Preparation of loan application,
- (3) Selection of financial institutions for loan syndication,
- (4) Issue of sanction letter of intent from the financial institutions
- (5) Compliance of terms and conditions for the availment of the loan,
- (6) Documentation, and
- (7) Disbursement of the loan.

The public financial institutions require the borrower to submit the requisite information for the loan in the prescribed forms along with the project report which is thoroughly scrutinised by them at individual levels and discussed in

the inter-institutional meetings. After the officers of the institutions satisfy themselves of the viability of the project, the proposal for the loan is submitted to the sanctioning authority and it is after this sanction the formal letter of intent is issued to the borrower.

This letter of intent is only an offer for financial assistance which is required to be accepted by the borrower in its board meeting with all the necessary terms and conditions appended to it. On complying with the terms and conditions of the loan, the borrower company avails of the loan amount in suitable installments as per the project details submitted and agreed to by the Financial Institutions. Before compliance of all the formalities and before the creation of security, the borrower also can avail of a Bridge Loan against the sanctioned amount of the loan.

In this way, it has been seen that the merchant bankers are neither creators of credit like commercial banks nor are they purveyors of credit like development banks. What they do is that they arrange/procure finance on request for the projects that come up for counseling. That is, in sequence of merchant banking services arrangement of finance comes next to project counseling. Otherwise too, after having decided the project to be undertaken, its implementation as a pre-requisite would require arrangement of funds that would involve,

- (a) Assessing the quantum and nature of funds required;
- (b) Locating the various sources of finance;
- (c) Approaching these sources with loan application forms and complying with other formalities etc.

### Estimating Capital Requirements

Quantum of funds required to get the project going would depend upon an estimation of the cost of different items of expenditure particularly with reference to the following elements of cost:

- (i) Preliminary expenses covering cost of promotion, incorporation etc.;
- (ii) Cost of fixed assets covering acquisition of land, construction of building, roads, railway siding, procurement of plant and equipment, furniture and fixtures or other miscellaneous fixed assets;
- (iii) Cost of current assets, particularly inventory, receivables etc.
- (iv) Cost of acquiring know-how covering expenses incurred on foreign or Indian technicians, training of personnel in India and abroad etc.;
- (v) Basis for provision of contingencies and margin money requirements for working capital;
- (vi) Cost of financing, brokerage, underwriting etc.;
- (vii) Any other element of cost likely to be incurred.

Some of the items like preliminary expenses etc. may not be relevant for established concern requiring funds for expansion, modernisation or diversification in which case costs of restructuring the business may become relevant.

It would always be advisable to compare these cost estimates with reference to similar concern in the same industry and in the same geographical area, of some size and scale of operation etc. Further, provision may also be made for likely escalation/ inflation and the 'tolerance limits' for under/over estimation may also be provided for.

Other than estimating the quantum of funds required for financing the project an important aspect to be considered is to identify the nature of funds required, i.e. whether funds are going to be in the nature of venture capital, bridge loan, special purpose loan such as loans under special schemes for rehabilitation, modernisation, diversification expansion etc., concessional loans such as backward area finance etc. Likewise, besides determining the target capital structure, there would be a need to separately address to the requirements of short-term, medium-term and long-term finances.

### Locating the various sources of finances

The choice for sources of fund would depend upon the quantum of funds required as well as nature thereof. For example, there are special schemes of development finance institutions for modernisation, expansion etc. in which case choice of sources of finance will be limited except making applications to the specified institutions under the designated schemes. Generally however, it would be better to survey the various sources of finance from two angles viz. (a) the period for which the funds are required, (b) nature of stake.

Sources of short-term funds are commercial banks, trade credit, public deposits, discount and finance houses etc.

Medium-term funds are provided on loan basis by,

- (i) State Financial Corporations;
- (ii) Commercial banks;
- (iii) All Indian Finance Institutions through special schemes pertaining the equipment credit, suppliers' credit, buyers' credit, bill discounting, instalment credit, public deposits etc.

Where funds are needed for a period of more than five years, such finance is termed as long-term finance. Owned funds are provided by promoters and public. Borrowed funds may be procured from all India and State level financial institutions. Long term funds may also be borrowed from international financing institutions where loan-syndication services can play an important role. While public offers of company's securities is beyond the purview of this financial service, loan syndication does cover private placement of debentures with investment institutions on behalf of the corporate issuer.

### Loan Application

This is an important aspect of loan syndication which would include preparation of loan application, filing and following up the loan application with the financial institution and arranging the disbursement of the same. Adequate care has to be taken particularly with regard to the compliance of what are known as 'covenants' or the terms and conditions stipulated in the letter of intent/sanction, particularly with regard to security, conversion option etc. Other than these, the company has to ensure the compliance of the provisions of the Companies Act, especially those pertaining to powers of the company to borrow and other relevant legislations to be entitled for obtaining the disbursement of the amount of loan.

### Syndication for working capital requirements

Here too, the services provided include not only the assessment of working capital requirements of the project but also the nature of advances provided by the commercial banks. For example, bank borrowings may comprise of two broad categories viz.,

- (i) fund based advances consisting of cash credit facility, bill finance, overdraft facility, demand loan; and
- (ii) non fund facilities consisting of letter of credit, letter of guarantee etc.

Here the merchant bankers will have to make necessary arrangements with regard to 'consortium finance' in cases where working capital requirements are very large. They are also required to ensure proper co-ordination between banks (especially the lead bank) and financial institutions in case a joint application for term loans and working capital finance is being furnished.

## SECURITIZATION OF DEBT

Securitisations constitutes a key segment of structured finance. It is a technique by which identified receivables and other financial assets can be packaged into transferable securities and sold to investors. The instruments issued under a securitisation deal derive their value from the cash flows (current or future) or collateral value of

a specified financial asset or pool of financial assets, general debt obligations or other financial receivables. Normally, these instruments do not have any recourse to the Originator other than aforementioned assets and specified third party support mechanisms that are clearly defined and are not unlimited (i.e. credit enhancements).

The simplest way to understand the concept of securitisation is to take an example. Let us say, I want to own a car to run it for hire. I could take a loan with which I could buy the car. The loan is my obligation and the car is my asset, and both are affected by my other assets and other obligations. This is the case of simple financing.

On the other hand, if I were to analytically envisage the car, my asset in the instant case, as claim to value over a period of time, that is, ability to generate a series of hire rentals over a period of time, I might sell a part of the cash flow by way of hire rentals for a stipulated time and thereby raise enough money to buy the car. The investor is happier now, because he has a claim for a cash flow which is not affected by my other obligations; I am happier because I have the cake and eat it also and also because the obligation to repay the financier is taken care of by the cash flows from the car itself.

In this way, in securitization the loan itself is not sold to another lender but rather a security instrument is created backed by the principal and interest payments on the loan. Through this means the beneficial ownerships of the loan is effectively transferred. The purchaser of the loan assumes the risk in the event of loan default, and the lender removes the risk from its balance sheet. Once securitization has taken place, then the securities themselves can be traded in a secondary market. To the borrowers, securitisation does not matter for what they get is loan and to them it makes no difference as to who holds the claim.

Securitisation can be classified into two categories:

- (1) **Asset backed securitisation (ABS)**- Securitisation of receivables which are “existing” i.e. the obligation of the Obligor to make payments is not dependent on further action or performance by the Originator. E.g. Mortgage-backed receivables, auto receivables securitisation and hire purchase rental receivables.
- (2) **Future Flow securitisation (FFS)**- Securitisation of receivables which are to be generated in the “future” i.e. the obligation of the Obligor to make payments depends on further substantial performance by the Originator. E.g. Typical FFS receivables are trade receivables (long term), electricity receivables, and toll road receivables.

### Participants of the securitisation process

The following parties are involved in a typical securitisation deal:

1. **Originator:** This is the entity that requires the financing and hence is the driver of the deal. Typically the Originator owns the assets or cash flows around which the transaction is structured.
2. **SPV (Special Purpose Vehicle):** An SPV is typically used in structured transaction for ensuring bankruptcy remoteness from the Originator. The SPV is the issuer of securities or the entity through which the financing is channeled. Typically the ownership of the cash flows or assets around which the transaction is structured is transferred from the Originator to the SPV at the time of execution of the transaction. The SPV is typically a marginally capitalized entity with narrowly defined purposes and activities and usually has independent trustees/directors.
3. **Investors:** The investors are the providers of funds and could be individuals or institutional investors like banks, financial institutions, mutual funds, provident funds, pension funds, insurance companies, etc.
4. **Obligor(s):** The Obligor is the Originator's debtor. The amount outstanding from the Obligor is the asset that is transferred to the SPV. The credit standing of the Obligor(s) is of paramount importance in a structured finance transaction.
5. **Guarantor/Credit Enhancement Provider/Insurer:** These are entities that provide protection to the

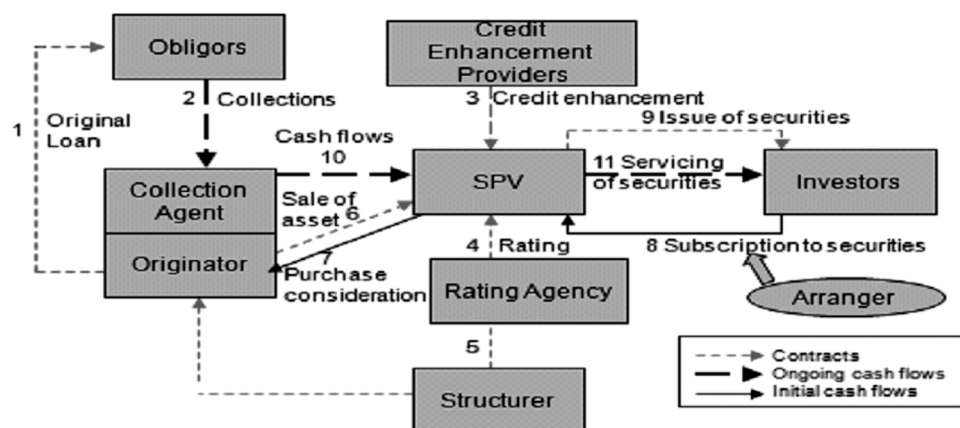


Investor for the finance provided and the returns thereon against identified risks. Typically, on the happening of pre-identified events, affecting the underlying assets or cash flows or the payment ability of the Obligors, these entities pay moneys, which are passed on, to the Investor.

Besides these primary parties, the other parties involved in a deal are given below:

1. **Rating Agency:** Since structured finance deals are generally complex with intricate payment structures and legal mechanisms, rating of the transaction by an independent qualified rating agency plays an important role in attracting Investors.
2. **Administrator or Servicer:** The Servicer performs the functions of collecting the cash flows, maintaining the assets, keeping records and general monitoring of the Obligors. In many cases, especially in the Indian context, the Originator also performs the role of the Servicer.
3. **Agent and Trustee:** The Trustee is the manager of the SPV and plays a key role in the transaction. The Trustee generally administers the transaction, manages the inflow and outflow of moneys, and does all acts and deeds for protecting the rights of the Investors including initiating legal action against various participants in case of any breach of terms and triggering payment from various credit enhancement structures.
4. **Structurer:** Normally, an investment banker acts as the structurer and designs and executes the transaction. The Structurer also brings together the Originator, Credit Enhancement Provider, the Investors and other parties to a deal. In some cases (like ICICI), the Investor also acts as the Structurer.

**Generic deal diagram**



A securitisation deal normally has the following stages:-

1. The originator issues loan to the obligors
2. The cashflows (principal + interest) on the loan are collected by the collection agent on behalf of the originator.
3. Support mechanisms (or credit enhancements) are appointed in the structure in order to minimise or mitigate potential credit risks.
4. The loan pool is selected and credit rating is taken.
5. A structure, generally, a merchant banker is appointed.
6. The SPV is formed. It acquires the receivables under an agreement at their discounted value.
7. The SPV pays the purchase consideration to the originator.

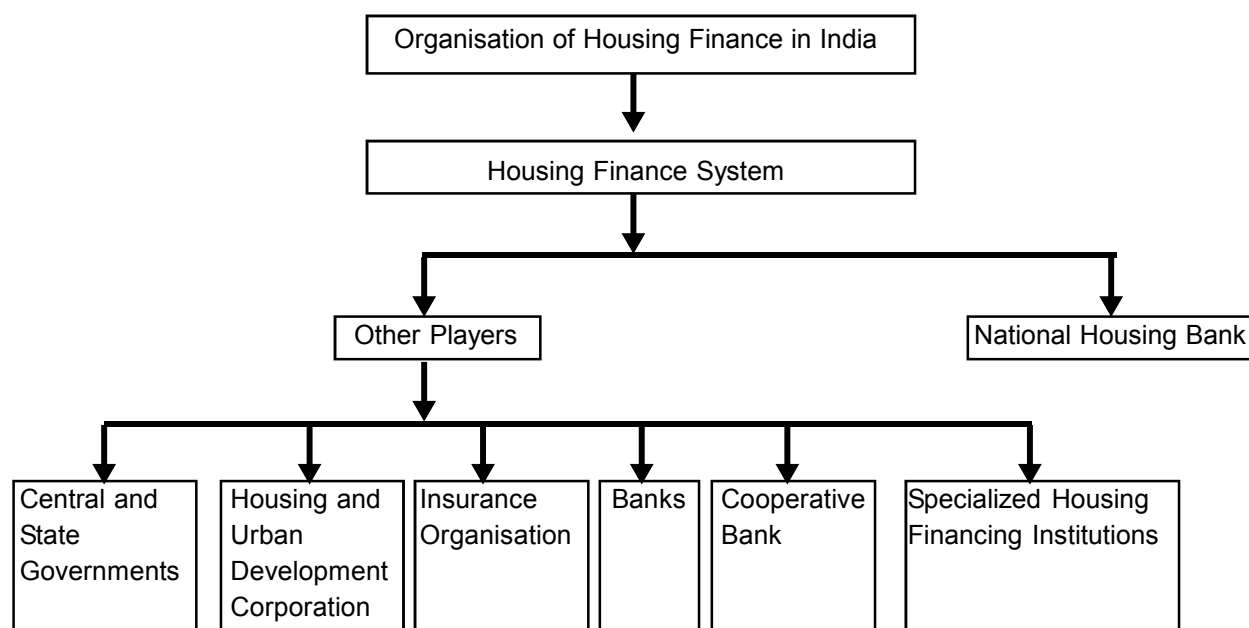


8. & 9. The SPV funds the purchase by issuing class A (senior) Pass Through Certificates (PTCs) and class B (Subordinated) PTCs.
10. The collection agent collects the receivables, usually in an escrow mechanism, and pays off the collection to the SPV.
11. The SPV either passes the collection to the investors, or reinvests the same to pay off to investors at stated intervals.

Since the early 1990s, securitization has been one of the dominant means of capital formation in the United States. Several trillion dollars in securitizations were outstanding at its peak before the financial crisis, and it remains an important source of financing. The investors can be banks, mutual funds, other financial institutions, government etc. In India only qualified institutional buyers (QIBs) who possess the expertise and the financial muscle to invest in securities market are allowed to invest in PTCs. In order to prevent unhealthy practices surrounding securitization viz; origination of loans for the sole purpose of securitization and in order to align the interest of the originator with that of the investors and with a view to redistribute credit risk to a wide spectrum of investors, it was felt necessary by the Reserve Bank of India that originators should retain a portion of each securitization originated and ensure more effective screening of loans. In addition, a minimum period of retention of loans prior to securitization was also considered desirable, to give comfort to the investors regarding the due diligence exercised by the originator. The Bank vide its circular DBOD.No.BP.BC-103/21.04.177/2011-12 dated May 07, 2012 has issued the final guidelines in this regard to banks. It has been decided to extend the guidelines to NBFCs also.

## HOUSING FINANCE SERVICES

The housing finance sector in India has undergone unprecedented change, especially over the past two decades. Traditionally, the chief source of finance for housing was individual personal savings. The personal savings were supplemented by borrowings from money lenders. Many households remained houseless for several years, mainly because of lack of funds. Gradually, the government realized the importance of housing and, accordingly, initiated several measures to improve housing conditions. Housing not only serves a social need of the people but also creates employment, both directly and indirectly. Presently, the construction industry is one of the major sources of employment.



### Institutional Infrastructure of Housing Finance Sector in India

The responsibility to provide housing finance largely rested with the Government of India till the early eighties. The setting up of the NHB in 1988 as the apex/principal housing finance institution was the beginning of the emergence of housing finance as a fund-based financial service in country. Although still at an early stage of development, with the entry of a number of specialized HFIs/HFCs, it has grown in volume and depth.

A diversified housing finance system is emerging in the country. The main components of the system are the NHB, the HUDCO, insurance organisations, commercial and cooperative banks and specialized HFIs in the public, private and /joint sectors such as the HDFCs, the SBIHF, Canfin Home, Indbank Housing, Citihome, Dewan Housing Finance and so on.

### HOUSING DEVELOPMENT FINANCE CORPORATION LIMITED (HDFC)

In the year 1977, HDFC was incorporated with the main objective of promoting home ownership by providing long-term loans. It was promoted as a company with an initial share capital of Rs. 10 crores. Its Board of Directors, consisting of 15 persons, representing government, financial institutions, construction industry and other representatives of the public, manages HDFC.

### Main Objectives of HDFC

1. To increase the number of residential houses in the country by providing housing finance in a systematic and professional manner.
2. To promote home-ownership.
3. To increase the flow of funds to the housing sector.
4. To strengthen housing finance by improving the domestic financial market and financial services.
5. To develop a close relationship with individual households, i.e., providing direct housing loans to individuals.
6. To maintain its position as one of the premier housing finance institutions in the country.
7. To transform various ideas into viable and creative solutions, i.e., building houses on the basis of cost, utility, and modernization.
8. To provide consistently high returns to shareholders.
9. To diversify activities to client-base by entering into mutual funds, leasing, commercial banking, insurance, etc.
10. To align with national priorities and adopt flexible housing finance policy by providing more houses to the weaker sections of the society.

### Types of Loans Offered

In order to provide housing finance, HDFC offers the following type of loans to individuals:

1. **For dwelling house** : Loans are given to individuals, based on their income. They are repayable over a maximum period of 20 years.
2. **Extension of existing houses** : Loans are made available for extending existing small houses either by constructing vertically or by extending horizontally.
3. **Purchase of land** : Of late, HDFC provides loans to enable individuals to purchase land or plots for constructing houses.
4. **Repairs/renovation** : Loans are granted for undertaking repairs in an existing house or for modernization.

5. **Large-scale construction** : HDFC provides loans for constructing large-scale housing, under group housing or for employees of a particular organization on the basis of collective responsibility.
6. **Facility to weaker sections** : The corporation provides loans for creating housing facility to people belonging to the weaker sections of society. This is done through low-cost housing, by using hollow-blocks for construction.

### Special Features of HDFC

1. Loans are granted for individual's upto a maximum of Rs. 1 crore, repayable within 20 years. This will come under the heading Home Extension Loan
2. Home improvement loan can be obtained either individually or jointly, where loan is sanctioned upto Rs. 1 crore.
3. Short-term building loan can also be applied for a maximum period of 24 months.
4. HDFC home equity loan is available for the owners of current property. Here, loan is available to a maximum of Rs. 50 lakhs and minimum of Rs. 1 lakh, but the market value of the dwelling unit should be at least Rs. 10 lakhs.

### HOUSING AND URBAN DEVELOPMENT CORPORATION OF INDIA (HUDCO)

Incorporated on 25th April, 1970, HUDCO was an expression of the concern of the Central Government towards the deteriorating housing conditions in the country, and a desire to assist various agencies in dealing with it in a positive manner. The principal mandate of HUDCO was to ameliorate the housing conditions of all groups and with a thrust to meet the needs of the low-income group and economically weaker sections.

### Objectives

1. To provide long-term finance for construction of houses for residential purposes in urban and rural areas, and finance or undertake housing and urban infrastructure development programmes in the country.
2. To finance or undertake, wholly or partly, the setting up of new or satellite towns.
3. To subscribe to debentures and bonds issued by the State Housing and Urban Development Boards, Improvement Trusts, and Development Authorities, etc especially for the purpose of housing and urban development programmes.
4. To finance or undertake the setting up of industrial enterprise for building material.
5. To administrate the amount received, from time to time, from the Government of India and other sources as grants or otherwise, for the purpose of financing or undertaking housing and urban development programmes in the country
6. To promote, establish, assist, collaborate and provide consultancy services for the projects in designing and planning of works relating to housing and urban development in India and abroad.

### Housing Programmes

HUDCO undertakes the following housing programs:

- Urban housing
- Rural housing
- Cooperative housing
- Construction housing

- Staff rental housing
- Repairs, renewals and upgradations
- Night shelters for pavement dwellers
- Working women ownership condominium
- Housing schemes through NGO's/CBO's
- Housing through private sector
- Individual housing loans through "HUDCO Niwas"

### **NATIONAL HOUSING BANK (NHB)**

The sub-group on housing finance during the Seventh Five-Year Plan (1985-90) identified the vacuum in the availability of long-term housing finance, particularly for individual households, and recommended the setting up of a national-level institution. The Government of India accepted the recommendations and introduced the National Housing Bank Bill in the winter session (1987) of Parliament. The bill was passed in Parliament and, with the assent of the President of India on December 23, 1987, it became an Act of Parliament.

The vision statement of NHB states that "NHB ensures a sound and healthy housing finance system in India through effective regulation and supervision of housing finance institutions. As a financial institution, NHB is known for its commitment, innovation and quality of service, offering a broad spectrum of financial products to address the needs of the housing sector with motivated employees working in a congenial and participative work environment."

### **The principal objectives of the NHB**

- (a) To promote a sound, healthy, viable and cost-effective housing finance system to cater to all segments of the population and to integrate the housing finance system with the overall financial system.
- (b) To promote a network of dedicated housing finance institutions to adequately serve various regions and different income groups.
- (c) To augment resources for the sector and channelize them for housing.
- (d) To make housing credit more affordable.
- (e) To regulate the activities of housing finance companies based on regulatory and supervisory authority derived under the act.
- (f) To encourage augmentation of supply of buildable land and also building materials for housing and to upgrade the housing stock in the country.

### **The principal activities of NHB**

- To provide refinance assistance to HFCs with respect to their direct lending up to INR 1 crore to individual for purchase/construction/repair and upgradation of housing units. Financial assistance is provided either at fixed or floating rates of interest. The HFC has the option to choose either floating or fixed interest rate depending on its requirement.
- Equity participation in housing finance companies; and
- To provide advisory services to the Central and State Governments, local authorities and other agencies, for formulation of overall policies aimed at promoting the growth of housing and housing finance institutions. It advises the government to bring up a legislation relating to matters having a bearing on shelter, housing, and human settlement.

- The part played by it in the supply of housing finance falls into three categories: (i) promotional, (ii) regulatory and (iii) financial. The promotional role includes promotion of HFIs/HFCs, coordination with Government and other agencies in securing necessary amendments to the existing laws to remove impediments in the housing sector and encouragement to participation of NGOs and social action groups in housing development. The regulatory powers exercised earlier by the RBI relating to HFCs are now the domain of the NHB. It regulates them through directions and guidelines. The financial support by the NHB to HFCs is in the form of equity capital and refinance, promotion of loan linked savings instruments and mortgage-based securitizations.
- In pursuance of its objective to promote HFCs and to provide financial and other support to them, the NHB issues operating guidelines to them from time to time. These pertain to share capital and activity norms, nominee directors and auditors, lending norms in terms of target groups, refinance rates of interest and other charges, ceiling on administrative cost, quarterly returns and so on.
- The NHB prudential norms for HFI relate to income recognition, provisioning, asset classification, capital adequacy, concentration of credit/investment and so on.

### NEW DEVELOPMENT IN HOUSING FINANCE

An important development in the housing finance business has been the entry of new players. The relatively low risk in a housing portfolio has spurred new entrants in the last few years. Arguably, the most significant entrant has been ICICI Home finance. Among non-banking finance companies, Sundaram Finance and Tata Finance have launched housing finance subsidiaries in the recent past, while banks have shown increased interest in acquiring housing assets.

The entry of new players and the consequent increase in competition has been followed by an interesting trend. The interest rates of most housing finance companies (HFC) move in unison, thereby suggesting that interest rate is not likely to be a competitive tool. The high level of competition has made it impossible for an HFC, with branches across the country, to charge an interest rate higher than the competition. Commercial banks are an exception to the rule, in the sense that they always charge lower than the competition.

Banks have always had subsidiaries handling housing finance, but in the recent past, they seem to have taken a greater interest in building retail assets. Banks have a clear advantage in the field simply because they access the lowest cost funds in India. As things stand, a loan from a bank is less expensive than one from a housing finance company.

### IMPEDIMENTS IN HOUSING FINANCE

The major problem in the housing finance sector is paucity of funds. The available funds for the sector are not sufficient to meet the growing needs of housing and real estate. To meet the increasing requirement of funds, the Government of India introduced a scheme in 1993 for NRI investment in housing and real estate development. The government also permitted 100 per cent foreign direct investment (FDI) in housing development. FDI is permitted in integrated development of townships, housing, build-up infrastructure and construction development projects. The FDI is subject to a stipulation of minimum land holding of 100 acres and has a minimum lock-in period of three years with respect to repatriation of profit on the original capital invested.

Some of the major issues facing the Indian housing financial sector are discussed below:

- (i) **Archaic Laws:** There are certain legislations that hamper the growth of housing finance in India. For instance, the archaic Urban Land Ceiling Regulation Act (ULCRA) has been a failure in the Indian housing finance system. The Act has only helped contribute towards the galloping prices of land, because it has failed to release adequate land for the purpose of housing development and financing.
- (ii) **Lack of Clear Title:** Another major issue confronting Indian housing is the lack of clear title to property.

Around 90 percent of all the land in India does not have a clear title. The ownership is unclear and hence, the land is off the market, thereby creating scarcity of land. This problem could be attributed to poor record keeping and complicated processes.

- (iii) **High Stamp Duty:** The cost of transferring land, stamp duty and registration charges payable are prohibitively high. This dissuades people from seeking housing development and financing. Moreover, the procedure followed is also not transparent.
- (iv) **Obsolete Rental Laws:** Obsolete tenancy and rental control laws keep a large part of the urban properties off the market. The rental laws must be revised to protect the owner and the property from the tenant. It is incumbent that steps are taken to get rid of all the old tenancies, remove restrictions on increase of rentals and empower owners to reclaim their properties without any court proceedings, which currently may even take decades.
- (v) **Foreclosure Laws:** Though the level of foreclosure for the housing finance companies are relatively low at around 1.5 to 2 percent, the foreclosure laws are obsolete and outdated. The laws for non-payment of Equated monthly Installment (EMI) and consequent foreclosure and repossession of the property must be revised. This would help financing companies to have the final rights on the property, which is the collateral for the housing loan. Moreover, this would further boost the housing finance business.
- (vi) **Inadequate Building Codes and Standards:** Although there are several building guidelines and standards in various cities and states, neither the housing developers follow them and nor do the authorities implement them. The system needs to be made more transparent and direct, so that there is no room for ambiguity and confusion. Presently too much of paperwork in the form of different permissions that needs to be obtained from too many authorities. They need to be centralized, simplified, streamlined and made transparent, so that there is no scope for corruption and time delays. There must be a single window clearance for all building and construction requirements. This will reduce time, paperwork and corruption at all levels and attract further investment capital. Mandatory ratings of developers and projects can be undertaken by rating agencies like NAREDCO, ICRA, CRISIL, etc to safeguard the interests of the public and increase investor confidence.
- (vii) **Inadequate Development and Planning:** The city or state authorities must use professionals to plan and execute all development plans for cities and towns, with future development in mind. This must be done without any political compulsions. The plans must be prepared in advance and executed without any exceptions and all regulations must be strictly enforced. The central and the state governments must lay down specific overall guidelines for the city/town corporations to follow and enforce them strictly. This will allow proper zoning within cities and towns, and green areas and other infrastructure systems to fall into place as the development plans unfold.
- (viii) **Inadequate Infrastructure:** This is one problem area which needs to be tackled on a war footing. Most Indian cities lack the infrastructure since they fail to keep pace with the growth in population and development. The central and state governments must provide sufficient power, water and roads to cope with the growth. The electricity boards must be able to provide reliable power and the corporation must charge reasonable property taxes to cover the costs of roads and water supply. The assessment base of property tax must be changed from historical value to capital value. The user charge for water, sewage and electricity and other municipal services boards may have to be considered very seriously. Presently, the property taxes do not cover the infrastructure costs. There is also pilferage and actual charges are not collected. The government cannot continue to subsidize these infrastructure costs indefinitely.

## CUSTODIAL AND ADVISORY SERVICES

Custodial services constitute an important modern financial service rendered by institutions of finance. Custodial services refer to safekeeping of securities of a client. The person who provides custodial services is known as a 'custodian'. A custodian maintains the accounts of securities of his client; collects benefits accruing to the client in respect of securities under custody; keeps the client informed of the actions taken by the issuer of securities; and maintains and reconciles records of the services.

- The provision of efficient custodial services forms an important element in the evolution of a matured stock market system. The custodians of securities who provide custodial services play a critical role in the secondary market. Recognising their importance securities market, the SEBI (Custodian of Securities) Regulations, 1996 was framed for the proper conduct of their business. According to the SEBI regulations, **custodial services** in relation to securities mean (i) safe-keeping of the securities of a client who enters into an agreement to avail of these securities and (ii) providing services incidental thereto, including: Maintaining accounts of the securities of a client;
- Collecting the benefits/rights accruing to him in respect of securities;
- Keeping him informed of the actions taken/ to be taken by the issuer of securities, having a bearing on the benefits/ rights accruing to him; and
- Maintaining and reconciling records of the services referred to above.

## Depository System in India

A depository is an organisation, which assists in the allotment and transfer of securities, and securities lending. The shares in a depository are held in the form of electronic accounts, i.e., in dematerialised form and the depository system revolves around the concept of paper-less or scripless trading. An effective and fully developed securities depository system is essential for maintaining and enhancing the market efficiency, which is one of the core characteristics of a mature capital market.

The National Securities Depository Limited (NSDL), the first depository in India which has been promoted by three premier institutions in India viz. IDBI, UTI and NSE, started operating from November 8, 1996. NSDL carries out its operations through participants and the clearing corporation of the stock exchange, with participants acting as market intermediates through whom NSDL interacts with the investors and the clearing members. To begin with only the capital market segment of the National Stock Exchange of India Limited (NSE) has been associated with the NSDL as only the NSE has a clearing corporation (NSCCL), which guarantees performance of trade obligations and has been admitted into the depository. The National Stock Exchange has also set up clearing corporation limited which acts as a counter party to every trade executed on the capital market segment of exchange.

The Depository System functions very much like the banking system. A bank holds funds in accounts whereas a Depository holds securities in accounts for its clients. A Bank transfers funds between accounts whereas a Depository transfers securities between accounts. In both systems, the transfer of funds or securities happens without the actual handling of funds or securities. Both the Banks and the Depository are accountable for the safe keeping of funds and securities respectively.

In the depository system, share certificates belonging to the investors are to be dematerialised and their names are required to be entered in the records of depository as beneficial owners. Consequent to these changes, the investors' names in the companies' register are replaced by the name of depository as the registered owner of the securities. The depository, however, does not have any voting rights or other economic rights in respect of the shares as a registered owner. The beneficial owner continues to enjoy all the rights and benefits and is subject to all the liabilities in respect of the securities held by a depository. Shares in the depository mode are fungible and cease to have distinctive numbers. The transfer of ownership changes in the depository is done automatically on the basis of delivery v. payment.



In the Depository mode, corporate actions such as IPOs, rights, conversions, bonus, mergers/amalgamations, subdivisions & consolidations are carried out without the movement of papers, saving both cost & time. Information of beneficiary owners is readily available. The issuer gets information on changes in shareholding pattern on a regular basis, which enables the issuer to efficiently monitor the changes in shareholdings.

The Depository system links the issuing corporates, Depository Participants (DPs), the Depositories and clearing corporation/ clearing house of stock exchanges. This network facilitates holding of securities in the soft form and effects transfers by means of account transfers.

### Benefits of depository system

In the depository system, the ownership and transfer of securities takes place by means of electronic book entries. At the outset, this system rids the capital market of the dangers related to handling of paper. The system provides numerous direct and indirect benefits, like:

1. **Elimination of bad deliveries** - In the depository environment, once holdings of an investor are dematerialised, the question of bad delivery does not arise i.e. they cannot be held "under objection". In the physical environment, buyer of shares was required to take the risk of transfer and face uncertainty of the quality of assets purchased. In a depository environment good money certainly begets good quality of assets.
2. **Elimination of all risks associated with physical certificates** - Dealing in physical securities have associated security risks of theft of stocks, mutilation of certificates, loss of certificates during movements through and from the registrars, thus exposing the investor to the cost of obtaining duplicate certificates and advertisements, etc. This problem does not arise in the depository environment.
3. **Immediate transfer and registration of securities** - In the depository environment, once the securities are credited to the investors account on pay out, he becomes the legal owner of the securities. There is no further need to send it to the company's registrar for registration. Having purchased securities in the physical environment, the investor has to send it to the company's registrar so that the change of ownership can be registered. This process usually takes around three to four months and is rarely completed within the statutory framework of two months thus exposing the investor to opportunity cost of delay in transfer and to risk of loss in transit. To overcome this, the normally accepted practice is to hold the securities in street names i.e. not to register the change of ownership. However, if the investors miss a book closure the securities are not good for delivery and the investor would also stand to lose his corporate entitlements.
4. **Faster disbursement of non cash corporate benefits like rights, bonus, etc.** - Depository system provides for direct credit of non cash corporate entitlements to an investors account, thereby ensuring faster disbursement and avoiding risk of loss of certificates in transit.
5. **Reduction in brokerage by many brokers for trading in dematerialised securities** - Brokers provide this benefit to investors as dealing in dematerialised securities reduces their back office cost of handling paper and also eliminates the risk of being the introducing broker.
6. **Reduction in Paper work** - Reduction in handling of huge volumes of paper and periodic status reports to investors on their holdings and transactions, leading to better controls.
7. **Elimination of problems related to change of address of investor, transmission, etc.** - In case of change of address or transmission of demat shares, investors are saved from undergoing the entire change procedure with each company or registrar. Investors have to only inform their DP with all relevant documents and the required changes are effected in the database of all the companies, where the investor is a registered holder of securities.



- 8. Elimination of problems related to selling securities on behalf of a minor** - A natural guardian is not required to take court approval for selling demat securities on behalf of a minor.

### Types of Advisory Services

Advisory Services is an important form of financial services. Now with the progress of economy, different types of advisory financial services have got emerged. Few of them are discussed below.

#### 1. Providing an investment planning service

Designing or offering to design a plan that:

- is based on an analysis of an individual's current and future overall financial situation and
- identifies their investment goals and
- Includes recommendations or opinions on how to realise those goals.

Investment planning services is getting very popular now a days. Investment planning services are mainly provided by corporate professionals like Chartered Accountants, Cost Accountants and investment consultants.

#### 2. Providing financial advice

Making a recommendation, or giving an opinion about acquiring, holding or disposing of a financial product. Providing factual information only about a financial product, in the absence of any recommendation or opinion would not be considered financial advice.

#### 3. Providing Insurance and Banking advisory services

Insurance advisory services are a very old form of financial services and now it is getting revamped. Now many banks and corporate have also started providing these types of financial services.

### REGULATION OF THE FINANCIAL SERVICES SECTOR

The financial services sector until recently the world over has been regulated by a plethora of legislation. As the winds of liberalization are sweeping the real sectors of economies, de-regulation of this sector is also underway. Hence, the freeing of interest/exchange rates, increased competition among the providers of the financial services viz. freer entry, de-regulated capital markets etc. However, the approach followed in regard to financial liberalization the world over has been much more cautious than a policy of free rein. While it is being seen that the impediments and road block, towards the development of an efficient and vibrant financial sector are removed, it is also being increasingly recognized that some type of discipline is necessary to varied interests of the different players at the financial services market place. Thus, 'prudential norms' rather than 'inhibitive control' is the watch word as far as regulation of this sector is concerned. It is in this spirit that the apparent contradiction between real-sector liberalisation and financial re-regulation should be viewed. Thus, a watch-dog body over the financial service sector is of prime necessity even in the wider context of de-regulation and liberalisation.

### LESSON ROUND-UP

- Various services offered by merchant bankers include: corporate counseling; project Counseling and pre-investment studies; capital re-structuring; credit syndication and project finance; issue management and underwriting; portfolio management; non-resident investment counseling and management; acceptance credit and bill-discounting; advising on mergers, amalgamations and take-over, arranging off-shore finance; fixed deposit brokering; and relief to sick industries
- A diversified housing finance system is emerging in the country. The main components of the system are the NHB, the HUDCO, insurance organisations, commercial and cooperative banks and specialized

HFIIs in the public, private and /joint sectors such as the HDFCs, the SBIHF, Canfin Home, Indbank Housing, Citihome, Dewan Housing Finance and so on.

- Securitisation is the process of pooling and repackaging of homogeneous illiquid financial assets into marketable securities that can be sold to investors. The process leads to the creation of financial instruments that represent ownership interest in, or are secured by a segregated income producing asset or pool, of assets. The pool of assets collateralises securities. These assets are generally secured by personal or real property such as automobiles, real estate, or equipment loans but in some cases are unsecured, for example, credit card debt and consumer loans.
- Custodial services constitute an important modern financial service rendered by institutions of finance. Custodial services refer to safekeeping of securities of a client. The person who provides custodial services is known as a 'custodian'. A custodian maintains the accounts of securities of his client; collects benefits accruing to the client in respect of securities under custody; keeps the client informed of the actions taken by the issuer of securities; and maintains and reconciles records of the services.
- In Depository System, share certificates belonging to the investors are to be dematerialized and their names are required to be entered in the records of depository as beneficial owners.

### SELF-TEST QUESTIONS

*(These are meant for re-capitulation only. Answers to these questions are not to be submitted for evaluation)*

1. What do you mean by the term Financial Services? State various types of financial Services.
2. What is the significance of financial services in a country like India? Elucidate.,
2. Describe the role of Merchant Bankers in managing pre-capital issues.
3. 'Loan syndication is one of the project finance services.' Discuss.
4. Define a financial service industry and discuss the various services rendered by it.
5. Write short notes on:
  - (a) Depository system in India
  - (b) Merchant Banking

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# Lesson 6

## Project Planning

### LESSON OUTLINE

- Project Planning
- Preparation of Project Report,
- Project Appraisal under Normal, Inflationary and Deflationary Conditions,
- Project Appraisal by Financial Institutions
- Lending Policies and Appraisal, Norms by Financial Institutions and Banks;
- Loan Documentation,
- Project Review and Control;
- Social Cost and Benefit Analysis of Project. (UNIDO Approach),
- Term Loans from Financial Institutions and Banks;
- Lease and Hire Purchase Finance;
- Venture Capital Funds;
- Private Equity;
- International Finance and Syndication of Loans,
- Deferred Payment Arrangements;
- Corporate Taxation and its Impact on Corporate Financing,
- Financing Cost Escalation
- LESSON ROUND UP
- SELF TEST QUESTIONS

### LEARNING OBJECTIVES

Project Finance is very important aspect of Financial management. To be successful in his endeavour, a finance manager should be well versed about various aspects of project financing, project appraisal techniques, essential of loan documents, project management and control techniques.

The object of the study is to enable the student to understand:

- The meaning of Project Planning
- Project Appraisal by various Financial Institutions
- Project Evaluation Technique
- Loan Documentation
- Loan Syndication – Bridge Loans against Sanctioned Loan
- Monitoring the progress of units assisted by the Financial Institutions
- Social Cost – Benefit Analysis
- Project Review and Control
- Follow-up Reports and Procedures

***“Planning without action is futile, action without planning is fatal.”***

***Cornelius Fitchner***

## PROJECT PLANNING

### What is Project Planning?

Project planning defines the project activities and end products that will be performed and describes how the activities will be accomplished. The purpose of project planning is to define each major task, estimate the time and resources required, and provide a framework for management review and control. The project planning activities and goals include defining:

1. The specific work to be performed and goals that define and bind the project.
2. Estimates to be documented for planning, tracking, and controlling the project.
3. Commitments that are planned, documented, and agreed to by affected groups.
4. Project alternatives, assumptions, and constraints.

The planning process includes steps to estimate the size of the project, estimate the technical scope of the effort, estimate the resources required to complete the project, produce a schedule, identify and assess risks, and negotiate commitments.

Repetition of these steps is necessary to establish the project plan. Typically, several iterations of the planning process are performed before a plan is actually completed.

### Importance of the Project Plan

***A project plan is a formal, approved document that is used to manage and control a project.***

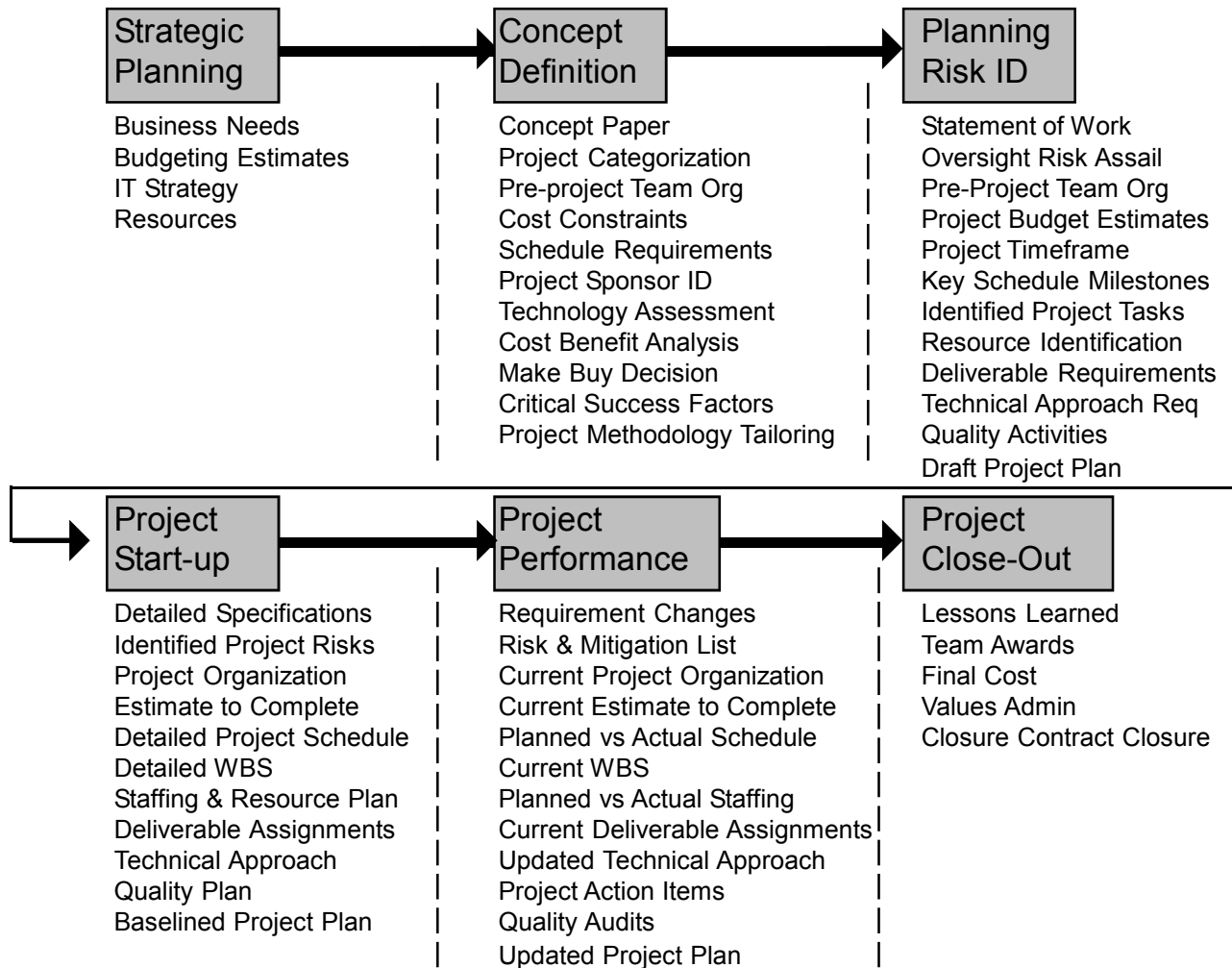
The project plan forms the basis for all management efforts associated with the project. It is a document that is also expected to change over time. The project plan documents the pertinent information associated with the project; the information associated with the plan evolves as the project moves through its various stages and is to be updated as new information unfolds about the project.

### Steps in the Project Planning Process

The planning process consists of the following basic tasks:

- (a) Define the technical approach used to solve the problem.
- (b) Define and sequence the tasks to be performed and identify all deliverables associated with the project.
- (c) Define the dependency relations between tasks.
- (d) Estimate the resources required to perform each task.
- (e) Schedule all tasks to be performed.
- (f) Define a budget for performing the tasks.
- (g) Define the organization used to execute the project.
- (h) Identify the known risks in executing the project.
- (i) Define the process used for ensuring quality.
- (j) Define the process used for specifying and controlling requirements.

### The Evolving Plan of a Project



The plan defines the objectives of the project, the approach to be taken, and the commitment being assumed. The project plan evolves through the early stages and, by the time the project is ready to begin project execution, contains the detail required to successfully complete the project. Then, when implementation begins, the plan is updated as required.

#### (1) Planning in the Concept Phase

In the projects concept phase, a need that would result in a product is identified. While only very general information may be known about the project at this time, it is important to capture this information for the planning phase. In this stage, the focus of planning is on the project definition and on getting the project underway. A strategy for deriving a solution to the stated goals is important at this point. The problem being addressed by the project is clearly stated; the project goals and objectives are identified; and success criteria for the project are documented. Also, the assumptions, constraints, and risks that apply to the project are defined. Without a description of this concept information, the completed project plan is difficult to thoroughly understand. Results of the technology assessment also are documented as a precursor to the technical approach that is later defined.

#### (2) Planning in the Planning Stage

The project plan is completed in the Project Planning and Risk Identification stage of a project. For large projects, this stage may be run as a mini-project, with a team of people dedicated to performing the effort. For very small projects, the plan may be developed by a group of people as a part-time job. Since various skill sets are required

to complete a successful project plan, it is a difficult task for one person to develop the entire plan. During this project stage, details of the plan are determined and an approach is defined. The full project plan is then developed. The plan may include the following elements: a brief project summary, a work breakdown structure, a project organization chart, a schedule, an approach, a list of identified risks, an estimated budget and cost, a list of deliverables, a description of planned quality activities, a description of the configuration management process to be used, and a summary of project requirements.

Even during the planning stage, the development of the project plan is an iterative process. Each element of the plan is regularly revisited for changes and refinements, based upon further analysis and decisions made in developing other plan elements. This refinement also develops buy-in from the project team and stakeholders.

It is critical to get buy off on the project plan from the involved parties prior to actually starting the project. Approval of the plan commits the resources needed to perform the work.

### ***(3) Planning in the Project Start-up Stage***

To transition a project from the initial conceptualization and planning to execution requires some type of start-up activities. The project start-up stage is typically a short period that transitions a project from the planning to the execution stage. In the start-up stage, the team is assembled and a kickoff meeting is held to familiarize the team with the elements of the plan and the requirements of the system. Specific work packages detail and specify the activities being performed by the teams, as well as the cost and schedule associated with those activities.

Sometimes, particularly in systems that include procurement, there may be a need to update the project plan during this stage to reflect negotiations or refinements in scope that occurred prior to the actual start of the project. In these cases, the plan is reviewed and updated prior to presentation to the team. Also, in some projects, auxiliary plans (such as the configuration management or quality assurance plans) are detailed in the start-up phase. These plans are developed from strategies defined in the project planning stage.

### ***(4) Planning in the Project Execution Stage***

Planning in the project execution stage consists of re-planning when it is determined that the project is not on track with the current plan. This might occur for a variety of reasons. It is very important to know that project plans will change and that re-planning is a natural part of the planning process. Re-planning does not necessarily mean that a project is in trouble. Frequent and extensive re-planning may, however, indicate that there are some serious issues with the project plan. It is better to re-plan than to simply throw away the original plan and operate without a plan.

### ***(5) Planning in the Project Close-Out Stage***

A close-out process is performed once the project objectives have been met. Closing a project should be fairly routine. The first step is acceptance of the system by the users. It is important that the user decides when the project is completed. The determination is based upon the success criteria defined in the very early concept and planning stages of the project. This acceptance may be very informal or it may be very formal and depends upon the criteria defined in the plan.

## **PREPARATION OF PROJECT REPORT**

The project report is an extremely important aspect of the project. It should be properly structured and also necessary and appropriate information regarding the project.

Preparation of project report is a pre-investment study of investment proposal but encompasses a thorough investigating process covering economic, technical, social managerial and commercial aspects. Project report is a working plan for implementation of project proposal after investment decision by a company has been taken.

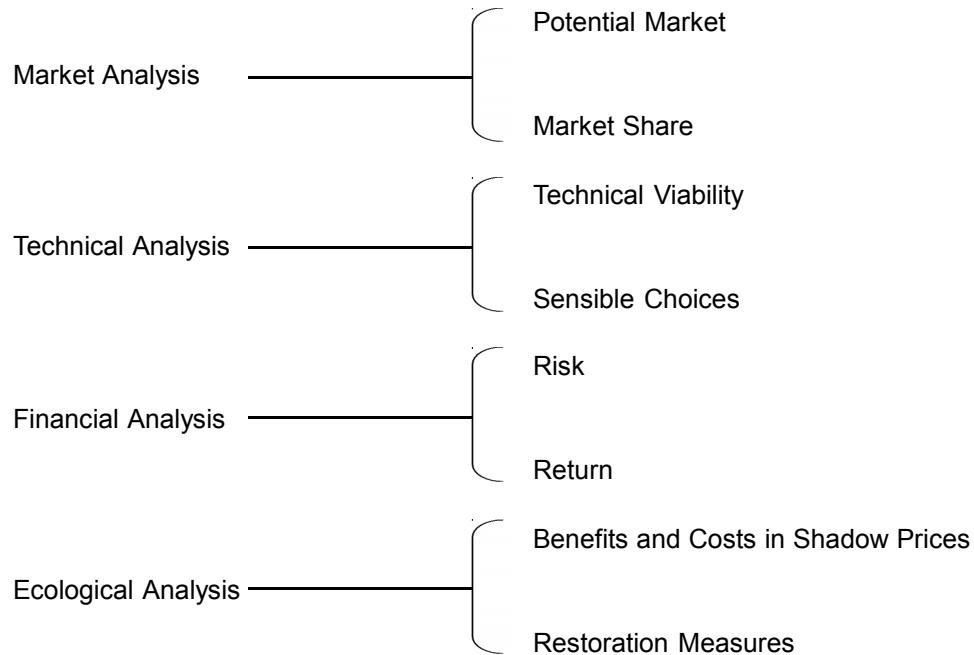
Importance of preparation of project report has been felt in the wake of sophisticated technology being adopted



and the heavy financial state of public funds through financial institutions, banks and investment organisation being contemplated. High technology involvement, higher cost in the project implementation and as such economy cannot afford to tolerate failure of the project. Therefore, to ensure before taking in hand a project whether or not the proposed project is viable, preparation of project report has become essential exercise for all corporate units particularly in the light of the following background:

- (1) Planning in advance, the accomplishment of the following objectives:
  - (a) Performance Objectives
  - (b) Marketing Objectives
  - (c) Operations Objectives
  - (d) Technical Objectives
  - (e) Financial Objectives
  - (f) Personnel Objectives
  - (g) Organisation Objectives
  - (h) The end product Objectives
  - (i) The customer benefit Objectives, and
  - (j) The societal Objectives
- (2) To evaluate above objectives in the right perspective it is essential to consider the input data, analyse the data, predict outcome, choose best alternatives, take action and measure results with predictions. Stress is laid that the objectives become measurable, tangible, verifiable, attainable and the risk of failures is avoided to the maximum desired extents.
- (3) To evaluate constraints on resources viz. manpower, equipment, financial and technological.
- (4) To avail of the financial facilities who require a systematic project report to evaluate desirability of financing the project. Besides, the financial intermediaries today check up and verify the project proposals for accepting the responsibility for a company to procure funds from the capital market. Merchant banks who have entered in the capital market as financial intermediaries are quite careful about the project viability before taking up a contract for making financial services available to corporate units.
- (5) Successful implementation of a project depends upon the course of action suggested in the project report. Besides, comparison of results will depend upon the projected profitability and cash flows, production schedule and targets as planned in the project report.

The above background necessitating the preparation of a project report leaves the impression that the task of preparation of project report involves skills, expertise and experience of field work covering different aspects by financial, technical, commercial, socio-economic, government rules and regulations and the legal requirements under different laws and can only be handled by a team of experts in different areas. Project idea can be formulated by an entrepreneur but project report cannot be prepared single-handedly as it requires a multi-disciplinary approach to incorporate the following set of analysis in the project report:



- (1) Technical analysis comprising systems analysis using technique of operation research to sort out complex problems like allocation problems, replacement problems, inventory problems, scheduling and queuing of operations with use of PERT/CPM, Linear programming. Inter programming, Goal Programming and simulation etc.
- (2) Marketing research to forecast demand for goods/services which may be produced on implementation of the project, capture market and elicit cooperation of the consumers etc.
- (3) Financial analysis, to project future cash flows, profitability, evaluate net worth, to do cost-benefit analysis, profit plannings, budgeting and resource allocation, etc.
- (4) Techno-economic Analysis suggesting to adopt optimal technology for project size/objectives, to explore economic conditions to absorb projects products, etc.
- (5) Project Design and network analysis i.e. detailed work plan to the project and its time profile.
- (6) Input output analysis etc.

### Format of Project Report

There is no prescribed format for the preparation of a project report - but a project report should contain mainly the following set of information in general:

- (1) Information about industry and its status in the economy, present production and demand, indicating Licensed, installed capacity, Government policies and export potential. Generally speaking, broad guidelines in this respect may be had from the plan documents of the Government.
- (2) Broad market trend of the product within and outside the states for 5 years.
- (3) Raw material survey, giving specifications and quality of raw materials required and their availability.
- (4) Process - broad description of different processes and their relative economics.
- (5) Availability of technical know-how.

- (6) Location of Plant, its advantages.
- (7) Water - requirement of water for process, boiler feed, cooling etc., sources of water available and making it useable for the factory and to townships.
- (8) Power - total power requirement for the factory specification of power and choice between purchased power and generated power. If power to be generated - total cost of investment, choice of fuel and the cost for fuel available to factory.
- (9) Fuel - its requirement for steam raising or processing source and price at which it will be available for factory including taxes and surcharge.
- (10) Effluents - type and quality of effluents, their treatment and disposal, investment in the effluent treatment and disposal. Government of India has since decided that any project proposal has to have a clearance of Environmental Authority set up by the government.
- (11) Implementation programme: implementation and construction programme in form of CPM/PERT.
- (12) Cost of Project - (Specify foreign exchange cost if any):
  - (a) Land, inclusive of development expenditure incurred on the land;
  - (b) Buildings to be erected for housing the plant and machinery, the administrative office, stores, services, etc. requirements estimates to be included in the project cost;
  - (c) Plant and machinery; including other equipments and their estimated cost;
  - (d) Offsite facilities: utilities and auxiliary facilities;
  - (e) Preliminary expenses (share issue, stamp duty, cost of raising equity etc.);
  - (f) Contingencies;
  - (g) Cost of spare, repairs and maintenance during trial run and commissioning period;
  - (h) Pre-commissioning and commissioning expenses;
  - (i) Working capital margin-details of estimation be given.
- (13) Margin of financing-broad pattern to be indicated.
- (14) Cost of production - project broad pattern five years vis-a-vis design capacity. Breakeven point of production cost should be given, effect of variation of cost of raw materials, utilities, selling price etc. be indicated and elaborated. Price trend of raw material and finished goods be discussed.
- (15) Profitability for five years after commission of the project should be worked out in the prescribed format.
- (16) Cash flow statement and pay period should be worked out for the project.
- (17) Technical feasibility be discussed in detail with financial viability.
- (18) Organisation and management – description of corporate management, promoters experience and background organisational chart, key personnels and delegation of power and responsibility structure be fully described.

## PROJECT APPRAISAL UNDER NORMAL CONDITIONS

Appraisal means to critically examine with a focus of attention on specific aspects, areas of operations, and target goals to ensure the conformity of the performance to the proposed goals. Basic task before the appraiser is to study progress in term of cost productivity ratio, time schedule relationship, inter-action between different agencies, and performance of personnel in terms of their responsibilities and objectives of the company.

Important ingredients of appraisal are the following:

- (1) Objectives as defined in the proposal to be kept in view for satisfactory assessment of operational courses;
- (2) Accuracy of methods and measurements planned to be adopted is well adhered to;
- (3) Objectivity of the proposal is highlighted so as to keep off from the bias and personnel prejudices;
- (4) Ensure the reliability of the data and projected statements;
- (5) Predictors made to conform to reality and should be objective.

In project appraisal above points should be kept in view by the members of appraisal team irrespective of the fact whether the appraisal is being done for an industrial project being implemented by a corporate unit or the project devoted to the national economy sponsored by the state agency.

Form the angle of a company unit the project appraisal of the project may be done at three stages as under:

- (1) Projects appraisal by the corporate unit itself i.e. the promoters of the company are interested in ensuring that on successful implementation of the project whether or not it would generate the required rate of return on the total investment. The promoters make selection of the projects following investment criteria of obtaining the required rate of return. In this appraisal, all aspects with reference to project idea are identified and evaluated. As a matter of fact, it is a feasibility study done to identify the project, identify internal constraints and external difficulties, environmental constraints including government placed restrictions and regulations. Once the promoters are satisfied on this aspect, they have the formal feasibility report prepared and consider it for investment purposes.
- (2) Second stage of project appraisal arises when a project report duly accepted by the promoters is submitted by the corporate unit of financial institution for considering it for grant of financial institution for considering it for grant of financial facilities to finance the cost of implementation of the project.
- (3) Project appraisal is done by Government agencies for according approvals required to clear a particular project under the different statutes or state regulations. The main criterion followed by Government agencies is the cost benefit analysis and social gains.

## PROJECT APPRAISAL UNDER INFLATIONARY CONDITIONS

Timing for project appraisal is most important consideration for all types of appraisers. A project under normal circumstances is appraised from different angles viz. technical feasibility, managerial aspects, commercial aspects, financial viability and economic and social aspects.

Under the normal conditions when prices are generally stable, demand pattern as projected in the project report is unchangeable, the project cost described in the project report remains unchanged at current prices and as such there is not much danger of any sudden escalation in project cost or over run in the projected resources.

There is practically no risk involved of either business or financial nature and evaluation of the project could be done from different angles without providing for any change in project cost and planning for additional financial resources to meet the over run or escalations.

Nevertheless, project appraisal can't be devoid of inflationary pressures as normal conditions for a project do not exist. Because the project is to be implemented over a period of time ranging upon the size and magnitude of the project, i.e. it could be six months or beyond to run or two or more years. During such a period, it can't be predicted as and when the trade cycles set in and the up-turn in economy is generated.

In a developing economy like India, inflation grow at a planned steady rate because of the economic development activities and as such provision for a probable escalation in the project cost is generally provided as a cushion to inflationary pressures.

However, during inflationary conditions the project cost is affected in magnitude of parameters. Cost of project on all heads viz. labour wage, raw material, fixed assets, equipments, plant and machinery, building material, remuneration of technicians and managerial personnels undergo a shift change. Besides, inflationary conditions place constraints on the resources of the consumers of the product and affect the demand pattern. Thus cost at production are affected besides the projected statements of profitability and cash flow by the change in the demand pattern and market forecasting figures. The inflationary pressures alone do not stop here. The financial institution and banks revise their rate of lending and their financing cost further escalate during inflationary conditions. Under such conditions, the appraisal of the project generally be done keeping in view the following guidelines which are usually followed by the Government agencies, banks and financial institutions:

- (1) Make provisions for delay in project implementation, escalation in project cost as per the forecasted rate of inflation in the economy particularly on all heads of cost.
- (2) Sources of finance should be carefully scrutinized with reference to revision in the rate of interest to be made by lender and the revision which could be followed in the interest bearing securities. All these factors will push up the cost of financial resources for the corporate unit.
- (3) Profitability and cash flow projections as made in the project report require revision and adjustment should be made to take care of the inflationary pressures affecting adversely future projections.
- (4) Explain fully the criteria followed in adjusting the inflationary pressures viz. there are two criteria followed given as under:-
  - (a) take inflationary rate at average rate and escalate the total cost at that rate;
  - (b) adjust each cost item against inflationary rate. This would make adjustment for inflationary pressures in the cost elements responsible outflows and the revenue elements in the cash. Both cash inflows and outflows will accordingly adjust to inflationary changes at the appropriate rate applicable to each of them respectively.
- (5) Examine the financial viability of the project at the revised rates and assess the same with reference to economic justification of the project. The appropriate measure for this aspect is the economic rate of return for the project which will equate the present value of capital expenditure to net cash flows over the life of the project. The rate of return should be acceptable which accommodates the rate of inflation per annum.
- (6) In inflationary times, early pay back projects should be prepared. Because projects with long pay back are more subjected to inflationary pressures and the cash flow generated by the project will bear high risk.

### PROJECT APPRAISAL UNDER DEFLATIONARY CONDITIONS

A different situation may arise in deflationary or recessionary situation. The economy is in down swing, prices are falling, lack of effective demand is discernible, production capacities are already affected narrowing the cash inflows affecting liquidity of the project adversely because wages and salaries and other overhead costs do not fall which keeps the outflow at static rate with declining inflows. The main consideration in project appraisal during this period is the cash inflow, sales, the demand for the projects and sales forecasting outliving the predictions. As a matter of fact new project are delayed as the appraisal never remains so realistic and the sources of supply of money become tight; investors have no enthusiasm in investing this money or savings in the corporate securities for the uncertain working results and higher risk investment. Nevertheless, the appraisal of the project should be done keeping in view the above factors.

From the above discussion, it is concluded that the difference in project appraisal during normal inflationary and deflationary condition is only of degree if due care is taken to adjust the economic, commercial or financial aspects of the project affecting the cost and cash inflows, the profitability and liquidity of the project.

## PROJECT APPRAISAL BY FINANCIAL INSTITUTIONS

Project Report submitted by a corporate unit to a financial institution for grant of financial facilities is properly appraised by a team of expert drawn from different disciplines.

The project appraisal is done as a “business risk” and, therefore, efforts are made to corroborate the data submitted by a company with authentic sources. Each project is appraised on its own merits and flexibility is observed while applying the norms of ratio analysis, funds flow analysis, financial indicators, technical norms etc. The basic objective during appraisal remains the project and its future in the form of successful implementation and efficient operation so as to contribute to national economy. If a project remains successful, the money lend by financial institutions is returned safely. The growth of the project is the best security for the financial institutions than the physical and legal security. No doubt this security from an important part in the entire transaction for lending and borrowing for the project.

Viewing from the above angle, project appraisal, in general, by the financial institutions seek to consider *inter alia* the following aspects:

- (1) The project profile, its reliable and formulation and project report;
- (2) The promoter's capacity and competence;
- (3) Viability Tests:
  - (A) Technical Aspects
  - (B) Financial Aspects
  - (C) Economic Aspects
  - (D) Societal/Distributive Aspects
  - (E) Environment, Energy Management and Economical Aspects
  - (F) Organisation and Management Aspects
  - (G) Commercial Including Marketing Aspects

**Now, we would be analyzing each aspect in detail**

### The Project

The first and foremost consideration for appraisal of project report by a financial institution is the examination of the project itself. It may be recalled that the term lending financial institutions have been established by the Government with the sole objective to promote development and growth of the industries which are given planned priorities for the economic development of the country. Therefore, the project should be such which meet this standard and falls within the category of approved projects.

Another important consideration in this area is that the project report prepared by the corporate unit should confirm to the prescribed standard of the financial institutions. To be on the safe side, it is desirable if the project report is prepared by the reputed consultants approved by the financial institutions or the Technical Consultancies organisation established in different parts of the country by the financial institution.

There is no standard performa for preparation of report but to facilitate its easy appraisal it should be self contained study with all necessary feasibility reports, market surveys, projected financial statements, managerial personnel and organisational charts, status of the company in the ownership and title to the property and the legal relationship with the promoters be clearly specified to avoid discrepancies and confusions. In reality, the prescribed application form for financing by the financial institutions contains clauses to bring out most of the salient features in accepting a project proposal.

## 2. The Promoters: Capacity and competence

The promoter's capacity and competence should be examined with reference to their management background, traits as entrepreneurs, business or industrial experience, and past performance in other concerns, their integrity and reputation, market standing and legal competence.

Different considerations have got to be applied for the established entrepreneurs, or promoters and the new entrepreneurs. The basic requirement is that their profile should inspire confidence of their abilities and capacities to run the project successfully and continue the interest therein till the repayment of the financial facilities disbursed by the institutions to the unit promoted by them. In the cases of technocrats who are coming up and taking up the industrial project, these aspects are paid more attention than their experience with entrepreneurship ability or skills.

## 3. Viability Tests

After analyzing the Project and Promoters capacity, a bank/financial institution carries out the different validity tests

### A. Technical Aspects of Project Appraisal

This involves studying the feasibility of selected technical processes and its suitability under Indian conditions, Location of the project, Plant layout, appropriateness of the chosen equipment, machinery and technology, availability of raw material, power and other inputs, appropriateness of technology chosen from social point of view, availability of infrastructure for the project, the techno economic assumptions and parameters used for analyzing costs and benefits and viability provision for treatment of effluents, training of manpower, legal requirement on documentation, license and registration.

The technical feasibility is generally examined by technical specialists in the organizations. In case of highly specialized projects, the banks seek opinions or get the projects appraised through experts like consultants, or organizations like Technical Consultancy Organizations (TCOs).

### B. The Financial Aspects of Project Appraisal

Financial Appraisal of a project is most important for a banker. The primary aim of financial analysis is to determine whether the project satisfies the investment criteria of generating acceptable level of profitability. The project should be able to service the debt and ensure expected returns to the investor. The important aspects which are examined while conducting financial appraisal are investment outlay, means of financing, projected financial statements, viability and profitability, break-even point analysis, sensitivity analysis and risk analysis.

Cash flow statement is the basis for financial analysis. In the initial period there is a negative cash flow because of investment in capital assets, but after the project takes off, the cash flow becomes positive due to the increased income.

Investment is generally required in the initial years, which is a cash outflow for the project. In the operational phase, there is inflow from the business, which results in positive cash flow till the project is wound up. In the last year, the inflow is higher due to the residual value adding to the cash inflow.

The period from start of the project till its winding up is known as project life and will vary from project to project. Generally, projects with more than 20 years life are analyzed for financial cost and benefits for 20 years only, as the benefits accruing after that have a negligible present value.

#### (a) Measures of Financial Viability – NPV, BCR and IRR

Financial viability is measured by net present value, benefit cost ratio, internal rate of return and debt service coverage ratios.

Net Present Value (NPV) representing wealth creation by the Project, is calculated by taking the discounted sum of the stream of cash flows during the project life. In symbolic terms we can express NPV of a project as under:

$$NPV = \frac{C_1}{(1+r)} + \frac{C_2}{(1+r)^2} + \dots + \frac{C_n}{(1+r)^n} - \text{Invst.}$$

Where C = Cash Flows for different periods,  $r$  = Discount Rate and Invest. = Initial Investment

In other words, NPV represents the difference between the present value of the cost and benefit streams.

A project is considered viable if the NPV is positive at a given discount rate and vice-versa. When two or more mutually exclusive projects are being appraised, the project with the highest NPV should be selected. Among the discounted techniques, NPV is considered the most important parameter for assessing viability.

- (i) **Benefit Cost Ratio (BCR):** BCR is the ratio of discounted value of benefit and discount value of cost. It can be expressed as under:-

$$BCR = \frac{\text{Summation of discounted value of Benefits}}{\text{Summation of discounted value of Costs}}$$

The project is viable when BCR is one or more than one and is unviable when it is less than one.

- (ii) **Internal Rate of Return (IRR):** IRR represents the returns internally generated by the project. This is also the rate which makes the net present value equal to 0. The calculation of IRR is a process of trial and error. Normally, the process starts with the minimum discount rate and as the discount rate is increased the NPV will come down and becomes 0 or negative. If NPV is positive at one rate and negative at the immediate next rate (for example if NPV is positive at 20% discount rate and is negative at 25%), 'Interpolation Method' could be used for finding out the exact IRR by the following formula.

$$\text{Exact IRR by interpolation method} = \frac{L + (H - L) \times (\text{NPV at L})}{\{(\text{NPV at L}) - (\text{NPV at H})\}}$$

Where, IRR = Internal Rate of Return; L = Lower discount rate where NPV was positive; H = Higher discount rate at which NPV was negative.

The project is considered viable if the IRR is more than the acceptable rate for the entrepreneur which could be the opportunity cost for his funds. In case of agricultural and rural development projects generally the prescribed IRR for viability is 15% in India and other developing countries.

### (b) Sensitivity Analysis

Projects are sensitive to fluctuation in values of critical variables like costs of inputs and prices of outputs. It is important to examine how sensitive is the project to fluctuations in the values of these variables because the basic assumptions taken for projections of balance sheet, cash flow statements for future years have an element of uncertainty. Different projects may, however, get affected differently from changes in the assumption of cost and return items. Sensitivity analysis helps us in finding out that how sensitive is the project to these fluctuations. Sensitivity analysis involves identification of crucial variable relating to costs and returns, specification of alternative values of the crucial variables and re-computation of the NPV and IRR by using the alternative values. A project, which is highly sensitive to even small fluctuations in cost and price, is a risky project for financing.

### (c) Scenario Analysis

Sensitivity analysis takes care of only one or two variable which is at times inadequate. This limitation is partially overcome by what is known as scenario analysis, where scenario of certain prices, cost and other variables are created and the financial parameters are computed.



**(d) Risk Analysis**

Even though through sensitivity analysis and scenario analysis techniques, some of the uncertainties in the project are taken care, both these types of analysis have limitation that they have deterministic values for the variables. In a significant improvement over these methods, under risk analysis, probabilistic analysis is done by identification of key risk variables, finding out values of each risk variable, assigning probabilities for each value to each of the risk variables, using these values for risk analysis and finding out the probability of negative outcome of the project, i.e. what is the probability that the NPV of the project will be negative.

The risk analysis adds valuable information to the project analysis and it is an important tool in this respect but to take up investment or not depends on the risk taking capacity of the entrepreneur which will vary from person to person. Therefore, it is judgmental in nature.

**C. Economic Appraisal**

The objective of economic appraisal is to examine the project from the entire economy's point of view to determine whether the project will improve the economic welfare of the country. Economic appraisal is traditionally not conducted in banks or financial institutions. It is generally conducted by agencies like the World Bank and the development agencies of the Government for the projects having huge investment and profound implication for the economy. Examples of the projects where economic analysis is conducted are big dams, forestry projects and big industrial projects.

**D. Social/distributive Appraisal**

For an analysis of a project to be complete, it should include not only the financial and economic but also social appraisal. The social analysis consists of two parts: measurement of the distribution of the income due to the project and identification of the impact on the basic needs objectives of the society.

The steps involved in social appraisal are: conducting financial analysis, economic analysis and appraisal of distributional effect of the net benefits (externalities) of the project. Here, the affected parties like farmers, dealers of the goods, existing operators and Government are to be identified. One party (like farmers whose lands will be irrigated in the case of a dam) is a gainer but the other (like those who are displaced due to the dam) is a loser.

After social and distributive analysis it may emerge that a project is financially unviable but socially and economically is viable. In such situations the decisions to undertake the project would depend upon the goals of the Government. If the Government believes that the positive externalities are worth the negative financial cash flow, it may decide to implement the project.

**E. Environmental Aspects**

Developing countries including India are now becoming increasingly aware of the urgency to integrate environmental concerns into their project formulations and appraisal. This has led to the increased importance being attached to the environmental aspects in the projects and now most of the banks and financial institutions insist on what is known as Environmental Impact Assessment (EIA). The essence of EIA is a prediction of the consequences to the natural environment from development projects.

The emphasis in EIA is on those consequences of the projects which are relatively well known and whose magnitudes can be easily estimated. Conditional, uncertain or probabilistic aspects of the impacts are not considered. Another elaborate analysis called Environmental risk Assessment (ERA) is used to differentiate a new and additional analysis in which the probabilistic element is explicitly addressed.

In India, the consciousness has already come at the policy level. A separate ministry has been formed and Environment (Protection) Act, 1986 was passed by the Government of India. Further, Central Pollution Control Board (CPCB) has been formed for ensuring proper implementation of the provisions of the Act. Most of the

industries are covered by the Act and therefore such industries have to seek clearance not only before setting up of industries but also on a regular basis from the state level PCBs. State level PCBs implement the standards set by CPCB. Reserve Bank of India has also directed the banks not to extend certain credit facilities to industries which have deleterious effects on the environment. Thus, environmental aspects of the projects are becoming very important in project appraisal.

## **F. Organizational and Managerial Aspects**

The organizational and managerial aspects evaluate the managerial capacity of the organization or the entrepreneur, responsible for implementing the project. Even if very good technology is chosen for the project, it may fail due to lack of or inadequate managerial capability. In small agricultural and other projects the entrepreneur is responsible for taking care of all these aspects. It is important for the banker to judge the borrower's managerial capability and also his financial capability (worth). In case of cost escalation he should be in a position to meet the additional financial requirement for the project.

## **G. Commercial Aspects Including Marketing**

Commercial aspects of a project include arrangement for supply of inputs for the initiation and operation of the project and marketing of outputs. Some experts prefer to have a separate marketing module and would treat it as the most important aspect of appraisal.

## **LENDING POLICIES AND APPRAISAL NORMS BY FINANCIAL INSTITUTIONS AND BANKS**

Lending policy and appraisal norms by banks are decided by the Reserve Bank of India. RBI has issued a master circular i.e. Master Circular DBOD. No. Dir. BC. 6/13.03.00/2010-11 dated July 1, 2011 suitably updated by the instructions issued up to June 30, 2012. Banks determine their lending policies on the basis of RBI circulars/instructions and government policies.

To lend, banks depend largely on deposits from the public. Banks act as custodian of public deposits. Since the depositors require safety and security of their deposits, want to withdraw deposits whenever they need and also adequate return, bank lending must necessarily be based on principles that reflect these concerns of the depositors.

These principles include: safety, liquidity, profitability, and risk diversion.

### **(1) Safety**

Banks need to ensure that advances are safe and money lent out by them will come back. Since the repayment of loans depends on the borrowers' capacity to pay, the banker must be satisfied before lending that the business for which money is sought is a sound one. In addition, bankers many times insist on security against the loan, which they fall back on if things go wrong for the business. The security must be adequate, readily marketable and free of encumbrances.

### **(2) Liquidity**

To maintain liquidity, banks have to ensure that money lent out by them is not locked up for long time by designing the loan maturity period appropriately. Further, money must come back as per the repayment schedule. If loans become excessively illiquid, it may not be possible for bankers to meet their obligations vis-à-vis depositors.

### **(3) Profitability**

To remain viable, a bank must earn adequate profit on its investment. This calls for adequate margin between deposit rates and lending rates. In this respect, appropriate fixing of interest rates on both advances and deposits is critical. Unless interest rates are competitively fixed and margins are adequate, banks may lose customers to their competitors and become unprofitable.

#### (4) Risk diversification

To mitigate risk, banks should lend to a diversified customer base. Diversification should be in terms of geographic location, nature of business etc. If, for example, all the borrowers of a bank are concentrated in one region and that region gets affected by a natural disaster, the bank's profitability can be seriously affected.

### LOAN POLICY

Based on the general principles of lending stated above, the Lending Policy Committee (LPC) of individual banks prepares the basic Lending policy of the Bank, which has to be approved by the Bank's Board of Directors. The loan policy outlines lending guidelines and establishes operating procedures in all aspects of Lending management including standards for presentation of Lending proposals, financial covenants, rating standards and benchmarks, delegation of Lending approving powers, prudential limits on large Lending exposures, asset concentrations, portfolio management, loan review mechanism, risk monitoring and evaluation, pricing of loans, provisioning for bad debts, regulatory/ legal compliance etc. The lending guidelines reflect the specific bank's lending strategy (both at the macro level and individual borrower level) and have to be in conformity with RBI guidelines. The loan policy typically lays down lending guidelines in the following areas:

- Level of Lending-deposit ratio
- Targeted portfolio mix
- Hurdle ratings
- Loan pricing
- Collateral security

#### 1. Lending Deposit (CD) Ratio

A bank can lend out only a certain proportion of its deposits, since some part of deposits have to be statutorily maintained as Cash Reserve Ratio (CRR) deposits, and an additional part has to be used for making investment in prescribed securities (Statutory Liquidity Ratio or SLR requirement). It may be noted that these are minimum requirements. Banks have the option of having more cash reserves than CRR requirement and invest more in SLR securities than they are required to. Further, banks also have the option to invest in non-SLR securities. Therefore, the CPC has to lay down the quantum of Lending that can be granted by the bank as a percentage of deposits available. Currently, the average CD ratio of the entire banking industry is around 70 percent, though it differs across banks. It is rarely observed that banks lend out of their borrowings.

#### 2. Targeted Portfolio Mix

The LPC aims at a targeted portfolio mix keeping in view both risk and return. Toward this end, it lays down guidelines on choosing the preferred areas of lending (such as sunrise sectors and profitable sectors) as well as the sectors to avoid. Banks typically monitor all major sectors of the economy. They target a portfolio mix in the light of forecasts for growth and profitability for each sector. If a bank perceives economic weakness in a sector, it would restrict new exposures to that segment and similarly, growing and profitable sectors of the economy prompt banks to increase new exposures to those sectors. This entails active portfolio management. Further, the bank also has to decide which sectors to avoid. For example, the LPC of a bank may be of the view that the bank is already overextended in a particular industry and no more loans should be provided in that sector. It may also like to avoid certain kinds of loans keeping in mind general Lending discipline, say loans for speculative purposes, unsecured loans, etc.

#### 3. Hurdle ratings

There are a number of diverse risk factors associated with borrowers. Banks should have a comprehensive risk

rating system that serves as a single point indicator of diverse risk factors of a borrower. This helps taking Lending decisions in a consistent manner. To facilitate this, a substantial degree of standardisation is required in ratings across borrowers. The risk rating system should be so designed as to reveal the overall risk of lending. For new borrowers, a bank usually lays down guidelines regarding minimum rating to be achieved by the borrower to become eligible for the loan. This is also known as the 'hurdle rating' criterion to be achieved by a new borrower.

#### 4. Pricing of loans

Risk-return trade-off is a fundamental aspect of risk management. Borrowers with weak financial position and, hence, placed in higher risk category are provided Lending facilities at a higher price (that is, at higher interest). The higher the Lending risk of a borrower the higher would be his cost of borrowing. To price Lending risks, banks devise appropriate systems, which usually allow flexibility for revising the price (risk premium) due to changes in rating. In other words, if the risk rating of a borrower deteriorates, his cost of borrowing should rise and vice versa. At the macro level, loan pricing for a bank is dependent upon a number of its cost factors such as cost of raising resources, cost of administration and overheads, cost of reserve assets like CRR and SLR, cost of maintaining capital, percentage of bad debt, etc. Loan pricing is also dependent upon competition.

#### 5. Collateral security

As part of a prudent lending policy, banks usually advance loans against some security. The loan policy provides guidelines for this. In the case of term loans and working capital assets, banks take as 'primary security' the property or goods against which loans are granted. In addition to this, banks often ask for additional security or 'collateral security' in the form of both physical and financial assets to further bind the borrower. This reduces the risk for the bank. Sometimes, loans are extended as 'clean loans' for which only personal guarantee of the borrower is taken.

#### 6. Compliance with RBI guidelines

The Lending policy of a bank should be conformant with RBI guidelines; some of the important guidelines of the RBI relating to bank Lending are discussed below.

#### 7. Directed Lending stipulations

The RBI lays down guidelines regarding minimum advances to be made for priority sector advances, export Lending finance, etc. These guidelines need to be kept in mind while formulating Lending policies for the Bank.

### CAPITAL ADEQUACY

If a bank creates assets-loans or investment-they are required to be backed up by bank capital; the amount of capital they have to be backed up by depends on the risk of individual assets that the bank acquires. The riskier the asset, the larger would be the capital it has to be backed up by. This is so, because bank capital provides a cushion against unexpected losses of banks and riskier assets would require larger amounts of capital to act as cushion. The Basel Committee for Bank Supervision (BCBS) has prescribed a set of norms for the capital requirement for the banks for all countries to follow. These norms ensure that capital should be adequate to absorb unexpected losses. In addition, all countries, including India, establish their own guidelines for risk based capital framework known as Capital Adequacy Norms. These norms have to be at least as stringent as the norms set by the Basel committee. A key norm of the Basel committee is the Capital Adequacy Ratio (CAR), also known as Capital Risk Weighted Assets Ratio, is a simple measure of the soundness of a bank. The ratio is the capital with the bank as a percentage of its risk-weighted assets. Given the level of capital available with an individual bank, this ratio determines the maximum extent to which the bank can lend. The Basel committee specifies a CAR of at least 8% for banks. This means that the capital funds of a bank must be at least 8 percent of the bank's risk weighted assets. In India, the RBI has specified a minimum of 9%, which is more stringent than the international norm.

The RBI also provides guidelines about how much risk weights banks should assign to different classes of assets (such as loans). The riskier the asset class, the higher would be the risk weight. Thus, the real estate assets, for example, are given very high risk weights. This regulatory requirement that each individual bank has to maintain a minimum level of capital, which is commensurate with the risk profile of the bank's assets, plays a critical role in the safety and soundness of individual banks and the banking system.

### LENDING EXPOSURE LIMITS

As a prudential measure aimed at better risk management and avoidance of concentration of Lending risks, the Reserve Bank has fixed limits on bank exposure to the capital market as well as to individual and group borrowers with reference to a bank's capital. Limits on inter-bank exposures have also been placed. Banks are further encouraged to place internal caps on their sectoral exposures, their exposure to commercial real estate and to unsecured exposures. These exposures are closely monitored by the Reserve Bank. Prudential norms on banks' exposures to NBFCs and to related entities are also in place.

#### Exposure norms for Commercial banks in India

Exposure to	Limit
1. Single Borrower	15 per cent of capital fund (Additional
	5 percent on infrastructure exposure)
2. Group Borrower	40 percent of capital fund (Additional
	10 percent on infrastructure exposure)
3. NBFC	10 percent of capital fund
4. NBFC - AFC	15 percent of capital fund
5. Indian Joint Venture/Wholly owned	20 percent of capital fund subsidiaries abroad/ Overseas step down subsidiaries of Indian corporates
6. Capital Market Exposure	
(a) Banks' holding of shares in any	The lesser of 30 percent of paid-up share company capital of the company or 30 percent of the paid-up capital of banks
(b) Banks' aggregate exposure to	40 percent of its net worth capital market (solo basis)
(c) Banks' aggregate exposure to	40 percent of its consolidated net worth capital market (group basis)
(d) Banks' direct exposure to capital	20 percent of net worth market (solo basis)
(e) Banks' direct exposure to capital	20 percent of consolidated net worth market (group basis)
7. Gross Holding of capital among	10 per cent of capital fund banks / financial institutions

Some of the categories of the above table are discussed below:

- 1. Individual Borrowers:** A bank's Lending exposure to individual borrowers must not exceed 15 % of the Bank's capital funds. Lending exposure to individual borrowers may exceed the exposure norm of 15 % of capital funds by an additional 5 % (i.e. up to 20 %) provided the additional Lending exposure is on account of infrastructure financing.
- 2. Group Borrowers:** A bank's exposure to a group of companies under the same management control must not exceed 40% of the Bank's capital funds unless the exposure is in respect of an infrastructure

project. In that case, the exposure to a group of companies under the same management control may be up to 50% of the Bank's capital funds.

3. **Aggregate exposure to capital market:** A bank's aggregate exposure to the capital market, including both fund based and non-fund based exposure to capital market, in all forms should not exceed 40 percent of its net worth as on March 31 of the previous year.

In addition to ensuring compliance with the above guidelines laid down by RBI, a Bank may fix its own Lending exposure limits for mitigating Lending risk. The bank may, for example, set upper caps on exposures to sensitive sectors like commodity sector, real estate sector and capital markets. Banks also may lay down guidelines regarding exposure limits to unsecured loans.

### Lending Rates

Banks are free to determine their own lending rates on all kinds of advances except a few such as export finance; interest rates on these exceptional categories of advances are regulated by the RBI. It may be noted that the Section 21A of the BR Act provides that the rate of interest charged by a bank shall not be reopened by any court on the ground that the rate of interest charged is excessive. The concept of benchmark prime lending rate (BPLR) was however introduced in November 2003 for pricing of loans by commercial banks with the objective of enhancing transparency in the pricing of their loan products. Each bank must declare its benchmark prime lending rate (BPLR) as approved by its Board of Directors. A bank's BPLR is the interest rate to be charged to its best clients; that is, clients with the lowest Lending risk. Each bank is also required to indicate the maximum spread over the BPLR for various Lending exposures. However, BPLR lost its relevance over time as a meaningful reference rate, as the bulk of loans were advanced below BPLR. Further, this also impedes the smooth transmission of monetary signals by the RBI.

### LOAN DOCUMENTATION

Term lending by the Financial Institutions is a high risk business and is therefore important for them to satisfy themselves that no legal lacuna or formality is omitted as might expose the Financial Institutions to the danger of losing the money lent. The relationship between the Lender and the Borrower is a legal relationship which results in mutual rights, duties and liabilities and commercial prudence demands that these should be well expressed and be fool proof as far as possible. Loan documentation is one of the most important aspects of banking and banks are very cautious in documentation for a project financing

Procedure for execution of documents has been standardized in most of the cases. Sometimes delay takes place in providing certain documents required in connection with the execution of the loan documents. The Company Secretary of the Borrower should therefore in consultation with Legal Department of the financial institution and the Company's advocate arrange to have:

- (a) Inspection and investigation of the Title Deeds of the Borrower in respect of its properties by the Lenders and/or by the advocates chosen by the Borrower from the panel maintained by the Lenders to establish a clear and marketable title in favour of the Borrower to its properties.
- (b) Approval of the shareholders of the company for mortgaging/charging company's properties in favour of the Financial Institutions as required under Section 180(1)(a) of the Companies Act, 2013;
- (c) Shareholders' Authority to the Board of directors of the company to borrow in excess of the limits of its paid-up capital and free reserves as required under Section 180(1)(a) of Companies Act, 2013;
- (d) Resolution of the Board of directors of the Company accepting the terms and conditions of the Sanction Letter or Letter of Intent issued by the Financial institution sanctioning the term loan and execution of Loan Agreement and Deed of Hypothecation.



- (e) Normally the Lending Institution obtains several undertakings from the borrower on stamp papers. These are:
  - (i) Undertakings from the Promoters Group regarding non-disposal of their shares in the Company without prior approval of the Lender;
  - (ii) Undertaking by the Promoters to meet the over-run in the cost of the project without having recourse to the Institutions and agreeing not to withdraw the unsecured loans and deposits brought in by the Promoters/their Group for financing the project;
  - (iii) Undertaking to complete the pending formalities given in the Sanction Letter within a stipulated period and also to create the Mortgage (if not completed) within a stipulated period.
- (f) The Institution in the case of bridge loan gets a Demand Promissory Note signed by the authorized Director.
- (g) The Institution also obtains a 'No-lien' letter from the Company's Bank to which the sanctioned loan amount is to be credited. Format of this 'No-lien' letter is provided by the Lending institution.
- (h) Permission of the Income-tax authorities under Section 281 of ITA.
- (i) Letter of Confirmation under Section 9A of IDBI Act that none of its Directors are interested in the project being financed.
- (j) Permission/exemption under Urban Land Ceiling Act, wherever required.

As such before signing the Loan Documents with the Financial Institutions, the Company secretary should, besides keeping the aforementioned documents/paper, constantly liaise with the lenders to ascertain if any further compliance is required to enable disbursement of the loan amount as soon as the documentation gets completed.

The importance of the Loan Agreement and its main terms and conditions are discussed hereunder.

### **Loan Agreement of Financial Institutions**

The Loan agreement is an agreement expressed in writing and entered into between the borrower and the lender bank, institution or other creditors. It envisages a relationship taking into account the commitment made at that time and the conduct of the parties carrying legal sanctions.

A company, as a borrower, delivers power to borrow under the Memorandum of Association and Articles of Association read with the provision of the Companies Act. The agreement as such is required to be on behalf of the company under its express or implied authority and may in the same manner be varied or discharged.

Loan agreement for borrowing money from financial institutions can be executed under the authority of the Board authorization and authorizing affixation of the common seal of the company on the documents at the time of its execution. An agreement, thus executed, binds the company and is valid in the eyes of law.

### **Usual conditions in Loan Agreement**

#### **(1) Loan Agreement Terms**

The loan agreement begins with the 'date of execution and 'description of the parties to the agreement'. The main terms used in the loan agreement are defined and a 'brief description of project and financing plan' is given.

#### **The Terms of Loan**

- (a) Under the terms of the loan, the exact amount of the loan the company agreed to borrow is specified.
- (b) After mention of the loan agreement amount, another important clause in the loan agreement is 'interest

which contains the exact rate of interest applicable to the loan and mode of its payment which is quarterly installments falling due on specified dates. In the eventuality of default in payment of instalment of interest, the clause contains provisions of compound interest being reckoned with rests taken or made quarterly. There is provision for interest on defaulted installments of principal. Again liquidation damages are to be paid on such defaulted sums at the rate settled by the financial institutions. The clause also describes the mode of computation of interest and other charges.

- (c) Another important clause in the Loan Agreement is the conversion of the option into Equity. In line with the Government's policy, mandatory conversion option has been done away with. Institutions shall, however, have a right to convert loan into equity in the event of default and assistance granted for rehabilitation of the borrower concern or to meet a part of the cost of over-run. In case of conversion of loan into equity is applicable to a particular loan it is so stated under the clause 'conversion right'. The institutions reserve a right to convert at par the entire outstanding amount into equity and in the case of conversion option attached to over-run cost of the project upto 20% of the additional assistance sanctioned by the institutions. The consequence of conversion is that the portion of the loan so converted would cease to carry interest as from the date of conversion and the loan stands correspondingly reduced. Upon partial conversion, the instalment of loan payable after the date of conversion stands reduced proportionately by the amount of the loan so converted into equity shares of the company. On such conversion, the lender becomes the equity holder.
- (d) Disbursement of the loan amount is another important aspect. The loan agreement describes the terms of disbursement. The basic idea is that the loan amount is required to be used by the borrower company as per the schedule of expenditure submitted by it and all expenditure is to be adhered to as per the schedule. The institutions want that the amount so disbursed by them should be used for the purpose of project implementation only. With this end in view, the draw-down schedule of the loan amount is drawn and mode of disbursement for the loan is also specified in the agreement.
- (e) Another important term of the loan agreement is the repayment of loan. The borrower has to repay the principal amount of the loan in quarterly instalments to the lender institution from a particular date depending upon the moratorium allowed as per the information furnished in the application for the financial assistance. The repayment clause contains provisions to exercise right by the lending institution to vary or alter the repayment schedule wherever cash inflow/profitability position so warrants. The company shall not make premature repayment of loan without prior permission of the lenders, and on such request being made by the company, the lenders reserve the right to impose such conditions to accept premature repayment. Generally, lenders stipulate payment of premium with such premature repayments. However, premature repayment of foreign currency loan is not possible and only in very special case the Institutions recommend such premature repayment after obtaining the approval of the Ministry of Finance and of the Reserve Bank of India.

## ***(2) The Security for loan***

The security clause is an important clause in the loan agreement. The borrower company has to execute security documents in favour of the lender on the basis of the provisions made in the agreement.

Loan Agreement stipulates security for the loan in the forms of mortgage of immovable properties, hypothecation of movable assets and personal guarantee of the promoters/directors of the borrowing company. The security clause stipulates first mortgage over the borrower's immovable and movable properties including its movable machinery, spares, tools, and accessories, present and future, and also a first charge on all the remaining assets of the borrower, present and future, (save and except book debts in the case of hypothecation), subject to prior charges created and/to be created in favour of the borrowers' bankers on the borrowers' stocks of the raw materials, semi-finished goods and finished goods, consumable stores and book debts and such other movables as may be agreed to by the lenders for securing borrowing for working capital requirements in the



ordinary course of the business. Where there are more than one lending institution involved, the mortgage and charge are to be created on *pari-passu* basis in favour of such institutions.

The provision of personal guarantee of Promoter/Directors made in the security clause is discretionary. The institutions in some cases obtain pledge of unencumbered shares held by the promoter as security for the loan. In these cases, it is to be ensured that the shares are not subject to lock-in-period or the intention to create the pledge is discussed in the prospectus.

### **(3) Borrowers Warranties**

Under this clause the borrower ensures the lenders of the accurate description of the project in the Loan Application, on the basis of which the borrower has been granted the loan followed by execution of the agreement. The borrower also undertakes to furnish correct information relating to the project to the lender in future also. Besides, this clause requires the borrower to disclose any material affecting the project in future also. Such changes may cover scope of the projects, the location of its factory, the processes to be used for the manufacture of its products, the line of activity, the specifications of machinery and equipment required for the project, buying and selling arrangements, the management set-up, the arrangements entered into with collaborators, machinery suppliers and technical consultants etc. except as approved by the lenders from time to time.

Warranties clause also cover assurance by the borrower for a good title to its properties. The assurance specifies that there has been no changes or encumbrances on the property or the assets of the borrower; that the properties are not involved in any litigation of title or ownership; that there is no defect in the property affecting its title, of ownership; that there is no infringement of public law, or no default in payment of demands of Municipalities or other statutory authorities etc. Further, warranty also covers that the properties are not affected by any public schemes like widening of public roads etc.

In addition to the above, the warranties clause covers briefly about the selling and purchasing arrangements; management agreements; financial position; auditors certificates, permissions under FEMA; various consents/licence from Government of India or State Agencies; Agreement with technical consultants/collaborators; agreements with machinery suppliers; construction schedules; cash budgets; supply of power, water, raw material, arrangements for working capital and arrangements for meeting short fall in the resources for completion of the project. Compliance of provisions of the Companies Act, 2013 in relation to borrowing like passing of requisite resolutions under Sections 180(1)(a) and 180(1)(c); adequacy of technical, financial and executive staff; resolving conflict in Memorandum of Association and Articles of Association exist in loan agreement. This list of warranties is not complete or exhaustive but only illustrative. Additional conditions befitting the circumstances are appended whenever the Institution deems them fit.

### **(4) Condition Precedent to Disbursement of the Loan**

To safeguard the interest of the financial institutions, the borrower is required to comply with the following matters incorporated under this clause in the Loan Agreement:

- (a) The borrower shall have share capital paid-up to the required extent as stipulated in the loan agreement;
- (b) The borrowers shall have created security in favour of lenders having proved to the satisfaction of the lenders about the borrowers clear and marketable title over its properties;
- (c) The borrower shall have complied with the provisions of the Companies Act, 2013, viz. under Section 180(1)(a) as applicable;
- (d) The borrower shall have entered into arrangements with other financial institutions and banks where so required for the balance portion of the funds required for completion of the project;
- (e) The borrower has furnished tax clearance certificate under Section 230A of the Income-tax Act, 1961; (whenever applicable)

- (f) That there are no legal proceedings pending against the borrower company involving any claim on its properties;
- (g) There has been no default discharge of its obligations to the financial institutions;
- (h) The borrower shall satisfy the lender of the utilisation of earlier disbursed amount of the loan.

Here, also additional conditions precedent to disbursement could be added depending upon the circumstances of each case as the Institution may deem fit. Similarly, some of the above conditions could even be deleted where the circumstances so warrant when compliance of such conditions in a particular case is not required.

#### **(5) Concurrent Covenants**

The affirmative covenants and terms as given in the Loan Agreement which apply during the currency of the Loan Agreement cover the following subject matter:

- (a) Project implementation;
- (b) Utilisation of loan;
- (c) Loan amount to be kept in separate Bank Account;
- (d) Insurance of the mortgaged assets and insurance policies to be furnished to the lenders endorsing the Lenders as Mortgages;
- (e) To report to the lender any changes in project;
- (f) To report to the lender any adverse changes in the production and profitability projections;
- (g) To report to the lender the changes in different contractors/agreements as covered in the loan agreement specially those made with machinery suppliers/collaborators/technicians or technical consultants and suppliers of raw materials;
- (h) Borrower to ensure proper maintenance of the property;
- (i) Borrower to inform the lender of the notices received by it about the winding up proceedings and other legal process instituted against the company;
- (j) Borrower to inform the lenders of the causes of delay in completion of the project;
- (k) Borrower to inform any loss-damages the borrower suffers due to any unforeseen circumstances;
- (l) On happening of certain events proportionate repayment of the loan is required to be made by the borrower. These, events may include payment being made to other lenders covered under the loan syndication arrangements without making proportionate payments to all i.e. preference being made in payment of dues by paying one over the other;
- (m) The borrower to reimburse and pay costs/charges and expenses to lenders e.g. travelling expenses of lender's inspection team etc.
- (n) Furnish to lenders the documents executed in favour of banks and other institutions;
- (o) Make alterations in memorandum of association and articles of association as desired by the lenders;
- (p) Pass necessary resolutions to entitle lenders to rights shares/bonus shares where a right of conversion of loan into equity has been exercised by the lenders;
- (q) Furnish details of additional property, movable or immovable acquired by the company subsequent to the creation of mortgage;
- (r) Borrower shall facilitate the appointment of the lender's nominee directors;

- (s) Borrower to agree to the lenders' right to depute observers at meetings of the Board of directors or General Meeting of the Borrower Company.
- (t) Borrower to place before its Board of Directors for consideration of all important matters and also those matters which the lenders may desire;
- (u) Borrower to uphold lenders' rights to appoint Technical/Management consultants and chartered accountants as and when the lender may so decide.

### **Negative Covenants**

In addition to the above positive covenants, there are certain 'negative covenants in the agreement which is required to be performed by the borrower. These negative covenants restrict the company (1) to pay commission to promoters, directors, managers or other persons for furnishing guarantee or indemnity or for undertaking any other liability in connection with any financial assistance obtained and/or to be obtained by the borrower for the purpose of the project; (2) to pay dividend to the equity share holders if default has been committed in payment of interest or repayment of installments of principal to the lenders; (3) to create charge or lien on its assets; (4) to enter into any partnership, profit-sharing or royalty agreements or enter into any similar arrangements whereby the business or operations of the company are affected; (5) to create any subsidiary or become subsidiary to any other existing concern; (6) to recognize or register any transfer of shares in the borrowers' share capital by the promoter directors, their relatives and associates who are required to furnish "Undertaking for non-disposal of shares" to the Financial Institutions; (7) to permit withdrawal of unsecured loans and deposits brought in or to be brought in by the Promoter Directors Group or Associates to finance capital cost of the project and to meet the working capital needs unless such withdrawal or payment of interest on such unsecured loan and deposit is permitted by the lenders.

The various other aspects covered under the 'negative covenants include not to carry out (1) the amendment of the memorandum of association and articles of association or alteration in the capital structure of the Company i.e. borrower (2) transfer of undertaking, trading activity other than the activities permitted by the Lenders (3) payment of directors remuneration, in addition to what has been approved by the Central Government and the Institution. Negative covenants also relate to (1) Mergers/consolidation etc. utilisation of funds, donations, new project, change of registered office and location of factory, not to raise loans or debentures or invest funds in other concerns etc. without the prior approval of the Lenders.

### **(6) Reporting System and Inspections**

The borrower company is required to submit to the lender the quarterly/half-yearly progress reports during the period when project implementation is in progress. Once the project is completed and production is commenced the borrower company is required to submit quarterly progress reports of production, sales, gross profits and other important details having a bearing on the operational performance of the company. Besides, the audited annual accounts of the company are also required to be submitted by the company to the lenders.

In addition to above and obtaining the information through periodical reports, the loan agreement contains provision for having the inspection of the borrower concern carried out periodically by the lenders to verify project expenditure, Books of Accounts and records; technical-cum-financial-cum-legal inspections through the Institutional Inspection team of experts in different areas. This practice continues till the entire amount of the loan is repaid. The cost of such inspection is borne and paid by the company on demand and until payment; the same shall carry interest at the same rate as on defaulted sums under the loan agreement.

### **(7) Remedies for the Breach**

The main remedy of the lender against the borrower is to call back the loan amount with interest and other dues. The clause for remedies specifies those circumstances in which the lender can take recourse to such remedies. These circumstances, *inter alia*, are default in payment of principal sum of the loan; interest and arrears of interest, non-performance of covenants and conditions; supply of misleading information to the lenders relating

to the projects, its promoters or relating to its operations; refusal to disburse loan by other Financial Institutions; sales, disposal or removal of Assets of the Company without lenders approval etc. etc.

**(8) Cancellation, Suspension and Termination of Loan**

The lender may cancel any part of the loan by giving notice to the borrower if such loan amount remains unavailed of by the borrower company. Any portion of the loan may be suspended or terminated for non-compliance of the terms and conditions of the loan agreement by the borrower or on emergence of any extraordinary situation. Such suspension shall continue till the default is remedied.

**PROJECT REVIEW AND CONTROL**

**Project review is a very important aspect of entire project life.**

Even projects that are well designed, comprehensively planned, fully resourced and meticulously executed will face challenges. These challenges can take place at any point in the life of the project and the project team must work to continually revisit the design, planning and implementation of the project to confirm they are valid and to determine whether corrective actions need to be taken when the project's performance deviates significantly from its design and its plan. This is the purpose of the Project Monitoring, Evaluation and Control Phase.

Not surprisingly, the three principle categories of activities taking place during the Monitoring, Evaluation and Control Phase are:

- Project Monitoring
- Project Evaluation
- Project Control

These activities are intended to occur continuously and continually, taking place through the entire life of the project. For example, the earliest iterations of the project indicators are already being developed during the Project Identification and Design Phase; the Monitoring Plan is developed during the Planning Phase; monitoring visits are conducted during the implementation phase, and many evaluation activities are undertaken during the End of Project Transition Phase.

**Differentiating Monitoring, Evaluation and Control**

Before examining each of the three categories of activities in the Project Monitoring, Evaluation and Control Phase in detail, it is first important to differentiate between them.

**Progress Monitoring** tracks the operational work of the project. It answers questions like “Have activities been completed as planned?” “Have outputs been produced as anticipated?” “Is the work of the project progressing as projected?” At a fundamental level it is a **passive process**, it changes nothing. Instead, it tells the project manager where the project performance is in terms of money, time, risk, quality, and other areas of project progress. At its core, the goal objectives, timing and activities of project progress monitoring are perhaps best identified via the following table:

**The What, Why, When and How of Monitoring**

What	A continuous review of project progress at the activity and outputs levels Identify necessary corrective action
Why	Analyze current situationIdentify issues and find solutionsDiscover trends and patternsKeep project activities on scheduleMeasure progress against outputsMake decisions about human, financial and material resources

When Continuous

How Field VisitsRecordsReports

**Examples of Monitoring Indicators**

	<b>Agriculture Example</b>	<b>Microfinance Example</b>	<b>Water Example</b>
Outputs – ‘The tangible products or services’	Number of farmer groups created - competence of trainees	Number of clients receiving and correctly using credit  Number of new water systems installed and functioning properly	Number of clients participating in savings programs
Activities – ‘Tasks or actions taken to implement project interventions’	Number of staff visits to farming communities Number of training sessions organized	Number of staff visits to villages Number of bank training sessions - competence of trainees	Number of communities organized for water system installation

**Project Evaluation** tends to focus on tracking progress at the higher levels of the logical framework – i.e. project outcomes. Evaluations tend to explore questions like, “Is the project successful at achieving its outcomes?” “Is the project contributing to its ultimate goal?” Evaluation data is collected and analyzed less frequently and often requires a more formal intervention (often by technical advisors or external evaluators) to show project results.

**Examples of Evaluation Indicators**

	<b>Agriculture Example</b>	<b>Microfinance Example</b>	<b>Water Example</b>
<b>Goals</b> – ‘Are the project outcomes contributing to a larger impact within the target communities?’	% of families who produce enough food to cover lean periods Decreased % of malnourished children	Increase in net household income Positive change in household consumption patterns	Reduced morbidity and mortality from water related diseases
<b>Outcomes</b> – ‘Are the project outputs resulting in the desired project outcomes?’	% of families adopting improved techniques % of hectares covered with improved techniques	% of households with increased working capital	% of households using safe water supply Increase in per capita consumption of water

*\*Note – While projects are expected to contribute to the achievement of the goal level indicators, it is NOT the responsibility of the project to achieve (or to monitor) the goals.*

**Project Control** involves establishing the systems and decision-making process to manage variances between the project plans (in terms of scope, cost, schedule, etc.) and the realities of project implementation. It also involves establishing how project variances and changes are managed, documented and communicated with stakeholders.

## The Project Monitoring and Evaluation Plan

<b>Connecting the Logical Framework and the Monitoring and Evaluation Plan</b>	
<b>Project Management is Iterative!</b>	As discussed, the Monitoring, Evaluation and Control Phase extends through the entire life of the project. The project logical framework is the first step in developing the full monitoring and evaluation plan for the project. The indicators and means of verification that are included for the logical framework will ultimately become the building blocks for the full monitoring and evaluation plan of the project.

A crucial element of a comprehensive implementation plan is a monitoring and evaluation plan which identifies the system for tracking and measuring project progress, performance and impact. The appropriate time to develop the formal Monitoring and Evaluation plan is after the project is approved for funding but before the start-up of project activities. However, the preparatory work that contributes to that plan will start long before this point.

Strong project design makes it easier to create and align comprehensive monitoring and evaluation systems. The Monitoring and Evaluation Plan expands on the initial progress indicators provided in the logical framework and the project proposal; and provides additional details for each of the levels of the project logical framework. While the format of project monitoring and evaluation plans varies, the plan usually includes the following information:

- What indicators are being monitored and evaluated?
- What information is needed to track the indicator?
- What are the sources of the information?
- What data collection methods are appropriate?
- Who will collect the information?
- How often will it be collected?
- Who will receive and use the results?

While there are many considerations (budget, resources, donor requirements, etc.) to keep in mind when identifying what data to collect in the Project Monitoring and Evaluation Plan, the most important consideration should be the usefulness of the data. When identifying indicators, the project team should always ask “What will this information tell us?” and “What are the expected improvements in decision-making resulting from this data?”

<b>Monitoring Project Progress AND Project Risk</b>	
<b>Project Management is Comprehensive!</b>	While the attention of the monitoring and evaluation plan is focused on tracking the project's progress against the indicators at each of the levels of the project logframe, the project team must also track the project risk throughout the life of the project. Risk monitoring, in comparison to progress monitoring, involves continuously surveying the project horizon and anticipating the possibility that something may go wrong, or not turn out as planned. The project manager needs to continually and comprehensively survey the risks which have the potential to threaten project success and actively manage these threats throughout the life of the project.

## SOCIAL COST AND BENEFIT ANALYSIS OF PROJECT

Social cost-benefit analysis is a systematic and cohesive method to survey all the impacts caused by a project. It comprises not just the financial effects (investment costs, direct benefits like tax and fees, etc), but all the social effects, like: pollution, safety, indirect (labour) market, legal aspects, etc. The main aim of a social cost-benefit analysis is to attach a price to as many effects as possible in order to uniformly weigh the above-mentioned heterogeneous effects. As a result, these prices reflect the value a society attaches to the caused effects, enabling the decision maker to form a statement about the net social welfare effects of a project.

Major advantages of a social cost-benefit analysis are that it enables investors to systematically and cohesively compare different project alternatives. Hence, these alternatives will not just be compared intrinsically, but will also be set against the “null alter-native hypothesis”. This hypothesis describes “the most likely” scenario development in case a project will not be executed. Put differently, investments on a smaller scale will be included in the null alternative hypothesis in order to make a realistic comparison in a situation without “huge” investments.

The social cost-benefit analysis calculates the direct (primary), indirect (secondary) and external effects:

- (a) Direct effects are the costs and benefits that can be directly linked to the owners/users of the project properties (e.g., the users and the owner of a building or highway).
- (b) Indirect effects are the costs and benefits that are passed on to the producers and consumers outside the market with which the project is involved (e.g., the owner of a bakery nearby the new building, or a business company located near the newly planned highway).
- (c) External effects are the costs and benefits that cannot be passed on to any existing markets because they relate to issues like the environment (noise, emission of CO<sub>2</sub>, etc.), safety (traffic, external security) and nature (biodiversity, dehydration, etc.).

The results of a social cost-benefit analysis are:

1. **An integrated way of comparing the different effects:** All relevant costs and benefits of the different project implementations (alternatives) are identified and monetized as far as possible. Effects that cannot be monetized are described and quantified as much as possible.
2. **Attention for the distribution of costs and benefits:** The benefits of a project do not always get to the groups bearing the costs. A social cost-benefit analysis gives insight in who bears the costs and who derives the benefits.
3. **Comparison of the project alternatives:** A social cost-benefit analysis is a good method to show the differences between project alternatives and provides information to make a well informed decision.
4. **Presentation of the uncertainties and risks:** A social cost-benefit analysis has several methods to take economic risks and uncertainties into account. The policy decision should be based on calculated risk.

## Two approaches for SCBA

- **UNIDO Approach:** - This approach is mainly based on publication of UNIDO (United Nation Industrial Development Organisations) named Guide to Practical Project Appraisal in 1978.
- **L-M Approach :-** IMD Little and J.A. Mireless approach for analysis of Social Cost Benefit in Manual of Industrial Project “ Analysis in Developing countries and project Appraisal and planning for Developing Countries.

### UNIDO Approach of Social Cost benefit Analysis

The UNIDO guidelines provide a comprehensive framework for appraisal of projects and examine their desirability and merit by using different yardsticks in a step-wise manner. The desirability is examined from various angles, such as the impact on

- (a) Financial profitability of utilization of domestic resources,
- (b) Savings and consumption pattern,
- (c) Income distribution, and
- (d) Production of merit and demerit goods.

These different aspects are examined in five stages, each stage leading towards a social benefit-cost of the project.

**Stage one:** measures financial profitability from detailed integrated standard analytical tables enumerating various costs and benefits at the market price and examines profit viability from investors' point of view.

**Stage two:** adjusts the financial costs and benefits to various distortions introduced by market imperfections by valuing costs and benefits or net benefits in terms of economic efficiency or shadow prices. For shadow prices, it categorizes project inputs and outputs into "traded", "tradable" and "non-traded". For traded and tradable, the guidelines use the border prices (f.o.b/c.i.f) as the relevant shadow prices, whereas non-traded inputs and outputs are broken down into their components and each tradable subcomponent is valued at border prices, and so on. The residual non-traded components of commodities are valued at domestic willingness to pay criterion and the labour is valued at shadow wage rate.

**Stage three:** This stage designed to examine the impact of projects on savings and consumption which are of vital consideration in the choice of alternative investments in labour-intensive and capital-intensive projects. If saving is assigned great importance, as should be the case in capital-scarce countries, this stage recommends the rate for adjustment for savings by which the social value of a rupee/dollar investment exceeds its consumption value.

**Stage four:** This is important for those countries that regard income redistribution in favor of weaker sections and backward regions as desirable objectives. The guidelines suggest weighting net benefits to various income groups or regions that reflect the judgment of politicians or the planners.

**Stage five:** Finally, in stage five, the UNIDO analysis suggests a methodology for necessary adjustment of the deviations in economic and social values and difference between the efficiency and social value of project output, say, between good and bad or merit and demerit goods. It has been claimed that the analysis of merit and demerit goods is not designed for "purists in economics who think that economics should be devoid of political or subjective judgements"

### Little – Mirrlees (L-M) Approach

The seminal work of Little and Mirrlees on benefit-cost analysis systematically develops a theoretical basis for the analysis and its underlying assumptions and lays down step-wise procedure for undertaking benefit-cost studies of public projects. The mathematical formulation is identical to the UNIDO method except for differences in assigning value to discount rates and accounting for imperfections and other market failures and social considerations.

Like UNIDO guidelines, the Little-Mirrlees method also suggests valuation of project investment at opportunity cost (shadow prices) of resources to correct distortions due to market imperfections. Both methods make use of border prices to correct distortions but with a major difference.

While Little and Mirrlees express the numeraire in terms of border prices in foreign currencies, the guidelines recommend that foreign exchange values be calculated in terms of domestic currency.



Little and Mirrlees have also suggested an elaborate methodology for calculating shadow prices of non-tradables. Use of detailed input-output tables is suggested with a view to tracing down the chain of all non-traded and traded inputs that go into their production. However, in the case of non-availability of detailed input/output tables, a conversion factor based on the ratio of domestic costs of representative items to world prices of these items could be used for approximation of shadow prices of non-traded resources. Little and Mirrlees believe that in all less developed countries, one of the major criteria for the choice of a project should be its ability to generate savings and, hence, the Little-Mirrlees method suggests the use of “accounting rate of interests” to calculate present worth of future annuities of savings and consumption. Guidelines, on the other hand, do not make any adjustment for consumption and saving impact of project investment. Unlike the five stages of UNIDO, the Little and Mirrlees procedure is relatively more practical, although, unlike guidelines, it does not provide sufficient insights by examining project investment from different angles.

### **Difference between UNIDO and L-M Approach**

UNIDO	L-M
Domestic currency is used as Nemeraire	International price is used as Nemeraire
Consumption is the measurement base	Uncommitted social income is the measurement base
SCBA objectives are met through stage by stage	At one place all SCBA objectives are fulfilled.

## **DIFFERENT SOURCES OF FINANCE**

### **Term Loans from Financial Institutions and Banks**

Term loan is a long term secured debt extended by banks or financial institutions to the corporate sector for carrying out their long term projects maturing between 5 to 10 Years which is normally repaid in monthly or quarterly equal instalment. They are external source of finance paid in instalments governed by loan agreement and covenants.

All the capital requirements cannot be fulfilled by the promoters or equity share issues and that is where the term loans come into picture. Term loan or project finance is a long term source of finance for a company normally extended by financial institutions or banks for a period of more than 5 years to a maximum of around 10 years. One common feature which helps management in relatively substituting equity by term loans is the longer term of the loan.

Term loan is a type of funding which is most suitable for projects involving very heavy investment which is not possible by an individual or promoters. Big projects cannot be concluded in a year or two. To yield return from them, long term perspective is required. Such big ventures are normally financed by big banks and financial institutions. If the investment is too large, several banks come together and finance it. Such type of term loan funding is also called as consortium loan

Term loan is acquired for new projects, diversification of business, expansion projects, or for modernization or technology upgradation. Here also, the underlying fact is that the investment in these projects is normally very huge. Lack of option of funding from other sources such as equity etc for any reason also directs a company to go for term loan.

### **Financial Leverage and Term Loan**

At times, important reason for selecting term loan is financial leverage. By opting for debt finance like term loan, a company tries to magnify the returns to their equity shareholders. This help management of a company achieve the core objective of wealth maximization for its shareholders and also preserve the control and share of existing shareholders.

### Features of a Term Loan:

**1. Loan in any Currency:** These loans are provided both in home or foreign currency. Home currency loans are offered normally for purchase of fixed assets such as land, building, plant and machineries, preliminary and preoperative expenses, technical know-how, working capital etc. On the other hand, foreign currency loans are offered for import of certain plant or machinery, payment of foreign consulting fee etc.

**2. Secured Loan:** Term loans come under secured category of loans. Two kinds of securities are there – primary and collateral. Primary security is the asset which is purchased using the loan amount and collateral security is the charge on other assets of the borrower.

**3. Loan Instalments:** Repayment of loan is done in instalments. These instalments cover both principal and interest. Normally, loan instalments are decided by banks based the borrower's cash flow capacity. There may be instalments paid monthly, quarterly, biannually, or even annually. Instalments are normally equal but they may be structured based on the borrower's business. Moratorium or grace period is also given by banks in which no instalment or very low instalment is asked from the borrower. Sometimes, small instalments are kept in the initial year or two and then the remaining loan is split into the remaining maturity period making the later instalments higher than the initial ones.

**4. Maturity:** Normally a term loan is ranging between 5 to 10 years. Forecasting for more than 10 years in the current changing business environment is very difficult.

**5. Loan Agreement:** An agreement is drafted between the borrower and the bank regarding the terms and conditions of the loans which is signed by the borrower and is preserved with bank.

**6. Loan Covenant:** Covenants are a part of loan agreement. They are certain statements in the agreement which states certain do's and don'ts for the company. They are normally related to use of assets, creation of liabilities, cash flow, and control of the management. They are positive / affirmative or negative in nature.

Leasing and hire purchase are currently a supplementary form of debt finance.

### LEASE FINANCE

A lease represents a contractual arrangement whereby the lessor grants the lessee the right to use an asset in return for periodic lease rental payments. While leasing of land, buildings, and animals has been known from times immemorial, the leasing of industrial equipments is a relatively recent phenomenon, particularly on the Indian scene.

There are two broad types of lease: finance lease and operating lease.

#### Finance Lease

A finance lease or capital lease is essentially a form of borrowing. Its salient features are:

1. It is an intermediate term to a long-term non-cancellable arrangement. During the initial lease period, referred to as the 'primary lease period'. Which is usually three years or five years or eight years, the lease cannot be cancelled.
2. The lease is more or less fully amortised during the primary lease period. This means that during this period, the lessor recovers, through the lease rentals, his investment in the equipment along with an acceptable rate of return. Thus, a finance lease transfers substantially all the risks and rewards incident to ownership to the lessee.
3. The lessee is responsible for maintenance, insurance, and taxes.

4. The lessee usually enjoys the option for renewing the lease for further periods at substantially reduced lease rentals.

### Operating Lease

An operating lease can be defined as any lease other than a finance lease. The salient features of an operating lease are:

1. The lease term is significantly less than the economic life of the equipment.
2. The lessee enjoys the right to terminate the lease at a short notice without any significant penalty.
3. The lessor usually provides the operating know-how and the related services and undertakes the responsibility of insuring and maintaining the equipment. Such an operating lease is called a 'wet lease'.  
An operating lease where the lessee bears the costs of insuring and maintaining the leased equipment is called a 'dry lease'.

From the above features of an operating lease it is evident that this form of a lease does not result in a substantial transfer of the risks and rewards of ownership from the lessor to the lessee. The lessor structuring an operating lease transaction has to depend upon multiple leases or on the realisation of a substantial resale value (on expiry of the first lease) to recover the investment cost plus a reasonable rate of return thereon. Therefore, specialising in operating lease calls for an in-depth knowledge of the equipments and the secondary (resale) market for such equipments. Of course, the prerequisite is the existence of a resale market. Given the fact that the resale market for most of the used capital equipments in our country lacks breadth, operating leases are not in popular use. In recent years there have been attempts to structure car lease and computer lease transactions in the operating lease format.

The key features of lease finance in India:

- Most leases in India are finance leases not operating leases
- Lease finance is available for identifiable performing assets
- Lease finance is available in small volume
- There is a great deal of flexibility in structuring lease finance
- Lease of immovable assets is not possible by banks
- Lease tenors up to eight years is available

### HIRE-PURCHASE

Hire Purchase is a loan or contract that involves an initial deposit, linked to a specific purchase, which is a way of obtaining the use of an asset before payment is completed. The payments of the HP are in monthly instalments, plus interest within which at the end of the agreement. Finance companies usually offer the facility of leasing as well as hire-purchase to its clients.

The main features of a hire-purchase arrangement are as follows:

- The hiree (the counterpart of lessor) purchases the asset and gives it on hire to the hirer (the counterpart of lessee).
- The hirer pays regular hire-purchase instalments over a specified period of time. These instalments cover interest as well as principal repayment. When the hirer pays the last instalment, the title of the asset is transferred from the hiree to the hirer.
- The hiree charges interest on a flat basis. This means that a certain rate of interest, usually around 8 percent, is charged on the initial investment (made by the hiree) and not on the diminishing balance.

- The total interest collected by the hiree is allocated over various years. For this purpose, the ‘sum of the years digits’ method is commonly employed.

The following differences between leasing and hire-purchase, from the point of view of the lessee (hirer), may be noted.

<i>Leasing</i>	<i>Hire-Purchase</i>
<ul style="list-style-type: none"> <li>– The lessee cannot claim depreciation.</li> <li>– The entire lease rental is a tax-deductible expense for the lessee.</li> <li>– The lessee, not being the owner of the asset, does not enjoy the salvage value of the asset.</li> </ul>	<ul style="list-style-type: none"> <li>– The hirer is entitled to claim depreciation.</li> <li>– Only the interest component of the hire-purchase instalment is a tax-deductible expense for the hirer.</li> <li>– The hirer, being the owner of the asset, enjoys the salvage value of the asset.</li> </ul>

## VENTURE CAPITAL

Venture capital is a source of financing for new businesses. Venture capital funds pool investors’ cash and loan it to startup firms and small businesses with perceived, long-term growth potential. This is a very important source of funding startups that do not have access to other capital and it typically entails high risk (and potentially high returns) for the investor.

Venture capital provides long-term, committed share capital, to help unquoted companies grow and succeed. If an entrepreneur is looking to start-up, expand, buy-into a business, buy-out a business in which he works, turnaround or revitalise a company, venture capital could help do this. Obtaining venture capital is substantially different from raising debt or a loan from a lender. Lenders have a legal right to interest on a loan and repayment of the capital, irrespective of the success or failure of a business. Venture capital is invested in exchange for an equity stake in the business. As a shareholder, the venture capitalists return is dependent on the growth and profitability of the business. This return is generally earned when the venture capitalist “exits” by selling its shareholding when the business is sold to another owner.

Venture capitalist prefers to invest in “entrepreneurial businesses”. This does not necessarily mean small or new businesses. Rather, it is more about the investment’s aspirations and potential for growth, rather than by current size. Such businesses are aiming to grow rapidly to a significant size. As a rule of thumb, unless a business can offer the prospect of significant turnover growth within five years, it is unlikely to be of interest to a venture capital firm. Venture capital investors are only interested in companies with high growth prospects, which are managed by experienced and ambitious teams who are capable of turning their business plan into reality.

Venture capital firms usually look to retain their investment for between three and seven years or more. The term of the investment is often linked to the growth profile of the business. Investments in more mature businesses, where the business performance can be improved quicker and easier, are often sold sooner than investments in early-stage or technology companies where it takes time to develop the business model.

Just as management teams compete for finance, so do venture capital firms. They raise their funds from several sources. To obtain their funds, venture capital firms have to demonstrate a good track record and the prospect of producing returns greater than can be achieved through fixed interest or quoted equity investments. Most UK venture capital firms raise their funds for investment from external sources, mainly institutional investors, such as pension funds and insurance companies.

## PRIVATE EQUITY

Private equity is essentially a way to invest in some assets that isn’t publicly traded, or to invest in a publicly traded asset with the intention of taking it private. Unlike stocks, mutual funds, and bonds, private equity funds

usually invest in more illiquid assets, i.e. companies. By purchasing companies, the firms gain access to those assets and revenue sources of the company, which can lead to very high returns on investments. Another feature of private equity transactions is their extensive use of debt in the form of high-yield bonds. By using debt to finance acquisitions, private equity firms can substantially increase their financial returns.

Private equity consists of investors and funds that make investments directly into private companies or conduct buyouts of public companies that result in a delisting of public equity. Capital for private equity is raised from retail and institutional investors, and can be used to fund new technologies, expand working capital within an owned company, make acquisitions, or to strengthen a balance sheet. Generally, the private equity fund raise money from investors like Angel investors, Institutions with diversified investment portfolio like –pension funds, insurance companies, banks, funds of funds etc.

### Types of Private Equity

Private equity investments can be divided into the following categories:

**Leveraged Buyout (LBO):** This refers to a strategy of making equity investments as part of a transaction in which a company, business unit or business assets is acquired from the current shareholders typically with the use of financial leverage. The companies involved in these transactions are typically more mature and generate operating cash flows.

**Venture Capital:** It is a broad sub-category of private equity that refers to equity investments made, typically in less mature companies, for the launch, early development, or expansion of a business.

**Growth Capital:** This refers to equity investments, most often minority investments, in companies that are looking for capital to expand or restructure operations, enter new markets or finance a major acquisition without a change of control of the business.

### Structure of Private Equity

Huss (2005) describes that investing in private equity can be done in two ways: a direct investment or an investment through a fund. A direct investor participates in privately placed offerings and is responsible for the investment process. Such an investment is not only very time consuming and costly, but it requires a certain know-how and experience in the private equity market. When investing through a fund, one can be faced with problems due to asymmetric information between investors and entrepreneurs. These entrepreneurs have a better knowledge about the real conditions of the firm, the market and potential risk factors.

### Characteristics of Private Equity

The structure of private equity funds is a fixed limited partnership; therefore early withdrawals are not possible. Moreover, there is often a sales restriction that underlies private equity investments. Private equity investments generally are liquid, because when there is a possibility of a secondary sale of fund shares, investors can expect a substantial discount on the net asset value if selling in the secondary market.

When participating in a limited partnership, the investor needs a minimum amount of capital commitment. This minimum differs from fund to fund, but it is a small fraction of the wealth of an investor. So, the potential for diversification is highly restricted. The private equity market is not transparent. One of the key characteristics in this market is that there is little publicly available information. The lacking of transparency is seen as a necessity for achieving the results, because substantial part of the returns, private equity experiences, is due to the ability to exploit inside information.

### DEFERRED PAYMENT ARRANGEMENTS

A deferred payments arrangement is one of the sources of finance to industry. Machinery suppliers in India or overseas where machinery is proposed to be imported may agree to accept payment in a scheduled manner in

instalments in the period ahead of delivery. This is known as deferred payment arrangement with the machinery suppliers. The machinery suppliers in India or abroad may agree to above arrangement on security which is procured in the form of guarantee from financial institutions and banks of repute relied upon by the machinery suppliers.

Guarantee for deferred payments are offered by All India Institution viz, IFCI, IDBI, ICICI to foreign machinery supplier and also to indigenous machinery supplier against the request of the company for financing project cost of the company. The application made by the borrower for facility of guarantee is processed in the same manner as applicable for loan. However, the borrower company to be able to avail the facility should be in possession of requisite import licence where the guarantee is required for import of machinery from abroad or should have tied up the foreign currency loan from the foreign institution with the approval of the Government of India where the guarantee for such loans is required to be given to such foreign lending institution.

## INTERNATIONAL FINANCE AND SYNDICATION OF LOANS

International finance plays a very important role in financing the cost of capital of projects of the corporate sector.

In international financial market the borrower from one country may seek lenders in other countries in specific currency which need not be of the participant country. In international financial market, the availability of foreign currency is assured under four main systems:

(a) Euro currency market; (b) Export credit facilities; (c) Bond issues; and (d) Financial institutions.

**Euro currency market**—Here funds are made available as loans through syndicated Euro credits/instruments known as Floating Rate Notes FRNS. Interest rates vary every 3 to 6 months based on London—Interbank offered—Rate. Syndicated Euro Currency bank loan has developed into one of the most important instruments for international lending. Syndicated Euro credit is available through instruments viz. Term loan and Revolving Line facility.

**Export Credit Facilities** are made available by several countries through an institutional frame work in which EXIM Banks play a prominent role. EXIM Bank of India is playing a significant role in financing exports and other off shore deals.

**International Bond Market** provides facilities to raise long term funds by using different types of instruments. The bond market is generally known as Euro bond market.

UN Agency financial institutions viz. IMF of World Bank and its allied agencies, IFC (W), ADB, etc. provide finance in foreign currency.

## New International Instruments

**Swap** is the international finance market instrument for managing funds. The basic concept involved in swaps is matching of difference between spot exchange rate for a currency and the forward rate. The swap rate is the cost of exchanging one currency into another for a specified period of time. The swap will represent an increase in the value of the forward exchange rate (premium of a decrease discount). There are three main types of swaps (a) interest swap; (b) currency swap; (c) combination of both.

## Syndicated Euro Currency Loans

The Eurocurrency market refers to the availability of a particular currency in the international financial market outside the 'home country' of that currency. For example, the Eurodollar market refers to the financial market for US dollars in England, France, West Germany, Hong Kong and other financial centres outside the US. The Eurodollar borrowing may be evidenced by issue of commercial paper in the form of promissory notes, or by subscription to bond/debentures or it may be syndicated loans type.

**Main Objectives of Syndication (Borrowers' point of view)**

- (a) Large sums are arranged without delay and at least cost.
- (b) Gets better introduction to enter into international loan market without much difficulty.
- (c) Funds are made available easily for meeting balance of payment deficit and for financing large industrial projects.
- (d) The borrower is allowed to select the length of the roll over period and in choosing different currencies to repay or cancel agreements after a short notice period without penalty.

**Lenders' point of view**

- (1) It helps the bank to share large credits with other banks, to finance many borrowers.
- (2) Different size banks can participate.
- (3) It provides more profitability to banks as costs are relatively low.
- (4) Syndicated loan is under-written by a small group banks which resell portions of the commitments to other banks.

**CORPORATE TAXATION AND THE IMPACT ON CORPORATE FINANCING**

Corporate Finance is the field of finance dealing with financial decision that business enterprises make and the tool and analysis used to make the decisions. There are three methods used in corporate financing, these are borrowings, Issue of shares and retained earnings. Corporate taxations play a vital role in taking decision of corporate financing. The provisions of tax laws have wider impact on Capital investment decisions that deal with which project to invest in, whether it is feasible to fund the investment with debt or equity, as well as the time when dividend should be paid to the shareholders.

The deductibility of interest paid on debt reduces the tax liability of the company therefore the companies preferred to fund the new project out of borrowed capital. However, the Companies with low expected marginal tax rates on their interest deductions are less likely to finance new investment with debt. Availability of deductions under the tax laws will reduce the taxable income which will lower the average tax rate and ultimately minimize the tax benefit on interest paid on borrowings. The companies have to pay tax first on the earned profits and secondly when it declares dividend. The companies have to pay Corporate Dividend Tax on the declared dividend.

In tax laws, there are certain types of deductions, tax incentives available to the corporates which need to be considered while taking financial decisions.

The deductions & incentives available to the industry are summed up as below:

1. Deduction of profits & gains derived by 100% Export Oriented Undertaking.
2. Deduction of profits & gains derived from the export of articles or things or services by an undertaking established in Special Economic Zone.
3. Deductions u/s 80IA of Income Tax Act, 1962 in respect of profits and gains from industrial undertakings or enterprises engaged in infrastructure development etc.
4. Deductions in respect of profits and gains by an undertaking or enterprise engaged in development of Special Economic Zone.
5. Deduction in respect of Profits and gains from certain industrial undertakings other than infrastructure development undertakings.
6. Deduction in respect of certain undertakings or enterprises in certain special category States.

7. Deduction in respect of profits and gains from business of hotels and convention centers in specified areas.
8. Allowability of revenue expenditure and capital expenditure (except on land) incurred on scientific research.
9. Capital expenditure incurred on acquisition of patent rights or copy rights (before 1st day of April 1998) is also allowed to be amortised in equal instalments over a period of 14 years.
10. Deduction of capital expenditure incurred on specified business under section 35AD of Income Tax Act, 1962.
11. Expenditure for obtaining license to operate telecommunication services in equal installments over the period for which the license remains in force.
12. Amortisation of preliminary expenses such as feasibility report or project report expense are allowed in 5 equal installments.

### FINANCING COST ESCALATION

Cost escalation results in the increase in project cost for many reasons viz. Delay in implementation of project and inflationary pressure on corporate purchasing.

Financing cost escalation will depend upon the corporate arrangements as to how the project cost has originally been financed. There may be two different aspects to treat the financing of cost escalation as discussed below:

1. Firstly, financing cost escalation in the case when the project is new and financed by owner fund only. In such cases, the raising of equity is costly but issue of right shares to existing shareholder could be planned and this cost be met out.

There may be another situation when the company is existing company and project cost is being financed by its internal funds. In this case the company can capitalise its reserves and surplus and use the amount in financing cost escalation.

2. In the second situation where the company has been using borrowed sums in addition to equity capital for financing the project cost, it can always make request of additional funds to the lending institutions to meet the cost escalations or over runs in the project cost. In case the cost escalation is of greater magnitude then the company will have to go to raise funds from equity holders besides raising loans from the institutions so as to maintain the debt equity ratio in the existing balanced and planned proportions.

### LESSON ROUND UP

- Project decisions are taken by the management with basic objective to maximize returns on the investment being made in a project.
- Project report is a working plan for implementation of project proposal after investment decision by a company has been taken.
- Project appraisal should be analyzed for determining the project objects, accuracy of method and measurement, objective of the proposal, reliability of data and project statements.
- A careful balance has to be struck between debt and equity. A debt equity ratio of 1:1 is considered ideal but it is relaxed up to 1.5:1 in suitable cases.



- Economic Rate of Return is a rate of discount which equates the real economic cost of project outlay to its economic benefits during the life of the project.
- Domestic Resource Cost measures the resource cost of manufacturing a product as against the cost of importing/exporting it. The output from any project adds to domestic availability implying a notional reduction in imports to the extent of output of the project or an addition to exports if the product is being exported.
- Effective Rate of Protection attempts to measure the net protection provided to a particular stage of manufacturing
- The Loan agreement is an agreement expressed in writing and entered into between the borrower and the lender bank, institution or other creditors. It envisages a relationship taking into account the commitment made at that time and the conduct of the parties carrying legal sanctions.
- Loan syndication involves obtaining commitment for term loans from the financial institutions and banks to finance the project. Basically it refers to the services rendered by merchant bankers in arranging and procuring credit from financial institutions, banks and other lending and investment organization or financing the client project cost or working capital requirements
- In Social Cost-Benefit Analysis, a project is analyzed from the point of view of the benefit it will generate for the society as a whole.

### SELF TEST QUESTIONS

1. What is Project report? Why is it necessary to prepare project report? Sketch a format for project report to be submitted to a financial institution.
2. Discuss the important covenant incorporated in a long term loan agreement. Also state its relevance.
3. How do the financial institutions monitor the projects financed by them.
4. Narrate the steps taken by financial institutions while appraising a project.
5. Write short notes:
  - (i) Promoters contribution
  - (ii) Social Cost benefit analysis
  - (iii) Viability tests
  - (iv) Economic aspects of project appraisal
  - (v) Borrowers warranties in loan agreement
- (vi) Social Cost Benefit Analysis.
6. Discuss various techniques of economic appraisal followed by the lending institutions.



# Lesson 7

## Dividend Policy

### LESSON OUTLINE

- Meaning of Cost of Capital
- Introduction
- Types of Dividend Policies
- Determinants and Constraints of Dividend Policy
- Type/ Forms of Dividend
- Different Dividend Theories –
  - (a) Walter's Model
  - (b) Gordon's Model
  - (c) Modigliani-Miller Hypothesis of Dividend Irrelevance Dividend Policy –
- Practical and Legal Constraints
- Corporate Dividend Practices in India
- Case Studies
- LESSON ROUND UP
- SELF TEST QUESTIONS

### LEARNING OBJECTIVES

Dividend is the part of EAT (Earning left after paying tax) which is paid to the shareholders. There is no stipulation in the legislations about dividend policy of an organisation. Dividend policy of an organisation depends on multiple factors. A finance manager should be aware about the different aspects affecting the dividend policy of an organisation. The object of the lesson is to enable the student to understand:

- Dividend Policy
- Types of the Dividend Policy
- Residual Theory of Dividend Policy
- Relevance of Dividend – Walter formula
- Dividend Growth Model
- Irrelevance of Dividend – Modigliani – Miller formula
- Marginal Analysis and Residual Theory
- Determinants of Dividend Policy
- Corporate Dividend Practices in India

***Dividend decision is one of the crucial parts of the financial manager, as it determines the amount available for financing the organisation long term growth and it plays very important part in the financial management***

## INTRODUCTION

Dividend policy determines what portion of earnings will be paid out to stock holders and what portion will be retained in the business to finance long-term growth. Dividend constitutes the cash flow that accrues to equity holders whereas retained earnings are one of the most significant sources of funds for financing the corporate growth. Both dividend and growth are desirable but are conflicting goals to each other. Higher dividend means less retained earnings and vice versa. This position is quite challenging for the finance manager and necessitate the need to establish a dividend policy in the firm which will evolve a pattern of dividend payments having no adverse effects on future actions of the firm.

The formulation of the dividend policy poses many problems. On the one hand theory would seem to dictate that the firm should retain all funds which can be employed at a higher rate than the capitalization rate; on the other hand, stock-holders preference must be considered.

Two important considerations evolve from the above, firstly, whether owners' needs are more important than the needs of the firm. It is not easy to ascertain the extent to which shareholders best interest or desires affect dividend policy because of the following difficulties: (1) in determining the dividend 'needs of the stock-holders, as related to tax position, capital gains, current incomes; it is also difficult to locate exactly what more affects the interest of the shareholders current income requirements or alternative use of funds, or tax considerations. (2) Existing conflict of interest amongst shareholders dividend policy may be advantageous to one and not to other. Nevertheless, investor's expectations of dividend are mainly based on three factors viz., (a) reduction of uncertainty due to current earnings by way of dividend. (b) Indication of company's strength and sound position that reposes confidence in investors. (c) To meet the need of current income.

Secondly, need of the firm are easier to determine which the centre of attention is for the policy makers. Firm-oriented matters relating to dividend policy can be grouped under the following six categories, affecting directly or indirectly the determination and the appropriateness of the policy:

- (1) Firms' contractual obligations, restrictions in loan agreement and/or legal limitations/considerations; and insufficiency of cash to pay dividends.
- (2) Liquidity, credit standing and working capital requirement and considerations. Ability to borrow, nature of stockholders, degree of control, timing of investment opportunities, inflation and need to repay debt.
- (3) Need for expansion-availability of external finance, financial position of promoters, relative cost of external funds, the ratio of debt to equity.
- (4) Business cycle considerations.
- (5) Factors relating to future financing.
- (6) Past dividend policies and stockholders relationship.

The above factors affect the different firms or industry in different manner in different situations.

## Types of Dividend Policies

There are basically 4 types of dividend policy. Let us discuss them on by one:

**(1) Regular dividend policy:** in this type of dividend policy the investors get dividend at usual rate. Here the investors are generally retired persons or weaker section of the society who want to get regular income. This type of dividend payment can be maintained only if the company has regular earning.

### Merits of Regular Dividend Policy:

- It helps in creating confidence among the shareholders.

- It stabilizes the market value of shares.
- It helps in maintaining the goodwill of the company.
- It helps in giving regular income to the shareholders.

**(2) Stable dividend policy:** here the payment of certain sum of money is regularly paid to the shareholders. It is of three types:

- (a) Constant dividend per share:** here reserve fund is created to pay fixed amount of dividend in the year when the earning of the company is not enough. It is suitable for the firms having stable earning.
- (b) Constant payout ratio:** it means the payment of fixed percentage of earning as dividend every year.
- (c) Stable rupee dividend + extra dividend:** it means the payment of low dividend per share constantly + extra dividend in the year when the company earns high profit.

**Merits of stable dividend policy:**

- It helps in creating confidence among the shareholders.
- It stabilizes the market value of shares.
- It helps in maintaining the goodwill of the company.
- It helps in giving regular income to the shareholders.

**(3) Irregular dividend:** as the name suggests here the company does not pay regular dividend to the shareholders. The company uses this practice due to following reasons:

- Due to uncertain earning of the company.
- Due to lack of liquid resources.
- The company sometime afraid of giving regular dividend.
- Due to not so much successful business.

**(4) No dividend:** the company may use this type of dividend policy due to requirement of funds for the growth of the company or for the working capital requirement

## DETERMINANTS/CONSTRAINTS OF DIVIDEND POLICY

In the company organisation, dividend policy is determined by the Board of directors having taken into consideration a number of factors which include legal restrictions imposed by the Government to safeguard the interests of various parties or the constituents of the company.

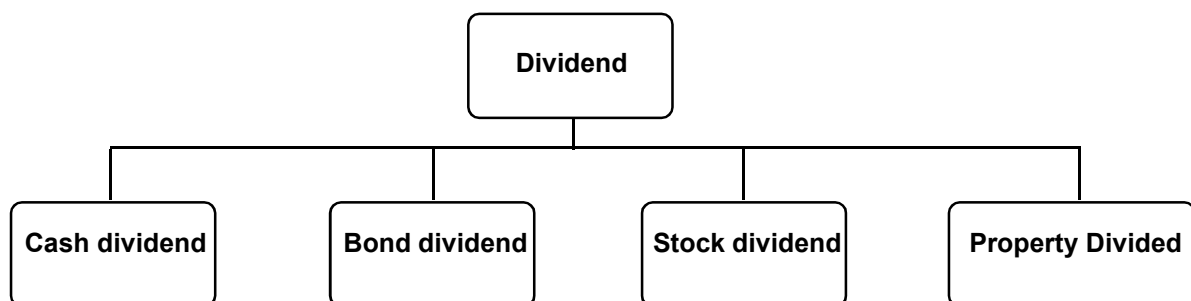
The main considerations are as follows:

- (1) Legal:** As regards cash dividend policy several legal constraints bear upon it – a firm may not pay a dividend which will impair capital. Dividend must be paid out of firm's earnings/current earnings. Contract/Agreements for bonds/loans may restrict dividend payments. The purpose of legal restriction is to ensure that the payment of dividend may not cause insolvency.
- (2) Financial:** There are financial constraints to Dividend Policy. A firm can pay dividend only to the extent that it has cash to disburse; a firm can't pay dividend when its earnings are in accounts receivables or firm does not have adequate liquidity.
- (3) Economic Constraints:** Besides, there are economic constraints also. The question arise, does the value of dividend affects the value of the firm. If the answer to it is yes then there must be some optimum level of dividend, which maximises the market price of the firm's stock.

- (4) **Nature of Business Conducted by a Company:** A company having a business of the nature which gives regular earnings may like to have a stable and consistent dividend policy. Industries manufacturing consumer/consumer durable items have a stable dividend policy.
- (5) **Existence of the Company:** The length of existence of the company affects dividend policy. With their long standing experience, the company may have a better dividend policy than the new companies.
- (6) **Type of Company Organisation:** The type of company organisation whether a private limited company or a public limited company affects dividend decisions. In a closely held company, a view may be taken for acquiescence and conservative policy may be followed but for a public limited company with wide spread of shareholder, a more progressive and promising dividend policy will be the better decision.
- (7) **Financial Needs of the Company:** Needs of the Company for additional capital affects the dividend policy. The extent to which the profits are required to be invested in the company for business growth is the main consideration in dividend decisions. Working capital position of a company is an important condition that affects the dividend policy as no company would declare a dividend to undermine its financial strength and threaten its solvency.
- (8) **Market Conditions:** Business cycles, boom and depression, affects dividend decisions. In a depressed market, higher dividend declaration are used to market securities for creating a better image of the company. During the boom the company may like to save more, create reserves for growth and expansion or meeting its working capital requirements.
- (9) **Financial Arrangement:** In case of financial arrangements being entered into or being planned like merger or amalgamation with another company, liberal policy of dividend distribution is followed to make the share stock more attractive.
- (10) **Change in Government Policies:** Changes in Government Policies particularly those affecting earnings of the company are also taken into consideration in settling dividend decisions. For example, higher rate of taxation will definitely affect company earnings and carry impact on dividend decisions. Besides, fiscal, industrial, labour, industrial policies do affect in different magnitude the dividend decisions of individual corporate enterprises.

## TYPES OF DIVIDEND/FORM OF DIVIDEND

Dividend may be distributed among the shareholders in the form of cash or stock. Hence, Dividends are classified into:



### (1) Cash Dividend

If the dividend is paid in the form of cash to the shareholders, it is called cash dividend. It is paid periodically out the business concerns EAIT (Earnings after interest and tax). Cash dividends are common and popular types followed by majority of the business concerns.

## (2) Stock Dividend

Stock dividend is paid in the form of the company stock due to raising of more finance. Under this type, cash is retained by the business concern. Stock dividend may be bonus issue. This issue is given only to the existing shareholders of the business concern.

## (3) Bond Dividend

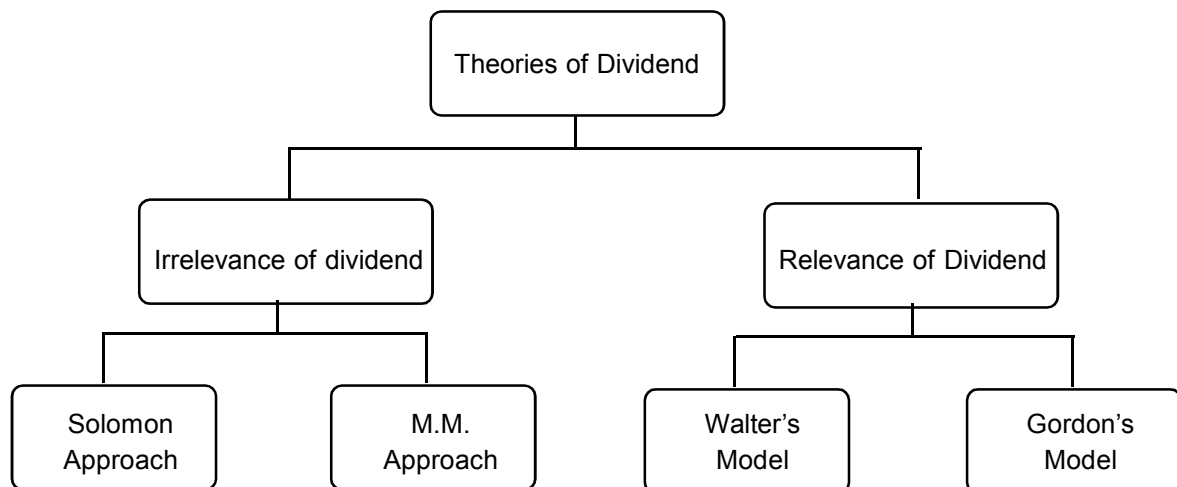
Bond dividend is also known as script dividend. If the company does not have sufficient funds to pay cash dividend, the company promises to pay the shareholder at a future specific date with the help of issue of bond or notes.

## (4) Property Dividend

Property dividends are paid in the form of some assets other than cash. It will distribute under the exceptional circumstance. This type of dividend is not published in India.

## THEORIES OF DIVIDEND

Dividend decision of the business concern is one of the crucial parts of the financial manager, because it determines the amount of profit to be distributed among shareholders and amount of profit to be treated as retained earnings for financing its long term growth. Hence, dividend decision plays very important part in the financial management. Dividend decision consists of two important concepts which are based on the relationship between dividend decision and value of the firm.



## (a) Residual Theory of Dividend Policy

According to Ezra Solomon, dividend policy is strictly a financing decision; the payment of cash dividend is a passive residual. The amount of dividend payout will fluctuate from period to period in keeping with fluctuations in the amount of acceptable investment opportunities available to the firm. If the opportunities abound, percentage of payout is likely to be zero; on the other hand, if the firm is unable to find out profitable investment opportunities, payout will be 100 per cent. The theory implies that investors prefer to have the firm retain and reinvest earnings rather than pay them out in dividends if the return on re-invested earnings exceeds the rate of return the investors could themselves obtain on other investments of comparable risks.

## (b) Irrelevance of Dividend

Professor Modigliani and Miller in their article, "Dividend Policy, Growth and the Valuation of Shares" advanced

most comprehensive arguments to hold that investors are indifferent to dividends and capital gains and so dividends have no effect on the wealth of shareholders. They argue that the value of the firm is determined by the earning power of firms assets or its investment policy. The manner in which earnings are divided into dividends and retained earnings does not affect this value. These conclusions of MM thesis are based on certain assumptions viz. Existence of perfect market with rational investors, no flotation cost on issue of shares, no taxes, investment policy of firm not subject to change, perfect certainty by every investors as to future investments and profits of the firm (this is dropped by MM later). With these assumptions, the market price of a share at the beginning of the period is defined as equal to the present value of dividend paid at the end of the period plus the market price at the end of the period. Thus,

$$P_0 = \frac{1}{1+p}(D_1 + P_1)$$

$P_0$  = market price per share at 0 time

$P$  = capitalisation rate for firm in that risk class (assumed constant throughout)

$D_1$  = dividend per share at time 1

$P_1$  = market price per share at time 1.

Suppose a share is expected to sell at Rs. 100/- one year from now, and is to pay a dividend of Rs. 5/- one year from now, the current value of stock is Rs. 105/- discounted by the appropriate rate  $p$ . A firm committed to equity financing may retain earnings and forego selling additional shares or it may pay dividend and sell shares. According to MM, the discounted value per share before and after a dividend payment (with an accompanying sale of shares) will be the same as if earnings had been retained (with no accompanying sale of shares). Let 'n' share be outstanding at period  $t_0$  and let  $\Delta n$  be number of new shares sold at  $t_1$  at a price of  $P_1$ , the new equation will be written as:

$$nP_0 = \frac{1}{(1+p)}[nD_1 + (n + \Delta n)P_1 - \Delta nP_1]$$

The total value of new shares to be sold ( $\Delta nP_1$ ) will depend on the volume of new Investment  $I$ , the net income earned  $Y$  during the period and the dividend paid on outstanding shares ( $nD_1$ ) will be:

$$\Delta nP_1 = I - (Y - nD_1)$$

Substituting the above into main equation above we have:

$$nP_0 = \frac{1}{(1+p)}[(n + \Delta n)P_1 - I + Y]$$

Since  $D_1$  does not appear in the above equation MM concludes that  $P_0$  is not a function of  $D_1$ , the other variable  $n$ ,  $\Delta n$ ,  $P_1$ ,  $I$ ,  $Y$  are assumed to be independent of  $D_1$ .

### Question

In the light of above, consider the following data:

$$p = .12$$

$$P_0 = 10$$

$$D_1 = .40$$

Shares outstanding 5,00,000

### Solution

$$P_0 = \frac{1}{1+p}(D_1 + P_1)$$



$$= P_0(1+p) - D_1 = P_1$$

$$= 10(1.12) - .40 = 10 \therefore P_1 = 10.80$$

If no dividend is paid, then the share price is  $10(1.12) - 0 = 11.20$ .

If the company earns ₹ 1/- per share next year, new investment of Rs. 10,00,000 are expected and company pays dividend then new shares to be issued are as under:

$$\Delta n P_1 = I - (Y - n D_1)$$

$$\Delta n(10.80) = 10,00,000 - (5,00,000 - 2,00,000)$$

$$\Delta n = \frac{7,00,000}{10.80} = 64,815 \text{ shares.}$$

If no dividend is paid by the company the new share to be issued are:

$$\Delta n(11.20) = 10,00,000 - 5,00,000$$

$$\Delta n = \frac{5,00,000}{11.20} = 44,643$$

The discounted value per share before and after a dividend payment will be the same as if earnings had been retained. Further, the total value of new shares to be sold will depend on the volume of new investment  $I$ , the net income earned during the period  $Y$  and the dividend paid on outstanding shares  $nD_1$  which established that  $P_0$  is not function of  $D_1$  and all the variables in the equation are independent of  $D_1$ .

However, the unrealistic assumptions of MM thesis render the hypothesis unrealistic and insignificant.

### (c) Marginal Analysis and Residuary Theory

Besides the above approaches, the current thinking contributes to the significance of marginal analysis in the explanation of the residuary theory of the dividend policy. Every firm has some optimum debt ratio, new financing is done partly by equity and partly by debt which is a cheaper source of funds as compared to equity. Debt and equity forms the capital and gives the average cost of capital as long as firm finances at the optimum point using an optimum amount of equity and providing that it uses only internal earning as equity. Its marginal cost of capital (MCC) is equal to the average cost of capital.

If the firm turns up for more common stock than the retained earnings, it will be from outside and expensive. At the point where new stock must be sold the cost of equity and consequently the MCC rises. This concept is depicted below in Fig. 1:

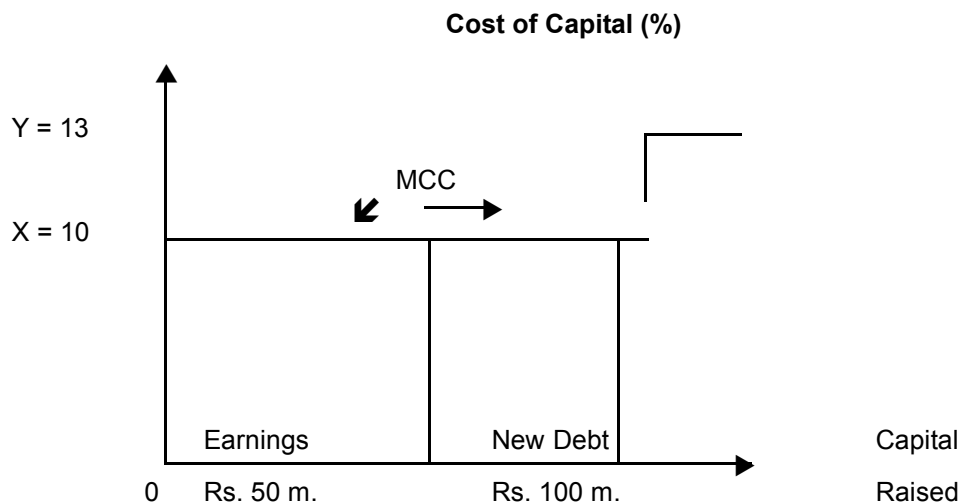
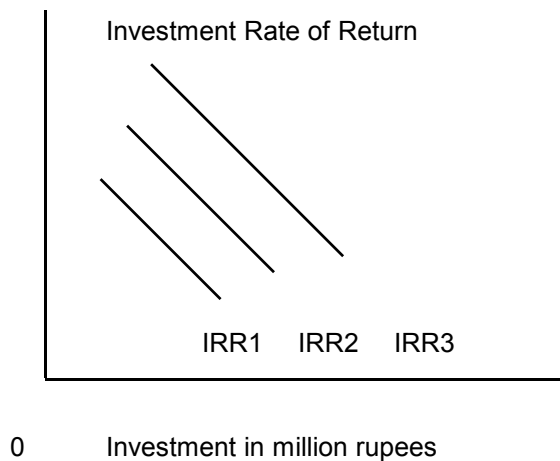


Fig. 1

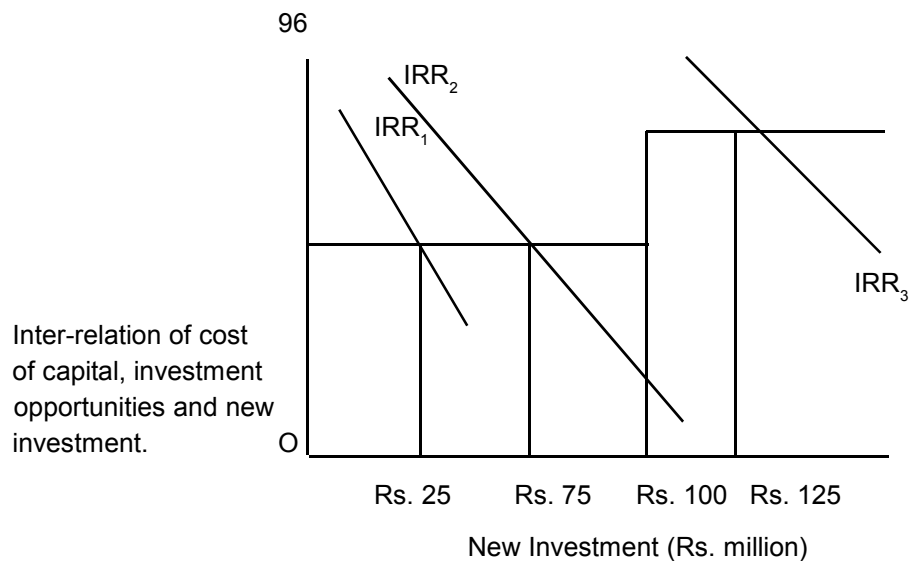
Suppose the firm has Rs. 50 million of retained earnings and a 50% optimum debt ratio. It can invest Rs. 100 million, its marginal cost is constant at 10% for upto Rs. 100 m. of capital; beyond Rs. 100 million, MCC rises to 13% as firm begins to use more expensive new capital.

In case the investment opportunities are ranked in terms of their rate of return (IRR) as bad, normal and good as respectively shown by  $IRR_1$ ,  $IRR_2$  and  $IRR_3$  in the Fig.2 then  $IRR_1$  shows that firm can invest more money at higher rates of return than it can in other given situations.



**Fig. 2**

If the above investment opportunities are combined with the cost of capital, the point where the investment opportunity curve cuts the cost of capital curve, defines the proper level of new investment. Where investment opportunities are relatively poor, the optimum level of investment is Rs. 25 million. Where it is normal, it is Rs. 75 million and when good, it is Rs. 125 million. (See the Fig. 3)



**Fig. 3**

An explanation to the above could be added. Consider the situation where firm can invest Rs. 100 million. It has Rs. 50 million debt and Rs. 50 million earnings so it can finance Rs. 100 million. If it pays part of the earnings as dividend, then it will have to use new stock and then cost curve will jump. This suggests that under this condition,

its pay-out ratio is zero %. Under  $IRR_2$  condition it can invest only Rs. 75 million by raising Rs. 25 million debt but the 50:50 ratio will change. To retain this, it should have 37.5 million equity and the same amount of debt. If it has Rs. 50 million in total earnings and decides to retain and reinvest Rs. 37.5 million, it must pay Rs. 12.5 million dividends. In this case pay out ratio is 25% (12.5/50). In the third situation it should invest only Rs. 25 million as it has Rs. 50 million earnings it could finance entire Rs. 25 million out of retained earnings and still have Rs. 25 million available for dividends. But this decision is not good, it will move it away from the target debt-equity ratio. The firm must retain Rs. 12.5 million and sell Rs. 12.5 million debt that is Rs. 50 million minus Rs. 12.5 million is equal to Rs. 37.5 million residual that should be paid out as dividend then pay out ratio is 75%.

The above theory can't be applied in fully. Flexibility may moderately be introduced.

An appropriate dividend policy must be evaluated in the light of the objectives of the firm, viz. Choose a policy that will maximise the value of the firm to its shareholders. Shareholders wealth includes not only the market price of stock but also current dividends which may be in the form of cash dividend or stock dividends. Payment of stock dividends does not fundamentally affect the value of the firm or influence the volume of financing available to the firm. But cash distributions, may effect the value of this firm or clearly influence the volume of funds available to the firm.

#### (d) Walter Formula

Professor James E. Walter has developed a theoretical model which shows the relationship between dividend policies and common stock prices. The basic premise underlying the formulation is that prices reflect the present value of expected dividend in the long run. The model operates on the objective of maximising common stockholders wealth. In general, if a firm is able to earn a higher return on earnings retained than the stockholder is able to earn on a like investment then it would appear beneficial to retain these earnings all other things being equal. Walter's model is as under:

$$P = \frac{D + \frac{R_a}{R_c}(E - D)}{R_c}$$

Where:

P : market price per share of common stock

D : dividend per share

E : earnings per share

$R_a$  : return on investment

$R_c$  : market capitalization rate.

**Example:** To illustrate the above formula suppose

$R_a$  = return on investment is given as 0.12

$R_c$  = market capitalization rate is as 0.10

E = earnings per share is Rs. 4/-

D = dividend per share is Rs. 2/-

Then, the market price per share would be:

$$P = \frac{2 + (0.12 \div 0.10)(4 - 2)}{0.10}$$

$$= \text{Rs. } 44/-$$

The optimal payout ratio is determined by varying D until we obtain the maximum market price per share. According to Walter the dividend payout ratio should be zero if  $R_a$  is greater than  $R_c$ . This will maximise the market price of the share. In the instant case, we have  $P = \text{Rs. } 48$  as calculated under:

$$P = \frac{2 + (0.12 \div 0.10)(4 - 0)}{0.10}$$

$$= \text{Rs. } 48/-$$

So, with payout ratio 0, the market price is maximised and comes to Rs. 48/-. Similarly, if  $R_a$  is less than  $R_c$  the optimal payout ratio should be 100%. This point can be exemplified if  $R_a = 0.8$  instead of 0.12 and other figures remain unchanged as in the above example, then we have market price of share as under:

$$P = \frac{2 + (0.8 \div 0.10)(4 - 2)}{0.10}$$

$$= \text{Rs. } 36/-$$

However, with Dividend payout ratio at 100%, we have:

$$P = \frac{4 + (0.8 \div 0.10)(4 - 4)}{0.10}$$

$$= \text{Rs. } 40/-$$

Thus, market price per share can be maximised with complete distribution of earnings. If  $R_a$  is equal  $R_c$ , then market price per share is insensitive to payout ratio. To sum up Walter's conclusions, the firm should distribute all the earnings in dividends if it has no profitable opportunities to invest.

### (e) Dividend Growth Model

Besides Walters formula there is a continuing Dividend Growth Model which gives the following formula for calculating the value of a firm's stock with dividend declaration:

$$P = \frac{E(1-b)}{K_e - br}$$

Where, P = price of share

E = earning per share

b = Retention ratio or percentage of earnings retained

(1 - b) = dividend payout ratio, i.e., percentage of earnings distributed as dividend

$K_e$  = Capitalisation rate/cost of capital

br = growth rate in r, i.e., rate of return on investment of an all equity firm.

The model is also referred to as the dividend  $\frac{3}{4}$  capitalization model. Graham and Dodd Myron Gordon and others worked on the model which considers capitalization of dividends and earnings. The model is also referred to as the dividend growth model. The model considers the growth rate of the firm to be the product of its retention ratio and its rate of return.

The capitalization model projects that the dividend decision has a bearing on the market price of the share. In situations where the rate of return on investment (r) is greater than the capitalization rate ( $k_e$ ), the market price of share increases with decrease in dividend payout ratio. If r is less than  $k_e$ , market price of share declines with decrease in dividend payout ratio. If r is equal to  $k_e$ , the dividend payout ratio has no effect on the market price of the security.

The dividend growth model thus, provides an additional measure of the intrinsic value of shares and may be used to supplement other valuation methods.

### Example

Determine the market price of a share of LMN Ltd., given

$k_e = 11\%$

$E = \text{Rs. } 20$

$R = \text{(i) } 12\%; \text{ (ii) } 11\%; \text{ and (iii) } 10\%$

The market price be determined if – (a)  $b = 90\%$

(b)  $b = 60\%$  and

(c)  $b = 30\%$

### Solution

$$P = \frac{E(1-b)}{K_e - br}$$

(i)  $r = 12\%$

(a)  $b = 90\%$

$$br = .9 \text{ Rs. } .12 = 0.108$$

$$P = \frac{\text{Rs. } 20(1-0.9)}{.11-.108} = \text{Rs. } 100$$

(b)  $b = 60\%$

$$br = .6 \text{ Rs. } .12 = 0.072$$

$$P = \frac{\text{Rs. } 20(1-0.6)}{.11-.072} = \text{Rs. } 210.52$$

(c)  $b = 30\%$

$$br = .3 \text{ Rs. } .12 = 0.036$$

$$P = \frac{\text{Rs. } 20(1-0.3)}{.11-.036} = \text{Rs. } 189.19$$

(ii)  $r = 11\%$

(a)  $b = 90\%$

$$br = .9 \text{ Rs. } .11 = 0.099$$

$$P = \frac{\text{Rs. } 20(1-0.9)}{.11-0.099} = \text{Rs. } 181.82$$

(b)  $b = 60\%$

$$br = .6 \text{ Rs. } .11 = 0.066$$

$$P = \frac{\text{Rs. } 20(1-0.6)}{.11-0.066} = \text{Rs. } 181.82$$

(c)  $b = 30\%$ 

$$br = .3 \text{ Rs. } .11 = 0.033$$

$$P = \frac{\text{Rs. } 20(1 - 0.3)}{.11 - .033} = \text{Rs. } 181.82$$

(i)  $r = 10\%$ (a)  $b = 90\%$ 

$$br = .9 \text{ Rs. } .10 = 0.090$$

$$P = \frac{\text{Rs. } 20(1 - 0.9)}{.11 - 0.090} = \text{Rs. } 100$$

(b)  $b = 60\%$ 

$$br = .6 \text{ Rs. } .10 = 0.060$$

$$P = \frac{\text{Rs. } 20(1 - 0.6)}{.11 - .060} = \text{Rs. } 160$$

(c)  $b = 30\%$ 

$$br = .3 \text{ Rs. } .10 = 0.030$$

$$P = \frac{\text{Rs. } 20(1 - 0.3)}{.11 - .030} = \text{Rs. } 175$$

**The impact of dividend growth model can thus be analysed in three situations:**

(1) When normal capitalization rate is less than the actual capitalization rate:  $CD_{\text{norm}} < CR_{\text{act}}$

In such a situation, the shareholder gains more earnings by investing in the company than he expects as a norm. The shareholder would want the firm to retain more than to pay as dividend. If dividend payout is enhanced it will lower the intrinsic value as it lowers the growth rate of a highly profitable company.

(2) Another situation could be where normal capitalization rate equals the actual capitalization rate:  $CD_{\text{norm}} = CR_{\text{act}}$

This situation represents that the company is doing well and shareholders are indifferent as to the level of dividend. If dividend is declared, it would be reinvested in the companies. Thus the dividend payout ratio does not effect the intrinsic value of the company.

(3) Where normal capitalization rate is more than actual capitalization rate i.e.,  $CD_{\text{norm}} > CR_{\text{act}}$ :

This situation represents the opposite side of (1) above. Here, the company is not doing well as expected, the shareholders would like to invest elsewhere in more profitable avenues, so dividend payout has to be higher and intrinsic value of shares accordingly gets enhanced.

The dividend growth model, thus an additional measure of the intrinsic value of shares that may be used to supplement other valuation methods.

## LEGAL ASPECTS OF DIVIDENDS

The Companies Act, 2013 makes the following provision for payment of dividends:

### **1. Dividends to be paid only out of profits**

According to Section 123(1) of Companies Act 2013, no dividend shall be declared or paid by a company for any

financial year except –

- (a) (i) out of the profits of the company for that year arrived at after providing for depreciation in accordance with the provisions of sub-section (2), or
  - (ii) out of the profits of the company for any previous financial year or years arrived at after providing for depreciation in accordance with the provisions of that sub-section and remaining undistributed, or
  - (iii) out of both; or For the above purpose, depreciation shall be provided in accordance with the provisions of Schedule II.
- (b) out of money provided by the Central Government or a State Government for the payment of dividend by the company in pursuance of a guarantee given by that Government.

Before declaration of dividend, a company may transfer a portion from the profit to the reserves of the company. The company is free to decide the percentage for such transfer to the reserve.

Second proviso to Section 123(1) states that owing to inadequacy or absence of profits in any financial year, any company proposes to declare dividend out of the accumulated profits earned by it in previous years and transferred by the company to the reserves, such declaration of dividend shall not be made except in accordance with such rules as may be prescribed in this behalf.

Third proviso to Section 123(1) states that that no dividend shall be declared or paid by a company from its reserves other than free reserves.

Another proviso added to section 123(1) by the Companies (Amendment) Act, 2013 states that no company shall declare dividend unless carried over previous losses and depreciation not provided in previous year or years are set off against profit of the company for the current year.

Section 123(3) of the Companies Act, 2013 provides that the Board of Directors of a company may declare interim dividend during any financial year out of the surplus in the Profit and Loss Account as well as profit of the financial year in which the interim dividend is sought to be declared. When the company has incurred any loss during the current financial year up to the end of the quarter immediately preceding the date of declaration of interim dividend, such interim dividend shall not be declared at a rate higher than the average dividends declared by the company during the immediately preceding the three financial years.

Section 123(4) of the Companies Act, 2013 provides that the amount of the dividend, including interim dividend, shall be deposited in a scheduled bank in a separate account within five days from the date of declaration of such dividend. Where, if the articles of the company do not authorize so, it has to be amended accordingly.

## **2. Unpaid Dividend Account - Section 124 of Companies Act, 2013**

According to Section 124 of Companies Act, 2013 where a dividend has been declared by a company but has not been paid or claimed within thirty days from the date of the declaration to any shareholder entitled to the payment of the dividend, the company shall, within seven days from the date of expiry of the said period of thirty days, transfer the total amount of dividend which remains unpaid or unclaimed to a special account to be opened by the company in that behalf in any scheduled bank to be called the Unpaid Dividend Account.

Section 124(4) states that any person claiming to be entitled to any money transferred under sub-section (1) to the Unpaid Dividend Account of the company may apply to the company for payment of the money claimed.

## **TRANSFER OF UNPAID/UNCLAIMED DIVIDEND TO INVESTOR EDUCATION AND PROTECTION FUND**

Section 124 (5) of the Companies Act, 2013 states that any money transferred to the Unpaid Dividend Account of a company in pursuance of this section which remains unpaid or unclaimed for a period of seven years from

the date of such transfer shall be transferred by the company along with interest accrued, if any, thereon to the Fund established under sub-section (1) of section 125 (Investor Education and Protection Fund) and the company shall send a statement in the prescribed form of the details of such transfer to the authority which administers the said Fund and that authority shall issue a receipt to the company as evidence of such transfer.

## CORPORATE DIVIDEND PRACTICES IN INDIA

Capital in the corporate sector is contributed by the investors with the main objective of earning a good return on their savings either as a regular annual income by way of dividend or the capital enhancement in the value of the shares. Corporate management has got to honour this legitimate expectation of the investors. Dividend makes equity investment attractive. Limitations of any nature put on the distribution of dividend by corporate sector has to bear upon the dis-incentive to savings and investment and thus to discourage economic growth. With this point in view, Public Companies (Limitation of Dividend) Act was allowed by the Government to lapse at the end of March, 1950 within a period of less than two years. But again, the government had promulgated Companies (Temporary Restrictions on Dividends) Ordinance on July 6, 1974 which became an Act but was subsequently withdrawn on July 6, 1976.

The main drawback that is reflected in the context of dividend practice is the Government direct taxation. Dividend income is taxed twice, once at the hands of the company and once in the hands of the recipient shareholders. Despite representations from different segments particularly the corporate sector and the representative bodies of investors, Government has not done away with the existing practices. The large shareholders are not interested in receiving dividend in cash but are interested in long-term growth of the company on the basis of utilization of retained earnings so that they escape the liability to pay tax on dividend income.

Corporate dividend practices, besides the above facts, are based on conservative management policies. Companies mostly prefer to depend for expansion, modification/renovation on the retained earnings rather than raising fresh equity or raising loans from financial institutions or banks. Governments credit policy also encourages the corporate units to declare dividend at lower rates and increase their retained earnings or free reserves so as to attain self-sufficiency of funds for utilisation in the implementation of modernisation schemes etc. With the higher profitability of certain companies, the shareholders have the grievances for not being paid higher dividend. Therefore, certain companies have now started paying higher dividend. This has in many cases raised the market, price of the share and provided opportunity to investors to encash their gains. Lower dividend keeps the market price general low unless special circumstances exist due to company's efforts for growth by way of expansion or modernisation or diversification to boost investors' sentiments.

## SOME CASE STUDIES

### Exercise No. 1

1. X Company Ltd., has 1,00,000 shares outstanding the current market price of the shares Rs. 15 each. The company expects the net profit of Rs. 2,00,000 during the year and it belongs to a rich class for which the appropriate capitalisation rate has been estimated to be 20%. The company is considering dividend of Rs. 2.50 per share for the current year. What will be the price of the share at the end of the year (i) if the dividend is paid and (ii) if the dividend is not paid?

### Solution

$$P_0 = \frac{(D_1 + P_1)}{1 + k_e}$$

$P_0$  = market price per share at 0 time

$k_e$  = capitalisation rate for firm in that risk class (assumed constant throughout)

$D_1$  = dividend per share at time 1



$P_1$  = market price per share at time 1.

**(i) If the dividend is paid**

$P_0$  = Rs.15

$K_e$  = 20%

$D_1$  = 2.50

$P_1$  = ?

$$15 = \frac{(2.50 + P_1)}{1 + 0.20}$$

$$2.50 + P_1 = 15 \times 1.2$$

$$P_1 = 18 - 2.50$$

$$P_1 = \text{Rs. } 15.50$$

**(ii) If the dividend is not paid**

$P_0$  = 15

$K_e$  = 20%

$D_1$  = 0

$P_1$  = ?

$$15 = \frac{(0 + P_1)}{1 + 0.20}$$

$$0 + P_1 = 15 \times 1.20$$

$$P_1 = \text{Rs. } 18.$$

**Exercise No. 2**

Ram Company belongs to a risk class for which the appropriate capitalization rate is 12%. It currently has outstanding 30000 shares selling at Rs. 100 each. The firm is contemplating the declaration of dividend of Rs. 6 per share at the end of the current financial year. The company expects to have a net income of Rs. 3,00,000 and a proposal for making new investments of Rs. 6,00,000. Show that under the MM assumptions, the payment of dividend does not affect the value of the firm. How many new shares issued and what is the market value at the end of the year?

**Solution**

$$P_0 = \frac{(D_1 + P_1)}{1 + k_e}$$

$P_0$  = market price per share at 0 time

$k_e$  = capitalisation rate for firm in that risk class (assumed constant throughout)

$D_1$  = dividend per share at time 1

$P_1$  = market price per share at time 1.

In the given problem

$$P_0 = 100$$

$$D_1 = \text{Rs. } 6$$

**214 PP-FT&FM**

$P_1 = ?$

$K_e = 12\%$

$6 + P_1 = 112$

$P_1 = 112 - 6$

$P_1 = \text{Rs. } 106$

If Dividend is not declared

$K_e = 12\%$ ,  $P_0 = 100$ ,  $D_1 = 0$ ,  $P_1 = ?$

$$100 = \frac{(0 + P_1)}{1 + 0.12}$$

$112 = P_1$

**Calculation of number of new shares to be issued/ Market Value of Firm**

	Dividends is Paid	Dividends is not Paid
Net Income	3,00,000	3,00,000
Total Dividend	1,80,000	Nil
Retained earning	1,20,000	3,00,000
Investment required	6,00,000	6,00,000
Amount to be raised from new shares (A)	4,80,000	3,00,000
Relevant Market Price (B)	106	112
No. of shares to be issued (A/B)	4,528	2,679
Total number of shares at the end of the year	30,000	30,000
Total Number of Shares	34,528	32,679
Market Price per share	106	112
Market Value for Shares	36,60,000	36,60,000

There is no change in the total market value of shares whether dividends are distributed or not distributed.

**Exercise No 3:**

A company has 10,000 shares of Rs 100 each. The capitalisation rate is 12%. Income before tax is Rs 1,50,000. Tax rate is 30%. Dividend pay-out ratio is 60%. The company has to take up a project costing Rs 4,00,000. Find MPS at the end of the current year and the number of shares to be issued for financing the new project if (a) dividend is paid, and (b) if dividend is not paid. Base the answer on M-M approach.

**Solution**

Net income = Rs 1,50,000(1 – 0.30) = Rs 1,05,000

Dividend = Rs 1,05,000 × 0.6 = Rs 63,000

Dividend per share = Rs 63,000/10,000 = Rs 6.30

$MPS_1$  when dividend is paid = Rs (100 × 1.12) – 6.30 = Rs 105.70

Additional investment required = Rs 4,00,000 – Rs 1,05,000 – Rs 63,000 = Rs 2,32,000

No. of shares to be issued additionally = Rs 2,32,000/105.70 = 2,195

MPS<sub>1</sub> when dividend is not paid = Rs 105.70 + 6.30 = Rs 112

Additional investment required = Rs 4,00,000 – 1,05,000 = Rs 2,95,000

No. of shares to be issued additionally = Rs 2,95,000/112 = 2,634

#### Exercise No. 4

From the following information supplied to you, determine the theoretical market value of equity shares of a company as per Walter's model:

Earnings of the company	Rs 5,00,000
Dividends paid	Rs. 3,00,000
Number of shares outstanding	Rs. 1,00,000
Price earnings ratio	8
Rate of return on investment	0.15

Are you satisfied with the current dividend policy of the firm? If not, what should be the optimal dividend payout ratio in this case?

#### Solution

$$P = \frac{D + \frac{r}{k_e}(E - D)}{k_e} = \frac{\text{Rs } 3 + \left[ \frac{0.15}{0.125} \right] (\text{Rs } 5 - \text{Rs } 3)}{0.125} = \text{Rs } 43.20$$

No, we are not satisfied with the current dividend policy.

The optimal dividend payout ratio, given the facts of the case, should be zero.

#### Working Notes

- (i)  $k_e$  is the reciprocal of P/E ratio =  $1/8 = 12.5$  per cent
- (ii)  $E$  = Total earnings ÷ Number of shares outstanding
- (iii)  $D$  = Total dividends ÷ Number of shares outstanding

#### Exercise No. 5

X company earns Rs 5 per share, is capitalised at a rate of 10 per cent and has a rate of return on investment of 18 per cent. According to Walter's model, what should be the price per share at 25 per cent dividend payout ratio? Is this the optimum payout ratio according to Walter?

#### Solution

$$(a) P = \frac{D + \frac{r}{k_e}(E - D)}{k_e} = \frac{\text{Rs } 1.25 \left[ \frac{0.18}{0.10} \right] (\text{Rs } 5.0 - \text{Rs } 1.25)}{0.10} = \text{Rs } 80$$

This is not the optimum dividend payout ratio because Walter suggests a zero per cent dividend payout ratio in situations where  $r > k_e$  to maximise the value of the firm. At this ratio, the value of the share would be maximum, that is, Rs 90.

#### Exercise No. 6

A company has the following facts:

**216 PP-FT&FM**

Cost of capital ( $k_e$ ) = 0.10

Earnings per share (E) = Rs.10

Rate of return on investments ( $r$ ) = 8%

Dividend payout ratio: Case A: 50% Case B: 25%

Show the effect of the dividend policy on the market price of the shares.

**Solution:**

**Case A:**

D/P ratio = 50%

When EPS = Rs.10 and D/P ratio is 50%,  $D = 10 \times 50\% = \$5$

$$P = \frac{5 + [0.08 / 0.10] [10 - 5]}{0.10} = \text{Rs. } 5$$

**Case B:**

D/P ratio = 25%

When EPS = Rs.10 and D/P ratio is 25%,  $D = 10 \times 25\% = \text{Rs. } 2.5$

$$P = \frac{2.5 + [0.08 / 0.10] [10 - 2.5]}{0.10} = \text{Rs. } 8.5$$

**Exercise No. 7:** Determination of value of shares, given the following data:

	Case A	Case B
D/P Ratio	40	30
Retention Ratio	60	70
Cost of capital	17%	18%
$r$	12%	12%
EPS	Rs.20	Rs.20

**Solution**

$$P = \frac{\text{Rs.20} (1 - 0.60)}{0.17 - (0.60 \times 0.12)} \Rightarrow \text{Rs.81.63 (Case A)}$$

$$P = \frac{\text{Rs.20} (1 - 0.70)}{0.18 - (0.70 \times 0.12)} \Rightarrow \text{Rs. } 62.50 \text{ (Case B)}$$

Gordon's model thus asserts that the dividend decision has a bearing on the market price of the shares and that the market price of the share is favorably affected with more dividends.

## LESSON ROUND-UP

- Dividend Policy determines what portion of earnings will be paid out to stockholders and what portion will be retained in the business to finance long term growth.
- The amount of dividend payout fluctuates from period to period in keeping with fluctuations in the amount of acceptable investment opportunities available to the firm. If the opportunities abound, percentage of payout is likely to be zero; on the other hand, if the firm is unable to find out profitable investment opportunities, payout will be 100 per cent.
- Walter formula: Prices reflect the present value of expected dividend in the long run. A firm is able to earn a higher return on earnings retained than the stockholder is able to earn on a like investment then it would appear beneficial to retain these earnings all other things being equal. Walter's model is as under:

$$P = \frac{D + \frac{R_a}{R_c}(E - D)}{R_c}$$

- Dividend Capitalization model projects that dividend decision has a bearing on the market price of the share.

$$P = \frac{E(1 - b)}{K_e - br}$$

- Modigliani Miller Approach: According to MM, the discounted value per share before and after a dividend payment will be same as if earnings had been retained.

$$nP_0 = \frac{1}{(1 + p)} [nD_1 + (n + \Delta n)P_1 - \Delta nP_1]$$

- Dividend Policy is determined by the Board of Directors having taken into consideration a number of factors which include legal restrictions imported by the Government to safeguard the interest of various parties or the constituents of the company.
- An appropriate dividend policy must be evaluated in the light of the objectives of the firm.
- Section 123 of the Companies Act provides that dividend could be declared out of profit of the company for any previous financial year or years arrived at after providing for depreciation in accordance with those provision and remaining undistributed.

## SELF-TEST QUESTIONS

*(These are meant for re-capitulation only. Answers to these questions are not to be submitted for evaluation)*

- What do you understand by 'dividend policy'? What are the main determinants of dividend policy in a corporate enterprise?
- Do you feel that a dividend decision is backed by a theoretical framework? What are different dividend theories? Describe each of them precisely.
- What steps as a corporate executive would you suggest to the management for following an appropriate dividend policy for your company that may be appreciated by the investors in general? Give reasons for your recommendations.
- What are the legal constraints on payment of dividends? Discuss in the light of statutory framework existing in India.
- How would you justify elimination of dividend entirely as a policy of your company to your shareholders? Under what circumstances a company should follow such a dividend policy?

- Write short notes on the following:

- (1) Steady Dividend Policy.
- (2) Fluctuating Dividend Policy.

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# Lesson 8

## Working Capital

### LESSON OUTLINE

- Meaning, Types, Determinants and Assessment of Working Capital Requirements,
- Negative Working Capital
- Operating Cycle Concept and Applications of Quantitative Techniques
- Management of Working Capital - Cash, Receivables, Inventories
- Financing of Working Capital; Banking Norms and Macro Aspects
- Factoring and Forfeiting
- Case Studies
- LESSON ROUND UP
- SELF TEST QUESTIONS

### LEARNING OBJECTIVES

Working capital is very important for an organisation. It is called the blood of the organisation. As without proper blood circulation in the body, body is to face various diseases, similarly proper circulation of working capital is vital for the proper and smooth functioning of an organisation. Seeing the importance of working capital management, it is very necessary for a corporate professional to know about management of different constituents of working capital.

The object of the study is to enable the student to understand:

- Concept of Working Capital
- Determinants of Working Capital
- Current Assets and Fixed Assets Financing
- Operating Circle
- Application of Quantitative Techniques
- Techniques for Allocation and control of Working Capital
- Financing of Working Capital
- Working Capital Leverage
- Banking Norms and Macro Aspect of Working Capital Management
- Cash Management
- Inventory Management
- Receivable Management

***All companies should focus on the proper management of working capital. Inventory, accounts receivable, and accounts payable are of specific importance since they can be influenced most directly by operational management and here starts the role of Management.***

## MEANING OF WORKING CAPITAL -THE BASIC CONCEPT

The capital which is required to finance current assets is called working capital. That is in operating daily business of the firm effectively, some resources are needed and the capital which are needed to finance, these resources is called working capital

“Working capital may be defined as all the short term assets used in daily operation”—John. J Harpton.

Short term assets of a firm means cash money, short-term securities, inventory, Bill receivable, note receivable, Debtors etc. In operating daily business, fixed assets are also needed in addition to current assets. Though some fixed assets help on the daily operation of a firm, these can't be told as working capital, because these can't be converted into cash in this current accounting period. So, the assets which can be converted into Raw Material from cash—R/M—Finished Goods—B/R—Cash and helps in operating daily business of the firm, is called working Capital. Working capital is also called ‘Trading Capital’, Circulating capital/Short term capital / Short /Current Assets management.

Working capital is defined varyingly keeping in view the objectives and purposes. To businessmen, working capital comprises current assets of business whereas to the accountant/creditors/investment analysts working capital is understood as the difference of current assets minus current liabilities. This is also called the Net Working Capital. There is operative aspects of working capital i.e. current assets (which is known as ‘funds’ also) employed in the business process form the gross working capital. Current assets comprise: cash, receivables, inventories, marketable securities held as short-term investment and other items near cash or equivalent to cash. This is also known as going-concern concept of working capital.

## TYPES OF WORKING CAPITAL

The working capital in certain enterprise may be classified into the following kinds.

- 1. Initial working capital:** The capital, which is required at the time of the commencement of business, is called initial working capital. These are the promotion expenses incurred at the earliest stage of formation of the enterprise which include the incorporation fees. Attorney's fees, office expenses and other preliminary expenses.
- 2. Regular working capital:** This type of working capital remains always in the enterprise for the successful operation. It supplies the funds necessary to meet the current working expenses i.e. for purchasing raw material and supplies, payment of wages, salaries and other sundry expenses.
- 3. Fluctuating working capital:** This capital is needed to meet the seasonal requirements of the business. It is used to raise the volume of production by improvement or extension of machinery. It may be secured from any financial institution which can, of course, be met with short term capital. It is also called variable working capital.
- 4. Reserve margin working capital:** It represents the amount utilized at the time of contingencies. These unpleasant events may occur at any time in the running life of the business such as inflation, depression, slump, flood, fire, earthquakes, strike, lay off and unavoidable competition etc. In this case greater amount of capital is required for maintenance of the business.
- 5. Permanent and Temporary Working Capital:** The Operating Cycle creates the need for Current Assets (Working Capital). However the need does not come to an end once the cycle is completed. It continues to exist. To explain the continuing need of current assets, a distinction should be drawn between temporary and permanent working capital.

Business Activity does not come to an end after the realization of cash from customers. For a company, the process is continuing, and hence, the need for regular supply of working capital. However, the, magnitude of Working Capital required is not constant but fluctuating. To carry on a business, a certain minimum level of working capital is necessary on a continuous and uninterrupted basis. For all practical purposes, this requirement



has to be met permanently as with other fixed assets. This requirement is referred to as permanent or fixed working capital.

Any amount over and above the permanent level of working capital is temporary, fluctuating or variable working capital. The position of the required working capital is needed to meet fluctuations in demand consequent upon changes in production and sales as a result of seasonal changes.

Both kinds of working capital are necessary to facilitate the sales proceeds through the Operating Cycle.

**6. Long Term working capital:** The long-term working capital represents the amount of funds needed to keep a company running in order to satisfy demand at lowest point. There may be many situations where Demand may fluctuate considerably. It is not possible to retrench the work force or instantly sell all the inventories whenever demand declines Due to temporary reasons. Therefore the value, which represents the long-term working capital, stays with the business process all the time. It is for all practical purpose as permanent as fixed assets. In other words, it consists of the minimum current assets to be maintained at all times. The size of the permanent working capital varies directly with the size of Operation of a firm.

**7. Short term working capital:** Short-term capital varies directly with the level of activity achieved by a company. The Volume of Operation decides the quantum of Short-term working capital. It also changes from one firm to another; from cash to inventory from inventory to debtors and from debtors back to cash. It may not always be gain fully employed. Temporary Working capital should be obtained from such sources, which will allow its return when it is not in use.

**8. Gross Working Capital:** Gross working capital refers to the firm's investment in current assets. Current assets are those assets which can be converted in to cash with in an accounting year and includes cash short term securities, debtors bills receivable and stock.

**9. Net Working Capital:** Net working capital refers to the difference between current asset and Current liabilities. Current liabilities are those claims of outsiders, which are expected to mature for payment within accounting year and include creditors, bills payable and outstanding expenses. Net Working capital can be positive or negative. A positive net working capital will arise when current assets exceed current liabilities.

The Gross working capital concept focuses attention on two aspect of current assets management.

- (a) How to optimize investment in current assets?
- (b) How should current assets be finance?

Both the question is the most decision making action of the management. It should be give due consideration before taking decision.

Both Net and Gross working capital is important and they have equal significance from management point of view.

### Determinants of Working Capital

Working capital is constantly affected by the criss-crossing economic currents flowing about a business. The nature of firm's activities, the industrial health of the country, the availability of material, the ease or tightness of the money markets are all part of these shifting forces. It is difficult to rank them because the influence in individual items rises and wanes over the years as a company's internal policies and environment in which it operates change.

The following factors are however important.

**1. Nature of Business:** A company's working capital requirements are directly related to the kind of business it conducts. A company that sells a service primarily on a cash basis does not have the pressure of keeping considerable amounts of inventories or of carrying customer's receivables. On the other hand, a manufacturing

enterprise ordinarily finances its own customers, requires large amounts to pay its own bills, and uses inventories of direct materials for conversion into end products. These conditions augment the working capital requirements.

**2. Degree of Seasonality:** Companies that experience strong seasonal movements have special working capital problems in controlling the internal financial savings that may take place. Aggravating this difficulty is the fact that no matter how clearly defined a pattern may be, it is never certain. Unusual circumstances may distort ordinary relationships. Although seasonality may pull financial manager from the security of fixed programmes to meet recurring requirements, flexible arrangements are preferable to guard against unforeseen contingencies. An inability to cope with sharp working capital swings is one of the factors that encourages companies to undertake diversification programmes.

**3. Production Policies:** Depending upon the kind of items manufactured, by adjusting its production schedules a company may be able to offset the effect of seasonal fluctuations upon working capital, at least to some degree, even without seeking a balancing diversified line. Thus in one year, in order to avoid burdensome inventories, firm may curtail activity when a seasonal upswing normally takes place. As a matter of policy, the choice will rest on the one hand, and maintaining a steady rate of production and permitting stocks of inventories to build up during off season periods, on the other. In the first instance, inventories are kept to minimum levels but the production manager must shoulder the burden of constantly adjusting his working staff; in the second, the uniform manufacturing rate avoids fluctuations of production schedules, but enlarged inventory stocks create special risks and costs. Because the purchase of inventories is often financed by suppliers, the mere fact that a company carries bigger amounts does not necessarily mean that its cash problem is more serious.

**4. Growth Stage of Business :** As a company expands, it is logical to expect that larger amounts of working capital will be required to avoid interruptions to the production sequence. Although this is true it is hard to draw up firm rules for the relationship between the growth in the volume of a company's business and the growth of its working capital. A major reason for this is management's increasing sophistication in handling the current assets, besides other factors operating simultaneously.

**5. Position of the Business Cycle:** In addition to the long-term secular trend, the recurring movements of the business cycle influence working capital changes. As business recedes, companies tend to defer capital replacement programmes and deflect depreciations to liquid balances rather than fixed assets. Similarly, curtailed sales reduce amounts receivable and modify inventory purchases, thereby contributing further to the accumulation of cash balances. Conversely, the sales, capital, and inventory expansions that accompany a boom produce a greater concentration of credit items in the balance sheet.

The tendency for companies to become cash-poor as the tide of economic prosperity rises and cash-rich as it runs out is well known economic phenomenon. The pressure on company finances during boom years is reflected in the business drive for loans and the high interest rate of these years as compared with a reversal of such conditions during the periods of economic decline. The financial implications of these movements may be deceptive. A weakening of the cash position in favourable economic environment may suggest the need or difficulty of raising capital for the further expansion rather than a shortage of funds to take care of current needs. On the other hand, a strong cash position when the economic outlook is bleak may be the forerunner of actual financial difficulties. The financial manager must learn to look behind the obvious significance of the standard test of corporate liquidity interpret their meaning in the light of his knowledge of the company's position in the industry, the prospects of new business and the availability of external sources for supplying additional capital.

**6. Competitive Conditions:** A corporation that dominates the market may relax its working capital standard because failing to meet customers requirements promptly does not necessarily lead to a loss of business. When competition is keen, there is more pressure to stock varied lines of inventory to satisfy customer's demands and to grant more generous credit terms, thereby causing an expansion in receivables.

**7. Production Collection Time Period:** Closely related to a company's competitive status are the credit terms, it must grant. These arrangements may be result of tradition, policy within the industry, or even carelessness in

failing to carry out announced principles. And the arrangements, in turn, are part of the overall production collection time sequence, that is, the time intervening between the actual production of goods and the eventual collection of receivables, flowing from sales. The length of this period is influenced by various factors.

Purchases may be on a cash basis, but the manufacturing cycle may be prolonged and sales terms generous, causing a wide gap between cash expenditure and receipt and possibly placing heavy financing pressure on the firm. The pressure may be eased, despite long manufacturing cycle, if the company can persuade its suppliers to bear a large part of its financing burden or the manufacturing cycle may be short, and get the pressures heavy because suppliers do not bear a large part of financial burden. The financing requirements of the company may always be traceable to the relation between purchasing and sales credit volume and terms of operations.

**8. Dividend Policy:** A desire to maintain an established dividend policy may affect the volume of working capital, or changes in working capital may bring about an adjustment of dividend policy. In either event, the relationship between dividend policy and working capital is well established, and very few companies ever declare a dividend without giving consideration to its effect on cash and their needs for cash.

**9. Size of Business:** The amount needed may be relatively large per unit of output for a small company subject to higher overhead costs, less favourable buying terms, and higher interest rates. Small though growing companies tend to be hard pressed in financing their working capital needs because they seldom have access to the open market as do large established business firms have.

**10. Sales Policies:** Working capital needs vary on the basis of sales policy of the same industry. A department store which caters to the “carries trade” by carrying a quality line of merchandise and offering extensive charge accounts will usually have a slower turnover of assets, a higher margin on sales, and relatively larger accounts receivable than many of its non-carriage, trade competitors. Another department store which stresses cash and carry operations will usually have a rapid turnover, a low margin on sales, and small or no accounts receivable.

**11. Risk Factor:** The greater the uncertainty of receipt and expenditure, more the need for working capital. A business firm producing an item which sells for a small unit price and which necessitates repeat buying, such as canned foods or staple dry goods etc., would be subject to less risk than a firm producing a luxury item which sells for a relatively high price and is purchased once over a period of years, such as furniture, automobiles etc.

## FACTORS INFLUENCING THE AMOUNT OF CASH, RECEIVABLES AND INVENTORIES

### Factors affecting holding of cash in an organisation

In all enterprises, cash holding is maintained for three motives viz. transaction, precautionary and speculative. Cash held for transaction purposes meets the normal day to day cash needs of the business. The size of precautionary cash balance is directly related to the company's ability to assume risk. The company's motive for holding cash balance for speculative purpose is understood when the objective is to take advantage of profitable opportunities.

Factors which influence cash balance include the credit position of the firm, status of the firm's receivables and inventory accounts, the nature of business enterprise, the management's attitude towards risk.

For managing the cash balances cash budget is used as a planning device which determines the size of cash holdings. The budget could be prepared for a week, quarter of a month, monthly, bi-monthly, and so on. Excess cash or shortage of cash can be sorted out through cash budgets.

### Factors affecting the investment in receivables

Factors influencing investment in receivables are mainly the cost and time values of funds. Cost is associated with the amount of investment in receivables and the value of each sale rupee sold on terms will be greater if it is received in the immediate future than received at some later date. Therefore, both the cost and time value of funds be given consideration while setting credit policy for the company. Generally, an increase in receivables results from several causes i.e. (1) increase in sales, (2) length of credit terms, and (3) volume of delinquent

accounts. Increase in sales generally requires larger investment in receivable. It is advantageous for a business enterprise to maintain the shortest credit terms possible along with the lowest cost of capital. Delinquent accounts should be avoided by expediting collections or by eliminating the delinquent customers or the cost of capital involved in such accounts be recovered from such customers for delinquency. The firm can reduce investment in receivables by offering cash discount to customers.

Risk is associated with receivables. The risk is related to bad debt losses to the profit margin i.e. a company can bear more risk with great profit margin. Risk associated with receivables can be accounted for by adjusting either (1) the discount rate used to ascertain the present value of receivables – cost of capital; or (2) the cash flow resulting from receivables. Standard deviation and co-efficient of variation are tools that may be used to determine the degree of risk associated with cash group.

### Factors affecting the investment in Inventories

There are several factors which influence the amount of funds invested in inventories at any one time. Firstly, the amount of time needed for inventories to travel through the various processes directly affect the amount of investment. Secondly, the cost associated with large inventories like storage costs, set-up and change over costs resulting from short production runs, costs associated with increased ordering activity and costs resulting from spoilage and obsolescence. Besides, there are certain costs associated with investment in inventories which cannot be measured like opportunity cost of not being able to invest funds in more profitable ventures, costs resulting from changes in price, or loss of sales for not having adequate inventories to satisfy demand. Therefore, the investment in inventories is guided by minimisation of costs. The third factor affecting investment in inventories is management's ability to predict the forces that may cause disruption in the flow of inventories like strikes or shifts in demand for the product, etc. Fourthly, the company's accounting procedure tends to influence the size of investment in inventories.

### ASSESSMENT OF WORKING CAPITAL

Working capital requirement assessment requires 1. Calculation of average value of Raw Material Inventory, Work in Progress inventory and Finished Goods inventory 2. Calculation of Trade receivables 3. Calculation of Cash and Cash Convertibles required for normal running of business, calculation of trade payables.

The formula which is used for assessing the working capital requirement is listed below

A. Value of Raw Material Stock	XXXX
Value of Work in Progress	XXXX
Value of Finished Goods Stock	XXX
Value of Trade Receivables	XXXX
Value of Cash Required	XXXX
<b>Total of A</b>	XXXXX
<b>Less:</b>	
B. Value of Trade Payable	XXXX
Value of Bank Overdraft	XXXX
Value of Outstanding expenses	XXXX
<b>Total of B</b>	XXXX
Working Capital	Total of A-Total of B

### NEGATIVE WORKING CAPITAL

Generally, negative working capital is a sign that the company may be facing bankruptcy or a serious financial trouble. Under the best circumstances, poor working capital leads to financial pressure on a company, increased

borrowing, and late payments to creditor - all of which result in a lower credit rating. A lower credit rating means banks charge a higher interest rate, which can cost a corporation a lot of money over time.

In general, companies that have a lot of working capital will be more successful since they can expand and improve their operations. Companies with negative working capital may lack the funds necessary for growth.

However, some companies can sell their inventory and generate cash so quickly that they actually have a negative working capital. This is generally true of companies in the restaurant business (McDonald's had a negative working capital of \$698.5 million between 1999 and 2000). Amazon.com is another example. This happens because customers pay upfront and so rapidly that the business has no problems raising cash. In these companies, products are delivered and sold to the customer before the company even pays for them.

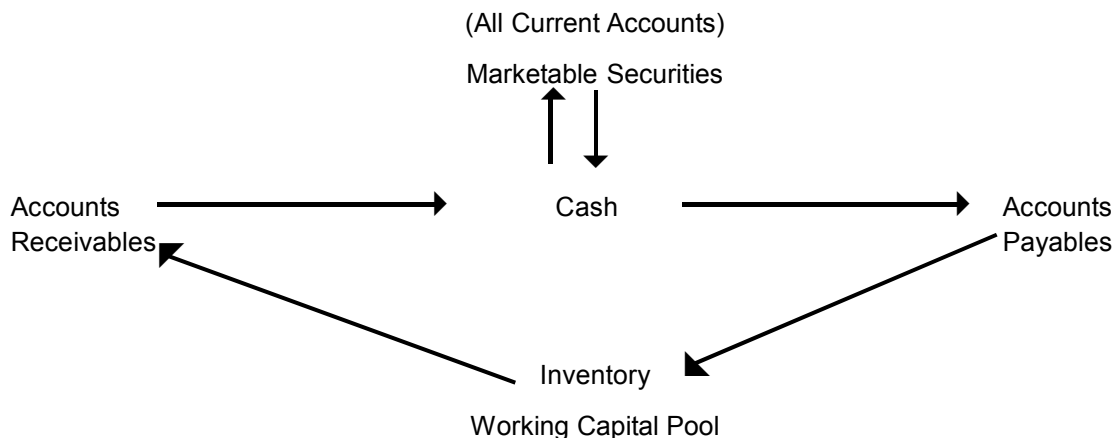
In order to understand how a company can have a negative working capital, let us take an example of Wal-Mart. Suppose Wal-Mart orders 500,000 copies of a DVD to Warner Brothers and they were supposed to pay within 30 days. What if by the sixth or seventh day, Wal-Mart had already put the DVDs on the shelves of its stores across the country? By the twentieth day, they may have sold all of the DVDs. Here, Wal-Mart received the DVDs, shipped them to its stores, and sold them to the customer (making a profit in the process), all before they had paid Warner Brothers! If Wal-Mart can continue to do this with all of its suppliers, it doesn't really need to have enough cash on hand to pay all of its accounts payable. As long as the transactions are timed right, they can pay each bill as it comes due, maximizing their efficiency.

The bottom line is that a negative working capital can also be a sign of managerial efficiency in a business with low inventory and accounts receivable (which means they operate on an almost strictly cash basis).

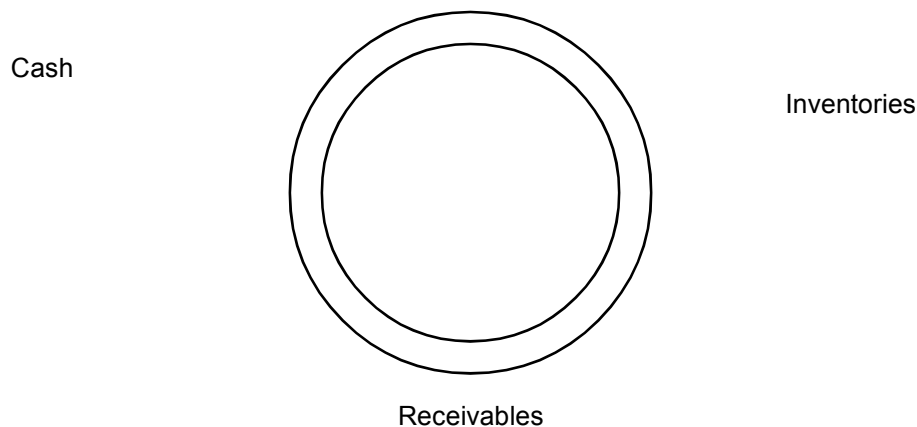
### CURRENT ASSETS AND FIXED ASSETS FINANCING

The more of the funds of a business are invested in working capital, lesser is the return in term of profitability and less amount is available for investing in long-term assets such as plant and machinery, etc. Therefore, the corporate enterprise has to minimise investment in working capital and to concentrate on investment of resources in fixed assets. Some economists argue that current assets be financed by current liabilities. But this all depends upon economic conditions prevailing at particular time requiring a company to keep business resources liquid so that business can take immediate advantage of knocking opportunities. In short-run, opportunity may arise for investment in stocks to make immediate gains due to movement in prices, whereas investment in plant and machinery may not be possible.

Current assets financing can be viewed from the working capital pool as under:



Current assets usually are converted into cash within a current accounting cycle in one year. Cash is used to purchase raw material etc., i.e. to create inventories. When inventories are sold, it gives rise to accounts receivables. Collection of receivables brings cash into company and the process forms a circle and goes on as depicted below:



Thus, the current assets represent cash or near cash necessary to carry on business operations at all times. A level of current assets is thus maintained throughout the year and this represents permanent working capital. Additional assets are also required in business at different times during the operating year. Added inventory must be maintained to support peak selling period when receivables also increase and must be financed. Extra cash is needed to pay increased obligations due to spurt in activities.

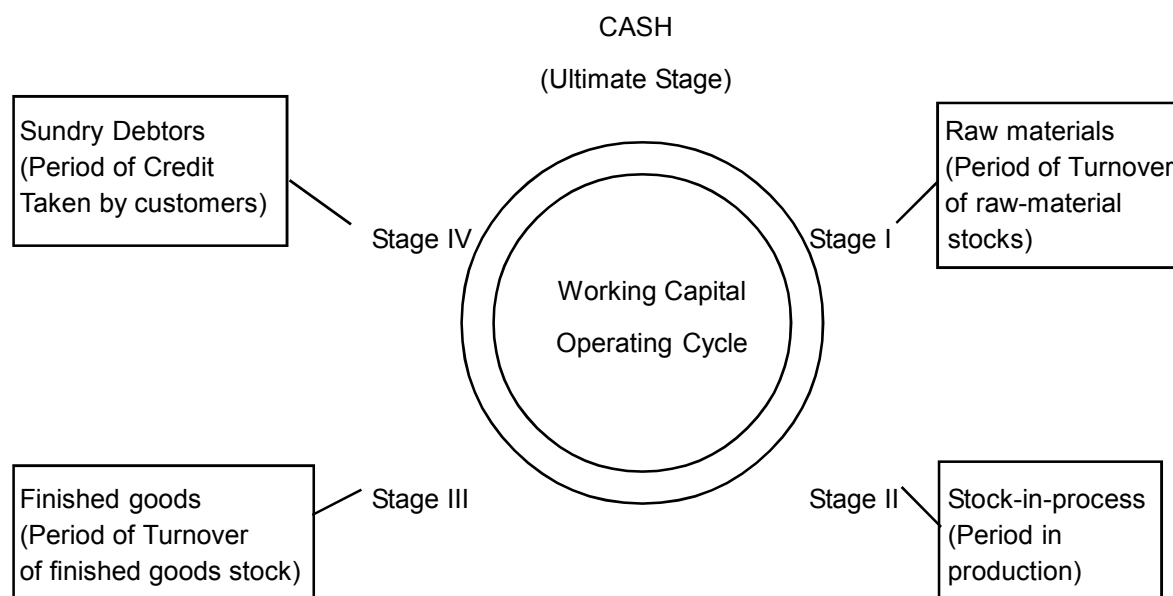
Fixed assets financing is different to current assets financing. In fixed assets investment is made in building, plant and machinery which remains blocked over a period of time and generates funds through the help of working capital at a percentage higher than the return on investment in current assets. Working capital financing or current assets financing is done by raising short-term loans or cash credits limits but fixed assets financing is done by raising long-term loans or equity.

The working capital leverage and the capital structure leverage are, therefore, two different concepts. Capital structure leverage is associated with the fixed assets, financing, with an optional mix of owner's funds and borrowed funds. Owner's funds are the internal funds of the company comprised of equity holder's money in the shape of equity, retained earnings, depreciation fund and reserves. Borrowed funds are the external sources of funds raised from banks, financial institutions, issue of debentures, stock and term deposits from public. Financing of fixed assets with borrowed funds is cheaper than using owner's funds which increases the earnings per share and tends to increase the value of owner's capital in the share market. The detailed discussion on this aspect can not be accommodated as this topic is entirely devoted to the aspects of working capital.

### OPERATING CYCLE CONCEPT AND APPLICATION OF QUANTITATIVE TECHNIQUES

The operating cycle is the length of time between the company's outlay on raw materials, wages and other expenditures and the inflow of cash from the sale of the goods. In a manufacturing business, operating cycle is the average time that raw material remains in stock less the period of credit taken from suppliers, plus the time taken for producing the goods, plus the time the goods remain in finished inventory, plus the time taken by customers to pay for the goods. Operating cycle concept is important for management of cash and management of working capital because the longer the operating cycle the more financial resources the company needs. Therefore, the management has to remain cautious that the operating cycle should not become too long.

The stages of operating cycle could be depicted through the diagram given next page.



The above figure would reveal that operating cycle is the time that elapses between the cash outlay and the cash realisation by the sale of finished goods and realisation of sundry debtors. Thus cash used in productive activity, often some time comes back from the operating cycle of the activity. The length of operating cycle of an enterprise is the sum of these four individual stages i.e. components of time.

The operating cycle can be calculated for a period as under:

S.No.	Name of Working Capital Component	Formula	Days
1.	<b>Raw materials</b>  Period of raw material stock  <b>Less:</b> Period of credit granted by supplier	$\frac{\text{Average value of Raw material stock}}{\text{Consumption of raw material per day}}$ $-\frac{\text{Average level of creditors}}{\text{Purchase of raw materials per day}}$	
2.	Period of Production	$\frac{\text{Average value of work in progress}}{\text{Average cost of production per day}}$	
3.	Period of turnover of finished goods stock	$\frac{\text{Stock of finished goods}}{\text{Average cost of goods sold per day}}$	
4.	Period of credit taken by customers	$\frac{\text{Average value of debtors}}{\text{Average value of sales per day}}$	
	Total operating cycle period	Sum of Sl. Nos. 1, 2, 3, 4	

**Example No. 1**

Calculate the Operating cycle from the following figures related to company 'X':

Particulars	Average amount Outstanding ₹	Average value per day (340 days assumed) ₹
Raw Material inventory	1,80,000	
Work-in-progress inventory	96,000	
Finished goods inventory	1,20,000	
Debtors	1,50,000	
Creditors	1,00,000	
Purchase of Raw Material		2,500
Cost of Sales		4,000
Sales		5,000

**Solution****Calculation of operating cycle**

			Days
1. Period of Raw Material Stock	$\frac{1,80,000}{2,500}$	72	
Less: Credit granted by supplier	$\frac{1,00,000}{2,500}$	40	32
2. Period of Production	$\frac{96,000}{4,000}$		24
3. Turnover of Finished Goods	$\frac{1,20,000}{4,000}$		30
4. Credit taken by customers	$\frac{1,50,000}{5,000}$		30
Operating Cycle Period			116

**Comments:** Operating cycle is long and a number of steps could be taken to shorten this operating cycle. Debtors could be cut by a quicker collection of accounts.

Finished goods could be turned over more rapidly, the level of raw material inventory could be reduced or the production period shortened.

**Example No. 2**

The following information is available for Swati Ltd.

	Amount (Rs.)
Average stock of raw materials and stores	2,00,000
Average work-in-progress inventory	3,00,000
Average finished goods inventory	1,80,000
Average accounts receivable	3,00,000



Average accounts payable	1,80,000
Average raw materials and stores purchased on credit and consumed per day	10,000
Average work-in-progress value of raw materials committed per day	12,500
Average cost of goods sold per day	18,000
Average sales per day	20,000

Calculate the duration of operating cycle.

### **Solution**

#### **Calculation of operating cycle**

Period of raw material stage	$\frac{2,00,000}{10,000}$	= 20 days
Period of work-in-progress stage	$\frac{3,00,000}{12,500}$	= 24 days
Period of finished goods stage	$\frac{1,80,000}{18,000}$	= 10 days
Period of Accounts receivable stage	$\frac{3,00,000}{20,000}$	= 15 days
Period of Accounts payable stage	$\frac{1,80,000}{10,000}$	= 18 days

Duration of operating cycle = (20 + 24 + 10 + 15) – 18 = 51 days

Requirement of working capital over the operating cycle period could be guessed for short-term, medium term as well as long-term. For short term, working capital is required to support a given level of turnover to pay for the goods and services before the cash is received from sales to customers. Effort is made that there remains no idle cash and no shortage of money to erase liquidity within the company's working process. For this purpose sales budget could be linked to the expected operating cycle to know working capital requirement for any given period of time or for each month. Medium term working capital include profit and depreciation provisions. These funds are retained in business and reduced by expenditure on capital replacements and dividend and tax payment. By preparing budget the minimum amount required for medium term working capital can be estimated. The company can work out its working capital needs for different periods through cash budget which is key part of working capital planning. To prepare such a budget operating cycle parameters are of great use as estimation of future sales level, time and amount of funds flowing into business, future expenditure and costs all can be made with least difficulty to help the main target.

Then, operating cycle help in assessing the needs of working capital accurately by determining the relationship between debtors and sales, creditors and sales and inventory and sales. Even requirement of extra working capital can be guessed from such estimate.

**Example No. 3**

From the following information, you are required to estimate the net working capital:

	<i>Cost per unit (₹)</i>
Raw Material	200
Direct Labour	100
Overheads (excluding depreciation)	<u>250</u>
Total Cost	<u>550</u>

Estimated data for the forthcoming period is given as under:

Raw material in stock	average 6 weeks
Work-in-progress (assume 50% completion stage with full material consumption)	average 2 weeks
Finished goods in stock	average 4 weeks
Credit allowed by suppliers	average 4 weeks
Credit allowed to debtors	average 6 weeks
Cash at bank is expected to be	₹ 75,000
Selling price	₹ 800 per unit
Output	52,000 units per annum

Assume that production is sustained at an even pace during the 52 weeks of the year. All sales are on credit basis. State any other assumptions that you might have made while computing.

**Solution****Computation of Net working Capital**

Nature of Asset/Liabilities		Basis of Calculation	Amount (₹)
A. Current Assets	(i) Raw material stock	Average 6 weeks $\frac{52,000 \times 200 \times 6}{52}$	12,00,000
	(ii) Work-in-progress	Average 2 weeks	
	(a) Raw Material	$\frac{52,000 \times 200 \times 2}{52}$	4,00,000
	(b) Direct labour and overhead (50% completion stage)	$\frac{52,000 \times 175 \times 2}{52}$	3,50,000
	(iii) Finished goods stock	Average 4 weeks	
		$\frac{52,000 \times 550 \times 4}{52}$	22,00,000

	(iv) Debtors	Average 6 weeks $\frac{52,000 \times 800 \times 6}{52}$	48,00,000
	(v) Cash at bank		75,000
	Total of A		90,25,000
B.	Current Liabilities		
	(i) Creditors	Average 4 weeks $\frac{52,000 \times 200 \times 4}{52}$	8,00,000
C.	Net Working Capital (A-B)		<u>82,25,000</u>

Note: (i) It has been assumed that the material has been introduced at the commencement of the process.

(ii) Lag in payment of overheads is nil.

(iii) There is no depreciation charge.

#### Example No. 4

Astle Garments Ltd. is a famous manufacturer and exporter of garments to the European countries. The Finance manager of the company is preparing its working capital forecast for the next year. After carefully screening all the documents, following information is collected:

Production during the previous year was 15,00,000 units. The same level of activity is intended to be maintained during the current year. The expected ratios of cost to selling price are:

Raw material	40%
Direct wages	20%
Overheads	20%

The raw materials ordinarily remain in stores for 3 months before production. Every units of production remains in the process for 2 months and is assumed to be consisting of 100% raw material, wages and overheads. Finished goods remain in the warehouse for 3 months. Credit allowed by the creditors is 4 months from the date of the delivery of raw material and credit given to debtors is 3 months from the date of dispatch.

Estimated balance of cash to be held Rs. 2,00,000

Lag in payment of expenses  $\frac{1}{2}$  month

Lag in payment of expenses  $\frac{1}{2}$  month

Selling price is Rs. 10 per units. Both production and sales are in regular cycle. You are required to make provision of 10% for contingency (except cash). Relevant assumption may be made.

As the Finance Manager of the Company you are required to prepare the forecast statement of estimated working capital required.

#### Solution

##### Calculation of Profit Margin

Particulars	%	Rs.
Raw material	40	4
Direct wages	20	2

Overheads	<u>20</u>	<u>2</u>
Total cost	80	8
Add: Profit	<u>20</u>	<u>2</u>
Selling price	100	10

**Estimation of Working Capital**

(Rs.)

<i>Current Assets</i>		
Raw materials stock	(15,00,000 units × Rs. 4 × 3/12)	15,00,000
Work-in-progress	(15,00,000 units × Rs. 8 × 2/12)	20,00,000
Finished goods stock	(15,00,000 units × Rs. 8 × 3/12)	30,00,000
Debtors	(15,00,000 units × Rs. 10 × 3/12)	<u>37,50,000</u>
	(a)	<u>1,02,50,000</u>
<i>Current Liabilities</i>		
Creditors for raw material	(15,00,000 units × Rs. 4 × 4/12)	20,00,000
Wages outstanding	(15,00,000 units × Rs. 2 × 0.5/12)	1,25,000
Outstanding expenses	(15,00,000 units × Rs. 2 × 0.5/12)	<u>1,25,000</u>
	(b)	<u>22,50,000</u>
Current assets less current liabilities	(a) – (b)	80,00,000
Add: Contingency	(10% of Rs. 80,00,000)	8,00,000
Add: desired cash balance		<u>2,00,000</u>
Estimated Working capital		<u>90,00,000</u>

The company may have a budget or plan to show the expected increase in sales over the next period and by using the relationship may determine sales and the relevant items of current assets and current liabilities. The relationship between sales and funds required as working capital can vary at different stages of economic cycle. Advance knowledge of actual sales is the main determinant of the working capital needs. For example, raw material stocks are partly based on estimates of production level and work in progress and finished goods are based on expected sales. At times of downturning in economic activity, there could be overstocking which is not desirable and a company should adjust this level to business activity.

The above is the management oriented approach of calculating working capital. Banks and financial institutions view the assessment of working capital from the angle as discussed in the following pages. Banks normally provide working capital finance to hold an acceptable level of current assets viz. raw materials and stores, stocks in progress, finished goods and sundry debtors for achieving a pre-determined level of production and sales. The assessment of funds required to be blocked in each of these items of the working capital required by an industry.

### REQUIREMENT OF FUNDS, FOR THE VARIOUS ITEMS OF CURRENT ASSETS

**1. Raw Material:** Raw material, of any kind is necessarily required by an industrial unit to continue the production process. Different raw material could be procured from different sources may be indigenous or overseas and accordingly different treatment of procurement time is bound to be given. Mode of payment for the raw material

may also be different. Thus, affecting the credit requirements of the client, the funds blocked up in procurement and stocking of material will have to be taken into consideration. Total materials including those in transit and for which advance payment is made can normally be expressed in terms of number of months consumption and requirements of funds can be assessed by multiplying the figure by the amount of monthly consumption.

**2. Work in Process:** The time taken by the raw material to be converted into finished product is the period of material processing and all the expenses of the process are involved in it. Therefore, the assessment of funds blocked in the process is made by taking into account the raw material consumption during the processing period and the expenses incurred during such period i.e. the cost of production for the period of processing.

**3. Finished goods in the next stage:** The funds blocked in finished goods inventories are assessed by estimating the manufacturing cost of product.

**4. Sundry Debtors:** When goods sold is not realised in cash, sundry debtors are generated. The credit period followed by a particular industrial unit in practice is generally the result of industry practices. Investment in accounts receivable remains blocked from the time of sale till the time amount is realised from debtors. The assessment of funds blocked should be on the basis of cost of production of the materials against which bank extends working capital credit.

**5. Expenses:** One month's total expenses, direct or indirect, are provided by way of cushion in assessing the requirement of funds which may include rent, salaries, etc. depending upon the length of operating cycle.

**6. Trade Credit** received on purchases reduces working capital funds requirements and has to be taken into account for correct assessment of funds.

**7. Advances** received alongwith purchase orders for the products also reduce the funds requirements for working capital.

Taking into consideration the above parameters of operating cycle, the working capital for a unit can be assessed as under:

<i>Particular</i>	<i>Basis of Calculation</i>	<i>₹</i>	
1. Raw material	Month's consumption	100	
2. Stock in process	Week's (cost of production for period of processing)	100	
3. Finished goods	Month's cost of production required to be stocked	100	
4. Sundry debtors	Month's cost of production	100	
5. Expenses	One month's	<u>100</u>	
	Total	500	
<b>Less:</b> Trade credit on month's purchases		₹ 100	
<b>Less:</b> Advance payment on Orders received		₹ 100	<u>200</u>
<b>Working Capital required</b>		<u>300</u>	

Banks do not provide the entire amount of ₹ 300 towards working capital. At every stage bank would insist upon the borrower's stake in the form of margin which depends on various factors like saleable quality of product, durability, price fluctuations, market conditions and business environment, etc. Thus the bank at every stage would allow at the pre-determined rate the margin as noted below:

<b>Component of Working Capital</b>		<b>Permissible Limit (₹)</b>
Raw material	100	
<b>Less:</b> Margin 10%	<u>10</u>	90
Stock in process	100	
<b>Less:</b> Margin 40%	<u>40</u>	60
Finished goods	100	
<b>Less:</b> Margin 25%	<u>25</u>	75
Sundry Debtors (at sale value)	100	
<b>Less:</b> Margin 10%	<u>10</u>	90
Expenses for one month	100	
100% Margin	<u>100</u>	–
Total permissible limit		<u>315</u>
Working capital requirement of the unit		500
Permissible limits (Bank loan)		315
Gap (contribution to be provided by Borrower)		<u>185</u>

Before sanctioning the working capital of ₹ 315, the bank would ensure that borrower is in a position to bring in margin money of ₹ 185 by way of excess current assets over current liabilities based on projected balance sheet.

### Quantitative Techniques for Forecasting Working Capital Needs

A company very often faces fluctuations in business operations which affect the levels of current assets and liabilities due to cyclical and seasonal fluctuations. Estimation of future needs of working capital becomes difficult in such situations. But the data collected for past working may establish a trend relationship between the sales per month or per week and the level of working capital. Linear regression model is used to judge the relationship of two variables for estimating the working capital needs for the given amount of working capital needs. The most widely used regression technique employs the method of least squares:

The linear equation technique solve the equation problem as under:

$$y = a + b(x)$$

When  $x$  = the independent variable i.e. sales

$y$  = the dependent variable i.e. working capital level

$a$  = intercept of the least square line with the vertical axis

$b$  = the slope of the line. With the help of such model, linear equation could be solved.

Working capital =  $a + b$  (prior months sales).

Linear regression can be solved in assisting the analyst in making estimates but it must be used with care. A straight line can be fitted to any data, some additional statistical technique would be needed to see how well the regression line actually describes the relationship between four variables. In those events where the relationship is not linear, more sophisticated analytical tools would be needed to express it accurately. The degree of accuracy will depend upon the skill and expertise of the analyst in using the information and making forecasting.

To forecast the working capital requirement for the next period, the following may also be used:

$$C + \frac{\text{O.C.}}{\text{Number of working days in the period}} \times \text{C.G.S}$$

Where, C = Cash balance required

O.C. = Operating cycle

C.G.S. = Estimated cost of goods sold.

### Techniques for Allocation of Working Capital

There are some mathematical techniques like Linear Programming for giving a basis for allocation of funds between individual current assets items from which a company can derive benefit in items when funds are scarce. This technique is not used in uncertain conditions that exist in India today where it is impossible to assess correctly all the variables from which the equation can be developed.

### Financing of Working Capital

Sources of financing of working capital differ as per the classification of working capital into permanent working capital and variable working capital.

#### 1. Sources of permanent working capital are the following:

- (a) Owner's funds are the main source. Sale of equity stock or preference stock could provide a permanent working capital to the business with no burden of repayment particularly during short period. These funds can be retained in the business permanently. Permanent working capital provides more strength to the business.
- (b) Another source of permanent working capital is bond financing but it has a fixed maturity period and ultimately repayment has to be made. For repayment of this source, company provides sinking funds for retirement of bonds issued for permanent working capital.
- (c) Term loan from banks or financial institutions has the same characteristics as the bond financing of permanent working capital.
- (d) Short-term borrowing is also a source of working capital finance on permanent basis.

#### 2. Source of variable working capital

Working capital required for limited period of time may be secured from temporary sources as discussed below:

- (a) **Trade Creditors:** Trade credit provide a quite effective source of financing variable working capital for the period falling between the point goods are purchased and the point when payment is made. The longer this period, the more advantageous it becomes for the firm to avoid efforts of seeking finance for holding inventories or receivables.
- (b) **Bank loan:** Bank loan is used for variable or temporary working capital. Such loans run from 30 days to several months with renewals being very common. These loans are granted by bank on the goodwill and credit worthiness of the borrower, and collateral may include goods, accounts/notes receivable or Government obligations or other marketable securities, commodities and equipments.
- (c) **Commercial Paper:** It can be defined as a short term money market instrument, issued in the form of promissory notes for a fixed maturity. It will be totally unsecured and will have a maturity period ranging from 90 days to 180 days. It will meet the short term finance requirements of the companies and will be good short term investment for parking temporary surpluses by corporate bodies.
- (d) **Depreciation as a source of working capital:** Increase in working capital results from the difference in the amount of depreciation allowance deducted from earnings and new investment made in fixed assets.

Usually, the entire amount deducted towards depreciation on fixed assets is not invested in the acquisition of fixed assets and is saved and utilised in business as working capital. This is also a temporary source of working capital so long as the acquisition of fixed asset is deferred.

- (e) **Tax liabilities:** Deferred payment of taxes is also a source of working capital. Taxes are not paid from day-to-day, but estimated liability for taxes is indicated in Balance Sheet. Besides, business organisations collect taxes by way of income tax payable on salaries of staff deducted at source, old age retirement benefits, excise taxes, sales taxes, etc. and retain them for some period in business to be used as working capital.
- (f) Other miscellaneous sources are Dealer Deposits, Customer advances etc.

### Working Capital – A Policy Decision

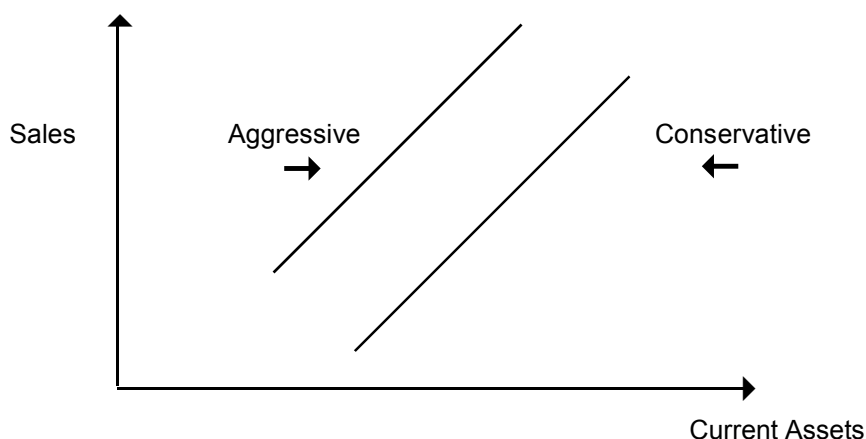
In formulating a Firm's Working Capital Policy, an important consideration is the trade-off between profitability and risk. In other words, the level of a firm's Net Working Capital (Current Assets – Current Liabilities) has a bearing on its profitability as well as risk. The term profitability here means profits after expenses. The term risk is defined as the probability that a firm will become technically insolvent so that it will not be able to meet its obligations when they become due for payment.

The risk of becoming technically insolvent is measured using net working capital. It is assumed that the greater the amount of Net Working Capital, the less risky the firm is, and *vice-versa*. The relationship between liquidity, Net Working Capital and risk is such that if either net working capital or liquidity increases, the firm's risk decreases.

What proportion of current assets should be financed by current liabilities and how much by long term sources will depend, apart from liquidity – profitability trade off, on the risk perception of the management. Two broad policy alternatives, in this respect, are:

- (a) **A conservative current Asset financing policy:** It relies less on short term bank financing and more on long term sources.  
No doubt it reduces the risk that the firm will be unable to repay its short term debt periodically, but enhances the cost of financing.
- (b) **An aggressive current Asset Financing Policy:** It relies heavily on short term bank finance and seeks to reduce dependence on long term financing. It exposes the firm to a higher degree of risk, but reduces the average cost of financing thereby resulting in higher profits.

The relationship between current assets and sales under different current asset policies is shown in the following figure:



To explain, an aggressive current asset policy aims at minimising the investment in current assets corresponding to increase in sales thereby exposing the firm to greater risk but at the result of higher expected profitability. On the other hand conservative policy aims at reducing the risk by having higher investment in current assets and thereby depressing the expected profitability. In between these two, lies a moderate current asset policy.



## Control of Working Capital

The direct approach to working capital control is to develop effective policies for the control of each of the components of working capital. Since deviations occur in actual operations, indirect control techniques are needed by management to reduce its working capital requirements. Control of cash, receivables and inventories be maintained in a synchronized way so that a matching balance in all parameters of working capital could be obtained.

## Working Capital Leverage

Working capital leverage may refer to the way in which a company's profitability is affected in part by its working capital management. Profitability of a business enterprise is affected when working capital is varied relative to sales but not in the same proportion. If the flow of funds created by the movements of working capital through the various business processes is interrupted, the turnover of working capital is decreased as is the rate of return on investment. Working capital management should enhance the productivity of the current assets deployed in business. This correlates the working capital with Return-on-Investment (ROI). ROI is product of two factors – assets turnover and profits margin. If either of these ratios can be increased, ROI will be increased to a great degree. DU Pont Chart illustrates this position as under:

If profit margins is 6% and Asset Turnover is 3 times then ROI would be 18%	By increasing profit margin by 1%, ROI increases by 3% i.e. $6 + 1 = 7 \times 3 = 21\%$	By increasing assets turnover by 1, ROI increases by 6% $6\% \times 4 = 24$
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Assets turnover side of ROI computation may also reflect the working capital management.

Current assets reflect the funds position of a company and is known as Gross Working Capital. Working Capital leverage is nothing but current assets leverage which refers to the asset turnover aspect of ROI. This reflects company's degree of efficiency in employing current assets. In other words, the ability of the company to guarantee large volume of sales with small current asset base is a measure of company's operating efficiency. This phenomenon is asset turnover which is a real tool in the hands of finance manager in a company to monitor the employment of fund on a cumulative basis to result into high degree of working capital leverage.

Short-term loans or cash credit raised by the company to meet the requirements of working capital i.e. to finance the current assets, add to the profitability of the company's turnover of current assets in comparison to the cost associated in terms of interest charges on such loans. This is the exact measure of working capital leverage. However, the concept of working capital leverage has not been much in use in academic discussions and its real importance is also to be understood by the business enterprises. To maximise profits, finance managers unanimously view the investment in current assets be kept to the minimum and should be financed from the funds such as current liabilities or low cost funds.

## Ways to Improve Working Capital Position

Working capital is a highly effective barometer of a company's operational and financial efficiency and effectiveness. The better its condition, the better positioned a company is to focus on developing its core business. By addressing the drivers of working capital, in fact, a company is sure to reap significant operating cost and customer service improvement.

According to an analysis of financial results from the 2,000 largest companies in the U.S. and Europe performed in 2005 by Hackett-REL, U.S. and European companies have reduced working capital by 12 percent and 17 percent, respectively, over the past three years. This strongly indicates that awareness of the benefits of

working capital and cash management improvement has been elevated beyond the treasury to the office of the CEO.

But while corporate profits may be soaring, corporations are still overlooking billions in cash a staggering \$460 billion in the U.S. and some \$570 million in Europe. This enormous sum is literally stuck in transit, a result of inefficient receivables, payables and inventory practices that could be reclaimed with relatively little investment.

Liberating the billions in cash trapped on the balance sheet is easier than one may think. Dell Inc., for instance a lauded for overall strong corporate management and working capital performance builds a computer only when it has received payment for an order, and doesn't pay its own suppliers for an agreed-upon period of time thereafter. As a result, Dell enjoys negative working capital and, the more it grows, the more its suppliers finance its growth.

Not all companies can operate like Dell, but most can improve their working capital position by at least 20 percent over time if they pay attention to the following list of cash management do's and don'ts:

**(1) Get educated.** There is more to working capital management than simply forcing debtors to pay as quickly as possible, delay paying suppliers as long as possible and keep stock levels as lean as possible. A properly conceived and executed improvement program will certainly focus on optimizing each of these components, but also, it will deliver additional benefits that extend far beyond operational rewards. All this underscores the need for ambitious executives to integrate working capital management into their strategic and tactical thinking, rather than view it as an extraneous added bonus.

**(2) Institute dispute management protocols.** Consider a case where a company's working capital is deteriorating due to an increase in past-due accounts receivable (A/R). A review of the past-due A/R illustrates a high level of customer disputes, which are taking on average of 30 days to resolve and consuming significant amounts of sales, order-entry and cash collectors' time.

By tackling the root cause of the disputes in this case, poor adherence to pricing policies the company can eliminate the disputes, thereby improving customer service. Established dispute-management protocols free up time for sales, order-entry and cash collections' personnel to be more effective at their designated roles, and they also will increase productivity, reduce operating costs and potentially boost sales. And finally, days payable outstanding (DPO) and working capital will improve, as customers won't have reason to hold payment.

This example illustrates how working capital is one of the best indicators of underlying inefficiency within an organization and why it is critical that senior executives remain focused on addressing the primary causes of working capital excesses to control operating costs and remain competitive.

**(3) Facilitate collaborative customer management.** One of the most important cash management and working capital strategies that executives CFOs and treasurers, as well as CEOs can employ is to avoid thinking linearly and concerning themselves solely with their own company's needs. If it is feasible to collaborate with customers to help them plan their inventory requirements more efficiently, it may be possible to match your production to their consumption, efficiently and cost-effectively, and replicate this collaboration with your suppliers.

The resulting implications for inventory levels can be massive. By aligning ordering, production and distribution processes, companies can increase inherent efficiency and achieve direct cost savings almost instantly. At this point, payment terms can be most effectively negotiated.

**(4) Educate personnel, customers and suppliers.** A business imperative should be to educate staff to consider the trade-offs between various working capital assets when negotiating with customers and suppliers. Depending on the usage pattern of a raw material, there may be more to gain from negotiating consignment stock with a

supplier instead of pushing for extended terms - particularly in cases of long lead-time items or those that require high minimum-order quantities.

The same can hold true for customers. Would vendor-managed inventory at a customer site provide you the insight into true usage to better plan your own production? It is important to remember, however, that this is not the solution for all products, and it should be evaluated on a case-by-case basis.

**(5) Agree to formal terms with suppliers and customers and document carefully.** This step cannot be stressed enough. Terms must be kept up to date and communicated to employees throughout the organization, especially to those involved in the customer-to-cash and purchase-to-pay processes; this includes your sales organization.

Avoid prolific new product introductions without first establishing a clear product-range management strategy. Whether in the consumer products or aluminium extrusions business, many companies rely heavily on new products to maintain and grow market share. However, poor product-range management creates inefficiency in the supply chain, as companies must support old products with inventory and manufacturing capability. This increases operating costs and exposes the company to obsolete inventory.

**(6) Don't forget to collect your cash.** This may sound obvious, but many businesses fail to implement effective ongoing collection procedures to prevent excess overdue funds or build-up of old debts. Customers should be asked if invoices have been received and are clear to pay and, if not, to identify the problems preventing timely payment. Confirm and reconfirm the credit terms. Often, credit terms get lost in the translation of general payment terms and what's on the payables ledger in front of the payables clerk.

**(7) Steer clear of arbitrary top-down targets.** Too many companies, for example, impose a 10 percent reduction in working capital for each division that fails to take into account the realistic reduction opportunities within each division. This can result in goals that de-motivate employees by establishing impossible targets, creating severe unintended consequences. Instead, try to balance top-down with bottom-up intelligence when setting objectives.

**(8) Establish targets that foster desired behaviours.** Many companies will incentivise collections staff to minimize A/R over 60 days outstanding when, in fact, they should reward those who collect A/R within the agreed-upon time period. After all, what would stop someone from delaying collections activities until after 60 days when they can expect to be rewarded? Likewise, a purchasing manager may be driven by the purchase price and rewarded for buying when prices are low, but this provides no incentive to manage lot sizes and order frequency to minimize inventory.

**(9) Do not assume all answers can be found externally.** Before approaching existing customers and suppliers to discuss cash management goals, fully understand your own process gaps so you can credibly discuss poor payment processes. Approximately 75 percent of the issues that impact cash flow are internally generated.

**(10) Treat suppliers as you would like customers to treat you.** Far greater cash flow benefits can be realized by strategically leveraging your relationship with suppliers and customers. A supplier is more likely to support you in the case of emergency if you have treated them fairly, and, likewise, a customer will be willing to forgive a mistake if you have a strong working relationship.

That said, also realize that each customer is unique. Utilize segmentation tactics to split your customers and suppliers into similar groups. For customers, segmentation may be based on criteria including, profitability, sales, A/R size, past-due debt, average order size and frequency. Once segmentation is complete, it is important to define strategies for each segment based around the segmentation criteria and your strategic goals.

For example, you should minimize the management cost for low-margin customers by changing service levels,

automating interaction, etc. Finally, allocate your resources according to the segmentation, with the aim of maximizing value.

### **Control of Working Capital**

The direct approach to working capital control is to develop effective policies for the control of each of the components of working capital. Since deviations occur in actual operations, indirect control techniques are needed by management to reduce its working capital requirements. Control of cash, receivables and inventories be maintained in a synchronized way so that a matching balance in all parameters of working capital could be obtained.

### **CASH MANAGEMENT**

By cash management, we mean the management of cash in currency form, bank balances and readily marketable securities. Cash is the most important component of working capital of a firm. It is also the terminal conversion point for other constituents. Each firm holds cash to some extent at any point of time. Source of this cash may be the working capital operating cycle or capital inflows. Similarly the outflow of cash from the cash reservoir of a firm can be either to the operating cycle or for capital repayment.

### **Motives for holding cash**

At the basic level, a firm like individuals, has three motives for holding cash. These are as under:

- (a) Transactional motive
- (b) Speculative motive
- (c) Contingency motive

#### ***(a) Transactional Motive***

This is the most essential motive for holding cash because cash is the medium through which all the transactions of the firm are carried out. Some examples of transactions of a manufacturing firm are given below:

- Purchase of Capital Goods like plant and machinery
- Purchase of raw material and components
- Payment of rent and wages
- Payment for utilities like water, power and telephone
- Payment for service like freight and courier

These transactions are paid for from the cash pool or cash reservoir which is all the time being supplemented by inflows. These inflows are of the following kinds:

- Capital inflows from promoters' capital and borrowed funds
- Sales proceeds of finished goods
- Capital gains from investments

The size of the cash pool depends upon the overall operations of the firm. Ideally, for transaction purposes, the working capital inflows should be more than the working capital outflows at any point of time. The non-working capital inflows should be utilized for similar outflows such as purchase of fixed assets together with the surplus of working capital inflows.

**(b) Speculative Motive**

Since cash is the most liquid current asset, it has the maximum potential of value addition to a firm's business. The value addition can come in two forms. First, as the originating and terminal point of the operating cycle, cash is invaluable. But cash has an opportunity cost also and if cash is kept idle, it becomes a liability rather than an asset. Therefore, efficient firms seek to deploy surplus cash in short term investments to get better returns. It is here that the second form of value addition from cash can be had. Since this deployment of cash needs to be done skillfully, not all the firms hold cash for speculative motive. Further the amount of cash held for speculative motive should not cause any strain upon the operating cycle.

**(c) Contingency Motive**

This motive of holding cash takes into account the element of uncertainty associated with any form of business. The uncertainty can result in prolongation of the working capital operating cycle or even its disruption. It is possible that cost of raw materials or components might go up or the time taken for conversion of raw materials into finished goods might increase. For such contingencies, some amount of cash is kept by every firm.

**Level of cash holding**

The level of cash holding of a firm depends upon a number of factors. Prominent among these factors are the nature of the firms' business, the extent and reach of the business. The level of cash is measured as a percentage of turnover of the firm.

**1. Nature of the business**

If the firm is engaged in cash purchase of raw material from a number of sources, its requirement of cash would be more than that a firm which buys on credit. Also a firm having cash purchase and cash sale would need to maintain more cash balance than a firm which buys on credit and sells on credit. A firm buying in cash and selling on credit is likely to have strained cash flows. On the other hand, a firm buying on credit and selling in cash has comfortable cash balances.

**2. Extent and reach of the business**

A multi location firm having a number of large and small branches has more cash requirement than a single location firm. Also the problems associated with moving cash between the branches and maintaining liquidity are much more in a multi location firm.

For illustration, let us assume the amount of cash and bank balances maintained by the firm:

(₹ in crores)

	<b>Firm A</b>		<b>Firm B</b>		<b>Firm C</b>	
	<b>2013</b>	<b>2014</b>	<b>2013</b>	<b>2014</b>	<b>2013</b>	<b>2014</b>
Income	3,031.76	3,322.44	10,948.86	11,353.68	1,381.91	1,882.61
Cash and Bank Balances	27.95	27.49	522.08	913.16	315.21	1,089.34
Cash balance as Percentage of Income	0.92	.082	4.77	8.04	22.81	57.86

Firm A is a large cement manufacturer, Firm B is a FMCG giant and firm C is a leading soft ware company. Out of the above three firms, firm A has been holding the minimum quantum of cash and bank balances as percentage of total income while firm C has the maximum quantum. On the face of it, the first impression that one is likely to get is that firm A is the most efficient user of cash and bank balances while firm C is the most inefficient user. But

that would be a hasty conclusion. We have to move further and probe into the status of cash and bank balances *vis-à-vis* other current assets:

Current Assets incl. Loans and Adv.	Firm A		Firm B		Firm C	
	2013	2014	2013	2014	2013	2014
Inventories	312.60	30.12	1182.10	1240.03	0	0
Sundry Debtors	247.63	216.50	264.51	424.78	375.22	395.61
Cash and Bank Balances	27.95	27.49	522.08	913.16	151.74	1098.34
Other Current Assets	12.81	6.02	48.53	50.61	0	0
Loans and Advances	306.29	351.42	744.09	798.19	147.68	129.26
Total Current Assets	907.48	901.55	2761.32	3426.76	674.64	1623.1
Cash & Bank Balance as % of Total current Assets	3.08	3.05	18.90	26.65	22.49	67.66

From the above table we note that Firm A holds just around 3% of its current assets as cash balances, i.e. its operating cycle has an extended and large span requiring conversion into Loans and Advances, Inventories, Sundry Debtors before re-conversion into cash. Firm B is engaged in manufacture and trading of consumer non-durables having a relatively shorter operating cycle. As such, holding of cash by this firm as a percentage of total current assets is larger. Firm C has 22.49% of the current assets in cash and bank balances in 2013 while the figure has gone up to 67.66% in 2014. The abnormal rise is due to the fact that out of the cash and bank balances of ₹ 1098.34 lacs represented unutilised proceeds of the capital issue made by the firm. Ignoring this figure, the cash and bank balances are ₹ 666.84 lacs, still 56.43% of the current assets. The implication of this is that the firm C, being in the services sector as a software exports, has a short operating cycle. The inventory holding is nil and current assets are generally held either as cash or receivables. So, the level of cash and bank balances viewed per se, is no indicator of the efficiency of cash management. We have to analyse the various components of cash holding to arrive at a more accurate conclusion.

### Components of cash and bank balances

Cash and bank balances are held by the firms in three major forms, i.e. cash and cheques in hand, balances with banks and investment in liquid securities.

#### 1. Cash and Cheques in hand

This is the most liquid and readily accessible component of cash. The cash is held to meet day-to-day payments of small amounts. It is generated from counter cash receipts of the firm, if any, and from cash withdrawals from the bank. The volume of cash on hand maintained by the firm again depends upon the nature of operations of the firm. In case of major portion of the sales being in cash, firm is left with large amounts of cash at the end of the day which needs to be taken care of safely. This entails security and custody arrangements for the cash before it is deposited in the bank. Moreover, since receipt and payment of cash is a primary level transaction which is culminated with the handing over of the cash, special care is required while handling cash.

Cheques in hand are clubbed with cash in a categorization because a cheque is a secondary form of cash and is equivalent to holding cash. The care and precaution required for holding cheques is much less than required for cash because almost all the cheques are "account payee cheques" which can be credited to the account of the firm only. The cheques in hand need to be deposited carefully and expeditiously into the bank in order to get credit to the correct account well in time. Attention also needs to be paid to those cheques which are dishonoured at the time of presentation to the payee banks since the drawer of the cheques has to be contacted for obtaining rectified cheques.

## 2. Bank Balances

Bank balances represent the amount held with banks in savings, current or deposit accounts. In the case of firms, balances are not held in savings accounts. A firm has at least one main current account with a bank through which the transactions are carried out. All the excess cash is deposited into this account together with the cheques. Payments to employees, creditors and suppliers are made by way of cheques drawn on this account. Being a current account, no interest is payable to the firm on the balance maintained in this account. Therefore the firm seeks to keep just sufficient balance in the current account for meeting immediate payment liabilities. After accounting for these liabilities, the surplus is transferred either to an interest bearing deposit account or invested in short term liquid instruments. In case the firm has borrowed funds for working capital, the surplus cash and cheques are credited to those accounts, thereby reducing the liability of the company.

### Nature of Bank Balances

On a superficial reading of the Balance sheet of a firm, a large amount held by the company in bank deposits portrays a comfortable and liquid position of finances of the company. It is not always true. Let us take a look at break-up of the bank balances of some firms :

(₹ in crores)

	<b>Firm A</b>		<b>Firm B</b>		<b>Firm C</b>	
	<b>2013</b>	<b>2014</b>	<b>2013</b>	<b>2014</b>	<b>2013</b>	<b>2014</b>
<b>Total Bank Balance</b>	<b>27.41</b>	<b>26.30</b>	<b>520.61</b>	<b>911.74</b>	<b>151.57</b>	<b>1,098.17</b>
Bal. in Current Accounts	15.15	7.86	147.56	222.9	149.28	275.55
Bal. in Deposit Accounts	0.59	0.75	373.05	689.45	0.72	820.55
Bal. in Earmarked Current A/c	1.03	2.32	0.00	0.00	1.57	2.07
Remittances in Transit	10.64	15.36	0	0	0	0

We can note that while firm B has a substantial portion of the cash in deposit accounts, firms A and C have comparatively much larger portion in current accounts. In the case of firm A, it appears that the cash inflows are quickly followed by cash outflows so that it does not have surpluses available for keeping in bank deposits. Firms B and C have comparatively comfortable cash position evidenced by the amounts kept in deposit accounts. It means that the firms have less pressure for cash outflows. Further, firm A has substantial amount outstanding as Remittance in Transit, i.e. remittance sent from other centers and cheques sent under collection. Such remittance need to be translated into bank balances at the earliest or else the firm can not make much use of this cash. There are certain deposits which have been earmarked for a specific purpose, for example margin money for bank guarantees or letters of credit. Such earmarked deposits can not be used for other purposes and to that extent, the cash balances are deemed to have been converted into other assets.

### Strategy for effective cash management

The strategy for effective cash management in any firm has a core component of ensuring uninterrupted supply of cash to the operating cycle. This cash is ideally generated from the cycle itself but under certain circumstances infusion of cash from outside the cycle also takes place. Examples of such circumstances are:

- when the firm has been newly set up and the cycle has yet to commence;
- when due to disruption in the cycle, cash gets stuck in other current assets and outside cash infusion in the form of promoters lenders' contribution is done.

Essential elements of a successful cash management strategy:

- Realistic cash forecasting
- Speeding up collections
- Spreading out payments

### ***(1) Realistic cash forecasting***

By realistic cash forecasting we mean that a cash forecast for the entire next year should be prepared at its commencement. The cash forecast has two parts—one is the forecast of cash flows from the operating cycle and the second part is the capital flows. The first part originates from the sales forecast for the year while the second part originates from the capital budget. The surplus of cash generated from the operating cycle is called the internal accruals of the firm and it is used to fund the capital outlays together with bank borrowings.

For a realistic cash forecast, the sales projections and capital budget have to be drawn up after extensive deliberations in the management committee of the firm. Such a forecast carries a cushion for normal contingences like sudden spurt or shrinkage in demand for which mid-term modifications in the forecast are made. Involvement of operational level people, both from production and sales areas, is essential for a realistic cash forecast.

### ***(2) Speeding up Collections***

After the cash forecast has been prepared, the firm should ensure that in day to day operations cash (including cheques) should be collected speedily. Towards this end, a schedule of receivables should be prepared and kept updated. Before due date of each payment, the debtor should be reminded for it. When the cheques are received on due dates, these should be credited to the bank account expeditiously. For a multi-locational firm, arrangements should be made with the bank for on-line transfer of funds to the main account. Similarly facilities like drop boxes can be provided by firms having a large user base whereby customers can drop their payments in boxes placed at vantage locations.

### ***(3) Spreading out Payments***

Simultaneously with speeding up collection, the firm should spread out payments as far as possible. It means that if credit period is available in some payments, it should be utilized fully. Bunching of payments should be avoided. For outstation customers, arrangement can be made with the bank for making at par payment.

## **INVENTORY MANAGEMENT**

Inventory Management is the second important segment of working capital management. Inventory is the second step in the operating cycle wherein cash is converted into various items of the inventory. Inventory has the following major components:

- (a) Raw Material
- (b) Work in Process
- (c) Finished Goods

Inventories form a link between production and sale of a product. A manufacturing company must maintain a certain amount of inventory during production, the inventory known as work in process (WIP). Although other types of inventory – namely, raw materials and finished goods – are not necessary in the strictest sense, they allow the company to be flexible. Raw materials inventory gives the firm flexibility in its purchasing. Finished goods inventory allows the firm flexibility in its production scheduling and in its marketing. Production does not need to be geared directly to sales. Large inventories also allow efficient servicing of customer demands. If a product is temporarily out of stock, present as well as future sales may be lost. Thus, there is an incentive to maintain large stocks of all three types of inventory.



### Benefits versus Costs

The advantages of increased inventories are several. The firm can effect economies of production and purchasing and can fill orders more quickly. In short, the firm is more flexible. The obvious disadvantages are the total cost of holding the inventory, including storage and handling costs, and the required return on capital tied up in inventory. An additional disadvantage is the danger of obsolescence. Because of the benefits, however, the sales manager and production manager are biased toward relatively large inventories. Moreover, the purchasing manager often can achieve quantity discounts with large orders, and there may be a bias here as well. It falls on the financial manager to dampen the temptation for large inventories. This is done by forcing consideration of the cost of funds necessary to carry inventories as well as perhaps the handling and storage costs.

Inventories should be increased as long as the resulting savings exceed the total cost of estimates of holding the added inventory. The balance finally reached depends on the estimates of actual savings, the cost of carrying additional inventory, and the efficiency of inventory control. Obviously, this balance requires coordination of the production, marketing, and finance areas of the firm in keeping with an overall objective. Our purpose is to examine various principles of inventory control by which an appropriate balance might be achieved.

### Extent and Quantum of Inventory Management

Let us take a look at the extent and quantum of inventory in real life examples taken up for consideration by us for working capital management.

(₹ in crores)

	<i>Firm A</i>		<i>Firm B</i>		<i>Firm C</i>	
	2013	2014	2013	2014	2013	2014
<b>Total Current Assets</b>	<b>907.48</b>	<b>901.55</b>	<b>2,761.32</b>	<b>3,426.78</b>	<b>674.64</b>	<b>1,623.21</b>
Inventories	312.8	300.12	1182.10	1424.04	0	0
Sundry Debtors	247.63	216.50	264.51	424.78	375.22	395.61
Cash and Bank Balance	27.95	27.49	522.08	913.16	151.75	1,098.34
Other Current Assets	12.51	60.2	48.53	50.61	0	0
Loans and advances	306.29	351.42	744.08	798.19	147.68	129.26
Inventory as % of Total current assets	33.75	33.29	42.80	36.19	0	0

Firm A, being in the current manufacturing sector has over 30% of the current assets held in the form of inventories, while firm B, being in the FMCG manufacturing and trading sector has over 35% of the current assets in the inventory form. Firm C, in the software export segment has obviously zero inventory holding.

### Strategy for Inventory Management

A successful strategy for inventory management has at its core the objective of holding the optimum level of inventory at the lowest cost.

The cost of holding inventory has the following three elements:

#### (i) Carrying Cost

This is the cost of keeping or maintaining the inventory in a usable condition. This includes the storage costs, i.e. the cost of storing the inventory in rented premises or the opportunity cost of storing in own premises + the wage cost of personnel assigned to storing and securing it + cost of utilities and insurance + cost of financing.

Inventory carrying cost is directly proportional to the level of inventory assuming that the loading of carrying cost is done pro rata to the space occupied. Thus if inventory level rises, its carrying cost also rises.

### **(ii) Ordering Cost**

It is the cost associated with placing each individual order for supply of raw materials, stores, packing materials etc. If these items are procured in small lots, then the ordering cost per unit of inventory would be more and vice versa.

### **(iii) Stock-out Cost**

It is the cost associated with procuring an inventory item, which has gone out of stock and is needed for immediate supply. This cost includes the reduction of profit and costs accruing due to disruption in the operating cycle.

How cost of inventory can be lowered:

Cost of inventory can be lowered by–

- Entering into long term arrangements for supply of raw materials at market driven prices.
- Arranging for direct supply of raw material at manufacturing locations.
- Promoting ex-factory sales of the finished goods.
- Availing quantity discounts and spot payment discounts if the carrying cost and financing cost is less than the discounts.
- Apart from these general steps, a technique called ABC analysis is also used for monitoring inventory costs.

## **Managing the Inventory Level**

### **1. EOQ Model**

Inventory level can be managed by adopting the Economic Order Quantity (EOQ) model. This model determines the order size that will minimize the total inventory cost. According to this model, three parameters are fixed for each item of the inventory:

- (1) Minimum level of that inventory to be kept after accounting for usage rate of that item and time lag in procuring that item and contingences.
- (2) The level at which next order for the item must be placed to avoid possibility of a stock-out.
- (3) The quantity of the item for which the re-order must be placed.

In addition to the determination of above parameters, the EOQ model is based on the following assumptions:

- The total usage of that particular item for a given period is known with certainty and the usage rate is even throughout the period.
- There is no time gap between placing an order and receiving supply.
- The cost per order of an item is constant and the cost of carrying inventory is also fixed and is given as a percentage of the average value of inventory.
- There are only two costs associated with the inventory and these are the cost of ordering and the cost of carrying the inventory.

Given the above assumptions, the optimum or economic order quantity is represented as:

$$EOQ = \sqrt{\frac{2AB}{C}}$$

Where A = Total annual requirement for the item

B = Ordering cost per order of that item

C = Carrying cost per unit per annum.

## 2. ABC Analysis

This system is based on the assumption that in view of the scarcity of managerial time and efforts, more attention should be paid to those items which account for a larger chunk of the value of consumption rather than the quantity of consumption. Let us take an example of a firm having three major components of raw material:

Component	Units Consumed	% to total	Value per unit	Total Value (Lacs)	%
A	5000	45.45	1000	50.00	22.93
B	4000	36.36	1200	48.00	22.00
C	2000	18.18	6000	120.00	55.05
	11000	100.00	218.00	100.00	

Thus the cost of raw material C which accounts for 55% of the total consumption value should be given priority over item A although the number of units consumed of the latter is much more than former.

## RECEIVABLES MANAGEMENT

Receivables are near the terminating point of the operating cycle. When raw material has been converted into finished goods, the final product is sold by the firm. Some of the sales are done on spot basis while the remaining sales are made on credit. The extent of credit sales varies from industry to industry and within an industry. Period of credit depends upon the position of the firm in the industry. If the firm has a monopoly position, period of credit would be very low. If the industry consists of a large number of players in keen competition with each other, the period of credit would tend to be fairly long. Also, during periods of demand recession, even a firm in monopoly situation might be forced to extend credit in order to promote sales.

Receivables are generally referred to by the name of "Sundry Debtors" in the books of account. Strictly speaking, Sundry Debtors refer to receivables created in the course of operation of the working capital cycle, i.e. those persons which owe payment to the firm for goods supplied or services rendered. Thus sundry debtors represent an intermediate stage between reconversion of finished goods into cash. So long as the sundry debtors persist, the firm is strained of cash. So, logically the firm seeks to minimize the level of sundry debtors.

The period of credit allowed to debtors also depends upon the industry practice. This period of credit has two components. First component is a small period of week to ten days which is normally allowed in all industries and no interest is charged on the amount due. The second component is the larger one, length of which varies from industry to industry and interest is usually charged for this period. In the alternative, the firm may charge full invoice value for payment made after the credit period and allow discount for spot payments.

The existence of debtors in the books of a firm is a routine and normal situation. Only a firm with a commanding market share or the one operating in a situation of acute mismatch between demand and supply can afford to dictate terms of sale and receive full invoice value in advance. Otherwise, the firm has to maintain a balance between promoting sales and maintaining the level of receivables within manageable limits.

Apart from the Sundry Debtors, cash flow of the firm is also affected by Loans and Advances made to suppliers, subsidiaries and others. These advances are not exactly working capital advances but nevertheless these are treated as current assets because these are assumed to be recoverable or converted into inventory, fixed assets or investments within one year.

Credit policy can have a significant influence on sales. In theory, the firm should lower its quality standard for accounts accepted as long as the profitability of sales generated exceeds the added costs of the receivables.

What are the costs of relaxing credit standards? Some arise from an enlarged credit department, the clerical work of checking additional accounts, and servicing the added volume of receivables. We assume for now that these costs are deducted from the profitability of additional sales to give a net profitability figure for computational purpose. An other cost comes from the increased probability of bad-debt losses.

### Illustration

To assess the profitability of a more liberal extension of credit, we must know the profitability of additional sales, the added demand for products arising from the relaxed credit standards, the increased slowness of the average collection period, and the required return on investment. Suppose a firm's product sells for ₹ 10 a unit, of which ₹8 represents variable costs before taxes, including credit department costs. The firm is operating at less than full capacity, and an increase in sales can be accommodated without any increase in fixed costs. Therefore, the contribution margin of an additional unit of sales is the selling price less variable costs involved in producing the unit, or  $₹10 - ₹8 = ₹2$ .

At present, annual credit sales are running at a level of ₹2.4 million, and there is no underlying trend in such sales. The firm may liberalize credit, which will result in an average collection experience of new customers of 2 months. Existing customers are not expected to alter their payment habits and continue to pay in 1 month. The relaxation in credit standards is expected to produce a 25 percent increase in sales, to ₹3 million annually. This ₹6,00,000 increase represents 60,000 additional units if we assume that the price per unit stays the same. Finally, assume that the opportunity cost of carrying additional receivables is 20 percent before taxes.

This information reduces our evaluation to a trade-off between the added profitability on the additional sales and the opportunity cost of the increased investment in receivables. The increased investment arises solely from new, slower paying customers; we have assumed existing customers continue to pay in 1 month. With the additional sales of ₹6,00,000 and receivable turnover of 6 times a year (12 months divided by the average collection period of 2 months), the additional receivable are  $₹ 6,00,000 / 6 = ₹1,00,000$ . For these additional receivables, the firm invests the variable costs tied up in them. For our example, ₹80 of every Re.1.00 in sales represents variable costs. Therefore, the added investment in receivables is  $.80 \times ₹1,00,000 = ₹80,000$ . In as much as the profitability on additional sales, ₹1,20,000, far exceeds the required return on the additional investment in receivables, ₹16,000, the firm would be well advised to relax its credit standards. An optimal credit policy would involve extending trade credit more liberally until the marginal profitability on additional sales equals the required return on the additional investment in receivables.

Now, we shall revert back to our sample firms and examine the level of Sundry Debtors and loans and Advances *vis-a-vis* the level of operations.

### How do firms ensure realisations?

Timely realisation of receivables is an important element of working capital management. Practices in this respect vary from firm to firm. Most of the firms dissuade credit sales to first time customers and gradually allow credit after development of relationship. While giving credit, some firms obtain post dated cheques from their clients. In other cases, firms have special staff earmarked for recovery efforts. The key elements here are the opportunity cost of funds blocked in receivables and the net expenses of maintaining recovery infrastructure. Expenses of maintaining recovery infrastructure include the costs associated with recovering the amount from debtors. If the funds realised from receivables can yield better return than the interest recovered from debtors, then the firm would be better off by promoting cash sales.

### Desirable Level of receivables

Considering the under given situation, let us find out whether there is a desirable level of receivables for a firm in relation to its turnover:

₹ in crores

	A		B		C	
	2013	2014	2013	2014	2013	2014
1 Sundry Debtors	247.63	216.50	264.51	424.78	470.76	464.10
2 Loans and Advances	306.29	351.42	744.09	798.19	136.91	104.73
3 Sales/Services	3,031.76	3,322.44	10,603.79	10,971.90	1,381.91	1,882.61
4 (1) as % of (3)	8.17	6.52	2.49	3.87	34.08	24.65
5 (2) as % of (3)	10.10	10.57	7.02	7.27	9.91	5.56

Obviously firm B has adopted a tight and conservative policy towards debtors. It is recovering its receivables quickly. Similarly the outgo on loans and advances is not disproportionate as compared to sales. One reason for this is that the firm B has undertaken a qualitative analysis of loans and advances and has treated some of these as doubtful. Such doubtful advances, including loans and advances to subsidiary companies have been charged to the Profit and Loss Account as part of prudent accounting practice. Similar treatment has been accorded to sundry debtors as well.

In the case of firm C, the sundry debtors are a fairly high percentage of total sales and rightly so, because the firm has no inventory and most of the working capital is locked in receivables only. The loans and advances are, however at around 6-10% of sales.

It is difficult to prescribe a reasonable level for loans and advances for any firm because of the percentage of sundry debtors to sales varies widely among these firms. In case of firm A sundry debtors are between 6 to 8% of sales while loans and advances are around 10% of sales. The loans and advances consist of various types of deposits, pre payments and advances etc. Not all loans and advances are meant to be converted into cash. That is why loans and advances, although considered as current assets, are not treated part of the working capital. In fact some of the advances get converted into either capital expenditure or investments. For example advances for supply of capital goods would ultimately get shaped into fixed assets. Advances towards share application money or as loans to subsidiary are converted into investments. Similarly pre-paid taxes & duties are ultimately treated as expenses. In the case of firm B, the sundry debtors are just around 3-4% of sales while loans and advances are around 7% of sales.

If a firm is buying raw material or traded goods on credit, then ideally the level of such creditors should be more than the level of debtors at any point of time. Benchmarking of the receivable level can also be done against historical industry trends. To guard against the receivables rising beyond tolerable levels, firms usually treat all advances and debts over six months old as doubtful cases and, if needed, charge such amounts to the profit and loss account.

#### Illustration 1 :

Ash Ltd. follows collection policy as detailed below :

- (i) 10% of the sales is collected in the same month
- (ii) 20% of the sales is collected in the 2nd month
- (iii) 40% of the sales is collected in the 3rd month
- (iv) 30% of the sales is collected in the 4th month.

Sales of the company for the first three quarters of the year are as follows :

<i>Month of the Quarter</i>	<i>Quarter-I</i>	<i>Quarter-II</i>	<i>Quarter-III</i>
1	15,000	7,500	22,500
2	15,000	15,000	15,000
3	15,000	22,500	7,500
Total	45,000	45,000	45,000
No. of working days	90	90	90

You are required to work out average age of receivables.

**Solution: Calculation of Receivable at the end of 3rd month of quarter**

<i>Out of sale of Month</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>Balance at the end</i>
1	100 –	(10% + 20% + 40%)		30%
2	100 –	(10% + 20%)		70%
3	100 –		(10%)	90%

Rocoverable at the end of Q-I

<i>Month</i>	<i>Amount Recoverable</i>	<i>Recovered</i>	<i>Balance</i>	<i>Balance Amount</i>
1	<u>15,000</u>	<u>70%</u>	<u>30%</u>	<u>4,500</u>
2	<u>15,000</u>	<u>30%</u>	<u>70%</u>	<u>10,500</u>
3	<u>15,000</u>	<u>10%</u>	<u>90%</u>	<u>13,500</u>
	45,000			28,500

Average age of receivables =  $28500/45000 \times 90 = 57$  days

Rocoverables at the end of Q-II

<i>Month</i>	<i>Amount Recoverable</i>	<i>Recovered</i>	<i>Balance</i>	<i>Balance Amount</i>
1	7,500	70%	30%	2,250
2	15,000	30%	70%	10,500
3	22,500	10%	90%	20,250
	45,000			33,000

Average age of receivables =  $33000/45000 \times 90 = 66$  days

Rocoverables at the end of Q-III

Month	Amount Recoverable	Recovered	Balance	Balance Amount
1	22,500	70%	30%	6,750
2	15,000	30%	70%	10,500
3	7,500	10%	90%	6,750
	45,000			24,000

Average age of receivables =  $24,000/45,000 \times 90 = 48$  days

Recovery speed is lowest in Q-II

### Illustration 2:

XYZ Co. Ltd, manufacturer of electronic gadgets, has an annual sales of Rs. 50 lakh. It offers 30 days credit on sales. The fixed costs are Rs. 5 lakh and the variable costs are 80% of the sales.

The company is considering a change in its credit policy. Based upon its knowledge of market response, it has estimated likely sales figure against each of the proposed collection period as follows:

Policy	Collection period (days)	Projected sales (Rs. lakhs)
A	45	56
B	60	60
C	75	62
D	90	63

If the expected rate of return is 20%, which policy should be adopted and why?

### Solution:

#### Evaluation of credit policy

(Rs. lakhs)

	Current policy	Policy A	Policy B	Policy C	Policy D
Credit period (days)	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
Projected sales	50	56	60	62	63
Less: variable cost @ 80%	<u>40</u>	<u>44.8</u>	<u>48</u>	<u>49.6</u>	<u>50.4</u>
Contribution	10	11.2	12	12.4	12.6
Less: Fixed cost	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>
Net profit	<u>5</u>	<u>6.2</u>	<u>7</u>	<u>7.4</u>	<u>7.6</u>
Cost of sales (Variable cost + Fixed cost)	45	49.8	53	54.6	55.4
Investment in debtors Cost of sales × credit period/360 days	3.75	6.225	8.833	11.375	13.85
Net profit	5	6.2	7	7.4	7.6
Less: cost of funds in debtors balances @ 20%	<u>0.75</u>	<u>1.245</u>	<u>1.767</u>	<u>2.275</u>	<u>2.77</u>
Net return	<u>4.25</u>	<u>4.955</u>	<u>5.233</u>	<u>5.125</u>	<u>4.83</u>

*Analysis:* Since the net return is highest for credit policy B, it is suggested to extend the credit policy upto 60 days, to maximize the company's profitability.

### Control of Bad debts

Control of bad-debts is an important part of controlling the working capital or the current assets of the company. Credit policy should be followed which may not lead to bad-debts and expedite collections. Periodical checks should be maintained by classifying debtors as outstandings from 0-30 days, 30-60 days, 60-90 days and 90 and over. Amount due for 60 days or more should be followed seriously and collected.

## BANKING NORMS AND MACRO ASPECT OF WORKING CAPITAL MANAGEMENT

The above is the management oriented approach of calculating working capital. Banks and financial institutions view the assessment of working capital from the angle as discussed in the following pages. Banks normally provide working capital finance to hold an acceptable level of current assets viz. raw materials and stores, stocks in progress, finished goods and sundry debtors for achieving a pre-determined level of production and sales. The assessment of funds required to be blocked in each of these items of the working capital required by an industry is discussed as under:

**1. Raw Material:** Raw material, of any kind is necessarily required by an industrial unit to continue the production process. Different raw material could be procured from different sources may be indigenous or overseas and accordingly different treatment of procurement time is bound to be given. Mode of payment for the raw material may also be different. Thus, affecting the credit requirements of the client, the funds blocked up in procurement and stocking of material will have to be taken into consideration. Total materials including those in transit and for which advance payment is made can normally be expressed in terms of number of months consumption and requirements of funds can be assessed by multiplying the figure by the amount of monthly consumption.

**2. Work in Process:** The time taken by the raw material to be converted into finished product is the period of material processing and all the expenses of the process are involved in it. Therefore, the assessment of funds blocked in the process is made by taking into account the raw material consumption during the processing period and the expenses incurred during such period i.e. the cost of production for the period of processing.

**3. Finished goods in the next stage:** The funds blocked in finished goods inventories are assessed by estimating the manufacturing cost of product.

**4. Sundry Debtors:** When goods sold is not realised in cash, sundry debtors are generated. The credit period followed by a particular industrial unit in practice is generally the result of industry practices. Investment in accounts receivable remains blocked from the time of sale till the time amount is realised from debtors. The assessment of funds blocked should be on the basis of cost of production of the materials against which bank extends working capital credit.

**5. Expenses:** One month's total expenses, direct or indirect, are provided by way of cushion in assessing the requirement of funds which may include rent, salaries, etc. depending upon the length of operating cycle.

**6. Trade Credit** received on purchases reduces working capital funds requirements and has to be taken into account for correct assessment of funds.

**7. Advances** received alongwith purchase orders for the products also reduce the funds requirements for working capital.

Taking into consideration the above parameters of operating cycle, the working capital for a unit can be assessed as under:



S.No.	Component of Working Capital	Basis of Calculation	₹
1.	Raw material	Month's consumption	100
2.	Stock in process	Week's (cost of production for period of processing)	100
3.	Finished goods	Month's cost of production required to be stocked	100
4.	Sundry debtors	Month's cost of production	100
5.	Expenses	One month's	<u>100</u>
		Total	500
<b>Less:</b> Trade credit on month's purchases			₹ 100
<b>Less:</b> Advance payment on Orders received			₹ 100
			200
Working Capital required			300

Banks do not provide the entire amount of ₹ 300 towards working capital. At every stage bank would insist upon the borrower's stake in the form of margin which depends on various factors like saleable quality of product, durability, price fluctuations, market conditions and business environment, etc. Thus, the bank at every stage would allow the margin at the pre-determined rate as noted below:

		Permissible Limit (₹)
Raw material	100	
Less: Margin 10%	10	90
Stock in process	100	
Less: Margin 40%	40	60
Finished goods	100	
Less: Margin 25%	25	75
Sundry Debtors (at sale value)	100	
Less: Margin 10%	10	90
Expenses for one month	100	
100% Margin	100	—
<b>Total permissible limit</b>		<b>315</b>
Working capital requirement of the unit		500
Permissible limits (Bank loan)		315
Gap (contribution to be provided by Borrower)		<u>185</u>

Before sanctioning the working capital of ₹ 315, the bank would ensure that borrower is in a position to bring in margin money of ₹ 185 by way of excess current assets over current liabilities based on projected balance sheet.

### DIFFERENT COMMITTEE OF RBI FOR WORKING CAPITAL MANAGEMENT

Commercial banks grant working capital advances by way of cash credit limits and are the major suppliers of working capital to trade and industry. In the past, the practices in commercial banks as revealed by the findings of different Study Groups appointed by RBI were as follows:

#### 1. Daheja Study Group

The current limit was related to the security offered by the clients of banks without assessing financial position of

the borrower through cash flow analysis. Short-term advances were not utilised for short-term purposes and defeated their self liquidating objective. In large number of accounts, no credit balance existed nor was the debit balance fully wiped out over a period of years because withdrawals were more than deposits.

To control the tendency of over-financing and the diversion of the banks funds, Daheja Study Group (National Credit Council constituted in 1968 under the Chairmanship of V.T. Daheja) made recommendations for the banking system to finance industry on the basis of a total study of the borrower's operations rather than on security considerations. Further, present as well as future cash credit accounts should be distinguished as between the 'hard core' and the 'short-term components'. The hard core should represent the minimum level of raw materials, finished goods and stores which the industry required to hold in order to maintain a given level of production, and the bank finance should be provided on strong financial basis as term loan and be subjected to regular repayment schedule whereas short-term component of the account would represent the requirement of funds for temporary purposes i.e. a short term increase in inventories, tax, dividends and bonus payments, etc. the borrowing being adjusted in a short period out of sales.

## 2. Tandan Committee of Daheja Study Group Council

Although the above recommendations were implemented but no improvement was noticed in money drain to strong industrial groups by banks and RBI appointed another study group under the chairmanship of Shri P.L. Tandon in August 1975. Tandon committee made certain recommendations *inter alia* comprising of recommendations on norms for inventory and receivables for 15 major industries, new approach to bank lending, style of lending credit, information system and follow up, supervision and control and norms of capital structure. A brief appraisal of the Tandon committee recommendations would prove more enlightening as given below:

**1. Norms for inventory and receivables** recommended by Tandon Committee for 15 major industries, cover about 50 per cent of industrial advances of banks. These norms were arrived at after examining the trends reflected in the company finance studies conducted by the Reserve Bank of India and detailed discussion with representatives and experts of the industries concerned.

**2. Bank lending:** The Committee introduced the concept of working capital gap. This gap arised due to the non-coverage of the current assets by the current liabilities other than bank borrowings. A certain portion of this gap will be filled up by the borrower's own funds and long-term borrowings. The Committee developed three alternatives for working out the maximum permissible level of bank borrowings:

1. 75% of the working capital gap will be financed by the bank i.e.  
 Total Current assets  
 Less: Current Liabilities other than Bank Borrowings  
       = Working Capital Gap.  
 Less: 25% of Working Capital gap from long-term sources.
2. Alternatively, the borrower has to provide for a minimum of 25% of the total current assets out of long-term funds and the bank will provide the balance. The total current liabilities inclusive of bank borrowings will not exceed 75% of the current assets:  
 Total Current Assets  
 Less: 25% of current assets from long-term sources.  
 Less: Current liabilities other than Bank borrowings  
       = Maximum Bank Borrowing permissible.
3. The third alternative is also the same as the second one noted above except that it excludes the permanent portion of current assets from the total current assets to be financed out of the long-term funds, viz.  
 Total Current assets  
 Less: Permanent portion of current assets  
 Real Current Assets

Less: 25% of Real Current Assets

Less: Current liabilities other than Bank Borrowings

= Maximum Bank Borrowing permissible.

Thus, by following the above measures, the excessive borrowings from banks will be gradually eliminated and the funds could be put to more productive purposes.

The above methods may be reduced to equation as under:

1st Method :  $PBC = 75/100 \times WCG$

2nd Method :  $PBC = TCA - [(25/100 \times TCA) + OCL]$

3rd Method :  $PBC = TCA - [CRA + 25/100 (TCA - CRA) + OCL]$

Where,

PBC stands for Permissible Bank Credit

WCG stands for Working Capital Gap

TCA stands for Total Current Assets

OCL stands for Other Current Liabilities

(i.e. Current Liabilities other than Bank Borrowings)

CRA stands for Amount required to finance Core Assets.

The three alternative methods mentioned above may be illustrated by taking the following figures of a borrower's financial position, projected at the end of next year.

#### ILLUSTRATION

<b>Current Liabilities</b>	<b>₹ in lakhs</b>	<b>Current Assets</b>	<b>₹ in lakhs</b>
Creditors for Purchase	100	Raw materials	200
Other Current Liabilities	<u>50</u> 150	Stock-in-process	20
Bank Borrowings including	200	Finished goods	90
bill discounted with banks		Receivable including bills discounted	50
		Other current assets	<u>10</u>
	<u>350</u>		<u>370</u>

The core Current Assets are ₹ 95 lakhs.

<b>1st Method</b>	<b>₹ in lakhs</b>	<b>2nd Method</b>	<b>₹ in lakhs</b>	<b>3rd Method</b>	<b>₹ in lakhs</b>
Total Current Assets	370	Total Current Assets	370	Total Current Assets	370
Less: Current Liabilities other than Bank borrowings	<u>150</u>	Less: 25% of Current Assets from long-term sources	<u>92</u>	Less: Core Current Assets	<u>95</u>
Working Capital gap	220		278	Real Current Assets	275
Less: 25% of above from Long-term sources	<u>55</u>	Less: Current liabilities other than Bank borrowings	<u>150</u>	Less: 25% of above from long-term sources	<u>69</u>
Maximum Bank borrowing					206
				Less: Current liabilities other than Bank borrowings	<u>150</u>

permissible	165	Maximum Bank			56
Actual borrowing from		Borrowings Permissible	128	Working capital gap	220
bank	<u>200</u>	Working capital gap	220	Maximum Bank borrowing	
Excess borrowings	35	Actual Bank borrowing	200	permissible	56
Current Ratio	1.17 : 1	Excess borrowings	72	Actual Bank borrowing	200
		Current Ratio	1.33 : 1	Excess borrowings	144
		Current Ratio	1.79 : 1		

The above approach of lending is meant to ensure reasonable relationship between current assets and current liabilities. Conventionally a current ratio of 2 : 1 is considered satisfactory but at that time it was anticipated that in view of the constraints the availability of long-term funds in India and lack of alternative sources, the vast majority of borrowers would not be able to comply at present with conventional standard. Accordingly, the study group preferred to take a realistic view in suggesting that current liabilities should not exceed the current assets and as such it is necessary that current ratio should carry a thin margin of safety i.e. it should be slightly over 1.1. The study group also emphasised the importance of the classification of current assets and current liabilities which should be made as per definition in the Companies Act.

The above illustration shows that each successive method is intended to increase progressively the investment of borrowers long-term funds (comprising borrower's own funds and long-term borrowings) to support current assets. The Committee recommended placement of the borrower on the first method within a year and their moving to the second and third methods in stages. Out of three methods Reserve Bank of India accepted first two methods for being put into practice by bank and deferred implementation of third method for the time being pending group work and detailed studies to be undertaken to work out core current assets for various industries. First and second method are not alternative but successive stages through which borrowers will pass. A borrower who reached 1st method will push a head to conform to second method. The borrower who already satisfy the requirement of the second method are not allowed to slip back to the 1st method by increasing their dependence on bank borrowings. This is to say, existing current ratio should not be impaired.

The application of first method which was the stage to be reached with in period of one year, might have required many existing borrowers to repay excess borrowings. In such cases bank were to hold dialogue with the customers to adjust the excess borrowing without causing any hardship to them. If adjustment was difficult, the bank could convert the excess borrowing into Working Capital Term Loan (WCTL) for being amortised over a reasonable period taking into account the borrowers cash accruals and obligations and his capacity to raise additional equity. Period of regularisation was to be agreed to on negotiation basis between banker and borrower at the time of entry into the new system.

**3. Style of credit:** A change in the style of lending has also been suggested by the Committee so as to bifurcate the cash credit into a loan account and demand cash credit instead of treating the entire credit limit as cash credit for a year. This will make the credit less expensive to borrowers. The demand cash credit will meet the seasonal requirements of industry and will be wiped out automatically at the end of the business cycle. This will introduce a better financial discipline in the credit system and will generate better financing system in the banking economy with numerous advantages.

**4. Information system:** To monitor better credit information system in the banking industry, the committee suggested for the borrower to submit quarterly statements in the prescribed format about its operations, current assets and current liabilities and funds flow statements with monthly stock statements and projected balance sheets and profit and loss account at the end of financial year.

**5. Follow up:** The Committee also suggested a close follow up for supervision and control of the use of credit by

the banks and change in attitude of the banks from security-oriented lending to production oriented lendings/ credit.

**6. Norms of Capital Structure:** For examining the capital structure of the company the norms have also been suggested by the committee for monitoring a better equity : debt relationship.

### 3. Chore Committee

Reserve Bank of India accepted the above recommendations of the Tandon Committee but found that the gap between sanctioned cash credit limit and its utilisation has remained unanswered. In this context, RBI appointed in April 1979 a working group under the Chairmanship of Mr. K.B. Chore to look into this gap between the sanctioned limits and their utilisation.

The Chore Committee has, *inter alia*, recommended as follows:

- (1) emphasised need for reducing the dependance of large and medium scale units on bank finance for working capital;
- (2) to supplant the cash credit system by loans and bills wherever possible; and
- (3) to follow simplified information system but with penalties when such information is not forthcoming within the specified limit.

Chore Committee also suggested that the banks should adopt henceforth Method II of the lending recommended by the Tandon Committee so as to enhance the borrowers' contribution towards working capital. The observance of these guidelines will ensure a minimum current ratio of 1.33 : 1. Where the borrowers are not in a position to comply with this, excess borrowings on account of adoption of Method II should be segregated and converted into a working capital term loan (WCTL). This loan should be made repayable in half-yearly instalments over a period not exceeding five years. WCTL may carry a rate of interest higher than the rate applicable on the relative cash credit limit, not exceeding the ceiling with a view to encouraging an early liquidation of WCTL.

It was also suggested that banks should fix separate limits where feasible for peak level and non-peak level requirements with periods where there is a pronounced seasonal trend. This will not apply to agro-based industries but also to certain consumer industries like fans, refrigerators, etc. The borrower should be discouraged from approaching banks frequently for *ad hoc* limits in excess of the sanctioned limits excepting those special circumstances when such requests be considered for short duration with 1 per cent additional interest over normal rate which could be waived in general cases on merits. Sick units may be allowed general exemptions from the above requirements. The Committee also favoured encouragement be given to bill finance i.e. bill acceptance and bill discounting practices involving banks, buyers and sellers. The Committee suggested some modifications and improvements in the system earlier recommended by the Tandon Committee. The modified system includes that banks should submit half-yearly statements to RBI above credit limits of borrowers with aggregate working capital of ₹ 50 lakhs and above from the banking system.

### 4. Marathe Committee

In 1982, it was felt that an independent review of the Credit Authorisation Scheme (CAS) which had been in operation for several years would be useful and accordingly the Reserve Bank of India appointed a Committee referred as "Marathe Committee" in November 1982 to review the working of the Credit Authorisation Scheme. The Committee submitted its report in July 1983.

The Marathe Committee which was given terms of reference to examine the Credit Authorisation Scheme from the point of view of its operational aspects stressed that the 'CAS is not to be looked upon as a mere regulatory measure which is confined to large borrowers. The basic purpose of CAS is to ensure orderly credit management and improve quality of bank lending so that all borrowings, whether large or small, are in conformity with the policies and priorities laid down by the Central Banking Authority. If the CAS scrutiny has to be limited to a

certain segment of borrowers, it is because of administrative limitations or convenience, and it should not imply that there are to be different criteria for lending to the borrowers above the cut off point as compared to those who do not come within the purview of the scheme.

## 5. Kannan Committee

With a view to free the banks from rigidities of the Tandon Committee recommendations in the area of Working Capital Finance and considering the ongoing liberalizations in the financial sector, IBA constituted, following a meeting of the Chief Executives of Selected public sector banks with the Deputy Governor of Reserve Bank of India on 31.8.96, a committee on 'Working Capital Finance' including Assessment of Maximum Permissible Bank Finance (MPBF), headed by Mr. K. Kannan, the then Chairman and Managing Director of the Bank of Baroda.

The Committee examined all the aspects of working capital finance and gave far reaching recommendations on the modalities of assessment of working capital finance in its report, submitted to IBA on February 25, 1997. It observed that since commercial banks in India were undergoing a metamorphosis of deregulations and liberalizations, it was imperative that micro-level credit administration should be handled by each bank individually with their own risks-perceptions, risks-analysis and risks-forecastings. The final report of the Committee was submitted to RBI for its consideration in March, 1997. In its final report, the Kannan Committee also pointed that alongwith modification of existing systems of working capital assessment and credit monitoring, certain undermentioned areas also need to be addressed:

- (1) Regular interface with the borrower to have a better understanding of (i) his business/activity; and, (ii) problems/constraints faced by him and the future action plan envisaged;
- (2) Periodical obtaining of affidavits from the borrowers, declaring highlights of their assets, liabilities and operating performance (in lieu of subjecting even the high rated/high valued borrowers to several routine inspections/ verifications) in order to bestow faith-oriented, rather than ab initio doubt-oriented, approach in monitoring the credit dispensation.
- (3) Periodical exchange of information between/among financing banks/financial institutions to pick-up the alarm signals at the earliest.
- (4) Establishing, within, a time bound programme, a "Credit Information Bureau" to provide updated information of existing/new borrowers before taking a credit decision. (Modality of Information Bureau in advanced countries may be taken as a guide for floating an appropriate Credit Information Bureau).

Accordingly, the Kannan Committee recommended that the arithmetical rigidities, imposed by Tandon Committee (and reinforced by Chore Committee) in the form of MPBF-computation, having so far been in vogue, should be given a go-by. The committee also recommended for freedoms to each bank in regard to evolving their own system of working capital finance for a faster credit delivery in order to serve more effectively various segments of borrowers in the Indian economy.

Concurring with recommendations of the Kannan Committee, Reserve Bank of India (vide circular No. IECD No. 23/08.12.01/96 dated 15.04.1997) advised to all the banks, inter-alia, as under:

It has now been decided that the Reserve Bank of India shall withdraw forthwith the prescription in regard to assessment of working capital needs based on the concept of maximum permissible bank finance (MPBF) enunciated by Tandon Working Group. Accordingly, an appropriate system may be evolved by banks for assessing the working capital needs of borrowers within the prudential guidelines and exposure norms already prescribed.

The turnover method, as already prevalent for small borrowers, may continue to be used as a tool of assessment for this segment; since major corporates have adopted cash budgeting as a tool of funds management, banks may follow cash budget system for assessing the working capital finance in respect of large borrowers; there should also be no objection to the individual banks retaining the concept of the present maximum permissible bank finance, with necessary modifications or any system."

Reserve Bank of India further directed that Working capital credit may henceforth be determined by banks according to their perception of the borrower and the credit needs. Banks should lay down, through their boards a transparent policy and guidelines for credit dispensation in respect of each broad category of economic activity.

## OTHER ISSUES INVOLVED IN THE MANAGEMENT OF WORKING CAPITAL

Apart from the discussion of the nature of various components of working capital, we need to consider various other aspects of this intricate system of financial management. These aspects undertake a finer and more microscopic analysis of the components in order to strengthen control over the current assets on one hand and to improve the productivity of working capital on the other. Some of the relevant issues are described as under:

### (A) The Concept of Net Working Capital

Net working capital is the term used to denote the difference of current assets and current liabilities. Traditionally it has been assumed that the current assets of a firm should be more than adequate to meet the current liabilities. In other words, the current ratio, i.e. the ratio of current assets to current liabilities should be more than one. The rationale behind this assumption is that the firm should at all times be in a position to maintain liquidity. By definition, current assets are treated as those assets which are capable of quick conversion into cash and secondly, the time period for conversion into cash is usually small but not more than one year in any case. Carrying the argument further, one can postulate that the older the current asset gets, the lesser are its chances of easy conversion into cash. So, in order to maintain the quality of its current assets, the firm seeks to reduce their holding period. Simultaneously, the firm tries to prolong the time period available for payment of its current liabilities by building up the level of inventory through trade finance and using bank borrowing against inventory and debtors. The result of this exercise is that the net working capital of the firm turns negative and its current ratio becomes less than one.

On the face of it the concept of negative net working capital appears to be fraught with unfavorable consequences for the firm. In such a situation, if the firm is required to meet its current obligations all at once, it might not have adequate liquidity available and as a result, it could default on its obligations. This could happen in a situation where the cash has moved out of the operating cycle to long term uses like creation of fixed assets or towards non-productive investments in other firms. But if the firm has, as part of its conscious working capital management policy, kept the level of current assets to the minimum and deployed the surplus cash in non-working capital, yet liquid investments, then it can afford to function with a net working capital that is negative.

Hence so long as a firm does not default on payment of its current liabilities, the fact that it has a negative net working capital need not be a cause for concern. This may not always be true as most of the organisations may like to see current assets more than current liabilities. Example of such organisations could be banks who provide short-term credit or suppliers of raw material who sell on credit to firms.

### (b) The Myth of Adequate Current Assets

Aligned to the first issue is the myth of adequate current asset. Traditionally, it has been believed that liquidity is proportional to the level of current assets. A firm having a high current ratio is treated as favorably placed as regards payment of its current liabilities. This is myth since the holding of current assets is always in proportion to the turnover. If level of current assets is rising disproportionately to the turnover, then notwithstanding the high current ratio, the situation has the following implications:

- The age of current assets is increasing which tells upon their quality. As the current assets, particularly inventory and receivables, get older the chances of their easy and complete conversion into cash recede. Once this happens, there is every possibility of the operating cycle cracking.
- The firm is paying a huge cost for the higher build up of current assets. This cost consists of
  - (a) The amount spent towards raw materials and intermediate inputs



- (b) The cost incurred towards storing and maintaining the inventory.
- (c) The interest cost for obtaining finance against these current assets
- (d) The cost of obsolescence associated with holding inventory for longer periods and
- (e) The cost of expected default on receivables as reflected in charge to Profit and loss account towards bad debts.

### **(c) Does the balance sheet give a true picture of current assets?**

We have restricted the discussion of current assets to the position obtained as on a particular date. This position may not be representative of the state of affairs prevailing on a day to day basis throughout the year. In order to even out the effects of daily variation in the level of current assets, it is advisable to take average of weekly, monthly or quarterly holding depending upon the nature of the industry and turnover of the assets. The position at the end of a day is a static position which is not representative of the entire year. By taking period averages some amount of dynamism is brought into the picture.

The second point to be noted is that an industry might have seasonal peaks or troughs of working capital requirement. For example agro based industry like fruit processing unit would need to stock more raw material during the peak season when the crop has been harvested than during the lean season. In such cases different norms have to be applied for peak season and non peak season for holding of current assets for judging the reasonability of their holding.

We find, therefore that the high level of current assets is nothing but a fiction when we seek to realize the current assets. It may happen that the inventory carried by the firm may consist of obsolete items, packing materials, finished goods which have been rejected by buyers and items like dies and tools which are more fixed than current in character. Prudence would advise that the firm should get rid of these current assets as early as possible.

On the other hand, the current liabilities are more ascertainable and less fictions. The payment of these liabilities, if not possible from the operating cycle, has to be arranged from long term sources of funds which results in a mismatch that is not conducive to financial health of the firm.

### **(d) The various forms of cash holding**

Cash is considered to be the most liquid of current assets. It is held either as cash balances with the firms or in bank accounts. There are two ways of holding bank balances – first as current accounts through which the day to day transactions of the firm are carried out and secondly as fixed deposits in which balances are held for a specified time period. Current account balances are most liquid. Fixed account balances are convertible into cash by adjustment downwards of the rate of interest even before maturity. Hence even fixed deposit balances should be treated at par as regards liquidity. But there is a catch here. Quite a few fixed deposits are not held *per se*, but as margin money deposits for availing the facilities like letters of credit and guarantee from banks. To the extent of such margin money deposits, the liquidity of bank balances of the firm is impaired.

Cash balances are also held as unavailed portion of the working capital facilities granted by the banks. All such balances earn money for the firm in terms of the interest that is saved on unavailed portion. Yet the money remains available to the firm almost on call. Such balances are most suitable to a firm for enhancement of liquidity provided the firm has the policy of availing bank finance for its working capital requirements.

These firms maintain just enough balance in their current accounts and transfer the surplus immediately to the borrower accounts for saving interest thereon. In most such cases, even the routine transactions are carried out through the borrowal accounts, thus precluding the need for maintaining current accounts even.



## ACCOUNTING POLICIES OF FIRMS FOR WORKING CAPITAL MANAGEMENT

The pattern of working capital management of a firm is determined to a large extent by its accounting policies regarding sales, receivables inventories and payables. These policies establish the level of working capital of the firm. Let us examine the accounting policies of three different firms say A, B, and C:

### Accounting policies of Firm A

#### 1. Sales

- (i) Sales are counted on dispatch of products and includes cost of self-consumption of goods produced.
- (ii) Income from works contract, consultancy and other services rendered is, accounted for on 'percentage of completion' basis.
- (iii) Revenue on real estate development is recognized on completion of contract.
- (iv) Lease rental income is accounted as per terms of lease.

#### 2. Accounting for claims and subsidies

- (i) Claims receivable are accounted at the time of lodgment depending on the certainty of receipt and claims payable are accounted at the time of acceptance.
- (ii) Claims raised by the Government authorities regarding taxes and duties, which are disputed by the company, are accounted based on the merits of each claim.
- (iii) Subsidy receivable against an expense is deducted from such expense and subsidy/grant receivable against a fixed asset is deducted from the cost of the relevant fixed assets.
- (iv) Investment subsidy not specifically related to a fixed asset is credited to capital reserve and retained till the requisite conditions are fulfilled.

#### 3. Inventories

- (i) Raw materials, stock-in-trade and work-in-progress are valued at cost or net realizable value whichever is lower.
- (ii) Cost is determined on a weighted average basis.
- (iii) Expenditure incurred on mobilization and creation of facilities in respect of incomplete contracts is carried forward and written off in proportion to work done.

#### 4. Receivables

- (i) Sundry debtors are classified into two categories, secured and unsecured.
- (ii) Secured debts are backed by agreements, documents and physical security. All these debts are considered good unless default occurs. Further classification of these debts is done as over six months old and less than six months old.
- (iii) Unsecured debts are divided into these over six months old and less than six month old. The former category contains a sub-classification of doubtful debts which is charged to provision made for bad and doubtful debts.

### Accounting policies of firm B

#### 1. Revenue recognition

- (i) Sales are recognized when goods are supplied and are recorded net of trade discounts, rebates, sales tax and excise duties but include, whenever applicable export incentives such as duty drawbacks and premiums or sales of import licences.

- (ii) Income from property development activity is recognized under the completed contract method and in terms of arrangements with developers, whenever applicable.

## 2. *Inventories*

- (i) Inventories are valued at the lower of cost, computed on a weighted average basis, and estimated net realizable value, after providing for cost of obsolescence and other anticipated losses, wherever considered necessary.
- (ii) Finished goods and works-in-process include costs of conversion and other costs incurred in bringing the inventories to their present location and condition.

## 3. *Sundry Debtors and loans and advances*

Sundry debtors and loans and advances are stated after making adequate provisions for doubtful advances.

## Accounting policies of firm C

### 1. *Revenue recognition*

Revenue from professional services consists primarily of revenue earned from services performed on a "time and material basis". The related revenue is recognized as and when the services are performed.

- 2. The company also performs time bound fixed price engagements, under which revenue is recognized using the percentage of completes method of accounting, unless work completed cannot be reasonably estimated.
- 3. Amounts received or billed in advance of services performed are recorded as unearned revenue. Unbilled revenue, included in debtors, represents amounts recognized based on services performed in advance of billing in accordance with contract terms.

## Comments on Accounting Policies

We may note that all the firms have adopted realistic and conservative policies for valuation of the current assets. These policies help in correct assessment of net working capital as the current liabilities are also appropriately stated and the picture one obtains is more amenable to rigorous analysis.

## FACTORING SERVICES

As the accounts receivable amount to the blocking of the firm's funds, the need for an outlet to impart these liquidity is obvious. Other than the lag between the date of sale and the date of receipt of dues, collection of receivables involves a cost of inconvenience associated with tapping every individual debtor. Thus, if the firm could contract out the collection of accounts receivable it would be saved from many things such as administration of sales ledger, collection of debt and the management of associated risk of bad-debts etc.

Factoring is a type of financial service which involves an outright sale of the receivables of a firm to a financial institution called the factor which specialises in the management of trade credit. Under a typical factoring arrangement, a factor collects the accounts on the due dates, effects payments to the firm on these dates (irrespective of whether the customers have paid or not) and also assumes the credit risks associated with the collection of the accounts. As such factoring is nothing but a substitute for in-house management of receivables. A factor not only enables a firm to get rid of the work involved in handling the credit and collection of receivables, but also in placing its sales *in effect* on cash basis.

## Origin of Factoring Services

Factoring has a long and fascinating history and the word factor has its etymological origin in the Latin word "Facere" which means to make or do, i.e. to get things done. During 15<sup>th</sup> and 16<sup>th</sup> centuries, factors were appointed by manufacturers in England, France and Spain in order to arrange for sales and distribution of then goods in the colonies in the New World. The first credit factors in modern times were textile agents in the

eighteenth century. Thus, the earlier factors used to provide services under marketing, distribution, administration and finance. From 1920s however the factors began to specialise in performing the credit and collection function for their clients.

The working group by RBI (Vaghul Committee) has recommended that banks as well as private non-bank financial institutions should develop factoring services. It has been widely accepted as a form of financing the working capital requirements in the USA, UK and Europe but has yet to take its roots in India. It will require the development of matching services such as information dissemination network and highly efficient communication facilities. It will thus, help in shortening the operating cycle and thereby reducing the money tied in working capital.

### Definition and functions – Factoring Services

“Factoring may be defined as a relationship between the financial institution or banker (‘factor’) and a business concern (the ‘supplier’) selling goods or providing services to trade customers (the customer) whereby the factor purchases book debts with or without recourse (‘with a recourse’ means that in the event of bad debts factor can approach the ‘supplier’) to the supplier and in relationship thereto controls the credit extended to the customers and administers the sales ledger of the supplier.”

Though the purchase of book debts is fundamental to the functioning of factoring, there are a number of functions associated with this unique financial services. A proper appreciation of these functions would enable one to distinguish it from the other sources of finance against receivables. They are:

- assumption of credit and collection function;
- credit protection;
- encashing of receivables;
- collateral functions such as:
  - (a) loans on inventory,
  - (b) loans on fixed assets, other security and on open credit,
  - (c) advisory services to clients.

### Factoring vs. Accounts Receivable Loans

Accounts receivable loan is simply a loan secured by a firm’s accounts receivable by way of hypothecation or assignment of such receivables with the power to collect the debts under a power of attorney. In case of factoring however, there is an outright sale of receivables. Thus in case of the former, the bank may debit client’s account for ‘handling charges’ if the debt turns out to be bad as against non-recourse factoring.

### Factoring vs. Bill Discounting

Under a bill discounting arrangement, the drawer undertakes the responsibility of collecting the bills and remitting the proceeds to the financing agency, whereas under factoring agreement, the factor collects client’s bills. Moreover, bill discounting is always with recourse whereas factoring can be either with recourse or without recourse. The finance house discounting bills does not offer any non-financial services unlike a factor which finances and manages the receivables of a client.

### Mechanics of Factoring

Factoring offers a very flexible mode of cash generation against receivables. Once a line of credit is established, availability of cash is directly geared to sales so that as sales increase so does the availability of finance. The dynamics of factoring comprises of the sequence of events outlined in figure.

- (1) Seller (client) negotiates with the factor for establishing factoring relationship.
- (2) Seller requests credit check on buyer (client).
- (3) Factor checks credit credentials and approves buyer. For each approved buyer a credit limit and period of credit are fixed.
- (4) Seller sells goods to buyer.
- (5) Seller sends invoice to factor. The invoice is accounted in the buyers account in the factor's sales ledger.

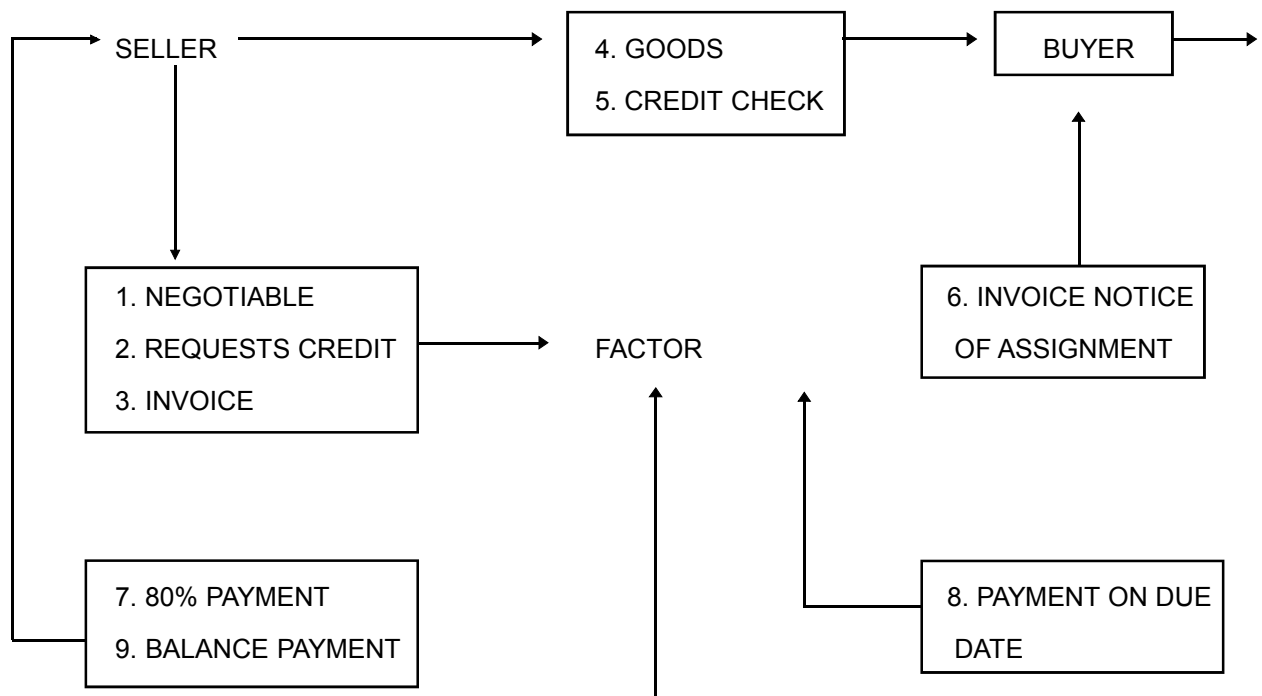


Figure: Mechanics of Factoring

Source: Ranjani Chari, 1991, Factoring in India, M.Phil, Dissertation, Delhi University.

- (6) Factor sends copy of the invoice to buyer.
- (7) Factor advises the amount to which seller is entitled after retaining a margin, say 20%, the residual amount paid later.
- (8) On expiry of the agreed credit period, buyer makes payment of invoice to the factor.
- (9) Factor pays the residual amount to seller.

**Types of Factoring:** Factoring services may be rendered to cover domestic as well as international sales. The various services offered by factors for domestic sales are of six types whose essential characteristics are outlined in Table 1.

Table 1 : Types of Factoring Services

Type of Factoring	Type of Functions					
	Avail- ability of Finance bad debts	Pro- tection* against	Credit Advice	Sales Ledger Adminis- tration	Collec- tion	Disclo- sure Custo- mers
Full Source(Non-Recourse)	Yes	Yes	Yes	Yes	Yes	Yes
Recourse Factoring	Yes	¾	Yes	Yes	Yes	Yes
Agency Factoring	Yes	Possible	¾	No	No	Yes
Bulk Factoring	Yes	Possible	¾	No	No	Yes
Invoice** Discounting	Yes	Possible	No	No	No	No
Undisclosed Factoring	Yes	Possible	No	No	No	No

\* Any form which includes this element may be referred to as 'non-recourse factoring'

\*\* Also referred to as confidential or non-notification factoring.

Source: *Ranjani Chari-opcit. P. 28.*

#### Illustration:

- The turnover of Zenith Ltd. is ₹ 100 lakh of which 72% is on credit. Debtors are allowed one month to clear off the dues. A factoring company is willing to advance 80% of the bills raised on credit for a fee of 1% a month plus a commission of 5% on the total amount of debts. Zenith Ltd. as a result of this arrangement is likely to save ₹ 48,000 annually in management costs and avoid bad debts at 1% on the credit sales.
- A bank has come forward to make an advance equal to 80% of the debts at an annual interest rate of 15%. However, its processing fee will be at 1% on the debts. Would you accept factoring or the offer from the bank?

#### Solution:

##### Cost of Factoring

Annual Credit Sales	=	100 x 72%	= ₹ 72 Lakh
Monthly Credit Sales	=	72 Lakh / 12	= ₹ 6 Lakh
Fee [6,00,000 x 0.80]	=	4,80,000	
4,80,000 x 0.01			= ₹ 4,800
Commission [600000 x 0.05]			= ₹ 30,000
			= ₹ 34,800

Less : Savings in Cost:

Management Cost [48000/12]	₹ 4,000	
Savings in Bad Debts [₹ 600000 x 0.01]	<u>₹ 6,000</u>	<u>₹ 10,000</u>
Net Cost of Factoring [Per Month]		<u>₹ 24,800</u>

**Cost of Bank Advance**

Interest [ $\text{₹ } 600000 \times 0.80 \times 0.15 \times 1/12$ ]	₹ 6,000
Processing Fee [ $\text{₹ } 600000 \times 0.01$ ]	₹ 6,000
Bad Debts [ $\text{₹ } 600000 \times 0.01$ ]	₹ 6000
Management Cost	<u>₹ 4,000</u>
Net Cost (Per Month)	<u>₹ 22,000</u>

Since cost of Bank Finance is less than the cost of factoring, therefore, it is advisable to accept bank offer.

## OTHER TECHNIQUES FOR CONTROL OF WORKING CAPITAL

Cash forecast technique can be used for control of funds flowing in and out of business to check surpluses and shortages. Daily, weekly, monthly, cash flow statements are used to regulate flow of funds and arrange for fund shortage and invest surplus cash.

### 1. Fund Flow Statement

Fund flow statements are used to find changes in assets over a period of time showing uses of funds and sources of funds. Funds flow represent movement of all assets particularly of current assets because movement in fixed assets is expected to be small except at times of expansion or diversification.

### 2. Forfaiting Services

Forfaiting is a form of financing of receivables pertaining to international trade. It denotes the purchase of trade bills/promissory notes by a bank/financial institution without recourse to the seller. The purchase is in the form of discounting the documents covering entire risk of non-payment in collection. All risks and collection problems are fully the responsibility of the purchaser (forfeiter) who pays cash to seller after discounting the bills/notes. The salient features of forfaiting as a form of export relating financing are as under:

- (i) The exporter sells and delivers goods to the importer on deferred payment basis.
- (ii) The importer draws a series of promissory notes in favour of the exporter for payment including interest charge. Alternatively the exporter draws a series of bill which are accepted by the importer.
- (iii) The bills/notes are sent to the exporter. The promissory notes/bills are guaranteed by a bank which may not necessarily be the importer's bank. The guarantee by the bank is referred to as an Aval, defined as an endorsement by a bank guaranteeing payment by the importer.
- (iv) The exporter enters into a forfaiting agreement with a forfeiter which is usually a reputed bank. The exporter sells the avalled notes/bills to the bank at a discount without recourse and receives the payment.
- (v) The forfeiter may hold these notes/bills till maturity for payment by the importers bank.

### **Forfaiting vs. Export Factoring**

Forfaiting is similar to cross border factoring to the extent both have common features of non recourse and advance payment. But they differ in several important respects:

- (a) A forfeiter discounts the entire value of the note/bill but the factor finances between 75-85% and retains a factor reserve which is paid after maturity.
- (b) The availing bank which provides an unconditional and irrevocable guarantee is a critical element in the forfaiting arrangement whereas in a factoring deal, particularly non-recourse type, the export factor bases his credit decision on the credit standards of the exporter.

- (c) Forfaiting is a pure financing arrangement while factoring also includes ledger administration, collection and so on.
- (d) Factoring is essentially a short term financing deal. Forfaiting finances notes/bills arising out of deferred credit transaction spread over three to five years.
- (e) A factor does not guard against exchange rate fluctuations; a forfeiter charges a premium for such risk.

### 3. Ratio Analysis

Ratio Analysis is normally used for working capital control. The following ratios are commonly used:

1. Current Ratio =  $\frac{\text{Current Assets}}{\text{Current Liabilities}}$
2. Acid Test Ratio =  $\frac{\text{Current Assets} - \text{Inventories}}{\text{Current Liabilities}}$
3. Inventory Turnover =  $\frac{\text{Cost of goods sold}}{\text{Average Inventory}}$
4. Current Assets Turnover =  $\frac{\text{Annual Sales}}{\text{Current Assets}}$
5. Receivable Turnover =  $\frac{\text{Sales}}{\text{Debtors}}$
6. Total Debt to share capital and free reserves.

Besides above, for managing current assets, it is advisable to calculate the following ratios also:

1. Quantum of shareholders funds invested in current assets.
2. Quantum of shareholders funds and long-term debts invested in current assets.
3. Relationship between the shareholders and long term funds on one hand and the short term funds on the other pertaining to current assets.

### CASE STUDIES

**Exercise No. 1** : Calculate cash conversion period from the financial variables given hereunder:

	Year 2010-2011	Year 2011-12	Year 2012-13
Sales	7,936		
Cost of Goods sold	7,036		
Inventory		940	936
Bills Receivables		942	962
Bills Payable		608	606

**Solution :**

$$\begin{aligned} \text{Inventory conversion period:} & \quad \frac{\{(940 + 936)/2\} \times 365}{(7,036)} = 48.7 \text{ days} \\ \text{B/R conversion period:} & \quad \frac{\{942 + 962\} \times 365}{(7,936)} = 43.8 \text{ days} \end{aligned}$$

$$\text{Payables conversion period: } \frac{\{(608+606)/2\}}{7036} = 31.5 \text{ days}$$

$$\text{Cash conversion period: } 48.7 + 43.8 - 31.5 = 61 \text{ days}$$

**Exercise No. 2** Find the average conversion period with the help of the following data:

Gross operating cycle	88 days
Net operating cycle	65 days
Raw material storage period	45 days
Work-in-progress conversion period	4 days
Finished goods storage period	25 days

**Solution :**

$$\text{Average conversion period : } 88 - (45 + 4 + 25) = 14 \text{ days}$$

**Exercise No. 3** Calculate the finished goods conversion period if:

	(₹ lakh)
Finished goods opening stock	525
Finished goods closing stock	850
Cost of production	8,000
Administrative expenses	2,250
Excise duty	3,000

**Solution :**

$$\text{Average stock of finished goods : } ₹ (525 + 850)/2 = ₹ 687.5 \text{ lakh}$$

$$\text{Cost of goods sold : } ₹ 525 \text{ Lakh} + 8,000 \text{ Lakh} + 2,250 \text{ Lakh} + 3,000 \text{ Lakh} - 850 \text{ Lakh} = ₹ 12,925 \text{ lakh}$$

$$\text{Daily average} = 12,925/365 ₹ 35.41 \text{ lakh}$$

$$\text{Finished goods conversion period} = 687.5/35.41 = 19.42 \text{ days}$$

**Exercise No. 4 :** Firm uses 1,100 units of a raw material per annum, the price of which is ₹ 1,500 per unit. The order cost per order is ₹ 150 and the carrying cost of the inventory is ₹ 200 per unit. Find the EOQ and the number of orders that are to be made during the year.

**Solution :**

#### Economic Order Quantity

$$= \sqrt{\frac{2 \times \text{Annual Requirement} \times \text{Ordering Cost Per order}}{\text{Carrying Cost per unit per annum}}}$$

$$= \sqrt{\frac{2 \times 1100 \times 150}{200}}$$

$$= 41$$

$$\text{No. of orders during the year} = 1,100/41 = 26.8 \text{ or } 27$$



**Exercise No. 5 :** A factory uses 40,000 tonnes of raw material priced at ₹ 50 per tonne. The holding cost is ₹ 10 per tonne of inventory. The order cost is ₹ 200 per order. Find the EOQ. Will this EOQ be maintained if the supplier introduces 5% discount if the order lot is 2000 tonnes or more?

**Solution :**

$$\text{Economic Order Quantity} = \sqrt{\frac{2 \times \text{Annual Requirement} \times \text{Ordering Cost Per order}}{\text{Carrying Cost per unit per annum}}}$$

$$\text{EOQ Without discount} = \sqrt{\frac{2 \times 40,000 \times 200}{10}}$$

$$= 1265$$

$$\text{No. of orders} = 40,000/1265 = 31.62$$

$$\text{Order cost} = ₹ 200 \times 31.62 = 6325$$

$$\text{Carrying cost} = ₹ 10/2 \times 1265 = 6,325$$

$$\text{Total cost} = ₹ 6,325 + 6,325 = ₹ 12,650$$

**EOQ with discount:**

$$\text{No. of orders} = 40,000/2000 = 20$$

$$\text{Order cost} = ₹ 200 \times 20 = ₹ 4,000$$

$$\text{Carrying cost} = ₹ 10/2 \times 2,000 = ₹ 10,000$$

$$\text{Price discount} = 40000 \times 0.05 = ₹ 2,000$$

$$\text{Total cost} = 4,000 + 10,000 - 2,000 = ₹ 12,000$$

Since total cost without discount > total cost with discount, discount may be availed. In this case, there will be deviation from the EOQ.

**Exercise No. 6 :** Find out the average size of receivables if the goods are sold for ₹ 10,00,000 on a net 60 credit term with an assumption that 20% of the customers do not pay within the prescribed time. Will there be any change in the average size if the terms of credit change to 2/10 net 60 with an assumption that 60% of the customers avail the discount?

**Solution**

**Case I:**

$$\text{Average collection period} = 60 + 0.20 \times 60 = 72 \text{ days}$$

$$\text{Average size of receivables} = ₹ (10,00,000/360) \times 72 = ₹ 2,00,000$$

**Case II:**

$$\text{Average collection period} = (0.6 \times 10) + 0.4 (60 + 0.2 \times 60)$$

$$= 6 + 28.8 = 35 \text{ days}$$

$$\text{Average size of receivables} = ₹ (10,00,000 / 360) \times 35 = ₹ 97,222.22$$

**Exercise No. 7 :** A firm sells 25,000 units at an average price of ₹ 200 per unit. The variable cost is 80 per cent of the sale price. The credit term is 1/10 net 30. One-tenth of the customers avail the discount and the average collection period is 28 days. Administrative cost is ₹ 20,000. Collection cost/sales and bad debt/sales ratios are 2% each. To increase the level of sales, credit term is changed as 2/10 net 30 as a result of which the sales are

expected to be 50,000 units. The administrative cost, collection cost ratio and bad debt ratio are expected to be unchanged. The cost of funds is 10%. Tax rate is 30%. Find the net benefit of the changed credit terms.

**Solution**

Average size of receivables:

**Case I :** ₹  $(50,00,000 / 360) \times 28 = ₹ 3,88,889$

**Case II :** ₹  $(1,00,00,000 / 360) \times 28 = ₹ 7,77,778$

Financing cost:

**Case I:** ₹  $3,88,889 \times 0.10 = ₹ 38,889$

**Case II:** ₹  $7,77,778 \times 0.10 = ₹ 77,778$

**Net Benefit:**

	<b>Case I</b>	<b>Case II</b>
Revenue (sales)	50,00,000	1,00,00,000
Less variable cost	40,00,000	80,00,000
Net revenue	10,00,000	20,00,000
Less financing cost	38,889	77,778
Less administrative cost	20,000	20,000
Less collection cost	1,00,000	2,00,000
Less bad debt losses	1,00,000	2,00,000
Profit before tax	7,41,111	15,02,222
Less tax @ 30%	2,22,333	4,50,667
Net profit after tax	5,18,778	10,51,555

Net benefit of liberal term = ₹  $10,51,555 - 5,18,778 = ₹ 5,32,777$

**Exercise No. 8 :** From the following information extracted from the books of a manufacturing company, compute the operating cycle in days and the amount of working capital required:

<i>Particulars</i>	<i>Amount in ₹</i>
Average Total of Debtors Outstanding	48,000
Raw Material Consumption	4,40,000
Total Production Cost	10,00,000
Total Cost of Sales	10,50,000
Sales for the year	16,00,000
Value of Average Stock maintained:	
Raw Material	32,000
Work-in-progress	35,000
Finished Goods	26,000
Period Covered in days	365
Average period of credit allowed by suppliers in days	16

**Solution****Computation of Operating Cycle**(i) *Raw material held in stock:*

$$\begin{aligned}\text{Raw material Inventory holding period} &= \frac{\text{Average stocks of raw materials held}}{\text{Average consumption per day}} \\ &= \frac{320 \times 365}{4400} = 27 \text{ days}\end{aligned}$$

**Less:** Average credit period granted by Suppliers = 16 days

Period for raw material holding = 11 days

(ii) *Work in progress holding period* =  $\frac{\text{Average WIP Maintained}}{\text{Average cost of production per day}}$ 

$$= \frac{350 \times 365}{10,000} = 13 \text{ days}$$

(iii) *Finished goods holding period* =  $\frac{\text{Average Finished Goods Maintained}}{\text{Average cost of Goods sold}}$ 

$$= \frac{260 \times 365}{10,500} = 9 \text{ days}$$

(iv) *Credit period allowed to debtors* =  $\frac{\text{Average debtors outstanding}}{\text{Average credit sales per day}}$ 

$$= \frac{480 \times 365}{16,000} = 11 \text{ days}$$

Total operating cycle period: (i) + (ii) + (iii) + (iv) = 44 days

Number of Operating cycles in a year =  $365/44 = 8.30$ 

$$\text{Amount of Working Capital required} = \frac{\text{Total Operating Cost}}{\text{Number of operating cycle in a year}}$$

$$\text{Amount of Working Capital required} = \frac{10,50,000}{8.30} = ₹ 1,26,500$$

**Exercise No. 9 :** From the following information calculate;

- (1) Re-order level
- (2) Maximum level
- (3) Minimum level
- (4) Average level

Normal usage : 100 units per week

Maximum usage : 150 units per week

Minimum usage : 50 units per week

Re-order quantity (EOQ) 500 : units

Log in time : 5 to 7 weeks

**Solution**

(1) Re-order Level

= Maximum consumption × Maximum Re-order period

=  $150 \times 7 = 1050$  units

(2) Maximum Level

= Re-order level + Re-order quantity – (Minimum consumption × Minimum delivery period)

=  $1050 + 500 - (50 \times 5) = 1300$  units

(3) Minimum Level

= Re-order level – (Normal consumption × Normal delivery period)

=  $1050 - (100 \times 6) = 450$  units(4) 
$$\text{Average Level} = \frac{\text{Maximum Stock Level} + \text{Minimum Stock level}}{2}$$
$$\text{Average Level} = \frac{1300 + 450}{2} = 875 \text{ units}$$
**LESSON ROUND-UP**

- Gross Working Capital is the total of all current assets. Networking capital is the difference between current assets and current liabilities.
- Permanent Working Capital is that amount of funds required to produce goods and services necessary to satisfy demand at its lowest point.
- Various factors such as nature of firm's activities, industrial health of the country, availability of material, ease or tightness of money markets affect the working capital.
- Factors which influence cash balance include credit position of the company, status of receivables and inventory accounts, nature of business enterprise and management's attitude towards risk.
- The amount of time needed for inventories to travel through the various process directly affect the amount of investment. The investment in inventories is guided by minimization of costs and management's ability to predict the forces that may cause disruption in the follow of inventories like strikes or shifts in demand for the product.
- Factors influencing investment in receivables are mainly the cost and time values of funds.
- The operating cycle is the length of time between the company's outlay on raw materials, wages and other expenditures and the inflow of cash from the sale of the goods.
- In deciding company's working capital policy, an important consideration is trade-off between profitability and risk.
- Working capital leverage may refer to the way in which a company's profitability is affected in part by its working capital management.
- Funds flow represent movement of all assets particularly of current assets because of movement in fixed assets is expected to be small except at times of expansion or diversification.

- Cash management means management of cash in currency form, bank balance and readily marketable securities.
- As John Maynard Keynes put, these are three possible motives for holding cash, such as transaction motive, precautionary motives and speculative motive.
- Inventory management has at its core the objective of holding the optimum level of inventory at the lowest cost.
- There are various technical tools used in inventory management such as ABC analysis, Economic Order Quantity (EOQ) and inventory turnover analysis.
- ABC analysis is based on paid to those item which account for a larger value of consumption rather than the quantity of consumption.
- EOQ determines the order size that will minimize the total inventory cost  $EOQ = \sqrt{\frac{2AB}{C}}$
- Factoring is a type of financial service which involves an outright sale of the receivables of a firm to a financial institution called the factor which specializes in the management of trade credit.

### SELF-TEST QUESTIONS

(These are meant for re-capitulation only. Answers to these questions are not to be submitted for evaluation)

1. What do you understand by working capital? What are its components?
2. "Working Capital Management is nothing more than deciding about level, structure and financing of current assets". Comment.
3. How would you assess the working capital requirements for seasonal industry in which you have been appointed as Finance Manager? Illustrate your answer with the example.
4. What are the norms for working capital management to be observed in sick industries? How would you control the liquidity of resources to avoid sickness in industrial unit facing shortage of cash resources?
5. Write short note on banking norms and macro aspects of working capital management keeping in view the recommendations of the Tandon Committee and Chore Committee.
6. What is the significance of working capital for a firm?
7. Briefly describe main constituents of working capital?
8. Why does the operating cycle determine the extent of working capital?
9. Describe the principles of effective cash management.
10. What are the main components of inventory?
11. Write short notes on the following:
  - (i) Working Capital Leverage.
  - (ii) Financing of working capital.
  - (iii) Techniques for control of working capital.



# Lesson 9

## Security Analysis and Portfolio Management

### LESSON OUTLINE

#### SECURITY ANALYSIS

- Measuring of Systematic and Unsystematic Risk
- Fundamental Analysis (Economic, Industry and Company)
- Technical Approach and Efficient Capital Market Theory

#### PORTFOLIO MANAGEMENT

- Meaning, Objectives; Portfolio Theory
- Traditional Approach; Fixed and Variable Income Securities
- Markowitz Portfolio Theory
- Modern Approach - CAPM Model
- Economic Value Added
- Sharpe Single & Multi Index Model
- Arbitrage Pricing Theory (APT)
- Risk Adjusted Measure of Performance
- LESSON ROUND UP
- SELF TEST QUESTIONS

### LEARNING OBJECTIVES

Security Analysis and Portfolio Management are two very important aspect of financial management and these are essential function of a finance manager. Keeping this important aspect in view, the subject Security Analysis and Portfolio Management has been included in the syllabus. The object of the study is to enable the students to understand:

The object of the study is enable the students understand –

- Concept of Investment and Security Analysis
- Risks and its types
- Approaches to Valuation of a Security
- Fundamental Analysis
- Technical Analysis
- Efficient – Market Theory
- Portfolio Management
- Portfolio Analysis
- Risk in Investment situation
- Markowitz Model
- Sharp Index Model
- Capital Asset Pricing Model
- Arbitrage Pricing Theory

## THE CONCEPT OF SECURITY ANALYSIS

Security Analysis means the entire process of estimating return and risk for individual securities. It involves analysis of various attributes of a security with a view to determine its value for investment decisions. Investments generally involve real assets or financial assets. Real assets are tangible, material things such as buildings, , furniture, automobiles etc. Financial assets are pieces of paper representing an indirect claim to real assets in form of debt or equity commitments. Therefore, a security is understood to be a debt or equity instrument issued by a firm in lieu of the funds raised by it to meet its long term and short term requirements. Among the many properties that distinguish real from financial assets are liquidity and marketability. These features make the financial assets more attractive for investors as they are able to liquidate their investments easily in ready and active markets.

For the purpose of our discussion we shall stick to the definition only and consider various avenues available in the Indian context. We shall, therefore, describe the term securities generally and discuss the prevalent options available in the Indian Securities market.

## WHAT ARE SECURITIES

Securities may be defined as instruments issued by seekers of funds in the investment market to the providers of funds in lieu of funds.

These instruments prima facie provide evidence of ownership to the holder of the instrument. The owner is entitled to receive all the benefits due on the instrument and to retrieve his investment at the time of redemption. Securities can broadly be divided into two categories – Debt Securities and Equity Securities. However, Section 2(h) of Securities Contract (Regulation) Act, 1956, defines securities as under:

### Securities include –

- (i) shares, scrips, stocks, bonds, debentures, debenture stock or other marketable securities of a like nature in or of any incorporated company or body corporate.
  - (ia) derivative.
  - (ib) units or any other instrument issued by any collective investment scheme to the Investors in such schemes.
  - (ic) security receipt as defined in clause (zg) of Section 2 of the Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest Act, 2002.
  - (id) units or any other such instrument issued to the investors under any mutual fund scheme.
  - (ie) any certificate or instrument (by whatever name called) issued to an investor by any issuer being a special purpose distinct entity which possesses any debt or receivable including mortgage debt, assigned to such entity and acknowledging beneficial interest of such investor in such debt or receivable, including mortgage debt, as the case may be.
- (ii) government securities.
  - (iia) such other instruments as may be declared by the Central Government to be securities and,
- (iii) rights or interests in securities.

The investor makes a comparison of the returns available from each avenue of investment, the element of risk involved in it and then makes the investment decision that he perceives to be the best having regard to the time frame of the investment and his own risk profile.

Investment differs from speculation. Speculation also involves deployment of funds but it is not backed by a



conscious analysis of pros and cons. Mostly it is a spur of the moment activity that is promoted and supported by half-baked information and rumours. Speculative deployment of funds is generally prevalent in the secondary equity market. What attracts people to speculation is a rate of return that is abnormally higher than the prevailing market rates. The balancing of risk and return nevertheless operates in speculative activity also and as such the risk element in speculation is very high.

Investment differs from gambling and betting also. Both gambling and betting are games of chance in which return is dependent upon a particular event happening. Here also, there is no place for research-based activity. The returns in gambling are high and known to the parties in advance.

To say that investors like return and dislike risk is, however, simplistic. To facilitate our job of analyzing securities and portfolios within a risk return context, we must begin with a clear understanding of what risk and return are, what creates them and how they should be measured.

## RISKS AND ITS TYPES

Risk in security analysis is generally associated with the possibility that the realized returns will be less than the returns that were expected. Risk can be further classified as systematic risk and unsystematic risk. Those forces that are uncontrollable, external and broad in their effect are called sources of systematic risk. On the other hand, controllable, internal factors which are peculiar to a particular industry or firm/(s) are known as unsystematic risk.

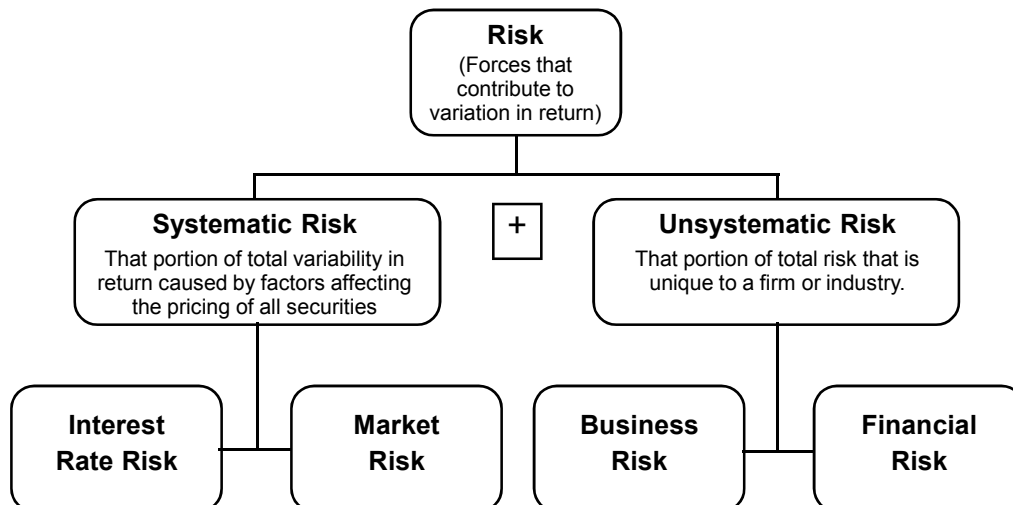
In this way economic, political and sociological changes are sources of systematic risk. For example, if an economy moves into recession or if there is a political upheaval, it will cause the prices of nearly all the securities, whether bond or equity to decline.

Conversely, unsystematic risk is the portion of the total risk that is unique to a firm or industry. It may be because of change in management, labour strikes which will impact the returns of only specific firms which are facing the problem.

Firms with high systematic risk tend to be those whose sales, profits and stock prices follow the general trend in the level of economic or stock market activity. These may include companies that deal in basic industrial goods like automobile manufactures.

Higher proportion of unsystematic risk are found in firms producing non durable consumer goods. Examples include suppliers of telephone, power and food stuffs.

Chart: Risk and its Types



Systematic and unsystematic risk can be subdivided. Systematic risk for bonds is normally identified with interest rate risk; for stocks with market risk. Unsystematic risk includes business and financial risk.

### Return of the Security

Another important property of a security that the investors are concerned with is the return that can be expected from holding a security. Earning a return on an investment requires a passage of time. After some time has passed, one may make an objective measurement of the rate of an investment return that has been achieved. The word “return” can be misleading, since no single measure of return can answer all possible questions regarding results. The reasons lie in the fact that taxes, inflation, commissions, and the timing of cashflows all play major roles in “correct” calculation of returns.

### Total Return

Total return, or holding period return ( $r$ ), is perhaps the best unique, rational and comparable measures of results, no matter what type of asset is under discussion. For example, if a bought a stock on April 1, for ₹ 10, received Re.1 in dividends at year end, and the stock price was ₹11 on March 31st, then total return or holding period return is :

$$1+r = \frac{\text{Income payments received during the period (₹) + Value at end period}}{\text{Value at the beginning of the period (₹)}}$$

$$1+r = (1+11)/10 = 1.20$$

$$r = (1+r) - 1$$

$$r = 0.2 \text{ or } 20\%$$

If ₹. 1 is invested in the Tata Steel stock at the end of 1950 had grown to ₹ 347.96 by the end of 2012 and if all dividends had been reinvested and there were no taxes or transaction costs paid, the overall return for the 62-year period would be:

$$1+r = 348/1 = 348$$

$$r = 3470\%$$

This can be converted into an annual total return by solving:

$$r = \sqrt[n]{(1+r_1)(1+r_2)\dots(1+r_n)} - 1$$

where  $n$  = number of years

$$r = \sqrt[62]{1+348} - 1 = 9.9\%$$

This 9.9 percent is the compound rate of return on the investment that will turn Re.1 into ₹ 348 in 62 years.

Often, it is necessary to adjust the return for taxes which makes a difference to the total returns. Let us take a simple example to illustrate these points.

Portfolio Information		
Beginning value		₹ 1,00,000
<b>Cash flows</b>		
Dividends received	₹7,500	
Capital appreciation	₹12,500	
Ending value		₹1,20,000
Total Return	[(1,20,000/1,00,000)]-1 = <b>20%</b>	

Suppose the investor has a tax rate of 30%. The ₹7,500 in dividends yields only ₹5,250 after taxes ( $₹7,500 \times .70$ ), and the capital gains is only ₹8,750 after taxes ( $₹12,500 \times .70$ ). So, after-tax return equals

$$[(1,00,000 + 5,250 + 8,750) / 1,00,000] - 1 = 14\%$$

High nominal returns may also reflect high inflation rate. Suppose that during the performance measurement period a 10 percent return was required just to maintain purchasing power. After-tax real return equals

$$[(1,00,000 + 5,250 + 8,750) / 1,00,000(1.10)] - 1 = 3.6364\%$$

So, the rate of return to this portfolio is either 20% or 14% or 3.6364%. for a tax exempt investor the 20% return is appropriate. For a taxable investor, the return is only 14%. Inflation affects both equally.

## APPROACHES TO VALUATION OF SECURITY

Security analysis begins with assessing the intrinsic value of security. There are three main schools of thought on the matter of security price evaluation. Advocates of different schools can be classified as (1) Fundamentalists; (2) Technicians; and (3) efficient market advocates. Let us compare these different perspectives in summary form before describing them in detail.

**(1) The Fundamental Approach:** The Fundamental approach suggests that every stock has an intrinsic value. Estimate of intrinsic worth of a stock is made by considering the earnings potential of firm which depends upon investment environment and factors relating to specific industry, competitiveness, quality of management, operational efficiency, profitability, capital structure and dividend policy. The earning potential is converted into the present value of the future stream of income from that stock discounted at an appropriate risk related rate of interest. Security analysis is done to compare the current market value of particular security with the intrinsic or theoretical value. Decisions about buying and selling an individual security depends upon the comparison. If the intrinsic value is more than the market value, the fundamentalists recommend buying of the security and vice versa.

**(2) Technical Approach:** The technical analyst endeavours to predict future price levels of stocks by examining one or many series of past data from the market itself. The basic assumption of this approach is that history tends to repeat itself and the price of a stock depends on supply and demand in the market place and has little relationship with its intrinsic value. All financial data and market information of a given security is reflected in the market price of a security. Therefore, an attempt is made through charts to identify price movement patterns which predict future movement of the security. The main tools used by technical analysis are: (1) The Dow Jones theory which asserts that stock prices demonstrate a pattern over four to five years and these patterns are mirrored by indices of stock prices. The theory employs two Dow Jones averages – the industrial average and the transportation average. If industrial average is rising, then transport average should also rise. Simultaneous price movement is the main prediction which may show bullish as well as bearish results. Chart Patterns are used along with Dow Jones Theory to predict the market movements.

**(3) Efficient Capital Market Theory :** The theory is popularly known as “Efficient Capital Market Hypothesis: (ECMH). The advocates of this theory contend that securities markets are perfect, or at least not too imperfect. It is based on the assumption that in efficient capital markets prices of traded securities always fully reflect all publicly available information concerning those securities. For market efficiency, there are three essential conditions; (i) all available information is cost free to all market participants; (ii) no transaction costs; (iii) all investors similarly view the implications of available information on current prices and distribution of future prices of each security.

It has been empirically proved that stock prices behave randomly under the above conditions. These conditions have been rendered unrealistic in the light of the actual experience because there is not only transaction cost involved but traders have their own information base. Moreover, information is not costless and all investors do not take similar data and interpretation with them.

Efficient Market Hypothesis has put to challenge the fundamental and technical analysts to the extent that random walk model is valid description of reality and the work of charists is of no real significance in stock price analysis. In practice, it has been observed that markets are not fully efficient in the semi-strong or strong sense. Inefficiencies and imperfections of certain kinds have been observed in the studies conducted so far to test the efficiency of the market. Thus, the scope of earning higher returns exists by using original, unconventional and innovative techniques of analysis. Also, the availability of inside information and its rational interpretation can lead to strategies for deriving superior returns.

In short, if these theories are taken in their strongest forms, fundamentalists say that a security is worth the present value (discounted) of a stream of future income to be received from the security; technicians assert that the price tend data should be studied regardless of the underlying data; efficient market theorists contend that a share of stock is generally worth whatever it is selling for.

There are four confusing terms which are appearing at this juncture-face value, book value; market value and intrinsic value. Let us first clarify them.

Face value of the security is the denominating value. It is also called the nominal value. When we say that authorized share capital of a company is ₹ 200 lac divided into 20 lac shares of ₹ 10 each, we mean that the face value or the nominal value of the share is ₹ 10/- each.

The book value may be much more than the face value. Let us assume that the shares of ₹ 10/- each are issued at ₹ 30/- each. The issuer is charging a premium of ₹ 20/- for the intrinsic value equalization. The issuer normally charges premium for the following attributes:

- Long years of establishment and profitable track record.
- Leadership position in the market.
- Potential for continued growth in the future.
- Existence of free reserves with the issuer which makes the book value higher than the face value.

### Case Study

Let us clarify the concept of book value a little further. Assuming that a company has been incorporated with an authorized capital of 2 crore shares of ₹ 10/- each and the company operates profitably for three years, the broad financial position of the company shall be as under:

(₹ In lacs)

Item	Year 1	Year 2	Year 3
Income	600	1,200	2,400
Expenditure	800	1,000	1600
Profit/Loss	(200)	200	800
Equity Capital	2,000	2,000	2,000
Free Reserves	– 200	0	800
Face Value/share	10	10	10
Book Value/share (Share capital + free reserves)	9	10	14

Book value of the share of the company became less than face value at the end of the first year due to the loss incurred by it. The book value was equal to the face value at the end of the second year due to recoupment of the loss. At the end of the third year the book value become ₹ 14/- due to building up of reserves. If, after the end of the third year the issuer wishes to come up with an offering of additional shares, the offer price will not be less than ₹ 14.

In actual market conditions does the book value track the market value? We may observe the trend of few company

Sl. No.	Name of the Company	Face Value Per Share	Book Value	Market Value (As on 30 September)
(1)	(2)	(3)	(4)	(5)
1	HB Ltd.	1	13.8	168.70
2	FI Ltd.	10	136.3	250.50
3	IT Ltd.	5	314.3	3411.30
4	ITB Ltd.	10	175.8	349.80
5	BIS	10	299.3	229.70
6	RP Ltd.	10	20.4	22.60
7	RL Ltd.	10	138.2	562.60
8	IDD Ltd.	10	101.9	144.85
9	MTGL Ltd.	10	151.2	109.50
10	SC Ltd.	2	61.4	210.70
11	RLD Ltd.	5	190.5	821.15
12	HCT Ltd.	2	60.5	205.90
13	HPC Ltd.	10	173.8	172.45
14	CIP Ltd.	10	152.8	946.35
15	NES Ltd.	10	27.5	565.85
16	HH Ltd.	2	34.3	248.75
17	TISC Ltd.	10	93.6	116.50
18	LCET Ltd.	10	77.1	129.15
19	T&L Ltd.	10	133.0	167.00
20	BA Ltd.	10	283.2	380.05
21	BHL Ltd.	10	182.6	160.15
22	HIND Ltd.	10	621.5	522.10
23	ZTE Ltd.	1	99.2	57.50
24	BSS Ltd.	10	194.3	216.20
25	GRA Ltd.	10	295.3	309.00
26	GSIM Ltd.	10	75.3	367.15

27	GLX Ltd.	10	155.14	163.00
28	ASC Ltd.	10	171.17	138.15
29	CAS Ltd.	10	32.1	189.80
30	CIG Ltd.	10	18.2	131.20

We note that the market value is not equal to the book value for shares of any of the leading companies of the country. In fact, there is wide divergence between these two. The divergence is mostly on the upper side except in some cases. We can conclude, therefore, that book value is not a perfect indicator of the intrinsic value of a security. At best it can be an indicator of the floor value or base value below which the market value in normal circumstances should not slide. Book value is a historic indicator. It depicts what the company has earned and saved in the past. It does not reflect the future earning potential of the company.

Having considered that the book value is not an appropriate measure for ascertaining the real or intrinsic value of a security, let us take up a more rigorous process of evaluating securities called fundamental analysis.

### FUNDAMENTAL APPROACH TO VALUATION

The investor seeks to arrive at the real value or the intrinsic value of a security through the process of security analysis. This value is arrived at by using a number of tools of financial analysis and it approximates the level at which the demand and supply of stock of the security would be in equilibrium leading to stability of prices. Price of the security below and above this level would tend to be unstable.

Money has a “time value.” the powerful tools of compounding and discounting can help us build a theoretical framework of valuation of bonds and stocks. Bond values are reasonably easy to determine. As long as a bond is not expected to go into default, the value of the bond is made up of present values of annual interest payments plus the principal amount to be recovered at maturity or sooner. Valuation of equity is different because earnings and dividend streams are uncertain as to timing of receipt and the amount of dividend. The value of an equity stock at any moment in time can be thought of as the discounted value of a series of uncertain future dividends that may grow or decline at varying rates over time.

It is easiest to start with equity valuation where the expected holding period is one year. The benefit any investor receives from holding an equity stock consists of dividends plus any change in price during the holding period. Suppose we buy one share of SBI at the beginning of the year for ₹ 500. We hold the stock for one year. ₹20 in dividends is collected at year-end, and the share is sold for ₹530. the rate of return achieved is the composite of dividend yield and change in price (capital gains yield). Thus we get

$$\text{Dividend yield} = D/P = 20/500 = .04$$

$$\text{Capital gains yield} = 530-500/500 = .06$$

The total rate of return achieved is .04+.06=.10 or 10 percent. How might we express this same notion in terms of present values? Thus:

$$P_0 = \frac{D_1}{1+r} + \frac{P_1}{1+r}$$

where:

$D_1$  = dividend to be received at the end of year 1

$r$  = investor's required rate of return or discount rate

$P_1$  = selling price at the end of year 1

$P_0$  = selling price today

Therefore,

$$\frac{500}{1+r} = \frac{\text{₹ } 20}{1+r} + \frac{\text{₹ } 530}{1+r}$$

Will  $r = .10$  balance the equation? At a required rate of return of 10 percent, the dividend is worth ₹18.18 (₹20\*.909) and selling price has a present value of ₹ 481.8182 (₹530 \*.909)(see present value table). The combined present value is ₹ 500.

Should a rate of return of 15 percent have been required, the purchase price would have been too high at ₹ 500. (the dividend of ₹20 and selling price of ₹530 remains constant). To achieve a 15% return, the value of the stock at the beginning of the year would have had to be

$$\begin{aligned} P_0 &= (\text{₹}20/1.15) + (\text{₹}530/1.15) \\ &= \text{₹}17.39 + 460.87 \\ &= \text{₹ } 478.26 \end{aligned}$$

An alternative approach would be to ask the question: at what price must we be able to sell the stock at the end of one year (if purchase price is ₹ 500 and the dividend is ₹ 20) in order to attain a rate of return of 15 percent?

$$\begin{aligned} \text{₹ } 500 &= (\text{₹}20/1.15) + (P_1/1.15) \\ \text{₹ } 500 &= \text{₹}17.39 + .87 P_1 \\ \text{₹ } 554.72 &= P_1 \text{ (selling price)} \end{aligned}$$

Now let us look at a multiple year holding period. In most cases dividends will grow from year to year. We can similarly add the present value of all dividends to be received over the holding period and the present value of the selling price of the stock to the end of the holding period to arrive at the present value of the stock.

To simplify let us assume that dividends will grow at the constant rate into the indefinite future. Under this assumption the value of a share is

$$P_0 = \frac{D(1+g)}{(1+r)^1} + \frac{D(1+g)^2}{(1+r)^2} + \frac{D(1+g)^3}{(1+r)^3} + \dots + \frac{D(1+g)^n}{(1+r)^n}$$

where  $N$  approaches infinity, this equation collapses simply to

$$P_0 = \frac{D_1}{r - g}$$

This model states that the price of a share should be equal to next year's expected dividend divided by the difference between the appropriate discount rate for the share and its expected long term growth rate. Alternatively, this model can be stated in terms of the rate of return on an equity share as

$$r = (D_1/P_0) + g$$

**Illustration:** An investor is holding 1000 shares of Right Choice Ltd. The current rate of dividend paid by the company is ₹ 5/- per share. The long term growth rate is expected to be 10% and the expected rate of return is 19.62%. We need to find out the current market price of the share:

**Solution**

$$P_0 = \frac{D(1+g)}{r - g}$$

$$= \frac{5(1 + 0.10)}{.1962 - .10}$$

$$\frac{5 \times 1.1}{0.0962} = \frac{5.5}{0.0962} = 57.17$$

The real value or intrinsic value is valid for a given set of conditions. These conditionalities include the national and international economic situation, industry specific and company specific circumstances. The first three conditionalities are viewed from a macro perspective in order to even out the effect of minor happenings. The last conditionality is observed at the micro level because at this level, even relatively smaller happenings can disturb the demand supply equilibrium.

Fundamental analysis is a three level systematic process that analyse the overall external and internal environment of the company before placing a value on its shares. The three levels at which the analysis is carried out are the following:

- (a) Analysis of the economy
- (b) Industry Level Analysis
- (c) Company Analysis

We shall describe the analytical process at all these levels in greater details hereunder:

### Analysis of the economy

Performance of a company is intimately related to the overall economic environment of the country because demand for products and services of the company would under normal circumstances be directly related to growth of the country's economy. If the country has an improving GDP growth rate, controlled inflation and increasing investment activity then chances are that the valuation of securities shall be liberal. The capital market is said to be in a bullish phase with share values shooting up across the board. As the economy is growing, the analyst expects almost every industry to do well.

On the other hand, if the GDP growth rate slackens, inflation is out of control and investment activity is stagnant or declining, the investor or the analyst will expect the performance of industries to slow down. Under such circumstances, valuation of securities tends to be conservative. The capital market enters a bearish phase and share values decline across the board.

### Industry Level Analysis

Industry level analysis focuses on a particular industry rather than on the broader economy. In this analysis, the analyst has to look for the composition of the industry, its criticality vis-à-vis the national economy, its position along the industrial life cycle, entry and exit barriers. All these factors have a bearing upon the performance of the company.

Industry is a combination or group of units whose end products and services are similar. Having a common market, the participants in the industry group face similar problems and opportunities. To the extent that an industry loses or gains from certain happenings, the performance of the participants is sure to be similarly impacted. These happenings may be technological changes, shifts in consumer preferences, availability of substitutes etc. These changes also drive the life cycle of the industry.

The industry life cycle or the industry growth cycle can be divided into three major stages-pioneering stage, expansion stage and stagnation stage. The pioneering stage is related to sunrise status of the industry. It is the stage when technological development takes places. The products have been newly introduced in the market and they gain ready acceptance. The pioneering units in the industry make extraordinary profits and thus attract competition. As competition increases profitability in the industry comes under strain and less efficient firms are



forced out of the market. At the end of the pioneering stage, selected leading companies remain in the industry.

In the expansion stage of the growth cycle the demand for the products increases but at a lower rate. There is less volatility in prices and production. Capital is easily available in plenty for these units. Due to retention of profits, internal accruals increase.

At the stagnation stage, the growth rate initially slows down, then stagnates and ultimately turns negative. There is no product innovation. External capital is hard to come by. Even the internal capital takes flight. This stage of the industry is most valuable during times of slow down in national economy.

### Company Analysis

Armed with the economic and industry forecasts, the analyst looks at the company specific information. Company information is generated internally and externally. The principle source of internal information about a company is its financial statements. Quarterly and annual reports including the income statement, the balance sheet and cash flows must be screened to assure that the statements are correct, complete, consistent, and comparable. Many popular and widely circulated sources of information about the companies emanate from outside, or external sources. These sources provide supplements to company-generated information by overcoming some of its bias, such as public pronouncements by its officers. External information sources also provide certain kinds of information not found in the materials made available by companies themselves. There are traditional and modern techniques of company analysis.

Among the traditional techniques are forecasting expected dividends and earnings using price-earning ratios which help us to determine whether a stock is fairly valued at a point in time. Such approaches allow us to evaluate an equity share for a short term horizon. Moreover, an approach combining the dividend discount model (with variable growth rates) and the concept of systematic risk can also be helpful in evaluating a stock for a longer term holding period. Among the modern methods are regression analysis, and the related tools of trend and correlation analysis, decision tree analysis and simulation. Modern methods have strengths of the traditional methods while attempting to overcoming their shortcomings.

### TECHNICAL ANALYSIS

In the fundamental analysis, share prices are predicted on the basis of a three stage analysis. After the analysis has been completed, the deciding factors that emerge are the financial performance indicators like earnings and dividends of the company. The fundamentalist makes a judgement of the equity share value with a risk return framework based upon the earning power and the economic environment. However, in actual practice, it often happens that a share having sound fundamentals refuses to rise in value and vice versa. We would now examine an alternative approach to predicting share price behavior. This approach is called the Technical Analysis. It is used in conjunction with fundamental analysis and not as its substitute.

Technical analysis assumes that market prices of securities are determined by the demand-supply equilibrium. The shifts in this equilibrium give rise to certain patterns of price and volume of trading which have a tendency to repeat themselves over a period of time. An analyst who is familiar with these patterns can predict the future behaviour of stock prices by noticing the formation of these patterns.

It is a science of predicting the share price movements from the past data about share price movements. These predictions are indicative and do not provide irrefutable declarations about future trends. In this type of analysis, no weightage is given to intangible items like investors' attitude, market sentiment, optimism, pessimism etc.

Technical analysis is based on the following assumptions:

- The inter-play of demand and supply determines the market value of shares.
- Supply and demand are governed by various factors – both rational and irrational.
- Stock values tend to move in trends that persist for a reasonable time.

- These trends change as a result of change in demand-supply equilibrium.
- Shifts in demand and supply can be detected in charts of market action.
- Chart patterns tend to repeat themselves and this repetition can be used to forecast future price movements.
- Markets behave in a random style.
- Markets discount every future event that has a bearing upon share values.

## DOW JONES THEORY

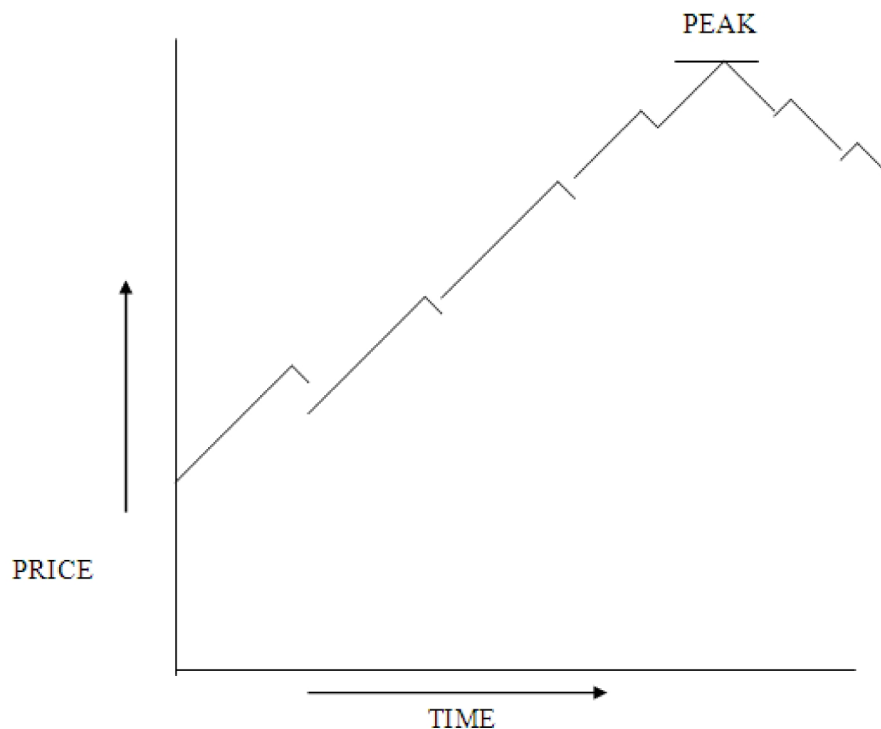
It is one of the earliest theories of technical analysis. The theory was formulated by Charles H. Dow of Dow Jones & Co. who was the first editor of Wall street Journal of USA. According to this theory, share prices demonstrate a pattern over four to five years.

These patterns can be divided into three distinct cyclical trends- primary, secondary and minor trends.

The primary trend lasts from one to three years. Over this period, the markets exhibit definite upward or downward movement which is punctuated by shorter spans of trend reversal in the opposite directions. The trend reversal is called the secondary trend. Primary trend is indicative of the overall pattern of movement.

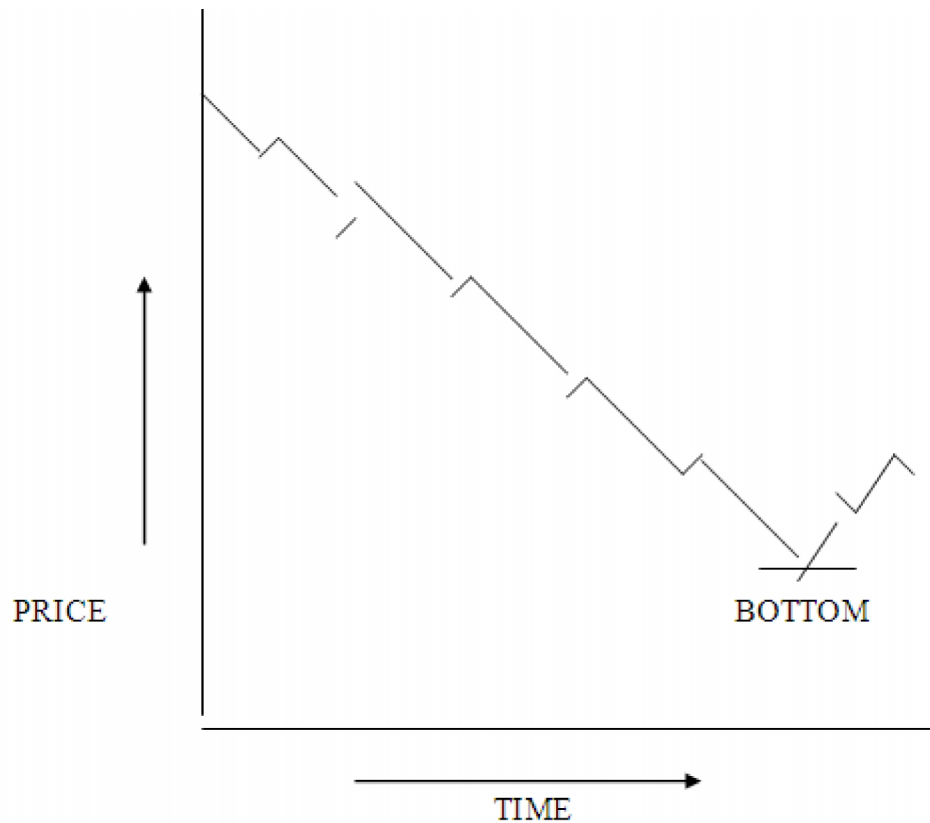
If the primary trend is upward, it is called a bullish phase of the market. If the primary trend is downwards, it is called a bearish phase. Illustrations of bullish phase and bearish phase are given below:

### Graph of Bullish Phase



In a bullish phase, after each peak, there is a fall but the subsequent rise is higher than the previous one. The prices reach higher level with each rise. After the peak has been reached, the primary trend now turns to a bearish phase.

### Graph of a Bearish Phase



In a bearish phase, the overall trend is that of decline in share values. After each fall, there is slight rise but the subsequent fall is even sharper. The secondary trend reversals last for one to three months.

Minor trends are changes occurring every day within a narrow range. These trends are not decisive of any major movement.

### TOOLS OF TECHNICAL ANALYSIS

The two variables concerning groups of securities or individual securities that technicians watch are the behavior of prices and volume of trading contributing to and influenced by changing prices. Technical analysts use two major types of tools for their analysis. These are the charts and the price indicators.

#### 1. TECHNICAL CHARTS

These are the plottings of prices and trading volumes on charts. The purpose of reading and analysing these charts is to determine the demand-supply equation at various levels and thus to predict the direction and extent of future movement of the prices. The charts are not infallible but because of their repeated accuracy, they have come to be accepted. In all the charts, a correlation exists between market price action and the volume of trading when the price increase is accompanied by a surge in trading volumes, it is a sure sign of strength. On the other hand, when the decline in share prices is accompanied by increased volumes, it is indicative of beginning of bearish trend.

There are three ways to construct a chart. These are the Line Chart, Bar Chart and Point & Figure Chart.

#### Line Chart

In a Line Chart, the closing prices of successive time periods are connected by straight lines and the intra-period highs and lows of stock prices are ignored. This type of chart is useful for making broad analysis over a longer period of time.

**(a) Bar Chart** – These charts portray intra-period high, low and closing values on a single vertical line designated for each time period. The vertical dimensions of the line represent price. The horizontal axis of the chart indicates the complete time period of analysis. Bar charts focus on time, volume and price.

**(c) Point and Figure Chart** – In this type of charts, emphasis is laid on charting price changes only and time and volume elements are ignored. The first step in drawing a figure and point chart is to put a X in the appropriate price column of a graph. Successive price increases are added vertically upwards in the same column as long as the uptrend continues. Once the price drops, the figures are moved to another column and Os are entered in downward series till the downward trend is reversed.

### Patterns created by charts

Once the charts have been constructed, analysts seek to locate certain indicators/patterns in the charts. The common patterns are being described below:

#### 1. Support and resistance levels

A support level indicates the bottom which the share values are unable to pierce. After rising time and again, the share price dips to a particular level and then starts rising again. At this level, the share gets buying support. A resistance level is that level after which the share price refuses to move up in repeated efforts. At this level, selling emerges. Support and resistance levels are valid for a particular time period. Once these levels are breached, beginning of a new bull or bear phase is signaled.

#### 2. Heads and Shoulders configuration

In this type of chart configuration, a formation similar to heads and shoulders is created wherein the neckline acts as the resistance or support line. As the head and shoulder top is formed, a resistance level appears at the top of the head. The volumes start declining near the head top and reversal sets in. The volumes become heavy again and shrink near the neckline where another reversal of trend begins.

### Limitations of charts

Interpretation of charts is prone to subjective analysis. This factor is a major cause of often contradictory analysis being derived from the same charts. Also the changes in charts are quite frequent in the short term perspective leading to a host of buy and sell recommendations which are not in the best interest of the investor. Another disadvantage is that decisions are made on the basis of chart alone and other factors are ignored.

## 2. TECHNICAL INDICATORS

Apart from the charts, technical analysts use a number of indicators generated from prices of stocks to finalise their recommendations. These indicators are often used in conjunction with charts. Some of the important indicators are the Advance Decline Ratio, the Market Breadth Index and Moving Averages.

### (a) Advance-Decline Ratio

It is the ratio of the number of stocks that increase to the number of stocks that have declined. If the ratio is more than one, the trend is assumed to be bullish. If the ratio starts declining, a change of trend is signaled.

### (b) Market Breadth Index

This index is a variation of the Advance-Decline Ratio. This index is computed by taking the difference between the number of stocks rising and the number of stocks falling. If during a month, 400 out of 1000 stocks in the market have risen and 300 have declined while 300 have remained unchanged, then market breadth would be calculated as  $= 2(400-300)/300$ . The figure of each time period is added to the previous period. If market breadth is increasing along with rise in stock indices, it confirms the bullish trend and vice versa.

### (c) Moving Averages

A moving average is the average of share values of a set of consecutive number of days. If we have to calculate 50 days moving average, we calculate the average for days 1–50. Then on day 51, we add the value of day 51 and deduct the value of day 1 and so on. Similarly, moving averages for 100 days, 200 days and 300 days can be calculated. Moving averages provide a benchmark for future valuation. If share value is below the moving average, it has scope for appreciation. If the value is above the moving average, the upside is limited in the near term.

## ALTERNATIVE APPROACHES TO VALUATION

### 1. Random walk theory

In the Fundamental Analysis, factors such as economic influences, industry factors and particular company information are considered to form a judgement on share value. On the other hand, price and volume information is analysed in Technical Analysis to predict the future course of share values. There is another approach which negates both Fundamental and Technical analysis. This approach has been based upon the research aimed at testing whether successive price changes are independent in different forms of market efficiency.

According to the theory, share prices will rise and fall on the whims and fancies of manipulative individuals. As such, the movement in share values is absolutely random and there is no need to study the trends and movements prior to making investment decisions. No sure prediction can be made for further movement or trend of share prices based on the given prices as at a particular moment. The Random Walk Theory is inconsistent with technical analysis. Whereas, it states that successive price changes are independent, the technicians claim that they are dependent. But believing in random walk does not mean that one should not believe in analyzing stocks. The random walk hypothesis is entirely consistent with an upward and downward movement in price, as the hypothesis supports fundamental analysis and certainly does not attack it.

One of the advantages of this theory is that one is not bothered about good or bad judgement as shares are picked up without preference or evaluation. It is easier for believers in this theory to invest with confidence. The second advantage is that there is no risk of being ill informed while making a choice as no information is sought or concealed.

Random walk theory implies that short term price changes i.e. day to day or week to week changes are random but it does not say anything about trends in the long run or how price levels are determined.

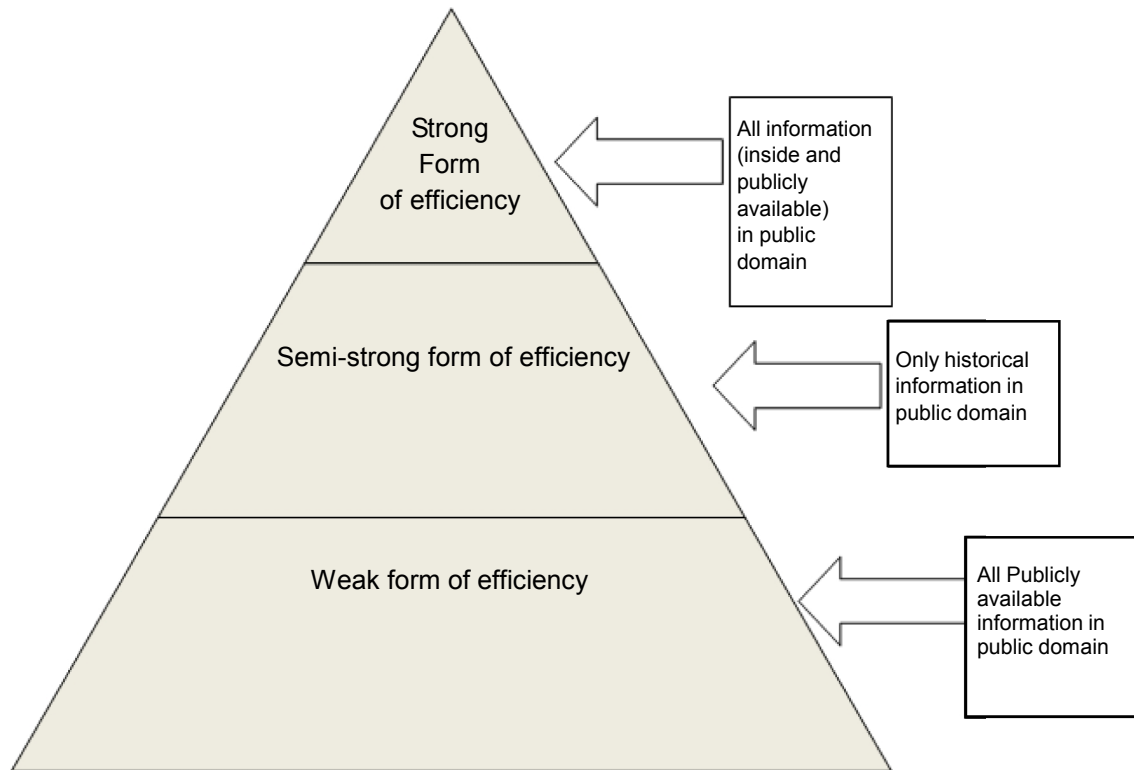
### 2. Efficient – Market Theory

Efficient Market Hypothesis accords supremacy to market forces. A market is treated as efficient when all known information is immediately discounted by all investors and reflected in share prices. In such a situation, the only price changes that occur are those resulting from new information. Since new information is generated on a random basis, the subsequent price changes also happen on a random basis. Major requirements for an efficient securities market are:

- Prices must be efficient so that new inventions and better products will cause a firms' securities prices to rise and motivate investors to buy the stocks.
- Information must be discussed freely and quickly across the nations so that all investors can react to the new information.
- Transaction costs such as brokerage on sale and purchase of securities are ignored.
- Taxes are assumed to have no noticeable effect on investment policy.
- Every investor has similar access to investible funds at the same terms and conditions.
- Investors are rational and make investments in the securities providing maximum yield.

Research studies devoted to test the random walk theory on Efficient Capital Market Hypothesis (ECMH) are put into three categories i.e.

- (a) the strong form,
- (b) the semi-strong form, and
- (c) the weak form theory.



**(a) The Strong Form of Efficiency:** This test is concerned with whether two sets of individuals – one having inside information about the company and the other uninformed could generate random effect in price movement. The strong form holds that the prices reflect all information that is known. It contemplates that even the corporate officials cannot benefit from the inside information of the company. The market is not only efficient but also perfect. The findings are that very few and negligible people are in such a privileged position to have inside information and may make above-average gains but they do not affect the normal functioning of the market.

**(b) Semi-strong form of Efficiency:** This hypothesis holds that security prices adjust rapidly to all publicly available information such as functional statements and reports and investment advisory reports, etc. All publicly available information, whether good or bad is fully reflected in security prices. The buyers and sellers will raise the price as soon as a favourable piece of information is made available to the public; opposite will happen in case of unfavourable piece of information. The reaction is almost instantaneous, thus, printing to the greater efficiency of securities market.

**(c) The Weak Form theory:** This theory is an extension of the random walk theory. According to it, the current stock values fully reflect all the historical information. If this form is assumed to be correct, then both Fundamental and Technical Analysis lose their relevance. Study of the historical sequence of prices, can neither assist the investment analysts or investors to abnormally enhance their investment return nor improve their ability to select stocks. It means that knowledge of past patterns of stock prices does not aid investors to make a better choice. The theory states that stock prices exhibit a random behaviour.

In this way, if the markets are truly efficient, then the fundamentalist would be successful only when (1) he has

inside information, or (2) he has superior ability to analyse publicly available information and gain insight into the future of the company. The empirical evidence of the random walk hypothesis rests primarily on statistical tests, such as runs test, correlation analysis and filter test. The results have been almost unanimously in support of the random walk hypothesis, the weak form of efficient market hypothesis.

## PORTFOLIO MANAGEMENT

Individual securities have risk-return characteristics of their own. In any case, given an estimate of return, the investor is always concerned about the probable downside price expectation or the risk. Portfolio, or combination of securities, helps in spreading this risk over many securities. The investors hope that if they hold different assets, even if one goes bad, the others will provide some protection from an extreme loss.

Portfolio management thus refers to managing efficiently the investment in the securities by diversifying the investments across industry lines or market types. The reasons are related to the inherent differences in the debt and equity markets, coupled with a notion that investment in companies in dissimilar industries would most likely do much better than the companies within the same industry.

However, there is disagreement over the “right” kind of diversification and the “right” reason. In the following paragraphs a formal, advanced notion of diversification conceived by Harry Markowitz will be introduced. Markowitz assumes that investor attitudes towards portfolio depend exclusively upon (1) expected return and risk, and (2) quantification of risk. And risk is, by proxy, the statistical notion of variance, or standard deviation of return.

## PORTFOLIO ANALYSIS

While discussing Security Analysis, we had restricted our discussion to the behavior of value of individual equity securities. Portfolio Analysis seeks to analyze the pattern of returns emanating from a portfolio of securities, i.e. a number of securities that absorb a proportion of total amount of investment. Although holding two securities is probably less risky than a portfolio composed exclusively of less risky asset. How? This is done by finding two securities each of which tends to perform well whenever the other does poorly. This makes a reasonable return for the portfolio more certain as a whole, even if one of its components happens to be quite risky. For example, if you invest in two stocks, say, one in company engaged in sugar production and other, in a company engaged in cement production, you would be always able to get a reasonable return as cement is a highly cyclical industry and sugar is non cyclical. When cement industry will rise, the sugar industry will just perform below average but when cement industry will fall sugar industry will outperform.

We shall clarify the concept of Portfolio with the help of following illustration:

	<i>Stock X</i>	<i>Stock Y</i>
Return (%)	7 or 11	13 or 5
Probability	.5 each return	.5 each return
Expected return(%)	9*	9†
Variance (%)	4	16
Standard deviation(%)	2	4

$$*\text{Expected return} = (.5)(7) + (.5)(11) = 9$$

$$\dagger\text{Expected return} = (.5)(13) + (.5)(5) = 9$$

It is clear that although X and Y have the same expected return, 9 percent, Y is riskier than X (standard deviation of 4 versus 2). Suppose that when X's return is high, Y's return is low, and vice versa. In other words, when the return on X is 11 percent, the return on Y is 5 percent; similarly, when the return on X is 7 percent, the return on Y is 13 percent. Question: Is a portfolio of some X and some Y in any way superior to an exclusive holding of X

alone (has it less risk)?

Let us construct a portfolio consisting of two-thirds stock X and one-third stock Y. The average return of this average return of each security in the portfolio; that is;

$$(20.1) \quad R_p = \sum_{i=1}^N X_i R_i$$

where:

$R_p$  = expected return to portfolio

$X_i$  = proportion of total portfolio invested in security i

$R_i$  = expected return to security i

$N$  = total number of securities in portfolio

Therefore,

$$R_p = (2/3)(9) + (1/3)(9) = 9$$

But what will be the range of fluctuation of the portfolio? In periods when X is better as an investment, we have  $R_p = (2/3)(11) + (1/3)(5) = 9$ ; and similarly, when Y turns out to be more remunerative,  $R_p = (2/3)(7) + (1/3)(13) = 9$ . Thus, by putting part of the money into the riskier stock, Y, we are able to reduce risk considerably from what it would have been if we had confined our purchases to the less risky stock, X. If we held only stock X, our expected return would be 9 percent, which could in reality be as low as 7 percent in bad periods or as much as 11 percent in good periods. The standard deviation is equal to 2 percent. Holding a mixture of two-thirds X and one-third Y, our expected and experienced return will always be 9 percent, with a standard deviation of zero. We can hardly quarrel with achieving the same expected return for less risk. In this case we have been able to eliminate risk altogether.

The above illustration indicates that it is better to spread out or diversify the investment in order to minimize the risk associated with investment in single securities. This fact is the essence of Portfolio Analysis.

Portfolio is a collection of securities belonging to a diverse set of industries. Management of a portfolio is considered to be a specialised activity because of the time and effort involved in tracking of each component of the portfolio. Portfolio management is a relatively new concept in security analysis. It gained prominence after World War II when it was realised that the instability of the securities market had put at stake fortunes of individuals, companies and governments. It was then discovered that investing in a basket of stocks maximised profits while minimising risks.

### Risk in investment situation

We have seen in the above illustration that investment in securities X and Y has been fraught with risk because the return on investment has varied from one year to the other and obviously from any expected rate of return also that might have been fixed.

Risk means that the return on investment would be less than the expected rate. Risk is a combination of possibilities because of which actual returns can be different or greatly different from expected returns. Thus risk can be high or low. In case we want to quantify how high or how low the risk in investment is going to be, we have to intimate the probability of various outcomes and their deviation from expected outcome.

The risk involved in individual securities can be measured by standard deviation or variance. When two securities are combined, we need to consider their interactive risk, or covariance. If the rates of return of two securities move together, we say their interactive risk or covariance is positive. If rates of return are independent, covariance is zero. Inverse movement results in covariance that is negative. Mathematically, covariance is defined as



$$\text{COV}_{xy} = \frac{1}{N} \sum [R_x - R_x] [R_y - R_y]$$

Where the probabilities are equal and

$\text{COV}_{xy}$  = covariance between x and y

$R_x$  = return on security x

$R_y$  = return on security y

$R_x$  = expected return to security x

$R_y$  = expected return to security y

N = number of observations

Continuing with the above illustration,

	<i>Return</i>	<i>Expected Return</i>	<i>Difference</i>	<i>Product</i>
Stock X	7	9	-2	
Stock Y	13	9	4	-6
Stock X	11	9	2	
Stock Y	5	9	-4	
				-6

$$\begin{aligned} \text{COV} &= \frac{1}{2}[(7 - 9)(13 - 9) + [(11 - 9)(5 - 9)] \\ &= \frac{1}{2}[(-8) + (-8)] = \frac{-16}{2} = -8 \end{aligned}$$

The coefficient of correlation is another measure designed to indicate the similarity or dissimilarity in the behavior of two variables. We define

$$r_{xy} = \frac{\text{COV}_{xy}}{\sigma_x \sigma_y}$$

where:

$r_{xy}$  = coefficient of correlation of x and y

$\text{COV}_{xy}$  = covariance between x and y

$\sigma_x$  = standard deviation of x

$\sigma_y$  = standard deviation of y

The coefficient of correlation is, essentially, the covariance taken not as an absolute value but relative to the standard deviations of the individual securities (variables). It indicates, in effect, how much x and y vary together as a proportion of their combined individual variations, measured by  $\sigma_x \sigma_y$ . In our example, the coefficient of correlation is

$$r_{xy} = 8/[(2)(4)] = -8/8 = -1.0$$

If the coefficient of correlation between two securities is -1.0, then a perfect negative correlation exists ( $r_{xy}$  cannot be less than -1.0). If the correlation coefficient is zero, then returns are said to be independent of one

another. If the returns on two securities are perfectly correlated, the correlation coefficient will be +1.0, and perfect positive correlation is said to exist ( $r_{xy}$  cannot exceed +1.0).

Thus, correlation between two securities depends upon (1) the covariance between the two securities, and (2) the standard deviation of each security.

We have shown the effect of diversification on reducing risk. The key was not that two stocks provided twice as much diversification as one, but that by investing in securities with negative or low covariance among themselves, we could reduce the risk. Markowitz's efficient diversification involves combining securities with less than positive correlation in order to reduce risk in the portfolio without sacrificing any of the portfolio's return. In general, the lower the correlation of securities in the portfolio, the less risky the portfolio will be. This is true regardless of how risky the stocks of the portfolio are when analyzed in isolation. It is not enough to invest in many securities; it is necessary to have the right securities.

Let us conclude our two-security example in order to make some valid generalization. Then we can see what three-security and larger portfolios might be like. In considering a two-security portfolio, portfolio risk can be defined more formally now as:

$$\sigma_p = \sqrt{X^2\sigma_x^2 + Y^2\sigma_y^2 + 2XY(r_{xy}\sigma_x\sigma_y)} \text{ Eq 0.1}$$

Where:

$\sigma_p$  = portfolio standard deviation

$X_x$  = percentage of total portfolio value in stock X

$X_y$  = percentage of total portfolio value in stock Y

$\sigma_x$  = standard deviation of stock X

$\sigma_y$  = standard deviation of stock Y

$r_{xy}$  = correlation coefficient of X and Y

Note:  $r_{xy} \sigma_x \sigma_y = \text{cov}_{xy}$

Thus we now have the standard deviation of a portfolio of two securities. We are able to see that portfolio risk ( $\sigma_p$ ) is sensitive to

- (i) the proportions of funds devoted to each stock,
- (ii) the standard deviation of each stock, and
- (iii) the covariance between the two stocks.

If the stocks are independent of each other, the correlation coefficient is zero ( $r_{xy} = 0$ ). Second, if  $r_{xy}$  is greater than zero, the standard deviation of the portfolio is greater than if  $r_{xy} = 0$ . Third, if  $r_{xy}$  is less than zero, the covariance term is negative, and portfolio standard deviation is less than it would be if  $r_{xy}$  were greater than or equal to zero. Risk can be totally eliminated only if the third term is equal to the sum of the first two terms. This occurs only if (1)  $r_{xy} = -1.0$ , and (2) the percentage of the portfolio in stock X is set equal to  $X_x = \sigma_y / (\sigma_x + \sigma_y)$ .

To clarify these general statements, let us return to our earlier example of stocks X and Y. In our example, remember that

	<b>Stock X</b>	<b>Stock Y</b>
Expected return (%)	9	9
Standard deviation (%)	2	4

We calculated the covariance between the two stocks and found it to be -8. The coefficient of correlation was -1.0. The two securities were perfectly negatively correlated.

### Changing the proportion of amount invested

What happens to portfolio risk as we change the total portfolio value invested in X and Y? Using Equation 9.1, we get:

Stock X (%)	Stock Y (%)	Portfolio Standard Deviation
100	0	2.0
80	20	0.8
66	34	0.0
20	80	2.8
0	100	4.0

Notice that portfolio risk can be brought down to zero by the skillful balancing of the proportions of the portfolio to each security. The preconditions were  $r_{xy} = -1.0$  and the proportion of amount invested in X is  $X_x = \sigma_y / (\sigma_x + \sigma_y)$ , or  $4 / (2 + 4) = .666$ .

### Changing the Coefficient of Correlation

What effect would be there using  $x = 2/3$  and  $y = 1/3$  if the correlation coefficient between stocks X and Y had been other than -1.0? Using Equation 9.2 and various values for  $r_{xy}$ , we have

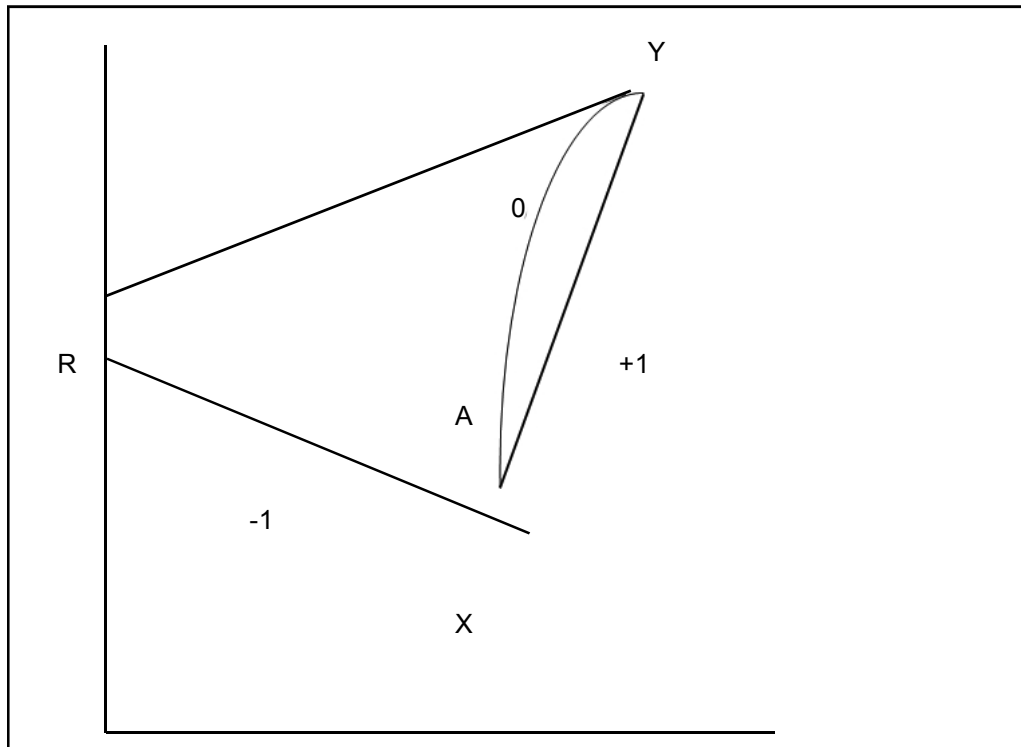
$r_{xy}$	Portfolio Standard Deviation
-0.5	1.34*
0.0	1.9
+0.5	2.3
+1.0	2.658

$$\begin{aligned} * \sigma_p \sqrt{ } &= (.666)^2(2)^2 + (.334)^2(4) + 2(.666)(.334)(-5)(2)(4) = \\ &\sqrt{1.777 + 1.777 - (.444)(4)} = \sqrt{1.77} = 1.34 \end{aligned}$$

If no diversification effect had occurred, then the total risk of the two securities would have been the weighted sum of their individual standard deviations:

$$\text{Total undiversified risk} = (.666)(2) + (.334)(4) = 2.658$$

Since the undiversified risk is equal to the portfolio risk of perfectly positively correlated securities ( $r_{xy} = +1.0$ ), we can see that favorable portfolio effects occur only when securities are not perfectly positively correlated.

**Figure: 10.1 : Graphic illustration of the correlation between two securities**

Line XY represent various combinations of X and Y. Point X has 100% holding of X and point Y has 100% holding of Y. The coefficient of correlation along XY is +1. It means that 100% holding of X is least risky and 100% holding of Y is most risky.

Segment XAY has zero correlation and line XR has  $-1$  coefficient of correlation.

The crucial point of how to achieve the proper proportions of X and Y in reducing the risk to zero will be taken up in the Markowitz model. However, the general notion is clear. The risk of the portfolio is reduced by playing off one set of variations against another.

### MARKOWITZ MODEL

Dr. Harry M. Markowitz is credited with developing the first modern portfolio analysis model. It provides a theoretical framework for analysis of risk-return choices. The concept of efficient portfolios has been enunciated in this model. A portfolio is efficient when it yields highest return for a particular level of risk or minimizes risk for a specified level of expected return.

The Markowitz model makes the following assumptions regarding investor behaviour:

- Investors consider each investment alternative as being represented by a probability distribution of expected returns over some holding period.
- Investors maximize one period expected utility and possess utility curve, which demonstrates diminishing marginal utility of wealth.
- Individuals estimate risk on the basis of variability of expected returns.
- Investors base decisions solely on expected return and variance of returns only.
- At a given risk level, higher returns are preferred to lower returns. Similarly for a given level of expected returns, investors prefer less risk to more risk.

## Simple Markowitz Portfolio Optimization

It is possible to develop a fairly simply decision rule for selecting an optimal portfolio for an investor that can take both risk and return into account. This is called a risk-adjusted return. For simplicity, it can be termed the utility of the portfolio for the investor in question. Utility is the expected return of the portfolio minus a risk penalty. This risk penalty depends on portfolio risk and the investor's risk tolerance.

### The Risk Penalty

The more risk one must bear, the more undesirable is an additional unit of risk. Theoretically, and as a computational convenience, it can be assumed that twice the risk is four times as undesirable. The risk penalty is as follows:

$$\text{Risk penalty} = \text{Risk squared} / \text{Risk tolerance}$$

Risk squared is the variance of return of the portfolio. Risk tolerance is a number from zero through 100. The size of the risk tolerance number reflects the investor's willingness to bear more risk for more return. Low (high) tolerance indicates low (high) willingness. Risk penalty is less as tolerance is increased.

For example, if a portfolio's expected return is 13 percent, variance of return (risk squared) is 225 percent, and the investor's risk tolerance is 50. the risk penalty is 4.5 percent:

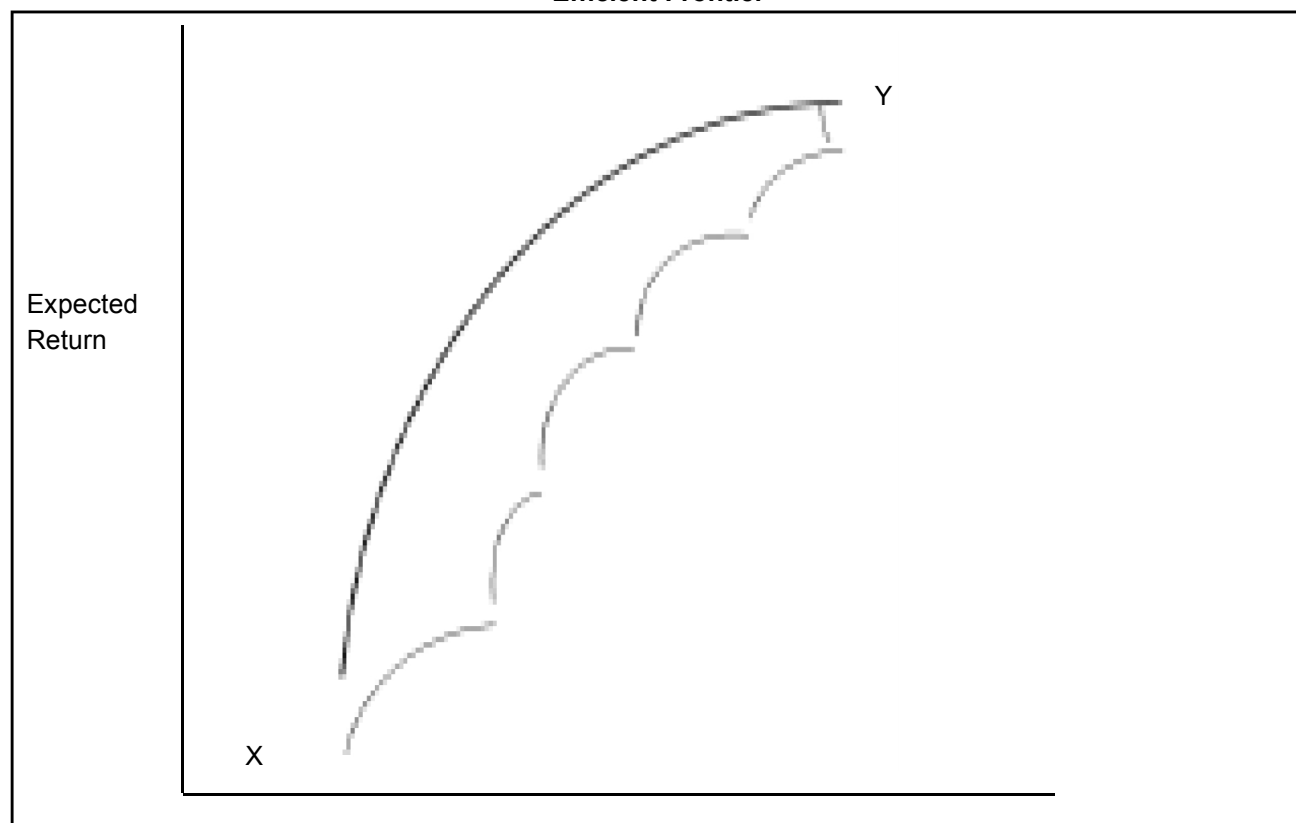
$$\text{Risk penalty} = 225\% / 50 = 4.5\%$$

Since utility is expected return minus the risk penalty, we have

$$\text{Utility} = 13 - 4.5 = 8.5\%$$

The optimal (best) portfolio for an investor would be the one from the opportunity set (efficient frontier) that maximizes utility.

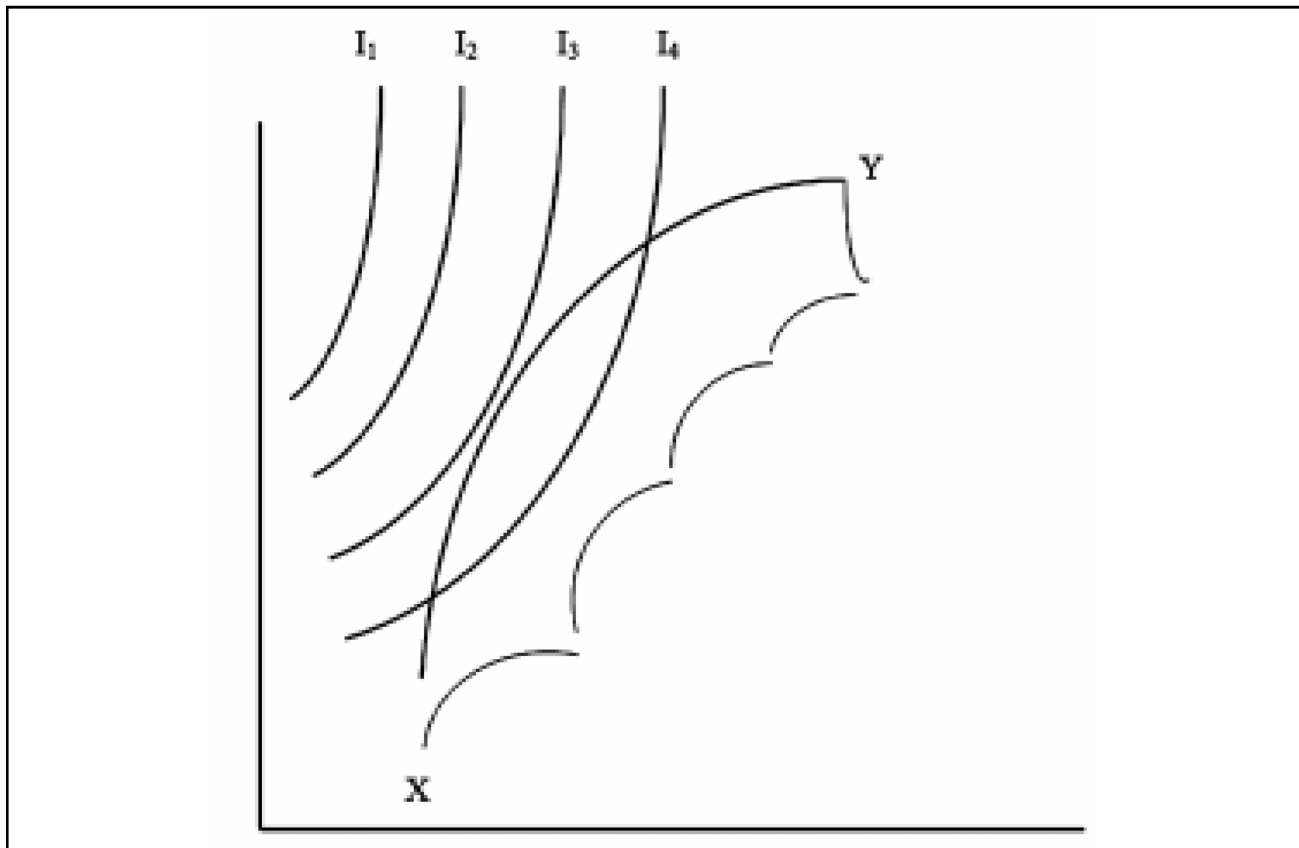
### Efficient Frontier



### Standard Deviation

In the above graphic presentation, arc XY is the efficient frontier. All points on this arc provide a superior combination of risk and return to other combinations with the shaded area, which represent attemptable portfolios. Each portfolio has its own combination of risk and return. Investor's final choice out of the range depends on his taste.

### Portfolio Optimization



The investor has four indifference curves.

In  $I_1$  to  $I_4$ ,  $I_1$  provides greatest satisfaction but since the efficient range touches only  $I_3$  is the maximum that can be achieved.

### Limitation of Markowitz Model

The Markowitz approach requires several inputs for portfolio analysis. These are expected return of the securities, variances of their return and co variances. Calculation of efficient portfolios is easy when the number of securities in the portfolio is two or three. As the number of securities in the portfolio increases, which indeed is the case in real life situations, the amount of calculations required to be done becomes enormous. Further, in the real world, portfolio analysts do not keep track of correlations between stocks of diverse industries. As such, correlating a security to a common index is much more convenient than correlating to a large number of individuals securities.

Secondly, the assumption that correlation in the values of two securities depends on the characteristics of these two securities alone is not valid. In fact movement in value of securities is affected by a variety of other factors. A stock index is more representative benchmark that incorporates the general economic conditions more authentically.

## CAPITAL ASSET PRICING MODEL

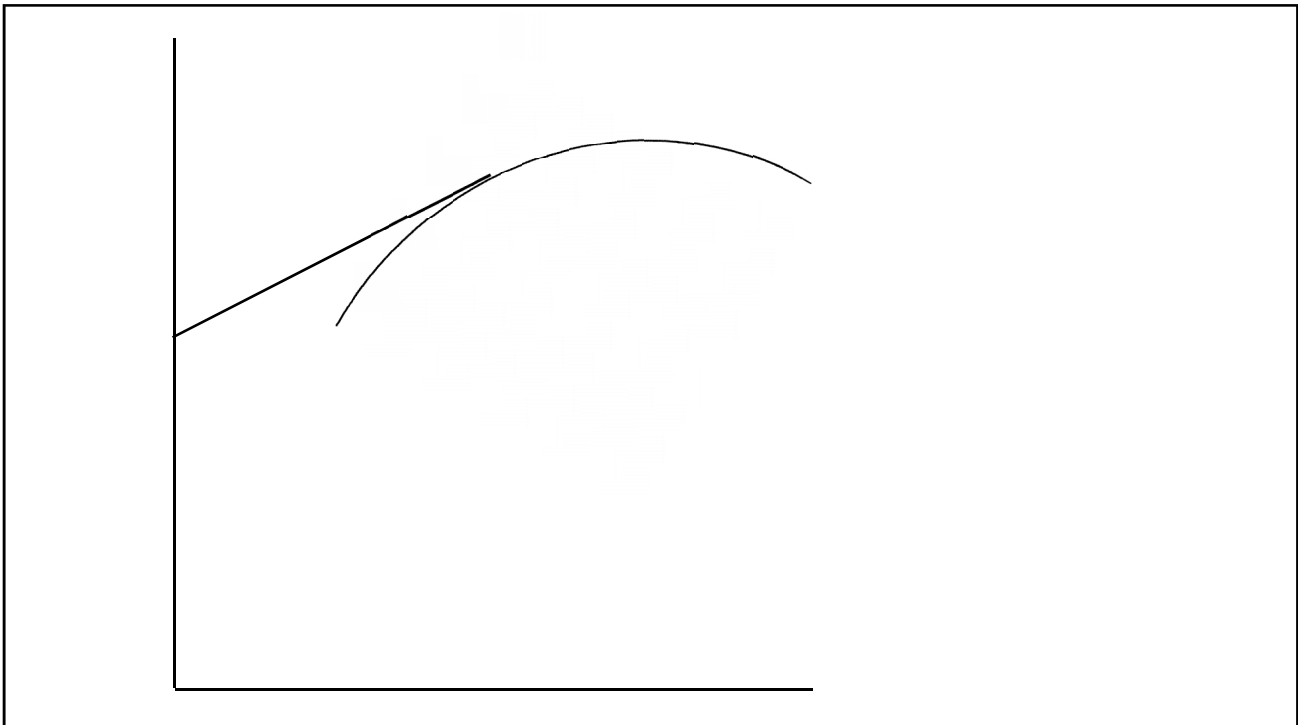
The CAPM developed by William F Sharpe, John Linter and Jan Mossin establishes a linear relationship between the required rate of return of a security and its beta. Beta, as we know is the non-diversifiable risk in a portfolio. A portfolio's standard deviation is a good indicator of its risk. Thus if adding a stock to a portfolio increases its standard deviation, the stock adds to the risk of the portfolio. This risk is the un-diversified risk that can not be eliminated. Beta measures the relative risk associated with any individual portfolio as measured in relation to the risk of the market portfolio.

$$\text{Beta} = \frac{\text{Non-diversifiable risk of asset or portfolio}}{\text{Risk of market portfolio}}$$

Thus Beta is a measure of the non-diversifiable or systematic risk of an asset relative to that of the market portfolio. A beta of 1 indicates an asset of average risk. If beta is more than 1, then the stock is riskier than the market. On the other hand, if beta is less than one, market is riskier.

Recall that portfolio theory implied that each investor faced an efficient frontier. In general, the efficient frontier will differ among investors because of differences in expectations. When we introduce riskless borrowing and lending there are some significant changes involved. Lending is best thought of as an investment in a riskless security. This security might be a savings account, Treasury bills, or even high-grade commercial paper. Borrowing can be thought of as the use of margin. Borrowing and lending options transform the efficient frontier into a straight line. See Figure below for the standard efficient frontier ABCD. Assume that an investor can lend at the rate of  $R_F = .05$ , which represents the rate on Treasury bills.

**Frontier with introduction of Lending**



Hence the point  $R_F$  represents a risk-free investment ( $R_F = .05; \sigma_p = 0$ ). The investor could place all or part of his funds in this riskless asset. If he placed part of his funds in the risk-free asset and part in one of the portfolios of risky securities along the efficient frontier, what would happen? He could generate portfolios along the straight-line segment  $R_F B$ .

Let us examine the properties of a given portfolio along the straight-line segment RF B. Consider point B on the original efficient frontier ABCD where, say,  $R_p = .10$  and  $\sigma_p = .06$ . If we placed one-half of available funds in the riskless asset and one-half in the risky portfolio, B, the resulting combined risk-return measures for the mixed portfolio, O, can be found from Equation A and B:

$$(eq^A) \quad R_p = XRM + (1 - X)RF$$

where:

$R_p$  = expected return on portfolio

$X$  = percentage of funds invested in risky portfolio

$(1 - X)$  = percentage of funds invested in riskless asset

$RM$  = expected return on risky portfolio

$RF$  = expected return on riskless asset

and:

$$(eq^B) \quad \sigma_p = X \sigma_M$$

where:

$\sigma_p$  = expected standard deviation of the portfolio

$X$  = percentage of funds invested in risky portfolio

$\sigma_M$  = expected standard deviation on risky portfolio

For our example, the risk-return measures for portfolio M are:

$$R_p = \left(\frac{1}{2}\right)(.10) + \left(\frac{1}{2}\right)(.05) = .075$$

$$\sigma_p = \left(\frac{1}{2}\right)(.06) + \left(\frac{1}{2}\right)(.00) = .03$$

Introduction of the possibility of borrowing funds will change the shape of our efficient frontier in 22.1 to the right of point B. In borrowing, we consider the possibilities associated with total funds invested being enlarged through trading on the equity.

Consider three cases. If we assume that  $X$  is the percentage of investment wealth or equity placed in the risky portfolio, then where  $X = 1$ , investment wealth is totally committed to the risky portfolio. Where  $X < 1$ , only a fraction of  $X$  is placed in the risky portfolio, and the remainder is lent at the rate  $RF$ . The third case,  $X > 1$ , signifies that the investor is borrowing rather than lending. It may be easier to visualize this by rewriting Equation A as follows:

$$(eq^C) \quad R_p = XR_M - (X - 1) R_F$$

where all terms are as in Equation A and the term  $RF$  is the borrowing rate. For simplicity, the borrowing rate and lending rate are assumed to be equal or 5 percent. The first component of Equation C is the gross return made possible because the borrowed funds, as well as the original wealth or equity, are invested in the risky portfolio. The second term refers to the cost of borrowing on a percentage basis. For example,  $X = 1.25$  would indicate that the investor borrows an amount equal to 25 percent of his investment wealth. This is equivalent to a margin requirement of 80 percent ( $X = 1/\text{margin requirement}$ ). His net return on his investment wealth would become:



$$R_p = (1.25) (.10) - (0.25) (.05) = .1125$$

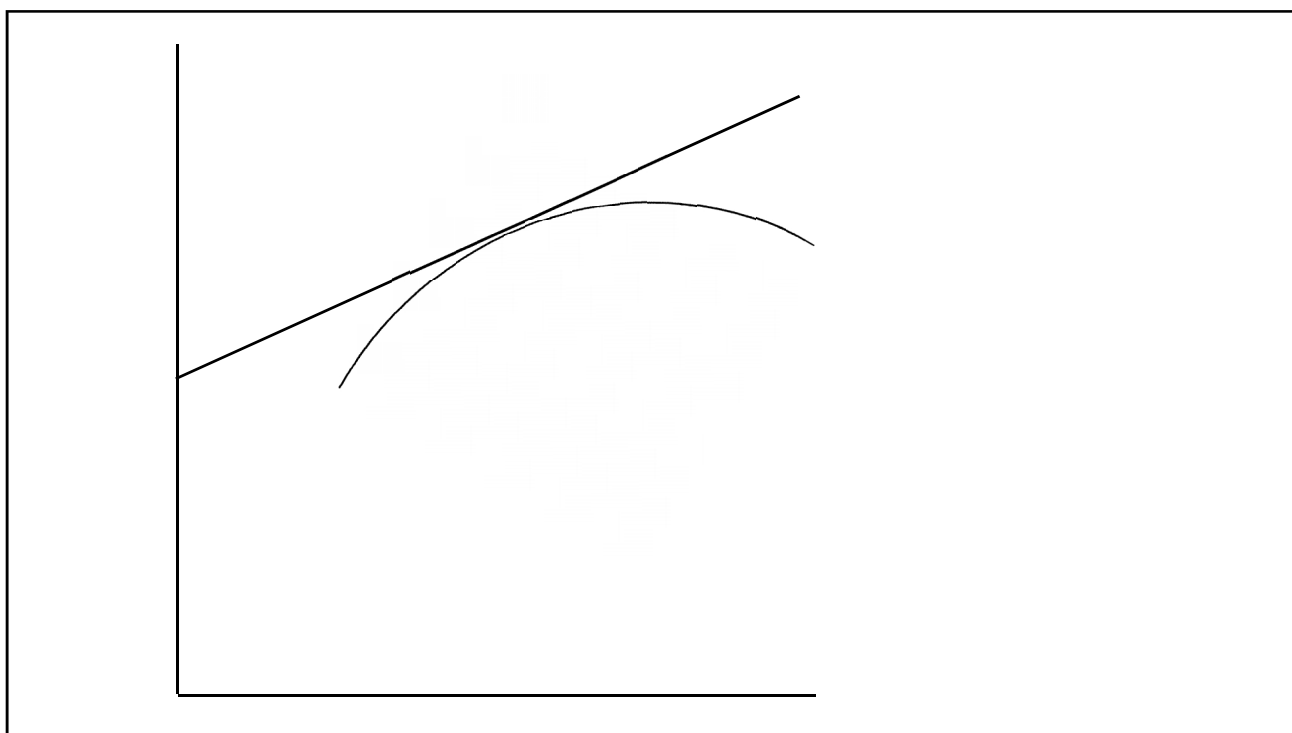
The associated risk would become:

$$\sigma_p = X\sigma_p = (1.25) (.06) = .075$$

Hence the levered portfolio provides increased return with increased risk.

The introduction of borrowing and lending has given us an efficient frontier that is a straight line throughout. In Figure below we show the new efficient frontier. Point M now represents the optimal combination of risky securities. The existence of this combination simplifies our problem of portfolio selection. The investor need only decide how much to borrow or lend. No other investments or combination of investments available is as efficient as point M. the decision to purchase M is the Investment decision. The decision to buy some riskless asset (lend) or to borrow (leverage the portfolio) is the financing decision.

### Efficient Frontier with Borrowing and Lending



These conditions give rise to what has been referred to as the separation theorem. The theorem implies that all investors, conservative or aggressive, should hold the same mix of stocks from the efficient set. They should use borrowing or lending to attain their preferred risk class. This conclusion flies in the face of more traditional notions of selection of portfolios for conservative clients and others for investors who are more daring. This analysis suggests that both types of investors should hold identically risky portfolios. Desired risk levels are then achieved through combining portfolio M with lending and borrowing.

If all investors face similar expectations and the same lending and borrowing rate, they will face a diagram such as that in Figure above and, furthermore, all of the diagrams will be identical. The portfolio of assets held by any investor will be identical to the portfolio of risky assets held by any other investor. If all investors hold the same risky portfolio, then, in equilibrium, it must be the market portfolio (M). The market portfolio is a portfolio comprised of all risky assets. Each asset will be held in the proportion which the market value of the asset represents to the total market value of all risky assets. This is the key: All investors will hold combinations of only two portfolios, the market portfolio and a riskless security.

The straight line depicted in Figure above is referred to as the capital market line. All investors will end up with portfolios somewhere along the capital market line and all efficient portfolios would lie along the capital market line. However, not all securities or portfolios lie along the capital market line. From the derivation of the efficient frontier we know that all portfolios, except those that are efficient, lie below the capital market line.

Observing the capital market line tells us something about the market price of risk. The equation of the capital market line (connecting the riskless asset with a risky portfolio) is

$$R_e = R_F + \frac{R_M - R_F}{\sigma_M} \sigma_e$$

where the subscript e denotes an efficient portfolio.

The term  $(R_M - R_F) / \sigma_M$  can be thought of as the extra return that can be gained by increasing the level of risk (standard deviation) on an efficient portfolio by one unit.

The entire second term on the right side of the equation is thus the market price of risk times the amount of risk in the portfolio. The expression  $R_F$  is the price of time. That is, it is the price paid for delaying consumption for one period. The expected return on an efficient portfolio is

$$(\text{Price of time}) + (\text{Price of risk}) (\text{Amount of risk})$$

Although this equation sets the return on an efficient portfolio, we need to go beyond to deal with returns on nonefficient portfolios or on individual securities.

### Security Market Line

For well-diversified portfolios, nonsystematic risk tends to go to zero, and the only relevant risk is systematic risk measured by beta. Since we assume that investors are concerned only with expected return and risk, the only dimensions of a security that need be of concern are expected return and beta.

We have seen that all investments and all portfolios of investments lie along a straight line in the return-to-beta space. To determine this line we need only connect the intercept (beta of zero, or riskless security) and the market portfolio (beta of one and return of  $R_M$ ). These two points identify the straight line shown in Figure below. The equation of a straight line is

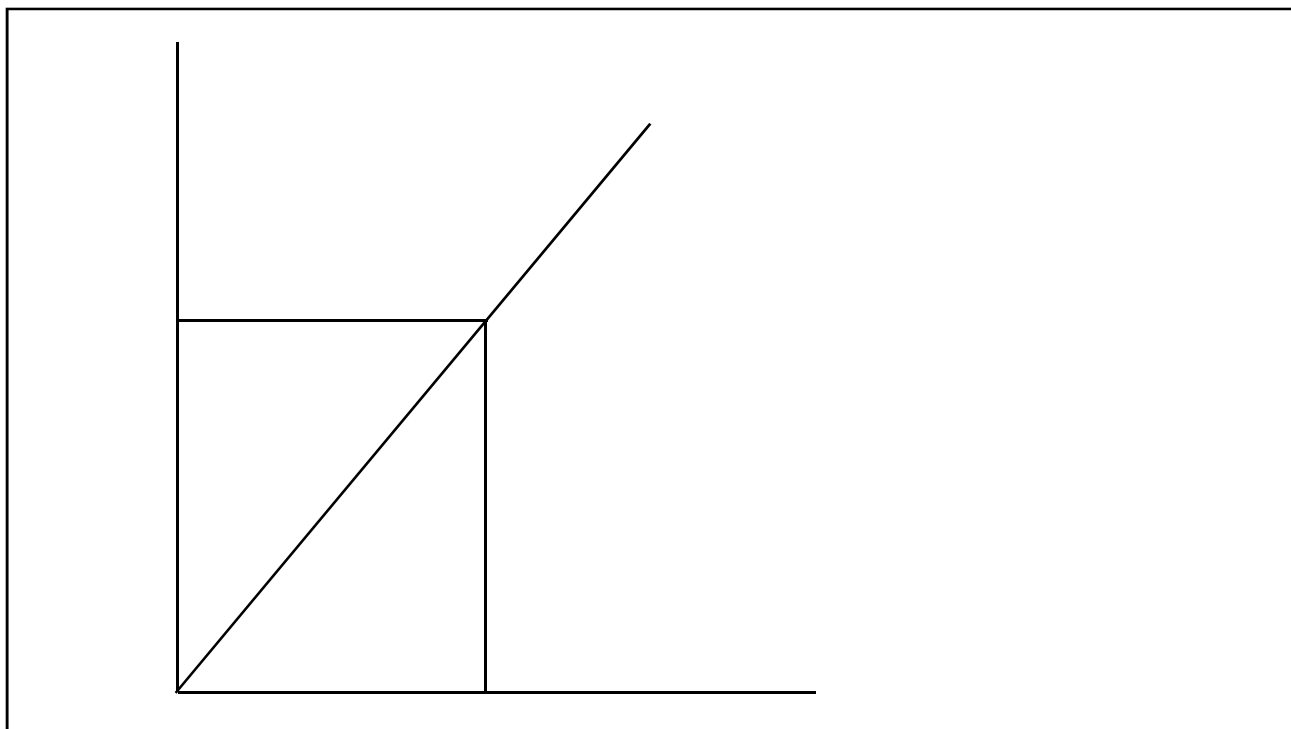
$$R_i = \alpha + b\beta_i$$

The first point on the line is the riskless asset with a beta of zero, so

$$R_F = \alpha + b(0)$$

$$R_F = \alpha$$

FIGURE The Security Market Line



The second point on the line is the market portfolio with a beta of 1. Thus,

$$R^M = \alpha + b(1)$$

$$R_M - \alpha = b$$

$$(R_M - R_F) = b$$

Combining the two results gives us

$$R_i = R_F + \beta_i (R_M - R_F)$$

This is a key relationship. It is called the security market line. It describes the expected return for all assets and portfolios of assets, efficient or not. The difference between the expected return on any two assets can be related simply to their difference in beta. The higher beta is for any security, the higher must be its expected return. The relationship between beta and expected return is linear.

Recall that in the beginning of this chapter we said that the risk of any stock could be divided into systematic and unsystematic risk. Beta is an index of systematic risk. This equation suggests that systematic risk is the only important ingredient in determining expected returns. Unsystematic risk is of no consequence. It is not total variance of returns that affects returns, only that part of the variance in returns that cannot be eliminated by diversification.

The CAPM is based on a list of critical assumptions:

- Investors are risk averse and use the expected rate of return and standard deviation of return as appropriate measures of risk and return for their portfolio.
- Investors make their investments decisions based on a single period horizon which is the immediate next time period.

- Transaction costs are either absent or so low that these can be ignored.
- Assets can be bought and sold in any desired unit.
- The investor is limited by his wealth and the price of the asset only.
- Taxes do not affect the choice of buying assets.
- All individuals assume that they can buy the assets at the going market price and they all agree on the nature of the return and risk associated with each investment.

In the CAPM, the expected rate of return is equal to the required rate of return because the market is in equilibrium. The risk-less rate can be earned by investing in instruments like treasury bills. In addition to the risk free rate, investors also expect a premium over and above the risk free rate to compensate them for investing in risky assets since they are risk averse. Thus the required rate of return for the investors becomes equal to the sum of Risk-free rate and the risk premium.

The risk premium can be calculated as the product of Beta and market risk premium, i.e. difference between expected rate of return and risk-free rate of return.

### ECONOMIC VALUE ADDED

Adam Smith, one of the fathers of classical economic thought, observed that firms and resource suppliers, seeking to further their own self-interest and operating within the framework of a highly competitive market system, will promote the interest of the public, as though guided by an “invisible hand.” (Smith, 1776)

The market mechanism of supply and demand communicates the wants of consumers to businesses and through businesses to resource suppliers. Competition forces business and resource suppliers to make appropriate responses. The impact of an increase in consumer demand for some product will raise that goods price. The resulting economic profits signal other producers that society wants more of the product. Competition simultaneously brings an expansion of output and a lower price.

Profits cause resources to move from lower valued to higher valued uses. Prices and sales are dictated by the consumer. In the quest for higher profits, businesses will take resources out of areas with lower than normal returns and put them into areas in which there is an expectation of high profits.

### Profits allocate resources

The primary objective of any business is to create wealth for its owners. If nothing else the organization must provide a growth dividend to those who have invested expecting a value reward for their investment. As companies generate value and grow, society also benefits. The quest for value directs scarce resources to their most promising uses and most productive users. The more effectively resources are employed and managed, the more active economic growth and the rate of improvement in our standard of living as a society. Although there are exceptions to the rule relating to the value of economic wealth, most of the time there is a distinct harmony between creating increased share value of an organization and enhancing the quality of life of people in society.

In most companies today the search for value is being challenged by a seriously out of date financial management system. Often, the wrong financial focus, cash strategies, operating goals, and valuation processes are emphasized. Managers are often rewarded for the wrong achievements and in many cases they are not rewarded for the efforts that lead to real value. Balance sheets are often just the result of accounting rules rather than the focus of value enhancement. These problems beg for approaches to financial focus that are completely different from current approaches. New approaches must start nothing less than an evolution in thinking in the process of economic evaluation. One of the focuses that have proved to be incorrect in the valuation of economic worth is earnings per share (EPS). EPS has long been the hallmark of executives that appear in meetings of the shareholders, as the measure of their accomplishments. This, along with return on equity has long been thought

of as the way to attract Wall Street investment. There is nothing that points to EPS as anything more than a ratio that accounting has developed for management reporting. Many executives believe that the stock market wants earnings and that the future of the organization's stock depends on the current EPS, despite the fact that not one shred of convincing evidence to substantiate this claim has ever been produced. To satisfy Wall Street's desire for reported profits, executives feel compelled to create earnings through creative accounting. Accounting tactics that could be employed to save taxes and increase value are avoided in favor of tactics that increase profit. Capital acquisitions are often not undertaken because they do not meet a hypothetical profit return. R&D and market expanding investments get only lip service. Often increased earnings growth is sustained by overzealous monetary support of businesses that are long past their value peak. We must ask then, what truly determines increased value in stock prices. Over and over again the evidence points to the cash flow of the organization, adjusted for time and risk that investors can expect to get back over the life of the business.

Economic Value Added (EVA) is a measurement tool that provides a clear picture of whether a business is creating or destroying shareholder wealth. EVA measures the firm's ability to earn more than the true cost of capital. EVA combines the concept of residual income with the idea that all capital has a cost, which means that it is a measure of the profit that remains after earning a required rate of return on capital. If a firm's earnings exceed the true cost of capital it is creating wealth for its shareholders.

### Definition of Economic Value Added

A discussion on Economic Value Added has to begin with the origin of the concept. EVA is based on the work of Professors Franco Modigliani and Merton H. Miller. In October, 1961, these two finance professors published "Dividend Policy, Growth and the Valuation of Shares", in the Journal of Business. The ideas of free cash flow and the evaluation of business on a cash basis were developed in this article. These ideas were extended into the concept of EVA by Bennett Stewart and Joel Stern of Stern, Stewart & Company. Economic Value Added is defined as net operating profit after taxes and after the cost of capital. (Tully, 1993) Capital includes cash, inventory, and receivables (working capital), plus equipment, computers and real estate. The cost of capital is the rate of return required by the shareholders and lenders to finance the operations of the business. When revenue exceeds the cost of doing business and the cost of capital, the firm creates wealth for the shareholders.

$$\text{EVA} = \text{Net Operating Profit} - \text{Taxes} - \text{Cost of Capital}$$

### Example

Say you made a ₹ 20,000 capital investment in your company. Your operating profit, after taxes, is ₹ 10,000. The opportunity cost of that investment is 10%.

In This case EVA would be Net Operating Profit after taxes – Cost of Capital

i.e. ₹ 10,000- 10% of ₹ 20,000 = ₹ 8,000.

The goal of EVA is to take into account the cost of capital invested in the company. If you have ₹ 50,000 and you invest that money in your company, you should receive a return... but you might not, at least in the above listed example.

## SHARPE SINGLE AND MULTI INDEX MODELS

### Sharpe Index Model

One Simplification of CAPM formula was done by Sharpe (1963), who developed the Single-Index Model. The single-index model imposes restrictions on how security returns can covary. In particular, it is assumed that all covariance arises through an "index." As we will see, this leads to a dramatic reduction in complexity. Sharpe's model has since been extended to multi-index models, and leads to a more general theory called the Arbitrage Pricing Theory, developed by Ross (1976). Besides simplifying the covariance matrix, this approach is easily

extended to take account of non-financial factors. In the multi-index model, for example, one of the indexes could easily be the rate of inflation.

### Single-Index Model

The major assumption of Sharpe's single-index model is that all the covariation of security returns can be explained by a single factor. This factor is called the index, hence the name "single-index model."

According to the Sharpe single index model the return for each security can be given by the following equation:

$$R = \alpha I + \beta I + e$$

Where  $R$  = Expected return on a security

$\alpha$  = Alpha Coefficient

$\beta$  = Beta Coefficient

$I$  = Expected Return an index

$E$  = Error term with a mean of zero and a constant standard deviation.

Alpha Coefficient refers to the value of  $Y$  in the equation  $Y = ? + ? x$  when  $X = 0$ . Beta Coefficient is the slope of the regression line and is a measure of the changes in value of the security relative to changes in values of the index.

A beta of +1.0 means that a 10% change in index value would result in a 10% change in the same direction in the security value. A beta of 0.5 means that a 10% change in index value would result in 5% change in the security value. A beta of 1.0 means that the returns on the security are inversely related.

The equation given above can also be rearranged as shown below:

$$R = \beta I + \alpha + e$$

Here the component  $\beta I$  is the market related or systematic component of the return. The other component represents the unsystematic component. As is assumed to be near zero the unsystematic return is given by alpha only.

### Multi-Index Models

The multi-index model assumes a return-generating process that is a linear function of many factors. In this approach, each factor is a source of systematic risk. Since investors cannot diversify systematic risk, they are assumed to be compensated for bearing this risk.

$$r_i = \beta_0 + \beta_A f_A + \beta_B f_B + \dots + \beta_K f_K + \beta_i$$

As a result, a security's sensitivity to each factor affects the assumed return-generating process for the security. This sensitivity is captured by a "factor beta," and the return-generating process is assumed to take the form

The last term is the source of idiosyncratic or diversifiable risk. Except for the fact that multiple factors make this a richer model than the single index model, the use of a multi-factor model is similar to the single-index model.

A broad generalization of these models is the Arbitrage Pricing Theory.

### SIMPLE SHARPE PORTFOLIO OPTIMIZATION

The construction of an optimal portfolio is simplified if there is a single number that measures the desirability of including a stock in the optimal portfolio. If we accept the single index model (Sharpe), such a number exists. In this case, the desirability of any stock is directly related to its excess return-to-beta ratio.

$$R_i - R_F / \beta_i$$

where:

$R_i$  = expected return on stock  $i$

$R_F$  = return on a riskless asset

$\beta_i$  = expected change in the rate of return on stock  $i$  associated with a 1 percent change in the market return

If stocks are ranked by excess return to beta (from highest to lowest), the ranking represents the desirability of any stock's inclusion in a portfolio. The number of stocks selected depends on a unique cutoff rate such that all stocks with higher ratios of  $(R_i - R_F) / \beta_i$  will be included and all stocks with lower ratios excluded.

To determine which stocks are included in the optimum portfolio, the following steps are necessary:

1. Calculate the excess return-to-beta ratio for each stock under review and the rank from highest to lowest.
2. The optimum portfolio consists of investing in all stocks for which  $(R_i - R_F) / \beta_i$  is greater than a particular cutoff point  $C$ .

Sharpe notes that proper diversification and the holding of a sufficient number of securities can reduce the unsystematic component of portfolio risk to zero by averaging out the unsystematic risk of individual stocks. What is left is systematic risk which, because it is determined by the market (index), cannot be eliminated through portfolio balancing. Thus the Sharpe model attaches considerable significance to systematic risk and its most important measure, the beta coefficient ( $\beta$ ).

According to the model, the risk contribution to a portfolio of an individual stock can be measured by the stock's beta coefficient. The market index will have a beta coefficient of +1.0. A stock with a beta of, for example, +2.0 indicates that it contributes far more risk to a portfolio than a stock with, say, a beta of +.05. Stocks with negative betas are to be coveted, since they help reduce risk beyond the unsystematic level.

Since efficient portfolios eliminate unsystematic risk, the riskiness of such portfolios is determined exclusively by market movements. Risk in an efficient portfolio is measured by the portfolio beta. The beta for the portfolio is simply the weighted average of the betas of the component securities. For example, an optimal portfolio which has a beta of 1.35, suggests that it has a sensitivity above the + 1.0 attributed to the market. If this portfolio is properly diversified (proper number of stocks and elimination of unsystematic risk), it should move up or down about one-third more than the market. Such a high beta suggests an aggressive portfolio. Should the market move up over the holding period, this portfolio will be expected to advance substantially. However, a market decline should find this portfolio falling considerably in value.

In this way, establishing efficient portfolios (minimum risk for a given expected return) comprising broad classes of assets (e.g., stocks, bonds, real estate) lends itself to the mean-variance methodology suggested by Markowitz. Determining efficient portfolios within an asset class (e.g., stocks) can be achieved with the single index (beta) model proposed by Sharpe.

## ARBITRAGE PRICING THEORY

The capital asset pricing model (CAPM) asserts that only a single number – a security's beta against the market – is required to measure risk. At the core of arbitrage pricing theory (APT) is the recognition that several systematic factors affect security return.

The returns on an individual stock will depend upon a variety of anticipated and unanticipated events. Anticipated events will be incorporated by investors into their expectations of returns on individual stocks and thus will be incorporated into market prices. Generally, however, most of the return ultimately realized will result from

unanticipated events. Of course, change itself is anticipated, and investors know that the most unlikely occurrence of all would be the exact realization of the most probable future scenario. But even though we realize that some unforeseen events will occur, we do not know their direction or their magnitude. What we can know is the sensitivity of returns to these events.

Systematic factors are the major sources of risk in portfolio returns. Actual portfolio returns depend upon the same set of common factors, but this does not mean that all portfolios perform identically. Different portfolios have different sensitivities to these factors.

Because the systematic factors are primary sources of risk, it follows that they are the principal determinants of the expected, as well as the actual, returns on portfolios. It is possible to see that the actual return,  $R$ , on any security or portfolio may be broken down into three constituent parts, as follows:

$$(Z) \quad R = E + bf + e$$

where:

$E$  = expected return on the security

$b$  = security's sensitivity to change in the systematic factor

$f$  = the actual return on the systematic factor

$e$  = returns on the unsystematic, idiosyncratic factors

Equation Z merely states that the actual return equals the expected return, plus factor sensitivity times factor movement, plus residual risk.

Empirical work suggests that a three-or-four-factor model adequately captures the influence of systematic factors on stock-market returns. Equation Z may thus be expanded to:

$$R = E + (b_1)(f_1) + (b_2)(f_2) + (b_3)(f_3) + (b_4)(f_4) + e$$

Each of the four middle terms in this equation is the product of the returns on a particular economic factor and the given stock's sensitivity to that factor. Suppose  $f_3$  is associated with labor productivity. As labor productivity unexpectedly increases,  $f_3$  is positive, and firms with high  $b_3$  would find their returns very high. The subtler rationale and higher mathematics of APT are left for development elsewhere.

What are these factors? They are the underlying economic forces that are the primary influences on the stock market. Research suggests that the most important factors are unanticipated inflation, changes in the expected level of industrial production, unanticipated shifts in risk premiums, and unanticipated movements in the shape of the term structure of interest rates.

The biggest problems in APT are factor identification and separating unanticipated from anticipated factor movements in the measurement of sensitivities. Any one stock is so influenced by idiosyncratic forces that it is very difficult to determine the precise relationship between its return and a given factor. Far more critical is the measurement of the  $b$ 's. The  $b$ 's measure the sensitivity of returns to unanticipated movements in the factors. By just looking at how a given stock relates to, say, movements in the money supply, we would be including the influence of both anticipated and unanticipated changes, when only the latter are relevant.

Empirical testing of APT is still in its infancy, and concrete results proving the APT or disproving the CAPM do not exist. For these reasons it is useful to regard CAPM and APT as different variants of the true equilibrium pricing model. Both are, therefore, useful in supplying intuition into the way security prices and equilibrium returns are established.



## RISK ADJUSTED MEASURE OF PERFORMANCE

Does the choice of risk-adjusted performance measure matter?" This is the question the current discussion in academic literature revolves around. Risk-adjusted performance measures are an important tool for investment decisions. Whenever an investor evaluates the performance of an investment he will not only be interested in the achieved absolute return but also in the risk-adjusted return – i.e. in the risk which had to be taken to realize the profit.

The first ratio to measure risk-adjusted return was the Sharpe Ratio introduced by William F. Sharpe in 1966. It has been one of the most referenced risk/return measures used in finance, and much of this popularity can be attributed to its simplicity. The ratio's credibility was boosted further when Professor Sharpe won a Nobel Memorial Prize in Economic Sciences in 1990 for his work on the capital asset pricing model (CAPM).

### The Ratio Defined

Most people with a financial background can quickly comprehend how the Sharpe ratio is calculated and what it represents. The ratio describes how much excess return you are receiving for the extra volatility that you endure for holding a riskier asset. Remember, you always need to be properly compensated for the additional risk you take for not holding a risk-free asset.

$$S(X) = (r_x - R_f) / \text{StdDev}(X)$$

where

- $X$  is the investment
- $r_x$  is the average rate of return of  $x$
- $R_f$  is the best available rate of return of a risk-free security (i.e. T-bills)
- $\text{StdDev}(X)$  is the standard deviation of  $r_x$

### Return ( $r_x$ )

The returns measured can be of any frequency (i.e. daily, weekly, monthly or annually), as long as they are normally distributed, as the returns can always be annualized. Herein lies the underlying weakness of the ratio - not all asset returns are normally distributed.

Abnormalities like kurtosis, fatter tails and higher peaks, or skewness on the distribution can be a problematic for the ratio, as standard deviation doesn't have the same effectiveness when these problems exist. Sometimes it can be downright dangerous to use this formula when returns are not normally distributed.

### Risk-Free Rate of Return ( $r_f$ )

The risk-free rate of return is used to see if you are being properly compensated for the additional risk you are taking on with the risky asset. Traditionally, the risk-free rate of return is the shortest dated government T-bill (i.e. U.S. T-Bill). While this type of security will have the least volatility, some would argue that the risk-free security used should match the duration of the investment it is being compared against.

For example, equities are the longest duration asset available, so shouldn't they be compared with the longest duration risk-free asset available - government issued inflation-protected securities (IPS)?

### Standard Deviation [ $\text{StdDev}(x)$ ]

Now that we have calculated the excess return from subtracting the return of the risky asset from the risk-free rate of return, we need to divide this by the standard deviation of the risky asset being measured. As mentioned above, the higher the number, the better the investment looks from a risk/return perspective.

How the returns are distributed is the Achilles heel of the Sharpe ratio. Bell curves do not take big moves in the market into account. As Benoit Mandelbrot and Nassim Nicholas Taleb note in their article, "How The Finance Gurus Get Risk All Wrong", which appeared in Fortune in 2005, bell curves were adopted for mathematical convenience, not realism.

However, unless the standard deviation is very large, leverage may not affect the ratio. Both the numerator (return) and denominator (standard deviation) could be doubled with no problems. Only if the standard deviation gets too high do we start to see problems. For example, a stock that is leveraged 10 to 1 could easily see a price drop of 10%, which would translate to a 100% drop in the original capital and an early margin call.

### Using the Sharpe Ratio

The Sharpe ratio is a risk-adjusted measure of return that is often used to evaluate the performance of a portfolio. The ratio helps to make the performance of one portfolio comparable to that of another portfolio by making an adjustment for risk.

For example, if manager A generates a return of 15% while manager B generates a return of 12%, it would appear that manager A is a better performer. However, if manager A, who produced the 15% return, took much larger risks than manager B, it may actually be the case that manager B has a better risk-adjusted return.

To continue with the example, say that the risk free-rate is 5%, and manager A's portfolio has a standard deviation of 8%, while manager B's portfolio has a standard deviation of 5%. The Sharpe ratio for manager A would be 1.25 while manager B's ratio would be 1.4, which is better than manager A. Based on these calculations, manager B was able to generate a higher return on a risk-adjusted basis.

To give you some insight, a ratio of 1 or better is considered good, 2 and better is very good, and 3 and better is considered excellent.

The Sharpe ratio is quite simple, which lends to its popularity. It's broken down into just three components: asset return, risk-free return and standard deviation of return. After calculating the excess return, it's divided by the standard deviation of the risky asset to get its Sharpe ratio. The idea of the ratio is to see how much additional return you are receiving for the additional volatility of holding the risky asset over a risk-free asset - the higher the better.

### CASE STUDIES

**Question No 1:** The following table summarizes risk premiums for stocks relative to treasury bills and bonds, for different time periods:

#### Risk Premium for Equity

	Stocks - T. Bills		Stocks - T. Bonds	
	Arithmetic Average	Geometric Average	Arithmetic Average	Geometric Average
1926-2010	8.41%	6.41%	7.24%	5.50%
1962-2010	4.10%	2.95%	3.92%	3.25%
1981-2010	6.05%	5.38%	0.13%	0.19%

- What does this premium measure?
- Why is the geometric mean lower than the arithmetic mean for both bonds and bills?
- If you had to use a risk premium, would you use the most recent data (1981-2010), or would you use the longer periods? Explain your reasoning.

### **Solution 1**

- A. It measures, on average, the premium earned by stocks over government securities. It is used as a measure of the expected risk premium in the future.
- B. The geometric mean allows for compounding, while the arithmetic mean does not. The compounding effect, in conjunction with the variability of returns, will lower the geometric mean relative to the arithmetic mean.
- C. The longer time period is most appropriate, because it covers more of the possible outcomes - crashes, booms, bull markets, bear markets. In contrast, a ten-year period can offer a slice of history that is not representative of all possible outcomes.

### **Question 2**

You are an investor who is interested in the emerging markets of Asia. You are trying to value some stocks in Afghanistan, which does not have a long history of financial markets. During the last two years, the stock market has gone up 60% a year, while the government borrowing rate has been 15%, yielding an historical premium of 45%. Would you use this as your risk premium, looking into the future? If not, what would you base your estimate of the premium on?

### **Solution 2**

Recent history is probably not an appropriate basis for estimating the premium, since this history can be skewed upward or downward by a couple of good or bad years. The premium should be based on the fundamentals driving the Afghanistan market, relative to other emerging and developed markets, and estimate a premium accordingly.

### **Question 3**

The beta for Marathon Limited is 1.10. The current six-month treasury bill rate is 3.25%, while the thirty-year bond rate is 6.25%. Estimate the cost of equity for Marathon Limited, based upon

- (a) Using the treasury bill rate as your risk-free rate.
- (b) Using the treasury bond rate as your risk-free rate.

(Use the premiums in the table in question 1, if necessary.)

Which one of these estimates would you use in valuation? Why?

### **Solution 3**

CAPM: using T.Bill rate =  $3.25\% + 1.10 (8.41\%) = 12.50\%$

CAPM: using T.Bond rate =  $6.25\% + 1.10 (5.50\%) = 12.30\%$

The long-term bond rate should be used as the risk-free rate, because valuation is based upon a long time horizon.

\* 8.41% is the arithmetic mean average premium earned by stocks over treasury bills between 1926 and 2010.

\*\* 5.50% is the geometric mean average premium earned by stocks over treasury bonds between 1926 and 2010.

### **Question 4**

You have been asked to estimate the beta of a high-technology firm which has three divisions with the following characteristics

**312 PP-FT&FM**

Division	Beta	Market Value
Personal Computers	1.60	₹ 100 million
Software	2.00	₹ 150 million
Computer Mainframes	1.20	₹ 250 million

- A. What is the beta of the equity of the firm?
- B. What would happen to the beta of equity if the firm divested itself of its software business?
- C. If you were asked to value the software business for the divestiture, which beta would you use in your valuation?

**Solution 5**

- A.  $\text{Beta} = 1.60 \times 100/500 + 2.00 \times 150/500 + 1.20 \times 250/500 = 1.52$
- B. If they pay the cash out as a dividend:  $\text{Beta} = 1.60 \times 100/350 + 1.20 \times 250/350 = 1.31$   
If they keep the cash in the firm:  $\text{Beta} = 1.60 \times 100/500 + 0 \times 150/500 + 1.20 \times 250/500 = 0.92$
- C. Use 2.00, the beta for the software division.

**Question No 5**

Dhanpat, an investor, is seeking the price to pay for a security, whose standard deviation is 5%. The correlation coefficient for the security with the market is 0.75 and the market standard deviation is 4%. The return from risk-free securities is 6% and from the market portfolio is 11%. Dhanpat knows that only by calculating the required rate of return, he can determine the price to pay for the security. What is the required rate of return on the security?

**Solution:**

Calculation of beta coefficient

Standard deviation = 5%

Correlation coefficient = 0.75

Market Standard Deviation = 4%

Calculation of required rate of return on security –

$R_f = 6\%$

$R_m = 11\%$

$E(R_1) = R_f + \beta[R_m - R_f]$

$= 6.0 + 0.9375 [11.00 - 6.00]$

$= 6.0 + 0.9375 \times 5$

$= 6.0 + 4.6875$

$= 10.6875\%$

**Question No. 6:** The market portfolio has a historically based expected return of 0.10 and a standard deviation of 0.04 during a period when risk-free assets yielded 0.03. The 0.07 risk premium is thought to be constant through time. Riskless investments may now be purchased to yield 0.09. A security has a standard deviation of 0.08 and a co-efficient of correlation with the market portfolio is 0.85. The market portfolio is now expected to have a standard deviation of 0.04. You are required to find —

- (i) market's return-risk trade-off;
- (ii) security beta; and
- (iii) equilibrium required expected return of the security

**Solution:**

**(i) Market's Return – Risk Tradeoff**

$$= \frac{R_m - R_F}{\sigma}$$

Where,

$R_m$  = Market rate of return, i.e. 0.10

$R_F$  = Risk free return, i.e. 0.03

$\sigma$  = Standard deviation 0.04

$$= \frac{0.10 - 0.03}{0.04} = 1.75$$

**(ii) Security Beta :**

$$\beta_1 = \frac{\sigma_s}{\sigma_m} \times r_m$$

Where,

$\beta_1$  = Beta factor of investment

$\sigma_s$  = Standard deviation of investment in security, i.e. 0.08

$r_m$  - Co-efficient of Correlation with market portfolio, i.e. 0.085

$\sigma_m$  = Market portfolio standard deviation, i.e. 0.04

**(iii) Equilibrium required for expected rate of return on the security :**

$$E(R_1) = R_F + \beta_1 (R_m - R_F)$$

Where:

$E(R_1)$  = Expected rate of return on investment

$\sigma_m$  = Riskless investment yield = 0.09

$R_m$  = Expected return on market portfolio

$\beta_1$  = Market sensitive index (Beta factor) of investment, i.e. 1.7

$$= 0.09 + 1.7 (0.10 - 0.03)$$

$$= 0.09 + 0.119$$

$$= 0.209$$

$$= 20.9\%$$

## LESSON ROUND-UP

- Investment may be defined as a conscious act on the part of a person that involves deployment of money in securities issued by firms with a view to obtain a target rate of return over a specified period

of time.

- Investment is conscious act of deployment of money in securities issued by firms. Speculation also involves deployment of funds but is not backed by a conscious analysis of pros and cons.
- The main objective of security analysis is to appraise the intrinsic value of security.
- The Fundamental approach suggests that every stock has an intrinsic value which should be equal to the present value of the future stream of income from that stock discounted at an appropriate risk related rate of interest.
- Technical approach suggests that the price of a stock depends on supply and demand in the market place and has little relationship with its intrinsic value.
- Efficient Capital Market Hypothesis (ECMH) is based on the assumption that in efficient capital markets prices of traded securities always fully reflect all publicly available information concerning those securities.
- Performance of a company is intimately related to the overall economic environment of the country because demand for products and services of the company would under normal circumstances be directly related to growth of the country's economy.
- Industry level analysis focuses on a particular industry rather than on the broader economy.
- Dow Jones theory shows that share prices demonstrate a pattern over four to five years and these patterns can be divided into primary, secondary and minor trends.
- Charts and Indicators are two major tools of Technical Analysis.
- Portfolio management refers to managing efficiently the investment in the securities by professionals for both small investors and corporate investors who may not have the time and skills to arrive at sound investment decisions.
- Portfolio Analysis seeks to analyze the pattern of return emanating from a portfolio of securities.
- Risk means that the return on investment would be less than the expected rate. Risk is a combination of possibilities because of which actual returns can be slightly different or greatly different from expected returns.
- As per Markowitz Model, a portfolio is efficient when it yields highest return for a particular level of risk or minimizes risk for a specified level of expected return.
- According to Sharpe Index Model, return on a security is correlated to an index of securities or an index or an economic indicator like GDP or prices and the return for each security can be given by:  

$$R = \beta I + \alpha + e$$
- Capital Asset Pricing Model provides that if adding a stock to a portfolio increases its standard deviation, the stock adds to the risk of the portfolio. This risk is the un-diversified risk that can not be eliminated.

### SELF-TEST QUESTIONS

(These are meant for re-capitulation only. Answers to these questions are not to be submitted for evaluation)

1. What is security analysis? Why do we need to carry it out?
2. Describe the nature of Indian Financial System.
3. What are the various techniques of security analysis?

4. Describe some techniques of Technical analysis.
5. Describe the Sharpe Index approach of Portfolio analysis.
6. Write a short note on expected return on a portfolio.
7. CAPM is a tool to workout cost of equity. Discuss.
8. Differentiate between:
  - (i) 'Markowitz model' and 'Sharpe index model'.
  - (ii) Efficient Portfolio and Optimal Portfolio
9. Mohan has a portfolio of 6 securities, each with a market value of 10,000. The current beta of the portfolio is 1.30 and beta of the riskiest security is 1.80. Mohan wishes to reduce his portfolio beta to 1.15 by selling the riskiest security and replacing it with another security with a lower beta . What must be the beta of the replacement security?
10. Excel Ltd. is considering investing in a risky project which would be added to an existing portfolio of investment projects, also subject to risk. It envisages six possible states of the economy for which it has estimated probabilities and outcome as follows :

State of Economy	Probability	Return on Existing Portfolio	Return on Proposed Projects
1	0.1	12%	8%
2	0.2	14%	10%
3	0.2	15%	12%
4	0.3	16%	10%
5	0.1	18%	14%
6	0.1	20%	6%

You are required to determine whether the project should be accepted. The riskfree rate of return is 6%.

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# Lesson 10

## Derivatives and Commodity Exchanges – An Overview

### LESSON OUTLINE

- Meaning, features of Derivatives
- Participants in Derivatives market
- Types of Derivative Market
- Difference between spot and forward market
- Difference between future and Options
- Development of derivative market in India
- Equity derivatives and its classification
- Forex Derivatives, its classification and advantages
- Interest rate derivative
- Credit derivatives
- Trading, Clearing and Settlement of Derivatives on Stock Exchanges
- Commodity Market
- Participants of Commodity Market
- Commodity Exchange in India
- LESSON ROUND UP
- SELF TEST QUESTIONS

### LEARNING OBJECTIVES

The emergence and growth of the market for derivative instruments can be traced back to the willingness of economic agents to guard themselves against uncertainties arising out of fluctuations in asset prices. Derivatives are meant to facilitate the hedging of price risks of inventory holdings or a financial/commercial transaction over a certain period. Following the growing instability in the financial markets, the financial derivatives gained prominence after 1970 but India's tryst with derivatives began in 2000 when both the NSE and the BSE commenced trading in equity derivatives. The study will enable the students to understand:

- Definition and concept of Derivatives
- Characteristics of Derivatives
- Participants in the derivatives market
- Types of Derivatives
- Spot Contract *vis-à-vis* forward Contract
- Forward Markets
- Options – Put Option – Call Option
- Futures
- Swaps
- Clearing and Trading and Settlement Mechanism
- Risk Management System
- Commodities Market-Evaluation and Advantages Commodity Future Trading in India

## INTRODUCTION

A *derivative* (or derivative security) is a financial instrument whose value depends on the values of other, more basic underlying variables. In recent years, derivatives have become increasingly important in the world of finance. Futures and options are now traded actively on many exchanges. Forward contracts, swaps, and many different types of options are regularly traded outside exchanges by financial institutions, fund managers, and corporations in what is termed the *over-the-counter* market. Derivatives also often form part of a bond or stock issue.

The variables underlying derivatives are the prices of traded assets. A stock option, for example, is a derivative whose value is dependent on the price of a stock. However, as we shall see, derivatives can be dependent on almost any variable, from the price of hogs to the amount of snow falling at a certain ski resort.

In recent decades, financial markets have been marked by excessive volatility. As foreign exchange rates, interest rates and commodity prices continue to experience sharp and unexpected movements, it has become increasingly important that corporations exposed to these risks, be equipped to manage them effectively. Price fluctuations make it hard for businesses to estimate their future production costs and revenues. Derivative securities provide them a valuable set of tools for managing these risk. Risk management, being used to control such price volatility has consequently risen to the top of financial agendas. It is here that derivative instruments are of utmost utility.

## CONCEPT OF DERIVATIVES

In any commercial transaction, there are minimum two parties. Between these parties there is an exchange of price and goods or service. One of the parties

pays the price while the other party provides goods or services. The exchange of price and goods or services could be either simultaneous or follow one another with a time gap.

Let us consider these illustrations:

### **Illustration 1**

You [along with two friends] want to go for the Aero India January 2013 air show, for which tickets are sold out. Through one of your close friends, you obtain a recommendation letter, which will enable you to buy three tickets. The price of a ticket is Rs 1,000. Which is the commodity that you are suppose to buy? Money/ recommendation letter (instrument) or both?

The recommendation letter is a derivative instrument. It gives you a right to buy the ticket. The underlying asset is the ticket. The letter does not constitute ownership of the ticket. It is indeed a promise to convey ownership. The value of the letter changes with changes in the price of the ticket. It derives its value from the value of the ticket.

### **Illustration 2**

'A' agrees to buy a shirt from 'B' for ₹ 800/-. 'A' pays ₹ 800/- to 'B' while 'B' promises to deliver the shirt after one week.

### **Illustration 3**

'A' agrees to buy a shirt from 'B' while 'A' promises to pay in four monthly installments of ₹ 200/- each.

All the above three illustrations are examples of "Spot" transactions. Virtually all the commercial transactions are

“Spot” transactions. In a spot transaction, pricing of goods or services is done according to the current value. The goods or services being purchased are tangible.

Now let us consider a situation where both the parties in a transaction agree to the quantity of goods and price but the exchange is to take place at a future date.

#### **Illustration 4**

‘A’ is a farmer who intends to sell his crop of 50 tonnes of wheat, which shall be ready after six months. He wants to make sure about the price that he should get for his crop. ‘B’ is a bakery owner who needs 50 tonnes of wheat at the time of the next crop for his bakery business. He wants to make certain that he gets the quantity after six months. Both of them negotiate a deal under which ‘A’ agrees to supply 50 tonnes of wheat to ‘B’ at a price of ₹ 10,000 per tonne.

The above illustration is a case of forward contract in which the quantity of wheat and its price have been settled but the exchange is to take place after six months. In this contract, the item to be exchanged i.e. wheat, is a commodity. There can be instances when the subject of exchange is foreign currency, shares, real estate etc. In every forward transaction, a nominal amount (expensed as a percentage of the contract amount) is paid upfront by the buyer to the seller as a token of his willingness to buy and also with a view to impose a moral binding upon the seller in addition to the legal binding of the contract.

### **WHAT ARE DERIVATIVES?**

Derivatives are financial instruments which derive their value from their underlying assets or securities. For examples, if a buyer enters into a contract with a seller to buy a specified number of shares of a company at a specified price after a specified period, the buyer has entered into a futures contract. It is important to note that the buyer has bought the contract and not the stock of shares under reference. This contract is called a derivative while the stock of shares to which it applies is called the underlying asset. Apart from futures, other commonly used derivatives are options, warrants, convertibles and many more. The special characteristics of derivatives, as shall discuss later, have made them a very popular mode of risk management in the stock markets. As instruments of risk management, these, generally, do not influence the fluctuations in the underlying asset prices. However, by locking-asset prices, derivative products minimize the impact of fluctuations in asset prices on the profitability and cash flow situation of risk-averse investors.

Thus, a ‘derivative’ is a financial instrument, or contract, between two parties that derive its value from some other underlying asset or underlying reference price, interest rate, or index. A derivative by itself does not constitute ownership; instead it is promise to convey ownership.

The Underlying Securities for Derivatives are:

- Commodities (Castor seed, Grain, Coffee beans, Gur, Pepper, Potatoes)
- Precious Metals (Gold, Silver)
- Short-Term Debt Securities (Treasury Bills)
- Interest Rates
- Common Shares/Stock
- Stock Index Value (NSE Nifty)

Derivative ontracts are primarily of two kinds – contracts that are traded on the exchanges and contracts that are traded outside the exchanges. Products/contracts that are traded on the exchanges are called *Exchang-traded*

*derivatives*. Products/contracts traded outside the exchanges are called *Over-the-counter derivatives*. The generic term used for the market outside the exchanges is over-the-counter market. Worldwide, large volume is traded in both exchange-traded and OTC derivative products. India also trades in both exchange-traded and OTC derivative products on different asset classes.

Securities Contracts (Regulation) Act, 1956 (SC(R) A) defines “derivative” to include—

1. A security derived from a debt instrument, share, loan whether secured or unsecured, risk instrument or contract for differences or any other form of security;
2. A contract which derives its value from the prices, or index of prices, of underlying securities.

Derivatives are securities under the SC( R)A and hence the trading of derivatives is governed by the regulatory framework under the SC(R)A.

## CHARACTERISTICS OF DERIVATIVES

The important characteristics of derivatives are as follows:

- Derivatives traded on exchanges are liquid and involves the lowest possible transaction costs.
- Derivatives can be closely matched with specific portfolio requirements.
- The margin requirements for exchange-traded derivatives are relatively low, reflecting the relatively low level of credit-risk associated with the derivatives.
- Derivatives are traded globally having strong popularity in financial markets.
- Derivatives maintain a close relationship between their values and the values of underlying assets.
- The change in values of underlying assets will have effect on values of derivatives based on them.

## PARTICIPANTS IN THE DERIVATIVES MARKET

1. **Hedgers** use futures or options markets to reduce or eliminate the risk associated with price of an asset.
2. **Speculators** use futures and options contracts to get extra leverage in betting on future movements in the price of an asset. They can increase both the potential gains and potential losses by usage of derivatives in a speculative venture.
3. **Arbitrageurs** are in business to take advantage of a discrepancy between prices in two different markets. If, for example, they see the futures price of an asset getting out of line with the cash price, they will take offsetting positions in the two markets to lock in a profit.

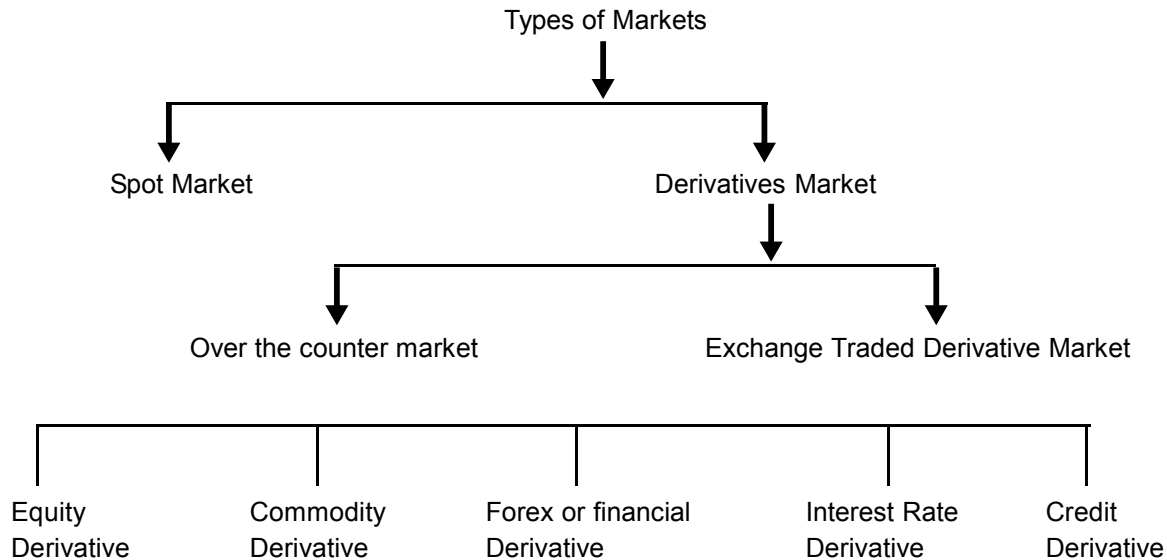
## TYPES OF DERIVATIVE MARKETS

### Exchange Traded Derivative Markets

- Market where standardised contracts are traded over an exchange such as NCDEX
- Quantities and qualities can not be customised
- Counterparty for each transaction is the exchange

**Over-The-Counter (OTC)**

- Usually done between two financial institutions/corporate bodies
- Not listed
- Trades are typically larger than exchange traded derivative transactions
- Structure can be customised as per the requirements of the two parties.

**TYPES OF MARKETS**

Derivative contracts can be of different types:

- Futures
- Options
- Swaps
- Caps
- Floor
- Collars etc.

The most popular derivative instruments are futures and Options.

Today, international markets trade innumerable derivative products on all kinds of underlying assets, both tangible and intangible. Without getting into the complexities of derivatives at this level, it is important to understand the following three generic derivative products/contracts in detail:

1. Forward contract
2. Futures contract
3. Option contract

It is necessary here, to state that an in-depth understanding of these concepts will create a strong foundation for a meaningful interpretation of complex derivative structures and innovations. Forward, futures, option and swap contracts must be understood as concepts, without limiting their thinking to a specific asset. Once the concepts are understood clearly, they may be applied to any asset class. In other words, characteristics of these contracts do not alter with change in the underlying asset.

## FORWARD CONTRACT

A *Forward contract* is a one-to-one, bipartite/tripartite contract, which is to be performed mutually by the contracting parties, in future, at the terms decided upon, on the contract date. In other words, a forward contract is an agreement to buy or sell an asset on a specified future date for a specified price. One of the parties to the contract assumes a *long* position, i.e. agrees to buy the underlying asset while the other assumes a *short* position, i.e. agrees to sell the asset. As this contract is traded out of the exchange and settled mutually by the contracting parties, it is called an over-the-counter product. As mentioned before, over-the-counter(OTC) is a generic term used for a product/market, which is off the exchange.

Forward contracts are extensively used in India in the foreign exchange market. Forward contracts are negotiated by the contracting parties on a one-to-one basis and hence offer tremendous flexibility in terms of determining contract terms such as price, quantity, quality (in case of commodities), delivery time and place. The parties may freely decide upon all these terms, based on their circumstances and negotiation powers. They may also carry out subsequent alterations in the contract terms, by mutual consent.

### Differences between spot contract and forward contract

- In a spot contract, at least one component, i.e. either the price or the goods/ services is tendered at the time of the contract. In a forward contract, both the components are exchanged at a specified future date.
- In a spot contract, both the parties transact on the basis of their present capability. The buyer purchases according to his ability to pay for the goods or services and the seller sells according to his present ability to deliver the goods or services. In a forward contract, a leveraging of capabilities is involved. Since no down payment is involved, the buyer might contract to buy a larger number of goods or services, expecting to derive some benefits from the perceived price differential between the spot price and the likely price at the time of maturity of the forward contract. Also the seller, feeling that a larger number of goods shall be available at the contracted price at the time of maturity, agrees to sell a far larger number of goods.
- In a spot contract, execution of the contract is more or less certain because both the components, i.e. money and goods are available. Even through the transaction does not pass through a regulated delivery and payment mechanism yet the chances of default are very less. The problems of payment and delivery get magnified in the case of a forward contract.

### Advantages of forward markets

In spite of the problems of the forward contracts described above, there are two important contributions of these contracts.

#### (a) *Forward contracts are useful hedging tools*

Hedging is a process of risk management under which the risks emanating from a transaction are covered or mitigated. So, when the farmer enters into the forward contract with bakery owner for selling 50 tonnes of wheat six months hence, he is hedging against the decline in price. The bakery owner, on the other hand, is hedging against the lack or shortage of supply. Both of them are trying to create a certain future for themselves as far as this transaction is concerned. Viewed in this background, forward contracts are excellent means of hedging against price risk and quantity risk.

#### (b) *Forward contracts help in price discovery*

The time gap between signing or formulation of a forward contract and its execution gives rise to uncertainty. From this uncertainty is born speculation regarding future price of the goods and services. Assuming that both

the seller and the buyer have near perfect information about future price of the goods and services, the forward contract may be considered as an appropriate means of their price discovery.

### Problems in case of a forward contract/Limitations of forward contract

There are three major problems in a forward contract – Liquidity, inadequate knowledge, and counter party risk.

#### (a) *The problem of liquidity*

One basic problem with the forward markets is that the terms of the contract are too general and too flexible. Thus 'A' and 'B' might agree for delivery of a particular variety of 50 tonnes of wheat at a particular place after six months. Now this contract has been tailor-made for the requirements of 'A' and 'B'. Both of them have tied up irrevocably to the contract and there is no way they can assign the contract to third parties unless of course they can find individuals with exactly matching requirements. Possibility of that happening is remote and as a result 'A' and 'B' are left holding on to a contract which both of them must fulfill.

#### (b) *Inadequate knowledge*

Further, in the forward transactions, there is no regular interface between the buyers and the sellers. At best there could be telephonic interaction but there is neither organized market nor any intermediaries on which both the parties could rely. Since a forward contract is a bilateral relationship between two parties, it requires utilization of only that much information as might be available to them. This results in inefficient transactions based upon inadequate discovery of price and insufficient knowledge about the quality of goods and services.

#### (c) *Problem of Counter Party Risk*

Yet another risk that is faced in forward transactions is that of "Counter Party Risk". By this term we mean that there is an ever present risk of the other party not being able to honour its commitment.

Suppose that in the illustration being considered by us, at the time of the maturity of the forward contract, the price of the wheat rises at ₹ 12,000/- instead of ₹ 10,000/- per tonne which is the contracted price. In this situation, the seller might have a tendency to back out of the contract. Or alternately, the price may be ₹ 8,000/- per tonne when the buyer may not like honour the contract since he has wheat of that particular kind available at a lesser price.

Apart from the price element, counter party risk could also arise from variation in quality of the goods, place of delivery etc. It could also happen that one of the parties to the forward contract goes bankrupt. In the absence of a regulated market for these forward contracts, the counter party risk is an important element that can jeopardize forward contracts.

### How to eliminate limitations of forward contracts

If all the forward contracts were to be initiated, traded and settled through the medium of an exchange, the limitations of forward contracts would be overcome. This is how it is done:

1. The large number of participants that trade through the exchange eliminates the problem of liquidity. The demand and supply equilibrium of the goods keeps shifting constantly. The original contract is thus capable of changing hands a number of times before final execution.
2. The limitation of inadequate knowledge is overcome by the pooling of knowledge of multitude of seasoned players in the exchange. The imperfections of knowledge give way to a constantly updated knowledge back up for the participants in an exchange-traded set up.
3. The limitation of counter party default is eliminated in a forward exchange having clearing house facilities. The clearing house, by taking margin money from the participants, ensures that all the transactions are paid for.

### Moving beyond forward contracts

Having discussed that forward contracts would be much more safe to enter into if routed through an exchange, let us consider if anything else can be traded other than plain contracts to deliver a particular quantity of goods.

Forward contracts contain an undertaking to deliver goods at a future point of time. At the time of maturity of the contract, the goods are to be delivered and payment is to be made. At best, in an exchange traded forward contract, the contract can be negotiated by both the buyer and the seller.

Since the forward contract helps in price discovery and six months is a sufficiently long time to impact prices in the spot market, it would be quite logical to conclude that the forward prices should also move in tandem with spot prices. In case of frequent changes in the forward price, people would be tempted to play at the price differential rather than deal in a single contract. This tendency on the part of investors gave rise to the advent of instruments called futures, which reflect the perceptions about future prices of commodities and financial products. Similarly, another variation of the contract gave an option or choice to the buyer to purchase or not to purchase goods at the time of maturity. These variations or deviations from original objects of contracts are called derivatives.

### FUTURES CONTRACT

A “futures” contract is an exchange traded forward contract to buy or sell a predetermined quantity of an asset on predetermined future date at a predetermined price. Contracts are standardized and there’s centralized trading ensuring liquidity.

There are two positions in a future contract :

**Long position:** This is when a futures contract is purchased and the buyer agrees to receive delivery of the underlying assets (Stock/indices/ commodities)

**Short Position:** This is when a futures contract is sold and the seller agrees to make delivery of the underlying assets ((Stock/indices/ commodities)

### Pricing of Futures

Futures should theoretically trade at a fair price. The fair price is the price adjusted for cost of carry for delivery at a later date. The cost of carry is the interest cost on the amount actually paid for an asset on a spot purchase. Cost of carry is adjusted for any dividends receivable in case of equities.

Cost of carry = Interest cost over period – expected dividend yield

The fair price of a future contract is always at a premium to the spot price.

**Example:** A futures contract is available on a company that pays an annual dividend of ₹5 and whose stock is currently priced at ₹200. Each futures contract calls for delivery of 1,000 shares of stock in one year, daily marking to market, an initial margin of 10% and a maintenance margin of 5%. The corporate treasury bill rate is 8%.

- (i) Given the above information, what should the price of one futures contract be?
- (ii) If the company stock price decreases by 7%, what will be the change, if any, in futures price ?
- (iii) As a result of the company stock price decrease, will an investor that has a long position in one futures contract of this company realise a gain or loss? Why ? What will be the amount of this gain or loss ?

#### Solution:

(i) Annual dividend (D) = ₹5

Current Stock Price(S) = ₹200



Initial Margin = 10%

Maintenance Margin = 5%

Corporate Treasury bill rate (C) = 8%

Price of One Future Contract

$$F = S + (S \times C) - D = 200 + (200 \times 0.08) - 5 = ₹ 211$$

(ii) If the company stock prices decrease by 7%, then price of futures contract

$$F = [200 \times (1 - 0.07)] + [200 \times (1 - 0.07) \times 0.08] - 5$$

$$= 186 + 14.88 - 5 = ₹ 195.88$$

(iii) An investor with a long position in one future contract agrees to buy 1,000 shares of the company in one year at ₹211. Therefore, this investor will benefit only if the future prices increase.

In this case, the future prices has decreased and the investor will therefore realize a loss of (₹ 195.88 – ₹ 211) x 1,000 = (–) ₹ 15,120

### DIFFERENCE BETWEEN FORWARDS AND FUTURES

Based on the preceding, we may summarise the finer points of differentiation between forward and futures contracts as follows:

Feature	Forward	Futures contracts
Operational mechanism	Traded directly between Contracting parties (not Traded on the exchange)	Traded on the exchange
Contract specification	Differ from trade to trade	
Counter party risk	Exists. But, sometimes jettisoned to a guarantor	Contracts are standardise contracts.
Liquidation profile	Low, as contracts are tailor-made contracts catering to the needs of the parties involved Further, they are not easily accessible to other market participants	Exist. But, assumed by the clearing agency, which becomes the counter party to all trades or unconditionally guarantees their settlement  High, as contracts are standardised exchange-traded contracts
Price discovery	Not efficient, as markets are scattered	Efficient, as market are centralised and all buyers and sellers come to a common platform to discover the price through a common order book
Quality of information and its dissemination	Quality of information may be poor. Speed of information dissemination is weak	As futures are traded on a nation-wide basis, every bit of decision-related information gets disseminated very fast
Examples	Currency market in India	Commodities futures, index futures and individual stock futures in India.

## OPTIONS CONTRACT

Option Contract gives its holder the right, but not the obligation, to take or make delivery on or before a specified date at a stated price. But this option is given to only one party in the transaction while the other party has an obligation to take or make delivery. Since the other party has an obligation and a risk associated with making good the obligation, he receives a payment for that. This payment is called as option premium.

Option contracts are classified into two types on the basis of which party has the option:

**Call Option:** A call option is with the buyer and gives the holder a right to take delivery.

**Put Option:** The put is with the seller and the option gives the right to make delivery .

Option contracts are classified into two types on the basis of time at which option can be exercised:

**European Option:** European Style options are those contracts where the option can be exercised only on the expiration date.

**American Option:** American style option are those contracts where the option can be exercised on or before the expiration date.

### What is a premium in Option market

In the options market, a contract is written giving the buyer of the contract the right (option) to purchase or sell a particular security at a fixed price for a period of time. The seller agrees to deliver if the contract owner elects to buy, or to purchase if the contract owner elects to sell. For agreeing to the terms of the contract, the seller receives a fee, which in options is called the premium.

Suppose the common stock of ABC Ltd. is trading in the market at ₹ 140/- a share. A contract (option) might be written allowing the buyer of this contract to purchase 100 shares of ABC Ltd. stock at ₹ 140/- at any time over the next three months. The seller will have agreed to deliver the 100 shares at this price on demand. For granting this option, the seller is paid a fee (premium) of say ₹ 8. This fee translates into ₹ 800 – ₹ 8 a share for each of the 100 shares covered by the contract.

If, within the next three months, A stock rises to ₹ 165/- a share, an option contract will be exercised by the buyer. He will have purchased 100 shares of ABC Ltd. at ₹ 148 a share (₹ 140 contract price plus ₹ 8 per share premium) which is well below the ₹ 165 market price.

If the stock had declined to ₹ 130/- a share during the three-month period, the owner of the contract would do nothing. He will certainly not pay ₹ 140/- a share for stock worth only ₹ 130/-. The contract will expire. The seller of the contract will keep the ₹ 800/- premium. The buyer will be out of ₹ 800/-.

This example illustrates an options contract that gave the owner the right to purchase stock. Options can also be devised that give the owner the right to sell stock at a fixed price.

### How to determine Option Premium

The three basic factors that determine an option premium are:

1. Intrinsic Value
2. Time Value and
3. Volatility

Intrinsic value is a option's arithmetically determinable value based on the strike price of the option and the market value of the underlying stock.

Time value reflects the fact that the longer the option has to run until expiration, the greater the premium should be. This is perfectly logical. The right to buy or sell a stock for two months should be worth more than the same privilege for only one month. The third factor namely volatility is also easy to understand. Higher the volatility higher the risk and higher the risk, higher the premium.

Two terms used frequently in the options are class and series.

### Series of Options

A series of options is all options of the same class having both the same strike price and the same expiration month. In the one class of TISCO calls, there is a number of different series as each call within that class has a different strike price and/or a different expiration month from any other option within the class. Each individual option is called a series. The total of all puts or calls on a particular stock makes up a class.

### Options Derivatives

In simple terms, the options premium is determined by the three factors mentioned earlier, intrinsic value, time value, and volatility.

But there are other, more sophisticated tools used to measure the potential variations of options premiums. They are generally employed by professional options traders and may be of little interest to the individual investor.

### Tools of Options Derivatives

These four tools are known as options derivatives. They are:

#### 1. Delta

An options delta is used to measure the anticipated percentage of change in the premium in relation to a change in the price of the underlying security. If a particular call option had a delta of 60% we would expect the option premium to vary by 60% of the change in the underlying stock. If that stock rose 1 point, the option premium should rise approximately 6/10 (60%) of 1 point.

#### 2. Gamma

Gamma measures the expected change in the delta factor of an option when the value of the price of the underlying security rises. If a particular option had a delta of 60% and a gamma of 5%, an increase of 1 point in the value of the stock would increase the delta factor by 5% from 60% to 65%.

#### 3. Theta

The theta derivative attempts to measure the erosion of an option's premium caused by the passage of time. We know that at expiration an option will have no time value and will be worth only the intrinsic value if, in fact, it has any. Theta is designed to predict the daily rate of erosion of the premium.

Naturally other factors, such as changes in the value of the underlying stock will alter the premium. Theta is concerned only with the time value. Unfortunately, we cannot predict with accuracy changes in a stock's market value, but we can measure exactly the time remaining until expiration.

#### 4. Vega

The fourth derivative, Vega is concerned with the volatility factor of the underlying stock. We have pointed out that the volatility varies among different securities. Vega measures the amount by which the premium will rise when the volatility factor of the stock increase.

Vega measures the sensitivity of the premium to these changes in volatility.

Delta, gamma, theta and vega are very sophisticated tools for predicting changes in an option's premium. They merely take the three factors which determine a premium (price of the stock, passage of time, and volatility), and measure each in an exacting manner. The derivatives vary for each series of options.

### Difference between Futures and Options

<i>Futures</i>	<i>Options</i>
Both the parties are obliged to perform the contract.	Only the seller (writer) is obligated to perform the contract.
No premium is paid by either party.	The buyer pays the seller (writer) a premium.
The holder of the contract is exposed to the entire spectrum of downside risk and has potential for all the upside return.	The buyer's loss is restricted to downside risk to the premium paid, but retains upward indefinite potentials.
The parties of the contract must perform at the settlement date. They are not obligated to perform before the date.	The buyer can exercise his option any time prior to the expiry date.

### SWAPS

A swap can be defined as the exchange of one stream of future cash flows with another stream of cash flows with different characteristics.

A swap is an agreement between two or more people/parties to exchange sets of cash flows over a period in future. Swaps can be divided into two types viz.,

(a) Currency Swaps, (b) Interest Rate Swaps.

**Currency Swaps:** The currency swap is an agreement between two parties to exchange (swap) payments or receipts in one currency for payment or receipts in other currency. Suppose if two entities are trading in currency, the rationale for currency swap between them lies in the fact that one borrower has a comparative advantage in borrowing in one currency, while the other borrower has an advantage in borrowing in another currency.

**Interest Rate Swaps:** An interest rate swap is an agreement whereby one party exchanges one set of interest rate payment for another rate over a time period. The most common arrangement is an exchange of fixed interest rate payment for another rate over a time period. The interest rates are calculated on notional values of principals.

### The comparative advantage argument

An explanation commonly put forward to explain the popularity of swaps concerns comparative advantages. Consider the use of an interest-rate swap to transform a liability. Some companies, it is argued, have a comparative advantage when borrowing in fixed-rate markets, whereas other companies have a comparative advantage in floating-rate markets. To obtain a new loan, it makes sense for a company to go to the market where it has a comparative advantage. As a result, the company may borrow fixed when it wants floating, or borrow floating when it wants fixed. The swap is used to transform a fixed-rate loan into a floating-rate loan, or vice versa.

**Table Borrowing Rates That Provide a Basis for the Comparative Advantage Argument**

	<i>Fixed</i>	<i>Floating</i>
Company A	10.0%	6-month LIBOR + 0.3%
Company B	11.2%	6-month LIBOR + 1.0%

**An Example**

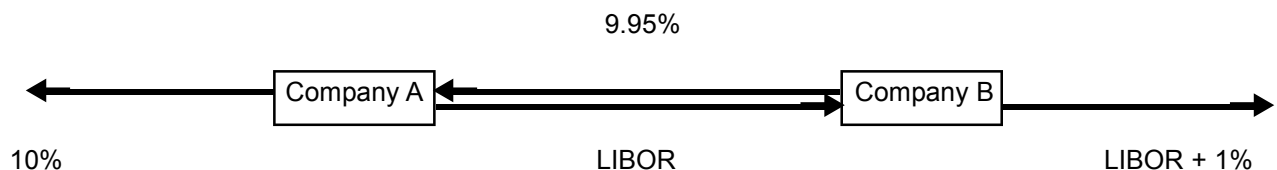
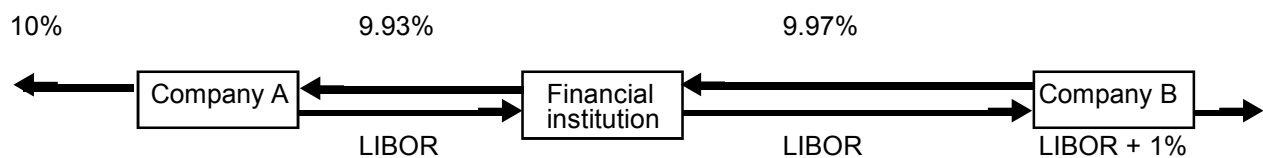
Suppose that two companies, A and B, both wish to borrow \$10 million for five years and have been offered the rates shown in Table. We assume that company B wants to borrow at a fixed rate of interest, whereas company A wants to borrow floating funds at a rate linked to six-month LIBOR. company B clearly has a worse credit rating than company A because it pays a higher rate of interest than company A in both fixed and floating markets.

A key feature of the rates offered to companies A and B is that the difference between the two fixed rates is greater than the difference between the two floating rates. Company B Pays 1.2% per annum more than company A in fixed-rate markets and only 0.7% per annum more than company A in floating-rate markets. Company B appears to have a comparative advantage in floating-rate markets, whereas company A appears to have a comparative advantage in fixed-rate markets.<sup>3</sup> It is this apparent anomaly that can lead to a swap being negotiated. Company A borrows fixed-rate funds at 10% per annum. Company B borrows floating-rate funds at LIBOR plus 1% per annum. They enter into a swap agreement to ensure that A ends up with floating-rate funds and B ends up with fixed-rate funds.

To understand how the swap might work, we first assume that A and B get in touch with each other directly. The sort of swap they might negotiate is shown in Figure 5.6. Company A agrees to pay company B interest at six-month LIBOR on \$10 million. In return, company B agrees to pay company A interest at a fixed rate of 9.95% per annum on \$10 million.

Company A has three sets of interest-rate cash flows:

1. It pays 10% per annum to outside lenders.
2. It receives 9.95% per annum from B.
3. It pays LIBOR to B.

**Swap agreement between A and B when rates in Table above apply.****Swap agreement between A and B when rates in Table apply and a financial inter-mediary is involved.**

The net effect of the three cash flows is that A pays LIBOR plus 0.05% per annum. This is 0.25% per annum less than it would pay if it went directly to floating-rate markets. Company B also has three sets of interest rate cash flows:

1. It pays LIBOR +1% per annum to outside lenders.
2. It receives LIBOR from A.
3. It pays 9.95% per annum to A.

The net effect of the three cash flows is that B pays 10.95% per annum. This is 0.25% per annum less than it would pay if it went directly to fixed-rate markets.

The swap arrangement appears to improve the position of both A and B by 0.25% per annum. The total gain is, therefore, 0.5% per annum. It can be shown that the total apparent gain in this type of interest rate swap agreement is always  $a - b$ , where  $a$  is the difference between the interest rates facing the two companies in floating-rate markets. In this case,  $a = 1.2\%$  and  $b = 0.70\%$ .

If A and B did not deal directly with each other and used a financial institution, an arrangement, such as that shown in Figure 5.7, might result. (This is similar to the example in Figure 5.4.) In this case, A ends up borrowing at LIBOR + 0.07%, B ends up borrowing at 10.97%, and the financial institution earns a spread of four basis points per year. The gain to company A is 0.23%; the gain to company B is 0.23%; and the gain to the financial institution is 0.04%. The total gain to all three parties is 0.50% as before.

In finance, a swap is a derivative in which two counterparties agree to exchange one stream of cash flows against another stream. These streams are called the legs of the swap.

The cash flows are calculated over a notional principal amount, which is usually not exchanged between counterparties. Consequently, swaps can be used to create unfunded exposures to an underlying asset, since counterparties can earn the profit or loss from movements in price without having to post the notional amount in cash or collateral.

Swaps can be used to hedge certain risks such as interest rate risk, or to speculate on changes in the underlying.

Most swaps are traded Over The Counter (OTC), 'tailor-made' for the counter parties. Some types of swaps are also exchanged on future markets, for instance Chicago Mercantile Exchange Holdings Inc., the largest US futures market, the Chicago Board Options Exchange and Frankfurt-based Eurex AG.

**Illustration:** Two companies Rita Ltd. and Gita Ltd. are considering to enter into a swap agreement with each other. Their corresponding borrowing rates are as follows:

<i>Name of Company</i>	<i>Floating Rate</i>	<i>Fixed Rate</i>
<i>Rita Ltd.</i>	<i>LIBOR</i>	<i>11%</i>
<i>Gita Ltd.</i>	<i>LIBOR + 0.3%</i>	<i>12.5%</i>

Rita Ltd. requires a floating rate loan of £8 million while Gita Ltd. requires a fixed rate loan of £8 million.

- (i) Show which company had advantage in floating rate loans and which company has a comparative advantage in fixed loans.
- (ii) If Rita Ltd. and Gita Ltd. engage in a swap agreement and the benefits of the swap are equally split, at what rate will Rita Ltd. be able to obtain floating finance and Gita Ltd. be able to obtain fixed rate finance? Ignore bank charges.

**Solution:**

- (i) Although Gita Ltd. faces higher rates in both markets, it has a comparative advantage in the floating rate

market. It is paying only 30bp more in the floating rate market, but it must pay 150bp more in the fixed rate market. Rita Ltd. has a comparative advantage in the fixed rate market because it is paying 150 bp less there, compared to 30 bp less in the floating rate market.

- (ii) Net Potential Gain =  $(\text{LIBOR} - (\text{LIBOR} + 0.3) + (12.5 - 11)) = -0.3 + 1.5 = 1.2$  per cent i.e. 0.6 per cent benefit to each company

Net floating rate cost to Rita Ltd. would be =  $\text{LIBOR} - .6\%$  And net fixed rate cost to Rita Ltd. would be  $12.5\% - .6\% = 11.9\%$

So the swapping the interest rate obligations, both companies would be benefitted to the extent of .6%.

## Swaption

A swaption is an option granting its owner the right but not the obligation to enter into an underlying swap. While options can be traded on a variety of swaps, the term “swaption” typically refers to options on interest rate swaps.

## Properties of Swaption

Unlike ordinary swaps, a swaption not only hedges the buyer against downside risk, also lets the buyer take advantage of any upside benefits. Like any other option, if the swaption is not exercised by maturity, it expires worthless.

If the strike rate of the swap is more favourable than the prevailing market swap rate, then the swaption will be exercised as detailed in the swaption agreement.

- It is designed to give the holder the benefit of the agreed upon strike rate if the market rates are higher, with the flexibility to enter into the current market swap rate if they are lower.
- The converse is true if the holder of the swaption receives the fixed rate under the swap agreement. Investors can also use swaptions to trade the volatility of the underlying swap rate.

## DEVELOPMENT OF DERIVATIVES MARKET IN INDIA

The first step towards introduction of derivatives trading in India was the promulgation of the Securities Laws (Amendment) Ordinance, 1995. It withdrew the prohibition on options in securities. The market for derivatives however, did not take off, as there was no regulatory framework to govern trading of derivatives. SEBI set up a 24-member committee under the Chairmanship of Dr. L.C. Gupta on November 18, 1996 to develop regulatory framework for derivatives trading in India. In its report, the committee prescribed necessary pre-condition for introduction of derivatives trading in India; it recommended that derivatives should be declared as ‘securities’ so that the regulatory framework applicable to trading of ‘securities’ could also govern trading of securities. SEBI also set up a group in June 1998 under the Chairmanship of Prof. J.R. Varma to recommend measures for risk containment in derivatives market. The Report worked out the operational details of margining system, methodology for charging initial margins, broker net worth, deposit requirement and real-time monitoring requirements.

The Securities Contract Regulation Act SC(R)A was amended in December 1999 to include derivatives within the ambit of ‘securities’. Thereafter a regulatory framework was developed for governing the trading in derivatives. Derivatives were formally defined to include: (a) *a security derived from a debt instrument, share, loan whether secured or unsecured, risk instrument or contract for difference or any other form of security, and (b) a contract which derives its value from the price, or index of price, or underlying securities.* The Act also made it clear that derivatives are legal and valid, but only if such contracts are traded on a recognized stock exchange. The Government also rescinded in March 2000 the notification, which prohibited forward trading in securities.

Derivatives trading commenced in India after SEBI granted the final approval to commence trading and settlement in approved derivative contracts on the NSE and BSE. NSE started operations in the derivatives segment on June 12, 2000. Initially, NSE introduced futures contracts on S&P CNX Nifty index. However, the basket of instruments has widened considerably. Now trading in futures and options is based on not only on S&P CNX Nifty index but also on other indices viz., CNX IT and Bank Index as well as options and futures on single stocks and also futures on interest rates.

National Stock Exchange of India (NSE) has made noteworthy contribution in setting up an organized derivatives market. At the outset it was realized that the fulfillment of certain pre-requisites was essential before the trading in exchange traded derivatives could start. Some of the pre-requisites are:

### **1. Strong and healthy cash market**

The first and foremost requirement is the existence of a strong and healthy cash market. An efficient, transparent and fair cash market with strong settlement cycles helps in building an efficient derivatives market.

### **2. Clearing Corporation and Settlement Guarantee**

Existence of a common clearing corporation providing settlement guarantee as well as cross margining is essential for speedy settlement as well as for risk minimization. This is particularly important in the case of derivatives where there are often no securities to be delivered and the settlement is arranged in the form of cash difference.

### **3. Reliable wide area telecommunication network**

Since derivative trading must be introduced on nation wide basis so as to provide equal opportunities for hedging to the investor population throughout the country, existing and reliable telecommunications network along with existence of proven automated trading systems is extremely important.

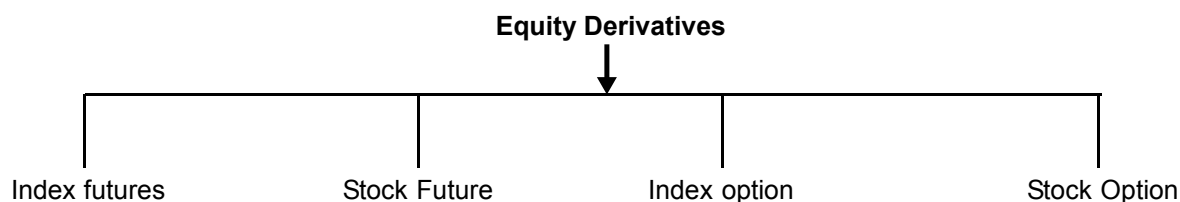
### **4. Risk containment mechanism**

There should exist a strong and disciplined margining system in the form of daily and mark to market margins, which provide a cover for exposure along with price risk and notional loss in case of default in settling outstanding positions, thereby minimizing market risk.

## **EQUITY DERIVATIVES**

These are derivative instruments with underlying assets based on equity securities. An equity derivative's value will fluctuate with change in its underlying asset's equity, which is usually measured by share price change in the price of the index.

### **Classification of Equity Derivatives**



**Index Futures:** It is a future contract with the index as the underlying asset. There is no underlying security or stock, which is to be believed to fulfil the obligations as index futures are cash settled. They can be used for hedging against an existing equity position, or speculating on future movements of the index.

**Stock Future:** A stock future contract is a standardized contract to buy or sell a specific stock at a future date at an agreed price. The contract derives its value from the underlying stock.

**Index option:** This is an option contract where the option holder has the call or put option on the index.



**Stock option:** Stock option is an option contract where the option holder has the right, but not the obligation, to buy or sell the particular stock on or before a specified date at a stated price.

#### Advantages of trading in equity derivatives

- It provides incentive to make profits with minimal amount of risk capital.
- Lower cost of trading.
- It increases trading volume in stock market liquidity.
- It also provides liquidity, enables price discovery in underlying market.

### STOCK INDEX FUTURES

Stock Index Futures are financial derivatives which have a Stock Index as the underlying.

An index is a scale of numbers that represents changes in a set of values between a base time period and another time period. These changes are reflected through the movements of the index values along the scale.

A Stock Index, on the other hand is a particular kind of index that represents changes in the market values of a number of securities contained in that index.

A Stock Index can be representative of a group of industries or of dominant companies among various industries. It can have a broad base of hundreds of companies or a select base of say 30 companies.

But why do we need the Stock Index at all? A major reason for the development of the indices is that they provide an efficient proxy for the market, to enable the portfolio managers to beat the market. Stock indices, being representative in character act as an effective barometer of the national economy and the market sentiments.

Since the index is representative of the values of the component stocks there can be more than one ways in which the values of the component stocks can be arranged in order to arrive at the index value.

#### Terminology commonly used terms in the Index Futures market:

- **Contract Size:** is the value of the contract at a specific level of index. It is denominated by the product of the index level and the multiplier.
- **Multiplier:** It is a pre-determined value, used to arrive at the contract size. It is the price per index point.
- **Tick size:** It is the minimum price difference between two quotes of similar nature.
- **Contract Month:** It is the month in which the contract will expire.
- **Expiry Day:** It is the last day on which the contract is available for trading.
- **Open Interest:** It is the total outstanding long or short position in the market at any specific point in time. As total long outstanding positions in the market would be equal to total short positions, for calculation of open interest, only one side the contracts is counted.
- **Volume:** It is the number of contracts traded during a specific period of time during a day, during a week or during a month.
- **Long position:** It is the outstanding/unsettled purchase position at any point of time.
- **Short position:** It is the outstanding/unsettled sales position at any point of time.
- **Open position:** It is the outstanding/unsettled long or short position at any point of time.

#### Calculation of Index Value

The value of underlying index can be calculated by different methods. These are described as under:

**1. Market Capitalization Method**

Under this arrangement, a weight is assigned to each component total of the Stock Index based upon its share in market capitalization of all the components. Then, on daily basis, changes in the market capitalization of each component impact the value of the index in proportion to their weights. Market capitalization, as we know is the multiple of the market value and the number of outstanding shares.

**2. Market Value Method**

Under the method, the weight is assigned on the basis of the market value and the index represents the aggregated market value of the component Stocks.

**3. Equal Weightage**

Under this arrangement of components, equal weightage is given to all the components. If there are 50 stocks in an index, each shall have 2 percent weight.

Out of the above three methods of arrangement, the market capitalization method is the most rational since it takes into account both market price and the number of shares. Thus a component having both larger floating stock and greater market value gets a better weightage.

**Stock Indices in India**

Both the major stock exchanges in India, i.e. Bombay Stock Exchange (BSE) and National Stock Exchange (NSE) have created a number of indices. Some of these are as follows:

- BSE-30 (Sensex)
- BSE-100
- BSE-200
- BSE-500
- S & P CNX Nifty
- S & P Mid cap
- S & P CNX 500

The Sensex and Nifty are the most popular indices. Both of these are considered benchmark indices.

**FINANCIAL DERIVATIVES**

Financial derivatives came into the spotlight along with the rise of uncertainty of post 1970, when the U.S.A. announced an end to the Britton Woods System of fixed exchange rates. This generated enormous discomfort owing to currency fluctuations. To mitigate this risk, foreign currency derivatives were introduced on an Over the Counter (OCT) basis by banks that ended up providing cover to their importer/ exporter clients at a cost. Within a few years, commodity futures exchanges that had perfected the trading/clearing/settlement of derivatives over many decades started futures trading for currencies.

**Forex derivatives**

A Foreign exchange (Forex) derivative is a financial derivative contract where the underlying is a particular currency and/or its exchange rate. These can be used by currency or forex traders, as well as large multinational corporations. The multinational corporations often use these products when they expect to receive large amounts of money in the future but want to hedge their exposure to currency exchange risk. Financial instruments that fall into this category include: currency options contracts, currency swaps, and forward and futures contracts.

### Classification of Forex Derivatives

- **Currency futures:** Future contracts are legally binding agreements in which one party agrees to either buy or sell a certain financial instrument at a later date in time. These contracts are standardized depending on what is being traded, the quantity, delivery time and delivery location for each specific commodity. They consist of secondary markets and can also be dealt numerous times much like a bond and opposed to a bank loan.
- **Currency forwards:** A foreign exchange forward is an over-the-counter contract under which a purchaser agrees to buy from the seller, and the seller agrees to sell to the purchaser, a specified amount of a specified currency on a specified date in the future – beyond the spot settlement date – at a known price denominated in another currency (known as the forward price) that is specified at the time the contract is entered into. Forward contracts are different from futures contracts in that they are not standardized and are negotiated privately.
- **Currency swaps:** A Currency swap is a specified type of forex derivative. A currency swap is an agreement between two parties to agree to exchange different currencies normally at the prevailing spot exchange rate with an agreement to reverse the exchange of currencies, at the same spot exchange rate, at a fixed date in the future, generally at the maturity of the swap.
- **Currency option:** Currency options, commonly known as a Forex options are contracts which allows a person the right to buy or sell an item of their choosing at a give price for a limited period of time however it does not oblige them to do so. The only person obliged to perform anything is the seller of the option.

### Advantages of Forex Derivatives

The two main purposes of the forex market are to establish exchange rates between currencies and to provide a vehicle for making cross-border payments. Currency swaps allow companies to revise their debt conditions to take advantage of currency or expected future market conditions. As a result of these advantages, they are used as financial tools to lower the amount needed to service a debt. Foreign exchange is more of a liquid market and is the biggest financial market in the world towering over the futures market in terms of daily exchanges.

Forex derivatives allow companies to take advantage of the global markets more efficiently by bringing together two parties that have an advantage in different markets. Although there is some risk associated with the possibility that the other party will fail to meet its obligations, the benefits that a company receives from participating in a forex derivative far outweigh the costs.

### INTEREST RATE DERIVATIVES

An interest rate derivative is a derivative where the underlying asset is the right to pay or receive a (usually notional) amount of money at a given interest rate. The interest rate derivatives market is the largest derivatives market in the world.

### Classification of Interest Rate Derivatives

Majorly the interest rate derivatives can be classified as:

- **Interest Rate Swap:** It is an agreement between two parties where one stream of future interest payments is exchanged for another based on a specified principal amount. It is a cash-settled OTC derivative. The most popular interest rate swaps are fixed-for-floating swaps under which cash flows of a fixed rate loan are exchanged for those of a floating rate loan.
- **Interest rate cap/floor:** An interest rate cap is a derivative in which the buyer receives payments at the end of each period in which the interest rate exceeds the agreed strike price and an interest rate floor is

a derivative in which the buyer of the floor receives money if on the maturity of any of the floor, the reference rate fixed is below the agreed strike price of the floor.

- **Interest Rate Swaption:** It is an option to enter an interest rate swap. In exchange for an option premium, the buyer gains the right but not the obligation to enter into a specified swap agreement with the issuer on a specified future date.
  - **Payer Swaption:** A swap option giving the holder the right to pay a fixed rate and receive a floating rate in an interest rate swap.
  - **Receiver Swaption:** It gives the right but not the obligation to enter into an Interest rate future. It is a financial derivative with an interest-bearing instrument as the underlying asset. For example, Treasury-bill futures, Eurodollar futures etc.

### Advantages of Interest Rate Derivatives

Interest Rate Derivative are mostly used by firms or corporations, therefore the advantages of using Interest Rate Derivatives is also analyzed from their perspective. Some of the important advantages interest rate derivatives are as follows:

- It helps to limit or manage exposure to fluctuations in interest rates by providing protection against falling interest rates and giving the freedom to benefit if interest rates move higher.
- Interest Rate Swaps are often used because a domestic firm can usually receive better rates than a foreign firm.
- It also helps companies hedge against interest rate exposure by reducing the uncertainty of future cash flows.
- It allows companies to revise their debt conditions to take advantage of current or expected future market conditions.
- It allows companies to take advantage of the global markets more efficiently by bringing together two parties that have an advantage in different markets.

### Interest Rate Futures (IRFs) In India

On 29th August, 2009 RBI issued directions for trading of Interest Rate Futures on Currency Derivative Segment of a Recognized Stock Exchange. The term “Interest Rate Futures has been defined in the Regulations as:

Interest Rate Futures means a standardized interest rate derivative contract traded on a recognized stock exchange to buy or sell a notional security or any other interest bearing instrument or an index of such instruments or interest rates at a specified future date, at a price determined at the time of the contract.

Products that can be traded in the market are futures on long bond (10 year notional G-secs) and T-bills (91 days notional) and any other product which is approved by RBI.

### CREDIT DERIVATIVES

Credit derivatives are financial contracts that provide insurance against credit-related losses. These contracts give investors, debt issuers, and banks new techniques for managing credit risk that complement the loan sales and asset securitization methods. The general credit risk is indicated by the happening of certain events, called credit events, which include bankruptcy, failure to pay, restructuring etc. There is a party trying to transfer credit risk, called protection seller.

A credit derivative being a derivative does not require either of the parties, the protection seller or protection buyer to actually hold the reference asset. When a credit event takes place, there are two ways of settlement – cash and physical. Cash settlement means the reference asset will be valued, and the difference between its

par and fair value will be paid by the protection seller. Physical settlement means the protection seller will acquire the defaulted asset, for its par value.

According to the Report of the Working Group on Introduction of Credit Derivatives in India set up by the Reserve Bank of India Credit derivatives are over the counter financial contracts. They are usually defined as “off-balance sheet financial instruments that permit one party (beneficiary) to transfer credit risk of a reference asset, which it owns, to another party (guarantor) without actually selling the asset”.

### Types of Credit Derivatives

- (1) **Credit Default Swaps (CDS):** It is a bilateral contract on one or more reference assets in which the protection buyer pays a fees through the life of the contract in return for a contingent payment by the protection seller following a credit event. The amount to be paid by the seller in case of a credit event would be the difference between he original value of the asset and the amount recovered from it.

For example: Assume investors who owned long maturity bonds issued by a company ABC. The issuer’s bonds have seen a widening of credit spreads with 3-year spreads currently quoted at 115 bps and 12-year spreads at 203 bps. The investor could, if concerned with shorter term default risk, hedge with a default swap.

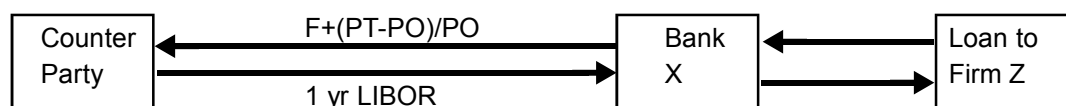
– Maturity	Three years
– Reference credit	ABC Company
– Reference loan	8.50% 3 year bond
– Credit event	The business day following occurrence of specific credit event
– Default payment	Notional amount × [100% - market value of reference bond after default]
– Default swap premium	3.20% payable by the entity purchasing protection

The default payment is payable by the entity providing protection upon the occurrence of a credit event.

- (2) **Total Return Swaps (TRS):** It is financial contract which transfers both the credit risk and market risk of an underlying asset. In a TRS, the total return obtained from one asset is passed on the protection seller, in return for a fixed pre-determined amount paid periodically. The total returns out of the asset are reflected by the actual cash flows and the actual appreciation/ depreciation in its price over time.

For example: Suppose a bank lends ₹ 100 crores to a firm a fixed rate of 10%. The bank seeks to hedge an unexpected increase in the borrower’s credit risk. The Bank enters into a TRS whereby:

- agrees to pay a counterparty the total return based on an annual rate (F) equal to the promised interest and fees on the loan plus the change in the market value of the loan.
- In return bank receives a variable market rate payment of interest annually (e.g, one year LIBOR) that reflects the cost of its funds.



- (2) **Credit Link Notes (CLN):** CLN’s are a securitized form of credit derivatives. The protection buyer issues notes or bonds which implicitly carries a credit derivative. The buyer of the CLN sells protection and pre-funds the protection sold by way of subscribing to he CLN. If there is a credit event payment due from the protection seller, the amounts due on the notes/bonds on account of credit events will be appropriated against the same and the balance will be paid to the CLN holder.

For example: Let us consider an issuer of credit cards that wants to fund its (credit card) loan portfolio via an issue of debt. In order to reduce the credit risk of the loans, it issues a two-year credit linked notes. The principal amount of the bond is 100 percent as usual, and it pays a coupon of 7.50%, which is 200 bp above the two year benchmark. If however, the incidence of bad debt amongst credit card holders exceeds 10% then the term states that note holders will only receive back ₹ 85 per ₹ 100 nominal.

The credit card issuer has in effect purchased a credit option that lowers its liability in the event that it suffers from a specified credit event, which in this case is an above-expected incidence of bad debts.

Investors may wish to purchase CLN because the coupon paid on it will be above what the credit card bank would pay on a bond and higher than other comparable investments in the market.

### Benefits from Credit Derivatives

- Banks and other financial institutions stand to benefit from the credit derivations mainly for two reasons
  - efficient utilization of capital and flexibility in developing/managing a target risk portfolio. Banks generally retain assets and hence, credit risk till maturity. This results in a blocking up of bank's capital and impairs growth through churning of assets. Due to exposure norms that restrict concentration of credit risk on their books, banks are forced to forego attractive opportunities on existing relationships.
- Financial intermediaries stand to gain from credit derivatives through indirect participation in credit-linked returns.
- Non banking participants gain from credit derivatives primarily through hedging of credit risk exposure. The ultimate benefit from the use of credit derivatives is on the whole financial system since there is an increased usage of capital and more efficient pricing of exposures.

### Some Modern Credit Derivatives

Over a period of time, the following other types of instruments have emerged on the landscape of financial derivatives:

#### ***(A) Stripped Mortgage Backed Securities***

Also called SMBS, these instruments represent interest in a pool of mortgages, called "Trenches" the cash flow of which has been separated into interest and principal components.

#### ***(B) Interest only securities***

Called IOs, receive the interest portion of the mortgage payment and generally increase in value as interest rates rise and decrease in value as interest rates fall. Where the underlying mortgages for an IO carry floating rate of interest, the value of the IOs tends to increase in value during periods of rising interest rates because individual borrowers are less likely to refinance and prepay their mortgages. The value of the SMBS would, therefore, tend to increase over the "life" of the mortgage instrument.

#### ***(C) Principal only "securities"***

Called POs, receive the principal portion of the mortgage payment and respond inversely to interest rate movement. As interest rates go up the value of the PO would tend to fall, as the PO becomes less attractive compared with other investment opportunities in the market place.

#### ***(D) Structured Notes***

These are debt instruments where the principal and/or the interest rate is indexed to an unrelated indicator. An example would be a bond whose interest rate is decided by the prevailing bank rate.

#### ***(E) Swaps***

A swap is a simultaneous buying and selling of the same security or obligation. Interest rate swaps are fairly common in which two parties exchange identical securities having different interest rate structures. The swap

market has grown dramatically. Today Swaps involve exchange of other than interest rates, such as mortgages and currencies. Swaps may also include “Caps” and “Floors” or Caps and Floors combined – “Collars”. A derivative consisting of an option to enter into an interest rate swap, or to cancel an existing swap in the future is called a “Swaption”.

### **(F) Warrants**

All options having maturity above one year are called warrants. These are generally traded over-the-counter.

### **(G) Leap**

*Leap* the acronym for Long-term Equity Anticipation Securities are options having a maturity of up to three years.

### **(H) Swaptions**

*Swaptions* are options to buy/sell a swap that will become operative at the expiry of the option. Thus a swaption is an option on a forward swap. Rather than having calls and puts, the swaptions market has receiver swaptions and payer swaptions. A receiver swaption is an option to receive fixed and pay floating, whereas a payer swaption is an option to pay fixed and receive floating.

## **TRADING, CLEARING AND SETTLEMENT OF DERIVATIVES ON STOCK EXCHANGES**

The pattern of trading on both the BSE and the NSE is similar.

### **1. Trading Mechanism**

The derivatives trading system at NSE, called NEAT-F&O trading system, provides a fully automated screen-based trading for derivatives on a nation-wide basis. It supports an anonymous order driven market, which operates on strict price/ time priority. It provides tremendous flexibility to users in terms of kinds of orders that can be placed on the system. Various time and price related conditions like Good-till-Day, Good-till-cancelled, Good-Till-Date, Immediate or Cancel, Limit/market Price, Stop Loss, etc. can be built into an order.

There are four entities in the trading system.

The NEAT-F&O trading system distinctly identifies two groups of users. The trading user more popularly known as trading member has access to functions such as, order entry, order matching, order and trade management. The clearing user (clearing member) uses the trader workstation for the purpose of monitoring the trading member(s) for whom he clears the trades. Additionally, he can enter and set limits on positions, which a trading member can take.

### **2. Period**

The contracts are traded in one-month two-month and three month expiry cycles. All contracts expire on the last Thursday of the relevant month. On the Friday following the last Thursday, a new contract for that expiry period would be introduced for trading. Thus at any point in time, three contracts would be available for trading with the first contract expiring on the last Thursday of that month.

### **3. Lot Size**

Trading is a minimum lot size of 200 units for NSE Nifty. Thus if the Nifty is trading at 1050, then the value of a single futures contract would be ₹ 210000. The minimum tick size for a Nifty contract is 0.05 units and for Sensex, it is 0.1 units.

### **4. Orders**

Orders for trading are identified in the following manner:



1. Buy "Open"
2. Sell "Open"
3. Buy "Close"
4. Sell "Close"

Buy "Open" orders are those wherein the client has first opened a buy position before sell. At the time of closure of this open position, the order is called a sell "Close".

Similarly when a client sells prior to buying, the sell order is identified as Sell "Open" and when the same sell "Open" position is to be closed out the respective buy order is market as a Buy "Close" order.

The futures market is a zero-sum game, i.e. the total number of long in any contract always equals the total number of short in any market. The total number of outstanding contracts (lot/short) at any point in time is called the "Open Interest".

The open-interest figure is a good indicator of the liquidity in every contract.

The index futures and index options contracts traded on NSE are based on S&P CNX Nifty Index and the CNX IT Index, while stock futures and options are based on individual securities. Presently stock futures and options are available on 119 securities. While the index options are European style, stock options are American style. There are a minimum of 7 strike prices, 'three-in-the-money', one 'at-the-money' and three 'out-of-the-money' for every call and put option. The strike price is the price at which the buyer has a right to purchase or sell the underlying.

In respect of equity derivatives, at any point of time there are only three contracts available for trading, with 1 month, 2 months and 3 months to expiry. These contracts expire on last Thursday of their respective expiry months. A new contract is introduced on the next trading day following the expiry of the near month contract. All the derivatives contracts are presently cash settled.

### **5. Clearing and settlement**

Clearing and settlement is undertaken by clearing members of the exchange and the clearing bank. Clearing members can be either trading members, clearing members who can trade and settle only for their own trades; or professional clearing members who can clear and settle their own trades as well as those of other trading members.

### **6. Clearing Mechanism**

The first step in clearing process is working out open positions and obligations of clearing (self clearing/trading-cum-clearing/professional clearing) members (CMs). The open positions of a CM is arrived at by aggregating the open positions of all the trading members (TMs) and all custodial participants (CPs) clearing through him, in the contracts which they have traded. The open position of a TM is arrived at by summing up his proprietary open position and clients' open positions. Proprietary positions are calculated on net basis for each contract and that of clients are arrived at by summing together net positions of each individual client. A TM's open position is the sum of proprietary open position, client open long position and client open short position.

### **7. Settlement Mechanism**

All futures and options contracts are cash settled, i.e. through exchange of cash. The underlying for index futures/options of the index cannot be delivered. These contracts, therefore, have to be settled in cash. Stock futures and stock options can be delivered as in the spot market. However, it has been currently mandated that Stock Options and Futures would be cash settled. The settlement amount for a CM is netted across all their TMs/clients, across various settlements. For the purpose of settlement, all CMs are required to open a separate bank account with the stock exchange's clearing corporation designated clearing banks for F&O segment.



## Settlement of Futures Contracts

Future contracts have two types of settlements – MTM settlement and the final settlement.

**MTM Settlement for Futures:** All futures contracts for each member are marked-to-market to the daily settlement price of the relevant futures contract at the end of each day. The profits/losses are computed as the difference between:

- (i) the trade price and the day's settlement price in respect of contracts executed during the day but not squared up,
- (ii) the previous day's settlement price and the current day's settlement price in respect of brought forward contracts,
- (iii) the buy price and the sell price in respect of contracts executed during the day and squared-up.

The CMs who have suffered a loss are required to pay the mark-to-market (MTM) loss amount in cash which is in turn passed on to the CMs who have made a MTM profit. This is known as daily mark-to-market settlement. CMs are responsible to collect and settle the daily MTM profits/losses incurred by the TMs and their clients clearing and settling through them. Similarly, TMs are responsible to collect/pay losses/profits from/to their clients by the next day. The pay-in and pay-out of the mark-to-market settlement are effected on the day following the trade day.

After completion of daily settlement computation, all the open positions are reset to the daily settlement price. Such position become the open positions for the next day.

- **Final Settlement for Futures:** On the expiry day of the futures contracts, after the close of trading hours, NSCCL marks all positions of a CM to the final settlement price and the resulting profit/loss is settled in cash. Final settlement loss/profit amount is debited/credited to the relevant CM's clearing bank account on the day following expiry day of the contract.
- **Settlement Prices for Futures:** Daily settlement price on a trading day is the closing price of the respective futures contracts on such day. The closing price for a futures contract is currently calculated as the last half an hour weighted average price of the contract executed in the last half an hour of trading hours. In case future contract is not traded in the last half an hour, the theoretical future price is computed and used as daily settlement price in the F&O segment of NSE. Final settlement price is the closing price of the relevant underlying index/security in the Capital market segment of NSE, on the last trading day of the contract. The closing price of the underlying Index/security is currently its last half an hour weighted average value in the Capital Market Segment of NSE.

## Settlement of Options Contracts

- **Daily Premium Settlement for Options:** Buyer of an option is obligated to pay the premium towards the options purchased by him. Similarly, the seller of an option is entitled to receive the premium for the option sold by him. The premium payable amount and the premium receivable amount are netted to compute the net premium payable or receivable amount for each client for each option contract.
- **Interim Exercise Settlement:** Interim exercise settlement takes place only for option contracts on securities. An investor can exercise his in-the-money options at any time during trading hours, through his trading member. Interim exercise settlement is effected for such options at the close of the trading hours, on the day of exercise. Valid exercised option contracts are assigned to short positions in the option contract with the same series (i.e. having the same underlying, same expiry date and same strike price), on a random basis, at the client level.

The CM who has exercised the option receives the exercise settlement value per unit of the option from the CM who has been assigned the option contract.

- **Final Exercise Settlement:** Final Exercise settlement is effected for all open long in-the-money strike price options existing at the close of trading hours, on the expiration day of an option contract. All such long positions are exercised and automatically assigned to short positions in option contracts with the same series, on a random basis.

The investor who has long in the money options on the expiry date will receive the exercise settlement value per unit of the option from the investor who has been assigned the option contract.

### Margins in settle of Future Options Contracts

The Clearing Corporation of the contracts to margins in two forms, Mark-to- market settlement and Initial margins.

#### Mark-to-Market settlement of index futures

All open positions in the index contracts are daily settled at the Mark-to-Market settlement price. Thus if a contract entered on a particular day at Sensex value of 3300 has the value at 3310 the next day, the position of the buyer will get credited by 10 points and position of seller will get debited by 10 points. The process will continue till the closure of the position. On the expiry, the settlement price is the spot index value as on expiry of any futures contract, the spot value and the futures value coverage. Mark-to-Market settlement is in cash.

#### Initial Margin

The computation of initial margin is done using the concept of Value-at-Risk (VAR). The initial margin amount will be large enough to cover a one-day loss that can be encountered on 99% of the days. Value at Risk is a single number which estimate maximum possible loss on an investment. VAR methodology seeks to measure that a portfolio may stand to lose within a certain horizon time period due to potential changes in the underlying assets' market price. In other words VAR seeks to measure the maximum loss that a portfolio might sustain over a period of time given a set probability level. Initial margin amount computed using VAR is collected up-front.

### RISK MANAGEMENT SYSTEM- ROLE OF NSCCL

NSCCL has developed a comprehensive risk containment mechanism for the F&O segment. The salient features of risk containment measures on the F&O segment are:

- The final soundness of the members is the key to risk management. Therefore, the requirements for membership in terms of capital adequacy (net worth, security deposits) are quite stringent.
- NSCCL charges an upfront initial margin for all the open positions of a CM. It specifies the initial margin requirements for each futures/options contract on a daily basis. It also follows VAR-based margining computed through SPAN. The CM in turn collects the initial margin from the TMs and their respective clients.
- The open positions of the members are marked to market based on contract settlement price for each contract. The difference is settled in cash on a T +1 basis.
- NSCCL's on-line position monitoring system monitors a CM's open position on a real-time basis. Limits are set for each CM based on his base capital. The on-line position monitoring system generates alerts whenever a CM reaches a position limit set up by NSCCL. NSCCL monitors the CMs for MTM value violation, while TMs are monitored for contract wise position limits violation.
- CMs are provided a trading terminal for the purpose of monitoring the open positions of all the TMs clearing and settling through him. A CM may set exposure limits for a TM clearing and settling through him. NSCCL assists the CM to minor the intra-day-exposure limits set up by a CM and whenever a TM

exceed the limits, it stops that particular TM from further trading.

- A member is alerted of his position to enable him to adjust his exposure or bring in additional capital. Position violations result in disablement of trading facility for all TMs of a CM in case of a violation by the CM.
- A separate Settlement Guarantee Fund for this segment has been created out of the base capital of members.

The most critical component of risk containment mechanism for F & O segment is the margining system and on-line position monitoring. The actual position monitoring and margining is carried out on-line through Parallel Risk Management System (PRISM) using SPAN (Standard Portfolio Analysis of Risk) system for the purpose of computation of on-line margins, based on the parameters defined by SEBI.

### NSE-SPAN

The objective of NSE-SPAN is to identify overall risk in a portfolio of all futures and options contracts for each member. The system treats futures and options contracts uniformly, while at the same time recognizing the unique exposures associated with options portfolios, like extremely deep out-of-the-money short positions and inter-month risk.

Its over-riding objective is to determine the largest loss that a portfolio might reasonably be expected to suffer from one day to the next day based on 99% VAR methodology.

**SPAN** considers uniqueness of option portfolios. The following factors affect the value of an option:

- (i) Underlying market price
- (ii) Volatility (variability) of underlying instrument, and
- (iii) Time to expiration.
- (iv) Interest rate
- (v) Strike price

As these factors change, the value of options maintained within a portfolio also changes. Thus, SPAN constructs scenarios of probable changes in underlying prices and volatilities in order to identify the largest loss a portfolio might suffer from one day to the next. It then sets the margin requirement to cover this one-day loss.

The complex calculations (e.g. the pricing of options) in SPAN are executed by NSCCL. The results of these calculations are called risk arrays. Risk arrays, and other necessary data inputs for margin calculation are provided to members daily in a file called the SPAN Risk Parameter file. Members can apply the data contained in the Risk Parameter files, to their specific portfolios of futures and options contracts, to determine their SPAN margin requirements.

Hence, members need not execute complex option pricing calculations, which is performed by NSCCL. SPAN has the ability to estimate risk for combined futures and options portfolios, and also re-value the same under various scenarios of changing market conditions.

### Margins

- **Initial Margin:** Margin in the F&O segment is computed by NSCCL upto client level for open positions of CMs/TMs. These are required to be paid up-front on gross basis at individual client level for client positions and on net basis for proprietary positions. NSCCL collects initial margin for all the open positions of a CM as computed by NSE-SPAN. A CM is required to ensure collection of adequate initial margin from his TMs up-front, in turn the TM collects it from his clients.

- **Premium Margin:** In addition to initial margin, premium margin is charged at client level. This margin is required to be paid by a buyer of an option till the premium settlement is complete.
- **Assignment Margin for Options on Securities:** Assignment margin is levied in addition to initial margin and premium margin. It is required to be paid on assigned positions of CMs towards interim and final exercise settlement obligations for option contracts on individual securities, till such obligations are fulfilled. The margin is charged on the net exercise settlement value payable by a CM towards interim and final exercise settlement.
- **Client Margins:** NSCCL intimates all members of the margin liability of each of their client. Additionally members are also required to report details of margins collected from clients to NSCCL, which holds in trust client margin monies to the extent reported by the member as having been collected from their respective clients.

### PARALLEL RISK MANAGEMENT SYSTEM (PRISM)

PRISM, the Parallel Risk Management System, is the real-time position monitoring and risk management system for the F&O market segment. The risk of each trading and clearing member is monitored on a real time basis by generating various alerts whenever a CM exceeds any limit set up by NSCCL. These are detailed below:

- **Initial Margin Violation:** The initial margin is computed on a real time basis i.e. for each trade the amount of initial margin is reduced from the effective deposits of the CM held with the clearing corporation. For this purpose, effective deposits are computed by reducing the total deposits of the CM by ₹ 50 lakh (referred to as minimum liquid net worth). The CM receives warning messages on his terminal when 70%, 80% and 90% of the effective deposits are utilized. At 100% the clearing facility provided to a CM is automatically withdrawn. Withdrawal of clearing facility of a CM in case of a violation leads to automatic withdrawal of trading facility for all TMs and/or custodial participants clearing and settling through such CM.

Similarly, the initial margins on positions taken by a TM is also computed on a real time basis and compared with the TM limits set by his CM. As the TM limit is used up to 70%, 80%, and 90%, the member receives a warning message on his terminal. At 100%, the trading facility provided to the TM is automatically withdrawn.

A member is provided with adequate warnings on the violation before his trading clearing facility is withdrawn. A CM may appropriately reduce his exposure to contain the violation or alternately bring in additional base capital.

- **Member-wise Position Limit Violation (Future and Option contracts on Equity index):** The member-wise position limit on open position of a TM is supervised by PRISM. The open position in all index futures in index option contracts of any TM, cannot exceed 15% of the total open interest of the market or ₹ 250 crore, whichever is higher at any time, including trading hours. This limit shall be applicable on open positions in all option contracts on a particular underlying index.
- **Member-wise Position Limit Violation (Future and Option contracts on Individual Securities):** The TM position limits in equity index futures contracts shall be higher of ₹ 250 crore or 15% of the total open interest in the market in equity index futures contracts. This limit would be applicable on open positions in all future contracts on a particular underlying index.
- **Exposure Limit Violation:** PRISM monitors exposure of members on all futures and option contracts, which cannot exceed 33.33 times the liquid net worth for index options and index futures contracts. For option and futures contract on individual securities, the exposure limits of, which is higher, 5% or 1.5 standard deviation of the notional value of gross open position in futures on individual securities and gross short open positions in options on individual securities in a particular underlying should be collected/adjusted from the liquid network of a member on a real time basis.

- **Market-wide Position Limit Violation:** PRISM monitors market wide position limits for futures and option contracts on individual securities. The open position across all members, across all contracts cannot exceed lower of the following limits; 30 times the average number of shares traded daily in the previous calendar month or 20% of the number of shares held by non-promoters in the relevant underlying security i.e. 20% of the free float in terms of the number of shares of a company. When the total open interest in an option contract, across all members, reaches 60% of the market wide position limit for a contract, the price scan range and volatility scan range (for SPAN margin) are doubled. NSCCL specifies the market-wide position limits once every month, at the beginning of the month, which is applicable for the subsequent month.
- **Client-wise Position Limit Violation:** Whenever the open position of any client exceeds 1% of the free float market capitalization (in terms of no. of shares) or 5% of the open interest (in terms of number of shares) whichever is higher, in all the futures and option contracts on the same underlying security, then it is termed as client-wise position limit violation. The TM/CM through whom the client trades/clears his deals should be liable for such violation and penalty may be levied on such TM/CM which he may in turn recover from the client. In the event of such a violation, TM/CM should immediately ensure that the client does not take fresh positions and reduce the position of those clients within the permissible limit.
- **Misutilisation of TM/Constituent's Collateral and/or Deposit:** it is violation, if a CM utilizes the collateral of one TM and/or constituent towards the exposure and/or obligations of a TM and/or constituent.
- **Violation of Exercised Position:** When option contracts are exercised by a CM, where no open long positions for such CM/tm and/or constituent exist at the end of the day, at the time the exercise processing is carried out, it is termed as violation of exercised position.

## COMMODITIES MARKET

India, a commodity based economy where two-third of the one billion population depends on agricultural commodities, surprisingly has an under developed commodity market. Unlike the physical market, futures markets trades in commodity are largely used as risk management (hedging) mechanism on either physical commodity itself or open positions in commodity stock.

For instance, a jeweller can hedge his inventory against perceived short-term downturn in gold prices by going short in the future markets.

In the present discussion, we aim at understanding the knowhow of the commodities market and how the commodities traded on the exchange. The idea is to understand the importance of commodity derivatives and learn about the market from Indian point of view. In fact it was one of the most vibrant markets till early 70s. Its development and growth was shunted due to numerous restrictions earlier. Now, with most of these restrictions being removed, there is tremendous potential for growth of this market in the country.

A commodity may be defined as an article, a product or material that is bought and sold. It can be classified as every kind of movable property, except Actionable Claims, Money & Securities.

Commodities actually offer immense potential to become a separate asset class for market-savvy investors, arbitrageurs and speculators. Retail investors, who claim to understand the equity markets, may find commodities an unfathomable market. But commodities are easy to understand as far as fundamentals of demand and supply are concerned. Retail investors should understand the risks and advantages of trading in commodities futures before taking a leap. Historically, pricing in commodities futures has been less volatile compared with equity and bonds, thus providing an efficient portfolio diversification option.

Commodity market is an important constituent of the financial markets of any country. It is the market where a wide range of products, viz., precious metals, base metals, crude oil, energy and soft commodities like palm oil,

coffee etc. are traded. It is important to develop a vibrant, active and liquid commodity market. This would help investors hedge their commodity risk, take speculative positions in commodities and exploit arbitrage opportunities in the market.

### Need for commodity trading

It is important to understand why commodity derivatives are required and the role they can play in, risk management. The prices of commodities, metals shares and currencies fluctuate over time. The possibility of adverse price changes in future creates risk for businesses. Derivatives are used to reduce or eliminate price risk arising from unforeseen price changes. The commodity derivative market is a direct way to invest in commodities rather than investing in the companies that trade in those commodities. Commodity futures markets allow commercial producers and commercial consumers to offset the risk of adverse price movements in the commodities that they are selling or buying.

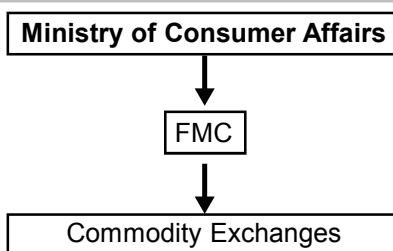
### Advantages of Commodity Trading

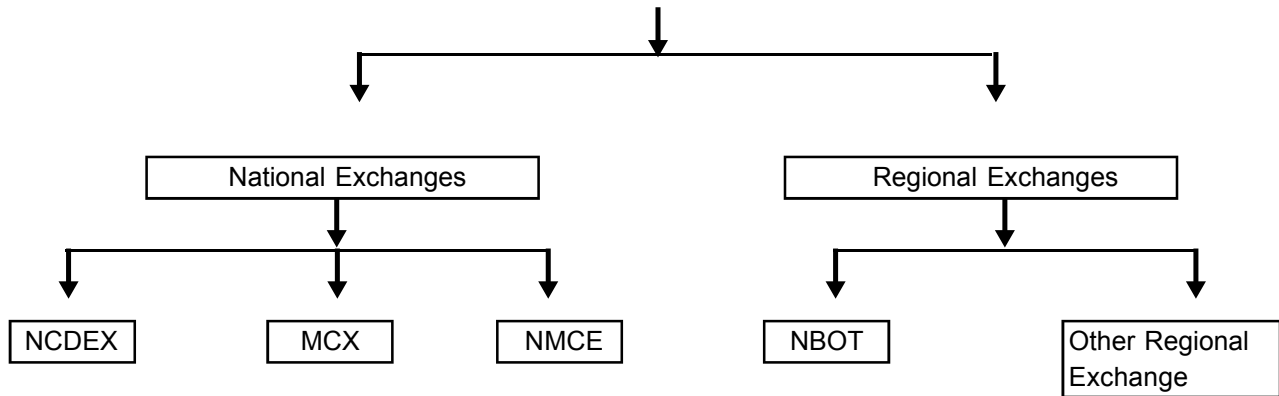
- A good low-risk portfolio diversifier.
- A highly liquid asset class, acting as a counterweight to stocks, bonds and real estate.
- Less volatile, compared with, equities and bonds.
- Investors can leverage their investments and multiply potential earnings.
- Better risk-adjusted returns.
- A good hedge against any downturn in equities or bonds as there is little correlation with equity and bond markets.
- High co-relation with changes in inflation.

### COMMODITY MARKETS IN INDIA

Bombay Cotton Trade Association Ltd., set up in 1875, was the first organized futures market. Bombay Cotton Exchange Ltd. was established in 1893 following the widespread discontent amongst leading cotton mill owners and merchants over functioning of Bombay Cotton Trade Association. The Futures trading in oilseeds started in 1900 with the establishment of the Gujarati Vyapari Mandali, which carried on futures trading in groundnut, castor seed and cotton. Futures' trading in wheat was existent at several places in Punjab and Uttar Pradesh. But the most notable futures exchange for wheat was chamber of commerce at Hapur set up in 1913. Futures trading in bullion began in Mumbai in 1920. Calcutta Hessian Exchange Ltd. was established in 1919 for futures trading in raw jute and jute goods. But organized futures trading in raw jute began only in 1927 with the establishment of East Indian Jute Association Ltd. These two associations amalgamated in 1945 to form the East India Jute & Hessian Ltd. to conduct organized trading in both Raw Jute and Jute goods. Forward Contracts (Regulation) Act was enacted in 1952 and the Forwards Markets Commission (FMC) was established in 1953 under the Ministry of Consumer Affairs and Public Distribution. In due course, several other exchanges were created in the country to trade in diverse commodities.

### Structure of Commodity Market





### Commodities traded in commodity Method

World-over one will find that a market exists for almost all the commodities known to us. These commodities can be broadly classified into the following:

*Precious Metals:* Gold, Silver, Platinum etc

*Other Metals:* Nickel, Aluminum, Copper etc

*Agro-Based Commodities:* Wheat, Corn, Cotton, Oils, Oilseeds.

*Soft Commodities:* Coffee, Cocoa, Sugar etc

*Live-Stock:* Live Cattle, Pork Bellies etc

*Energy:* Crude Oil, Natural Gas, Gasoline etc

### Leading Commodity Exchanges in India

The government has now allowed national commodity exchanges, similar to the BSE & NSE, to come up and let them deal in commodity derivatives in an electronic trading environment. These exchanges are expected to offer a nation-wide anonymous, order driven, screen based trading system for trading. The Forward Markets Commission (FMC) will regulate these exchanges.

Consequently four commodity exchanges have been approved to commence business in this regard. They are:

Multi Commodity Exchange (MCX) located at Mumbai.

National Commodity and Derivatives Exchange Ltd (NCDEX) located at Mumbai.

National Board of Trade (NBOT) located at Indore.

National Multi Commodity Exchange (NMCE) located at Ahmedabad.

### Participants in Commodity Futures

- Farmers/ Producers
- Merchandisers/ Traders
- Importers
- Exporters
- Consumers/ Industry
- Commodity Financers
- Agriculture Credit providing agencies



- Corporate having price risk exposure in commodities

### Types of Commodity Derivatives

- (i) **Commodity futures contracts:** A futures contract is an agreement for buying or selling for a predetermined delivery price at a specific future time. Futures are standardized contracts that are traded on organized future exchanges that ensure performance of the contracts and thus remove the default risk. The major function of futures markets is to transfer price risk from hedgers to speculators. For example, if a farmer is expecting his crop of wheat to be ready in two months time, but is worried that the price of wheat may decline in this period. In order to minimize the risk, he can enter into a futures contract to sell his crops in two months' time at a price determined now. This way he is able to hedge his risk arising from a possible adverse change in the price of his commodity.
- (ii) **Commodity options contracts:** Options are used for hedging and speculation. The commodity option holder has the right, but not the obligation, to buy (or sell) a specific quantity of a commodity at a specified price on or before a specified date. Option contracts involve two parties- the seller of the option writes the option in favour of the buyer who pays a certain premium to the seller as a price for the option. There are two types of commodity options: a call option gives the holder a right to buy a commodity at an agreed price, while a put option gives the holder a right to sell a commodity at an agreed price, while a put option gives the holder a right to sell a commodity at an agreed price on or before a specified date (called expiry date).

### Advantages of commodity trading

- 1. Leverage:** Commodity futures operate on margin, meaning that to take a position only a fraction of the total value needs to be available in cash in the trading account.
- 2. Commission costs:** It is a lot cheaper to buy/sell one futures contract than to buy/sell the underlying instrument. For example, one full size S & P 500 contract is currently worth in excess of \$ 250,000 and could be bought/sold for as little as \$20. The expense of buying/selling \$250,000 could be \$2,500+.
- 3. Liquidity:** The involvement of speculator means that futures contracts are reasonably liquid. However, how liquid depends on the actual contract being traded. Electronically traded contracts, such as the e-minis tend to be the most liquid whereas the pit traded commodities like corn, orange juice are not readily available to the retail trader and more expensive to trade in terms of commission and spread.
- 4. Ability to go short:** Futures contracts can be sold as easily as they are bought enabling a speculator to profit from falling markets as well as rising ones.
- 5. No time delay:** Options suffer from time decay because the closer they come to expiry the less time is for the option to come into the money. Commodity futures do not suffer from this as they are not anticipating a particular strike price at expiry.

### Disadvantages of commodity trading

**Leverage:** Low margin requirements can encourage poor money management, leading to excessive risk taking. Not only are profits enhanced but so are losses.

### Commodity Derivatives vs. Financial Derivatives

Derivatives as a tool for managing risk first originated in the Commodities markets. They were then found useful as a hedging tool in financial markets as well. The basic concept of a derivative contract remains the same whether the underlying happens to be a commodity or a financial asset. However there are some features, which are very peculiar to commodity derivative markets. In the case of financial derivatives, most of these contracts are cash settled. Even in the case of physical settlement, financial assets are not bulky and do not



need special facility for storage. Due to the bulky nature of the underlying assets, physical settlement in commodity derivatives creates the need for warehousing. Similarly, the concept of varying quality of asset does not really exist as far as financial underlyings are concerned. However in the case of commodities, the quality of the asset underlying a contract can vary largely. This becomes an important issue to be managed.

### LESSON ROUND-UP

- According to the Section 2(ac) of Securities Contract (Regulations) Act, 1956, derivatives includes:
  - a security derived from a debt instrument, share, loan, whether secured or unsecured, risk instrument or contract for difference or any other form of security;
  - a contract which derives its value from the prices, or index of the prices, of underlying securities.
- An option represents the right but not the obligation to buy or sell a security or other asset during a given time for a specified price called the “Strike” price. An option to buy is known as a “Call” and an option to sell is called a “Put”.
- In Forward Contract, the purchaser and its counter party are obligated to trade in security or other asset at a specified date in future.
- A Future represents the right to buy or sell a standard quantity and quality of an asset or security at a specified date and price.
- Interest only securities popularly known as IOs, receive the interest portion of the mortgage payment and generally increase in value as interest rates rise and decrease in value as interest rates fall.
- Structured Notes are debt instruments where the principal and/or the interest rate is indexed to an unrelated indicator.
- A swap is a simultaneous buying and selling of the same security or obligation. Interest rate swaps are fairly common in which two parties exchange identical securities having different interest rate structures.
- A Stock Index is a particular kind of index that represents changes in the market values of a number of securities contained in that index.
- Index futures are the future contracts for which the underlying is the cash market index. In India, futures on both BSE Sensex and NSE Nifty are traded
- Value at Risk is a single number which estimates maximum possible loss on an investment. VAR seeks to measure the maximum loss that a portfolio might sustain over a period of time given a set probability level.
- The seller agrees to deliver if the contract owner elects to buy, or to purchase if the contract owner elects to sell. For agreeing to the terms of the contract, the seller receives a fee, which in options is called the premium.
- A class of options consists of all options of the same type (put or call) covering the same underlying security.
- A series of options is all options of the same class having both the same strike price and the same expiration month.
- All futures and options contracts are cash settled, i.e. through exchange of cash. For the purpose of settlement, all CMs are required to open a separate bank account with NSCCL designated clearing banks for F&O segment.

*(These are meant for re-capitulation only. Answers to these questions are not to be submitted for evaluation)*

1. Illustrate the difference between spot market and forward market.
2. What do you understand by the term “financial derivatives” ?
3. What is the significance of a Stock Index?
4. What are future contracts and how do they differ from forward contracts?
5. Describe the various kinds of options contracts.
6. Evaluate the growth of derivatives market in India.

[illegible]

# Lesson 11

## Treasury Management

### LESSON OUTLINE

- Meaning and objectives of Treasury Management
- Significance, Functions and Scope of Treasury Management
- Relationship between Treasury Management and Financial Management;
- Role and Responsibilities of Chief Finance Officer
- Tools of Treasury Management;
- Internal Treasury Controls
- Environment for Treasury Management
- Liquidity Management
- Regulation, Supervision and Control of Treasury Operations
- Implications of Treasury on International Banking
- LESSON ROUND UP
- SELF TEST QUESTIONS

### LEARNING OBJECTIVES

Treasury Management is an activity associated with managements of cash and funds in an organisation. It is one of the core and most important activity of financial management and a finance manager should be aware about core aspects of treasury management.

The object of the study is enable the students understand

- Objectives of Treasury Management
- Function and scope of Treasury Management
  - Unit level
  - Domestic level
  - International level
- Treasury Management vis-a-vis Financial Management
- Role and responsibilities of Treasury Managers
- Tools of Treasury Management
  - Zero based Budgeting
  - Financial Statement Analysis
- Internal Treasury Control
- Environment for Treasury Management

## INTRODUCTION- TREASURY MANAGEMENT

Treasure management means "To plan, organise and control cash and borrowings so as to optimise interest and currency flows, and minimise the cost of funds " or in other words "the handling of all financial matters, the generation of external and internal funds for business, the management of currencies and cash flows, and the complex strategies, policies, and procedures of corporate finance" It involves ensuring that proper funds are available with the company at the time of outflow required & also that funds are not kept utilised for a good long time...this requires investing/disinvesting funds in open ended mutual fund schemes. The scope of Treasury management includes the management of cash flows, banking, money-market and capital-market transactions; the effective control of the risks associated with those activities; and the pursuit of optimum performance consistent with those risks.

## OBJECTIVES OF TREASURY MANAGEMENT

We have noted above that the main function of a treasury manager is the management of funds. While managing these funds, the treasury manager seeks to fulfill the under-noted objectives:

### 1. Availability of funds in right quantity

The treasury manager arranges funds for the unit. It is the duty of the treasury manager to ensure that after the funds have been arranged in required quantity. The term quantity refers to the amount of funds required for day to day functioning of the unit. This quantity is available to the firm either as external loans or as internal generation. The loans quantity is arranged in the form of working capital treasury against the security of inventory and trade receivables.

Availability of funds in the right quantity is the core objectives of treasury management. Alongside, the treasury manager has also to ensure that the funds are just adequate for the requirements, neither more nor less. In case funds are kept in excess of the requirement, the excess portion imposes an opportunity cost over the system, i.e. the cost represented by the earnings which these funds would have obtained instead of being left idle. Again, the adequacy of funds has to be determined carefully. For this purpose, the cash flows for the relevant period have to be accurately charted out. Cash flows are the actual cash flows in this case as there can be a lag in terms of less realization of the projected flows. Thus actual cash flows only have to be considered while determining adequacy. Further, while actual inflows should be ascertained, as regards outflows a margin of contingency should be maintained to take care of the uncertainties. Cash is understood here to include both cash and bank balances plus that portion of highly liquid securities that can be converted into cash within a stipulated time period.

### 2. Availability of funds at right time

The requisite funds for day-to-day working of the firm should be available in time. Timely availability of funds smoothens the operations of the firm and brings about certainty to the quantum of inflows that would be available at a particular point in time. What is timely is a relative matter dependent upon the situation of each case. Again the inflows have to be actual inflows at the determined time and not projected or anticipated flows. This is because the element of uncertainty has to be accorded due consideration. In case of a firm having a large number of transactions, timely availability of funds is extremely important because the execution of many transactions would be dependent upon funds position. This is relevant also for transactions involving foreign exchange. For the purpose of treasury operations, we consider foreign currencies at par with the domestic currency. It is assumed that the regulatory mechanism for holding foreign currency and domestic currency is the same and there is no constraint on holding or converting currencies. For foreign exchange transactions, funds have to be made available for meeting many critical situations. The treasury manager ensures that all the

receipts of funds are credited to the account of the firm well in time. Another way of ensuring timely availability of funds is to park short-time surplus funds in liquid securities which can be sold conveniently and quickly to realize cash. In this way, availability can be ensured without straining other resources.

### 3. Deployment of Funds in right quantity

Just as procurement of funds in right quantity is important for a treasury manager, equally important is to ensure that the right quantity of funds is deployed. By deployment of funds, we mean earmarking of funds for various expense heads, parking of short-term funds and investing surplus funds.

The expense heads can be capital expenditure and revenue expenditure. Capital expenditure involves allocation of funds for acquisition of fixed assets. The amount involved per transaction in capital expenditure is large and such expenditure is usually known well in advance. Revenue expenditure on the other hand is routine expenditure for purchase of raw materials and making payment for utilities, wages and other miscellaneous items. The number of transactions for revenue expenditure is large and the amount involved per transaction is smaller as compared to the capital expenditure. Some items of revenue expenditure are in the form of cash payment but the capital expenditure is mainly through bank account.

For deploying the right amount of funds, the treasury manager has to keep track of all receipts of funds. Simultaneously, the time table of deployment of funds is to be drawn up. In this time table, the payees are prioritized according to the urgency of their payments. There are certain expenses like important raw material payments, utility payments etc. which have to be accorded top priority over others. Other payments like payment to capital goods suppliers and financiers have also to be arranged in the right quantity. Apart from these payments, some extra funds have to be kept available for meeting contingencies. The sum of all these deployments makes the right quantum of funds to be deployed. For making the right development of funds at right time, it is necessary to have a close tie-up with different department i.e. Purchase department, HR Department. Without this type of tie-up, right quantity of funds cannot be deployed.

If the deployment is not in right quantity, the result can either be under deployment resulting in higher cost of funds or over deployment resulting in funds remaining idle. In case all the requirements of deployment of funds have been met and procurement of funds has been done in the right quantity, there is a possibility that some amount of funds would remain in surplus with the treasury department. This surplus would be in excess of the contingency requirements and as such can be deployed further on short term or long term basis depending upon the quantum of funds. If the quantum of surplus is large enough, some amount from this can be earmarked for long term deployment in investments etc. otherwise the entire surplus can be parked in short term securities.

Deployment of the right quantity of funds cannot be achieved in case the procurement of funds has not been done in right quantity in the first place. This is because ultimately the inflows of funds shall be utilized for feeding the outflows on whatsoever account. If the deployment has been done rightly, there shall be no bottlenecks in the funds flow of the firm. The allocation and use of funds follow each other in a cyclical manner and both have to be done in the right quantity for optimal use of the funds.

### 4. Deployment of funds at right time

A logical corollary of sourcing funds at the right time is that the funds should be deployed at the right time. The description of the right time is a relative term and what amount of time is appropriate varies from firm to firm. The span of time varies from a week to a month in case of purchase of fixed assets. However, in working capital deployment, the range of time allowed may be quite narrow – say 2–3 days only. The treasury manager has to honour the outstanding commitments on working capital account within this short span of time. Payment for wages and utilities etc. has to be made in time to avoid any defaults. Similarly, payment to trade creditors, domestic and overseas, has to be made within a stipulated short period of time for avoiding interest payments etc.

Timely disbursement ensures that the funds are not left idle for the shortest span of time. In case the sourcing

and deployment of funds is well organized, surplus of funds shall soon start emerging which can be deployed in short term liquid investments. However, if the inflow and outflow of funds is not evenly matched in the time dimension, bottlenecks and mismatch of funds are sure to emerge. Apart from causing administrative problems and rationing of funds, such a situation also leads to increase in cost of funds. Thus the treasury manager seeks to avoid such situations. Timely deployment of funds is a well planned activity requiring intra-organisation co-ordination and liaison with banks and financial institutions apart from forex dealers.

### 5. Profiting from availability and deployment

One of the prime objectives of a treasury manager is to ensure timely procurement of right amount of funds and timely deployment of right amount of funds. This objective results in administrative smoothening and paves way for easier achievement of performance targets of the firm. Modern day treasury manager has another objective, which is to profit from such sourcing and deployment. Profit from this function is derived as under:

Sourcing of funds at the right time and in right quantity is a result of realization of debtors and financing of borrowings. Realisation of debtors in time has a direct impact upon profitability of the firm through decrease in cost of holding debtors. Financing of borrowings is a capital structure decision but the actual availment of these borrowings is the domain of the treasury manager. Adequate and timely utilization of the borrowed funds results in the avoidance of strain on other sources of funds.

Once the funds have been sourced in correct measure, the deployment adds further to the profitability of the firm it has been done in tandem with the pace of sourcing. Correct deployment ensures that there is no unnecessary accumulation of funds in the firm at any point in time. Needs of every department are met as per schedule. This action results in avoidance of special and extraordinary costs, interests and the like. With costs being in control, surplus funds emerge from the system which is deployed profitably either as long term investments or as short-term parking tools. Both ways, the net result for the firm is an addition to profits.

## ROLE OF TREASURY MANAGEMENT AND BENEFITS

In its broadest sense Treasury covers cash management, corporate finance and financial risk management. Closer inspection reveals that the Treasury function undertakes a range of complex and skilled tasks; liaises with internal and external stakeholders and plays a key role in the smooth functioning and value creation of an organization.

Although the role of the Treasury function is constantly evolving, it can be broken down into 6 broad but interlinked categories:

### 1. Planning and Operations

Key Activities	Key benefits
Cash flow forecasting	Subsidiary and Group financial management
Risk forecasting	Risks are identified early and mitigated
Investment appraisal	Resources are directed to the best opportunities
Tax planning	Clear and quantifiable approach to the future
Pensions planning	Tested contingencies in the event of exceptions
Co-operate with Board on strategic development	Operational risk management
Choose and operate Treasury systems	Transaction costs minimized
Negotiate, analyze and manage the fee's and margins of service providers	Smooth operations
Ensure quality standards of service providers	Efficiency gains

## 2. Cash and Liquidity Management

Key Activities	Key benefits
Manage internal capital market by investing and lending to subsidiaries	Minimize external borrowing requirement
Work with the business to optimize commercial cash flows	Optimize interest expense
Work with the business to optimize working capital	Optimize tax expense
Minimize idle cash through netting and cash concentration	Avoid future liquidity problems
Confirmation and reconciliation of receipts	Create 'cash is king' culture
Timely disbursement of payments	Smooth operations and supplier relationships

## 3. Funding and Capital Markets

Key Activities	Key benefits
Optimization of capital structure	Optimization of Weighted Average Cost of Capital (WACC)
Manage short, medium and long-term investments	Maximize yield on assets
Ensure adequate liquidity to support the business	Minimize interest expense
Ensure adequate liquidity to meet obligations as they fall due	Access to capital at the right time, price and conditions
Arrange liquidity for strategic events such as M&A, Divestiture and JV's	Removal of concentration risks
Diversify capital sources, partners and maturities	Ensure good credit ratings
Portfolio management of debt, derivatives and investments	Ensure limits accurately reflected the borrowing requirement (thus minimizing commitment fees)
Ensure contractual terms and covenants do not constrain the business	Ensure hedging matches the funding profile (no over hedging)

## 4. Financial Risk Management

Key Activities	Key benefits
Seek natural hedges and offsets within the business	Visibility of financial risks on an enterprise basis
Interest Rate risk management	Minimize external hedging requirement
FX risk management	Minimize impact of external risk on P&L and Balance Sheet
Commodity risk management	Reduce volatility
Counterparty risk management	Access to capital at the right time, price and conditions
Credit risk management	Improve asset quality
Liquidity risk management	Create 'risk aware' culture

Pension risk management	Certainty facilitates better decisions
Work with the business to de-risk contracts and avoid bad debts	Scenario planning and stress testing avoid surprises

## 5. Corporate Governance

Key Activities	Key benefits
Ensure accurate valuation of financial instruments	Ensure the financial profile represents and true and fair view
Ensure accurate accounting of Treasury transactions	Adequate internal controls
Implement and manage treasury policies and procedures	Demonstrate preparedness
Provision of covenant tests and information to investors	Reputational risk management
Provision of compliance information to regulators	
Ensure accurate transaction history and audit trail	
Work with internal and external auditors	

## 6. Stakeholder Relations

Key Activities	Key benefits
Provide performance and risk analytics to Board	Access to capital at the right time, price and conditions
Manage relationship with banks and other investors	Relationship benefit from proactive communication
Manage relationship with credit rating agencies	Reputational risk management
Co-operate with Board and Investor Relations on shareholder matters	Valuable knowledge and contacts from deep involvement with financial markets
Ensure the Treasury function is understood and valued within the business	Tangible financial results in the form of cost savings, efficiency gains, yield enhancement and protecting profitability

## SIGNIFICANCE OF TREASURY MANAGEMENT FUNCTION

The Treasury function in any corporate has always been important in making sure that the business has sufficient liquidity to meet its obligations, whilst managing payments, receipts and financial risks effectively. With the ever increasing pace of change to regulation, compliance and technology in the financial sector, Treasury has increasingly become a strategic business partner across all areas of the business, adding value to the operating divisions of the company: for example, working with the sales department to establish good financial contract terms so that any trade discounts offered and the payment method agreed are beneficial to the business. Current market conditions also reinforce the need for corporates to ensure that their financial position is managed as efficiently as possible, with no excess working capital tied up in the business - the old adage 'cash is king' is certainly as relevant today as it has always been.

Treasury departments need to cover the complete financial environment; from capital structure and long term investments to liquidity and working capital management. If Treasury can drive improvements in the Purchase-



To-Pay and Order-To Cash cycles, there can be a direct effect on the overall debt and investment requirements and thus on the capital structure required in the business.

The question then is: if the Treasury function is becoming more of a business partner, how can the department manage its time to ensure that day to day administration, processing and transaction execution is completed using the minimum of resource? The answer is that larger companies automate the majority of their daily financial processing and administration tasks, supported by policy standards, control and monitoring processes, embedding financial best practices across the whole business. Integrating corporate systems with those of their banks can achieve significant levels of automation, reducing the amount of time that needs to be spent on tasks such as calculating the daily cash position.

At the same time, the efficient use of secure systems can minimise operational risk, increase operational security and maximise straight through processing. Add to this automatic reconciliation of bank account data and Treasury can then manage exceptions rather than every item, giving them the time to devote to delivering value-added services across the company.

## FUNCTIONS AND SCOPE OF TREASURY MANAGEMENT

Government sector, business sector and the foreign sector are the major sectors of country's economy. For macro operations of these sectors, there is requirement of cash, currency and credit. In broader terms, all financial resources including foreign exchange are to be made available to the industrial or business units. Similarly, at the macro level return flow of funds in the form of taxes and repayment of loans is needed. Such to and from movement of funds is part of the financial functioning.

Any business enterprise requires finance to start business operations. The first requirement is in the form of capital for setting up of the project. Project finance needs long term funds. These funds can be obtained from equity and debt both. Equity and internal accruals are considered the owners' contribution whereas debt is treated as the outsiders' stake in the project. Once the company starts operations of production and manufacture, it needs working capital funds also. These funds are required to meet the payments for raw materials and other inputs, spares, utilities etc. The quantum of funds needed for working capital depends upon nature of the company's business and nature of its products or services.

The function of treasury management is concerned with both macro and micro facets of the economy. At the macro level, the pumping in and out of cash, credit and other financial instruments are the functions of the government and business sectors, which borrow from the public. These two sectors spend more than their means and have to borrow in order to finance their ever-growing operations. They accordingly issue securities in the form of equity or debt instruments. The latter are securities including promissory notes and treasury bills which are redeemable after a stipulated time period. Such borrowings for financing the needs of the government and the business sector are met by surplus funds and savings of the household sector and the external sector. These two sectors have a surplus of incomes over expenditure. The micro units utilize these surpluses and build up their capacities for production of output and this leads to the productive system and distribution and consumption systems.

No company can operate in a vacuum. Its assets are both financial and human. As such, there are both quantifiable and non-quantifiable factors involved in financial performance, forecasting and achievement of targets. The company's treasury manager is the pivot around which day to day operations of the company revolve. His operations and performance have an impact on the company itself and the financial system and the economy in the broad sense. An analysis of the sources of funds of business units reveals that broadly there are three categories of resources – internal accruals of the unit, external sources from the capital and the money market and the external sources. The same analysis holds good at the sectoral and national level. In fact, the emergence of international financial markets can be traced to this sectoral inter-dependence, including the foreign sector and intra-national dependence. Basically, as no country is self-sufficient, international economic and economic relations emerge.

In a similar fashion, it would be appropriate to set out the pattern of use of funds of any company into various sectors of the economy, including the foreign sector. Dispensation of funds for current or capital expenditures in domestic and international markets can be separately set out. Such an analysis is particularly more relevant to multinational corporations and branches or subsidiaries of foreign companies in whose case foreign markets and foreign sources of supply play an important part. The head office or the holding company may spend apart of its funds in investment in the host country, make inward remittances for working capital or investment purposes and outward remittances for royalty and dividend payments or technical fees.

International financial markets emerged out of the need to facilitate operations of nations arising out of commercial and financial transactions with the rest of the world. This emergence can be attributed logically to the inter-relations of the economic unit with the corporate sector and of the latter with the other sectors of the economy, including the foreign sector. It would be apt to set out here the inter-relations between micro level operations of a treasury manager with the macro level working of the corporate sector and foreign sector. A treasury manager is a micro unit in the financial sector. The environment he faces is competition from other similar units in the corporate sector. Besides this, the corporate sector, in turn, is inter-linked with all other sectors of the economy. The treasury manager is thus faced with a total environment of the economy which includes foreign sector and it is thus necessary for him to be familiar with the international financial system, as much as to the domestic financial system.

### **(1) Scope of Treasury Management of Unit Level**

At the unit level, the treasury manager's activities encompass all other management functions. The performance of production, marketing and HRD functions is dependent upon the performance of the treasury department. The lubricant for day-to-day functioning of a unit is money or funds and these funds are arranged by the treasury manager. The treasury is involved in all the budgeting activities of the unit, whether these are financial budget, costing budget, the marketing budget or the HRD budget. The feedback available from interactions with the various departments of the company is utilized by the treasury department to fine tune the overall performance targets of the company within the constraints of availability of currency, cash and cash equivalents.

Treasury manager also monitors the cash flows of the unit on a continual basis. It is ensured by him that adequate funds are made available for day-to-day working of the unit. In case there is genuine shortfall in cash flows, the outflows are made in an order of priority with the more urgent payments being made first. The treasury manager has two duties of taking decisions both in the areas of cash inflows and outflows. He has to integrate the treasury function with the production and marketing functions. The scope of the treasury management function at the unit level can be better described in the following routine duties of the treasury manager:

1. Keeping a track, on monthly, fortnightly or weekly basis, of all cash inflows and outflows and their variance with budget projections.
2. Maintaining a record of all receivables and payables, credit instruments, credit sales, deposits, loans and advances etc.
3. Study regularly the quantity and quality of current assets and liabilities and position of current liquidity.
4. Assess from time to time the long-term and short-term solvency of the company and its overall solvency position.
5. Keep liaison with stock exchanges, where the shares of the company are listed for a study of the share price movements.
6. Keep liaison with banks and financial institutions for any change in borrowing limits or to inform them of any imminent changes in company's financial position or policies. Payments of interest and instalment of principal are to be arranged at the right times.

7. Keep liaison with Registrar of Companies and government departments concerned with the investment and financing decisions for any information regarding policy changes.
8. Keep abreast with all legal and procedural requirements for raising funds and investment decisions.
9. Keep the top management or the board informed of any likely changes in the financial position of the company due to internal factors.

## **(2) Scope of Treasury Management of Domestic Level**

At the domestic or national level, the scope of treasury management function is to channelise the savings of the community into profitable investment avenues. This job is performed by the commercial banks. Treasury management is a crucial activity in banks and financial institutions as they deal with the funds, borrowing and lending and investments. By nature of their activity, they earn their profits through operations in money or near money claims. They borrow from the public in the form of deposits which along with other borrowings constitute their liabilities. Their assets are mostly in the form of loans, advances and investments. As their liabilities are mostly of short and medium term nature, funds management becomes critical for ensuring a proper matching of assets and liabilities according to the maturity of each and their costing. Commercial banks being the creators of credit have an additional responsibility of maintaining their image of creditworthiness, safety and integrity.

Commercial banks are also required to observe capital adequacy norms and provide for non-performing assets on a strict basis. Thus there are limits to which the banks can expand their credit portfolio. Banks are also enjoined by regulations to maintain Cash Reserve Ratio (CRR) of a minimum of 3% and Statutory Liquid Ratio (SLR) of 25% of their net demand and time liabilities. While the CRR is required to be maintained with the RBI in the form of cash balances, the SLR is to be maintained in the form of investment in central and state government securities. It has been observed that during times of slack credit demand, banks invest in govt. securities to a higher extent than the statutory requirement of 25% of net DTL. This activity is more pronounced when the interest rates are falling because the yields on govt. securities fall in such a period, driving up their prices. Banks, which do their treasury management astutely, stand to gain tremendously during such periods.

The gilt edged market has two forms—primary and secondary. The primary market is a wholesale market where RBI is the underwriter and allots the securities to applicants on behalf of the government. On the same basis, the RBI sells the repos (or repurchase agreements) of government securities to the institutions, banks, etc. to meet the market demands. The interest rates are decided by the discounts quoted in these bids and these are market related rates. In the primary market, RBI sells securities to banks, FIs, PF trusts, etc. RBI as the underwriter of government securities, makes up for any shortfall in subscription for them. But in the case of state government securities, it only arranges for subscription.

The main features of the primary market are listed below:

- New borrowings to be made on behalf of govt. is decided by RBI and terms such as tenor and coupon rates are announced.
- The RBI acts as underwriter and contributes to the loans unsubscribed by the public. Work of the RBI is shared with a class of primary dealers.
- The timing and conditions, and the amounts involved are discussed by RBI with banks and FIs and sometimes prior commitments are enlisted.
- The floatation of bonds is effected throughout the year depending on the conditions of the market and requirements of the government.

- The timing and quantum is also adjusted having regard to overall liquidity in the market.
- The subscription to the loans can be in cash as also in the form of rolling over of existing securities which have fallen due for repayment.

In the secondary market, which is a retail market, trading is over the counter. Main operators in the secondary market are the Discount and Finance House of India (DFHI), banks, FIs, PFs etc. This market is an over-the-counter (OTC) market where trading is done through phones, fax etc.

The concept of yields is important for understanding of the government securities market. Yield, as we know, is the rate of return on an investment. In case of lending made by the banks, they stipulate a rate of interest per annum which becomes the benchmark for their return. The actual yield may vary from the benchmark depending upon whether the periodicity of interest is monthly, quarterly or half yearly basis. In case of government securities, however, the yields are determined on the basis of the price at which the security is auctioned in the primary market or the prices determined in the secondary market through sale and purchase.

### ***Nominal Yield***

Coupon rate is the rate of interest payable per annum per Rs. 100/- or the face value. If the purchase price is different from the face value then the return is equal to  $(\text{coupon rate}/\text{purchase price}) \times 100$ . This return is called the normal yield.

### ***Real Yield***

Nominal yields deflated by the index of inflation rate, such as WPI or CPI will give real yields, which reflect the true purchasing power of the return on these securities.

### ***Net Yield***

Nominal yields adjusted for the tax rate or payment of relevant taxes at which deduction of tax at source takes place are called the net yield.

### ***Current Yield***

Coupon rate is the rate at which the bond carries interest. This is the nominal yield payable on the face value of the bond regularly and remains unaltered, say, for example 7.75% loan 2005. Current yield is equal to  $(\text{coupon rate} \times \text{face value}) / \text{cost or market price}$ .

### ***Redemption yield or yield to maturity***

This takes into account the price paid for the bond, length of time to maturity and the coupon rate of the bond. This is the yield which the holder gets per annum if he holds it until maturity and is the same as current yield if the bond is purchased at par. Redemption yield is equal to current yield  $\pm$  average annual capital gain or loss (for the bond purchased at a discount or premium as the case may be).

RBI is responsible for public debt management of the government. It does this by underwriting and subscription to new issues not subscribed by public, by use of Open Market Operations (OMO) as a technique of sale and purchase of government securities to control the liquidity and the interest rate structure and by use of SLR and CRR as the method of controlling the liquidity of banking system and their contributions to government debt.

## **(3) Scope of Treasury Management of International Level**

At the international level, the function of treasury management is concerned with management of funds in the foreign currencies. Foreign exchange as a subject refers to the means and methods by which the rights to income and wealth in one currency are converted into similar rights in terms of another country's currency. Such exchanges may be in the form of one currency to another or of conversion of credit instruments denominated in different currencies such as cheques, drafts, telegraphic transfers, bills of exchange, trade bills or promissory

notes. Exchange is done through dealers in foreign exchange regulated by the central bank of a country. Banks are usually the dealers apart from other specialized agencies.

One of the important components of the international financial system is the foreign exchange market. The various trade and commercial transactions between countries result in receipts and payments between them. These transactions are carried out in the currencies of the concerned countries? any one of them or in a mutually agreed common currency. Either way, the transactions involve the conversion of one currency to the other. The foreign exchange market facilitates such operations. The demand for goods and services from one country to another is the basis for demand for currencies in the market. Thus basically, demand for and supply of foreign currencies arises from exporters or importers or the public having some transactions with foreign countries.

Companies having an import or export component in their business profile have to frequently deal in forex operations. Forex operations in a country being supervised by the central bank, reference to the central bank in one form or the other is necessary to use foreign exchange. If the country on the whole is a net exporter of goods and services, it would have a surplus of foreign exchange. If, on the other hand, it is a net importer then it would have a shortage of foreign exchange. The extent of regulation of the forex market depends upon the availability of foreign exchange in a country. If the forex is scarce, then holding and using it would be subject to a lot of regulatory control. It also matters whether international trade forms a significant percentage of the GDP of a nation. If it is so, then the awareness about forex regulations would be much more widespread as compared to a situation when foreign trade forms an insignificant portion of GDP. Presently, however, with increasing globalisation, forex dealing has become a normal part of treasury operations.

Every foreign exchange transaction involves a two-way conversion – a purchase and sale. Conversion of domestic currency into foreign currency involves purchase of the latter and sale of the former and vice versa. These transactions are routed through the banks. The transactions take the shape of either outright release of foreign currency for meeting travel and related requirements or payments to outside parties in the denominated currency via the medium of correspondent banks. For effecting payment, following instruments are generally used:

### ***Telegraphic transfers (TT)***

A TT is a transfer of money by telegram or cable or telex or fax from one center to another in a foreign currency. It is a method used by banks with their own codes and correspondent relations with banks and abroad for transmission of funds. It involves payment of funds on the same day, it is the quickest means of transmission of funds. As there is no loss of interest or capital risk in this mode, it enjoys the best rate for the value of receipts.

### ***Mail Transfers (MT)***

It is an order to pay cash to a third party sent by mail by a bank to its correspondent or branch abroad. It is issued in duplicate, one to the party buying it and the other to the correspondent bank. The amount is paid by the correspondent bank to the third party mentioned therein in the transferee country by its own cheque or by crediting the party's account. As the payment is made after the mail advice is received at the other end, which will take a few days, the rate charged to the purchaser is cheaper to the extent of the interest gain to the seller bank.

### ***Drafts and cheques***

Draft is a pay order issued by a bank on its own branch or correspondent bank abroad. It is payable on sight but there is always a time lapse in the transit or in post between the payment by the purchaser of the draft to his bank and the receipt of the money by the seller in the foreign center. As in the case of MT, there is risk of loss of draft in transit or delay in release of payment to the beneficiary and loss of interest in the intervening period.

***Bills of exchange***

It is an unconditional order in writing addressed by one person to another, requiring the person to whom the order is addressed, to pay certain sum on demand or within a specified time period. If it is payable on demand, it is called a sight bill. If it is payable after a gap of some time, it is called a usance bill. Such bills can be bankers' bills or trade bills. Bankers' bills are drawn on banks abroad while trade bills are made between individual parties.

There are four major components of the forex markets, depending upon the level at which the transactions are put through. These can be either

- Banks with public
- Inter-bank deals
- Deals with correspondents and branches abroad
- Deals with RBI.

In the market, there is no physical exchange of currencies except in small denominations when travelers and tourists carry them across national borders. The medium of exchange is credit instruments or book entries in the books of concerned banks.

Exchange rates can be spot rates or forward rates. If an importer is paying on receipt of documents, then he can buy a foreign currency say dollars on spot basis. It means that the exchange of Indian Rupee and Dollars is proceeding on current basis. But if the importer agrees to pay three or six months hence, his demand for dollars might arise only after three or six months. In such a situation, the transaction is carried out through forward transaction. The exchange of Rupee and Dollar is to take place after the stipulated time period, though the exchange price has been pre-decided.

Just as the banks are buying and selling spot, they also do business in forward currencies. Corresponding to the spot rate of exchange, there is a forward rate for various periods. Currencies sold or bought in forward are subject to the influences of interest rates? both domestic and international. Forward rates also depend upon the relative position of currencies vis-à-vis other currencies. Hence there is an implicit risk that the forward rates contracted today may be different from actual spot rates that would prevail three or six months hence. If any bank succeeds in forward purchases with forward sales of the same currency, it avoids exposure to the exchange rate risk. If the forward sales and purchases do not match, the bank may have an uncovered position which it may cover with another bank which has a contrary position. If it fails to cover with a bank, it may still do so with the central bank of the country or with a correspondent bank abroad. If a bank takes a position uncovered, it may take a calculated risk in the hope that the rate may move in its favour or else it may have to bear the exchange rate differential.

When foreign exchange markets operate in a free manner, the assumption is that the exchange rates between various currencies would be quoted at the same level at all the trading centers throughout the world. But it seldom happens and at the best of times, there are discernible differences in exchange values across centers. Banks and other dealers take advantage of these differences and profit from the rate difference. This operation is called arbitrage. For example, if the Dollar-Euro parity is 1.00 in New York and 1.05 in Frankfurt, then a dealer can sell Euros in Frankfurt, purchase Dollars and with the Dollars, buy Euros again in New York thereby profiting from the deal.

Operations in the forex market are exposed to a number of risks. These risks are as follows:

- Credit risk arising out of lending to a foreign borrower whose credit rating is not known for certainty.
- Currency risk of trading in a currency whose stability and strength is known to fluctuate.

- Country risks involved in dealing in the currency of a country whose political and economic stability is uncertain.
- Solvency risks due to mismatch between current assets and liabilities of dealers and resultant default in meeting forward commitments.

In India, commercial and most of the co-operative banks have been authorized to deal in foreign exchange. Banks finance huge amount of foreign trade. This trade is conducted on daily basis through purchase and sale of foreign currencies. The demand and supply of active currencies is matched by the banks from their own stock. There are cases when the bank needs some currencies or has a surplus of such currencies. These needs are met by buying or selling such currencies to the RBI.

The foreign exchange department of every bank draws up a position sheet for each currency daily in which purchases and sales of the currency are recorded. The banks generally avoid taking any exchange risk by covering uncovered balances at the end of the day. When the purchases exceed sales, the credit balance is plus and the position is overbought. This is to be covered by equal sales of that currency. When the sales exceed purchases, it is a situation of overselling and the same is covered by purchases of that currency.

A typical dealer in Forex may be a bank having the controlling and supervisory authority and the head office. Actual dealings in forex would take place through authorized branches. At these branches, there are dealing rooms and back office operations. Dealing room would perform the following functions normally:

- Quoting, negotiating and fixing rates of exchange for larger sized customer transactions involving purchase or sale of foreign currencies.
- Arranging cover against purchase and sale of foreign currencies.
- Trading on own account, i.e. purchase/sale of foreign currencies for profit.
- Mobilisation of required foreign currency funds by swapping arrangements or purchases from other dealers.
- Accepting customer forward contracts for purchase/sale of foreign currency and arranging cover against the same.

The back office operations would comprise of the following:

- Consolidation of all exchange deals and provide cover operations
- Analysis of the structure of the deals for determining the future rates.
- Processing of inter-bank deals, sending or receiving contract notes or confirmation of deals.
- Follow-up work on contracts
- Transfer of funds to correspondents and their branches.

## RELATIONSHIP BETWEEN TREASURY MANAGEMENT AND FINANCIAL MANAGEMENT

Finance function is a key element in the corporate activity. Its main objective is to keep the firm in good financial health. To secure financial health, the finance manager has to perform the following functions:

- Investment functions and decisions
- Financing function and decisions

Investment function relates to the efficient use of funds in alternate activities. The aim is to allocate funds to each activity so as to obtain optimal returns from such allocation. The short-term and long-term investment strategy has to be planned in line with the objective of maximization of wealth of shareholders. The utilization of funds, as and when they accrue, should take care of two prime considerations. The first consideration is that there should



not be any idle funds and second consideration is that there should be no threat of liquidity crisis. Idle funds have their own cost and it results in lowering of profitability. Extreme tightness of funds, on the other hand, raises the specter of default and loss of commercial reputation. So a delicate balance between these two conflicting objectives has to be maintained by the finance manager. It is in this context that the function of finance becomes crucial to the survival and growth of a firm.

The financing function refers to the securing of right resources of funds at an appropriate cost and at the right time. Here the decision is to be taken about the least cost combination of funds for capital requirements and for working capital needs. Whether owners' equity should be used for financing or should the firm resort to external financing? If owners' equity is to be arranged, what returns are to be assured? If borrowing has to be done, then what rate of interest is to be paid?

In line with the twin objectives of investment and financing, the finance manager has to take responsibility for all decisions pertaining to these areas. In the finance function, a macro view of the requirements and uses of funds is to be taken. The finance manager has to arrange the funds within the approved capital structure of the firm. The funds may be debt or equity. Once the funds have been arranged, it is left to the treasury function to utilize these funds according to the approved parameters. Financial management is also concerned with the overall solvency and profitability of the firm. By overall solvency, we mean that the funds should be able at all times to meet its liabilities. The liabilities can be short-term or long-term. The long-term liabilities pertain to payment of long-term borrowings. Internal liabilities like payment to shareholders are a matter of consideration once external solvency has been attained by the firm. Profitability means that the firm should run its affairs profitably. It may be possible that some segments of the firm may at times face strain upon their profitability due to macro-economic or internal causes. But the firm should be in a position to earn reasonable return on its investment on the capital employed. Capital employed, as we know, is the sum of own funds and borrowed funds. Profitability of operations of the firm means that both the own funds and borrowed funds generate adequate surpluses for the firm. This can be ensured by investing the funds in such projects which provide optimal returns.

The treasury function is concerned with management of funds at the micro level. It means that once the funds have been arranged and investments identified, handling of the funds generated from the activities of the firm should be monitored with a view to carry out the operations smoothly. Since funds or cash is the lubricant of all business activity, availability of funds on day to day basis is to be ensured by the treasury manager. The role of treasury management is to manage funds in an efficient manner, so that the operations in the area of finance are facilitated in relation to the business profile of the firm. The treasury function is thus supplemental and complementary to the finance function. As a supplemental function, it reinforces the activities of the finance function by taking care of the finer points while the latter delineates the broad contours. As a complementary function, the treasury manager takes care of even those areas which the finance function does not touch. Looked at from this point of view, the treasury function integrates better with manufacturing and marketing functions than the finance function. This is because the treasury department of a firm is involved in more frequent interaction with other departments. For the purpose of performing this role, the treasury manager operates in various financial markets including the inter-corporate market, money market, G-sec market, forex market etc.

## **DIFFERENCE BETWEEN FINANCIAL MANAGEMENT AND TREASURY MANAGEMENT**

Following differences can be observed between financial management and treasury management:

### **1. Control Aspects**

The objective of financial management is to establish, coordinate and administer as an integral part of the management, an adequate plan for control of operations. Such a plan should provide for capital investment programs, profit budgets, sales forecasts, expenses budgets and cost standards.

The objective of treasury management is to execute the plan of finance function. Execution of the plan takes care of the issues arising in routine operations of the firm which have a bearing upon the funds position.



Thus the finance function of a firm would fix the limit for investment in short term instruments for a firm for example. It is the treasury function that would decide which particular instruments are to be invested in within the overall limit having regard to safety, liquidity and profitability. Again, the finance function would arrange the borrowed funds for the firm but the treasury function would take care of day-to-day monitoring of the funds.

## 2. Reporting Aspects

Financial management is concerned with the preparation of overall financial reports of the firm such as Profit and Loss account and the Balance Sheet. It also takes care of the taxation aspects and external audit. Based upon the performance of the firm, budgets for the ensuing years are fixed. The reports are submitted to the top management of the firm.

Treasury management is concerned with monitoring the income and expense budgets on a periodic basis vis-à-vis the budgets. The budgets are fixed department/ segment wise so as to dovetail with the overall corporate budgets. Variances from the budgets are analysed by the treasury department on a continual basis for taking corrective measures. The corrective measures that can be taken are pointing out of discrepancies to departmental heads and refuse payments that are not according to approved procedures and guidelines. The treasury department is also involved in the internal audit of the firm.

## 3. Strategic Aspects

The finance function is involved in formulating overall financial strategy for the firm. The top management chooses the line of activity for the firm. The finance function firms up the investment and financing plans for the activity. The strategic choices before the financial manager are the options of investment and financing. While making these choices, the finance manager is taking a long-term view of the state of affairs. It is just possible that the business of a firm may not be profitable in the initial years but it does not mean that the choice regarding investing has been strategically incorrect. In fact, there are many mega projects where the gestation period is even upto seven years. But given the correctness of the original assumptions, performance of the finance function would be measured by the number of years that gets reduced in breaking even.

Strategy for treasury management is more short-term in nature. The treasury manager has to decide about the tools of accounting and development of systems for generation of controlling reports. The maintenance of proper systems of accounting is one of the objectives of treasury management. Another strategic objective for treasury management would be maintenance of short-term liquidity. This is done through regulation of payments and speedy realization of receivables.

## 4. Nature of assets

The finance manager is concerned with creation of fixed assets for the firm. Fixed assets are those assets which yield benefit to the firm over a longer period of time. It can be said that the time span of a project coincides with the span of the fixed assets. In case the fixed assets have depreciated physically by a significant measure, then a decision has to be taken for upgradation and replacement of the assets.

The treasury manager is concerned with the net current assets of the firm. Net current assets are the difference between the current assets and current liabilities of the firm, both normally realizable within a period of one year. Current assets should always be more than the current liabilities for ensuring liquidity of the firm. Current assets are the inventory, receivables and cash balances. Current liabilities are the trade creditors, statutory payables and loan repayables within one year. To ensure a healthy level of net current assets, the treasury manager is to ensure that the quality of the assets does not deteriorate.

As regards investments, the finance manager is concerned with long-term and strategic investments. These investments could be funded from borrowed funds or from internal accruals. The investments are expected to be held over a longer period of time as such day-to-day monitoring of the investments is not required. The treasury manager is concerned with short-term investments. The tenor and quality of these investments has to be constantly monitored by the treasury manager for ensuring safety and profitability.

## TREASURY ORGANIZATION: PICKING THE RIGHT MODEL

Organisations have extended debates on the kind of treasury they should have. The common themes include services that the treasury should offer, the right size or structure, and the right spread of management control. There are many dimensions to the structure of a treasury organisation. Two key dimensions – range of services and extent of centralisation of management control – define resultant organisation models. The relationship between organisation models and factors that influence decisions on the right model to adopt.

There are various definitions of the word treasury. In its strictest sense, it refers to one function: asset liability management, especially when used in the context of banks. In a wider sense, treasury includes a whole range of activities encompassing various markets. A few significant activities are:

Asset liability management:

- Maturity mismatch;
- Interest rate and type mismatch; and
- Currency mismatch.

Sales and trading:

- Currency, interest rate, and credit products;
- Money market and long-tenure instruments; and
- Derivative products.

Risk management

- Back office processing, settlement, and accounting; and
- Customer and regulatory reporting.

### **Organisation Models: Dimensions**

Any organisation can exercise its choice on the scope of the treasury functions it undertakes. In doing this, it may be governed by a variety of considerations:

- It may choose to handle only those needs driven by utilitarian motives such as liquidity support or, on the other hand, it may consider treasury as a “core” organisational process and hence handle the full range of services.
- It may choose to outsource portions of the activities required or it may choose to foster these capabilities in-house.

Independently, an organisation can also decide on the extent of centralisation of treasury management:

- It may be efficient to centralise back office processing, while the front office may need to be decentralized to aid speedy local decision-making.
- It may be important to have a common risk management strategy, while execution may be decentralised.

A study of common practices relating to the two key influencers – the range of activities supported and the degree of centralization or decentralisation – at treasury organisations globally suggests four models.

### 1. Full Service Global

Full service refers to a treasury that undertakes most, if not all, of the activities of treasury management. Global treasury refers to one that either operates as the only treasury for all markets across the globe, or ultimately combines all regional or local treasuries (that may exist due to legal or regulatory reasons) into a central treasury

for pooling risks, for policies or strategies, or for both these. In this sense, management of the treasury function in this model is very much centralised. Although this model readily lends itself to global organisations, it could also be used by local businesses that need to access global markets.

## 2. Full Service Local

In this model, each treasury is a self-contained local unit dictated purely by the needs of the local business. Thus, the treasury management function is, by and large, decentralised. While this sort of treasury is usually the norm for a business with a local or regional spread, it may be adopted for a global organisation that operates as a collection of highly independent business units. Again, the range of services offered is the full gamut, as described in the full service global model above.

## 3. Limited Service Global

This model is different from the full service global model in that the range of services offered is limited. This could largely be due to the fact that certain activities are kept outside the purview of treasury and are handled directly by business units because the scale of these activities is not large enough to warrant the attention of the central treasury. Examples are treasuries with limited or no foreign exchange trading activities, with the exposure being either managed directly by the concerned export or import department or not managed at all. For those activities that are included in the treasury in such a model, pooling is at a central level.

## 4. Limited Service Local

This model is akin to having virtually little or no treasury activities, beyond local cash and liquidity management. These are very small decentralised treasuries where the concerned managers may also have other responsibilities in the finance department.

## ROLE AND RESPONSIBILITIES OF TREASURY MANAGER

The overall finance function starts with capital structuring, scouting for the least cost combination of internal and external capital for financing of the project and forecasting the sources and uses of funds. In this function, one has to coordinate with production and marketing functions and all others that constitute the management team. The inflows and the outflows and their coordination and synchronization and meeting any gaps are the functions of the finance manager. The treasury manager has a larger role of coordinating the apparently routine, yet significant activities of the firm. The activities are apparently routine because a sense of repetition is involved in these activities. Nevertheless, the activities are significant because smooth functioning of these activities paves the way for eventual solvency and profitability of the firm. The role and responsibilities of the treasury manager may be described as follows:

### Role of a treasury manager

A treasury manager has a significant part to play in the overall functioning of the firm. At any point of time he is engaged in a number of roles played. While the production manager or the marketing manager may be involved in limited roles pertaining to their own fields, the roles of treasury manager intermingle with and overlap other role sets. In any business entity which is engaged in marketing, a treasury manager could be performing a variety of roles. The expected roles to be carried out by him would be slightly less in number in case the firm is engaged in service activity but that does not deride the importance of treasury manager for a services organization. The treasury manager has the following roles:

#### (a) Originating roles

The treasury manager inducts and originates system of accounting for the firm. Routine accounting of the firm is then carried out along these established systems. These systems are the pivot around which the functioning of the unit revolves. For operations of these systems, the treasury manager compiles exhaustive operations manual

for the guidance of the users. It is expected that all the users shall comply with all important disclosure requirements for endorsing the integrity and validity of the systems.

### ***(b) Supportive Roles***

The second role expected from a treasury manager is a supportive role. In this role, the treasury manager supports the activities of other departments like manufacturing, marketing and HRD. The support is evidenced through a meaningful and constructive coordination with the other departments. While doing this, the treasury manager is acting as an extended arm of the finance manager. Allocation for expenses for every department is made by the finance manager in the annual budget. It is the duty of treasury manager to ensure that each department is able to spend the earmarked amount subject to completion of disclosure and documentation formalities.

### ***(c) Leadership Roles***

The treasury manager also has a leadership role to play. This role comes into play during times of exigency. An exigency could occur during times of systems break-down. During such periods, the treasury manager has to make alternative arrangements for transaction processing. While doing this, he has to act like a leader and carry the team along with him. Another example of exigency could be a situation when the firm is face to face with a sudden and unexpected liquidity crunch. During such an eventuality, the treasury manager has to use his ingenuity and leadership skills for tiding over the crunch. These skills could take the shape of postponing and prioritizing payments and expediting recoveries.

### ***(d) Watchdog Roles***

The treasury department is the eyes and ears of the management. Every financial transaction passes through his accounting system. As a processor of all the financial transactions, he keeps a watch on suspected bunglings and frauds in the firm. He sets an example for other departments of the firm by adhering to sound accounting practices and transparent dealings.

### ***(e) Learning Roles***

The accounting practices all over the world are in a state of constant flux due to evolution of new accounting concepts and technological changes. The treasury manager accepts these changes with an open mind and adopts the changes best suited to the organization. Simultaneously, he educates the other departments of the firm also about the changes.

### ***(f) Informative Roles***

The treasury manager is the source of information for the top management regarding performance of the firm vis-à-vis the budgets. For conveying this information, he develops a management information system suited for the organization. This system provides concise and timely information on all the relevant parameters which enable the top management to take decisions.

Apart from the above roles, the treasury manager has the under-mentioned responsibilities which he is expected to shoulder along with his roles:

#### ***1. Compliance with statutory guidelines***

While establishing operational systems for the firm, the treasury manager has a duty to ensure that the systems comply with all statutory and regulatory guidelines. Particularly, he has to take care of provision regarding taxation and other government dues. He must ensure that the system should be simple and not cumbersome. The system should be transparent and it should protect the integrity of the transactions. Moreover, it should be impersonal and capable of being operated on the basis of pre-established guidelines. It should be flexible also to incorporate any subsequent changes in accounting and taxation norms.

## **2. Equal treatment to all departments**

While playing the supportive role, the treasury manager has a responsibility of professionalism and impartiality. In accepting the demands for expenditure from various departments, the treasury manager has to ensure that the role is carried out without any undue favour or bias. He has to keep the interest of the organization in mind and not to promote intra-organisation conflicts. The support that he provides must be detached and objective.

## **3. Ability to network**

While playing the leadership role in case of systems break-down or during periods of cash crunch, the treasury manager should be able to exhibit traits of public relationship and networking. A crisis situation requires level headedness and ability to think straight. What it also requires is the ability to provide comfort to all users of the system. This can be done by exercising PR skills of a high order. Apart from this, the treasury manager should have networking abilities for outsourcing some of the accounting work to outside agencies during the period of interruption.

## **4. Integrity and impartial dealings**

Since the treasury manager is the watchdog of the management regarding honest and straight dealings, he has to be impartial in his dealings. He must highlight the true state of affairs of the finances to the management. In case of any inadvertent shortcoming on the part of his department, the same should be admitted and the whole matter should be looked at in an impartial manner.

## **5. Willingness to learn and to teach**

The treasury manager is required to keep himself of all the developments in the field. He should be able to pick out the latest developments that are likely to help his organization. He must accept new ideas in an open minded state rather than treating new ideas as a threat to his fiefdom. Simultaneously, he should be willing to teach and inculcate the latest developments among his colleagues.

# **TOOLS OF TREASURY MANAGEMENT**

Treasury manager is required to work in a fast changing and competitive environment. For carrying out his activities, he has resort to certain tools and techniques. Most of the tools originate from the finance department and as such can not be considered to be an exclusive prerogative of the treasury department. Yet it is the treasury manager which is using these tools most extensively. The tools are being described below:

## **1. Analytic and planning tools**

In treasury function, planning and budgeting are essential to achieve targets and to keep effective control on costs. Analysis of the data and information is necessary for planning and budgeting. Performance budgeting is referred to as setting of physical targets for each line of activity. The financial outlay or expenditure needed for each is earmarked to choose the least cost mode of activity to achieve the targets. Productivity and efficiency improves by decentralization of responsibility and that is achieved by performance budgeting, where each department or section is made a profit center and is accountable for its targets, financial involvement and profits in financial terms, relative to the targets in physical terms.

This type of planning involving performance budgeting is best suited for service industry say a financial services company or bank where every department can function in a decentralized manner and achieve the targets.

## **2. Zero Based Budgeting (ZBB)**

Another tool of analysis and performance is ZBB wherein each manager establishes objectives for his function and gain agreement on them with top management. Then alternate ways for achieving these targets are defined and most practical way for achieving the targets is selected. This alternative is then broken into incremental levels of effort required to achieve the objective. For each incremental level of activity, costs and benefits are assessed. The alternative with the least cost is then selected.

### 3. Financial Statement Analysis

Financial analysis of a company is necessary to help the treasury manager to decide whether to invest in the company. Such analysis also helps the company in internal controls. The soundness and intrinsic worth of a company is known only by such analysis. The market price of a share depends, among other things on the sound fundamentals of the company, the financial and operational efficiency and the profitability of that company. These factors can be known by a study of financial statements of the company.

### 4. Internal Treasury Control

All economic units have the goal of profit maximization or wealth maximization. This objective is achieved by short-term and long-term planning for funds. The plans are incorporated in the budget in the form of activities and corresponding targets are fixed accordingly. The next step in the process is the control function to see that the budgets are being implemented as per plans. Control is thus part of planning and budgeting in any organization.

Control is a process of constant monitoring to ensure that the activities are being carried out as per plans. It is also noticed whether there is any divergence from the plans, what are the reasons for the divergence and what remedial action can be suggested.

Internal treasury control is a process of self improvement. It is concerned with all flows of funds, cash and credit and all financial aspects of operations. From time to time and on regular basis, the internal treasury control is exercised on financial targets. The financial aspects of operations include procuring of inputs, paying creditors, making arrangement for finance against inventory and receivables. The gaps between inflows and outflows are met by planned recourse to low cost mix of financing.

The control aims at operational efficiency and removal of wastages and inefficiencies and promotion of cost effectiveness in the firm. The control is exercised under phases of planning and budgeting. These phases include setting up of targets, laying down financial standards, evaluation of performance as per these norms and reporting in a standard format.

The quarterly and annual budgets would set the targets for each department and financial standards are set out for each activity. Monthly budgets are evaluated by the performance sheets maintained daily and regular reports go to the financial controller. Reporting and evaluation go together and on the basis of information system built in the past, plans are prepared for the next period.

Following principles of internal control need to be mentioned here:

1. Control should be at all levels of management and participation should be from all cadres of personnel. More important are specific levels of operations. The top management should concern itself with strategic controls. The middle management is more concerned with segmental controls whereas the lower management concerns itself with operational controls.
2. The management control can be decentralized or centralized. In a decentralized form of control, responsibility is given to lower managers to achieve the targets. A margin of deviation from the targets is allowed but the basic objective of control is to see that activities are in the direction of the plan and the budgetary targets are a guide.
3. For effective control, there has to be a system of building up of effective communication from top to bottom and bottom to the top.
4. The control should be built upon the management information system. This function involves the collection of data from all departments on their operations, analysis of operations and suggesting the methods of improving the efficiency and productivity.

## ENVIRONMENT FOR TREASURY MANAGEMENT

Treasury management is carried out in the real corporate world and the corporate functioning is carried out in the overall corporate environment. Environment for treasury operations can broadly be classified as under:

### **(a) Legal environment**

By legal environment we refer to the legislations which govern corporate functioning. These legislations are the one pertaining to company law, taxation, industrial regulation etc.

### **(b) Regulatory environment**

The regulatory environment encompasses regulations regarding employment, wages, land laws, promotion of units and closure of units etc.

### **(c) Financial environment**

Financial environment pertains to policies regarding monetary and fiscal control, financial supervision, exchange control etc.

## ROLE OF INFORMATION TECHNOLOGY IN TREASURY MANAGEMENT

With the ever increasing pace of change to regulation, compliance and technology in the financial sector, treasury has increasingly become a strategic business partner across all areas of the business, adding value to the operating divisions of the company: for example, working with the sales department to establish good financial contract terms so that any trade discounts offered and the payment method agreed are beneficial to the business. The major role the information technology is playing in effective treasury management is as follows:

### **1. Automate repetitive tasks**

Technology today is being leveraged to automate repetitive tasks such as data gathering, accounting, bank polling, portfolio tracking and reporting. By automating these processes, the delays and the possibility of human error may be minimized. Automation also facilitate information sharing across departments, offices and geographies, and provide an accurate audit trail. Furthermore, automating these processes enable to focus on more value added tasks, critical to providing effective decision support to management team.

### **2. Implement internal controls**

To ensure compliance with rule and regulations, sound and effective internal controls must be implemented. The focus should not only on system-related controls, but also on clear cut segregation of duties. In treasury workstation, sophisticated rules must be implemented to ensure policy compliance. The solution that has obtained a Internal audit and other compliance activities must be implemented.

### **3. Time saver and fraud & error detection Methodology**

This best practice is a great time saver, especially when it's time to close the books. On the first day of the accounting close, there is a need to balance that day's transactions, not the entire months. In treasury management system, the source of cash transactions is the previous day's bank data. Through the treasury management system, all repetitive transactions are automatically tagged with the correct instructions. Most companies using a treasury management system get 90-95% of their transactions automatically tagged accurately without any manual intervention.

### **4. Forecast cash flows**

Effective forecasting helps manage financial risk by enabling to predict a cash shortfall or liquidity crisis, taking into account interest rate changes and foreign exchange fluctuations. Forecasting also helps to enhance financial returns, enabling to make more effective decisions regarding investments and borrowing needs. Finally, forecasting helps maintain financial control by identifying unexpected occurrences for further review and action.



## **5. Communicate with operating units**

Operating units must be involved while building your forecasts to ensure incorporation of all the necessary and up-to-date information. The past may not be indicative of the present so it's important to have the latest and updated information. There must be benchmarking resulted at the operating unit level, and the cash forecasting results must be published. It's important to keep a two-way flow of information by providing feedback to the operating units based on how the actuals compare to the forecasts. The treasury forecast performance matters must be compared to forecasts generated by other groups and/ or divisions. Significant variances may be indicators that treasury is not yet aware of all the information that should be included in the forecast.

## **6. Choose a Web-based treasury management system**

The full benefits of technology without unnecessary costs or delays may be achieved by selecting a web-based treasury management system. Web-based solutions significantly reduce implementation costs and timeframes, and enable to access the system from anywhere at any time. Furthermore, any enhancements to the system are automatically deployed to all users, thus eliminating the need to spend internal resources on hardware or software acquisition, testing or downloads. To ensure the security of your information, select a system with two factor authentication and encryption technology must be selected.

## **7. Rethink treasury processes**

There should be reassessing of the treasury workstation at transparent intervals to evaluate processes and identify how they can/should be revised to maximize efficiencies. While reevaluating treasury management system, the focus should not only be on data, but on experience and knowledge.

## **8. Pay for performance**

To reinforce the importance of forecasting, portfolio management, cash consolidation, and other value added activities across treasury department, benchmarks should be defined. The proper and effective use of information technology in treasury operation increases the efficiency and effectiveness of corporate officers across the treasury, investor relations, corporate finance and corporate communication function.

## **LIQUIDITY MANAGEMENT VIS-A-VIS TREASURY MANAGEMENT**

Liquidity management ensures that the right amount of cash is available, at the right time and in the right place, is firmly positioned as a pivotal task for every treasurer. Over the past few years, many treasurers have made substantial progress towards increasing the visibility of their cash flow and centralising cash within countries or regions. However, industry surveys indicate year on year that liquidity management and particularly cash flow forecasting remain the greatest challenges facing treasurers. With credit more expensive and elusive for many companies, it is now imperative to tackle these challenges effectively. Working capital management of a financial institution or bank or company is some how different to that of other trading units, the process starts with tapping of funds at lower rate in shape of deposits/borrowing and ends with investing the same in higher rate to earn profit out of business with a margin of small portion of cash-in-hand kept to meet day to day operation.

Efficient account and cash pooling structures are key to efficient and cost-effective liquidity management. Every investment has a cost to the company even the shares tapped from the share holders. Deposits are tapped in exchange of payment of interest. Borrowing has cost of payment of interest to creditors. So every fund has dividend/interest payment risks for the banks/company. So if funds tapped are not properly utilized, the banks/company should suffer loss. Idle cash balance in hand has no yield. On the other hand if we do not keep balanced liquid cash-in-hand, we may not be able to pay the demand withdrawal of depositors, as well as, installment of creditors and untimely payment for other contingent liabilities. These will lead overtrading position to the company. So there must be a scientific liquidity management policy for the company/bank/financial institution.



Proper liquidity management can increase the turnover of business and also creates additional profit to the company/banks. Liquidity management has great significance in modern days to the company/bankers/financial institution, because they engage not only in retail business, but also deal in wholesale banking and investment banking business.

Overliquidity on the other hand implies excess idle cash balance in hand. So every company should avoid both the position and should manage the company without less/excess funds in hand i.e. just liquid position.

## REGULATION & SUPERVISION OF TREASURY OPERATION

The Treasury Operations Department is responsible for treasury's middle and back office functions, all systems services, and particularly cash management and banking relations services. Treasury operation's cross-functional staffs provide pricing and valuation, performance measurement, transaction and securities processing and compliance support functions. The middle office provides quantitative analytics support and operational risk reporting and coordinates treasury's control risk assessments related to internal corporate governance and risk management functions.

Treasury Operations implements and manages information systems in support of treasury's asset management, funding, pension investment, and cash operations functions.

The role of Treasury Manager, is to manage, mitigate and monitor financial risks arising due to differences in currency basis and timing of pledges from donors, disbursements and debt service. The risk management tools that are used include, among others, currency swaps and currency forwards, interest rate swaps and forward rate agreements. Treasury Manager enters into a master derivatives agreement and hedges risk positions using its counterparties in the market.

Risk management generally incorporates:

- a prudent approach to balance sheet management, with the aim of mitigating and controlling financial risks;
- suitable risk limits and policies and procedures formulated to ensure that the limits are not breached; and
- appropriate systems, controls and reporting mechanisms for measuring and monitoring residual risks.

In this context, the role of treasury manager typically includes:

- (a) **Policy Analysis:** develop the risk management framework, taking into account Board's risk preferences, balance sheet dynamics and market limitations, as well as credit, interest rate, operational and foreign currency risks, and the different instruments available for risk transfer.
- (b) **Strategy Design:** advise on optimal risk transfer through a broad-based suit of risks to be hedged out and the instruments available, based on modeling and evaluation of risk management options.
- (c) **Structuring, Negotiating and Executing transactions:** The treasury manager is responsible to efficiently remove interest rate and foreign currency exposure based on board-approved risk management strategy; tactical decision-making on overall execution strategy and timing for transacting on the different currencies to accommodate to market and liquidity limitations; benchmark counterpart market quotes based on in-house models to negotiate prices and ensure best execution.

## TREASURY CONTROL MECHANISM

Treasury management relates to most of the highly volatile instrument's market dealing. The volume of transactions involved in the dealings are usually heavy and risk in operation are also heavy. So any unorganisation operation will create heavy loss for the institution. Generally control system may be related to :

- (a) Internal control of different, dealing rooms, settlement offices and control offices.
- (b) Checking of unhealthy insider trading system.
- (c) Mutual and amicable solution of different conflicts of interest in dealing operation.

Internal Control System: It relates to forming policies to check leakage of profit for the institution. In treasury operation, the role of Central Offices are vital. They should form suitable guidelines for the institution in respect of various treasury dealing operations. There are advice dealing offices to bifurcate all treasury items into different classes according to risk involvement. As treasury business is a risky business responsible positioned persons should be delegated powers to deal in treasury operation with imposition of different limits on their discretionary power.

Some important area should be taken (i) fixation of rates for each treasury items and (ii) fixing limits for dealers to deal with different counterparties, with proper observation of confidentiality and adherence to best market practice. Treasury executive should be ensured that the transactions were carried in correct manner by cross checking during each dealing day.

For above facts the central offices should develop proper policies and guidelines for treasury operation and should advise the dealers to deal according to policies of the following :

- (i) restriction on deal in one's own account.
- (ii) timely advice to dealing offices in respect of any adverse transactions received or excess reporting.
- (iii) timely submission of returns to different statutory authorities.
- (iv) review of security and contingency arrangement of different offices.
- (v) proper verification of compliance given by lower offices for irregularities.

### Insider Dealings

Insiders are those who are in management including near and dear; and their dealings means-taking advantages of unpublished internal informations of the corporate body. These may create price sensitive situation. So these disadvantages dealings should properly efficient internal control system should be taken by the management to eliminate insider dealing by fixing penalties for insider dealers.

### TREASURY OPERATIONS IN BANKING

All banks/financial institution (core principals and brokers) should ensure that they should try to serve for giving best service in the market operation within code of conduct issued for time to time. Core principals should be conducted non-investment business with private individuals should segregate them into retail or wholesale for smooth function of business within sound guidelines. It is essential that all staff should be familiar to code of conducts, in professional manner while entering into dealing transactions. Banks/financial institution will be responsible for dealing actions of the staff members. So it should be segregated work for the staff members such as no staff member control the full operation. Banks/financial institution should identify any potential or actual conflict of interest that might arise when undertaking wholesale market transactions; and take measures either to eliminate these practices and provide fair treatment to counter parties. Banks/financial institution should know their counter party and their credit worthiness before entering into contract. It is good practice for principals, subject to their own legal advice, to alert counter party to any legal or tax uncertainty which they know are relevant to a proposed relationship or transaction. All principals have the responsibility to assessing the credit worthiness of their counter parties, or potential counter parties whether dealing directly or through a brokers/firms. Bank/financial institution should take measure of risk control and meet proper legal obligation for each contract to minimize the loss. It is better to prepare a dealing mandate for each transaction. The mandate will be helpful to clarify the extent of a relationship between core principals and their customers with responsibility.

Banks/financial institutions should observe confidentiality. It is essential for the preservation of reputable and efficient market place for bank/financial institution. The transactions should not be dealt in non-market rates. So this practice should be avoided. Adequate safeguards should be established to prevent abuse of informations by staff members with respect to non-public price-sensitive informations.

## PRESENT STATUS OF TREASURY MANAGEMENT IN INDIA

Treasury management is still in its infancy in India. It is still considered as a sub-function of the financial management. In most of the companies, it is the finance manager which is also taking care of the treasury function. Treasury operations are carried out professionally and systematically by some banks and financial institutions. The first stage of evolution in treasury management is the establishment of a treasury function. The second stage is running it as a profit center. In India, treasury operations at the micro level are expected to grow at a fast pace with increasing integration of the Indian economy with the world economy.

Treasury management is the science of managing treasury operations of a firm. Treasury in its literal sense refers to treasure or valuables of the Government. The valuables are nothing but the coins and the currency which are the medium of financial transactions in the country. In the earlier days when the level of governmental operations was comparatively smaller, there used to be a centralized treasury into which the revenue receipts of the government were credited and from which the payments of the government were withdrawn. In a federal set-up, both the central govt. and the state govts. had their treasuries for managing the inflows and outflows of government finances.

As the size and spread of government revenues grew, it became difficult to manage the flows of cash into a centralized treasury. The function of collecting revenues on behalf of the government was gradually shifted to State Bank of India and other nationalised banks. These banks also started making payments on behalf of the state governments through cash counters and through bank accounts of various government departments. Simultaneously with the increase in size of government revenues, the corporate sector in India also grew manifold in operations. There were companies with multi-locational set-up involving receipt and disbursement of cash and cash equivalents at more than one places. In all such companies, the function of treasury management developed analogous to the transfer of government treasury functions to Banks. Along with this growth evolved the concept of profitable treasury management. Hitherto, the treasury management as practiced by the government was a passive concept. The over-riding motive was to provide a platform for transactions and little effort was made to evaluate the costs and expenses associated with managing large amount of currency, cheques and other liquid instruments. Similarly, the opportunity available for making profits from holding large liquid funds was not recognized. But with the arrival of corporate treasuries, the function of treasury management was established as a profitable venture.

Today when we speak of treasury management, we refer to all activities involving the management of revenues, inflows and outflows of government, banks and corporates etc. It is a general concept applicable to overall fund management.

Government as the sovereign power is the fountainhead of all treasury operations. It creates money by printing currency and minting coins. This money flows into various channels which take money to various users of currency and coinage as a medium of exchange. Thus at the macro level, the treasury operations revolve around Reserve Bank of India. RBI as a banker to the govt. creates the currency on behalf of the govt. and manages public debt. It is also a banker to the banks and in this role, it controls the credit creation of banks.

At the micro level the concept of treasury and its management is mirrored in small corporate units which manage the cash flows on a daily basis. As we move from the macro level to the micro level, the nomenclature of treasury management becomes diffused. The terms treasury management and fund management are used almost synonymously. Conceptually, the latter is a general term, applicable to the business sector, while treasury management refers to the management of cash, currency and credit of sovereign power of the country. The term currency here includes both national currency and the foreign currencies dealt with by the government.

Historically, the treasury of a sovereign included gold, silver and other precious metals which were used as a medium of exchange. As a ruler, the sovereign exercised un-challenged rights over all the precious metals extracted from the earth. The booties earned from wars, foreign exploits and domestic plundering kept on adding to the treasure chest of the sovereign. These metals were circulated in the form of coins which became a medium of all commercial transactions in due course, replacing the earlier system of barter. The practice continued till the nineteenth century when paper currency began to be issued.

Reserve Bank of India manages the macro treasury management of the country. This is done through

- Issue of Currency notes
- Distribution of small coins, one, two and five rupee coins and rupee notes on behalf of the government
- Maintenance of currency chests.

The currency is issued by the Reserve Bank of India in terms of the Indian Currency Act whereas the small coins and rupee coins are issued under the provisions of the Indian Coinage Act. The provision of adequate supply of currency and coins is the responsibility of the government which was at first discharged by providing currency chests at the branches of Issue Department of RBI and at branches of Imperial Bank of India (which later became State Bank of India). SBI carried out the business of Government treasury and maintained the currency chests at all district headquarters. Later on all the nationalized banks were also entrusted with the task of maintenance of currency chests.

The basic objective of keeping the currency chests at various places in India is to facilitate quick disbursement of currency and coins to far flung places and also to facilitate remittance to banks. This way, the banks can remit surplus cash to the currency chests located in their region and avoid transportation of cash over long distances. Also, the banks can draw from the currency chests during time of need. Currency chests are the agents of the Reserve Bank of India for keeping custody of currency and coins. Any deposit of currency and coins into these chests implies that the money circulation has been curtailed to that extent. Similarly, any disbursal from these chests would expand their supply. Thus expansion and contraction of currency takes place on continual basis due to operation of the currency chest.

Government as a sovereign power has control on cash and currency circulated in the country. The issue of currency and coins is based on the treasures of the government in the form of gold and silver stocks which are supposed to back such issue. More recently, government securities and their promissory notes became the basis of such issue. In fact, the coins of gold and silver were first replaced by the paper currency on the one hand and coins of base metals like copper, nickel, bronze, zinc etc., on the other. To supplement the available currency and to facilitate trade and business, credit instruments came into vogue in the form of promissory notes to pay at a future date by the trade and industry. Thus on the one hand, the government promissory notes became the basis for coins and currency rather than precious metals like gold and silver; and on the other hand, the promissory notes of trade and industry became the source of credit instruments. These credit instruments, particularly the safest among them such as government securities, in fact became the medium of parking of liquid funds over a period of time. Thus apart from handling cash and currency and bank funds, the liquid investment in government securities and mutual funds became another function of treasury management.

Treasury function is a part of the total managerial functions. Managerial function set-up can be classified into three broad units, viz. production function, marketing function and finance function. Production function pertains to the building up of capacities and generation of output. Marketing function is concerned with the marketing of the output through establishment of the sales and marketing network. In the finance function, the manager is concerned with financing of inputs and outputs and management of funds during the entire production cycle.

Availability of cash, currency and credit by the government, business and foreign sectors is a must for macro

operations of the economy. In broader terms, all financial resources including forex are to be made available to the micro-economic units, i.e. the companies. Similarly, the operations at the national level involve return flow of funds, repayment of loans, taxes, fees etc. to the government, business and foreign sector.

The finance function comes into play when the company is incorporated. With capital restructuring, efforts are made for arriving at least cost combinations of capital for financing of a project and forecasting for working capital. In this function, one has to coordinate with the production and operations manager, sales or marketing manager and they together constitute the marketing team. Apart from arranging the requisite funds for commencing an activity, the finance function is also concerned with managing the day-to-day finances of the company. Whereas arranging project funds and working capital finance is a one-time assignment, management of funds on daily basis is a much more astute activity requiring forecasting skills and prioritization ability of a high order.

The inflows and outflows of funds, their coordination and synchronization and making arrangements for meeting any gap between them is only one end of the spectrum of finance function. The other end of the spectrum is the management of the surpluses and maximization of returns from short term funds. These two ends of the spectrum form the core of activities of the finance function. But the handling of each of the activities requires further specialization. Arranging of long-term funds is the domain of the proper finance function but the management of funds required in and arising from the day-to-day activities of the firm is the domain of the treasury function. These two have to be viewed together and analysed for overall assessment of financial efficiency. So a finance manager need not have a treasury function or a treasury manager need not be bothered with long term arrangement of funds. The finance manager can be termed as an arranger of funds whereas the treasury manager can be viewed as a manager of funds.

Treasury management has both macro and micro aspects. At the macro level, the inflows and outflows of cash, credit and other financial instruments are the functions of the government and the business sectors. These inflows are arranged by them as borrowing from the public. In these sectors, the ratio of savings to investments is less than one, i.e. the savings are inadequate to fund the investments. Hence the need for borrowing. They accordingly issue securities or promissory notes which are part of the financial system. These borrowings for financial needs are met by surplus savings and funds of the household and the foreign sector, where the ratio of savings to investments is positive. The micro units utilize these inflows and build up their capacities for production of output. This leads to establishment of a production system which logically leads us to the natural consequence, i.e. the establishment of distribution and consumption systems. Once the production, distribution and consumption systems are in place at the micro level, the generation of surpluses at the units begins. These surpluses are channeled back into the macro system as outflows from the micro system. The inflows are the taxes paid to the government and repayment of loans made to the banks and financial institutions. These inflows into the macro level have to be managed by the treasury managers at the macro level.

While arranging funds for the micro unit, the finance manager aims at optimizing the value of his assets or wealth and minimizing the burden of his liabilities. He may seek to maximise his operational profits and seek to maximise the wealth of stakeholders of the micro unit. The basic objectives are economy, efficiency and productivity of assets. These objectives can not be achieved at the one end of the finance spectrum unless the management of funds at the other end of the spectrum, i.e. the treasury segment is equally triggered by the dictums of economy, efficiency and productivity.

### LESSON ROUND-UP

- Treasury management is the science of managing treasury operations of a firm. Treasury in its literal sense refers to treasure or valuables of the Government.
- Macro level: It is the inflows and outflows of cash, credit and other financial instruments are the functions of the government and the business sectors. These inflows are arranged by them as borrowing from the public. In these sectors, the ratio of savings to investments is less than one, i.e. the savings are inadequate to fund the investments.
- At micro level, the finance manager aims at optimizing the value of his assets or wealth and minimizing the burden of his liabilities. He may seek to maximise his operational profits and seek to maximise the wealth of stakeholders of the micro unit.
- The availability of funds in right quantity, Availability in right time, Deployment in right quantity, Deployment in right time and Profiting from availability and deployment are the main objective of the Treasury Management.
- At unit level, treasury manager's activities encompass all other management functions.
- Treasury manager monitors the cash flows of the unit on a continual basis. It is ensured by him that adequate funds are made available for day-to-day working of the unit. In case there is genuine shortfall in cash flows, the outflows are made in an order of priority with the more urgent payments being made.
- At domestic level or national level treasury management function is to channelise the savings of the community into profitable investment avenues.
- At the international level, the function of treasury management is concerned with management of funds in the foreign currencies
- Analytic and planning tools, Zero Based Budgeting and Financial Statement Analysis are the various Tools of treasury management.
- Internal treasury control is a process of self improvement which is concerned with all flows of funds, cash and credit and all financial aspects of operations.
- Environment for treasury management can be broadly classified as Legal environment, Regulatory environment and Financial environment

### SELF-TEST QUESTIONS

(These are meant for re-capitulation only. Answers to these questions are not to be submitted for evaluation)

1. What do you understand by treasury management? What are its main objectives?
2. What is the significant of treasury management for the top management of a company?
3. Distinguish between treasury management and financial management.
4. Describe the various tools of treasury management.
5. Bring out the importance of control in the treasury function.

[illegible]





# Lesson 12

## Forex Management

### LESSON OUTLINE

- Nature, Significance and Scope of Forex Management,
- Foreign Exchange Market and its Structure,
- Foreign Exchange Rates and its Determination,
- Exchange Rate Quotes;
- Types of Exchange Rates;
- Forex Trading; Currency Futures and Options
- Foreign Exchange Risk Exposures and their Management
- Exchange Rate Forecasting
- Risk in Foreign Exchange Business
- LESSON ROUND UP
- SELF TEST QUESTION

### LEARNING OBJECTIVES

Forex management may be defined as the science of management of generation, use and storage of foreign currencies in the process of exchange of one currency into other called foreign exchange.

Knowledge of the forex management can help avoid harmful effects of international events and perhaps even profit from these events. With the advent of globalization and liberalization the scope for international trade and international financing has increased tremendously. International trade has grown more quickly than trade in general. This has necessitated the study of Forex management by the finance executives.

The study will enable the students to understand:

- Concept of Forex Management
- Scope and significance of Forex Management
- Role of Forex Manager
- Foreign Exchange Market
- Determinants of Foreign Exchange Rates
- Exchange Rate Quotes – Direct or Indirect Quotations.
- Risks in Foreign Exchange Markets
- Currency Exposure Management
- Managing Foreign Exchange Rate Risk
- Exchange Rate Forecasting
- Mechanics of Forex Trading
- Capital Account Convertibility
- Foreign Exchange Market in India

## INTRODUCTION

FOREX, an acronym for Foreign Exchange, is the largest financial market in the world. Every firm and individual operating in international environment is concerned with foreign exchange i.e. the exchange of foreign currency into domestic currency and vice-a-versa. Generally, the firm's foreign operations earn income denominated in some foreign currency; however, the shareholders expect payment in domestic currency and therefore, the firm must convert the foreign currency into domestic currency. So, what is foreign exchange?

Exchange rate is the price of one country's money in terms of other country's money. When we say that exchange rate of Indian rupee is 52.40 per US Dollar, we mean that 52.40 Indian Rupees are required to purchase one US Dollar. When this exchange rate becomes 52.90 we say that the value of Indian Rupee has depreciated against the US Dollar. On the other hand when the exchange rate becomes 52.10 we say that Indian Rupee has appreciated against the US dollar. Assuming that there are no exogenous factors restricting the changes in exchange rates, their movement can be traced to pure demand and supply. When Indian rupee depreciates against the US Dollar, it indicates that demand for latter is more than its supply. Similarly when the supply of US dollar is more than its demand, it declines in value against the Indian Rupee.

Currency of a country is used for transactions with foreigners. Each country in the world has its own currency. Theoretically, a country should transact with all foreign entities on a one-to-one basis, i.e. for all imports from a foreign country, a host country should pay in the currency of the former and for all exports, the host country should be paid in its currency. But practically this is not possible because it involves keeping record of a multitude of exchange rates and associated payment problems. Therefore, most of the countries choose a common currency for trade amongst themselves. The U.S. dollar has emerged as the strongest international currency for the past sixty years and as such is used as the payment medium for most of the world trade. In the European Union the Euro has established itself as the common currency of about 25 countries.

It is clear that the currency of a country is evaluated against a common currency for external transactions. In case of countries having dominant economic power, trade would be held in their currency. Hence a country is required to trade in U.S. dollar or in other dominant currencies like Euro, Pound or the Japanese Yen. Account of a country's external trade is kept in the form of a Balance of payment account which is a double book entry system. Receipts of foreign currencies are credited to this account while payments in foreign currency are debited to this account. The balance in this account shows a positive or a negative figure depending upon whether the receipts of foreign currency are more or less than the payments.

Other things being equal, the presumption is that a country having a deficit balance of payments position would have a weakening national currency and vice versa. A deficit in the balance of payment account results in more demand for foreign currencies. Hence their value *vis-à-vis* the domestic currency increases.

## NATURE OF FOREX MANAGEMENT

Forex management may be defined as the science of management of generation, use and storage of foreign currencies in the process of exchange of one currency into other called foreign exchange.

The above definition of forex management has the following essential elements:

### (a) It is part of management science

Forex management is part of the broader management science. It is a scientific discipline requiring scientific and analytic orientation. The techniques of management are applied to the broad spectrum of foreign currencies. This broad spectrum refers to all the currencies of the world excluding the domestic currency. These techniques include planning for forex, organization of forex and control of forex. We use the terms forex and foreign exchange interchangeably. The planning part includes budgeting for forex, organization refers to utilization of forex and control part focuses on creation of forex reserves.

The tools of forex management are akin to domestic currency management but the level of analytical skills required for it is slightly higher because of the existence of spot, forwards and futures markets unlike the domestic currency area. Operations in the forex market require quicker response time because of the greater volatility in exchange rates.

### **(b) It refers to generation of forex**

Forex is generated from international trade transactions. When a country exports goods or services, it earns forex. When goods or services are imported by a country, forex is consumed. If the exports of a country are more than the imports, the forex would be accumulated in reserves of the country. If the imports are more than the exports, the result would be a forex deficit which has to be met by international borrowings. Either way, the forex needs to be generated. Generation of forex is a more difficult proposition because of variation in international trade practices and extent of competition.

### **(c) It pertains to use of forex**

Forex management is concerned with use of forex in meeting the requirements of the user group. The tools of cash management come handy in using forex. The process of use of forex involves identification of suppliers of goods and services, negotiation of terms and conditions of the transaction and culmination of transaction with the exchange of goods and services with forex. Because of relative uncertainty about availability of forex and volatility in its rates, advance tie-up of forex is made through forward purchase contracts. In this entire process, close track of exchange rates needs to be maintained.

### **(d) It covers storage of forex**

Forex management involving firm level forex storage could be done through forward purchase contracts or through deposits in foreign currency bank accounts. At the national level, forex storage is done through forex reserves which are held in the form of Gold, Special Drawing Right (SDRs) of IMF and foreign currencies. While some amount of foreign exchange reserves need to be maintained to meet unforeseen contingencies, excessive accretion to reserves involve a cost which is sometimes justified on other economic consideration at the firm's level. Forex is stored for meeting future import liabilities, whether certain or contingent. While storing forex, it is important to bear in mind the actual cost of storage and the opportunity cost of not using the forex elsewhere. Depending upon availability of forex, if the opportunity cost is more than the cost of storage, then it is better not to store it.

## **SCOPE OF FOREX MANAGEMENT**

Forex management has quite a wide scope of operation. We can cover in its ambit all those transactions which involve use of forex. Let us consider the following illustrations:

- A citizen of India travels abroad on a business visit and purchases foreign currency from an authorized dealer.
- An Indian citizen goes to USA for a period of three years under an employment contract. He periodically remits US Dollars to his bank account in India.
- An Indian student subscribes to a British scientific magazine and pays for it through an international credit card held by him.
- An Indian industrialist imports raw material from Malaysia for his plant under a Letter of Credit arrangement provided by his bank.
- A sports goods manufacturer of India exports his consignment to Europe and gets paid for it in foreign currency received through banking channels.

- Indian subsidiary of a Multinational corporation imports white goods in completely knocked down (CKD) from the Chinese affiliate. After reassembling these goods, the same are exported to Europe.
- The World Bank disburses aid to an Indian State under an infrastructure development project.

The above illustrations show how individuals, companies and states transact in forex. When goods or services are imported into a country, these are paid for in the currency of the country exporting these goods or services. When an Indian traveler goes to a foreign country on a short visit, he needs foreign currency of that country for meeting his expenses. When he stays in that country for a longer duration for employment purpose, he earns foreign currency of that country. When an Indian firm exports goods to Europe, it is earning foreign exchange. Thus when goods and services are sent abroad by India, foreign currencies are earned by them.

Forex management being involved in all the trade and non-trade transactions involving forex, it is essential to have a broad idea of international banking and trading practices. Since the transactions are taking place among counter parties from different countries, a standardized format of documentation is used to minimise errors.

Apart from the transaction value, forex management finds scope as a mode of investment. Because of the frequent and often miniscule fluctuations in forex values, enough arbitrage and speculative opportunities crop up in the forex market for astute investors. There are many expert forex dealers specializing in trading of forex.

### **SIGNIFICANCE OF FOREX MANAGEMENT**

Business operations in countries across the globe have been in existence for centuries, but an unprecedented growth in world wide production and distribution of a large number of capital, intermediate and consumer goods has been witnessed in the past fifty years. At present most of the countries are economically related to each other through a complex network of trade, foreign investment and international loans.

The emergence of WTO and the process of global integration has reinforced the importance of International trade, cross border financial flows and consequently foreign currency transactions. Each country has its own currency and each currency has different value in relation to a globally accepted standard. The significance of forex management lies in the study and maintenance of the exchange levels.

Every good or service reaching us from abroad involves forex. Knowledge of the forex management can help avoid harmful effects of international events and perhaps even profit from these events. With the advent of globalization and liberalization the scope for international trade and international financing has increased tremendously. International trade has grown more quickly than trade in general. This has put up both benefits and challenges.

The principal benefit for international trade has been in the form of the gain in standard of living it has permitted. The gain has come from exploiting relative efficiencies of production in different countries. The challenges of international trade are the introduction of exchange rate risk and country risk. Various methods and markets have evolved that allow firms to avoid or reduce these risks.

The after effect of development of international trade has been swift movement of funds from one finance centre to the other. There has been investment by multinationals in the third world countries in the form of capital outlays. All this has necessitated the need for a better understanding of the mechanism of forex flows.

Forex management has become a more important subject because of an increased globalization of financial markets. The benefits of the increased flow of capital between nations include a better international allocation of capital and greater opportunities to diversify risk. However, globalisation of investment has meant new risks from exchange rates, political actions and increased interdependence of financial conditions in different countries.

### **FOREX MANAGER AND HIS SKILLS**

The developments in international trade have resulted in the emergence of a new brand of manager called the

forex manager. The forex manager is a category apart from the finance manager or the treasury manager. He deals in currency and money but not of one country. He has to transact with a number of counter parts both in the domestic country and abroad. He is face to face with special kind of risk. Yet his vocation is full of opportunities and challenges.

For effective management of forex transactions, the forex manager is expected to have the following skills:

**(a) Awareness of historical development of world trade**

The forex manager must have a fair idea of as to how the world trade has reached its present status. The shifting power alliances, emergence and decline of economic superpowers, present political situations, trade patterns etc. should be known. This knowledge base enables the manager to view the current situation in proper perspective.

**(b) Ability to forecast future trends**

The forex manager must be in a position to derive an accurate forecast of the future trends in international trade flows and exchange rate patterns. This forecast helps the manager to prepare his forex budget.

**(c) Comparative Analysis skills**

The forex manager should be able to carry out a comparative analysis of costs of domestic and imported raw materials, price of local sales and export sales, shipping rates, insurance costs etc. in order to determine whether it is expedient to produce locally or to outsource

**(d) In-depth knowledge of forex market**

The forex manager is expected to have in-depth knowledge of functioning of foreign exchange markets, their rules and regulations, the size of their operation, the profile of active currencies, strength and weakness of the domestic currency etc. in order to achieve better pricing of deals.

**(e) Knowledge of interest rates**

Since interest rates have a direct bearing upon exchange values, awareness about domestic and international interest rates enables the forex manager to form an accurate opinion about the forward premia.

**(f) Willingness to undertake risk**

Armed with the knowledge and awareness about international financial and trade patterns, currency positions and interest rates, the forex manager should have the ability to undertake reasonable level of risks with a view to profit from forex exposures.

**(g) Hedging strategies**

The forex manager should be in a position to hedge his positions to the best extent possible. To achieve this, a sense of timing is essential in the background of ever changing world of exchange values.

## FOREIGN EXCHANGE MARKET AND ITS STRUCTURE

The foreign exchange transaction (i.e., for the sale and purchase of foreign currencies) takes place in foreign exchange market, which provides a mechanism for transfer of purchasing power from one currency to another. This market is not a physical entity like the Mumbai stock exchange or a trading center; rather it is network of telephones among banks, foreign exchange dealers and brokers etc. The market is an over the counter market. The dealers sit in their dealing room of major commercial banks around the world and communicate with each other through telephones, computer terminals and Society for Worldwide Inter bank Financial Telecommunication (SWIFT) mechanism. This is a non-profit Belgian cooperative with main and regional centers around the world connected by data transmission lines. Depending on the location, a bank can access a regional processor or a main center which then transmits the information to the appropriate location.

The forex market is a wholesale market called the inter-bank market. Commercial banks are the market makers. Corporations use the foreign exchange market for a variety of purposes relating to their operation like payment for imports, conversion of export receipts, hedging of receivables and payables, payment of interest on foreign currency loans, placement of surplus funds etc.

Forex market operates at three levels. At the first level are the currency dealers or money changers who provide for encashment of travelers cheques and release of small amount of forex to travelers. The money changers quote the buying and selling rates for various currencies. An illustration of the quote is given below.

Far larger than the money changer market is the spot foreign exchange market which is at the second level. This market is involved with the exchange of currencies held in different currency denominated bank accounts. The spot exchange rate, which is determined in the spot market, is the number of units of one currency per unit of another currency, where both currencies are in the form of bank deposits. The deposits are transferred from sellers' to buyers accounts. "Delivery" or "Value" or actual transfer is "spot" or "immediate". Usually it takes one or two days. This distinguishes the spot market from the forward market. Spot exchange rates are determined by the demand supply equations of the currencies being exchanged.

The inter-bank foreign exchange market is the largest financial market in the world. The phenomenal size of this market can be put in perspective by noting, for example, that foreign exchange turnover exceeds that of all the world's stock markets combined. Indeed it takes over 2 months average trading on the New York Stock Exchange to match 1 day of trading in forex.

The forex market is an informal arrangement of the larger commercial banks and a number of foreign exchange brokers. The banks and brokers are linked by telephone, telex, computers and a satellite communications network called the Society for Worldwide International Financial Telecommunications (SWIFT). Because of speed of communications, significant events have virtually instantaneous impacts everywhere in the world.

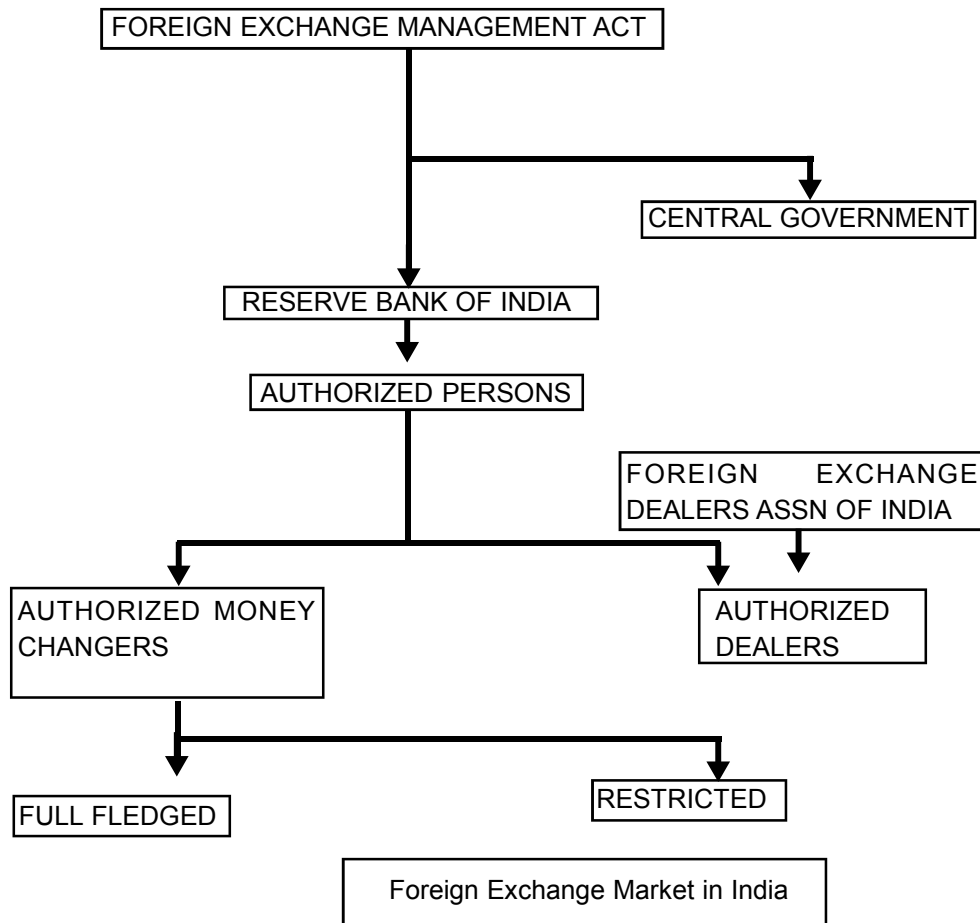
The efficiency of the spot forex market is revealed in the extremely narrow spreads between buying and selling prices. These spreads can be smaller than a tenth of a percent of the value of currency exchanged.

### **ORGANISATION OF FOREIGN EXCHANGE MARKET IN INDIA**

The statutory basis for administration of foreign exchange in India is the foreign Exchange Management Act, 1999. The Central Government has been empowered under Section 46 of the Act to make rules to carry out the provisions of the Act. Similarly, Section 47 empowers the Reserve Bank to make regulations to carry out the provisions of the Act and the rules made thereunder. Further, Section 41 provides that the Central Government may from time to time, give to the Reserve Bank such general or special directions as it thinks fit, and the Reserve Bank shall comply with such directions. Thus, ultimately the Reserve Bank has been charged with the powers as well as the responsibility to administer foreign exchange in India.

The Forex market in India is regulated by Reserve Bank of India. Participants in this market are the Authorised Money Changers and the Authorised Dealers.

While the Reserve Bank has the authority to administer foreign exchange in India, it is recognized that it cannot do so by itself. Foreign exchange is received required by a large number of exporters and importers in the country spread over a vast geographical area. It would be impossible for the Reserve Bank to deal with them individually. Therefore provision has been made in the Act (Section 10), enabling the Reserve Bank to authorize any person to be known as authorized person to deal in foreign exchange or in foreign securities, as an authorized dealer, money change or off-shore banking unit or in any other manner as it deems fit.



## PARTICIPANT IN FOREX MARKET

### Authorised Money Changers

In order to provide facilities for encashment of foreign currency to visitors from abroad, especially foreign tourists, Reserve Bank has granted licences to certain established firms, hotels and other organisations permitting them to deal in foreign currency notes, coins and travellers cheques subject to directions issued to them from time to time. These firms and organisations who are generally known as “authorised money changers” fall into two categories, viz. “Full-fledged money changers” who are authorised to undertake both purchase and sale transactions with the public and “Restricted money changers” who are authorised only to purchase foreign currency notes, coins and travellers cheques, subject to the condition that all such collections are surrendered by them in turn to an authorised dealer in foreign exchange/full fledged money changer.

### Authorised Dealers in Foreign Exchange

A major portion of actual dealing in foreign exchange from the customs (importers, exporters and others receiving or making personal remittances) is dealt with by such of the banks in India which have been authorized by the Reserve Bank to deal in foreign exchange. Such of the banks and select financial institutions who have been authorized to deal in foreign exchange by the Reserve Bank are known as authorized dealers. An authorized dealer should comply with the directions and instructions of the Reserve Bank given from time to time. With the coming into effect of the FEMA, the Reserve Bank has issued a series of regulations under the Act.

### Foreign Exchange Dealers’ Association of India

FEDAI was established in 1985 as an association of all authorized dealers in India. All authorized dealers,

currently numbering over 70, are its members. It has its headquarters at Mumbai and local offices at Bangalore, Calcutta, Chennai and New Delhi. The affairs of FEDAI are managed by a Managing Committee at the Head Office and respective Local Committees at local offices. The Committees are represented equally by banks incorporated in India and outside India. The principal functions of FEDAI are:

- (a) To frame rules for the conduct of foreign exchange business in India. These rules cover various aspects like hours of business, charges for foreign exchange transactions, quotation of rates to customers, interbank dealings, etc. All authorized dealers have given undertakings to the Reserve Bank to abide by these rules. Provisions of FEDAI rules have been considered at appropriate places in the relevant chapters of this book.
- (b) To coordinate with Reserve Bank of India in proper administration of exchange control.
- (c) To circulate information likely to be of interest to its members. (Information of international trade received from organizations like the International Chamber of Commerce is passed to the members. It also acts as a clearing house for exchange of information among members.)

Thus, FEDAI provides a vital link in the administrative set-up of foreign exchange in India. It is the mouthpiece of the authorized dealers, representing their views to the Reserve Bank and other international agencies.

### Why Participate in the Foreign Exchange Market

Due to its vast volume and large number of participants, no individual or single company has complete control over which way the market will sway. Historically, Forex has been dominated by commercial banks, money portfolio managers, money brokers, large corporations, and very few private traders.

Lately this trend has changed. While there are many reasons for participating in foreign exchange including facilitating commercial transactions, corporations converting its profits, or hedging against future price drops, more and more people are getting involved in the market for the purposes of speculation.

- (a) **Exporting and Importing Companies:** Large multinational corporations influence the foreign exchange market as they purchase and sell goods and materials between different countries. Importing companies affect the demand of a currency as well. For example, an American retailer features Japanese furnishings and pays its suppliers in Japanese yen. If consumers like these products then they will indirectly contribute to an increase in demand for the yen as the American retailer will have to buy more merchandise from Japan. As the retailer purchases the yen and sells the dollar on the exchange market, the yen appreciates.
- (b) **Foreign Investment Flows:** Foreign investment has many aspects, having to do with goods, services, stocks, bonds, or property. Suppose a Canadian company wants to open a factory in America. In order to cover the costs of the land, labour and capital the firm will need dollars. Suppose the company holds most of its reserves in Canadian dollars. It must sell some of its Canadian dollars to buy US dollars.

The supply of Canadian dollars on the foreign exchange market will increase and the supply of US dollars will decrease, which causes the US dollar to appreciate against the Canadian dollar. On the flip side, foreign investors are also increasing or decreasing the demand for the currency of the country in which they are interested in investing.

- (c) **Banks:** For a long time the foreign exchange market has been associated with the term “interbank” market. This term was employed to capture the nature of the foreign exchange market when it predominantly dealt with banks. Banks include central bank, investment banks and commercial banks.
- (d) **Speculators - Investment Management Firms, Hedge funds, and Retail Traders:** Many financial institutions use currency exchange as a method to generate income. There are also many individuals who try to do the same thing. The currency markets move in one direction only when many investors act together. An individual investor cannot move the exchange rate of a currency but many traders, investment funds, and banks may collectively move it.



If speculating traders think the Japanese Yen is going to weaken in the near future due to poor economic data or a change in interest rate policy, then they sell the yen on the foreign exchange market relative to another stronger currency. The supply of yen will increase and cause the currency to depreciate. If many investors feel that a particular currency will depreciate in the near future, their collective selling of that currency will move its price down. Similarly, if speculators feel that a currency is going to appreciate in the near future then they will buy that currency today and cause it to experience a higher demand which causes its price to go up. Investors help materialize their predictions by acting in a herd mentality, and in some people's eyes bring about a self fulfilling prophecy.

#### Different Currencies and their symbols

Country	Currency	Symbol
Australia	Dollar	A\$
Canada	Dollar	Can \$
Denmark	Krone	Dkr
EMU	Euro	€
Finland	Markka	FM
India	Rupee	₹
Iran	Rial	RI
Japan	Yen	¥
Kuwait	Dinar	KD
Mexico	Peso	Ps
Norway	Krone	NKr
Saudi Arabia	Riyal	SR
Singapore	Dollar	S\$
South Africa	Rand	R
Sweden	Krona	Skr
Switzerland	Franc	SFr or CHF
United Kingdom	Pound	£
United States	Dollar	\$

### MECHANICS OF FOREX TRADING

Forex trading concerned with various forex operations including purchase and sale of currencies of different countries in order to meet payments and receipts requirements as a result of foreign trade. Forex trading is done either in retail market or in whole sale market (also called inter bank market). Under retail market, the traveler and tourists exchange one currency for another in form of currency notes or traveler cheques. Here, the total turnover and average transaction size are very small. The spread between buying and selling price is large. Whereas wholesale market or inter bank market is a market with huge turnover. The major market participants of this market include commercial banks, corporation and central banks.

Suppose bank A wishes to buy the British pound sterling against the US dollar. A trader in bank A might call his counterpart in bank B and ask for a price quotation. If the price is acceptable they will agree to do the deal and both will enter the details the amount bought/sold, the price, the identity of the counter party etc. — in their

respective banks' computerized records systems and go on to the next transaction. Subsequently, written confirmations will be sent containing all the details. On the day of settlement, bank A will turn over a US dollar deposit to bank B and B will turn over a sterling deposit to A. The traders are out of the picture once the deal is agreed upon and entered in the record systems. This enables them to do deals very rapidly. At the international level inter-bank settlement is effected through the Clearing House Inter Bank Payment System (CHIPS), located at New York.

When asked to quote a price between a pair of currencies, say pound sterling and dollar, a trader gives a "two-way quote" i.e. he quotes two prices: a price at which he will buy a sterling in exchange for dollars and a price at which he will sell a sterling for dollars. In a normal two-way market, a trader expects "to be hit" on both sides of his quote in roughly equal amounts. That is, in the pound-dollar case above, on a normal business day the trader expects to buy and sell roughly equal amount of pounds (and of course dollars). The Bank's margin would then be the bid-ask spread.

But suppose during the course of trading a trader finds that he is "being hit" on one side of his quote much more often than the other side. In our pound-dollar example this means that he is either buying many more pounds *vice versa*. This leads to the trader building up "a position". If he has sold (bought) more pounds than he had bought (sold) he is said to have net short position (long position) in pounds. Given the volatility of exchange rates, maintaining a short or long position for too long can be a risky proposition. For instance, suppose that a trader has built up a net short position in pounds of 1,00,000. The pound suddenly appreciates from say \$1.7500 to \$1.7520. This implies that the bank's liability increases by \$2000 (\$0.0020 per pound for 1 million pounds). Of course, a pound depreciation would have resulted in a gain. Similarly, a net long position leads to a loss if it has to be covered at a lower price and a gain if at a higher price. (By "covering a position" we mean undertaking transactions that will reduce the net position to zero. A trader net long in pounds must sell pounds to cover; a net short must buy pounds).

The potential gain or loss from a position depends upon the size of the position and the variability of exchange rates. Building and carrying such net positions for long durations would be equivalent to speculation and banks exercise tight control over their traders to prevent such activity. This is done by prescribing the maximum size of net positions a trader can building up during a trading day and how much can be carried overnight.

### How Trading Works

So how does the actual trading work? A complete transaction is the buying of one currency and selling of another at the same time. In this chapter, we will be focus on spot transactions only and other forms of Forex transaction (i.e. futures, options) are not covered. The technical definition for a spot contract is a transaction at the current market rate with a settlement that takes place within two business days. However, in a practical sense, when trading Forex, a position is opened at the current rate and can then be closed any time afterwards, at that next moment's rate. Positions that are not closed within the two business days are automatically "rolled over", meaning the Forex dealer with which the position is open will keep automatically renewing your spot contract for you until it is closed.

Any trading has two aspects – (i) purchase, and (ii) sale. A trader has to purchase goods from his suppliers which he sells to his customers. Likewise, the bank (which is authorized to deal in foreign exchange) purchase as well as sells its commodity – the foreign currency. Two points need be constantly kept in mind while talking of a foreign exchange transaction:

- (i) The transaction is always talked of from the bank's point of view; and
- (ii) The item referred to is the foreign currency.

Therefore, when we say a purchase, we imply that

- (i) the bank has purchased; and

- (ii) it has purchased foreign currency.

Similarly, when we say a sale, we imply that

- (i) the banks has sold; and
- (ii) it has sold foreign currency.

In a purchase transaction the bank acquires foreign currency and parts with home currency.

In a sale transaction the bank parts with foreign currency and acquires home currency.

**This is further illustrated with the help of an illustration.**

**Problem :** Determine which of the following transactions constitute (i) purchase, and (ii) sale of foreign exchange:

- (a) The bank issues a demand draft on London for GBP100.
- (b) the customer of the bank purchases a telegraphic transfer on New York for 500.
- (c) A traveler encashes at the bank a traveler cheque for GBP 50.
- (d) The bank purchases a demand draft drawn on London for GBP 500.

**Solution:** (a) and (b) sales; (c) and (d) purchases.

### More Trading Terminology

- (a) **PIP** : A change in price of one “point” in Forex trading is referred to as a pip, and it is equivalent to the final number in a currency pair’s price. For pairs that involve the Yen (like in our USD/JPY example), a pip is counted from the second decimal place, 120.94. For all pairs that don’t involve the Japanese Yen a pip is the fourth decimal place, 1.3279. For the EUR/USD pair that rate would mean that it takes 1.3279 Dollars to get 1 Euro.

- (b) **Going Long or Short:** A long position is a situation in which one purchases a currency pair at a certain price and hopes to sell it later at a higher price. This is also referred to as the notion of “buy low, sell high” in various trading markets. In Forex, when one currency in a pair is rising in value, the other currency is declining, and vice versa. If a trader thinks a currency pair will fall he will sell it and hope to buy it back later at a lower price. This is considered a short position, which is the opposite of a long position.

On every exchange, a trader has a long position on one currency of the pair and a short position on the other currency. A trader defines his or her position as an expression of the first currency of the traded pair. The first currency in a pair is known as the base currency. The second currency in the pair is called the counter currency. When a trader buys the base currency he or she takes a long position on a pair, if a trader sells the base currency he or she shorts the pair. Let’s look at a Forex chart and visualize this idea.

- (c) **Spot Exchange Rates:** A spot exchange rate is a rate at which currencies are being traded for delivery on the same day. For example, an Indian Importer may need U.S. \$ to pay for the shipment that has just arrived. He will have to purchase the \$ in the market to make payment for the import. The rate at which he will buy the \$ in the market is known as the spot exchange rate. He will make the payment in terms of ‘and gets in turn the U.S. \$ which will be paid to the foreign exporter. The spot exchange rate therefore, for a currency is the current rate at which one currency can be immediately converted into another currency. For example, a spot rate of \$ 0.99/Euro indicates that one Euro can be converted into \$0.99 in the market place at present. In most of the cases, the spot exchange rates are set by the demand and supply forces in the foreign exchange market.

- (d) **Forward Exchange Rate:** Imagine a New York City firm exports its products to a German company. The business transaction will be settled in dollars so the American firm obtains revenue in its own currency and can pay its employees’ salaries in dollars. If the payment by the German company is

coming 6 months later, it introduces the risk that the amount of dollars they would receive for a certain amount of euros today will not be the same in 6 months time. A company may want to limit, or hedge, this exchange rate risk by immediately converting their euro into dollars, or by purchasing forward contracts in the foreign exchange market. A forward contract is a contract to convert euros into dollars at a future date at a set price.

In this way, the forward rate is a price quotation to deliver the currency in future. The exchange rate is determined at the time of concluding the contract, but payment and delivery are not required till maturity. Foreign exchange dealers and banks give the forward rate quotations for delivery in future according to the requirements of their clients. Generally, the forward quotations are given for delivery in 30 days, 90 days, and 180 days, But, the quotations may be given up to 2 years. Sometimes, forward contracts with maturities exceeding two years are also arranged by the dealers to meet specific requirements of their clients. Quotations are normally given for major currencies, but dealers also provide forward quotations for other currencies on the specific request of their clients.

The forward rate for a currency may be higher or lower than the spot rate. Forward rate may be higher than the spot rate if the market participants expect the currency to appreciate *vis-à-vis* the other currency, say US dollar. The currency, in such case is called trading at a forward premium. If the forward rate is lower than the spot rate, the participants expect the currency to depreciate *vis-à-vis* the US dollar. The currency in this case, is said to be 'trading at forward discount'.

- (e) **Forward premium or discount** is generally calculated as percentage per annum. This percentage helps in making a comparative analysis of the interest rate differential between the two countries whose currencies are quoted. The forward premium (or discount) is generally calculated by the following formula:

Forward premium (or discount) in percent per annum

$$= \frac{(\text{Forward Rate} - \text{Spot Rate})}{\text{Spot Rate}} \times \frac{12}{n} \times 100$$

Where 'n' is the number of months till maturity of the forward contract

For example, suppose that the forward rate (60 days) for the Rupee is 49.05/\$ whereas the spot rate for it is 48.20/\$. The forward discount on Indian Rupee will be

$$\begin{aligned} &= \frac{49.05 - 48.20}{48.20} \times \frac{6}{1} \times 100 \\ &= 10.58\% \text{ (discount)} \end{aligned}$$

If, on the other hand, the forward rate for the Rupee is 47.80/\$, the forward premium on it will be

$$\begin{aligned} &= \frac{47.80 - 48.20}{48.20} \times \frac{6}{1} \times 100 \\ &= 4.97\% \text{ (premium)} \end{aligned}$$

### Relationship between Spot and Forward Rates

A study of the relationship between spot and future rates would help in determining the degree and the extent of predictability of the former on the basis of the latter.

The collective judgment of the participants in the exchange market influences the appreciation or depreciation in the future spot price of a currency against other currencies. The forward premium or discount is also affected by the interest rate differential between two countries, differences in the rates of inflation between them, and the degree to which inflation rate differential is translated into interest rate differential in the expected time horizon. Moreover, the relationship between spot and forward rates may be affected by the efficiency of the financial and

exchange markets in two countries. Controls, restrictions and other interventions which can affect adjustments in exchange, and interest and inflation rates differential also influences the spot and forward rates.

Theoretically, in the (i) efficient market and (ii) absence of intervention or control in the exchange or financial markets, the forward rate is an accurate predictor of the future spot rate. These requirements are, generally, satisfied if the following three conditions are found:

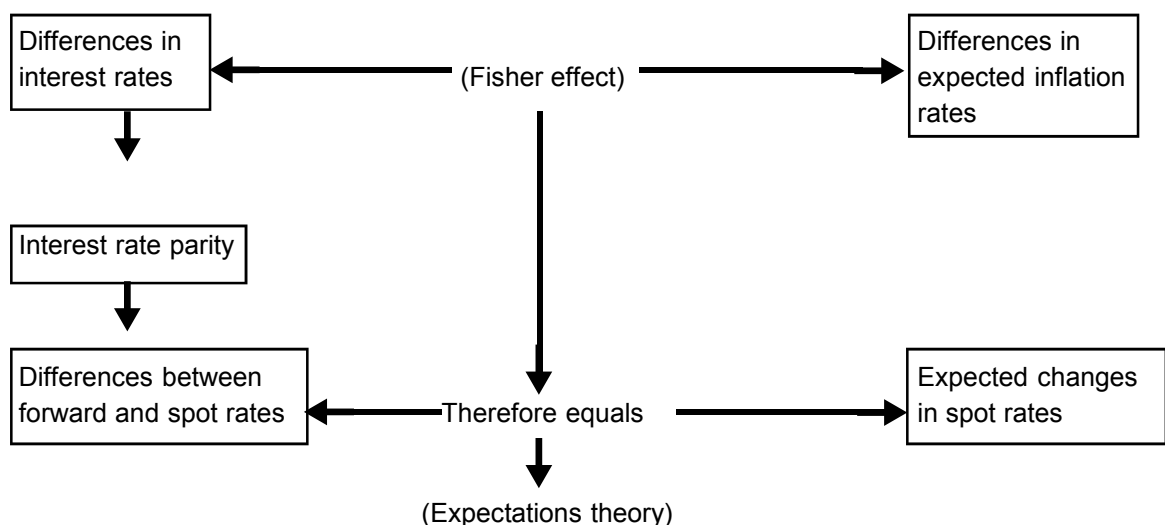
- (i) **Interest Rate Parity:** According to interest rate parity principle, the forward premium (or discount) on currency of a country *vis-à-vis* the currency of another country will be exactly offset by the interest rate differential between the countries. The currency of the country with lower interest rate is quoted at a forward premium and *vice-versa*.
- (ii) **Purchasing Power Parity (PPP):** According to the PPP Principle, the currency of a country will depreciate *vis-à-vis* the currency of another country on the basis of differential in the rates of inflation between them. The rate of depreciation in the currency of a country would roughly be equal to the excess inflation rate in the country over the other country.
- (iii) **International Fisher Effect:** The interest rate differential between two countries, according to the Fisher effect, will reflect differences in the inflation rates in them. The high interest country will experience higher inflation rate.

It should, however, be noted that even if these conditions are satisfied, the future spot rate might not be identical to the forward rate. Random differences between the two rates may be found.

### INTER-RELATIONSHIP OF DIFFERENT VARIABLES IN FOREIGN EXCHANGE TRANSACTIONS

Interest rates, inflation rates, forward margins, exchange rates and expectations across nations are inter-related as shown in the diagram. The diagram suggests that interest rates vary across countries because of varying expectations with regard to their rates of inflation. Under perfect competition, funds would move to a country where real interest rate (nominal interest rate less inflation rate) is higher, till the forces of demand and supply equilibrate them. In other words, the difference in interest rates between two countries is equal in equilibrium to the expected difference in the inflation rates.

The expected difference in inflation rates between two countries equals, in equilibrium, the expected movement in spot rates. The forward rate for a given period, say 6 months, should equal the spot rate 6 months hence. The difference between the forward rate and the present spot rate represents the interest element for the period of the forward rate. In reality, however, the future spot rate would usually be higher or lower than the forward rate.



Exchange rate movements overtime are influenced by various factors not only those mentioned above but also by market imperfections arising out of official intervention in markets, exchange control restrictions, customs barriers, etc.

### EXCHANGE RATE QUOTATIONS AND ARBITRAGE

Although the term “market rate” is often used it is not true that all banks will have identical quotes for a given pair of currencies at a given point of time.

For example if Bank A gives the quote given above:

₹/\$ : 34.85/34.92

At the same time Bank B quotes

₹/\$ : 34.75/34.82

Such a situation will give rise to an arbitrage opportunity. Dollars can be bought at ₹ 34.82 from Bank B and sold at 34.85 to bank A. Thus giving a net profit of ₹ 0.33 per dollar without any risk or commitment of capital. This would lead to a situation where every dealer would like to buy from Bank B and sell to Bank A. However, in an efficient market this would not be allowed to prevail, if at all it does prevail it will be only for a few moments.

### Two Point Arbitrage

If dollars are available in India at ₹/\$ : 34.60/34.75 and at the same time Rupees are available in U.S.A at \$/₹ : 0.0285/0.0287.

In such a situation a trader can buy \$ from India at 34.75 and sell it at U.S.A for 34.84 (1/0.287). Thus making a net profit of ₹ 0.09 per dollar. This arbitrage transaction in which the trader buys a currency in one market and sells it at a higher price in another market is called “Two Point Arbitrage”.

The bid and risk rate for dollars in terms of ₹ in U.S.A is computed as follows:

$$(\$/\text{₹})_{\text{bid}} = 1/(\text{₹}/\$)_{\text{ask}}$$

$$(\text{₹}/\$)_{\text{ask}} = 1/(\text{₹}/\$)_{\text{bid}}$$

The ask on the rupee being the bid on the dollar and vice-versa.

### Problem :

A bank in Canada displays the following spot quotation.

C\$/\\$ : 1.3690/1.4200

At the same time a bank in New York quotes

\\$/C\\$ : 0.7100/0.7234

- Is there an arbitrage opportunity?
- If the Canadian bank lowers its ask rate to 1.3742, Is there an arbitrage opportunity?
- If you buy one million U.S. \$ from Canada and sell them in U.S.A after the Canadian lowers its ask rate. What is the riskless profit you will make?

### Solution:

- If we buy U.S. dollars from Canada we will pay C\$ 1.4200 per U.S. dollar. This can be sold in U.S.A for 1.4085 only there by leaving us with a loss. Hence there is no arbitrage opportunity.

$$\$/C\$ : 0.7100/0.7234$$

$$\begin{aligned}
 \text{C\$/\$} & : [1/(\$/\text{C})\text{ask}]/[1/(\$/\text{C}\$)\text{bid}] \\
 & : [1/0.7234]/[1/0.7100] \\
 & : 1.3824/1.4085
 \end{aligned}$$

- (b) If the Canadian bank lowers its ask rate to 1.3742 we can buy U.S. \$ from Canada for C\$ 1.3742 and sell them in U.S.A for C\$ 1.4085 per U.S. dollar. Thus making an arbitrage profit of 0.0343 Canadian dollars on every U.S. dollar.

$$\begin{aligned}
 \text{(c) } 10,00,000 & \times 1.3732 = 14,08,500 \\
 10,00,000 & \times 1.4085 = -13,73,200 \\
 & \quad \quad \quad 35,300
 \end{aligned}$$

Thus if one million U.S. dollars are bought from Canada and sold in America after the Canadian bank lowers its ask rate, the riskless profit that can be made is C\$ 35,300.

### Three Point Arbitrage

Three point arbitrage refers to the transactions wherein a trader deals with three currencies, he starts with currency X, sells it for currency Y, sells currency Y for currency Z, and finally sells currency Z for currency X. After this process he should have more of Z than he began with.

For three currencies X, Y and Z

The no Arbitrage opportunity condition implies:

$$(X/Y)\text{bid} < (X/Z)\text{ask} \quad \times \quad (Z/Y)\text{ask}$$

$$(X/Y)\text{ask} > (X/Z)\text{bid} \quad \times \quad (Z/Y)\text{bid}$$

#### Problem :

A bank in Wales is currently offering the following quotes:

$$\text{FFr/£} : 7.9970/7.9990$$

$$\text{HK\$/£} : 11.9071/11.9091$$

At the same time a bank in Hong Kong is quoting

$$\text{FFr/HK\$} : 0.6750/0.6770$$

Is there an Arbitrage opportunity?

#### Solution:

One FFr gets £[1/(FFr/£)ask]

$$=£(1/7.9990)$$

$$=£0.1250$$

£[1/(FFr/£)ask] gets HK\$[1/FFr/£)ask] [(FFr/£)bid]

$$=(1/7.9990) (11.9071)$$

$$=1.4884$$

And finally the amount of FFr is obtained

$$\text{FFr}\{[1/(\text{FFr/£})\text{ask}][(\text{HK\$/£})\text{bid}(\text{FFr/HK\$})\text{bid}]\}$$

FFr  $[(1/7.9990) (11.9071) (0.6750)] = \text{FFr } 1.0048$

There is an arbitrage opportunity.

A riskless profit of FFr 1.0048 per French Franc.

**Note:** Problems given above are not real life situations, these type of arbitrage opportunities seldom appear in the market. Even if it does it will only be for a few moments and efficient traders are bound to take advantage of this situation.

### Covered Interest Arbitrage

Investments abroad have to be converted into home currency on maturity. Exchange rate may have changed in the meanwhile. An investor may make a forward sale of funds to be repatriated on maturity. The process of investing abroad for higher returns and making a forward sale of the proceeds is known as covered interest arbitrage. An investment abroad will be undertaken if the return from interest rate differential exceeds the forward margin (difference between the forward and spot exchange rates). In general terms, the forward rate of the foreign currency will contain a discount (premium) if its interest rate is higher (lower) than that of the home currency. Covered interest arbitrages will go on till the market forces realign the forward margins with the interest rate differentials.

Problem : If,

- Spot rate: ₹ 42.0010 = \$ 1
  - 6 month forward rate: ₹ 42.8020 = \$ 1
  - Annualised interest rate on:
    - 6 month rupee: 12 %
    - 6 month dollar: 8%
- Calculate the arbitrage possibilities.

#### Solution:

The rule is that if the interest rate differential is greater than the premium or discount, place the money in the currency that has a higher rate of interest or vice versa.

Given the above data:

Negative interest rate differential =  $(12-8) = 4\%$

$$\begin{aligned} \text{Forward premia (annualised)} &= \frac{\text{Forward rate} - \text{Spot rate}}{\text{Spot rate}} \times 100 \times \frac{12}{6} \\ &= \frac{42.8020 - 42.0010}{42.0010} \times 100 \times \frac{12}{6} = 3.8141\% \end{aligned}$$

Negative interest rate differential > forward premia, therefore, there is a possibility of arbitrage inflow in India. Suppose, investment = \$1000 by taking a loan @ 8% in US. Invest in India at spot rate of ₹ 42.0010 @ 12 % for six months and cover the principal + interest in the six month forward rate. Principal = \$ 1000 = ₹ 42001.

$$\begin{aligned} \text{Interest on investment for six months} &= ₹ 42,001 \times 12 / 100 \times 6 / 12 \\ &= ₹ 2520.06 \end{aligned}$$

$$\begin{aligned} \text{Amount at the end of six months} &= \text{Interest} + \text{Principal} \\ &= ₹ 42001 + 2520.06 \end{aligned}$$



$$= ₹ 44,521.06$$

Converting the above in dollars at the forward rate = \$ 44,521.06 / 42.8020

$$= \$ 1,040.16$$

The arbitrageur will have to pay at the end of six months = \$1,000 + (\$1000 \* 8/100 \* 6/12)

Hence, the arbitrageur gains (\$1040.16 - \$1040) = \$ 0.16 on borrowing \$1000 for six months.

**Problem :** If,

- Spot rate: ₹ 44.0030 = \$ 1
- 6 month forward rate: ₹ 45.0010 = \$ 1

Annualised interest rate on:

- 6 month rupee: 12 %
- 6 month dollar: 8%

Calculate the arbitrage possibilities.

**Solution:**

The rule is that if the interest rate differential is greater than the premium or discount, place the money in the currency that has a higher rate if interest or vice –versa.

Given the above data:

- Negative interest rate differential = (12-8) = 4%
- Forward premia (annualised) =  $\frac{\text{Forward rate} - \text{Spot rate} * 100 * 12}{\text{Spot rate} * 6}$

$$= \frac{(45.0010 - 44.0030) * 100 * 12}{44.30 * 6} = 4.5361\%$$

Here, Negative interest rate differential < forward premia, therefore, there is a possibility of arbitrage inflow in US. Suppose, investment = ₹ 10,000 by taking a loan @ 12% in India. Invest in US at spot rate of ₹ 44.0030 @ 8 % for six months (US \$ 227.257) and cover the principal + interest in the six month forward rate.

Amount at the end of six months = Interest + Principal

$$= (\$227.257 * 8) / (100 * 6/12)$$

$$= \$ 236.3473$$

Sell US \$ at 6 month forward to receive 236.3473 \* 45.0010 = ₹ 10635.865

Return the rupee debt borrowed at 12%. The amount to be refunded is ₹ 10,600

$$\text{Profit} = ₹ 10635.865 - 10600 = ₹ 35.865$$

## FOREIGN EXCHANGE RATES

An exchange rate is the price of one country's money in terms of other country's money. When we say that exchange rate of Indian rupee is 48.40 per US Dollar, we mean that 48.40 Indian Rupees are required to purchase one US Dollar. When this exchange rate becomes 48.90 we say that the value of Indian Rupee has depreciated against the US Dollar. On the other hand when the exchange rate becomes 48.10 we say that Indian Rupee has appreciated against the US dollar. Assuming that there are no exogenous factors restricting the changes in exchange rates, their movement can be traced to pure demand and supply. When Indian rupee

depreciates against the US Dollar, it indicates that demand for latter is more than its supply. Similarly when the supply of US dollar is more than its demand, it declines in value against the Indian Rupee.

Currency of a country is used for transactions with foreigners. Each country in the world has its own currency. Theoretically, a country should transact with all foreign entities on a one-to-one basis, i.e. for all imports from a foreign country, a host country should pay in the currency of the former and for all exports, the host country should be paid in its currency. But practically this is not possible because it involves keeping record of a multitude of exchange rates and associated payment problems. Therefore, most of the countries chose a common currency for trade amongst themselves. The U.S. dollar has emerged as the strongest international currency for the past sixty years and as such is used as the payment medium for most of the world trade. In the European Union the Euro has established itself as the common currency of about 25 countries.

It is clear that the currency of a country is evaluated against a common currency for external transactions. In case of countries having dominant economic power, trade would be held in their currency. Hence a country is required to trade in U.S. dollar or in other dominant currencies like Euro, Pound or the Japanese Yen. Account of a country's external trade is kept in the form of a Balance of payment account which is a double book entry system. Receipts of foreign currencies are credited to this account while payments in foreign currency are debited to this account. The balance in this account shows a positive or a negative figure depending upon whether the receipts of foreign currency are more or less than the payments.

Other things being equal, the presumption is that a country having a deficit balance of payments position would have a weakening national currency and vice versa. A deficit in the balance of payment account results in more demand for foreign currencies. Hence their value *vis-à-vis* the domestic currency increases.

## FACTORS AFFECTING FOREIGN EXCHANGE RATES

Foreign Exchange being a commodity likes any other commodities the exchange rates tend to fluctuate from time to time. There are various factors that cause the fluctuations in the rates of exchange. These factors can be divided into several following groups. These groups can affect the exchange rates on a short term as well as long-term basis.

### 1. Fundamental Factors

The fundamental factors include all such events that affect the basic economic and fiscal policies of the concerned government. These factors normally affect the long-term exchange rates of any currency. On short-term basis on many occasions, these factors are found to be rather inactive unless the market attention has turned to fundamentals. However, in the long run exchange rates of all the currencies are linked to fundamental causes. The fundamental factors are basic economic policies followed by the government in relation to inflation, balance of payment position, unemployment, capacity utilization, trends in import and export, etc. Normally, other things remaining constant the currencies of the countries that follow sound economic policies will always be stronger. Similarly for the countries which are having balance of payments surplus, the exchange rate will always be favorable. Conversely, for countries facing balance of payment deficit, the exchange rate will be adverse. Continuous and ever growing deficit in balance of payment indicates over valuation of the currency concerned and the dis-equilibrium created can be remedied through devaluation.

### 2. Political and Psychological Factors

Political and psychological factors are believed to have an influence on exchange rates. Many currencies have a tradition of behaving in a particular way for e.g. Swiss franc as a refuge currency. The US Dollar is also considered a safer haven currency whenever there is a political crisis anywhere in the world.

### 3. Technical Factors

The various technical factors that affect exchange rates can be mentioned as under:

- (a) **Capital Movement:** The phenomenon of capital movement affecting the exchange rate has a very recent origin. Huge surpluses of petroleum exporting countries due to sudden spurt in the oil prices could not be utilised by these countries for home consumption entirely and needed to be invested elsewhere productively. Movement of these petro dollars, started affecting the exchange rates of various currencies. Capital tended to move from lower yielding to higher yielding currencies and as a result the exchange rates moved.
- (b) **Relative Inflation Rates:** It was generally believed until recently that one *prima-facie* direction for exchange rates to move was in the direction adjusted to compensate the relative inflation rates. For instance, if a currency is already overvalued, i.e., stronger than what is warranted by relative inflation rates, depreciation sufficient enough to correct that position can be expected and vice versa. It is necessary to note that exchange rate is a relative price and hence the market weighs all the relevant factors in a relative term, (in relation to the counterpart countries). The underlying reasoning behind this conviction was that a relatively high rate of inflation reduces a country's competitiveness in international markets and weakens its ability to sell in foreign markets. This will weaken the expected demand for foreign currency (increase in supply of domestic currency and decrease in supply of foreign currency). But during 1981-85 period exchange rates of major currencies did not confirm the direction of relative inflation rates. The rise of the dollar persistently for such a long period discredited this principle.
- (c) **Exchange rate policy and intervention:** Exchange rates are also influenced in no small measure by expectation of changes in regulation relating to exchange markets and official intervention. Official intervention can smoothen an otherwise disorderly market but it is also the experience that if the authorities attempt half-heartedly to counter the market sentiments through intervention in the market, ultimately more steep and sudden exchange rate swings can occur. In the second quarter of 1985 the movement of exchange rates of major currencies reflected the change in the US policy in favour of co-ordinated exchange market intervention as a measure to bring down the value of the dollar.
- (d) **Interest rates:** An important factor for movements in exchange rates in recent years has been difference in interest rates; i.e. interest differential between major countries. In this respect the growing integration of the financial markets of major countries, the revolution in telecommunication facilities, the growth of specialized asset managing agencies, the deregulation of financial markets by major countries, the emergence of foreign exchange trading etc. having accelerated the potential for exchange rates volatility.

#### 4. Speculation

Speculation or the anticipation of the market participants many a times is the prime reason for exchange rate movements. The total foreign exchange turnover worldwide is many a times the actual goods and services related turnover indicating the grip of speculators over the market. Those speculators anticipate the events even before the actual data is out and position themselves accordingly to take advantage when the actual data confirms the anticipations. The initial positioning and final

profit taking make exchange rates volatile. These speculators many a times concentrate only on one factor affecting the exchange rate and as a result the market psychology tends to concentrate only on that factor neglecting all other factors that have equal bearing on the exchange rate movement. Under these circumstances even when all other factors may indicate negative impact on the exchange rate of the currency if the one factor that the market is concentrating comes out positive the currency strengthens.

#### 5. Others

The turnover of the market is not entirely trade related and hence the funds placed at the disposal of foreign exchange dealers by various banks, the amounts which the dealers can raise in various ways, banks' attitude towards keeping open position during the course of a day, at the end of the day, on the eve of weekends and holidays, window dressing operations as at the end of the half year or year, end of the month considerations to

cover operations for the returns that the banks have to submit the central monetary authorities etc. — all affect the exchange rate movement of the currencies.

### Exchange Rate Quotes:

The rate of exchange for a currency is known from the quotation in the foreign exchange market. The banks operating at a financial centre, and dealing in foreign exchange, constitute the foreign exchange market. As in any commodity or stock market, the rates in the foreign exchange market are determined by the interaction of the forces of demand for and supply of the commodity dealt in, viz., foreign exchange. Since the demand and supply are affected by a number of factors, both fundamental and transitory, the rates keep on changing frequently, and violently too.

When asked to give a quote the trader generally quotes two prices.

The trader may give a quotation

$$\text{₹ / \$ : 34.85/34.92}$$

This is the price of one dollar in terms of rupees.

The number on the left side of the hyphen or slash (34.85) is the trader's bid rate i.e., the number of Indian rupees a trader or the bank is willing to pay to sell an American dollar. The number on the right side of the hyphen (34.92) is the trader's ask rate (also called the offer rate) i.e., the amount of rupees the trader or bank will require to buy an American dollar.

The difference between the bid and the ask rate is known as the bid-ask spread. In the quote given above the bid-ask spread is 0.07 (34.92-34.85). This is the market maker's compensation for the costs incurred and the normal profit on capital invested in the dealing function.

The ask-bid spread depends upon the breadth and depth of the market for that currency and the volatility of the currency. In case, when there is a large volume of transactions and the trading is continuous in any currency, the spread is small and may range between 0.1% to 0.5%. The spread is much higher for infrequently traded currencies. This spread compensates the dealer for holding the risky foreign currency and for providing the service of converting currencies. The bid spread is usually stated as a percentage cost of transacting in the foreign exchange market and may be computed as follows:

$$\% \text{ Spread} = \frac{\text{Ask Price} - \text{Bid Price}}{\text{Ask Price}} \times 100$$

For example, if the ask price of \$/£ is \$1.6646 and the bid price is \$1.6629, then the % spread may be ascertain as follows :

$$\begin{aligned} \% \text{ Spread} &= \frac{1.6646 - 1.6629}{1.6646} \times 100 \\ &= 0.1\% \end{aligned}$$

The two ways in which exchange rates are quoted are:

**Direct Quotes** : Direct quotes of a country are those that give units of currency of that country per unit of foreign currency.

In the quotation given above, ₹ 34.85/\$ is a direct for India.

**Indirect Quotes** : Indirect quotes are the number of units of a foreign currency per unit of home currency. If the quotation given above is reversed to \$/₹ it will become an indirect quote for India.

$$\text{So, Indirect Quote} = \frac{1}{\text{Direct Quote}}$$

There are two major ways of offering exchange rate quotes. These are called the direct quote and indirect quote.

### Cross Rates

If X, Y and Z are three different currencies and quotes are given in terms of:

X/Y

Z/Y

Then the computation of X/Z is given by:

X/Y

Z/Y

Thus attaining

X/Z

Thus the X/Z rate derived from the Y/X and Y/Z is called the **Cross rate**.

### Problem :

Consider the following quotes:

\$/SFr : 0.7935

C\$/SFr : 1.0866

Compute the quote for \$/C\$.

### Solution:

Since SFr = \$0.7935 and FFr = C\$ 1.0866

Then \$0.7935 = C\$ 1.0866

Finally \$/C\$ =  $\frac{0.7935}{1.0866} = 0.7303$

In international transactions, both the direct quote and indirect quote are used. For example, if the direct quote of Euro in U.S. is Euro/\$ = Euro 1.037 and American importer has to pay Euro 1,000 to a German Firm, then how many \$ will be required by the American importer ? In this, case, the quote for \$/Euro may be obtained as the inverse of Euro/\$ i.e.,  $1/1.037 = 0.9643$ . So, he will require  $\$0.9643 \times 1,000 = \$964.32$  to pay for the German firm.

In an ordinary foreign exchange transaction, no fees are charged. The bid-ask spread itself is the transaction cost. Also, unlike the money or capital markets, where different rates of interest are charged to different borrowers depending on their creditworthiness, in the wholesale foreign exchange market no much distinction is made. Default risk – the possibility that the counter party in a transaction may not deliver on its side of the deal is handled by prescribing limits on the size of positions a trader can take with different corporate customers.

## Determination of Exchange Rates

There is no generally accepted theory or model to determine exchange rates. However, there are certain approaches which provide a general frame-work for analysis of exchange rates which are discussed below:

- (a) **Balance of payments:** If payments by a country for its imports of goods and services and invisibles are out of step with its receipts for exports of goods and services and invisible, two possibilities arise. One, foreign currency payments exceed receipts and there is a deficit. This puts the home currency of the country under downward pressure against foreign currencies. Two, there is a surplus and there is an

upward pressure on the home currency. In the former case, the home currency tends to depreciate, and in the latter to appreciate, against foreign currencies.

- (b) **Demand and supply:** The demand for a foreign currency to pay for imports, etc. and the supply of a foreign currency by way of receipts on account of exports, etc. vary at various rates of exchange. The rate which equilibrates the demand and supply should be the rate of exchange. Imagine a New York City firm exports its products to a German company. The business transaction will be settled in dollars so the American firm obtains revenue in its own currency and can pay its employees' salaries in dollars.

To facilitate the transaction, the German firm needs to convert some of its capital from euros to dollars on the foreign exchange market. The supply of euros increases leading to an appreciation of the dollar and depreciation of the euro. It can also be said that the German firm increases the demand for dollars, again causing the dollar to appreciate in comparison to the euro. This transaction would have to be for a very large contract in order for the exchange rate to actually move a pip up or down.

- (c) **Purchasing power parity:** This theory maintains that free international trade equalises prices of tradable goods in different countries. So, a product will sell for the same price in common currency in all countries. Different rates of changes in prices i.e. different inflation rates must eventually induce off-setting changes in exchange rates in order to restore approximate price equality. Mathematically, the rate (or the expected rate) of change of the exchange rate should equal the rate (or the expected rate) of change of the inflation rate. Evidence shows that there do exist disparities between changes in observed exchange rates and those in inflation rates in the short-run. But, the theory should hold in the long-run.
- (d) **Interest rate:** Interest rates are often highly related with inflation rates, and interest rate differentials between countries may be the result of inflation rate differentials. Therefore, interest rate differentials are also used as an important determinant of exchange rates.

Interest rates in a country are determined, under free market conditions, by supply of and demand for money. Funds flow across countries in search of opportunities for higher returns. These flows between any two countries cause opposite changes in demand of and supply for their respective currencies. According to the theory of International Fisher Effect, the exchange rate of a currency with higher interest rate will depreciate to offset the interest rate advantage achieved by foreign investments till an equilibrium is achieved.

- (e) **Relative income levels:** If income level in a country rises and that in her trading partner remains unchanged, the demand by the former for the goods of the latter may increase. That is, the former would need more units of currency of the latter, while their supply remains unchanged. This would put upward pressure on the exchange rate of the latter. There can be different configurations of the relative income levels and of corresponding exchange rates.
- (f) **Market expectations:** Like other financial markets, foreign exchange markets react to any news that may have an effect on exchange rates in future. Expected developments regarding polity, economy etc. of a country is used to figure out how exchange rates would move. These peeps into the future impinge on the present as well as the future spot rates.

## FOREX TRADING; CURRENCY FUTURES AND OPTIONS

### Currency Derivatives Trading

A Currency market is a market in which one Currency is traded for another. The Spot exchange rate refers to the prevailing exchange rate at which a Currency can be bought or sold for another. The Forward exchange rate refers to the exchange rate for the future delivery of the underlying Currencies.

A Currency Futures contract, traded on Exchanges, is a standardised version of a Forward contract. The only

difference between a Forward contract and the Futures contract is that the Forward contract is an over-the-counter (OTC) product. The main advantages of Currency Futures over Forwards are price transparency, elimination of counter-party credit risk and greater accessibility for all.

The Futures contract is an agreement to buy or sell the underlying Currency, on a specified date in the future, and at a specified price. The underlying asset for a Currency Futures contract is a Currency. The Exchange's clearing house acts as a central counter-party for all trades and thus provides a performance guarantee.

Currency Futures can be bought and sold on the Currency Exchanges through members of the Exchange. MCX-SX, NSE and USE all offer Currency Futures in India. Before trading, the investor/trader/speculator needs to open a trading account and deposit the stipulated cash and/or collaterals with the trading member. The average daily turnover in global Forex and related markets is trillions of US Dollars

### **Participates in the Currency Futures market**

Any Indian resident or company, including banks and financial institutions, can participate in the Currency Futures market. At present, Foreign Institutional Investors (FIIs) and Non-Resident Indians (NRIs) are not permitted to participate in the Currency Futures market in India. Participants in the Currency Derivatives segment can be classified in three broad categories:

#### ***(A) Hedgers***

Foreign Currency markets have been volatile in recent times due to various geo-political uncertainties. In order to ensure that profits for any business are not depleted due to fluctuations in the Currency exchange rate, hedging Currency risk can be an excellent tool.

Large corporates, small and medium enterprises (SMEs) and individual businessmen, apart from the general investing public, are increasingly exposed to the global markets. Hence, protecting against Forex risk is becoming more significant.

#### ***(B) View-based traders***

Currency Futures provide view-based traders with an efficient platform to observe the movements of the local Currency (INR) against other Currencies. These traders can trade based on various technical indicators, fundamental factors, economic and policy-based news and developments on the global stage.

#### ***(C) Arbitraders***

Currency Futures provide an opportunity for arbitrage trading by taking advantage of price differences between similar products and/or markets by choosing a combination of matching deals and capitalising on the imbalance without any additional market risk.

### **How do Exchange Traded Currency Futures enable hedging against Currency risk?**

On a Currency exchange platform you can buy or sell Currency Futures. If you are an importer, you can buy Futures to 'lock in' a price for your purchases at a future date. You thus avoid exchange rate risk. If you are an exporter, you sell Currency Futures on an exchange platform and 'lock in' a sale price at a future date.

### **How Does Currency Derivatives Trading Work?**

- Presently, all Futures contracts on Exchanges are settled in cash. There are no physical contracts.
- All trades on Currency Exchanges take place on their respective nationwide electronic trading platforms. These can be accessed from dedicated member terminals at various locations across India.
- All participants on the Currency Exchange trading platform can participate only through trading members of the Exchange.
  - Participants have to open a trading account and deposit stipulated cash and/or collaterals with the trading member.



- Exchanges stand in as the counter-party for each transaction. Therefore, participants do not need to worry about defaults.
  - In the event of a default, Exchanges will step in and fulfil the obligations of the defaulting party, and then proceed to recover dues and penalties from them.
- Those who enter the market either by buying (long) or selling (short) a Futures contract can close their contract obligations by squaring-off their positions at any time during the life of that contract by taking an opposite position in the same contract.
  - Participants have to open a trading account and deposit stipulated cash and/or collaterals with the trading member.
  - A long (buy) position holder has to short (sell) the contract to square-off their position and vice versa.
  - Participants will be relieved of their contract obligations to the extent they square-off their positions.
- All contracts that remain open at expiry are settled in INR in cash at the reference rate specified by the Reserve Bank of India.

## FOREIGN EXCHANGE CURRENCY OPTIONS

Foreign exchange (FX) options are contracts that give the buyer the right, but not the obligation, to buy or sell one currency against the other, at a predetermined price and on or before a predetermined date.

The buyer of a call (put) FX option has the right to buy (sell) a currency against another at a specified rate. If this right can only be exercised on a specific date, the option is said to be European, whereas if the option can be exercised on any date till a specific date, the option is said to be American. Currently only USD INR options are permitted for trading in India and the clients can trade currency options through NSE and USE.

### Exchange traded currency options

Exchange traded currency options are standardized products with pre-defined maturities. They are easily accessible with OTC derivatives contracts. Now individuals and corporate can reap benefit out of the currency options. Options are like insurance contracts, they protect you from the downside at the same time allowing you to reap the benefits of any upside. Rupee options would introduce greater flexibility in risk management of corporate and cost control.

### Advantages of Currency Options

Hedge for currency exposures to protect the downside while retaining the upside, by paying a premium upfront. This would be a big advantage for importers, exporters (of both goods and services) as well as businesses with exposures to international prices. Currency options would enable Indian industry and businesses to compete better in international markets by hedging currency risk.

Non-linear payoff of the product enables its use as hedge for various special cases and possible exposures e.g. If an Indian company is bidding for an international assignment where the bid quote would be in dollars but the costs would be in rupees, then the company runs a risk till the contract is awarded. Using forwards or currency swaps would create the reverse positions if the company is not allotted the contract, but the use of an option contract in this case would freeze the liability only to the option premium paid up front.

The nature of the instrument again makes its use possible as a hedge against uncertainty of the cash flows. Option structures can be used to hedge the volatility along with the non-linear nature of payoffs.

Attract further forex investment due to the availability of another mechanism for hedging Forex risk.



### Features of currency option contracts

Standardized exchange traded currency options have the following features:

- The underlying for the currency option shall be US Dollar – Indian Rupee (USD-INR) spot rate.
- The options shall be premium styled European call and put options.
- The size of each contract shall be USD 1000. The premium shall be quoted in Rupee terms. The outstanding position shall be in USD
- The maturity of the contracts shall not exceed twelve months.
- The contracts shall be settled in cash in Indian Rupees.
- The settlement price shall be the Reserve Bank's Reference Rate on the date of expiry of the contracts.

### Factors influencing Currency Options Prices

Parameter	Call Premium	Put Premium
<b>Exchange Rate</b>	As exchange rate increases call premium also increases	As exchange rate increases put premium decreases.
<b>Strike Price</b>	As strike rate increases call premium decreases	As strike rate increases put premium also increases
<b>Risk Free Interest Rate</b>	As the interest rate in the economy increases, value of call option increases	As the interest rate in the economy increases, value of Put option decreases
<b>Time to maturity</b>	Call & Put options become more valuable as time to maturity increases, it is because of Risk as the time increases.	
<b>Volatility</b>	As volatility increases there is high degree of uncertainty about the rate of the currency and hence on the option. The owner of the call benefits from the rate increase and that of the put benefits from the rate decreases.	

### Options Strategy for Traders

A trader having a “Long” directions view on the Currency can buy a Call option or Sell a Put Option. Similarly a trader having a “Short” directional view on the Currency can Sell a Call Option or Buy a Put option. In case where Call or Put Option is being bought, the downside risk is limited only upto the amount of Premium paid, the upside is unlimited in this case. In case where Call or Put option is being sold, the Downside risk is unlimited and Upside potential is capped upto the Premium amount.

### FOREIGN EXCHANGE RISK EXPOSURES AND THEIR MANAGEMENT

Foreign Exchange Exposure is the sensitivity of the real domestic currency value of assets, liabilities, or operating incomes to unanticipated changes in exchange rates. Foreign Exchange Risk is measured by the variance of the domestic - currency value of assets, liabilities, or operating income that is attributable to unanticipated changes in exchange rates

There are three important Facts about foreign exchange risk exposure:

1. Changes in the nominal exchange rate are not offset by corresponding changes in prices at home and abroad: there is real exchange rate risk

2. Neither the forward rate is successful in forecasting the exchange rate nor are other fundamental variables
3. Given the various market imperfections in the real world, hedging exchange rate risk can lead to an increase in the value of the firm

### Exposure of Foreign Exchange Risk

There are three types of Foreign Exchange Risk Exposure:

- Translation or Accounting Exposure
- Transaction or Contractual Exposure
- Operating or Economic Exposure

### Transaction Exposure

A transaction exposure occurs when a value of a future transaction, through known with certainty, is denominated in some currency other than the domestic currency. In such cases, the monetary value is fixed in terms of foreign currency at the time of agreement which is completed at a later date.

For example, an Indian exporter is to receive payment in Euros in 90 days time for an export made today. His receipt in Euros is fixed and certain but as far as the Re. value is concerned, it is uncertain and will depend upon the exchange rate prevailing at the time of receipt. All fixed money value transactions such as receivables, payables, fixed price sale and purchase contracts etc. are subject to transaction exposure. The transaction exposure looks at the effects of fluctuations in exchange rates on the transactions that have already been entered into and have been denominated in foreign currency.

Transaction exposure refers to the potential change in the value of a foreign currency denominated transaction due to changes in the exchange rate. Credit purchases and sales as well as borrowing and lending denominated in foreign currencies, and uncovered forward contracts are some examples of transaction exposure.

Transaction exposure basically covers the following:

- (a) *Rate Risk*: this will occur
  - (i) When there is mismatch of maturities and borrowings:
  - (ii) In foreign exchange, it results in net exchange positions (long or short).
- (b) *Credit Risk*: A situation when the borrower is not in a position to pay.
- (c) *Liquidity Risk*: Same as in the case of credit risk.

To illustrate, suppose an Indian company, XX India Ltd., contract with a US company, YY US Inc., to sell 1000 sets of machines for delivery one year from now. XX India Ltd. wants to realize ₹ 2000 million from this sale. The US company has indicated that it will enter into the contract if the price is stated in US\$. The one-year forward rate is ₹ 49/\$1. Hence XX India Ltd. quotes a price of \$41 million. The Indian company faces transaction exposure. If, for example, the value of rupee increases to ₹ 47/\$1, the Indian company would receive ₹ 1,927 million (\$41 million × ₹ 47) rather than ₹ 2000 million which it was expecting. Foreign currency depreciation will result in exchange loss if the exposed receipts are greater than the payments. Foreign currency appreciation, on the other hand, will cause exchange loss if exposed receipts are smaller than exposed payments. The company may hedge its position or take some other action to guarantee its future rupee proceeds from sale. The company may, otherwise lose on the transaction if the value of the dollar weakens. The concept of hedging can be understood with the help of following problem.

**Problem :** Ankush Ltd. has a plan to raise an amount of ₹ 50 crore for a period of 3 months, 6 months from now. The current rate of interest is 9% but it may rise in 6 months time. The company wants to hedge itself against the

increase in interest rate. Bank of India has quoted a forward rate agreement (FRA) at 9.1% per annum. Find out the effect of FRA and actual interest cost to Ankush Ltd., if the actual rate after 6 months happens to be 9.5% or 8.5%.

**Solution: If actual rate is 9.5%.**

In this case, the bank, shall pay a differential of 0.4% (9.5%-9.1%). The cash flow is—

Cash Flow = 50 Crores x 0.4% x 0.25 = ₹ 5,00,000

This amount is paid up front to Ankush Ltd., which can invest it @9.5% for 3 months period at 6 months from now. Total accumulation is—

Total amount = ₹ 5,00,000 x (1.095/4) = ₹ 5,11,875

At the end of the borrowing period Ankush Ltd. will pay interest @9.5% on ₹ 50 Crores

Interest = ₹ 50 Crores x 0.095 x .25 = ₹ 1,18,75,000

Net Cost to XYZ = ₹ 1,18,75,000 – ₹ 5,11,875 = ₹ 1,13,63,125

This is 9.1% of the total borrowing for a period of 3 months. So, by entering into Forward Rate Agreement (FRA), Ankush Ltd. has restricted its cost at 9.1% p.a.

**If actual rate is 8.5%**

If the rate is 8.5%. Ankush Ltd. will be required to pay up front 0.6% to the bank i.e. the amount of ₹ 7,50,000. On the due date, interest on ₹ 50 Crores is payable @8.5% i.e. ₹ 1,06,25,000. The total cost to Ankush Ltd. is ₹ 1,13,75,000 which is 9.1% of total funds.

It may be noted that the amount of ₹ 7,50,000 is to be borrowed at 8.5% p.a. for a period of 3 months. This will be paid to the bank. The borrowing of ₹ 7,50,000 will be repaid as ₹ 7,65,938 after 3 months inclusive of interest.

**Problem :** Silver Oak Ltd., an Indian company, is mainly engaged in international trade with US and UK. It is currently 1st January. It will have to make a payment of \$7,29,794 in the coming six months time. The company is presently considering the various alternatives in order to hedge its transactional exposure through its London office. The following information is available :

**Exchange Rates :**

\$/£ Spot rate : 1.5617 - 1.5773

6-month \$ forward rate : 1.5455 - 1.5609

**Money Market Rates:**

	Borrow (%)	Deposit (%)
US Dollar (\$)	6	4.5
Sterling (£)	7	5.5

**Foreign currency option prices** (Cents per £ for contract size £12,500) :

Exercise Price	Call Option (June)	Put Option (June)
\$1.70/£	3.7	9.6

Suggest which of the following hedging option is the most suitable for Silver Oak Ltd. :

- (i) Forward exchange contract

- (ii) Money market
- (iii) Currency option

**Solution:**

(i) Using Forward Exchange Contract

$$\text{\$ } 729794 / 1.5455 = \text{\pounds } 472206$$

(ii) Using Money Market

Silver Oak Ltd. must make a deposit now

Six months dollar deposit rate :  $4.5/2 = 2.25\%$

$$Z \times 1.0225 = \text{\$ } 729794$$

$$Z = \text{\$ } 729794 / 1.0225$$

$$= \text{\$ } 7,13,735$$

Hence amount required to be deposited @ 4.5% = \$ 713735

Cost of buying \$ 713735 at current spot rate is  $713735 / 1.5617 = \text{\pounds } 457024$

Six months sterling borrowing rate =  $7/2 = 3.5\%$

Interest for six months on £ 457024 =  $(\text{\pounds } 457024 \times 0.035) = \text{\pounds } 15996$

Total Cost = £ 457024 + £ 15996 = **£ 473020**

(iii) Using Currency option

Each contract will deliver =  $1.7 \times 12500 = \text{\$ } 21250$

No. of put option contract required =  $729794 / 21250 = 34.34$  or 34

Cost of total contracts =  $0.096 \times 12500 \times 34 = \text{\$ } 40800$

Sterling cost of option =  $40800 / 1.5617 = \text{\pounds } 26,125$

Sterling required =  $34 \times \text{\pounds } 12500 = \text{\pounds } 425000$  to buy \$ 722500 @ \$ 1.70

Shortfall =  $729794 - 722500 = 7294$

Cost of sterling using forward rate =  $7294 / 1.5455 = 4720 \text{ £}$

Total cost using option =  $26125 + 425000 + 4720 = \text{\pounds } 455845$

Therefore currency options are the cheapest mode of hedging transaction exposure.

### Translation Exposure

This is also called the accounting exposure. It refers to and deals with the probability that the firm may suffer a decrease in assets value due to devaluation of a foreign currency even if no foreign exchange transaction has occurred during the year. This exposure needs to be measured so that the financial statements i.e the balance sheet and the income statement reflect the change in value of assets and liabilities. It may be noted that the assets and liabilities are considered exposed to foreign exchange risk if their values are to be translated into parent company currency using the exchange rate effective on the balance sheet date. Other assets and liabilities and the capital that are translated at the historical exchange rates i.e., the rate in effect when these items were first recognized in the balance sheet, are not considered to be exposed.

The translation exposure occurs when the firm's foreign balances are expressed in terms of the domestic

currency. Changes in exchange rates can therefore, alter the values of assets, liabilities, expenses and profits of foreign subsidiaries. Two related decision areas are involved in translation exposure management:

- (i) Managing balance sheet items to minimize the net exposure,
- (ii) Deciding how to hedge against this exposure

Financial managers should attempt to keep a rough balance between exposed assets and liabilities. Such a balance would bring about offsetting changes in values when the balance sheet of a foreign subsidiary is translated. If the value of the currency declines relative to the currency of the home country, then the translated value will be lower and simultaneously the translated liabilities would also be lower. An asset denominated in terms of foreign currency will lose value if that foreign currency declines in value. A firm would normally be interested in its net exposed position for each period in each currency. Although, expected changes in exchange rates can often be included in the cost benefit analysis relating to such transactions, still there is an unexpected component in exchange rate changes.

This exposure is particularly relevant for the companies which have subsidiaries in other countries. These companies have to translate the financial statements of their subsidiaries that are prepared in a foreign currency into the currency of the home country to prepare the consolidated statements. Foreign currency depreciation results in exchange losses if the exposed assets are greater than exposed liabilities. Foreign currency appreciation, on the other hand, will produce exchange gains.

The calculation of translation gains and losses is an exercise on paper only. These gains and losses do not involve any actual cash flow. Some companies, however, are concerned about this risk because it affects their cost of capital, earnings per share, and the stock price, besides the ability to raise capital in the market.

To illustrate the translation risk, assume that XYZ (India) Ltd., has a wholly owned subsidiary, YZ Inc. in USA. The exposed assets of the subsidiary are \$200 million and its exposed liabilities are \$100 million. The exchange rate changes from \$0.020 per rupee to \$0.021 per rupee. The potential foreign exchange gain or loss to the company will be calculated as follows:

In this case, the net exposure is

Exposed assets	=	\$200 million
Exposed liabilities	=	<u>\$100 million</u>
Net exposure	=	<u>\$100 million</u>
Pre-devaluation rate (\$0.020 = ₹ 1) \$100 million	=	₹ 2.400 million
Post-devaluation rate (\$0.021 = ₹ 1) \$100 million	=	<u>₹ 2.500 million</u>
	=	<u>₹ 0.100 million</u>

If the post-devaluation rate is less than the pre-devaluation rate (\$0.20 = Re. 1), the net result will be potential exchange loss. In this case, an unrealized translation loss of ₹ 0.100 million would have been incurred. In the example given above, the transactions are fairly straightforward. But, when different types of assets and liabilities are involved, conceptual problems emerge about the true home-currency value of these items. Four different methods are used to translate assets and liabilities of the subsidiary into the currency of the parent company, namely, current/ non-current method, monetary/non-monetary method, temporal method, and current-rate method.

### Economic Exposure

The economic exposure refers to the probability that the change in foreign exchange rate will affect the value of the firm. Since the intrinsic value of the firm is equal to the sum of the present values of future cash flows discounted at an appropriate rate of return, the risk contained in economic exposure requires a determination of the effect of changes in exchange rates on each of the expected future cash flows. The firm's economic exposure may be

greater or lesser than its translation exposure since the present value of future cash flows can neither be increased nor decreased by a revaluation of the currency. The measurement of economic exposure requires that a detailed analysis of the effects of exchange rates changes on each of the future cash flows should be made.

Economic, operating, competitive, or revenue exposure refers to the immediate and potential effect of change in the exchange rate on the net present value (NPV) of expected future cash flows generated by the affiliates. The favourable factors in a country like stability, low rates of taxation, easy availability of funds, and favourable balance of payment may change over time because of variations in the economic condition of a country. The local currency may also be devalued or depreciated as a result of changes in the economic forces. The inflationary forces, supply of funds, and price controls may also be affected as a result of change in exchange rates. In fact, the economic exposure encompasses all facets of a company's operations including the effects of exchange rate changes on customers, suppliers, and competitors. The economic exposure is more subjective, difficult to measure, and broader in nature than the translation and the transaction exposures. In fact, the translation and the transaction losses are one-time events, whereas the economic loss is a continuous one. For example, assume that the Danish subsidiary of an Indian company is likely to earn 100 million Kroner each year. The annual depreciation charges are estimated at 10 million Kroner. The exchange rate between the countries is likely to change from ₹ 9.60 per Danish Kroner to ₹ 8.00 per Kroner in the next year. The change in the exchange rate will have the following effect on the cash flows of the parent company:

Profit after taxes	100 million Kroner
Depreciation	10 million Kroner
Cash flow from operations	110 million Kroner
Old rate (₹ 9.60 per Danish Kroner)	
(110 million Kroner x ₹ 9.60)	₹ 1056 million
New rate (₹ 8.00 per Danish Kroner)	
(110 million Kroner x ₹ 8.00)	₹ 880 million
Exchange loss	₹ 176 million

Thus, the Indian company loses ₹ 176 million in cash flows over the next one year. If the anticipated business activity would be same for the next five years, the next cash flows would decrease by ₹ 880 million.

The actual impact of economic exposure on the value of the company depends on the distribution of sales between the domestic and export markets, elasticity of demand for the product in each market, and the cost structure of the affiliate.

The major differences among the exposures are given below:

#### Differences among Translation, Transaction and Economic Exposures

Bases	Economic Exposure	Transaction Exposure	Translation Exposure
Duration	Life of the project	Duration of the contract	At a point of time (conversion)
Gains/Losses	Actual, total value difficult to compute	Actual, total value relatively less difficult to calculate	Paper exercise only easy to work out
Contract	General in nature	Specific in nature	Specific in nature
Measurement in actual spot rates	Value depends on variation	Value depends on changes in actual spot rates	Value depends on accounting guidelines

Hedging	Difficult because difficult to predict	Relatively easy	Easy
Value	Market value of assets	Contract value of assets and liabilities	Book value of assets and liabilities
Extent of exposure	Guided by the product and factor markets	Determined by the nature	Depends on the accounting rules
Management of exposure	All departments	Treasury department	Treasury department

Thus, the translation exposure is historic in nature. It is basically static. It does not consider the likely change in an exchange rate. Moreover, no cash flow is involved in this exposure. The transaction and economic exposures, on the other hand, consider the impact of an exchange rate change in future.

It may be noted that the firms are exposed to exchange rate changes at every stage in the process of capital budgeting, from developing new products to entering into contracts to sell these products in foreign market. For example, a weakening of the Re. will increase the competition among firms that depend upon the export markets, while hurting those firms that need import as inputs in their production process.

The transaction exposure can result in exchange rate related losses and gains that are already realized and have an impact on the reported income. However, the translation exposure results in exchange rate losses and gains that are reflected in the firm's accounting record and are not realized and hence have no impact on the taxable income. Thus, if the financial market are efficient and the managerial goal is consistent with the wealth maximization, then the firm should not have to waste efforts and real resources hedging against the book value losses caused by translation exposure. However, if the financial market is not efficient, then the firm should find it economical and go for hedge against expected translation exposure. But it is useful for a firm to manage its transaction and economic exposures because they affect the value of the firm directly.

### GENERAL PROTECTION MEASURES FOR FOREIGN EXCHANGE RISK EXPOSURE MANAGEMENT

The general protection measures are those measures which are implemented on an ongoing basis as a part of a firm's normal operations. The assumption here is that in a multinational setting, the subsidiaries are wholly-owned. If there are shareholders in the host countries of the subsidiaries, these measures could at times conflict with their interests.

**(a) Invoicing Policies:** if a firm has subsidiaries abroad, there may be transaction among them or between a subsidiary and the parent firm. Or, the parent and the subsidiaries may have transactions in foreign currencies with third parties. The foreign exchange effect on intra-firm payments on a consolidated basis does not depend upon the currency denomination of the invoice. For, a payable in the books of an importing subsidiary is off-set by an exactly equal amount of a receivable in the same currency in the books of the exporting subsidiary. It is immaterial from the parent's point of view whether the invoice is in the currency of the exporting subsidiary or that of the importing subsidiary. Even if the invoice is in a third currency, The foreign exchange risk will be shared by the exporting and importing subsidiaries concerned. When the consolidated position of the firm is not affected, regard should be had of external factors such as tax structure and exchange controls in the countries of the firm and its subsidiaries, and invoicing decisions should be based on the what is advantageous to the firm as a whole. The objective should be to obtain maximum credits upon exchange losses or to minimise tax liabilities on exchange gains. Invoices to third parties abroad should be denominated in the relatively stronger currency. On the other hand, while importing goods etc. from third parties a firm should try to negotiate payments in the weaker currency. Respective bargaining strengths and the need for good customer relations have a bearing on the invoicing decision.

In India, exchange control does not place restrictions on the choice of a currency for invoicing international transactions, It could be Indian rupee, SDR, ECU or any freely convertible currency, or further for certain specified

purposes, currencies of the A.C.U. parties undertaking such transactions may also keep in view the availability of forward cover in the currency chosen.

(b) **Transfer Pricing:** It is a mechanism by which profits are transferred through an adjustment of prices on intra-firm transactions. It can be applied to transactions between the parent firm and its subsidiaries or between strong currency and weak currency subsidiaries. Subject to the demands of competition, a parent may charge higher prices to its weak currency subsidiary, thereby increasing its own profit and reducing that of the subsidiary. The taxable income of the subsidiary comes down. Recovering higher level of operating charges from the subsidiaries also serves the same purpose. It is likely that audit profession, exchange controls and customs duties of the host country may supervene to negate this strategy. So, the mechanism may be applied moderately—gradually over a long period, without upsetting the environment in which the subsidiaries operate.

(c) **Leading and Lagging and extension of Trade Credit:** Leading implies speeding up collections on receivables if the foreign currency in which they are invoiced is expected to appreciate. Lagging implies delaying payments of payables invoiced in a foreign currency that is expected to depreciate. At the level of an individual transaction this is a specific protection measure; but at the corporate level this requires forecasting of currency movements, centralisation of information on transactions, and evolving guidelines for subsidiaries. Hence, it has been located here as a general protection measure.

Leading and lagging is primarily an intra-firm measure, because in third party trade there is a clear conflict of interest between buyer and seller. It involves both costs and benefits. There are three elements in this calculation: (i) cash cost/benefit represented by the interest rate differential between the lead and lag countries; (ii) an expected cash gain/loss to be realised on the altered transactional exposure in the said countries, and (iii) an expected translation gain/loss on the altered translation exposure. The corporate policy should take them into account and also consider effective tax rates in the two countries as also the currency of intra-firm invoicing.

Duration of a trade credit should be decided keeping in view much the same factors discussed above.

**Problem:** An Indian importer has to settle an import bill for \$1,30,000. The exporter has given the Indian exporter two options :

- (i) Pay immediately without any interest charges.
- (ii) Pay after three months with interest @ 5% per annum.

The importer's bank charges 15% per annum on overdrafts. The exchange rates in the market are as follows :

Spot rate (₹/\$) : 48.35/48.36  
 3-Month forward rate (₹/\$) : 48.81/48.83

The importer seeks your advice. Give your advice.

**Solution:**

**Option I: Pay immediately without any interest charges**

Bill value converted to Indian rupees (\$ 1,30,000 x ₹ 48.36) = ₹ 62,86,800

Interest on the borrowing from bank (o/d) @ 15% p.a.

For three months ₹ 62,86,800 x 15/100 x 3/12 = ₹ 2,35,755

Total : ₹ 65,22,555

**Option II: Pay after 3 months with interest @ 5% p.a.**

Bill value \$ 1,30,000

Interest @ 5% p.a. for 3 months = \$ 1,30,000 x 0.05 x 0.25 \$ 1,625

\$ 1,31,625



Forward ₹/\$ rate (\$ 1,31,625 × ₹ 48.83) =

₹ 64,27,249

***Difference in outflows in Option I and Option II***

= ₹ 65,22,555 – ₹ 64,27,249 = ₹ 95,306.

**Advice:** it is advisable to settle bill payable after three months since rupee outflow is less by ₹ 95,306.

(d) **Netting:** All transactions-gross receipts and payments among the parent firm and subsidiaries should be adjusted and only net amounts should be transferred. This technique is called netting. This again involves centralisation of data at the corporate level, selection of the time period at which netting is to be done, and choice of the currency in which netting is to be done. The currency could be the home currency of the firm. Netting reduces costs of remittance of funds, and increases control of intra-firm settlements. It also produces savings in the form of lower float (funds in the pipe-line) and lower exchange costs.

(e) **Matching:** It is a process whereby cash inflows in a foreign currency are matched with cash outflows in the same currency with regard, to as far as possible, amount and maturation. Hedging of exchange risk could be done for the unmatched portion. When there are cash inflows in one foreign currency and cash outflows in another foreign currency, the two could still be matched, provided they are positively correlated i.e. expected to move in tandem. There is the risk of exchange rates going off the expectations.

## EXCHANGE RATE FORECASTING

Participants in the international markets face problems, in making decisions which are based on future exchange rates. For example, future exchange rates may be required by the companies to hedge against potential losses, arranging short-and long-term funds, performing investment analysis, and to assess earnings of a foreign subsidiary. The quality of decision, in such cases, depends on the accuracy of exchange rate projections.

The percentage change between the current and the forecasted exchange rates may be calculated to find out appreciation or depreciation in the currency. A positive percentage change represents currency appreciation whereas a negative percentage change shows depreciation.

The exchange rates may be fixed or floating. Different methods are used to forecast fixed and floating exchange rates.

The floating exchange rates, are determined by the market forces of demand and supply. These are not influenced by the government intervention. Fixed exchange rates, on the other hand, are decided by the regulating agencies.

The floating exchange rates may be forecast with the help of various methods. Fundamental and technical analyses are commonly used for this purpose. Fundamental analysis studies the relationship between macro economic variables (such as inflation rates, national income growth, and changes in money supply) and exchange rates to forecast the latter. Technical analysis uses past prices and volume movements to project future currency exchange rates. The technical analysis may produce useful results if the past trend is repeated. The companies normally use technical analysis for short-term forecasts. But, they use fundamental analysis for long-term projections. The primary methods of technical analysis are charting and mechanical rules. The reliability of the forecasts may be found out on the basis of forecasting error which is calculated by root square error. The root square error is computed with the help of the following formula:

$$RSE = \frac{(FV - RV)^2}{RV}$$

Where RSE is the root square error as a percentage of realized value; FV is the forecasted value and RV is the realized value.

Fixed exchange rate forecasts are based on the study of government decision-making structure. Attempt is made to determine the pressure to devalue the currency of the nation and the ability of the government to sustain the disequilibrium.

Forecasting fixed exchange rates requires an assessment of balance-of-payments disequilibrium on the basis of key economic variables such as inflation, money supply, international reserves, gap between official and market rates, and the balance of foreign trade. The change in the exchange rate required to restore the balance of payment equilibrium is estimated with the help of forward exchange rates, free market rates and the purchasing power parity principle. The capacity of the country to resist or postpone the use of corrective measures is evaluated on the basis of the ability to borrow hard currencies and the availability of international reserves. Attempt is also made to project the policies which may be followed by the Government to correct the position of the nation.

Thus, exchange rates are forecasted to make various decisions by the companies which require foreign exchange. These forecasts are made separately for the fixed and floating exchange rates with the help of different methods. Percentage change between forecasted and current exchange rates may be calculated to find out appreciation or depreciation in the currency.

### RISK IN FOREIGN EXCHANGE BUSINESS

While the forex market may offer more excitement to the investor, the risks are also higher in comparison to trading equities. The ultra-high leverage of the forex market means that huge gains can quickly turn to damaging losses and can wipe out the majority of your account in a matter of minutes. This is important for all new traders to understand, because in the forex market - due to the large amount of money involved and the number of players - traders will react quickly to information released into the market, leading to sharp moves in the price of the currency pair.

Though currencies don't tend to move as sharply as equities on a percentage basis (where a company's stock can lose a large portion of its value in a matter of minutes after a bad announcement), it is the leverage in the spot market that creates the volatility. For example, if you are using 100:1 leverage on \$1,000 invested, you control \$100,000 in capital. If you put \$100,000 into a currency and the currency's price moves 1% against you, the value of the capital will have decreased to \$99,000 - a loss of \$1,000, or all of your invested capital, representing a 100% loss. In the equities market, most traders do not use leverage, therefore a 1% loss in the stock's value on a \$1,000 investment, would only mean a loss of \$10. Therefore, it is important to take into account the risks involved in the forex market before diving in.

### PEGGING OF CURRENCY

Pegging of currency refers to a method of stabilizing a country's currency by fixing its exchange rate to that of another country

Different countries follow different methods for pegging of their currencies. The foreign exchange value is established according to the practice being followed by a country. If the country follows a fixed rate of parity between its currency and a foreign currency, then the changes in parity value of that currency shall determine changes in the value of domestic currency *vis-a-vis* other foreign currencies. Thus, in that situation, performance of the domestic economy is not reflected in the valuation of its currency. This is one extreme side of absolute rigidity in fixation of exchange rate. The other extreme is allowing the exchange value of the national currency to float independently according to market forces without any intervention from the Central Bank. In between these two extremes, there are many intermediate arrangements for determination of exchange values. These arrangements are being listed below:

#### **(a) Domestic currency pegged to one foreign currency**

Under this arrangement, the exchange rate of one currency is pegged to a dominant foreign currency, usually the U.S. dollar. For example the Argentine Peso was till recently pegged to the US dollar in the ratio of 1:1.

#### **(b) A currency pegged to a basket of currencies**

The currency of a country may be pegged to a basket of currencies. The basket is generally formed by the

currencies of major trading parties to make the pegged currency more stable than if a single currency peg is used. Trade, services and major capital flows may be used as currency weights while calculating the basket. The Indian Rupee is linked to a basket of currencies.

**(c) Flexibility limited in terms of a single currency**

In this system, the value of the currency is maintained within certain margins of the peg. Some Middle Eastern countries follow this system and maintain their currency within a limit of the peg against the U.S. dollar.

**(d) Pegged to some indicators**

Under this arrangement, the currencies adjust more or less automatically to changes in the selected indicators. A common indicator is the real effective exchange rate (REER) that reflects inflation adjusted changes in the currency against major trading parties.

This category also includes cases where the exchange rate is adjusted according to a pre-announced schedule.

**(e) Managed Float**

Central Bank of a country decides the exchange rate in this system. The rates are revised from time to time depending on forex reserves, developments in parallel exchange markets, the real effective exchange rate etc.

**(f) Independent float**

In this system market forces determine the exchange rate. Most of the developed countries follow this system of exchange rate.

## SOME CASE STUDIES

**Question No 1:** Following are the quotes given by Banker at Mumbai.

	Direct / Indirect	Quote the Opposite Rate
1) 1\$ = ₹ 43.18		
2) 1£ = ₹ 78.68		
3) 1INR = Euro 0.0184		
4) 100 Indo Rupiah = ₹ 0.53		

Identify the quote as Direct or Indirect quote. Also compute the Direct for Indirect Quote and Vice – Versa.

**Solution:**

	Direct/Indirect	Opposite rate
1\$ = ₹ 43.18	Direct	1 INR = \$ 0.0232 [1/43.18]
1£ = ₹ 78.68	Direct	1 INR = £ 0.0127 [1/78.68]
1INR = Euro 0.0184	Indirect	1 Euro = ₹ 54.35 [1/0.0184]
100 Indo Rupiah = ₹ 0.53	Direct	1 INR = Indo Rupiah 188.69 [100/0.53]

**Question No. 2**

Direct Quote	Bid Rate	Offer Rate Spread	Spread %
a) INR/\$43.72 – 43.94			
b) INR/Euro 54.44 – 54.67			
c) INR/100¥ 0.3996-0.3999			

Find out Bid Rate and offer Rate. Also find out the spread. Express the spread in %

**Solution:**

Direct Quote	Bid	Offer	Spread	Spread as %
INR/\$ 43.72 – 43.94	43.72	43.94	0.22	$0.22/43.94 \times 100 = 0.50\%$
INR/Euro 54.44 – 54.67	54.44	54.67	0.23	$0.23/54.67 \times 100 = 0.42\%$
INR/100¥ 0.3996-0.3999	0.3996	0.3999	0.0003	$0.0003/0.3999 \times 100 = 0.075\%$

**Question No. 3**

Mr. X took a long position in dollar futures [bought futures] on 01.07.12 when the futures were trading at ₹ 42.35. He closed his position on 05.07.12 by making a future sell at ₹ 42.40. He bought 5 dollar futures contract. The size of each contract is \$1,25,000. The closing futures price during the period when his position was open is given below.

Date	Closing futures price
01.07.12	42.36
02.07.12	42.45
03.07.12	42.25
04.07.12	42.30
05.07.12	42.40

Show how Mr. X will take book profit or loss from futures market?

**Solution**

It seen that, the futures exchange daily closes the open buy position by selling futures at the day's closing price and reopens by buying on next day's opening price. The daily profit or loss is then credited to margin account.

Date	Buy price	Sell price	Profit or loss per \$	Amount credited or (debited) to margin a/c
01.07.12	42.35	42.36	0.01	$\$6,25,000 \times 0.01 = 6,250$
02.07.12	42.36	42.45	0.09	$\$6,25,000 \times 0.09 = 56,250$
03.07.12	42.45	42.25	(0.20)	$\$6,25,000 \times 0.20 = (1,25,000)$
04.07.12	42.25	42.30	0.05	$\$6,25,000 \times 0.05 = 31,250$
05.07.12	42.30	42.40	0.10	$\$6,25,000 \times 0.10 = 62,500$
<b>Net credit</b>	<b>0.05</b>	<b>31250</b>		

**Question No. 4**

On 1.1.2013, UBS, a French firm, purchased a machinery from a US firm for \$ 1,00,000 on 3 months credit. On the same day, the French firm entered into a 3 months forward contract with its bank for purchasing \$ 1,00,000. Later on the machinery was found sub-standard. After negotiation, it was decided that UBS will pay only \$70,000. On 31.3.2013, UBS book the delivery of \$ 70,000 from the bank and paid the same to the US firm. Calculate the net amount in Euro that UBS has to pay to its bank, using the following data:

**1.1.2013**

Spot 1 Euro = \$1.25/1.26

3 months forward swap margins 0.10 / 0.08 c

**31.3.2013**

Spot 1 Euro = \$1.26/1.27

**Solution**

1.1.2013 Spot 1 Euro = \$ 1.25/1.26

3 months forward rate 1 Euro = \$ 1.2490/1.2592

31.3.2013 Spot 1 Euro = \$ 1.26/1.27

**31, 3.2013:**

UBS has to purchase 1, 00,000\$ for 1,00,000/1.2490 i.e. 80,064 Euro It will pay 70,000\$ to US firm. It will sell remaining 30,000\$ to bank @ 1.27\$ per Euro (spot rate on 31.3.13).

Amount payable for 1, 00,000\$ : 80,064 Euro

Amount Receivable for 30,000\$ : 23,622 Euro

Net payable to bank : 56,442 Euro

**Question No. 5:** A US Co. exports a Radiotherapy machine to the Health Department of Government of Switzerland. The price is 1,00,000 CHF with terms of 30 days. The present spot rate is 1.72 CHF per dollar. The 30 days forward rate is 1.71. The US Co. enters into forward contract. How many dollars the US Co. receives after 30 days? Is the CHF at premium or at a discount?

**Solution**

The applicable rate: 1\$ = 1.71 CHF

To receive after 30 days = 1,00,000/1.71 i.e. 58,479.53\$

Today 1\$ = 1.72 CHF

Forward 1\$ = 1.71 CHF

(It means purchasing power of dollar, in terms of CHF, is decreasing. It means dollar is at discount), So, CHF is at premium.

**Question No. 6**

Sacrifice Ltd. is planning to import a multi-purpose machine from Japan at a cost of 3,400 lakhs Yen. The company can avail loans at 18% interest per annum with quarterly rests with which it can import the machine. However there is an offer from Tokyo branch of an India based bank extending credit of 180 days at 2% per annum against opening of an irrevocable letter of credit.

**Other information:**

Present exchange rate ₹ 100=340 yen

180 days forward rate ₹ 100=345 yen

Commission charges for letter of credit at 2% per 12 months. Advise whether the offer from the foreign branch should be accepted?

**Solution****Assumptions**

Credit from Tokyo Branch is available for 180 days. Considering this fact, we assume

- (a) Alert Ltd. requires credit for 180 days i.e. under both the alternatives, all the payments (Principal, Commission & Interest) will be made after 180 days.
- (b) 180 Days = 6 months = Two Quarters.

**Evaluation of Two alternatives**

- (A) To pay 3,400 Lakhs Yen, Alert Ltd. may borrow ₹ 1,000 Lakhs in Indian Market. From this amount, it may purchase 3,400 Lakhs Yen and pay for machine. (Now there is no foreign exchange risk). It may repay the loan (raised in Indian market) with interest after 180 days. Total payment (including interest) = ₹ 1,000 Lakhs (1.045) (1.045) = ₹ 1,092.025 Lakhs
- (B) Alert may borrow 3,400 Lakhs Yen from Tokyo Branch and pay for machine. It has to pay 34 Lakhs Yen as interest. (Rate of interest is 2% p.a.; For 180 days it is 1%. 1% of 3,400 Lakhs = 34 Lakhs). Alert has to pay 3,434 Lakhs Yen after 180 days. At that time 1 Yen can be purchased, on the basis of forward, for Re. 0.289855. (345 Yens = ₹ 100).

(Hence 1 Yen = 100 / 345 i.e. 0.289855). To purchase 3,434 Lakhs Yen, Alert has to pay 3,434 Lakhs x .289855 i.e. ₹ 995.362 Lakhs).

Under this alternative, there is one more cost i.e. cost of getting Letter of credit (LC).

Bank charges for issuing LC will be 1% (Commission is 2% per 12 months. For 180 days, it is 1%). The LC will be for 3,400 Lakhs Yen. Today 3,400 Lakhs Yen are equal to ₹ 1,000 Lakhs. Hence Commission = ₹ 1,000 Lakhs x 1 % i.e. ₹ 10 Lakhs. We assume that commission will be paid after 180 days and for this delay Bank will charge interest @ 18% p.a. with quarterly rests. Commission and interest on commission = ₹ 10 lakhs (1.045) (1.045) = ₹ 10.92 lakhs.

Total payment under Alternative I (After 180 days) = ₹ 1,092.025 Lakhs

Total payment under Alternative II (After 180 days) = (₹ 995.362 Lakhs + ₹ 10.92 Lakhs) = ₹ 1,006.282 Lakhs

**Recommendation**

Alternative II (Tokyo Branch Credit) may be preferred

**Question No. 7**

A customer with whom the Bank had entered into 2 months' forward purchase contract for Euro 5,000 @ ₹ 54.50 comes to bank after 1 months and requests for cancellation of the contract. On this date, the prevailing rates are:

Spot 1 Euro : ₹ 54.60 / 54.70

One month forward 1 Euro : ₹ 54.90 / 55.04

What is the loss or gain to customer on cancellation?

**Solution**

On the day the customer comes to the bank for cancellation, the bank will enter into a forward contract (same maturity date as that of the original) under which bank will sell 5,000 Euro @ ₹ 55.04.

On maturity, bank will sell 5,000 Euro to customer (@ ₹ 55.04) for ₹ 2,75,200 (under the new contract) and

purchase 5,000 Euro from the customer (@ ₹ 54.50) for ₹ 2,72,500 ( under the original contract ). Loss to the customer ₹ 2,700. (This loss will be recovered from the customer)

**Question No 8:** An Indian exporting firm, Bimal Jalan & Co. would cover itself against a likely depreciation of Pound sterling. The following data is given :

Receivables of Bimal Jalan & Co. : £ 5,00,000. Spot rate ₹ 56/£

3 months interest rate: India: 12% p.a. UK : 5% p.a. What the exporter should do?

**Solution :**

The firm may borrow £5,00,000/1.0125 i.e. £4,93,827.16.

This amount shall be repaid after three months with interest @ 5% p.a. using the export proceeds.

Convert borrowings in Rupees.  $4,93,827.16 \times 56$  i.e. ₹ 2,76,54,321,

Invest this amount for three months.

Investment proceeds =  $2,76,54,321 \times 1.03$

= ₹ 2,84,83,950.63

**Question No. 9**

The rate of inflation in USA is likely to be 3% p.a. and in India it is likely to be 6.50%. The current spot rate of US \$ in India is 53.40. Find the expected rate of US \$ in India after 1 year and 3 years from now using purchasing power parity theory.

**Solution**

Spot rate: 1 \$ = ₹ 53.40

1 year forward rate:  $1\$(1.03) = ₹ 53.40 (1.0650)$

1 \$ = ₹ 55.21456

3 year forward rate:  $1\$(1.03)^3 = ₹ 53.40 (1.0650)^3$

1 \$ = ₹ 59.03076

**Question No. 10**

On April 1, 3 months interest rate in UK Pound and USD are 7.50% and 3.50% p.a. respectively. The UK Pound/ USD spot rate is .7570. What would be the forward rate of USD for delivery 30th June?

**Solution**

Three months interest rate (UK):  $7.50/4 = 1.875\% = 0.01875$

Three months interest rate (US):  $3.50/4 = 0.875\% = 0.00875$

Spot rate: 1\$ = £0.7570

3 months forward rate :  $1\$(1.00875) = £0.7570(1.01875)$

1 \$ = £0.7645

### LESSON ROUND-UP

- Forex management may be defined as the science of management of generation, use and storage of foreign currencies in the process of exchange of one currency into other called foreign exchange.
- Exchange rate is the price of one country's money in terms of other country's money.
- Factors affecting Foreign Exchange Rates can be grouped into Fundamental Factors, Political and Psychological Factors, Technical Factors such as Capital Movement, Relative Inflation Rates. Exchange rate policy and intervention-Interest rates and Speculation.
- A spot exchange rate is a rate at which currencies are being traded for delivery on the same day.
- A direct quote indicates the number of units of the domestic currency required to buy one unit of foreign currency.
- An indirect quote indicates the number of units of foreign currency that can be exchange for one unit of the domestic currency.
- Ask price is the selling rate or the offer rate and refers to the rate at which the foreign currency can be purchased from the dealer.
- Bid price is the rate at which the dealer is ready to buy the foreign currency in exchange for the domestic currency
- The ask-bid spread depends upon the breadth and depth of the market for that currency and the volatility of the currency.

$$\% \text{ Spread} = \frac{\text{Ask Price} - \text{Bid Price}}{\text{Ask Price}} \times 100$$

- The exchange rate between two currencies calculated on the basis of the rate of these two currencies in terms of a third currency is known as a cross rate.
- The forward rate is a price quotation to deliver the currency in future. The exchange rate is determined at the time of concluding the contract, but payment and delivery are not required till maturity.
- Transfer Pricing is a mechanism by which profits are transferred through an adjustment of prices on intra-firm transactions.
- Leading implies speeding up collections on receivables if the foreign currency in which they are invoiced is expected to appreciate.
- Lagging implies delaying payments of payables invoiced in a foreign currency that is expected to depreciate.
- Netting implies that all transactions-gross receipts and payments among the parent firm and subsidiaries should be adjusted and only net amounts should be transferred.
- Matching is a process whereby cash inflows in a foreign currency are matched with cash outflows in the same currency with regard, to as far as possible, amount and maturation
- A transaction exposure occurs when a value of a future transaction, through known with certainty, is denominated in some currency other than the domestic currency.
- Translation Exposure is also called the accounting exposure. It refers to and deals with the probability that the firm may suffer a decrease in assets value due to devaluation of a foreign currency even if no foreign exchange transaction has occurred during the year.



- The economic exposure refers to the probability that the change in foreign exchange rate will affect the value of the firm.
- Capital account convertibility implies the right to transact in financial and other assets with foreign countries without restrictions.

## SELF-TEST QUESTIONS

*(These are meant for re-capitulation only. Answers to these questions are not to be submitted for evaluation)*

1. What is the importance of Foreign Exchange for a country?
2. What do you understand by spot rates and forward rates?
3. What factors determine exchange rates?
4. How can forex risks be managed?

This image shows a blank sheet of white paper with horizontal ruling lines. At the very top, there is a thick, solid black rectangular bar. Below this bar, the page contains approximately 20 evenly spaced horizontal lines, providing space for writing or drawing. The lines are thin and dark, extending across the width of the page.



## PRACTICAL QUESTIONS AND CASE STUDIES

## CAPITAL BUDGETING

## Question No. 1

Following data in respect of two machines namely 'A' and 'B' are detailed below Depreciation has been charged on straight line basis and estimated life of both machines is five years.

(In ₹)

Item	Machine 'A'	Machine 'B'
Cost	56,125	56,125
Net income after depreciation and taxes:		
1st Year	3,375	11,375
2nd Year	5,375	9,375
3rd Year	7,375	7,375
4th Year	9,375	5,375
5th Year	<u>11,375</u>	<u>3,375</u>
	<u>36,875</u>	<u>36,875</u>

Find out –

- Average rate of return on 'A' and 'B' machines
- Which machine is better from the point of view of pay-back period and why?
- Calculate average rate of return when salvage value of machine 'A' turns out to be ₹ 3,000 and when 'B' machine has zero salvage value.

## Answer to Question No. 1

- Average Rate of Return (ARR)

$$\text{ARR} = \frac{\text{Average net income after taxes}}{\text{Average investment}}$$

$$\text{Average income of machine 'A'} = \frac{\text{₹ } 36,875}{5} = \text{₹ } 7,375$$

$$\text{Average income of machine 'B'} = \frac{\text{₹ } 36,875}{5} = \text{₹ } 7,375$$

$$\text{Average investment} = \frac{1}{2} (\text{₹ } 56,125) = \text{₹ } 28,062.50$$

(Average investment of Machine A and Machine B is the same as the cost is same)

$$\text{ARR for Machine A} = \frac{7,375}{28,062.50} \times 100 = 26.28\%$$

$$\text{ARR for Machine B} = \frac{7,375}{28,062.50} \times 100 = 26.28\%$$

(b) From the Point of View of Pay-back Period

From this point of view, Machine B is better as the initial inflow is much higher compared to Machine A and hence Machine B provides large liquidity of funds.

(c) Average Rate of Return when Salvage Value of Machine A is ₹ 3,000

$$\begin{aligned} \text{Average Investment} &= ₹ 3,000 + 1/2 (₹ 56,125 - ₹ 3,000) \\ &= ₹ 3,000 + ₹ 26,563 \text{ (approximately)} \\ &= ₹ 29,563 \text{ (approximately)} \end{aligned}$$

$$\text{ARR} = \frac{\text{Average income}}{\text{Average investment}}$$

$$\begin{aligned} &= \frac{7,375}{29,563} \times 100 \\ &= 24.95\% \end{aligned}$$

$$\text{ARR of Machine A} = 24.95\%$$

As Machine B does not have any salvage value, the ARR for Machine B will remain the same, i.e. 26.28% (as calculated in (a) above).

### Question No. 2

A Company is contemplating to purchase a machine. Two machines A and B are available, each costing ₹ 5,00,000. In comparing the profitability of the machines, a discounted rate of 10% is to be used. Earnings after taxation are expected as follows:

Year	CASH FLOW	
	Machine 'A' (₹)	Machine 'B' (₹)
I	1,50,000	50,000
II	2,00,000	1,50,000
III	2,50,000	2,00,000
IV	1,50,000	3,00,000
V	1,00,000	2,00,000

Indicate which of the machines would be profitable using the following methods of ranking investments proposals:

- (i) Pay back method
- (ii) Net present value method
- (iii) Post pay back profitability
- (iv) Average rate of return.

This discount factor at 10% is:

1st year — .9091

2nd year	—	.8264
3rd year	—	.7513
4th year	—	.6830
5th year	—	.6209

**Answer to Question No. 2****(I) PAY BACK METHOD:****Pay back period for Machine 'A'**

	<b>Cash Flow (₹)</b>	
<b>Year</b>	<b>Total</b>	<b>Cumulative Cash flow</b>
I	1,50,000	1,50,000
II	2,00,000	3,50,000
III	2,50,000	5,50,000
Investment	5,00,000	

Total pay back period :  $2 \text{ year} + \left( \frac{1,50,000}{2,50,000} \right) \times 12 = 2 \text{ years } 7.2 \text{ months}$

**Pay back period for Machine 'B'**

	<b>Cash Flow (₹)</b>	
<b>Year</b>	<b>Total</b>	<b>Cumulative Cash flow</b>
I	50,000	50,000
II	1,50,000	2,00,000
III	2,00,000	4,00,000
IV	3,00,000	5,00,000
Investment	5,00,000	

Total pay back period :  $3 \text{ year} + \left( \frac{1,00,000}{3,00,000} \right) \times 12 = 3 \text{ years } 4 \text{ months}$

<b>Rankings:</b>	<b>Machine 'A'</b>	<b>Machine 'B'</b>
	I	II

**(II) NET PRESENT METHOD:***Calculation of Present Values of Cash Flows*

<b>Year</b>	<b>Cash Flow (₹)</b>		<b>Discount Factor @10%</b>	<b>Present Value (₹)</b>	
	<b>Machine 'A'</b>	<b>Machine 'B'</b>		<b>Machine 'A'</b>	<b>Machine 'B'</b>
I	1,50,000	50,000	0.9091	1,36,365	45,455
II	2,00,000	1,50,000	0.8264	1,65,280	1,23,960

III	2,50,000	2,00,000	0.7513	1,87,825	1,50,260
IV	1,50,000	3,00,000	0.6830	1,02,450	2,04,900
V	1,00,000	2,00,000	0.6209	62,090	1,24,180
	Total Present Value			6,54,010	6,48,755
	Initial Investment			5,00,000	5,00,000
	Net Present Value			1,54,010	1,48,755

	<b>Machine 'A'</b>	<b>Machine 'B'</b>
<b>Ranking</b>	I	II

**(iii) Post Pay Back Profitability:**

	<b>Machine 'A'</b> ₹	<b>Machine 'B'</b> ₹
Total Actual Cash Flows	8,50,000	9,00,000
<b>Less:</b> Initial Investment (Recovered during pay-back)	5,00,000	5,00,000
Post Pay back Profitability	3,50,000	4,00,000
Ranking	II	I

**(iv) Return on Investment Method:**

$$\text{Return on Investment}^* = \frac{\text{Average Annual Cash Flow}}{\text{Initial Investment}} \times 10$$

	<b>Machine 'A'</b> ₹	<b>Machine 'B'</b> ₹
Total cash flows	8,50,000	9,00,000
(Less Depn. For 5 years)	<u>5,00,000</u>	<u>5,00,000</u>
Net earning after tax and depn.	3,50,000	4,00,000
Life of Machine (yrs)	5	5
Average earning per year	70,000	80,000
Initial cost	5,00,000	5,00,000
ARR	$\left( \frac{70,000}{5,00,000} \times 100 \right)$ = 14%	$\left( \frac{80,000}{5,00,000} \times 100 \right)$ = 16%
Ranking	II	I

**Question No. 3**

Following are the details of three project A, B and C

	<b>A</b>	<b>B</b>	<b>C</b>
Cost (₹)	50,000	70,000	70,000
Life	10 years	12 years	14 years
Estimated scrap (₹)	5,000	10,000	7,000
Annual Profit Less Taxation (₹)	5,000	6,000	5,500

Select the best one using

- (i) Pay back period
- (ii) Surplus life over pay back period
- (iii) *Surplus cash flow, as the decision criterion.*

\* Note: It may be calculated by using other methods also.

**Answer to Question No. 3**

- (a) Under pay-back method, the project which has the shortest pay-back period is selected. The pay-back period is the length of time required for recovering the initial investment out of the annual cash flow. In our question, the following are the pay-back periods of projects A, B and C.

Project A       $50,000/5,000 = 10$  years

Project B       $70,000/6,000 = 11.66$  years

Project C       $70,000/5,500 = 12.73$  years

- (b) From the above, one can simply say that, on the basis of surplus life over pay-back period, Project C is the best because, C has the longest surplus life of 1.27 years.  $(14 - 12.73)$ . However, to be more scientific, the scrap value should be taken into account in this case, because if the full life is allowed to be run the scrap value will be realised. One way to do this would be to deduct scrap value from initial cost and calculate the time period required to cover this cost. The difference between the life of the project and the time required to cover this cost may then be taken to represent the surplus life. On this basis, the surplus life of our projects are:

Project A:      10 years      —       $(45,000/5,000)$  years      = 1 year

Project B:      12 years      —       $(60,000/6,000)$  years      = 2 years

Project C:      14 years      —       $(63,000/5,500)$  years      = 2.55 years

So, Project 'C' is the best one.

- (c) In our question, time value of money has been ignored. As such, the calculation of surplus cash flow, thus becomes easier. The scrap value may be deducted from the initial cost to derive the actual cost. On this basis, the surplus cash flows from each project after the life of each project is over, are:

	<b>A</b>	<b>B</b>	<b>C</b>
	₹	₹	₹
Total cash flow: (Life x Annual Cash Flow)	50,000	72,000	77,000
<b>Less:</b> Initial cost: (Cost – Estimated Scrap Value)	45,000	60,000	63,000
Surplus	5,000	12,000	14,000

However, in order to select the best project we must see the highest rate of cash flow:

For Project A, the rate of surplus cash flow is 1.1 per cent per annum.

For Project B, the rate of surplus cash flow is 1.7 per cent per annum.

For Project B, the rate of surplus cash flow is 1.6 per cent per annum.

On the above basis, Project B yields the highest rate of surplus cash flow per annum and is the best.

### Alternative Solution

#### Calculation of Depreciation

	<b>A</b>	<b>B</b>	<b>C</b>
Cost (₹)	50,000	70,000	70,000
<b>Less:</b> Scrap (₹)	5,000	10,000	7,000
	45,000	60,000	63,000
Life (years)	10	12	14
Depreciation p.a. (₹)	4,500	5,000	4,500

#### Pay Back Period:

Projects	A (₹)	B (₹)	C (₹)
Profits less Taxation	5,000	6,000	5,500
Depreciation	4,500	5,000	4,500
CFAT but before Depreciation	9,500	11,000	10,000
<i>Pay Back Period</i>	$\frac{50,000}{9,500}$ = 5.3 years	$\frac{70,000}{11,000}$ = 6.4 years	$\frac{70,000}{10,000}$ = 7 years
Rank	I	II	III
Life	10 years	12 years	14 years
<i>Profitable Period (Life – Pay Back Period)</i>	4.7 years	5.8 Years	7 years
Rank	III	II	I
Cash Flows over the profitable period Profitable period * CFATBD	₹ 44,650	₹ 63,800	₹ 70,000
Estimated Scrap	5,000	10,000	7,000
Surplus Cash Flow	49,650	73,800	77,000
Rank	III	II	I



**Question No. 4**

The particulars relating to two alternative Capital Projects are furnished below:

	<b>PROJECT X 4 years</b>	<b>PROJECT Y 6 years</b>
<b>Life of Project</b>		
Estimated Cash Outflow (₹ in lakhs)	15	15
Estimated Cash Inflow (₹ in lakhs)		
1st Year	8	7
2nd Year	10	8
3rd Year	7	8
4th Year	3	6
5th Year	—	5
6th Year	—	4

Compute internal rate of return of Project X and Y and state which project you could recommend. You may use the present value tables given below:

**PRESENT VALUE OF Re. 1**

After	20%	25%	30%	35%	40%	45%	50%
1st	0.833	0.800	0.769	0.741	0.714	0.690	0.677
2nd	0.694	0.640	0.592	0.549	0.510	0.476	0.444
3rd	0.579	0.512	0.455	0.406	0.364	0.328	0.296
4th	0.482	0.410	0.350	0.301	0.260	0.226	0.198
5th	0.402	0.328	0.269	0.223	0.186	0.156	0.132
6th	0.335	0.262	0.207	0.165	0.133	0.108	0.088

**Answer to Question No. 4**

OUT FLOW: ₹ 15,00,000

**Project X**

Years	Cash Inflow	Discount Factor @ 25%	Present Value (₹)	Discount Factor @30%	Present Value (₹)
1st Year	8,00,000	.800	6,40,000	.769	6,15,200
2nd Year	10,00,000	.640	6,40,000	.592	5,92,000
3rd Year	7,00,000	.512	3,58,400	.455	3,18,500
4th Year	3,00,000	.410	1,23,000	.350	1,05,000
	<b>Inflow</b>	<b>Discount Factor @ 35%</b>		<b>Discount Factor @ 40%</b>	
1st Year	8,00,000	.741	5,92,800	.714	5,71,200
2nd Year	10,00,000	.549	5,49,000	.510	5,10,000

**430 PP-FT&FM**

3rd Year	7,00,000	.406	1,84,200	.364	2,54,800
4th Year	3,00,000	.301	96,300	.260	78,000
			15,16,300		14,14,000

PV required 15,00,000

PV at 35% 15,16,300

PV at 40% 14,14,000

Difference in Rate = 5%

Difference in inflow at 35% and 40% = 1,02,300

$$\text{IRR} = 35\% + \frac{16,300}{1,02,300} \times 5 = 35.8\%$$

**Project Y**

OUT FLOW: ₹ 15,00,000

Years	Cash Inflow	Discount Factor @ 30%	Present Value (₹)	Discount Factor @ 40%	Present Value (₹)
1	2	3	4	5	6
1	7,00,000	.741	5,18,700	.714	4,99,900
2	8,00,000	.549	4,39,200	.51	4,08,000
3	8,00,000	.406	3,24,800	.364	2,91,200
4	6,00,000	.301	1,80,600	.26	1,56,000
5	5,00,000	.223	1,11,500	.186	93,000
6	4,00,000	.165	66,000	.133	53,000
	Total		16,40,800		15,01,200
		<b>Discount Factor @ 45%</b>			
1	7,00,000	.69	4,83,000		
2	8,00,000	.476	3,80,800		
3	8,00,000	.328	2,62,400		
4	6,00,000	.226	1,35,600		
5	5,00,000	.156	78,000		
6	4,00,000	.106	43,200		
			13,83,000		

PV required: ₹15,00,000

PV at 40%: ₹15,01,200

PV at 45%: ₹ 13,83,000

Difference in Rate = 5%

Difference in inflow at 40% and 45% = 1,18,200

$$\text{IRR} = 40\% + \frac{1,200}{1,18,200} \times 5 = 40 + .05 = 40.05\%$$

The profitability statement of project X shows that at 35 per cent, trial cash inflows are marginally greater and therefore 35 per cent is the rate of return which equates the present value of inflows with outflows. After employing the interpolation techniques the true rate in case of project 'X' comes to be 35.8%. The profitability of project 'Y' shows that the rate of return is 40%. Using the rate of return method project 'Y' yields a rate of return of 40.05 per cent while project 'X' yields 35.8%. On this basis Project 'Y' is recommended.

### Question No. 5

A company is faced with the Question of choosing between two mutually exclusive projects. Project A requires a cash outlay of ₹ 1,00,000 and cash running expenses of ₹ 35,000 per year. On the other hand, Project B will cost ₹ 1,50,000 and require cash running expenses of ₹ 20,000 per year. Both the projects have a eight-year life. Project A has a ₹ 4,000 salvage value and Project B has a ₹ 14,000 salvage value. The company's tax rate is 50% and rate of return is 10%. Assume depreciation on straight line basis. Which project should be accepted. Present value of Re. 1 at the end of each year at 10% for 8 years is equal to ₹ 5.335 and present value of Re. 1 at the end of 8th year at 10% is equal to Re. 0.467.

### Answer to Question No. 5

	<b>Project A</b>	<b>Project B</b>	<b>Differential cash flow (B-A)</b>	<b>Differential net cash flow (B-A)</b>
	₹	₹	₹	₹
1	2	3	4	5
Cash Outlay	1,00,000	1,50,000	50,000	50,000
Cash running expenses before taxes	35,000	20,000	+15,000	—
Tax saving (@ 50%) on expenses	17,500	10,000	<u>7,500</u>	7,500
Net savings depreciation	12,000	17,000	+ 5,000	
Tax savings on depreciation	6,000	8,500	2,500	<u>2,500</u>
Net savings				10,000
Salvage (at the end of 8 years)	4,000	14,000	10,000	10,000

Thus, if Project B is chosen it would require an additional outlay of ₹ 50,000 but would save in terms of cash inflows ₹ 10,000 each year for eight years. This project should be accepted if it has a positive net present value at a 10% discount rate.

	₹
PV of ₹ 10,000 each for eight years @ 10% (10,000 x 5.335)	53,350
PV of ₹ 10,000 at the end of eight years @ 10% (10,000 x .467)	<u>4,670</u>
	58,020
<b>Less:</b> Cash outlay	<u>50,000</u>
Net present value	<u>8,020</u>

As Project B will offer whatever Project A offers and also helps in generating an additional net present value of ₹ 8,020 it should be preferred to Project A.

### Question No. 6

The Klein & Co. is contemplating either of two mutually exclusive projects. The data with respect to each are

given below. The initial investment for both is equal to their depreciable value. Both will be depreciated straight line over a five-year life.

	<b>Project A</b>	<b>Project B</b>
	(₹)	(₹)
Initial Investment	1,00,000	1,40,000
Year		
		Profits after taxes
1	10,000	25,000
2	15,000	25,000
3	20,000	25,000
4	25,000	25,000
5	35,000	25,000

- Calculate the 'net present value' and 'benefit-cost ratio' for each project.
- Evaluate the acceptability of each project on the basis of above mentioned two techniques.
- Select the best project, using NPV and benefit cost ratios and comment on the resulting rankings.
- Assume that the Klein Co. has an 11% cost of capital.
- The following data relates to discounting factor:

<b>Year</b>	<b>Discounting factor at 11%</b>
1	.901
2	.812
3	.731
4	.659
5	.593

and discounting factor for present value of an annuity discounted at 11% for five years is 3.696.

#### **Answer to Question No. 6**

- The NPV for project A can be calculated as follows:

<b>Year</b>	<b>Cash inflow after tax but adding back depreciation (₹)</b>	<b>Present value interest factor at 11%</b>	<b>Present value (₹)</b>
1	30,000	.901	27,030
2	35,000	.812	28,420
3	40,000	.731	29,240
4	45,000	.659	29,655
5	55,000	.593	2,515
		Total	1,46,600

For Project A, question provides data regarding profits after taxes. To obtain cash inflow, therefore, we have to add depreciation amount. Total project investment is ₹ 1,00,000. Life of the project is 5 years and it is depreciated at straight line method. Therefore, depreciation amount would be ₹ 20,000 each year which should be added to

PAT to obtain CI (Cash Inflow).

Similarly, for project B, the depreciation amount would be ₹ 28,000 per year, which should be added to PAT for obtaining Cash Inflow.

PV for inflow	:	(3.696) x (53,000)	=	₹ 1,95,888
NPV of Project B	=	1,95,888 – 1,40,000	=	₹ 55,888
NPV of Project A	=	1,46,960 – 1,40,000	=	₹ 46,960

### Benefit Cost Ratio

The benefit-cost ratio (B/C) can easily be determined by dividing the present value of inflow by the initial investment in each case.

Project A	B/C	=	$\frac{1,46,960}{1,00,000} = 1.47$
Project B	B/C	=	$\frac{1,95,888}{1,40,000} = 1.40$

(ii) On the basis of both NPV and B/C ratios, both projects are acceptable because their NPVs are greater than zero and their B/Cs are greater than one respectively.

(iii) On the basis of NPV, project B is preferable to project A. On the basis of B/C ratios, project A is preferable to project B. If the firm is operating under capital rationing the B/C ratio approach would be best (i.e. project A preferred), while if the firm has unlimited funds, the NPV approach is best (i.e. project B preferred).

### Question No. 7

M/s Lalvani & Co. has ₹ 2,00,000 to invest. The following proposal are under consideration. The cost of capital for the company is estimated to be 15 per cent.

Project	Initial Outlay ₹	Annual Cash Flow ₹	Life of Project (Years)
A	1,00,000	25,000	10
B	70,000	20,000	8
C	30,000	6,000	20
D	50,000	15,000	10
E	50,000	12,000	20

Rank the above projects on the basis of—

- (i) Pay-back method
- (ii) NPV method
- (iii) Profitability index method

Present value of annuity of Re. 1 received in steady stream discount at the rate of 15%

8 years	=	4.6586
10 years	=	5.1790
20 years	=	6.3345

**Answer to Question No. 7**

The ranking of various project under the various methods are shown below:

**(i) Pay-Back Method:**

$$\text{Pay back period} = \frac{\text{Initial Investment}}{\text{Annual cash flows}}$$

The project with the lowest pay-back period is to be ranked first.

<b>Project</b>	<b>Initial Investment ₹</b>	<b>Annual Cash Flow ₹</b>	<b>Pay-back period(in years)</b>	<b>Ranking</b>
A	1,00,000	25,000	4	3
B	70,000	20,000	3.5	2
C	30,000	6,000	5	5
D	50,000	15,000	3.33	1
E	50,000	12,000	4.17	4

**(ii) Net Present Value Method:** The project with the highest N.P.V. is to be ranked first.

<b>Project</b>	<b>Initial investment (₹)</b>	<b>Annual Cash Flow (₹)</b>	<b>Life in years</b>	<b>PV Factor at 15%</b>	<b>PV₹</b>	<b>NPV (₹)</b>	<b>Ranking</b>
A	1,00,000	25,000	10	5.1790	1,29,475	29,475	1
B	70,000	20,000	8	4.6586	93,172	23,172	4
C	30,000	6,000	20	6.3345	38,007	8,007	5
D	50,000	15,000	10	5.1790	77,685	27,685	2
E	50,000	12,000	20	6.3345	76,014	26,014	3

**(iii) Profitability Index Method:** The project which shows the highest profitability index is to be ranked first.

$$\text{Profitability Index} = \frac{\text{Total Present Value of Cash flows}}{\text{Initial Investment}}$$

<b>Project</b>	<b>Initial investment (₹)</b>	<b>Annual Cash Flow (₹)</b>	<b>Life in years</b>	<b>PV Factor at 15%</b>	<b>PV(₹)</b>	<b>Profitability Index</b>	<b>Ranking</b>
A	1,00,000	25,000	10	5.1790	1,29,475	1.29	4
B	70,000	20,000	8	4.6586	93,172	1.33	3
C	30,000	6,000	20	6.3345	38,007	1.27	5
D	50,000	15,000	10	5.1790	77,685	1.55	1
E	50,000	12,000	20	6.3345	76,014	1.52	2

**Question No. 8**

Mohan & Co. is considering the purchase of a machine. Two machines X and Y each costing ₹ 50,000 are available. Earnings after taxation are expected to be as under:

Year	Machine X(₹)	Machine Y(₹)	Discount factor at 10%
1st	15,000	5,000	.9091
2nd	20,000	15,000	.8264
3rd	25,000	20,000	.7513
4th	15,000	30,000	.6830
5th	10,000	20,000	.6209

Estimate the two alternatives according to—

- (i) Payback method;
- (ii) Return on investment method;
- (iii) Net present value method – a discount rate of 10% is to be used.

#### Answer to Question No. 8

##### (i) Payback method:

Year	Earning Machine X(₹)	Earning Machine Y(₹)	Cumulative Earning Machine X (₹)	Cumulative Earning Machine Y (₹)
1st	15,000	5,000	15,000	5,000
2nd	20,000	15,000	35,000	20,000
3rd	25,000	20,000	60,000	40,000
4th	15,000	30,000	75,000	70,000
5th	10,000	20,000	85,000	90,000

$$\begin{aligned} \text{Pay back period for Machine X} &= 2 \text{ years} + \frac{15,000}{25,000} \times 12 \text{ year} \\ &= 2 \text{ years 7 months 6 days.} \end{aligned}$$

$$\begin{aligned} \text{Pay back period for Machine Y} &= 3 \text{ years} + \frac{10,000}{30,000} \times 12 \text{ year} \\ &= 3 \text{ years 4 months} \end{aligned}$$

##### (ii) Return on Investment Method:

PARTICULARS	MACHINE – X	MACHINE – Y
Total of Cash flows	₹ 85,000	₹ 90,000
Average Annual Cash flows	₹ 85,000/5	₹ 90,000/5
	= ₹ 17,000	= ₹ 18,000
Annual Depreciation (₹ 50,000/5)	₹ 10,000	₹ 10,000
Annual Net Savings	₹ 17,000 – 10,000	₹ 18,000 – 10,000
	= ₹ 7,000	= ₹ 8,000
Average Investment	₹ 50,000/2	₹ 50,000/2
	= ₹ 25,000	= ₹ 25,000

Return on Investment	= $\frac{\text{Annual Net Savings}}{\text{Average Investment}} \times 100$	
	= $\frac{7,000 \times 100}{25,000}$	= $\frac{8,000 \times 100}{25,000}$
	= 28%	= 32%

**Note:** In this case, Net cash flows after depreciation have been calculated for arriving at the ROI. The question can be solved with gross cash flows also.

**(iii) Net present value method**

Calculation of Present Value of Cash Flows

Year	Discount factor at 10%	Machine X		Machine Y	
		Cash flow	P.V.	Cash flow	P.V.
		₹	₹	₹	₹
1	.9091	15,000	13,636	5,000	4,545
2	.8264	20,000	16,528	15,000	12,396
3	.7513	25,000	18,782	20,000	15,026
4	.6832	15,000	10,245	30,000	20,490
5	.6209	10,000	6,209	20,000	12,418
		85,000	65,400	90,000	64,875

Net Present Value = Present value – Initial Investment

Net Present Value of Machine X = ₹ 65,400 – ₹ 50,000  
= ₹ 15,400

Net Present Value of Machine Y = ₹ 64,875 – ₹ 50,000  
= ₹ 14,875

It is evident from the above calculations that machine X would be preferred under the pay-back method and Net Present Value Method while machine Y would be preferred under the return on investment method. But NPV method is more scientific and therefore investment in Machine X will be more profitable while taking the time value of cash inflows into consideration.

**Question No. 9**

Calculate the payback period, accounting rate of return, net present value and internal rate of return for the following investment:

Year	Cashflow (₹)
0	(30,000)
1	4,000
2	10,000
3	20,000
4	11,000



The discount rate for discounted cashflow (DCF) calculation is 12 per cent. Accounting profits are the same as cashflow except that the initial expenditure should be depreciated over 4 years; there is no resale value at year 4.

**Answer to Question No. 9**

**Calculation of Pay Back Period**

Year (₹)	Cashflow Inflow (₹)	Cumulative Cash
0	(30,000)	—
1	4,000	4,000
2	10,000	14,000
3	20,000	34,000
4	11,000	45,000

Pay back period = 2 years + (16/20 x 12) = 2.8 years (app.)

**Accounting Rate of Return**

Annual depreciation = 30,000/4 = ₹ 7,500

Accounting profits/(losses) =

	In ₹	(₹)
Year 1	4,000 – 7,500	= (3,500)
Year 2	10,000 – 7,500	= 2,500
Year 3	20,000 – 7,500	= 12,500
Year 4	11,000 – 7,500	= 3,500
		15,000

Average profits =  $\frac{₹15,000}{4}$  = ₹ 3,750

ARR =  $\frac{₹3,750 \times 100}{₹30,000}$  = 12.5%

**Net Present value**

Year	Cashflow(₹)	DF@12%	PV (₹)
0	(30,000)	1.0	(30,000)
1	4,000	0.8929	3,572
2	10,000	0.7972	7,972
3	20,000	0.7118	14,236
4	11,000	0.6355	6,991
NPV			2,771

**Internal Rate of return**

Discount at 16% and use linear interpolation:

Year	Cashflow (₹)	DF@16%	PV (₹)
0	(30,000)	1.0	(30,000)
1	4,000	0.8621	3,448
2	10,000	0.7432	7,432
3	20,000	0.6407	12,814
4	11,000	0.5523	6,075
NPV = ₹ (231)			

$$\text{IRR} = 12\% + \left( \frac{2,771}{2,771 + 231} \times 4\% \right) = 15.7\%$$

**Question No. 10**

The management of a company has two alternative projects under consideration. Project A requires a capital outlay of ₹ 1,20,000 but Project B needs ₹ 1,80,000. Both are estimated to provide a cash flow for five years: A – ₹ 40,000 per year and B – ₹ 58,000 per year. The cost of capital is 10%. Show which of the two projects is preferable from the viewpoint of (i) Net Present Value; and (ii) Internal rate of Return.

**Answer to Question No. 10****(i) Determination of NPV**

Years	CFAT Project in ₹		P.V. Factor	Total P.V. in ₹	
	A	B		A	B
1—5	40,000	58,000	3.791	₹ 1,51,640	2,19,878
<b>Less:</b> Cash Outlay				1,20,000	1,80,000
Net Present Value				31,640	39,878

In the above case, Project B is preferable as its NPV is more than that of A.

**(ii) Determination of IRR**

$$\text{Payback Period} = \frac{1,20,000}{40,000} = 3 \text{ years (Project A)}$$

$$= \frac{1,80,000}{58,000} = 3.1034 \text{ (Project B)}$$

Annuity Table indicates that closest factor to 3.0 against five years are 3.058 (19%) and 2.991 (20%).

By interpolation, we get

$$\text{IRR}_A = r_1 + \frac{(\text{PV}_{\text{CFAT}} - \text{PV}_C) \times 1}{\text{PV}}$$

$$= 19 + \frac{(1,22,320 - 1,20,000)}{2680} \times 1$$

$$= 19 + 0.86$$

$$= 19.86\%$$

In case of Project B, Annuity Table indicates that closest factor to 3.0134 against five years are 3.127 (18%) and 3.058 (19%). By interpolation, we get

$$IRR_B = 18 + \frac{(1,81,366 - 1,80,000)}{4,002} \times 1$$

$$= 18 + \frac{(1,366)}{(4,002)} \times 1$$

$$= 18 + 0.34 = 18.34\%$$

So project A is preferable as its IRR is greater than that of B.

### **Question No. 11**

Andhra Pradesh Udyog is considering a new automatic blender. The new blender would last for 10 years and would be depreciated to zero over the 10 year period. The old blender would also last for 10 more years and would be depreciated to zero over the same 10 year period. The old blender has a book value of ₹ 20,000 but could be sold for ₹ 30,000 (the original cost was ₹ 40,000). The new blender would cost ₹ 1,00,000. It would reduce labour expense by ₹ 12,000 a year. The company is subject to a 50% tax rate on regular income and a 30% tax rate on capital gains. Their cost of capital is 8%. There is no investment tax credit in effect.

You are required to –

- Identify all the relevant cash flows for this replacement decision.
- Compute the present value, net present value and profitability index.
- Find out whether this is an attractive project?

### **Answer to Question No. 11**

#### **(a) Tax on the sale of the old machine:**

Original cost	₹ 40,000
Sale Price	₹ 30,000
Book value	₹ 20,000
Profit	₹ 10,000
Tax	50% of ₹ 10,000 = 5,000

#### **After tax cash receipts from sale of old machine:**

Sale Price	₹ 30,000
Taxes on sale	<u>5,000</u>
After-tax cash receipts	<u>₹ 25,000</u>

#### **Net cash flow to replace old machine with new:**

Cost of new machine	₹ 100,000	
After-tax receipt from sale of old machine	<u>₹ 25,000</u>	
Net cash flow to replace old machine with new	<u>₹ 75,000</u>	
Depreciation on new machine	= 1,00,000/10 =	₹ 10,000
Depreciation on old machine	= 20,000/10 =	₹ 2,000

	<b>Book Value in ₹</b>	<b>Cash flow in ₹</b>
Annual labour savings	12,000	12,000
Increased depreciation (₹ 10,000 – ₹ 2,000)		<u>8,000</u>
Increased earnings before tax		4,000
Increased tax	<u>2,000</u>	<u>2,000</u>
Increased earnings after tax		2,000
Increased after-tax cash flow		<u>10,000</u>

(b) Calculation of present value at 8% discount rate are tabulated below:

Year	Cash flow	Present value factor	Present value
1-10	₹ 10,000	6.710	₹ 67,100
Present value	=	₹ 67,100	
Net present value	=	₹ 67,100 – ₹ 75,000	= (–) ₹ 7,900
Profitability Index	=	₹ 67,100/₹ 75,000	= .895

(c) Since the net present value is negative and profitability index is less than one, the project is not an attractive project.

### Question No. 12

A most profitable company in the country is faced with the prospect of having to replace a large stamping machine. Two machines currently being marketed will do the job satisfactorily. The Zenith Stamping machine costs ₹ 100,000 and will require cash running expenses of ₹ 40,000 per year. The Godrej Stamping machine costs ₹ 150,000 but running expenses are only expected to be ₹ 30,000 per year. Both machines have a ten-year useful life with no salvage value and would be depreciated on a straightline basis.

(a) If the company pays a 50% tax rate and has 10% after-tax required rate of return, which machine should it purchase?

(b) Would your answer be different if the required rate of return were 8%?

### Answer to Question No. 12

	<b>Godrej ₹</b>	<b>Zenith ₹</b>	<b>Differential ₹</b>
Initial outlay	₹ 1,50,000	₹ 1,00,000	₹50,000
Operating expenses	30,000	40,000	10,000
Depreciation	15,000	10,000	5,000
Expenses savings-depreciation			5,000
Tax on the above			2,500
Cash flow			7,500
(Expenses savings of ₹ 10,000 - tax)			
Present value of Re. 1 received each year for 10 year	=	5.6502	
	7,500 x 5.65	=	42,376

Since the present value of the incremental cash flow benefits ₹ 42,376 is less than the differential cash outlay of ₹ 50,000, the additional cost of the Godrej machine cannot be justified. Thus, the Zenith machine should be purchased.

(b) *Present value of Cash flow at 8% for 10 year* = ₹ 7,500 × 6.7101 = ₹ 50,336

Since the present value of incremental benefits, ₹ 50,336 now exceeds ₹ 50,000 the Godrej machine should be purchased.

### **Question No. 13**

Saroj & co. is considering purchase of a machine that will enable production to increase by 2.5% (from 40,000 units to 50,000 units). The machine costs Re. 1 lakh and has a useful life of 10 years with a salvage value of 5%. The company is eligible for investment allowance of 25%. There will be increased requirement of working capital to the extent of ₹ 20,000. The following additional information is also furnished to you :

Variable cost (per unit) — ₹ 5

Fixed cost (per annum) — ₹ 1,00,000

The variable costs will remain the same but the fixed costs will increase by the amount of depreciation on the new machine. The current selling price is ₹ 10 per unit, which may have to be brought down by 50 paise in order to sell the entire production of 50,000 units.

The company adopts straight line method of depreciation, tax rate is 50% and the minimum required rate of return is 15%. P.V. factors at 15%.

(i) Present value of an annuity of Re. 1 at the end of 9 years = 4.772

(ii) Present value of Re. 1 receivable at the end of the 10 years = 0.247

*Discuss if it would be advisable for the company to purchase the machine.*

### **Answer to Question No. 13**

#### **1. Cash Outflows (Period):**

	₹
Cost of new machine	1,00,000
Working capital increase	20,000
Tax saving on account of investment allowance* i.e. (25% of ₹ 1 lakhs × 50%)	<u>(12,500)</u>
Net cash outlay	<u>1,07,500</u>

\*This could also be considered at year 1 end.

#### **2. Cash inflows (year to year 9):**

	Existing ₹	Proposed ₹
Revenues:	4,00,000	
40,000 units @ ₹ 10		
50,000 units @ ₹ 9.50		4,75,000
Variable cost		
40,000 units @ ₹ 5	2,00,000	

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50,000 units @ ₹ 5		<u>2,50,000</u>
Contribution margin	2,00,000	2,50,000
Fixed cost	<u>1,00,000</u>	<u>**1,09,500</u>
Surplus	1,00,000	1,15,500
Excess marginal contribution		15,500
<b>Less: Tax @ 50%</b>		<u>7,750</u>

Incremental Cash Flow from year 1 to 9 after tax (including depreciation) ₹ 7,750 + ₹ 9,500  
= ₹ 17,250

**3. Cash Inflow (10th year):**

	₹
Annual incremental cash flow	17,250
Working capital recovered	20,000
5% salvage value of machine	<u>5,000</u>
	<u>42,250</u>

**4. Present value of Cash Flows:**

Year	Cash flow (₹)	P.V. at 15%	Total P.V. (₹)
1-9	17,250	4,772	82,317.00
10	42,250	0.247	10,435.75
		Total	92,752.75
	P.V. of outlays		1,07,500.75
	Net Present Value		(14,747.25)

The machine yields negative P.V. of (₹14,747.25) and hence should not be procured. Therefore, it would not be advisable for the company to purchase the machine.

**\*\*Note:** Depreciation =  $\frac{\text{Cost} - \text{Salvage Value}}{\text{Useful life}}$

$$= \frac{\text{Rs. } 1,00,000 - \text{Rs. } 5,000}{10} = \text{Rs. } 9,500 \text{ p.a.}$$

$$\text{Fixed cost} = ₹ 1,00,000 + ₹ 9,500 = ₹ 1,09,500.$$

**Question No. 14**

Rama manufacturing company must choose between constructing a large or small factory to produce a new line of products. The large plant would be needed if the future brings a high demand for new products. But the large plant would have a net cash inflows below the ₹ 20,00,000 outlay, if demand for the product is medium or low. The present value of cash inflows are ₹ 28,00,000 with high demand, ₹ 18,00,000 with medium demand and ₹ 12,00,000 with low demand. The smaller plant produces a lower return if demand is high but has positive net present values at medium demand for the products. It would cost ₹ 4,00,000 as a cash outlay and would

return a present value inflow of ₹ 6,40,000 with high demand, ₹ 5,40,000 with medium demand and ₹ 3,60,000 with low demand. What is the net present value (NPV) of each alternative if there is 40% chance of high demand and 20% chance of low demand.

**Answer to Question No. 14**

*Capital outlay for large project – ₹ 20,00,000*

<b>Probabilities of demand for products</b>	<b>Present value of cash inflow (₹)</b>	<b>Expected Return (₹)</b>
1	2	3 = 1 x 2
High demand (.40)	28,00,000	11,20,000
Medium demand (.40)	18,00,000	7,20,000
Low demand (.20)	12,00,000	<u>2,40,000</u>
Total Expected Return		20,80,000
<b>Less: Capital outlay</b>		<u>20,00,000</u>
NPV		80,000

**Capital outlay for small project – ₹ 4,00,000**

<b>Probabilities of demand for products</b>	<b>Present value of cash inflow (₹)</b>	<b>Expected Return (₹)</b>
1	2	3 = 1 x 2
High demand (.40)	6,40,000	2,56,000
Medium demand (.40)	5,40,000	2,16,000
Low demand (.20)	3,60,000	<u>72,000</u>
Total Expected Return		5,44,000
<b>Less: Capital outlay</b>		<u>2,00,000</u>
NPV		1,44,000

From the above it is clear that the small factory is a better investment on NPV basis.

**Question No. 15**

A product is currently being manufactured on a machine that has a book value of ₹ 30,000. The machine was originally purchased for ₹ 60,000 ten years ago. The per unit costs of the product are: Direct labour ₹ 8.00; direct materials ₹ 10.00; variable overheads ₹ 5.00; fixed overheads ₹ 5.00; and total is ₹ 28.00. In the past year 6,000 units were produced and sold for ₹ 50.00 per unit. It is expected that the old machine can be used indefinitely in the future.

An equipment manufacturer has offered to accept the old machine at ₹ 20,000, a trade-in for a new version. The purchase price of the new machine is ₹ 1,00,000. The projected per unit costs associated with the new machine are: direct labour ₹ 4.00; direct materials ₹ 7.00; variable overheads ₹ 4.00; fixed overheads ₹ 7.00; and total is ₹ 22.00.

The management also expects that, if the new machine is purchased, the new working capital requirement of the company would be less by ₹ 10,000. The fixed overheads costs are allocations from other departments plus the depreciation of the equipment. The new machine has an expected life of ten years with no salvage value; the straight line method of depreciation is employed by the company. It is also expected that the future demand of

#### 444 PP-FT&FM

the product would remain at 6,000 units per year. Should the new equipment be acquired? Corporate tax is @ 50%.

Notes:

(i) Present value of annuity of Re. 1.00 at 10% rate of discount for 9 years is 5.759.

(ii) Present value of Re. 1.00 at 10% rate of discount, received at the end of 10th year is 0.386.

#### Answer to Question No. 15

Determination of Cash Outflows  $t = 0$

	₹	₹
Cost of new machine		1,00,000
Less : (i) Sale value of old machine	20,000	
(ii) Tax saving due to direct loss on the sale of old machine @ 50% on ₹ 10,000 (i.e. 30,000 – 20,000)	5,000	
(iii) Release of working capital	<u>10,000</u>	<u>35,000</u>
Net cash outflows		<u>65,000</u>

#### Calculation of Cash Inflows:

	₹	₹
I. Cost saving after tax:		
Cost saving: 6,000 x 8*	48,000	
<b>Less:</b> Tax @ 50%	<u>24,000</u>	24,000
II. Tax saving on additional depreciation		
Depreciation on new machine	10,000	
<b>Less:</b> Depreciation on old machine	<u>3,000</u>	
Additional Depreciation	<u>7,000</u>	
Tax saving @ 50% on ₹ 7,000		<u>3,500</u>
Cash inflows after tax i.e. CFAT ( $t = 1$ to 10)		27,500

#### Determination of Net Present Value:

Year	CFAT (A)	PV factor at 10% (B)	Total P.V. (A x B) (₹)
1–10	₹ 27,500	x 6.145 = (5.759 + 0.386)	1,68,987.50
<b>Less:</b> Present value of cash outlay			<u>65,000.00</u>
			<u>1,03,987.50</u>

Since NPV > 0 therefore, the new equipment should be acquired.

\*Variable cost (i.e. cost saving per unit):



	₹
Old machine	23
Less: New machine	(-) 15
	<u>8</u>

**Question No. 16**

Apollo Ltd. manufactures a special chemical for sale at ₹ 30 per kg. The variable cost of manufacture is ₹ 15 per kg. Fixed cost excluding depreciation is ₹ 2,50,000. Apollo Ltd. is currently operating at 50% capacity. It can produce a maximum of 1,00,000 kgs. at full capacity.

The production manager suggests that if the existing machines are replaced, the company can achieve maximum capacity in the next 5 years gradually increasing the production by 10% a year.

The finance manager estimates that for each 10% increase in capacity, the additional increase in fixed cost will be ₹ 50,000. The existing machines with a current book value of ₹ 10,00,000 and remaining useful life of 5 years can be disposed of for ₹ 5,00,000. The vice-president (finance) is willing to replace the existing machines provided the NPV on replacement is ₹ 4,53,000 at 15% cost of capital.

- (a) You are required to compute the total value of machines necessary for replacement. For computations, you may assume the following:
- All the assets are in the same block. Depreciation will be on straight line basis and the same is allowed for tax purposes.
  - There will be no salvage value for the new machines. The entire cost of the assets will be depreciated over a five year period.
  - Tax rate is 46%.
  - Cash inflows will accrue at the end of the year.
  - Replacement outflow will be at the beginning of the year (year 0).
- (b) On the basis of data given above, the managing director feels that the replacement, if carried out, would at least yield a post-tax return of 15% in three years provided the capacity build up is 60%, 80% and 100% respectively. Do you agree? Give reasons.

	Year 1	Year 2	Year 3	Year 4	Year 5
Present value factor at 15%	0.87	0.76	0.66	0.57	0.50
Present value annuity factor at 15%	0.87	1.63	2.29	2.86	3.36

**Answer to Question No. 16****(a) Determination of total replacement value of machines**

Incremental cash outflows:

Cost of replacement of new machines = ₹ X

**Less:** Disposal value of existing machines = ₹ 5,00,000

Cash outflows required = (X – ₹ 5,00,000)

**Determination of cash flows after tax (CFAT) and Net Present Value (NPV) (excluding depreciation)**

	Years				
	1	2	3	4	5
Increase Production and sales (kg) ... (I)	10,000	20,000	30,000	40,000	50,000
Contribution per unit (Sales Price – Variable Cost) i.e. ₹ 30 – ₹ 15) ... (II)	15	15	15	15	15
Incremental Contribution (I x II) ... (III)	1,50,000	3,00,000	4,50,000	6,00,000	7,50,000
Incremental fixed cost ... (IV)	50,000	1,00,000	1,50,000	2,00,000	2,50,000
Incremental profits (III – IV) ... (V)	1,00,000	2,00,000	3,00,000	4,00,000	5,00,000
<b>Less:</b> Taxes @ 46% (VI)	46,000	92,000	1,38,000	1,84,000	2,30,000
Earnings after taxes ... (V – VI)	54,000	1,08,000	1,62,000	2,16,000	2,70,000
PV Factor	0.87	0.76	0.66	0.57	0.50
Total Present Value (₹)	46,980	82,080	1,06,920	1,23,120	1,35,000
Total Present Value for 5 years (T = 1 – 5) ₹ 4,94,100 .. (A)					

**Base for Incremental Depreciation**

	₹
Current book value of existing machine	10,00,000
<b>Add:</b> Cost of new machines	X
<b>Less:</b> Sale proceeds of existing machine	5,00,000
Depreciation base of new machine	X + 5,00,000
<b>Less:</b> Depreciation base of existing machine	<u>10,00,000</u>
Base for Incremental Depreciation	<u>X – 5,00,000</u>

**Calculation of Present Value of tax savings on Incremental Depreciation for years 1–5**

$$\begin{aligned}\text{Incremental Depreciation per year} &= X - 5,00,000 / 5 \\ &= 0.20 X - 1,00,000\end{aligned}$$

$$\text{Tax Rate} = 0.46$$

$$\text{Present Value Factor of annuity for 5 years} = 3.36$$

$$\text{Present Value of tax savings on Incremental Depreciation for years 1 – 5} = \text{Incremental Depreciation per year} \times \text{Present Value Factor of annuity for 5 years}$$

Tax rate ₹ PV of annuity for 5 years

$$= 0.20X - 1,00,000) \times 0.46 \times 3.36$$

$$= 0.30912X - ₹ 1,54,560 \quad \dots(B)$$

Total Present Value

$$= (A) + (B)$$

$$= ₹ 4,94,100 + 0.30912X - ₹ 1,54,560$$

$$= ₹ 3,39,540 + 0.30912X$$

**Net present value = Present value of cash flows after tax – Present value of outflows**

$$₹ 4,53,000 \quad \quad \quad = ₹ 3,39,540 + 0.30912X - (X - ₹ 5,00,000)$$

$$₹ 4,53,000 \quad \quad \quad = ₹ 3,39,540 + 0.30912X - X + ₹ 5,00,000$$

$$0.69088X \quad \quad \quad = ₹ 3,39,540 + ₹ 5,00,000 - ₹ 4,53,000$$

$$X = \frac{3,86,540}{0.69088} = ₹ 5,59,489$$

Total value of machines required for replacement is ₹ 5,59,489

*(b) Financial evaluation whether replacement would yield post-tax return of 15% in 3 years*

	1	2	3
Increased Capacity (%)	10%	30%	50%
Increased sales	₹ 10,000	₹ 30,000	₹ 50,000
Contribution (Sales – V.C.)			
i.e. (₹ 30 – ₹ 15)	₹ 15	₹ 15	₹ 15
Incremental Contribution	₹ 1,50,000	₹ 4,50,000	₹ 7,50,000
Less: Incremental fixed cost	₹ 50,000	₹ 1,50,000	₹ 2,50,000
	₹ 1,00,000	₹ 3,00,000	₹ 5,00,000
Less: Incremental Depreciation			
(Rs. 5,00,000 + 5,59,489 – 10,00,000) / 5 years	Rs. 59,489 / 5		
	₹ 11,898	₹ 11,898	₹ 11,898
Earnings before taxes	₹ 88,102	₹ 2,88,102	₹ 4,88,102
Less: Taxes (0.46)	₹ 40,527	₹ 1,32,527	₹ 2,24,527
Earnings after taxes	₹ 47,575	₹ 1,55,575	₹ 2,63,575
Cash flow after tax			
(Earnings after tax + Depreciation)	₹ 59,473	₹ 1,67,473	₹ 2,75,473
Present Value Factor at 15%	0.87	0.76	0.66
Present Value	₹ 51,742	₹ 1,27,279	₹ 1,81,812

Total Present Value	= ₹ 3,60,833
Less: Incremental Cash Outflows	= ₹ 59,489
Net Present Value	<u>₹ 3,01,344</u>

Hence, the assessment of the managing director is correct as the Net Present Value is positive.

### Question No. 17

The management of Rohit Ltd. is considering the replacement of machine which has current written down value of ₹25,00,000 and a present sale value of ₹8,00,000. The machine is still usable for 5 years, but will have no scrap value at the end of 5 years.

A new machine having a useful life of 5 years and scrap value of ₹ 1,00,00,000 at the end of this is available for ₹ 10,00,000. The installation of the new machine, it is estimated, would result in saving of ₹ 20,00,000 per annum in operating cost at the present level of production. The capacity of new machine is more than that of old, and since sales are no Question, utilisation of additional capacity would bring in an additional contribution of ₹ 25,00,000 per annum (after meeting incremental costs of production and sale). This machine would be depreciated @ 25 per cent on written down basis.

The company has other assets in the block. Current income tax is 35 per cent. Considering the company's estimated cost of capital, it will not pay to purchase the new machine unless the net savings are 20% or more, on the added investment. Should the company replace the existing machine?

### Answer to Question No. 17

	(₹)
<b>Existing Machine</b>	
Current Written Down Value of Machine	25,00,000
Present Sale Value of Machine	8,00,000
Life of Machine	5 years
Scrap Value after 5 years	0
<b>New Machine</b>	
Scap Value	10,00,000
Cost Price	1,00,00,000
Life of Machine	5 years

### Calculation of Cash Flows for 5 years

(₹)

	1	2	3	4	5
Saving in Operating Cost	20,00,000	20,00,000	20,00,000	20,00,000	20,00,000
Contribution	25,00,000	25,00,000	25,00,000	25,00,000	25,00,000
EBIT	45,00,000	45,00,000	45,00,000	45,00,000	45,00,000
Incremental Depreciation	16,75,000	12,56,250	9,42,187	70,664	5,29,980
EBIT	28,25,000	32,43,750	35,57,813	37,93,359	39,700
Less Tax (@ 35%)	98,750	11,35,313	12,45,234	13,27,676	13,89,507

PAT	18,36,250	21,08,438	23,12,579	24,65,683	25,80,513
NPV	15,30,147	14,64,099	13,38,289	11,89,199	1,03,78,108
Total PV	65,58,842.3				

As the Net Present cash inflow is negative, it is not advisable to purchase the machine.

Old Machine Cost = ₹ 25,00,000

New Machine Cost = ₹ 1,00,00,000 – ₹ 8,00,000

Sale Value of Machine = ₹ 92,00,000

#### Calculation of Incremental Depreciation

(₹)

Year	Old machine	New machine	Incremental Depreciation
1	625000	2300000	1675000
2	468750	1725000	1256250
3	351563	1293750	942187
4	263672	970313	706641
5	197754	727734	529980

#### Question No. 18

Strong Enterprises Ltd. is a manufacturer of high quality running shoes. Ms. Dazling, President, is considering computerising the company's ordering, inventory and billing procedures. She estimates that the annual savings from computerisation include a reduction of ten clerical employees with annual salaries of ₹15,000 each, ₹8,000 from reduced production delays caused by raw materials inventory Questions, ₹12,000 from lost sales due to inventory stockouts and ₹3,000 associated with timely billing procedures. The purchase price of the system is ₹2,00,000 and installation costs are ₹50,000. These outlays will be capitalised (depreciated) on a straight-line basis to a zero book salvage value which is also its market value at the end of five years. Operation of the new system requires two computer specialists with annual salaries of ₹40,000 per person. Also annual maintenance and operating cash expenses of ₹12,000 are estimated to be required. The company's tax rate is 40% and its required rate of return (cost of capital) for this project is 12%.

You are required to –

- find the project's initial net cash outlay.
- find the project's after tax profit and cash flows over its 5-year life.
- evaluate the project using Net Present Value (NPV) method.
- evaluate the project using Profitability Index (PI) method.
- calculate the project's payback period.
- find the project's cash flows and NPV [parts (a) through [(c)] assuming that system can be sold for ₹25,000 at the end of five years even though the book salvage value will be zero.
- find the project's cash flows and NPV [parts (a) through (c)] assuming that the book salvage value of depreciation purposes is ₹20,000 even though the machine is worthless in terms of its resale value.

## NOTE:

(i) Present value of annuity of Re. 1 at 12% rate of discount for 5 years is 3.605.

(ii) Present value of Re. 1 at 12% rate of discount, received at the end of 5 years is 0.567.

**Answer to Question No. 18****(a) Project's Initial cash outlay**

	₹
Cost	2,00,000
Installation Expenses	<u>50,000</u>
Total Net Cash Outlay	<u>2,50,000</u>

**(b) Project's after tax profit and cash inflows over its 5-year life**

Savings	₹	₹
Reduction in clericals salaries	1,50,000	
Reduction in production delays	8,000	
Reduction in lost sales	12,000	
Gains due to timely production	<u>3,000</u>	1,73,000
<b>Less: Expenses</b>		
Depreciation	50,000	
Addl. employee's cost	80,000	
Maintenance cost	<u>12,000</u>	<u>1,42,000</u>
Profit before Tax		31,000
Less: Tax (40%)		<u>12,400</u>
Profit after Tax		<u>18,600</u>

Cash inflow = PAT + Depreciation

$$= ₹ 18,600 + ₹ 50,000 = ₹ 68,600$$

The cash flow is the same for the years 1 to 5.

**(c) Evaluation of the Profit by using NPV Method**

Years	Cash inflow after tax (₹)	PV of Annuity of Re. 1 at 12% for five years	=	Total present value (₹)
(1 to 5)	68,600	3.605		2,47,303
		<b>Less: total Initial Cash Outlay</b>		<u>2,50,000</u>
		NPV	=	<u>(- ₹ 2,697)</u>

Since NPV is negative, the project is unviable.

**(d) Evaluation of the Project by using PI Method**

Profitability Index (PI) = PV of cash inflows/Initial outlay

$$= 2,47,303/2,50,000 = 0.989$$

Since PI is less than 1.0, the project is unviable.

**(e) Calculation of the Projects' Payback Period**

Year	Net cash inflow (₹)	Cumulative cash inflow (₹)
1	68,600	68,600
2	68,600	137,200
3	68,600	205,800
4	68,600	274,400
5	68,600	343,000

$$\text{Payback period} = 3 \text{ years} + \frac{(\text{₹ } 2,50,000 - \text{₹ } 2,05,800)}{68,600}$$

Therefore, the payback period is 3.64 years.

**(f) Calculation of cash flows and NPV assuming when the system can be sold for ₹25,000 at the end of 5 years.**

In case the project has a salvage of ₹ 25,000 at the end of five years, present value of the after tax salvage amount is required to be added to the current NPV.

Post tax salvage value in year 5 = ₹ 15,000.

Present value of ₹ 15,000 discounted at 12% is (₹ 15000 × 0.567) = ₹ 8,505 Previous NPV of the projects is – ₹ 2697. [see © above] New NPV is ₹ 8,505 – ₹ 2,697 = ₹ 5,808, Since NPV > 0, the project is viable.

**(g) Project's cash flow and NPV assuming that book salvage value for depreciation purposes is ₹20,000.**

Depreciation = ₹ 2,50,000 – ₹ 20,000/5 = ₹ 46,000 per year

Cash flow for the years 1 to 5 are ₹ 67,000\*.

In year 5, the firm get an additional tax credit on ₹ 20,000 book value, which is ₹ 8,000, the NPV of this additional tax credit and new cash flow is – ₹ 3,929\*\*. Since NPV is negative the project is not viable.

₹

**Working\***

Saving [see (b) above]		1,73,000
Less : Expenses		
Depreciation	₹ 46,000	
Addl. employee's cost	₹ 80,000	
Maintenance cost	<u>₹ 12,000</u>	<u>1,38,000</u>
Profit before tax		35,000
Tax (40%)		<u>14,000</u>
Profit after tax		<u>21,000</u>

## 452 PP-FT&FM

Cash inflow = PAT + Depreciation = ₹ 21,000 + ₹ 46,000 = ₹ 67,000.

### Working\*\*

Years	Cash inflow (₹)	PV factor at 12%	Total present value (₹)
(1 to 5)	67,000	3.805 (Annuity)	2,41,535
<b>Add.</b> Tax Credit in 5th year	8,000	0.567	<u>4,536</u>
Total PV of cash inflow			2,46,071
<b>Less:</b> Total initial cash outlay			<u>2,50,000</u>
NPV			<u>(– ₹ 3,929)</u>

### Question No. 19

P. Ltd. has a machine having an additional life of 5 years, which costs ₹10,00,000 and has a book value of ₹4,00,000. A new machine costing ₹20,00,000 is available. Though its capacity is the same as that of the old machine, it will mean a saving in variable costs to the extent of ₹7,00,000 per annum. The life of the machine will be 5 years at the end of which it will have a scrap value of ₹2,00,000. The rate of income-tax is 46% and P Ltd.'s policy is not to make an investment if the yield is less than 12% per annum. The old machine, if sold today, will realise ₹1,00,000; it will have no salvage value if sold at the end of 5th year. Advise P. Ltd. whether or not the old machine should be replaced. (Present value of Re. 1 receivable annually for 5 years at 12% = 3.605, present value of Re. 1 receivable at the end of 5 years at 12% per annum = 0.567). Capital gain is tax free. Ignore income-tax savings on depreciation as well as on loss due to sale of existing machine.

### Answer to Question No. 19

#### Net Cash Outlay on New Machine

	₹
Purchase Price	20,00,000
<b>Less:</b> Realisation from sale of old machine	<u>1,00,000</u>
Net Initial Investment	19,00,000
<b>Cash Inflows</b>	
Annual saving in variable cost as a	
Result of purchase of New Machine	7,00,000
Tax = 46%	
Annual Saving in variable cost after tax = ₹ 7,00,000 (1 – 0.46) =	3,78,000
Present value for cash inflows annually	
for 5 years @12% per annum = 3,78,000 x 3.605 =	13,62,690
PV of Salvage value (2,00,000 x 0.567)	
at the end of 5 years @ 12% per annum	<u>1,13,400</u>
Total PV of Cash Inflows	14,76,090
<b>Less:</b> Initial Investment	<u>19,00,000</u>
Net Present Value	<u>–4,23,910</u>



Since NPV of new machine is negative, it is not profitable for the company to go for new machine. Therefore, the company should continue with the old machine.

**Question No. 20**

Norton Engineering company is considering the replacement of existing machine by a new one. The written down value of the existing machine is ₹ 1,50,000 and its cash salvage value is ₹ 40,000. The removal of this machine could cost ₹ 10,000 by way of labour charges etc. The purchase price of the new machine is ₹ 40 lakhs and its expected life is 10 years. The company follows straight line depreciation without considering scrap value. The other expenses associated with the new machine are carriage inward and installation charges ₹ 30,000, cost of training workers to handle the new machine ₹ 10,000, additional working capital ₹ 20,000 (which is assumed to be received back by sale of scraps in last year) and the fees paid to a consultant for his advice to buy a new machine ₹ 20,000. The annual savings (before tax) from the new machine would amount to ₹ 4,00,000. The income tax rate is 40%. The company's required rate of return is 12%. Should the company replace the existing machine?

**Note:** Present value of Re. 1 at 12% discount rate are as follows:

Year	1	2	3	4	5	6	7	8	9	10
P.V.	.893	.797	.712	.636	.567	.507	.452	.404	.361	.322

**Answer to Question No. 20**

*Present Value of Cash Outflow:*

		₹
Purchase Price of a new machine		40,00,000
Carriage inward for installation		30,000
Cost of Training to workers		10,000
Fees Paid to consultant		<u>20,000</u>
Total Investment on new machine		40,60,000
<b>Add:</b> Working capital		<u>20,000</u>
		40,80,000
<b>Less:</b> Cash inflow at the start cash salvage value of old machine	40,000	
<b>Less:</b> Removal charges	<u>10,000</u>	30,000
<b>Less:</b> Tax benefit on the loss of old machine (40%)		<u>48,000</u>
		<u>78,000</u>
Total cash outflow		<u>40,02,000</u>
Annual Cash Inflow (New Machine):		
Annual saving before tax		4,00,000
<b>Less:</b> Tax at 40%		<u>1,60,000</u>
Annual Saving after tax		2,40,000
<b>Add:</b> Depreciation (₹ 40,60,000 ÷ 10)		<u>4,06,000</u>
Annual Cash inflow		<u>6,46,000</u>

## Statement Showing NPV of Cash Flows

	<b>Cash inflows</b>	<b>PV Factor 12%</b>	<b>Present value</b>
	(₹)		(₹)
Annual Cash inflow for 10 years	6,46,000	5.650	36,49,900
Working capital received back after 10 years	20,000	0.322	<u>6,440</u>
Total Present Value of Cash-inflow in 10 years			36,56,340
Present value of cash outflows in 1st year			<u>40,02,000</u>
		NPV =	<u>(3,45,660)</u>

**Recommendation:** Since NPV is negative by ₹ 3,45,660, the company is advised not to buy the new machine.

		₹
@Written down value of the old machine		1,50,000
Salvage Value	40,000	
<b>Less:</b> Removal Charges	<u>10,000</u>	<u>30,000</u>
Loss on Salvaging the machine		1,20,000
Tax benefit due to loss on old machine (40%)		48,000

**Note:** Tax benefit has been presumed to have been realised at zero year. In practical life, tax benefit will be realised at the year-end over and if this presumption is taken then ₹ 48,000 will have to be discounted by the factor 0.893.

**Question No. 21**

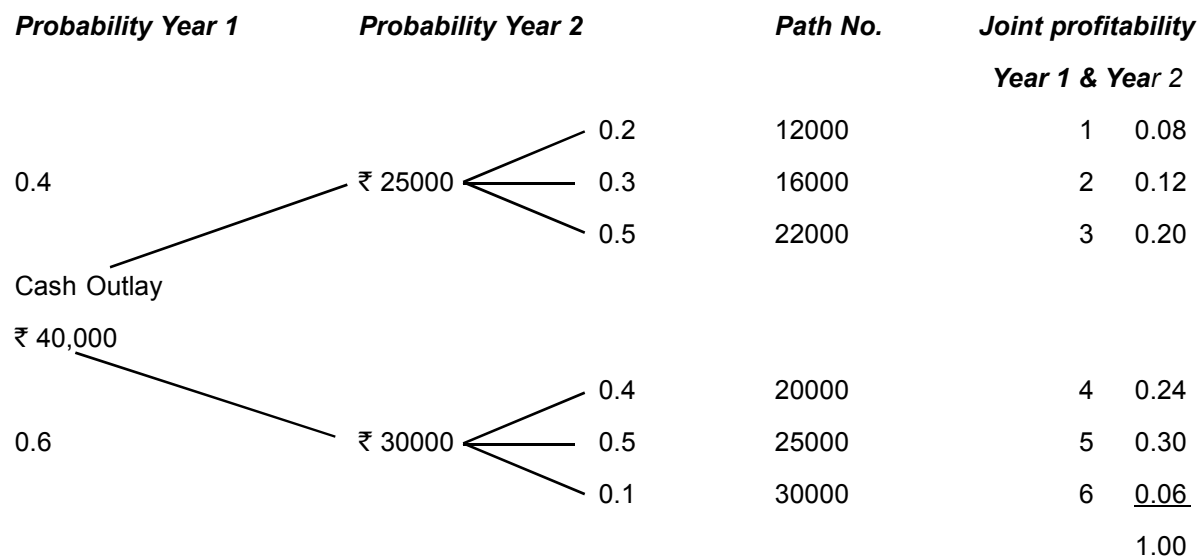
A firm has an investment proposal, requiring an outlay of ₹ 40,000. The investment proposal is expected to have 2 years' economic life with no salvage value. In year-1, there is a 0.4 probability that cash flow after tax (CFAT) will be ₹ 25,000 and 0.6 probability that CFAT will be ₹ 30,000. The probabilities assigned to CFAT for the year-2 are as follows:

<u><b>If CFAT = ₹ 25,000</b></u>		<u><b>If CFAT = ₹ 30,000</b></u>	
<b>Amount</b>	<b>Probability</b>	<b>Amount</b>	<b>Probability</b>
(₹)		(₹)	
12,000	0.2	20,000	0.4
16,000	0.3	25,000	0.5
22,000	0.5	30,000	0.1

The firm uses a 10% discount rate for this type of investment.

You are required to –

- Present the above information in the form of a decision tree.
- Find out the NPV under (a) the worst outcome; and (b) under the best outcome.
- Find out the profitability or otherwise of the above investment proposal.

**Answer to Question No. 21****(i) Decision Tree**

The Decision Tree given above shows that there are six possible outcomes each represented by a path.

(ii) The Net Present Value (NPV) of each path at 10% discount rate is given below:

Path	(Cash inflow year 1 x Discount factor year 1)(a)	(Cash inflow year 2 x Discount factor year 2)(b)	Total Cash inflow (c) = (a)+(b)	Cash Outflow (d)	Net present value(e) = (c)-(d)
₹	₹	₹	₹	₹	₹
1.	(25,000 x 0.909) = 22,725	(12,000 x 0.826) = 9,912	32,637	40,000	-7,363
2.	(25,000 x 0.909) = 22,725	(16,000 x 0.826) = 13,216	35,941	40,000	-4,059
3.	(25,000 x 0.909) = 22,725	(22,000 x 0.826) = 18,172	40,897	40,000	897
4.	(30,000 x 0.909) = 27,270	(20,000 x 0.826) = 16,520	43,790	40,000	3,790
5.	(30,000 x 0.909) = 27,270	(25,000 x 0.826) = 20,650	47,920	40,000	7,920
6.	(30,000 x 0.909) = 27,270	(30,000 x 0.826) = 24,780	52,050	40,000	12,050

(a) If the worst outcome is realized, the Net Present Value which the project will yield in ₹ 7,363 (negative).

(b) The best outcome will be path 6 when Net Present Value is highest i.e. ₹ 12,050 (Positive).

(iii) Statement showing the Expected Net Present Value

Path	NPV @ 10% (a) ₹	Joint Probability (b) ₹	Expected PV(a) x (b) ₹
1	-7,363	0.08	-589.04
2	-4,059	0.12	-487.08
3	897	0.20	179.40
4	3,790	0.24	909.60

5	7,920	0.30	2,376.00
6	12,050	0.06	723.00
		<b>1.00</b>	<b>3,111.88</b>

Yes, the project will be accepted since the Expected Net Present Value is positive.

### Question No. 22

A product is currently manufactured on a machine that is not fully depreciated for tax purposes and has book value of ₹ 80,000. It was purchased for ₹ 2,40,000 twenty years ago. The costs of the product are as follows:

	<b>Unit Cost</b>
	(₹)
Direct labour	28.00
Indirect labour	14.00
Other variable overhead	10.50
Fixed overhead	<u>17.50</u>
	<u>70.00</u>

In the past year 10,000 units were produced. It is expected that with suitable repairs the old machine can be used indefinitely in future. The repairs are expected to average ₹ 75,000 per year.

An equipment manufacturer has offered to accept the old machine as trade-in for a new equipment. The new machine would cost ₹ 5,20,000 before allowing for ₹ 1,00,000 for the old equipment. The project costs associated with the new machine are follows:

	<b>Unit Cost</b>
	(₹)
Direct labour	14.00
Indirect labour	21.00
Other variable overhead	7.00
Fixed overhead	<u>22.75</u>
	<u>64.75</u>

The fixed overhead costs are allocations for other departments plus the depreciation of the equipment.

The old machine can be sold now for ₹ 60,000 in the open market. The new machine has an expected life of 10 years and salvage value of ₹ 20,000 at that time. The current corporate income tax rate is assumed to be 50%. For tax purpose cost of the new machine and the book value of the old machine may be depreciated in 10 years. The minimum required rate is 10%. It is expected that the future demand of the product will stay at 10,000 units per year. The present value of an annuity of Re. 1 for 9 years @ 10% discount factor is = 5.759. The present value of Re. 1 received at the end of 10th year @ 10% discount factor is = 0.386.

Should the new equipment be purchased? (Assume no capital gain taxes).

**Answer to Question No. 22****Net Cash outlay on New Machine**

	₹	₹
Purchase Price		5,20,000
<b>Less:</b> Trade in value		<u>1,00,000</u>
		<u>4,20,000</u>

**Depreciation:**

New Machine	50,000
Old Machine	<u>8,000</u>
Differential Depreciation per annum	<u>42,000</u>

**Annual Cash Savings from New Machine**

Variable Cost of product on new machine (A)	4,20,000
(10,000 units x ₹ 42)	
Variable cost of product on old machine (B)	5,25,000
(10,000 units x ₹ 52.50) + Annual Repair	<u>75,000</u>
	<u>6,00,000</u>

Differential savings (₹ 6,00,000 – ₹ 4,20,000) per annum 1,80,000

Taxable Saving (₹ 1,80,000 – ₹ 42,000) 1,38,000

**Less:** Tax @ 50% 69,000

Income after tax 69,000

**Add:** Depreciation (Difference) 42,000

Cash flow per annum for 9 years 1,11,000

Cash flow for 10th year ₹ 1,11,000 + ₹ 20,000 salvage value 1,31,000

**Present value of 1,11,000 annuity for 9 years**

(₹ 1,11,000 x 5.759) 6,39,249

Present value of ₹ 1,31,000 at the end of 10th year

(₹ 1,31,000 x 0.386) 50,566

Present value of Total cash Inflow 6,89,815

**Less:** Cash outlay 4,20,000

**Net Present Value** 2,69,815

*Recommendation:* Since NPV is positive, new equipment should be purchased.

**COST OF CAPITAL****Question No. 23**

In considering the most desirable capital structure for a company, the following estimates of the cost of debt and equity capital (after tax) have been made at various levels of debt-equity mix:

<i>Debt as percentage of total capital employed</i>	<i>Cost of debt (%)</i>	<i>Cost of equity (%)</i>
10	7.0	15.0
20	7.0	15.0
30	7.5	16.0
40	8.0	17.0
50	8.5	19.0
60	9.5	20.0

You are required to determine the optimal debt-equity mix for the company by calculating composite cost of capital.

**Answer to Question No. 23****Composite Cost of Capital**

<i>Debt as % of total capital</i>	<i>Cost of debt %</i>	<i>Cost of equity %</i>	<i>Composite Cost of capital %</i>
0	7.0	15.0	$(7 \times 0) + (15 \times 1) = 15.0$
10	7.0	15.0	$(7 \times 0.10) + (15 \times 0.9) = 14.20$
20	7.0	15.5	$(7 \times 0.20) + (15.5 \times 0.80) = 13.80$
30	7.5	16.0	$(7.5 \times 0.30) + (16 \times 0.70) = 13.45$
40	8.0	17.0	$(8 \times 0.40) + (17 \times 0.60) = 13.40$
50	8.5	19.0	$(8.5 \times 0.50) + (19 \times 0.50) = 13.75$
60	9.5	20.0	$(9.5 \times 0.60) + (20 \times 0.40) = 13.70$

The optimal debt-equity mix for the company on the basis of composite cost of capital = 40 % debt

= 60 % Equity

When the composite cost of capital will be least i.e. 13.40.

**Question No. 24**

M/s Robert Cement Corporation has a financial structure of 30% debt and 70% equity. The company is considering various investment proposals costing less than ₹ 30 lakhs.

The corporation does not want to disturb its present capital structure.

The cost of raising the debt and equity are as follows:

**Project Cost****Cost of debt****Cost of equity**

Upto ₹ 5 lakhs	9%	13%
Above ₹ 5 lakhs and upto ₹ 20 lakhs	10%	14%
Above ₹ 20 lakhs and upto ₹ 40 lakhs	11%	15%
Above ₹ 40 lakhs and upto ₹ 1 crore	12%	15.5%

Assuming the tax rate of 50% you are required to calculate:

- (i) Cost of capital of two projects A and B whose funds requirements are ₹ 8 lakhs and ₹ 21 lakhs respectively, and
- (ii) If a project is expected to give after tax return of 11% determine under what conditions it would be acceptable.

**Answer to Question No. 24****(i) Calculation of Weighted Average Cost of Capital**

<b>Project Financing</b>		<b>Prop. of capital structure</b>	<b>Cost before tax (%)</b>	<b>Cost after tax of Capital</b>		<b>Weighted cost</b>
Upto ₹ 5 lakhs	Debt	0.30	9.00	4.50	1.35	
Equity	Equity	0.70	13.00	13.00	9.10	<b>10.45</b>
Above ₹ 5 lakhs and upto ₹ 20 lakhs	Debt	0.30	10.00	5.00	1.50	
Equity	Equity	0.70	14.00	14.00	9.80	<b>11.30</b>
Above ₹ 20 lakhs and upto ₹ 40 lakhs	Debt	0.30	11.00	5.50	1.65	
Equity	Equity	0.70	15.00	15.00	10.50	<b>12.15</b>
Above ₹ 40 lakhs and upto ₹ 1 Crore	Debt	0.30	12.00	6.00	1.80	
Equity	Equity	0.70	15.50	15.50	10.85	<b>12.65</b>

- (i) Project A costs ₹ 8 lakhs. In the above table one can see that Project A lies in the range of ₹ 5 lakhs and ₹ 20 lakhs. So the weighted average cost of capital for this amount to the company will be 11.30 per cent. Similarly, for the project B which requires ₹ 21 lakhs and lies in the range of ₹ 20 lakhs and ₹ 40 lakhs the weighted average cost of capital will be 12.15 per cent.
- (ii) A company may accept a project which is expected to give after tax return of 11% if project cost is below ₹ 5 lakhs. The project which requires above ₹ 5 lakhs may not be accepted by the company because the expected rate of return on the project is low as against its cost of capital and thus acceptance of project will adversely affect the value of share of the company.

**Question No. 25**

Following are the details regarding capital structure of a company.

	<b>Book value</b>	<b>Market value</b>	<b>Specific cost</b>
(₹)	(₹)	(%)	
Debentures	80,000	76,000	5
Preference Capital	20,000	22,000	8
Equity Capital	1,20,000	2,40,000	13
Retained Earnings	<u>40,000</u>	<u>—</u>	9
	<u>2,60,000</u>	<u>3,38,000</u>	

You are required to calculate the weighted average cost of capital using (i) book value as weights (ii) market value as weights. Can you imagine a situation where weighted average cost of capital would be the same using either of the weights?

**Answer to Question No. 25**

**(i) Calculation of the weighted average cost of capital using book value weights:**

<b>Source of Capital</b>	<b>Amount of Book value (W) (₹)</b>	<b>Specific Cost (X)(%)</b>	<b>Total cost (XW) (₹)</b>
Debentures	80,000	5	4,000
Preference Capital	20,000	8	1,600
Equity Capital	1,20,000	13	15,600
Retained Earning	<u>40,000</u>	9	<u>3,600</u>
	<u>2,60,000</u>		<u>24,800</u>

$$\text{Weighted average cost of capital (K}_o\text{)} = \frac{\sum XW}{\sum W}$$

$$= \frac{\text{Total Costs}}{\text{Total Capital}} \times 100$$

$$\frac{\text{Rs. 24,800}}{\text{Rs. 2,60,000}} \times 100 = 9.54\% \quad \text{Approximately}$$

**(ii) Calculation of the weighted average cost of capital using market value as weights:**

<b>Source of Capital</b>	<b>Market value (W)(Rs)</b>	<b>Specific Cost (X)(%)</b>	<b>Total cost (WX)(₹)</b>
Debentures	76,000	5	3,800
Preference Capital	22,000	8	1,760
Equity Capital	1,80,000	13	23,400
Retained Earning	<u>60,000</u>	9	<u>5,400</u>
	<u>3,38,000</u>		<u>34,360</u>

$$K_o = \frac{\text{Rs. 34,360}}{\text{Rs. 3,38,000}} \times 100$$

$$= 10.17\%$$



In our question the market value of equity share and retained earnings is ₹ 2,40,000 as against their book value ₹ 1,60,000. In relative term we can say that every equity funds of rupees 2 at book value have market value of ₹ 3/- (₹ 2,40,000/₹ 1,60,000). On basis of this criteria, we may calculate the value of retained earning and that of equity shares as under.

$$\text{Value of retained earnings} = ₹ 40,000 \times \frac{3}{2} = ₹ 60,000$$

$$\text{Value of Equity Share} = ₹ 1,20,000 \times \frac{3}{2} = ₹ 1,80,000$$

The weighted average cost of capital computed on the basis of market value weight is higher than the weighted average cost of capital computed on the basis of book value weights as in our Question. Because market value of equity capital is higher than its book value.

The weighted average cost of capital would be the same under book value weights and market value weights provided there is no difference in value of securities under both the cases.

### **Question No. 26**

The Novex company has the following capital structure on 31st March, 2013

	₹
Ordinary shares (4,00,000 shares)	80,00,000
10% Preference shares	20,00,000
14% Debentures	<u>60,00,000</u>
	<u>1,60,00,000</u>

The share of the company sells for ₹ 20. It is expected that company will pay next year a dividend of ₹ 2 per share which will grow at 7 per cent forever. Assume a 40 per cent tax rate.

You are required to:

- Compute a weighted average cost of capital based on existing capital structure.
- Compute the new weighted average cost of capital if the company raises an additional ₹ 40 lakh debt by issuing 15 per cent debenture. This would result in increasing the expected dividend to ₹ 3 and leave the growth rate unchanged, but the price of share will fall to ₹ 15 per share.
- Compute the cost of capital if in (b) above growth rate increases to 10 per cent.

### **Answer to Question No. 26**

#### **(a) Weighted Average Cost of Capital – Existing Capital Structure**

	Amount cost	After-tax (%)	Weights cost (%)	Weighted
Ordinary Shares	80,00,000	0.17	* 0.500	0.0850
10% Preference Shares	20,00,000	0.10	0.125	0.0125
14% Debentures	<u>60,00,000</u>	0.084	0.375	<u>0.0315</u>
Total	<u>1,60,00,000</u>			<u>0.1290</u>
Weighted Average Cost of Capital (WACC)				or 12.9%

\*Cost of Ordinary Share  $(K_e) = \frac{D_1}{P_0} + g$

$$= \frac{\text{Rs. 2}}{\text{Rs. 20}} + 0.07$$

$$= 0.10 + 0.07 = 0.17$$

**(b) Weighted Average Cost of Capital—New Capital Structure**

<b>Scripts</b>	<b>Amount (₹)</b>	<b>After-tax cost</b>	<b>Weights (%)</b>	<b>Weighted cost (%)</b>
Ordinary shares	80,00,000	0.27	** 0.40	0.108
10% Preference shares	20,00,000	0.10	0.10	0.010
14% Debentures	60,00,000	0.084	0.30	0.025
15% Debentures	<u>40,00,000</u>	0.09	0.20	<u>0.018</u>
Total	<u>2,00,00,000</u>			<u>0.161</u>
Weighted Average Cost of Capital (WACC)				or 16.1%

\*\*Cost of ordinary share  $(K_e) = \frac{D_1}{P_0} + g$

$$= \frac{\text{Rs. 3}}{\text{Rs. 15}} + 0.07$$

$$= 0.20 + 0.07 = 0.27$$

**(c) Weighted Average Cost of Capital—Changed Growth Rate**

<b>Scripts</b>	<b>Amount (₹)</b>	<b>After-tax cost</b>	<b>Weights (%)</b>	<b>Weighted cost (%)</b>
Ordinary shares	80,00,000	0.30	*** 0.40	0.120
10% Preference shares	20,00,000	0.10	0.10	0.010
14% Debentures	60,00,000	0.084	0.30	0.025
15% Debentures	<u>40,00,000</u>	0.09	0.20	<u>0.018</u>
Total	<u>2,00,00,000</u>			<u>0.173</u>
Weighted Average Cost of Capital (WACC)				or 17.3%

\*\*\*Cost of ordinary share  $(K_e) = \frac{D_1}{P_0} + g$

$$= \frac{\text{Rs. 3}}{\text{Rs. 15}} + 0.10$$

$$= 0.20 + 0.10 = 0.30$$

**Note:** The book value weights have been used to calculate WACC in the above cases.

**MANAGEMENT OF WORKING CAPITAL****Question No. 27**

From the given information for Ajanta manufacturing company, prepare an estimate of the requirement of working capital.

Production	90,000 units
Selling Price per unit	₹ 5/-
Raw Materials	60% of selling price
Direct Wages	10% of selling price
Overheads	20% of selling price
Materials in hand	2 months requirements
Production time	1 month
Finished goods in stores	3 months
Credit for material	2 months
Credit allowed to customers	3 months
Average cash balance	₹ 30,000/-

*Wages and overheads are paid at the beginning of the month following. In production all the required materials are charged in the initial stage and wages and overheads accrue evenly.*

**Answer to Question No. 27****Calculation of Working Capital Requirement**

	<b>Amount in ₹</b>	<b>Amount in ₹</b>
<b>Current assets (level of production 90,000 units)</b>		
<b>Current Assets:</b>		
Materials (90,000 x ₹ 3 x 2/12)		45,000
<b>Work in Progress:</b>		
Materials (90,000 x ₹ 3 x 1/12)	22,500	
Labour (90,000 x ₹ 0.50 x 1/12 x 1/2)	1,875	
Overheads (90,000 x Re. 1 x 1/12 x 1/2)	<u>3,750</u>	28,125
Finished goods (90,000 x 90% x ₹ 5 x 3/12)		1,01,250
Debtors (90,000 x ₹ 5 x 3/12)		1,12,500
Cash		<u>30,000</u>
<b>Total Current Assets (A)</b>		<u>3,16,875</u>
<b>Less: Current Liabilities</b>		
Creditors (90,000 x ₹ 3 x 2/12)	45,000	
Outstanding wages (90,000 x Re. 0.50 x 1/12)	3,750	
Outstanding Overheads (90,000 x Re. 1 x 1/12)	<u>7,500</u>	
Total Current Liabilities (B)		<u>56,250</u>
<b>Estimated Working Capital Requirements (A-B)</b>		<u>2,60,625</u>

**Question No. 28**

The Management of Apollo Ltd. Has called for a statement showing the working capital needed to finance a level of activity of 6,00,000 units of output for the year. The cost structure for the company's product, for the above mentioned level is given as under:

	<b>Cost per unit (₹)</b>
Raw materials	20
Direct labour	5
Overheads	<u>15</u>
Total cost	<u>40</u>
Profit	<u>10</u>
Selling price	<u>50</u>

Past trends indicate that raw materials are in stock on an average for two months.

Work in progress will approximate to half a months production. Finished goods remain in warehouse on an average for a month. Supplier of a materials extend a months credit.

*Two months credit is normally allowed to debtors. A minimum cash balance of ₹ 60,000 is expected to be maintained. The production pattern is assumed to be even during the year. Prepare the statement of working capital determination.*

**Answer to Question No. 28****Statement showing Cost & Profit**

	<b>Per unit (₹)</b>	<b>Amount for 6,00,000 Units of output (₹)</b>
Raw materials	20.00	1,20,00,000
Direct labour	5.00	30,00,000
Overheads	<u>15.00</u>	<u>90,00,000</u>
Total cost	40.00	2,40,00,000
Profit	<u>10.00</u>	<u>60,00,000</u>
Sales	50.00	3,00,00,000

**Calculation of working capital requirement**

	<b>₹</b>
Raw materials (stock for two months) = $\frac{2}{12} \times 1,20,00,000$	20,00,000
Work in progress 1/2 months production i.e. 1/2 month total cost = $\frac{1}{24} \times 2,40,00,000$	10,00,000
Finished goods remain in warehouse for one month	
Total inventory one month's total cost = $\frac{1}{12} \times 2,40,00,000$	20,00,000

	50,00,000
Debtor balances – 2 months sales = $\frac{2}{12} \times 3,00,00,000$	50,00,000
Cash balance (minimum as given in the question)	<u>60,000</u>
Total current assets	1,00,60,000
<b>Less:</b> Creditors = $\frac{1}{12} \times 1,20,00,000$	10,00,000
Working capital required	<u>90,60,000</u>

**Question No. 29**

*M/s Kataria & Co. have approached their banker for their working capital requirement who have agreed to sanction the same by retaining the margins as under:*

Raw material	15%
Stock in Progress	30%
Finished goods	20%
Debtors	10%

From the following projections for 2013–14 you are required to work out:

- (a) the working capital required by the company; and  
 (b) the working capital limits likely to be approved by bankers.

Estimates for 2013–14	₹
Annual Sales	16,80,000
Cost of production	14,40,000
Raw material Purchases	8,15,000
Monthly Expenditure	45,000
Anticipated opening stock of raw materials	1,80,000
Anticipated closing stock of raw materials	1,55,000

**Inventory Norms:**

Raw material	2 months
Work in Progress	15 days
Finished goods	1 months

*The firm enjoy a credit of 15 days on its purchases and allows 1 month credit on its supplies. On sales orders, the company has received an advance of ₹ 25,000. State your assumption if any.*

**Answer to Question No. 29****Calculation of Monthly consumption of raw materials, monthly sales and monthly cost of production***Raw materials*

Opening Stock + Purchases (₹ 8,15,000 + ₹ 1,80,000)	=	₹ 9,95,000
<b>Less</b> closing stock	=	<u>₹ 1,55,000</u>
Annual Consumption	=	₹ 8,40,000
Monthly Consumption = $\frac{\text{Rs. 8,40,000}}{12}$	=	₹ 70,000
Monthly Sales $\frac{\text{Annual Sales}}{12} = \frac{\text{Rs. 16,80,000}}{12}$	=	₹ 1,40,000
Monthly Cost of Production $\frac{\text{Cost of Production per year}}{12} = \frac{\text{Rs. 14,40,000}}{12}$	=	₹ 1,20,000

**Calculation of Working capital required by Kataria & Co.**

	₹
1. Raw materials — 2 months consumption	1,40,000
2. Work in Progress — 15 days Cost of Production	60,000
3. Finished Goods — 1 month Cost of Production	1,20,000
4. Sundry debtor — 1 month sales	1,40,000
5. Expenses for — 1 month	<u>45,000</u>
	<u>5,05,000</u>

<b>Less :</b> (i) Creditors 15 days purchases $\left( \frac{8,15,000}{12} \times \frac{1}{2} \right)$	= 33,959	
(ii) Advance received on sales order	= <u>25,000</u>	<u>58,959</u>
Working capital required by the company		4,46,041

**Working capital limits set by bankers**

1. Raw materials — 2 months' consumption	1,40,000	
<b>Less:</b> 15% margin	<u>21,000</u>	1,19,000
2. Work in progress — 15 days' cost of production	60,000	
<b>Less:</b> 30% margin	18,000	42,000
3. Finished goods — 1 month cost of production	1,20,000	
<b>Less:</b> 20% margin	<u>24,000</u>	96,000
4. Sundry Debtors — 1 month sales	1,40,000	
<b>Less:</b> 10% margin	<u>14,000</u>	1,26,000
5. For expenses		<u>Nil</u>
<b>Total limit likely to be approved by bank</b>		<u>3,83,000</u>

**Question No. 30**

A company is floated to manufacture a new chemical called 'moin'. Currently 'moin' is imported in India at a landed cost of ₹ 8,500 per tonne. The following data have been collected regarding the project:

**(i) Investment:**

Land	= ₹ 1 lakh
Building	= ₹ 8 lakhs
Plant and machinery	= ₹ 12 lakhs

**(ii) Cost of production:**

Imported raw material	= ₹ 6,50,000
Indigenous raw material	= ₹ 6,26,000
Salaries and wages	= ₹ 1,35,000
Repairs and maintenance:	5% on plant cost; and 2% on building cost
Depreciation:	7% on plant; and 2-1/2% on building
Administrative expenses	= ₹ 50,000
Steam requirement	= ₹ 7,000 tonnes at ₹ 16 per tone
Power	= ₹ 60,000
Packing drums	= ₹ 30 each per 500 kgs.

**(iii) Working capital requirements:**

Imported raw material stock	— 6 months
Local raw material stock	— 3 months
Packing material stock	— 3 months
Finished product stock	— 1 month
Credit to customers	— 1 month
Credit from suppliers	— 1 month
Cash expenses	— 1 month

**(iv) Expected production — 250 M/T per annum.**

- Calculate the total capital needed for the project.
- Assuming that the entire production can be sold at the imported price, calculate the percentage yield on the investment and profit on sales.
- Also calculate the rate of cash generation per annum before taxation.

**Answer to Question No. 30****Working:**

<b>Forecast Operating Statement</b>	<b>₹</b>
Raw materials — imported	6,50,000
Raw materials — local	6,26,000
Packing material — 500 drums @ ₹ 30/- each	15,000
Salaries and wages	1,35,000
Repair and Maintenance: Plant	60,000
Building	16,000
Administrative expenses	50,000
Steam requirement	1,12,000
Power	60,000
Depreciation: Plant	84,000
Building	<u>20,000</u>
Total Cost	<u>18,28,000</u>

<b>Production 250 M/T</b>	
Cost per tonne (₹ 18,28,000 – 250)	7,312
Selling price	8,500
Profit	<u>1,188</u>
Total profit per annum	<u>2,97,000</u>
<b>Investment</b>	<b>₹ in lakh</b>
Fixed Assets	1.00
Land	8.00
Building	<u>12.00</u>
Total	<u>21.00</u>

**Answer to Question No. 30(i)****Working Capital**

(i) Total Capital needed for the project

*Investment in fixed Assets:*

	(Amt. in ₹)	(Amt. in ₹)
Land	1,00,000	
Building	8,00,000	
P & M	12,00,050	<u>21,00,000</u>
Investment in working capital		
Imported Raw Material	(6,50,000 x 6/12)	3,25,000
Local Raw Material	(6,26,000 x 3/12)	1,56,000
Packing Drums Stock	(15,000 x 3/12)	3,750



Debtors (₹ 8,500 x 250)	(21,25,000 x 1/12)	1,77,083
Finish Goods Stock	(18,28,000 x 1/12)	1,52,333
Cash exp.	(4,48,000 x 1/12)	37,334
		<u>8,52,000</u>
<b>Creditors</b>		
Import ₹ 6,50,000		
Local ₹ 6,26,000	(12,76,000 x 1/12)	1,06,333
Working Capital		₹ 7,45,667
Total Capital Required = Fixed Capital + Working Capital		
(₹ 21,00,000 + ₹ 7,45,667)		= ₹ 28,45,667

**Answer to Question No. 30(ii)**

It has been assumed that no credit is available in respect of imported raw material.

(a) Total Capital requirement	₹/lakh
Investment	21.00
Working Capital	7.97
	<u>28.97</u>

$$(b) \text{ Percentage yield on total investment} = \frac{2,97,000 \times 100}{\text{Rs. } 28,97,000} = \text{Rs. } 10.25\%$$

$$\text{Profit on sales: } \frac{\text{Rs. } 1,188}{\text{Rs. } 8,500} \times 100 = 13.97\%$$

**Answer to Question No. 30(iii)**

Cash generation per annum: Profit + Depreciation

$$\begin{aligned} & ₹ 2.97 \text{ lakhs} + ₹ 1.04 \text{ lakhs} \\ & = ₹ 4.01 \text{ lakhs} \end{aligned}$$

**Question No. 31**

PQR company is currently selling 2,00,000 units of its product @ ₹ 50 each. At the current level of production the cost per unit is ₹ 45, variable cost per unit is ₹ 40. The company is currently extending one month credit. The company is thinking of extending credit period to two months in the expectation that sales will increase by 20 per cent. If the required rate of return on firms investment is 25 per cent, is the new credit policy desirable for the company?

**Answer to Question No. 31****Calculation of total cost at new Sales Level**

	₹
Cost at present level of sales (2,00,000 x ₹ 45)	90,00,000
Cost of increased sales (2,00,000 x 20%) x 40	<u>16,00,000</u>
Cost of Sales of 2,40,000 units	1,06,00,000
Average cost per unit of sales at the new level of Sales is = $\frac{1,06,00,000}{2,40,000}$	44.16

Calculation of Profitability and required rate of return	
Profitability on additional sales [40,000 x (₹ 50 – ₹ 40)]	4,00,000
Present average investment in receivables = ₹ 90,00,000/12	7,50,000
Average investment in receivable after change in credit policy (₹ 1,06,00,000/6)	17,66,666
Additional investment in receivables (₹ 17,66,666 – ₹ 7,50,000)	10,16,666
Required rate of return on additional investment (₹ 10,16,666 x .25)	2,54,166

From above it is clear the new credit policy is acceptable to the company because profit on account of additional sales is expected to increase by ₹ 4,00,000 as against the required rate of return of ₹ 2,54,166 on the additional investment in receivable.

Assumptions : (1) All sales are on credit sales.

(2) Fixed cost do not change.

### Question No. 32

Compute 'maximum bank borrowings' permissible under Method I, Method II and Method III of Tandon Committee norms from the following figures and comment on each method:

₹ (lakhs)	₹ (lakhs)
<b>Current Liabilities:</b>	<b>Current Assets:</b>
Creditors for purchases 400	Raw Materials 800
Other current liabilities <u>200</u> 600	Work-in-process 80
Bank borrowings inclu	Finished goods 360
bills discounted	Receivables including billswith bankers 800
discounted with bankers 200	
	Other current assets <u>40</u>
<u>1,400</u>	<u>1,480</u>

Assume core current assets are ₹ 380 lakhs.

### Answer to Question No. 32

#### Maximum bank borrowings permissible under different methods of Tandon Committee norms

Method I	(₹ in lakhs)
Total current assets	1480
<b>Less:</b> Current liabilities other than bank borrowings	<u>600</u>
Working capital gap	880
<b>Less:</b> Borrower's contribution of 25% of above from Long term sources	<u>220</u>
Maximum bank borrowings permissible	<u>660</u>
Excess borrowings (₹ 800 lakhs – ₹ 660 lakhs)	140
<b>Method II</b>	
Total current assets	1480

<b>Less:</b> Borrower's contribution of 25% of above from Long term sources	<u>370</u>
<b>Less:</b> Current liabilities other than bank borrowings	<u>600</u>
Maximum bank borrowings permissible	<u>510</u>
Excess borrowings (₹ 800 lakhs – ₹ 510 lakhs)	290
<b>Method III</b>	
Total current assets	1480
<b>Less:</b> Core current assets (100% Contribution)	<u>380</u>
Real current assets	1100
<b>Less:</b> Borrower's contribution of 25% of above from Long term sources	<u>275</u>
	825
<b>Less:</b> Current liabilities other than bank borrowings	<u>600</u>
Maximum bank borrowings permissible	<u>225</u>
Excess borrowings (₹ 800 lakhs – ₹ 225 lakhs)	575

**Comments**

**Method I:** According to Method I prescribed by Tandon Committee the maximum permissible limit of bank borrowings for the Company are ₹ 660 lakhs whereas actual bank borrowings are of ₹ 800 lakhs. Thus, there is excess amount of bank borrowing to the tune of ₹ 140 lakhs which may be converted into term loan to be paid out gradually.

**Method II:** According Method II, the Company has to get ₹ 290 lakhs converted into term loan to be phased out gradually.

**Method III:** As per Method III, excess borrowings of the Company from bank are ₹ 575 lakhs. Under this method, the borrower has to finance core current assets also from the long-term sources. Till the time the borrower is able to arrange for long-term funds, bank may convert the excess amount of borrowings into term loan to be phased out in future.

**Question No. 33**

X Public Limited Company has obtained the following data concerning the average working capital cycle for other components in the same industry.

	Day
Raw material stock turnover	20
Credit received	(40)
Work in progress turnover	15
Finished goods stock turnover	40
Debtors' collection period	<u>60</u>
	<u>95</u>

Using the following information, you are required to calculate the current working capital cycle for X Public Limited Co. and briefly comment on it.

	₹ ('000)
Sales	3,000
Cost of sales	2,100
Purchases	600
Average raw material stock	80
Average work-in-progress	85
Average finished goods stock	180
Average creditors	90
Average debtors	350

**Answer to Question No. 33**

Working capital cycle for X Public Ltd. Co. can be calculated in the following manner—

$$\text{Raw material stock} = \frac{\text{Average raw material stock}}{\text{Purchases}} \times 365$$

$$= \frac{80}{600} \times 365 = 49 \text{ days approx.}$$

$$\text{Less: Creditors} = \frac{\text{Average creditors}}{\text{Purchases}}$$

$$= \frac{90}{60} \times 365 = (55) \text{ days}$$

$$\text{Work in progress} = \frac{\text{Average work in Progress}}{\text{Cost of goods sold}} \times 365$$

$$= \frac{85}{2100} \times 365 = 15 \text{ days}$$

$$\text{Finished goods stock} = \frac{\text{Average finished goods stock}}{\text{Cost of goods sold}} \times 365$$

$$= \frac{180}{2100} \times 365 = 31 \text{ days}$$

$$\text{Debtors} = \frac{\text{Average debtors}}{\text{Sales}} \times 365$$

$$= \frac{350}{3000} \times 365 = 43 \text{ days}$$

Working capital cycle is 83 days = 49 – 55 + 15 + 31 + 43

**Comments**

Overall, the working capital cycle is below the industry average, indicating a lower investment in current assets. However, the following point should be noted about the individual elements of working capital:

- The stock of raw material is considerably higher than the average. The stock control procedures should be reviewed since these could possibly be reduced.

- (b) The value of creditors is also above average. This indicates that X Ltd. Company is delaying the payment of creditors beyond the credit period. Although this is an additional source of finance, it may result in a higher cost of raw materials.
- (c) The finished goods stock is below average. This may be due to high demand for the firm's goods or to efficient stock control. A low finished goods stock can be however, reduce sales since it can cause delivery delays.
- (d) Debts are collected more quickly than average. The Company may employ good credit control procedures or may offer cash discount for early payment. This can, however, be done at the expense of profitability.

**Question No. 34**

Calculate the amount of working capital requirements for Jolly & Co. Ltd. from the following information :

	₹ (per unit)
Raw materials	160
Direct labour	60
Over heads	<u>120</u>
Total cost	340
Profit	<u>60</u>
Selling price	<u>400</u>

Raw materials are held in stock on an average for one month. Materials are in process on an average for half-a-month. Finished goods are in stock on an average for one month.

Credit allowed by suppliers is one month and credit allowed to debtors is two months. Time leg in payment of wages is 1-1/2 weeks. Time leg in payment of overhead expenses is one month. One fourth of the finished goods is sold against cash.

Cash in hand and at bank is expected to be ₹ 50,000 ; and expected level of production amounts to 1,04,000 units.

You may assume that production is carried on evenly throughout the year, wages is equivalent to a month.

**Answer to Question No. 34****Total value method****Working:**

1. **Raw material inventory:** Total cost of materials for the whole year (Fifty two weeks) is ₹ 1,66,40,000. The monthly (four weeks ) consumption would be ₹ 12,80,000. Raw material requirement is for one month, hence raw materials in stock would be ₹ 12,80,000.
2. **Debtors:** The average credit sales (per week) is ₹ 6,00,000. Therefore, a sum of ₹ 48,00,000 is the amount of sundry debtors.
3. **Creditors:** Suppliers allow a one month credit period. Hence the average amount of creditors is ₹ 12,80,000. Besides wages and overhead payable are:  
 Wages (1-1/2 weeks) = ₹ 1,80,000  
 Overheads (4 weeks) = ₹ 9,60,000
4. **Work-in-process:**

₹

(i) Raw materials in WIP	6,40,000
(ii) Labour cost (it is given in the question that labour and overheads accrue evenly throughout the year or month. Thus on the first day of month it would be zero, and on the last day of the month the WIP includes one month's labour cost on an average it is equivalent to 1 week labour cost).	1,20,000
(iii) Overhead (for 1 weeks as explained above)	<u>2,40,000</u>
Total WIP	<u>10,00,000</u>

**5. Finished goods inventory:**

One month cost of raw material	12,80,000
Labour	4,80,000
Overhead	<u>9,60,000</u>
	<u>27,20,000</u>

**Working capital requirements :****Current Assets (A):**

	₹	₹
Raw materials inventory	12,80,000	
Debtors	48,00,000	
Work-in-process	10,00,000	
Finished goods inventory	27,20,000	
Cash	<u>50,000</u>	98,50,000

**Current liabilities (B):**

Creditors	12,80,000	
Wages payable	1,80,000	
Overheads payable	<u>9,60,000</u>	<u>24,20,000</u>
		<u>74,30,000</u>

**Alternate Cash Cost Method****Working capital requirements:**

<b>Current Assets</b>	
Raw materials inventory	12,80,000
*Debtors	40,80,000
Work-in-progress	10,00,000
Finished goods inventory	27,20,000
Cash	50,000
<b>Total</b>	<b>91,30,000</b>

<b>Current Liabilities:</b>	
Creditors	12,80,000
Wages payable	1,80,000
Overhead payable	9,60,000
Estimated Working Capital requirement (Balancing figure)	67,10,000
<b>Total</b>	<b>91,30,000</b>

\*Debtors: The average credit sales (per week) is ₹ 5,10,000 (1,500 units x ₹340).

### Question No. 35

In order to increase sales from the normal level of ₹ 2.4 lakhs per annum, the marketing manager submits a proposal for liberalising credit policy as under :

Normal sales ₹ 2.4 lakhs

Normal credit period 30 days

<b>Proposed increase in credit period beyond normal 30 days</b>	<b>Relevant increase over normal sales (₹)</b>
15 days	12,000
30 days	18,000
45 days	21,000
60 days	24,000

The P.V. ratios of the company is 33-1/3%

The company expects a pre-tax return of 20% on investment. Evaluate the above four alternatives and advise the management. (Assume 360 days a year)

### Answer to Question No. 35

#### Evaluation of Alternative

(₹ in lakhs)

	<b>Existing Credit Policy</b>	<b>Proposed Credit Policy</b>			
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
(i) Credit period days	30	45	60	75	90
(ii) Credit period year	1/12	1/8	1/6	1/4.8	1/4
(iii) Sales	2.4	2.52	2.58	2.61	2.64
(iv) Contribution					
(Sales x P/V ratio)	0.8	0.84	0.86	0.87	0.88
(v) Increase in contribution					

overexisting (a)	—	0.04	0.06	0.07	0.08
(vi) Debtors balances	0.2	0.315	0.43	0.54375	0.66
(Sales x Credit period)					
(vii) Required pre tax return on investment	0.04	0.063	0.086	0.10875	0.132
(viii) Increase in return on investment over existing (b)	—	0.023	0.046	0.06875	0.092
(ix) Excess (a – b)	—	0.017	0.014	0.00125	(0.012)

It will be seen from the above calculation that there is maximum return when the credit period is for 45 days. There is an excess of contribution over increase in return on investment. Therefore management is advised to extend the credit period to 45 days.

**Note:** Investment in debtors could be calculated on variable cost basis also.

### Question No. 36

Taxes Manufacturing Company Ltd., is to start production on 1st January, 2012. The prime cost of a unit is expected to be ₹ 40 out of which ₹ 16 is for materials and ₹ 24 for labour. In addition variable expenses per unit are expected to be ₹ 8, and fixed expenses per month ₹ 30,000. Payment for materials is to be made in the month following the purchase. One-third of sales will be for cash and the rest on credit for settlement in the following month. Expenses are payable in the month in which they are incurred.

The selling price is fixed at ₹ 80 per units manufactured and sold are expected to be as under :

January	900	April	2,100
February	1,200	May	2,100
March	1,800	June	2,400

Draw up a statement showing requirements of working capital from month to month, ignoring the question of stocks.

### Answer to Question No. 36

Statement showing requirements of Working Capital (Jan. to June 2012)

	January ₹	February ₹	March ₹	April ₹	May ₹	June ₹
<b>Requirements:</b>						
Wages	21,600	28,800	43,200	50,400	50,400	57,600
Materials	—	14,400	19,200	28,800	33,600	33,600
<b>Expenses:</b>						
Fixed	30,000	30,000	30,000	30,000	30,000	30,000
Variable	7,200	9,600	14,400	16,800	16,800	19,200
Total (i)	58,800	82,800	1,06,800	1,26,000	1,30,800	1,40,000
<b>Receipts:</b>						



Cash sales	24,000	32,000	48,000	56,000	56,000	64,000
Sundry Debtors						
(Credit Sales)	—	48,000	64,000	96,000	1,12,000	1,12,000
Total (ii)	24,000	80,000	1,12,000	1,52,000	1,68,000	1,76,000
Cash required:						
[(i)—(ii)]	34,800	2,800	—	—	—	—
Surplus (ii)—(i)	—	—	5,200	26,000	37,200	35,600
Cumulative requirement	34,800	37,600	32,400	6,400	—	—
Cumulative Surplus	—	—	—	—	30,800	66,400

**Question No. 37**

Estalla Garment Co. Ltd. is a famous manufacturer and exporter of garments to the European countries. The finance manager of the company is preparing its working capital forecast for the next year. After carefully screening all the documents, he collected the following information:

Production during the previous year was 15,00,000 units. The same level of activity is intended to be maintained during the current year.

The expected ratios of cost to selling price are:

Raw materials	40%
Direct wages	20%
Overheads	20%

The raw materials ordinarily remain in stores for 3 months before production. Every unit of production remains in the process for 2 months and is assumed to be consisting of 100% raw material, wages and overheads. Finished goods remain in warehouse for 3 months. Credit allowed by the creditors is 4 months from the date of the delivery of raw material and credit given to debtors is 3 months from the date of dispatch.

The estimated balance of cash to be held: ₹ 2,00,000

Lag in payment of wages:  $\frac{1}{2}$  month

Lag in payment of expenses:  $8\frac{1}{2}$  month

Selling price is ₹ 10 per unit. Both production and sales are in a regular cycle. You are required to make a provision of 10% for contingency (except cash). Relevant assumptions may be made.

*You have recently joined the company as an assistant finance manager. The job of preparing the forecast statement has been given to you. You are required to prepare the forecast statement. The finance manager is particularly interested in applying the quantitative techniques for forecasting the working capital needs of the company. You are also required to explain the approach in the brief note to be prepared by you.*

**Answer to Question No. 37****Forecast statement of Working Capital Requirement of Estalla Garment Co. Ltd.****A. Current Assets**

	₹
(i) Debtors $\left(1,50,00,000 \times \frac{80}{100} \times \frac{3}{12}\right)$	30,00,000
(ii) Finished goods $\left(1,50,00,000 \times \frac{80}{100} \times \frac{3}{12}\right)$	30,00,000
(iii) Work-in-progress $\left(1,50,00,000 \times \frac{80}{100} \times \frac{2}{12}\right)$	20,00,000
(iv) Raw materials $\left(1,50,00,000 \times \frac{40}{100} \times \frac{3}{12}\right)$	15,00,000
<b>Total Current Assets (A)</b>	<b><u>95,00,000</u></b>

**B. Current Liabilities**

	₹
(i) Creditors $\left(1,50,00,000 \times \frac{40}{100} \times \frac{4}{12}\right)$	20,00,000
(ii) Wages $\left(1,50,00,000 \times \frac{20}{100} \times \frac{1}{24}\right)$	1,25,000
(iii) Expenses $\left(1,50,00,000 \times \frac{20}{100} \times \frac{1}{24}\right)$	1,25,000
<b>Total Current Liabilities (B)</b>	<b><u>22,50,000</u></b>

	₹
Excess of current assets over current liabilities (A – B)	72,50,000
<b>Add:</b> Provision of 10% contingency	<u>7,25,000</u>
	79,75,000
<b>Add:</b> Balance of Cash available	<u>2,00,000</u>
<b>Forecast of Working Capital Requirement</b>	<b><u>81,75,000</u></b>

**Working Notes:**

Total sales of the company for the current year:

Total sales	=	Number of units sold x Price per unit
Total sales	=	15,00,000 x ₹ 10
	=	₹ 1,50,00,000

**Assumptions:**

- (i) All sales are made on credit basis.
- (ii) The working capital blocked in debtors, finished goods and work-in-progress is taken at cost i.e. 80% of selling price.

**NOTE**

Dated: 2.1.2013

From: Assistant Finance Manager

To: Finance Manager

Sir,

This has reference to your direction to prepare a brief note on application of quantitative techniques for forecasting the working capital. In this connection, I hereby submit as under:

Apart from the estimation of working capital, as per operating cycle method, the following quantitative techniques are also used for estimating the working capital needs of the company:

- (i) **Regression analysis method:** The regression analysis method is very useful statistical technique of forecasting working capital requirements. In the sphere of working capital management, it helps in making projections after establishing the average relationship in the past years between sales and the working capital and its various components. The analysis can be carried out through the graphic portrayals (scatter diagram) or through mathematical formulae. The relationship between sales and working capital may be simple and direct indicating complete linearity between the two or may be complex in differing degrees involving simple linear regression and multiple regression situations. This method is suitable for simple as well as complex situations.
- (ii) **Percent-of-sales method:** It is a traditional and simple method of determining the level of working capital and its components. In this method, working capital is determined on the basis of past experience. If over the years, the relationship between sales and working capital is found to be stable, then this relationship may be taken as base for determining the working capital for future. This method is simple, easy to understand and useful in forecasting of working capital. However, this method is criticised on the assumption of linear relationship, between sales and working capital. Therefore, this method is not universally applicable.

Submitted please.

XYZ

(Assistant Finance Manager)

**Question No. 38**

A dealer having annual sales of ₹ 50 lakh extends 30 days credit period to its debtors. The variable cost is estimated at 80% on sales and fixed costs are ₹ 6,00,000. The dealer intends to change the credit policy for which the following information is given:

<b>Credit Policy Period (Days)</b>	<b>Average Collection (₹ in lakhs)</b>	<b>Annual Sales</b>
A	45	56
B	60	60
C	75	62

Rate of return (pre-tax) required on investment is 20%.

You are required to assess the most profitable policy with the help of incremental approach. Calculations may be restricted to two decimal places.

**Answer to Question No. 38**

**Evaluation of Proposed Credit Policies**

**Amount in lakhs (₹)**

<b>Credit Policy</b>	<b>Present</b>	<b>A</b>	<b>B</b>	<b>C</b>
Period (days)	30	45	60	75
Annual Sales	50	56	60	62
Variable Cost (80% on sales)	40	44.8	48	49.6
Fixed Cost	6	6	6	6
Total Cost	46	50.8	54	55.6
Profit (Annual Sales-Total Cost)	4.00	5.20	6.00	6.40
Incremental Profit (A)	—	1.20	2.00	2.40..(A)
<b>Average Investment in Debtors</b>				
46 x 30/365	3.78			
50.8 x 45/365		6.26		
54 x 60/365			8.88	
55.6 x 75/365				11.42
Incremental Investment in Debtors as compared to present level	—	2.48	5.10	7.64
<b>Required Return:</b>				
20% of incremental investment (B)	—	0.50	1.02	1.53
Excess return i.e. (A – B)	—	0.70	0.98	0.87

Policy B having Average Collection Period 60 day's yields the maximum profit and thus is most profitable.

**Question No. 39**

On 1st January, 2013, the Board of directors of Dowell Co. Ltd. wishes to know the amount of working capital that will be required to meet the programme of activity; they have planned for the year. The following information is available:

- (i) Issued and paid-up capital ₹ 2,00,000.
- (ii) 5% Debentures (secured on assets) ₹ 50,000.
- (iii) Fixed assets valued at ₹ 1,25,000 on 31.12.2013.
- (iv) Production during the previous year was 60,000 units. It is planned that this level of activity should be maintained during the present year.

- (v) The expected ratios of cost to selling price are – raw materials 60%, direct wages 10% and overheads 20%.
- (vi) Raw materials are expected to remain in stores for an average of two months before these are issued for production.
- (vii) Each unit of production is expected to be in process for one month.
- (viii) Finished goods will stay in warehouse for approximately three months.
- (ix) Creditors allow credit for 2 months from the date of delivery of raw materials.
- (x) Credit allowed to debtors is 3 months from the date of dispatch.
- (xi) Selling price per unit is ₹ 5.
- (xii) There is a regular production and sales cycle.

*Prepare:*

- (a) working capital requirement forecast; and
- (b) an estimated profit and loss account and balance sheet at the end of the year.

**Answer to Question No. 39**

**(a) Forecast of Working Capital Requirements – of Dowell Co. Ltd.**

	Holding Periods	₹
<b>Current Assets:</b>		
Raw Material	2 months	30,000
Work-in-progress	1 month	18,750
Finished goods	3 months	67,500
Debtors	3 months	<u>75,000</u>
Total Current Assets		1,91,250
<b>Less:</b> Current Liabilities – Creditors	2 months	<u>30,000</u>
Net Working Capital (CA – CL)		<u>1,61,250</u>

(b)(i)

**Dowell Company Limited**  
**Estimated Profit and Loss Account**  
**for the year ending 31st December, 2013**

	₹	₹
Sales 60,000 units @ ₹5		3,00,000
<b>Less:</b> Cost of Sales:		
Raw material @ 60%	1,80,000	
Direct Wages @ 10%	30,000	
Overheads @ 20%	<u>60,000</u>	<u>2,70,000</u>
Gross profit		30,000
<b>Less:</b> Debenture Interest @ 5% on 50,000		<u>2,500</u>
Net Profit		<u>27,500</u>

(ii)

**Dowell Company Limited**  
**Estimated Balance Sheet**  
**for the end of 31st December, 2013**

<b>Liabilities</b>	<b>₹</b>	<b>Assets</b>	<b>₹</b>
Share Capital	2,00,000	Fixed Assets	1,25,000
Reserve & Surplus (balance figure)	8,750	<i>Current Assets:</i>	
Profit & Loss A/c (Profit for the year)	27,500	Raw material	30,000
5% Debentures	50,000	Work-in-progress	18,750
Creditors	<u>30,000</u>	Finished goods	67,500
	<u>3,16,250</u>	Debtors (equivalent to 3 months sales)	<u>75,000</u>
			<u>3,16,250</u>

**Working Notes:****(i) Computation of Cost and Sales:**

	<b>Per unit</b>	<b>Total 60,000 units</b>
	<b>₹</b>	<b>₹</b>
Selling price	<u>5.00</u>	<u>3,00,000</u>
Cost of Sales:		
Raw material	3.00	1,80,000
Direct Wages	0.50	30,000
Overheads	<u>1.00</u>	<u>60,000</u>
	<u>4.50</u>	<u>2,70,000</u>

**(ii) Stock of Raw material:**

$$2 \text{ month's consumption} \left( \frac{1,80,000 \times 2}{12} \right) = ₹ 30,000$$

**(iii) Work in progress (1 month's production):**

$$\text{Raw Material} \left( \text{Rs. } \frac{1,80,000}{12} \right) = ₹ 15,000$$

$$\text{Direct Wages} * \left( \frac{30,000}{12} \times \frac{1}{2} \right) = ₹ 1,250$$

$$\text{Overheads} * \left( \frac{60,000}{12} \times \frac{1}{2} \right) = ₹ 2,500 \quad ₹ 18,750$$

\*Presumed to accrue evenly during the period

(iv) Finished goods (3 months' production)

$$\frac{\text{₹ } 2,70,000 \times 3}{12} = \text{₹ } 67,500$$

(v) Debtors (3 months cost of sales)

$$\frac{\text{₹ } 3,00,000 \times 3}{12} = \text{₹ } 75,000$$

(vi) Creditors (2 months consumption of raw materials)

$$\frac{\text{₹ } 1,80,000 \times 2}{12} = \text{₹ } 30,000$$

#### **Question No. 40**

Prepare working capital forecast and projected profit and loss account and balance sheet from the following information:

	₹
Issued equity share capital	50,00,000
Preference share capital	15,00,000
Fixed assets	30,66,667

Production during the previous year was 10,00,000 units which is expected to be maintained during the current year. The expected ratios of cost to selling price are?

Raw material	40%
Direct wages	20%
Overheads	20%

*Raw material ordinarily remains in stock for 3 months before production. Every unit of production remains in process for 2 months. Finished goods remain in stock for 3 months. Creditors allow 3 months for payment and debtors are allowed 4 months credit. Estimated minimum cash to be held will be half a month. The selling price will be ₹ 8 per unit. The production is in continuous process and sales are in regular cycle.*

#### **Answer to Question No. 40**

Total Production : 10,00,000 units

Sale Rate : ₹ 8/unit

Cost per unit of:

Raw Material = ₹ 8 x 40% = ₹ 3.20

Wages = ₹ 8 x 20% = ₹ 1.60

Overheads = ₹ 8 x 20% = ₹ 1.60

**Current Assets**

		(₹)
Cash		2,00,000
Raw Material $10,00,000 \times ₹ 3.20 \times 3m/12$		8,00,000
Work-in-Progress $10,0,000 \times [₹ 3.20 + ₹ 0.80 + ₹ 0.80] \times 2/12$		8,00,000
Finished Goods $10,00,000 \times ₹ 6.40 \times 3/12$		16,00,000
Debtors $10,00,000 \times ₹ 8 \times 4/12$		<u>26,66,667</u>
	Total :	60,66,667
<b>Current Liabilities</b>		
Creditors $10,00,000 \times ₹ 3.20 \times 3/12$	8,00,000	
Wages $10,00,000 \times ₹ 1.60 \times 1/24$	66,667	
Overheads $10,00,000 \times ₹ 1.60 / 1/24$	<u>66,667</u>	<u>9,33,334</u>
<b>Working Capital required</b>		<u>51,33,333</u>

It is assume that there is a lag of 1/2 months in payment of basis and overhead

**Profit Statement**

		(₹)
Sales		80,00,000
<b>Less:</b>		
Raw Material	32,00,000	
Wages	16,00,000	
Wages	<u>16,00,000</u>	<u>64,00,000</u>
Profit		<u>16,00,000</u>

**Balance Sheet as on.....**

<b>Liabilities</b>	₹	<b>Assets</b>	₹
Capital	50,00,000	Fixed	30,66,667
Prof. Share Capital	15,00,000	Raw Material	8,00,000
<i>Profit:</i> Previous Years		Work-in-Progress	8,00,000
(Balance figure)	1,00,000	Finished Goods	16,00,000
Current Year	16,00,000	Debtors	26,66,667
Creditors	8,00,000	Cash	2,00,000
Wages Payable	66,667		
Overheads Payable	<u>66,667</u>		
	<u>91,33,334</u>		<u>91,33,334</u>



## PORTFOLIO MANAGEMENT

**Question No. 41**

During a 5 year period, the relevant results for the aggregate market are that the  $r_f$  (risk-free rate) is 8 percent and the  $r_m$  (return on market) is 14 percent. For that period, the results of four portfolio managers are as follows:

<b>Portfolio Manager</b>	<b>Average Return (%)</b>	<b>Beta</b>
A	13	0.80
B	14	1.05
C	17	1.25
D	13	0.90

Using CAPM model you are required to (a) Calculate the expected rate of return for each portfolio manager and compare the actual returns with the expected returns. (b) Based upon your calculations, select the manager with the best performance.

**Answer to Question No. 41**

(a) Use the CAMP equation :

The expected rates of return are as follows :

<b>Portfolio Manager</b>	<b>Average Return (%)</b>	<b>Expected Return (%)</b>	<b>Actual Return (%)</b>	<b>Difference between Actual and Expected Returns (%)</b>
A	13	$r_A = 8\% + 0.80 (14\% - 8\%) = 12.8$	13	+ 0.2
B	14	$r_B = 8\% + 1.05 (14\% - 8\%) = 14.3$	14	- 0.3
C	17	$r_C = 8\% + 1.25 (14\% - 8\%) = 15.5$	17	+ 1.5
D	13	$r_D = 8\% + 0.90 (14\% - 8\%) = 13.4$	13	- 0.4

(b) Portfolio Managers A and C did better than expected, since A exceeded the expected return by 1.56 percent (0.2% - 12.8%) and C bettered the expected return by 9.68 percent (1.5% - 15.5%). C therefore showed the best performance.

Note: Average return is the actual return.

**Question No. 42**

From the following information, calculate the expected rate of return of a portfolio:

Risk Free rate of interest	12%
Expected return of market portfolio	18%
Standard deviation of an asset	2.8%
Market standard deviation	2.3%
Co-relation co-efficient of portfolio with market	0.8%

**Answer to Question No. 42**

Calculation of Expected Rate of Return of a Portfolio

Expected Rate of Return of a portfolio can be worked by using following formula:

$$R_e + R_f + \beta_j(R_m - R_f) \dots(1)$$

Where  $R_e$  stands for expected rate of return of a portfolio

$R_f$  = Risk free rate of interest or return

$r_m$  = Expected return of market portfolio

$\beta_s$  = Beta co-efficient of Security j.

Since in the question, information on ? is not given, it is essential to find it. The formula to calculate ? is

$$\frac{r_{sm} \times \sigma_s}{\sigma_m} \dots(2)$$

Where  $r_{sm}$  — Stands for correlation co-efficient of portfolio with market

$\sigma_s$  — Standard deviation of an asset

$\sigma_m$  — Market standard deviation

By substituting the available information in above formula, (2) we may get

$$\begin{aligned} \beta &= \frac{0.80 \times 0.028}{0.023} \\ &= 0.97 \end{aligned}$$

Now we may get expected rate of return by substituting available information in equation (1)

$$\begin{aligned} R_e &= 12 + 0.97 (18 - 12) \\ &= 17.82 \text{ per cent} \end{aligned}$$

**Question No. 43**

The following information is available in respect of Security-X and Security-Y:

Security	b	Expected Rate of Return
X	1.8	22.00%
Y	1.6	20.40%

Rate of return of market portfolio is 15.3%.

If risk-free rate of return is 7%, are these securities correctly priced? What would be the risk-free rate of return, if they are correctly period?

**Answer to Question No. 43**

If the two Securities X and Y are correctly priced, then the returns required, based on their levels of systematic risk and calculated from the CAPM, will be the same as their expected returns given. So, the required return can be ascertained with the help of CAPM equation as follows:

$$\text{Security X} = I_{RF} + (R_M - I_{RF}) b$$

$$\begin{aligned}
 &= 7\% + (15.3\% - 7\%) 1.8 \\
 &= 7\% + (8.3\% \times 1.8) \\
 &= 7\% + 14.94\% \\
 &= 21.94\%
 \end{aligned}$$

This is less than the expected return of Security X i.e. 22%. Therefore, Security A is not correctly priced.

$$\begin{aligned}
 \text{Security Y} &= I_{RF} + (R_M - I_{RF}) \beta \\
 &= 7\% + (15.3\% - 7\%) 1.6 \\
 &= 7\% + (8.3\% \times 1.6) \\
 &= 7\% + 13.28\% \\
 &= 20.28\%
 \end{aligned}$$

Return of 20.28% is less than the expected return of 20.40%. Therefore, Security Y is not correctly priced.

In case, both securities are correctly priced, then they must offer same Reward to Risk Ratio. The risk free rate would have to be such that:

$$\begin{aligned}
 (22\% - I_{RF}) \div 1.8 &= (20.4\% - I_{RF}) \div 1.6 \\
 (.22 - I_{RF}) \times 1.6 &= (.204 - I_{RF}) \times 1.8 \\
 .352 - 1.6 I_{RF} &= .3672 - 1.8 I_{RF} \\
 .2 I_{RF} &= 0.152 \\
 I_{RF} &= 7.6\%
 \end{aligned}$$

So, both securities would have correctly priced if the risk free rate is 7.6%.

## LEASING

### Question No. 44

XYZ Ltd. Is considering to acquire an additional computer to supplement its time-share computer services to its clients. It has two options –

- (i) To purchase the computer for ₹ 22,00,000.
- (ii) To lease the computer for 3 years from a leasing company for ₹ 5,00,000 as annual lease rent plus 10% of gross time-share service revenue. The agreement also requires an additional payment of ₹ 6,00,000 at the end of the third year. Lease rent are payable at the year end, and the computer reverts to the lessor after the contract period.

The company estimates that the computer under review now will be worth ₹ 10 lakhs at the end of the third year. Forecast revenues are –

Year	₹
1	22,50,000
2	25,00,000
<u>3</u>	<u>27,50,000</u>

Annual operating costs (excluding depreciation/lease rent of computer) are estimated at ₹ 9,00,000 with an additional ₹ 1,00,000 for start-up and training costs at the beginning of the first year. These costs are to be borne by the lessee. XYZ Ltd. Will borrow at 16% interest to finance the acquisition of the computer; repayments are to be made according to the following schedule:

<i>Year-end</i>	<i>Principal (₹)</i>	<i>Interest (₹)</i>	<i>Total (₹)</i>
1	5,00,000	3,52,000	8,52,000
2	8,50,000	2,72,000	11,22,000
3	8,50,000	1,36,000	9,86,000

The company uses the straight line method to depreciate its assets and pays 50% tax on its income.

The management of XYZ Ltd. Approaches you, as a company secretary, for advice. Which alternative would you recommend and why?

**Note:** Present value factor at 8% and 16% rate of discount:

Year	8%	16%
1	0.926	0.862
2	0.857	0.743
3	0.794	0.641

#### **Answer to Question No. 44**

Present Value of Cash Outflows under Leasing Alternative

<i>Year</i>	<i>Payment under lease contract (₹)</i>			<i>Total payment</i>	<i>Tax Shield @ 50% on lease</i>	<i>Net cash outflows</i>	<i>PV factor at 8%</i>	<i>Total PV</i>
	<i>Lease Rent</i>	<i>10% of gross revenue</i>	<i>Lump-sum payment</i>					
	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)		(₹)
1.	5,00,000	2,25,000	—	7,25,000	3,62,500	3,62,500	0.926	3,35,675
2.	5,00,000	2,50,000	—	7,50,000	3,75,000	3,75,000	0.857	3,21,375
3.	5,00,000	2,75,000	6,00,000	13,75,000	6,87,500	6,87,500	0.794	<u>5,45,875</u>
								<u>12,02,925</u>

Present Value of Cash Outflows under Buying/Borrowing Alternative

Year end	Instalment Payment			Tax advantage on		Net cash outflows Depreciation	PV factor at 8%	Total PV
	Principal	Interest @16%	Total	Interest Payment				
	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)		(₹)
1.	5,00,000	3,52,000	8,52,000	1,76,000	2,00,000	4,76,000	0.926	4,40,776
2.	8,50,000	2,72,000	11,22,000	1,36,000	2,00,000	7,86,000	0.857	6,73,602
3.	8,50,000	1,36,000	9,86,000	68,000	2,00,000	7,18,000	0.794	5,70,092
		Salvage value				(10,00,000)	0.794	(7,94,000)
Total								8.90,470

**Recommendation:** Since the Present value of cash outflows under borrowing/buying alternative ₹ 8,90,470 is

less than Present value of cash outflow under lease alternative i.e. ₹ 12,02,925. Therefore, the Company is advised to buy the computer.

\*Depreciation for 3 years = (₹ 22,00,000 – ₹ 10,00,000) = ₹ 12,00,000. Effective rate of interest or discount = 16% (1 – .50) = 8%.

**NOTE:** Since the annual operating costs and training costs are same under both the alternatives, so it is not included in the calculations of cash outflows.

#### Question No. 45

The Controller of Mahindra Electronic Corporation of India has been analysing the firm's policy regarding computers, which are now being leased on a yearly basis on rental amounting to ₹ 2,00,000 per year. The computer can be bought for ₹ 10,00,000. The purchase would be financed by 16% loan repayable in 4 equal annual instalments.

On account of rapid technological progress in the computer industry, it is suggested that a 4 year economic life should be used, instead of 10 years physical life. It is estimated that the computer could be sold for ₹ 4,00,000 at the end of 4 years.

The company uses the straight line method of depreciation. Corporate tax rate is 50%.

You are required to:

- Comment on whether the equipment should be bought or leased?
- Analyse the financial viability from the point of view of the lessor, assuming 14% cost of capital.
- Determine the minimum lease rent at which the lessor would break-even.
- Determine the lease rent which will yield on IRR of 16% to the lessor.

#### Answer to Question No. 45

##### (a) Present value of cash outflows under Leasing alternative

Year	Lease Rent after Taxes (₹)	PV factor at 8%	Total Present Value (₹)
1 – 4	1,00,000	3.312	3,31,200

##### Cash outflows under Buying alternative

Year end	Loan at the beginning of the year in ₹	Loan Instalment in ₹	Interest on Loan in ₹	Principal Repayment of the year in ₹	Principal outstanding at the end in ₹
1	10,00,000	3,57,398	1,60,000	1,97,398	8,02,602
2	8,02,602	3,57,398	1,28,416	2,28,982	5,73,620
3	5,73,620	3,57,398	91,779	2,65,619	3,08,001
4	3,08,001	3,57,398	49,397	3,08,001	—

\*(₹ 10,00,000 / 2.798) Present value factor of annuity of Re. 1 at 16% for 4 years.

##### Present value of cash outflows under Buying alternative

Year	Loan Instalment	Tax advantage		Net Cash on	PV factor Outflows	Total PV at 8%
		Payment of Interest	Depre-ciation			
1	3,57,398	80,000	75,000	2,02,398	0.926	1,87,421
2	3,57,398	64,208	75,000	2,18,190	0.857	1,86,989
3	3,57,398	45,890	75,000	2,36,508	0.794	1,87,787

4	3,57,398	24,699	75,000	2,57,699	0.735	1,89,409
			Salvage value	(4,00,000)	0.735	(2,94,000)
						4,57,606

*Recommendation:* It may be noted from the above workings that leasing option is financially superior as against buying alternative because present value of cash outflow under leasing option is lower.

**(b) (i) Viability from the lesser's point of view. at 14% cost of capital**

*Determination of CFAT*

Lease rent received	2,00,000
<b>Less:</b> Depreciation	1,50,000
Earning before tax	50,000
<b>Less:</b> Taxes (50%)	25,000
Earning after tax	25,000
<b>Add:</b> Depreciation	1,50,000
CFAT	1,75,000

**(ii) Determination of NPV**

Year	CFAT (₹)	PV Factor at 14%	Total PV (₹)
1-4	1,75,000	2.914	5,09,950
4	4,00,000	0.592	<u>2,36,800</u>
			7,46,750
<b>Less:</b> Cost of computer			<u>10,00,000</u>
			<u>(2,53,250)</u>

*Recommendation:* The proposal is not financially viable to the lessor.

**(c) Lease rent at which lessor would break even:**

	₹
Cost of computers	10,00,000
<b>Less:</b> PV of salvage price of computer	<u>2,36,800</u>
Net cost to be covered	7,63,200
CFAT (Desired) (7,63,200 ÷ 2.914*)	2,61,908
<b>Less:</b> Depreciation	<u>1,50,000</u>
Earning after taxes	1,11,908
<b>Add:</b> Taxes @ 50%	<u>1,11,908</u>
Earning before tax	2,23,816
<b>Add:</b> Depreciation	<u>1,50,000</u>
Lease rent at which lessor would break-even	<u>3,73,816</u>

\* Annuity factor at 14% for four years.

**(d) Lease rent to yield 16% IRR**

$$₹ 10,00,000 = \sum_{t=1}^4 \frac{X}{(1+0.16)^t} + \frac{₹ 4,00,000}{(1+0.16)^4}$$

Where X = CFAT

$$₹ 10,00,000 - \frac{₹ 4,00,000}{(1.16)^4} = \sum_{t=1}^4 \frac{X}{(1+0.16)^t}$$

Substituting (i) PV factor of annuity of Re. 1 at 16% for 4 years is 2.798 and

(ii) PV factor of Re. 1 at 16% in 4 years is 0.552.

$$₹ 10,00,000 - ₹ 4,00,000 \times .552 = 2.798X$$

$$₹ 10,00,000 - ₹ 2,20,800 = 2.798X$$

$$₹ \frac{779200}{2.798} = X$$

$$X = ₹ 2,78,485$$

	₹
CFAT desired	2,78,485
<b>Less:</b> Depreciation	<u>1,50,000</u>
Earning after taxes	1,28,485
Add: Taxes @ 50%	<u>1,28,485</u>
Earning before taxes	2,56,970
Add: Depreciation	<u>1,50,000</u>
Lease Rent Desired	<u>4,06,970</u>

**Question No. 46**

ABC Ltd. is considering to acquire an additional sophisticated computer to supplement its time-share computer services to its clients. It has two options:

- (i) To purchase the computer for ₹ 44,00,000.
- (ii) To lease the computer for 3 years from a leasing company for ₹ 10,00,000 as annual lease rent plus 10% of gross time share service revenue. The agreement also requires an additional payment of ₹ 12,00,000 at the end of the third year. Lease rents are payable at the year end, and the computer reverts back to the lessor after the contract period.

The company estimates that the computer under review now will be worth ₹ 20 lakhs at the end of the third year.

Year	₹
1	45,00,000
2	50,00,000
3	55,00,000

Annual operating costs (excluding depreciation/lease rent of computer) are estimated at ₹ 18,00,000 with an

additional cost of ₹ 2,00,000 for start-up and training at the beginning of the first year. These costs are to be borne by the lessee. ABC Ltd. will borrow 16% interest to finance the acquisition of the computer and the repayments are to be made according to the following schedule:

Year-end	Principal (₹)	Interest (₹)	Total (₹)
1	10,00,000	7,04,000	17,04,000
2	17,00,000	5,44,000	22,44,000
3	17,00,000	2,72,000	19,72,000

The company uses the straight line method to depreciate its assets and pays 50% tax on its income.

The management of ABC Ltd. approaches you, as a Company Secretary-cum-Finance Manager, for advice. Which alternative would you recommend and why?

**Note:** Present value factor at 8% and 16% rate of discount:

Year	8%	16%
1	0.926	0.862
2	0.857	0.743
3	0.794	0.641

**Answer to Question No. 46**

#### Present Value of Cash Outflows under Leasing Alternative

Year	Payment under lease contract (₹)			Total payment	Tax Shield @ 50% on lease	Net cash outflows	PV factor at 8%	Total PV
	Lease Rent	10% of gross revenue	Lump-sum payment					
	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)		(₹)
1	10,00,000	4,50,000	—	14,50,000	7,25,000	7,25,000	0.926	6,71,350
2	10,00,000	5,00,000	—	15,00,000	7,50,000	7,50,000	0.857	6,42,750
3	10,00,000	5,50,000	12,00,000	27,50,000	13,75,000	13,75,000	0.794	10,91,750
							PV	24,05,850

#### Present Value of Cash Outflows under Buying/Borrowing Alternative

Year end	Instalment Payment			Tax advantage on		Net cash outflows Depreciation	PV factor at 8%	Total PV
	Principal	Interest @16%	Total	Interest payment				
	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)		(₹)
1	10,00,000	7,04,000	17,04,000	3,52,000	4,00,000	9,52,000	0.926	8,81,552
2	17,00,000	5,44,000	22,44,000	2,72,000	4,00,000	15,72,000	0.857	13,47,204
3	17,00,000	2,72,000	19,72,000	1,36,000	4,00,000	14,36,000	0.794	11,40,184
		Salvage Value		(20,00,000)	0.794	(15,88,000)	PV	17,80,940



**Recommendations:** Since the Present value of cash outflows under borrowing/buying alternative ₹ 17,80,940 is less than Present value of cash outflow under lease alternative i.e. ₹ 24,05,580. Therefore, the Company is advised to buy the computer.

$$\begin{aligned}\text{Depreciation for 3 years} &= (\text{₹ } 44,00,000 - \text{₹ } 20,00,000) \\ &= \text{₹ } 24,00,000 / 3 = \text{₹ } 8,00,000.\end{aligned}$$

Effective rate of interest or discount = 16% (1 - .50) = 8%.

Note: Since the annual operating costs and training costs are same under both the alternatives, these are not considered in the calculation of cash outflows.

## FINANCIAL DECISIONS

### Question No. 47

Sales and earnings before interest and taxes for the XYZ Company during 2012, were ₹ 17,50,000 and ₹ 4,50,000, respectively. During 2012, interest expense was ₹ 4,000 and preferred dividends were ₹ 10,000. These fixed charges are expected to continue during 2013. An expansion is planned, which will require ₹ 1,75,000 and is expected to increase EBIT by ₹ 1,00,000 to ₹ 5,50,000.

The firm is considering the following financing alternatives:

- Issue 5,000 shares of common stock to net the firm ₹ 35 per share. The firm currently has 40,000 shares of common stock outstanding.
- Issue ₹ 1,75,000 of fifteen-year bonds at 8%. Sinking fund payments on these bonds will commence in 2012.
- Issue ₹ 1,75,000 of 8.5% preferred stock.

Assume a 50% income tax rate.

- Calculate the EPS for 2013 at the expected earnings before interest and taxes level of ₹ 5,50,000 of each financing alternative.
- Calculate the equivalency level of earnings before interest and taxes between the debt and common stock alternatives.
- Calculate the equivalency level of earnings before interest and taxes between the preferred stock and common stock alternatives.

### Answer to Question No. 47

#### (i) Determination of EPS at EBIT of ₹ 5,50,000

#### Financial Plans

	(a) Equity shares	(b) Bonds	(c) Preference shares
	(₹)	(₹)	(₹)
EBIT	5,50,000	5,50,000	5,50,000
<b>Less:</b> interest	<u>4,000</u>	<u>18,000</u>	<u>4,000</u>
Taxable income	5,46,000	5,32,000	5,46,000
<b>Less:</b> Taxes 50%	<u>2,73,000</u>	<u>2,66,000</u>	<u>2,73,000</u>
Income after taxes	2,73,000	2,66,000	2,73,000

<b>Less:</b> Dividend on preference shares	<u>10,000</u>	<u>10,000</u>	<u>24,875</u>
Earnings available for equityholders	<u>2,63,000</u>	<u>2,56,000</u>	<u>2,48,125</u>
Number of equity shares	45,000	40,000	40,000
EPS	₹ 5.84	₹ 6.40	₹ 6.20

**(ii) Equivalency level of earnings between equity and debt plan**

$$\frac{(X - I_1)(1 - t) - P_1}{N_1} = \frac{(X - I_1 - I_2)(1 - t)P_1}{N_2}$$

where I = Interest, t = tax rate

P = Dividend to Preference Share holders.

$$\text{or } \frac{(X - \text{Rs. } 4,000)0.5 - \text{Rs. } 10,000}{45,000} = \frac{(X - \text{Rs. } 4,000 - \text{Rs. } 14,000)0.5 - \text{Rs. } 10,000}{40,000}$$

$$\text{or } \frac{0.5X - \text{Rs. } 2,000 - \text{Rs. } 10,000}{45,000} = \frac{0.5X - \text{Rs. } 9,000 - \text{Rs. } 10,000}{45,000}$$

$$\text{or } \frac{0.5X - \text{Rs. } 12,000}{45,000} = \frac{0.5X - \text{Rs. } 19,000}{40,000}$$

Multiplying each side of the equation by 3,60,000

$$8(0.5X - ₹ 12,000) = 9(0.5X - ₹ 19,000)$$

$$4X - ₹ 96,000 = 4.5X - ₹ 1,71,000$$

$$75,000 = 0.5X$$

$$₹ 1,50,000 = X \text{ (EBIT)}$$

**Verification table**

	<b>Equity plan</b> (₹)	<b>Debt plan</b> (₹)
EBIT	1,50,000	1,50,000
<b>Less:</b> Interest	<u>4,000</u>	<u>18,000</u>
Taxable earnings	1,46,000	1,32,000
<b>Less:</b> Taxes 50%	<u>73,000</u>	<u>66,000</u>
Earnings after taxes	73,000	66,000
<b>Less:</b> Preference dividends	<u>10,000</u>	<u>10,000</u>
Earnings for equity holders	63,000	56,000
Number of equity shares	45,000	40,000
EPS	₹ 1.40	₹ 1.40

**(iii) Equivalency level between the preferred stock and common stock alternatives**

$$\frac{(X - I_1)(1 - t) - P_1 - P_2}{N_1} = \frac{(X - I_1)(1 - t) - P_1}{N_2}$$

$$\text{or } \frac{(X - \text{Rs. } 4,000)0.5 - \text{Rs. } 24,875}{40,000} = \frac{(X - \text{Rs. } 4,000)(0.5) - \text{Rs. } 10,000}{45,000}$$

$$\text{or } \frac{0.5X - \text{Rs. } 2,000 - \text{Rs. } 24,875}{40,000} = \frac{0.5X - \text{Rs. } 2,000 - \text{Rs. } 10,000}{45,000}$$

Multiplying both sides of the equation by 3,60,000

$$9(0.5X - ₹ 26,875) = 8(0.5X - ₹ 12,000)$$

$$4.5X - ₹ 2,41,875 = 4X - ₹ 96,000$$

$$0.5X = ₹ 1,45,875$$

$$X = ₹ 2,91,750$$

**Question No. 48**

The balance sheet of XYZ Company is given as under:

<b>Liabilities</b>	<b>₹</b>	<b>Assets</b>	<b>₹</b>
Equity Capital		Net fixed assets	2,25,000
(₹ 10 per share)	90,000	Current Assets	75,000
10% long term debt	1,20,000		
Retained earning	30,000		
Current liabilities	<u>60,000</u>		
	<u>3,00,000</u>		<u>3,00,000</u>

The Company's total assets turnover ratio is 3.00, its fixed operating cost is ₹1,50,000 and its variable operating cost ratio is 50%. The income tax rate is 50%.

You are required to

- Calculate different type of leverages for the company.
- Determine the likely level of EBIT if EPS is (i) Re. 1 (ii) ₹ 2 (iii) Re. 0

**Answer to Question No. 48****Income Statement of XYZ Company**

$$\text{Sales Turnover ratio} = \frac{\text{Sales}}{\text{Total Assets}}$$

$$\text{Let sales of the Company be X, then } 3 = \left\{ \frac{X}{3,00,000} \right\} \text{ or } ₹ 9,00,000$$

$$\text{Less: Variable Cost (50\% of sales)} ₹ 4,50,000$$

$$\text{Less: Fixed Assets} ₹ 1,50,000 \quad ₹ 6,00,000$$

$$\text{Earning before Interest and Taxes (EBIT)} ₹ 3,00,000$$

$$\text{Less: Interest (10\% of ₹ 1,20,000)} ₹ 12,000$$

Earning before Taxes (EBT) ₹ 2,88,000

**Less:** Taxes (50% of Income) ₹ 1,44,000

Earning after Taxes (EAT) ₹ 1,44,000

### Leverages

$$\begin{aligned} \text{(a)(i) operating leverages} &= \frac{\text{Contribution}}{\text{EBIT}} \\ &= \frac{\text{Rs. } 9,00,000 - \text{Rs. } 4,50,000}{\text{Rs. } 3,00,000} \end{aligned}$$

$$= \frac{₹4,50,000}{₹3,00,000} = 1.50$$

$$\begin{aligned} \text{(a)(ii) financial leverage} &= \frac{\text{EBIT}}{\text{EBT}} \\ &= \frac{₹3,00,000}{₹2,88,000} = 1.04 \end{aligned}$$

$$\text{(a)(iii) combined leverage} = \text{operating leverage} \times \text{financial leverage}$$

$$= \frac{\text{Contribution}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{EBT}}$$

$$\text{Combined leverage} = 1.50 \times 1.04 = 1.56$$

$$\text{EPS} = \frac{(\text{EBIT} - I)(1 - t)}{N}$$

where I stands for interest  
t stands for taxes  
N stands for number of shares

(b)(i) If EPS = Re. 1

$$\text{Re. 1} = \frac{(\text{EBIT} - ₹12,000)(1 - .50)}{9,000}$$

$$₹ 9,000 = (\text{EBIT} - ₹ 12,000) (.50)$$

$$₹ 9,000 = .5 \text{ EBIT} - ₹ 6,000$$

$$.5 \text{ EBIT} = ₹ 9,000 + ₹ 6,000$$

$$.5 \text{ EBIT} = ₹ 15,000$$

$$\text{EBIT} = ₹ 15,000 \times 2 = ₹ 30,000$$

(b)(ii) If EPS = ₹ 2

$$₹ 2 = \frac{(\text{EBIT} - ₹12,000)(1 - .5)}{9,000}$$

$$₹ 18,000 = .5 \text{ EBIT} - ₹ 6,000$$

$$.5\text{EBIT} = ₹ 18,000 + ₹ 6,000$$

$$.5\text{EBIT} = ₹ 24,000$$

$$\text{EBIT} = ₹ 48,000$$

(b)(iii) If EPS = Re. 0

$$\text{Re. 0} = \frac{(\text{EBIT} - ₹12,000)(1 - .5)}{9,000}$$

$$.5\text{EBIT} - 6,000 = 0$$

$$.5\text{EBIT} = ₹ 6,000$$

$$\text{EBIT} = ₹ 12,000$$

### Question No. 49

X & Co. needs ₹ 10,00,000 for construction of a new plant for which it has three financing plans. The company wants to maximise EPS. Currently, the equity share is selling for ₹ 30 per share. The EBIT resulting from the plant operations are expected to run about ₹ 1,80,000 per year. The company's marginal tax rate is 50%. Money can be borrowed at the rates indicated as under:

Upto ₹ 1,00,000 at 10%

Over ₹ 1,00,000 and upto ₹ 5,00,000 at 14%

Over ₹ 5,00,000 at 18%

If fund is excess of ₹ 5,00,000 are borrowed, the company anticipates a drop in the price of equity to ₹ 25 per share. The three financing plans are as follows:

Plan-A – Use ₹ 1,00,000 debt

Plan-B – Use ₹ 3,00,000 debt

Plan-C – Use ₹ 6,00,000 debt

You are required to determine the EPS for these three plans and indicate the financial plan which will result in the highest EPS.

### Answer to Question No. 49

Calculation of EPS under different plans			
	Plan - A	Plan - B	Plan - C
EBIT (₹)	1,80,000	1,80,000	1,80,000
Interest (₹)	<u>10,000</u>	<u>38,000</u>	<u>84,000</u>
EBT (₹)	1,70,000	1,42,000	96,000
Taxes (50%)	<u>85,000</u>	<u>71,000</u>	<u>48,000</u>
EAT	85,000	71,000	48,000
No. of shares	30,000	23,333	16,000
EPS (₹)	2.83	3.04	3.00

From the above it is clear that plan B gives highest earning per share i.e. ₹ 3.04 for the Company.

**Question No. 50**

Sales and earnings before interest and taxes for the XYZ Ltd., during current year were ₹ 35,00,000 and ₹ 9,00,000, respectively. During the year interest expense was ₹ 8,000, and preference dividends were ₹ 10,000. These fixed charges are expected to continue for the next year.

An expansion is planned, which will require ₹ 3,50,000 and is expected to increase EBIT by ₹ 2,00,000 to ₹ 11,00,000.

The firm is considering the following financing alternatives:

- (a) Issue 10,000 shares of common stock to net the firm ₹ 35 per share. The firm currently has 80,000 shares of common stock outstanding.
- (b) Issue ₹ 3,50,000 of fifteen-year bonds at 15%. Sinking fund payments on these bonds will commence after 15 years.
- (c) Issue ₹ 3,50,000 of 14% preference share.

Assume a 50% income tax rate:

- (i) Calculate the EPS at the expected earnings before interest and taxes level of ₹ 11,00,000 for each financing alternative.
- (ii) Calculate the equivalency level of earnings before interest and taxes between the debt and common stock alternatives.
- (iii) Calculate the equivalency level of earnings before interest and taxes between the preference share and common stock alternatives.

**Answer to Question No. 50****(i) Determination of EPS at EBIT Level of ₹ 11,00,000**

<b>Financing Plan</b>			
	<b>(a) Equity Shares</b>	<b>(b) Bond Shares</b>	<b>(c) Preference</b>
	₹	₹	₹
EBIT	11,00,000	11,00,000	11,00,000
<b>Less: Interest</b>	<u>8,000</u>	<u>60,500</u>	<u>8,000</u>
Taxable Income	10,92,000	10,39,500	10,92,000
<b>Less: Taxes 50%</b>	<u>5,46,000</u>	<u>5,19,750</u>	<u>5,46,000</u>
Income after taxes	5,46,000	5,19,750	5,46,000
<b>Less: Dividend on Preference Shares</b>	<u>10,000</u>	<u>10,000</u>	<u>59,000</u>
Earning available for equity holders	5,36,000	5,09,750	4,87,000
Number of Equity shares	90,000	80,000	80,000
EPS (₹)	5.96	6.37	6.09

## (ii) Equivalency Level of Earnings between Equity and Debt Plan

$$\frac{(X - I_1)(1 - t) - P_1}{N_1} = \frac{(X - I_1 - I_2)(1 - t) - P_1}{N_2}$$

OR

$$\frac{(X - \text{Rs. } 8,000)0.5 - \text{Rs. } 10,000}{90,000} = \frac{(X - \text{Rs. } 8,000 - \text{Rs. } 52,500)0.5 - \text{Rs. } 10,000}{80,000}$$

$$\frac{0.5X - \text{Rs. } 4,000 - \text{Rs. } 10,000}{90,000} = \frac{0.5X - \text{Rs. } 30,250 - \text{Rs. } 10,000}{80,000}$$

The above equation can be simplified as under:

$$\text{▷ } 8(0.5X - ₹ 14,000) = 9(0.5X - ₹ 40,250)$$

$$\text{▷ } 4X - ₹ 1,12,000 = 4.5X - ₹ 3,62,250$$

$$\text{▷ } 4X - 4.5X - ₹ 3,62,250 + ₹ 1,12,000$$

$$\text{▷ } -0.5X = -2,50,250$$

$$X = ₹ 5,00,500$$

**Verification Table**

	<b>Equity Plan</b> (₹)	<b>Debt Plan</b> (₹)
EBIT	5,00,500	5,00,500
<b>Less: Interest</b>	<u>8,000</u>	<u>60,500</u>
	4,92,500	4,40,000
<b>Less: Taxes (50%)</b>	<u>2,46,250</u>	<u>2,20,000</u>
EAT	2,46,250	2,20,000
<b>Less: Pref. Dividend</b>	<u>10,000</u>	<u>10,000</u>
Earnings for Equityholders	2,36,250	2,10,000
No. of Equity shares	90,000	80,000
EPS (₹)	2.625	2.625

## (iii) Equivalency level between the Preferred stock and common stock alternatives

$$\frac{(X - I_1)(1 - t) - P_1 - P_2}{N_1} = \frac{(X - I_1)(1 - t) - P_1}{N_2}$$

OR

$$\frac{(X - \text{Rs. } 8,000)0.5 - \text{Rs. } 10,000 - \text{Rs. } 49,000}{80,000} = \frac{(X - \text{Rs. } 8,000)0.5 - \text{Rs. } 10,000}{90,000}$$

$$= \frac{0.5X - \text{Rs. } 4,000 - \text{Rs. } 59,000}{80,000} = \frac{0.5X - \text{Rs. } 4,000 - \text{Rs. } 10,000}{90,000}$$

OR

$$\Rightarrow \frac{0.5X - \text{Rs. } 63,000}{80,000} = \frac{0.5X - \text{Rs. } 14,000}{90,000}$$

By simplifying the above, we get:

$$\text{P} \quad 9 (0.5X - ₹ 63,000) = 8 (0.5X - ₹ 14,000)$$

$$\text{P} \quad 4.5X - ₹ 5,67,000 = 4X - ₹ 1,12,000$$

$$\text{P} \quad 4.5X - 4X = ₹ 5,67,000 - ₹ 1,12,000$$

$$0.5X = ₹ 4,55,000$$

$$X = \frac{₹ 4,55,000}{.5} = ₹ 9,10,000$$

**Question No. 51**

Two companies – P Ltd. and Q Ltd. belong to the equivalent risk group. The two companies are identical in every respect except that Q Ltd. is levered, while P Ltd. is unlevered. The outstanding amount of debt of the levered company is ₹6,00,000 in 10% debentures. The other information for the two companies are as follows:

	<i>P Ltd.</i>	<i>Q Ltd.</i>
Net operating income (EBIT) (₹)	1,50,000	1,50,000
Interest (₹)	—	60,000
Earnings to equity-holders (₹)	1,50,000	90,000
Equity capitalization rate, $k_e$	0.15	0.20
Market value of equity (₹)	10,00,000	4,50,000
Market value of debt (₹)	—	6,00,000
Total value of firm (₹)	10,00,000	10,50,000
Overall capitalization rate, $k_o = \text{EBIT}/V$	15.0%	14.3%
Debt-equity ratio	0	1.33

An investor owns 5% equity shares of Q Ltd. Show the process and the amount by which he could reduce his outlay through use of the arbitrage process. Is there any limit to the 'process'?

**Answer to Question No. 51****Investor's current position (in Company Q)**

Dividend income (5% of ₹ 90,000) = ₹ 4,500

Market value of Investment (5% of ₹ 4,50,000) = ₹ 22,500

He sells his holdings in company Q for ₹ 22,500 and creates a personal leverage by borrowing ₹ 30,000 (5% of ₹ 6,00,000). The total amount with him is ₹ 52,500. He purchases 5% equity holdings of the Company P for ₹50,000 as the total value of the firm is ₹ 10,00,000. Further, his position with respect to income would be as follows:

	<i>Company P</i>	<i>Company Q</i>
Dividends (5% of profit)	₹ 7,500	₹ 4,500
<b>Less:</b> Interest (10% of ₹ 30,000)	<u>3,000</u>	—
Net Income	<u>4,500</u>	<u>4,500</u>



The investor, thus, can save an amount of ₹ 2,500 through the use of leverage and still continue to earn the same earnings of ₹ 4,500 as before.

There are limits to the arbitrage process and it will come to an end when the market values of both the companies are same.

### Question No. 52

XYZ Corporation has plans for expansion which calls for 50% increase in assets. The alternatives before the corporation are issue of equity shares or debt at 14%. Its balance sheet and profit and loss accounts are as given below:

**Balance sheet as at 31st December, 2012**

<b>Liabilities</b>	<b>₹ (in lakhs)</b>	<b>Assets</b>	<b>₹ (in lakhs)</b>
12% debentures	25	Total assets	200
Ordinary shares – 10 lakhs shares of ₹ 10 each	100		
General reserve	<u>75</u>		<u>—</u>
	<u>200</u>		<u>200</u>

**Profit & loss account for the year ending 31st December, 2012**

	<b>₹ (in lakhs)</b>
Sales	750
<b>Less:</b> Total cost excluding interest	<u>675</u>
EBIT	75
<b>Less:</b> Interest on debentures	<u>3</u>
EBT	72
<b>Less:</b> Taxes	<u>36</u>
EAT	<u>36</u>
Earning per share (EPS) ₹ 36,00,000 ÷ 10,00,000	3.60
P/E ratio	5 times
Market price	18.00

If the corporation finances the expansion with debt, the incremental financing charges will be at 14% and P/E ratio is expected to be at 4 times. If the expansion is through equity, the P/E ratio will remain at 5 times. The company expects that its new issues will be subscribed to at a premium of 25%.

With the above information determine the following:

- If the EBIT is 10% of sales, calculate EPS at sales levels of ₹ 4 crores, ₹8 crores and ₹ 10 crores.
- After expansion determine at what level of EBIT, EPS would remain the same, whether new funds are raised by equity or debt.

(iii) Using P/E ratios calculate the market value per share at each sales level for both debt and equity financing.

**Answer to Question No. 52**

(i) ..... ₹ 100 lakhs:

Sales	Sales Level					
	₹ 4 crores		₹ 8 crores		₹ 10 crores	
	₹ in lakh		₹ in lakh		₹ in lakh	
	Equity	Debt 14%	Equity	Debt 14%	Equity	Debt 14%
EBIT at 10%	40	40	80	80	100	100
<b>Less:</b> Interest	3	17 (3+14)	3	17 (3+14)	3	17 (3+14)
EBT	37	23	77	63	97	83
<b>Less:</b> Tax @ 50%	18.5	11.5	38.5	31.5	48.5	41.5
EAT	18.5	11.5	38.5	31.5	48.5	41.5
*No. of equity shares in lakhs	18	10	18	10	18	10
EPS (₹)	1.03	1.15	2.14	3.15	2.00	4.15

\*Existing Shares 10,00,000

$$\text{New issue} = \left( \frac{\text{Rs. } 10,00,000 \times 10}{12.5} \right)$$

(if equity financing is resorted) (since shares are sold at a premium of 25%)

(ii) Let 'A' be the EBIT level at which EPS would be the same:

$$\frac{(A - I_1) \times .5}{18} = \frac{(A - I_1 - I_2) \times .5}{10} = \text{EBIT}$$

Where  $I_1$  is interest when additional funds are raised through equity and  $I_2$  is incremental interest charges if financing is through debt.

$$\text{i.e. } \frac{(A - 3) \times .5}{18} = \frac{(A - 3 - 14) \times .5}{10}$$

$$\frac{5A - 1.5}{18} = \frac{.5A - 8.5}{10}$$

By cross multiplication, we may get

$$\begin{aligned} 10 (.5A - 1.5) &= 18 (.5A - 8.5) \\ 5A - 15 &= 9A - 153 \\ -4A &= -138 \\ 4A &= 138 \\ A &= 138/4 \\ A &= 34.5 \end{aligned}$$

So solving for A, we get the EBIT as ₹ 34.5 lakhs.

**Question No. 53**

Triplex Company Limited is considering an expansion programme which is expected to cost ₹ 10,00,000. The company can finance it either through debt or through equity. Its current financing pattern is given as below:

	₹
Equity Capital (50,000 shares @ ₹ 10 each)	5,00,000
Reserves and Surplus	2,00,000
Debt (10%)	3,00,000
<b>Total</b>	<b>10,00,000</b>

The latest income statement reveals the following information:

	₹
Sales	64,00,000
<b>Less: Total costs</b>	<u>59,00,000</u>
EBIT	5,00,000
<b>Less: Interest</b>	<u>30,000</u>
EBT	4,70,000
<b>Less: Income-tax @ 50%</b>	<u>2,35,000</u>
EAT	<u>2,35,000</u>

The expansion programme is expected to generate additional sales of –

₹ 16,00,000 with a return of 15% on sale, before interest and taxes. If the expansion is financed through debt, the rate of new debt will be 12% and the price earning ratio will be 4 times. If the expansion programme is financed through equity shares i.e. the new shares can be sold at a price of ₹ 40 and the price to earning ratio will be 5 times. Which form of financing should the company choose if the objective of financial management in the company is maximisation of shareholders wealth.

**Answer to Question No. 53**

**Statement Showing the Comparative Analysis of Alternative Financial Plan**

<b>Financial Plans</b>		
	<b>I</b>	<b>II</b>
	<b>Debt Issue</b>	<b>Equity Issue</b>
	(₹)	(₹)
<b>Earnings Before Interest and Taxes (EBIT)</b>		
(₹ 5,00,000 + 15% of 16,00,000)	7,40,000	7,40,000
<b>Less: Interest</b>	1,50,000	30,000
Earnings Before Taxes (EBT)	5,90,000	7,10,000
<b>Less: Taxes @ 50%</b>	2,95,000	3,55,000
Earnings After Taxes	2,95,000	3,55,000

No. of shares	50,000	75,000
EPS (EAT/No. of shares)	5.90	4.73
Price-Earning Ratio	4 times	5 times
Market value of share	5.90 x 4	4.73 x 5
(EPS P/E ratio)	= ₹ 23.60	= ₹ 23.65

**Decision:** Though there is a marginal difference in the market value of shares under alternative financial plans but in view of higher EPS (₹ 5.90) and debt equity ratio with in acceptable norm, i.e., 2.1; Financial Plan I may be accepted.

### DIVIDEND DECISIONS

#### Question No. 54

From the given details regarding three companies, you are required to (i) calculate the value of an equity share of each of these companies when dividend pay-out ratio is (a) 20% (b) 50% (c) 0% and (d) 100% (ii) Comment on the results drawn.

<b>A Ltd.</b>	<b>B Ltd.</b>	<b>C Ltd.</b>
R = 15%	R = 10%	R = 8%
$K_e = 10\%$	$K_e = 10\%$	$K_e = 10\%$
$E = ₹ 10$	$E = ₹ 10$	$E = ₹ 10$

#### Answer to Question No. 54

According to J. Walter, the price of a equity share in a company with no debt or taxes may determined by the following equations.

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e}$$

Where P = Price per share  
D = Cash dividend per share  
E = Earnings per share  
r = Operating return on assets or internal rate of return  
 $K_e$  = Cost of equity capital or capitalisation rate.

Using the above mentioned formula, the price or value of an equity share can be calculated as under:

	<b>A Ltd.</b>	<b>B Ltd.</b>	<b>C Ltd.</b>
<b>(i) When dividend pay out ratio is 20%</b>	$2 + \frac{15\%(10 - 2)}{10\%}$ $= \frac{2 + \frac{(.15)(8)}{.10}}{.10}$ $= ₹ 140$	$2 + \frac{10\%(10 - 2)}{10\%}$ $= \frac{2 + 8}{.10}$ $= ₹ 100$	$2 + \frac{8\%(10 - 2)}{10\%}$ $= \frac{2 + \frac{.08 \times 8}{.10}}{.10}$ $= ₹ 84$

(ii) When dividend pay out ratio is 50%	$5 + \frac{.15(10 - 5)}{.10}$ $= \frac{.10}{.10}$ $= ₹ 125$	$5 + \frac{.10(10 - 5)}{.10}$ $= \frac{.10}{.10}$ $= ₹ 100$	$5 + \frac{.08(10 - 5)}{.10}$ $= \frac{.10}{.10}$ $= ₹ 90$
(iii) When dividend pay out ratio is 0%	$0 + \frac{.15(10 - 0)}{.10}$ $= \frac{.10}{.10}$ $= ₹ 150$	$0 + \frac{.10(10 - 0)}{.10}$ $= \frac{.10}{.10}$ $= ₹ 100$	$0 + \frac{.08(10 - 0)}{.10}$ $= \frac{.10}{.10}$ $= ₹ 80$
(iv) When dividend pay out ratio is 100%	$10 + \frac{.15(10 - 10)}{.10}$ $= \frac{.10}{.10}$ $= ₹ 100$	$10 + \frac{.10(10 - 10)}{.10}$ $= \frac{.10}{.10}$ $= ₹ 100$	$10 + \frac{.08(10 - 10)}{.10}$ $= \frac{.10}{.10}$ $= ₹ 100$

**Comments**

1. Firm A is a growth firm because its internal rate of return ( $r = 15\%$ ) is greater than the cost of capital ( $K_e = 8\%$ ). This firm may re-invest its retained earnings at a rate which is higher than the rate expected by share holders. Firm A will maximise its share value when dividend pay out ratio is 0%. At this ratio, the value of share is ₹ 150. The market price of share increases as dividend pay out ratio declines and reverse otherwise. So optimum pay out ratio for growth firm A is zero.
2. Firm B is the normal firm because for this firm  $r = K_e$  (i.e. 10%). The dividend pay out ratio for the firm is irrelevant as it does not affect the market price of its share. It is same i.e. ₹ 100 at different level of dividend pay out ratios.
3. Firm C is declining firm because the rate of return (i.e. 8%) on the investment for this firms is lower than the cost of capital (i.e. 10%). Investors of this firm would like earnings to be distributed to them so that they may either spend it or invest it elsewhere to get a rate higher than earned by this firm. The optimum pay out ratio for this firm is 100% because at this ratio market price of its share is maximum i.e. ₹ 100.

**Question No. 55**

Bajaj Auto Ltd. has outstanding 1,20,000 shares selling at ₹ 20 per share. The company hopes to make a net income of ₹ 3,50,000 during the year ending on March 2013. The company is thinking of paying a dividend of ₹ 2 per share at the end of current year. The capitalisation rate for risk class of this firm has been estimated to be 15%. Assuming no taxes, answer questions listed below on the basis of the Modigliani Miller dividend Valuation Model:

- (a) What will be the price of share at the end of March 31, 2013.
  - (i) If the dividend is paid and
  - (ii) If the dividend is not paid.

(b) How many new shares must the company issue if the dividend is paid and company needs ₹ 7,40,000 for an approved investment expenditure during the year.

**Answer to Question No. 55**

(i) Price of the share if the dividend is paid

$$P_0 = \frac{D_1 + P_1}{(1 + K_e)}$$

Where  $P_0$  stands for prevailing market price of shares.

$D_1$  stands for dividend to be received at the end of period.

$K_e$  stands for the cost of equity capital.

$P_1$  stands for market price of share at the end of period one.

$$₹ 20 = \frac{₹ 2 + P_1}{(1 + 0.15)}$$

$$₹ 20 (1 + 0.15) = (₹ 2 + P_1)$$

$$₹ 20 (1.15) = ₹ 2 + P_1$$

$$P_1 = ₹ 23 - ₹ 2 = ₹ 21.$$

(ii) Price of the share if dividends is not paid.

$$₹ 20 = \frac{0 + P_1}{(1 + .15)}$$

$$₹ 20 = \frac{0 + P_1}{(1.15)}$$

$$P_1 = ₹ 20 (1.15)$$

$$P_1 = ₹ 23$$

(iii) Number of new equity to be issued

$$\Delta N = \frac{I - (E - ND_1)}{P_1}$$

$$\Delta N = \frac{\text{Rs. } 7,40,000 - (\text{Rs. } 3,50,000 - 1,20,000 \times \text{Rs. } 2)}{\text{Rs. } 21}$$

$$= \frac{\text{Rs. } 7,40,000 - (\text{Rs. } 3,50,000 - 2,40,000)}{\text{Rs. } 21}$$

$$= \frac{\text{Rs. } 7,40,000 - \text{Rs. } 1,10,000}{\text{Rs. } 21}$$

$$= \frac{\text{Rs. } 6,30,000}{\text{Rs. } 21}$$

$$= 30,000 \text{ shares.}$$

**Question No. 56**

From the given information for Alpha & Company you are required to:

- (i) Find out whether the firm's dividend pay-out ratio is optimal according to Walters formula. The firm was starting a year before with equity capital of ₹ 40 lakhs.

Earnings of the firm	₹ 4,00,000
Dividend paid	₹ 3,20,000
Price earning ratio	12.5
Number of share outstanding	40,000 @ ₹ 100 each.

- (ii) Will the Company change its dividend policy if P/E ratio is 8 instead of 12.5?

**Answer to Question No. 56**

According to J. Walter, the price of share may be found out by using the following formula:

$$P = \frac{D + (E - D) \frac{r}{K_e}}{K_e}$$

- P — stands for price per equity shares.  
 D — stands for dividend per share.  
 E — stands for earnings per share.  
 $K_e$  — stands for cost of capital.  
 r — stands for internal rate of return on investments.  
 (E-D) — stands for retained earnings per share

Substitute the information in above formula we may get

$$P = \frac{8 + \frac{10\%}{8\%}(10 - 8)}{8\%}$$

$$P = \frac{8 + \frac{.10}{.08}(2)}{.08}$$

$$P = \frac{8 + \frac{20}{8}}{8/100}$$

$$P = \frac{\frac{64 + 20}{8}}{8/100}$$

$$P = \frac{84}{8} \times \frac{100}{8} = \frac{8400}{64}$$

$$P = \frac{2100}{16}$$

$$P = 131.25$$

**Working Notes**

$K_e$  is the reciprocal of  $1/12.5\% = 8\%$

$$EPS = \frac{\text{Total Earnings of the firm}}{\text{Number of shares}} = \frac{\text{₹}4,00,000}{\text{₹}40,000} = \text{Rs. } 10.00$$

$$D = \frac{\text{Amount of Dividend Paid}}{\text{Number of Shares}} = \frac{\text{₹}3,20,000}{\text{₹}40,000} = \text{Rs. } 8$$

$$r = \frac{\text{Total Earnings of the firm}}{\text{Total Equity Capital of the firm}} = \frac{\text{₹}4,00,000}{\text{₹}40,00,000} \times 100 = 10\%$$

At present, the firm pay out ratio which is 80% is not optimal. The zero dividend pay out ratio is considered maximum because at this point the price of share would be maximum.

It is evident from the following calculations.

$$P = \frac{0 + \frac{10\%}{8\%}(10 - 0)}{8\%}$$

$$= \frac{0 + \frac{.10}{.08}(10)}{.08}$$

$$= \frac{0 + 1.25 \times 10}{.08}$$

$$= \frac{12.5}{8} \times 100$$

$$= \text{₹ } 156.25$$

(ii) The firm will change its dividend policy if P/E ratio is 8. It is because at this level of P/E ratio, the value of Cost of Capital ( $K_e = 12.5\%$ ) is greater than that of internal rate of return of investment ( $r = 10\%$ ). The optimum dividend policy for company in this case is to go for 100% dividend pay out ratio. Since  $K_e > r$ , 100% dividend pay out ratio would maximise the value of share.

**Question No. 57**

Consider a common stock whose dividends are expected to grow at a 25 percent rate for 2 years, after which the growth rate is expected to fall to 5 percent. The dividend paid last period was ₹ 2. The investor desires a 12 per cent return. You are required to find the value of this stock.

**Answer to Question No. 57**

Compute the dividends during the supernormal growth period and find their present value. Assuming  $D_0$  is ₹ 2,  $g$  is 15 per cent, and  $r$  is 12 percent :

$$D_1 = D_0 (1 + g) = \text{₹ } 2 (1 + 0.25) = \text{₹ } 2.50$$

$$D_2 = D_0 (1 + g)^2 = \text{₹ } 2 (1.563) = \text{₹ } 3.125 \text{ or}$$

$$D_2 = D_1 (1 + g) = \text{₹ } 2.50 (1.25) = \text{₹ } 3.125$$

$$PV \text{ of dividends} = \frac{D_1}{(1+r)^1} + \frac{D_2}{(1+r)^2} = \frac{\text{₹ } 2.50}{(1+0.12)^1} + \frac{\text{₹ } 3.125}{(1+0.12)^2}$$



$$\begin{aligned}
&= ₹ 2.50 (\text{PVIF } 12\%, 1) + ₹ 3.125 (\text{PVIF } 12\%, .2) \\
&= ₹ 2.50 (0.8929) + ₹ 3.125 (0.7972) \\
&= ₹ 2.23 + ₹ 2.49 = ₹ 4.72.
\end{aligned}$$

Find the price of the stock at the end of the supernormal growth period. The dividend for the third year

$$D_3 = D_2 (1 + g), \text{ where } g = 5\%$$

$$= ₹ 3.125 (1 + 0.05) = ₹ 3.28$$

The price of the stock is therefore :

$$P_2 = \frac{D_3}{r - g} = \frac{\text{Rs. } 3.28}{0.12 - 0.05} = \text{Rs. } 46.86$$

PV of stock price = ₹ 46.86 (PVIF 12% .2)

$$= ₹ 46.86 (0.7972) = ₹ 37.36.$$

Add the two PV figures obtained above to find the value of the stock

$$P_0 = ₹ 4.72 + ₹ 37.36 = ₹ 42.08$$

### Question No. 58

Harish Engineering company has a cost of equity capital 15%. The current market value of the firm is ₹ 60,00,000 @ ₹ 30 per share. Assume value for I (New Investment) ₹ 18,00,000, E (Earnings) ₹ 10,00,000 and total dividends (D) ₹ 6,00,000. You are required to show that under the MM assumptions the payment of dividend does not affect the value of the firm.

### Answer to Question No. 58

#### (a) Price of a share when dividend is declared

$$P_0 = \frac{D_1 + P_1}{(1 + K_e)}$$

Where

$P_0$  = Price of share at time period 0.

$D_1$  = Dividend to be received at the end of time period 1.

$P_1$  = Price of share at the end of time period 1.

$K_e$  = Cost of capital.

Substituting the values in the above formula, we may get

$$₹ 30 = \frac{₹ 3 + P_1}{1.15}$$

$$P_1 = ₹ 30 \times 1.15 - ₹ 3 = ₹ 31.50$$

Price of a share when dividend is not declared

$$₹ 30 = \frac{P_1}{1 + .15} = \frac{P_1}{1.15} \text{ or } P_1 = ₹ 34.50$$

**Amount of New-Financing***(i) When dividend is declared*

$$I - (E - nD_1)$$

Where I = New Investment, E = Earnings of the Firm during the period

n = The Number of shares outstanding at the beginning of the year

 $D_1$  = Dividend paid to the shareholder at the end of time period 1.

Substituting the value in above equation, we may get

$$= ₹ 18,00,000 - (₹ 10,00,000 - ₹ 6,00,000)$$

$$= ₹ 14,00,000$$

$$\Delta n = \frac{\text{Rs. } 14,00,000}{\text{Rs. } 31.50}$$

(Here  $\Delta n$  = The change in the number of shares outstanding during the year)*(ii) When dividend is not declared*

$$= I - E$$

$$= ₹ 18,00,000 - ₹ 10,00,000$$

$$= ₹ 8,00,000$$

New shares to be issued are

$$\Delta n = \frac{\text{Rs. } 8,00,000}{\text{Rs. } 34.50}$$

**(b) (i) Value of Firm (V) when dividend is declared:**

$$V = \frac{1}{(1 - K_e)} [nD_1 + (n + \Delta n)P_1 - I + E - nD_1]$$

$$= \frac{₹ 6,00,000 + \left( 2,00,000 + \frac{14,00,000}{31.50} \right) \times ₹ 31.50 - ₹ 18,00,000 + ₹ 10,00,000 - ₹ 6,00,000}{1.15}$$

$$= \frac{₹ 6,00,000 + \left( \frac{63,00,000 + 14,00,000}{31.50} \right) \times ₹ 31.50 - ₹ 14,00,000}{1.15}$$

$$= \frac{₹ 6,00,000 + ₹ 77,00,000 - ₹ 14,00,000}{1.15} = \frac{₹ 69,00,000}{1.15}$$

$$= ₹ 60,00,000$$

**(ii) Value of Firm (V) when dividend is not declared:**

$$V = \frac{1}{(1 + K_e)} [(n + \Delta n)P_1 - I + E]$$

$$= \frac{\left[ 2,00,000 + \frac{8,00,000}{34.5} \right] \times ₹ 34.50 - ₹ 18,00,000 + ₹ 10,00,000}{1.15}$$

$$\begin{aligned}
&= \frac{[\text{₹ } 69,00,000 + \text{₹ } 8,00,000] \times 34.5 - \text{₹ } 8,00,000}{1.15} \\
&= \frac{\text{₹ } 77,00,000 - \text{₹ } 8,00,000}{1.15} = \frac{\text{₹ } 69,00,000}{1.15} \\
&= \text{₹ } 60,00,000
\end{aligned}$$

Thus, it is clear from above that under MM Hypothesis dividend payment does not affect the value of the firm.

#### Question No. 59

The shares of XYZ is presently at ₹ 50 and the company is currently paying dividend of ₹ 4 per share with a growth rate expected at 8 per cent per annum. It plans to raise fresh equity share capital. The merchant banker has suggested that an underprice of Rupee 1 is necessary, in pricing the new issue besides involving a cost of 50 paise per share on miscellaneous expenses. You are required to find out the cost of existing equity shares as well as the new equity given that the dividend rate and growth rate are not expected to change.

#### Answer to Question No. 59

Current Price Share	Current Dividend Payment	Annual Growth Rate
$P_0 = \text{₹ } 50$	$D_0 = 4$	$g = 8\%$
$F = \text{₹ } 0.50 + \text{₹ } 1 = \text{₹ } 1.50$		

$$K_{\text{new}} = \frac{D_1}{(P_0 - F)} + g = \frac{4(1.080)}{(50 - 1.50)} + 0.08 = 16.91\%$$

#### Question No. 60

The earning per share of a company is ₹ 10. Its has an internal rate of return of 15 percent and the capitalization rate of risk class is 12.5 percent. If Walter's model is used:

- What should be the optimum pay out ratio of the firm?
- What should be the price of share at this pay out?
- How shall the price of share be affected if different pay out were employed?

#### Answer to Question No. 60

According to Walter Model –

$$\text{Market Price per share} = \frac{DPS + (r / K_e)(EPS - DPS)}{K_e}$$

Where, DPS = Dividend per share, EPS = Earning per share,  $r$  = return on Investment and  $K_e$  = Capitalization rate.

- If  $r/K_e > 1$ , the value of the share of a firm will increase as EPS increases under this type of firm situation the has ample opportunities for investment and growth. The price of the share would be maximum when the firm retains all its earnings. Thus, the optimum payout ratio in this case is zero.
- When the optimum payout is zero, the price of the share of the firm is as under:

$$P = \frac{0 + (0.15 / 0.125)(10 - 0)}{0.125} = \frac{12}{0.125} = \text{Rs. } 96$$

- (iii) If the firm, under the condition  $r/K_e > 1$ , chooses a payout other than zero, the price of the share will fall. Suppose the firm has a payout of 20 per cent, the price of the share will be:

$$P = \frac{2 + (0.15 / 0.125)(10 - 2)}{0.125} = \frac{2 + (1.2)(8)}{0.125} = \frac{2 + 9.6}{0.125} = \frac{11.60}{0.125} = \text{Rs. } 92.80$$

### Question No. 61

A closely-held toys manufacturing company has been following a dividend policy, which can maximise the market value of the company as per Walter's Model. Accordingly, each year at dividend time, the capital budget is reviewed in conjunction with the earnings for the period and alternative investment opportunities for the shareholders. In the current year, the company reports net profits of ₹ 10,00,000. It is estimated that the company can earn ₹ 2,50,000 if such profits are retained. The investors have alternative investment opportunities that will yield them 12%. The company has 1,00,000 shares outstanding. What would be the dividend payout ratio of the company, if it wishes to maximise the wealth of the shareholders?

### Answer to Question No. 61

Dividend Payout (DP) ratio of the company should be zero for maximising the wealth of shareholders. At this ratio, market price of the share would be the maximum as shown by the following calculation:

$$P = [D + (r/K_e)(E - D)]/K_e$$

$$R = (\text{₹ } 2,50,000 / \text{₹ } 10,00,000) \times 100 = 25\%$$

$$E = \text{₹ } 10,00,000 / 1,00,000 = \text{₹ } 10$$

$$P = [0 + 0.25/0.12 (\text{₹ } 10 - 0)]/0.12$$

$$= (2.083 \times 10)/0.12$$

$$= 20.83/0.12$$

$$= \text{₹ } 173.58$$

## FOREX MANAGEMENT

### Question No. 62

Blue Ltd. is engaged in the production of synthetic yarn and planning to expand its operations. In this context, the company is planning to import a multi-purpose machine from Japan at a cost of ₹ 2,460 lakh. The company is in a position to borrow funds to finance import at 12% interest per annum with quarterly rests. India based Tokyo branch has also offered to extend credit of 90 days at 2% per annum against opening of an irrevocable letter of credit. Other informations are as under.

Present exchange rate : ₹ 100 = ¥ 246.

90 Days forward rate : ₹ 100 = ¥ 250.

Commission charges for letter of credit at 4% per 12 months.

*Advise whether the offer from the foreign branch should be accepted.*

**Answer to Question No. 62****Evaluation of Options****Option I : Financing Import by borrowing at 12% p.a.**

Cost of Machine	₹ (in lakhs)
2,460 lakhs yen in ₹ [@ ₹ 100 = 246 yen]	1,000.00
+ Interest at 3% for Quarter	<u>30.00</u>
Total Outflow in ₹	<u>1,030.00</u>

**Option II : Offer from Foreign Branch**

	₹ (in lakhs)
Cost of Letter of credit (Commission) at 1% (for quarter) on 2460 lakhs yen @ ₹ 100 = 246 yen	10.00
+ Interest for Quarter (3% of 10 lakhs)	<u>.30</u>
	<u>10.30 (a)</u>

**Payment at the end of 90 days:**

Cost of Machine	2,460.00 lakh yen
Interest at 2% p.a. [2460 x 2/100 x 90/365]	<u>12.13 lakh yen</u>
	<u>2,472.13 lakh yen</u>

Conversion cost of 2,472.13 lakh Yen at ₹ 100 = 250 yen:  $2,472.13 \text{ lakhs} \times \frac{100}{250} = ₹ 988.85 \text{ lakhs (b)}$

Total Cost = (a) + (b) = 10.30 lakhs + 988.85 lakhs = ₹ 999.15 lakhs.

The above calculation shows that Option II i.e. offer from Foreign Branch is cheaper and hence better. Therefore, it should be accepted.

**Question No. 63**

Horizon Ltd. has to make a US \$ 5 million payment in three months' time. The required amount in dollars is available with Syntex Ltd. The management of the company decides to invest them for three months and following information is available in this context:

- The US \$ deposit rate is 9% per annum.
- The sterling pound deposit rate is 11% per annum.
- The spot exchange rate is \$ 1.82/pound.
- The three month forward rate is \$ 1.80/pound.

Answer the following questions—

- (i) Where should the company invest for better returns?
- (ii) Assuming that the interest rates and the spot exchange rate remain as above, what forward rate would yield an equilibrium situation?
- (iii) Assuming that the US interest rate and the spot and forward rates remain as above, where should the company invest if the sterling pound deposit rate were 15% per annum?
- (iv) With the originally stated spot and forward rates and the same dollar deposit rate, what is the equilibrium sterling pound deposit rate?

**Answer to Question No. 63**

(i) US\$ Deposit Rate	=	9% per annum
Sterling Pound Deposit Rate	=	11% per annum
Spot Exchange Rate	=	\$ 1.82 / pound
Three Month Forward Rate	=	\$ 1.80 / pound

**Option I:**

Invest in \$ deposit @ 9% per annum for 3 months

$$\text{Income} = 50,00,000 \times \frac{9}{100} \times \frac{3}{12} = \$ 1,12,500$$

**Option II:**

Available dollars may be converted to pounds at spot rate. Cover forward position and invest @ 11% p.a. for three months.

Spot exchange rate = \$ 1.82 / £

$$\text{So, \$ 5 million} = \frac{5,000,000}{1.82} = \text{£ } 2747252.747$$

$$\text{Interest earning on £ } 2747252.747 \text{ @ } 11\% \text{ p.a.} = 2747252.747 \times \frac{11}{100} \times \frac{3 \text{ months}}{12} = \text{£ } 75549.450$$

$$\text{Maturity Amount after 3 months} = \text{£ } 2747252.747 + \text{£ } 75549.450 = \text{£ } 2822802.197$$

$$\text{Pound converted to dollar at } 1.80 \text{ / pound Forward rate} = 2822802.197 \times 1.80 = \$ 5081043.954$$

$$\text{Gain} = \$ 50,81,043.954 - \$ 5,000,000 = \$ 81043.954$$

$$\text{Hence, Gain – Option I} = \$ 1,12,500$$

$$\text{Gain – Option II} = \$ 81043.95$$

Therefore, Syntex Ltd. must invest under Option I in \$ at 9%.

(ii) For an equilibrium situation, amount at the end of three months should be equal. Therefore, amount invested in sterling covered by forward rate.

$$= \$ 50,00,000 + \$ 1,12,500 = \$ 51,12,500$$

Let forward rate be \$ x / £

$$\therefore \text{ at equilibrium £ } 2822802.197 \text{ equals } 2822802.197 \times x = \$ 51,12,500$$

$$\therefore x = \frac{51,12,500}{28,22,802.197} = 1.811$$

$$\therefore \text{ Forward rate} = \$ 1.811/\text{£}$$

(iii) Interest earned in pounds given same spot and forward rates and interest rate is 15%:

$$= \text{£ } 2747252.747 \times \frac{15}{100} \times \frac{3}{12} = \text{£ } 103021.978$$

$$\therefore \text{ Total £} = 2747252.747 + 1,03,021.978 = 28,50,274.725$$

$$\text{Total \$} = 2850274.725 \times 1.80$$

$$= \$ 5130494.505$$

After 3 months, if the market price is more than ₹ 30, the counter-party would exercise the call option and the investor would be required to sell the share at ₹ 30. The loss to the investor would be ₹ 0.76 (i.e., ₹ 30.76 – 30).

However, if the rate is less than ₹ 30, the investor would exercise the put option and would get ₹ 30 from the rate of share. The loss to the buyer would again be ₹ 0.76.

\*Interest can also be calculated on a simple interest basis instead of continuous compound interest.

### Question No. 65

A company operating in a country having the \$ as its unit of currency has today invoiced sales to an Indian company, the payment being due 3 months from the date of invoice. The invoice amount is \$13,750. At today's spot rate, it is equivalent is ₹ 5,00,000. It is anticipated that the exchange rate will decline by 5% over the 3 months period and in order to protect the \$ payments, the importer proposes to take appropriate action in the foreign exchange market. The 3 months forward rate is presently quoted at \$ 0.0273. You are required to calculate the expected loss and to show how it can be hedged by a forward contract.

### Answer to Question No. 65

#### Calculation of Expected Exchange Loss

$$\begin{aligned}\text{Spot rate} &= \frac{\$13,750}{\text{Rs. } 5,00,000} \\ &= \$ 0.0275/\text{Re } 1\end{aligned}$$

$$3 \text{ months forward rate} = \$ 0.0273/\text{₹ } 1$$

$$\begin{aligned}\text{Expected spot rate after 3 months} &= (\$ 0.0275 - 5\%) \\ &= (\$ 0.0275 - 0.001375) = 0.026125\end{aligned}$$

$$\text{Present Cost of \$ 13,750} = ₹ 5,00,000 \quad \dots(\text{A})$$

#### Cost after 3 months

$$(\$ 13,750 @ 0.026125/\text{Re } 1) = ₹ 5,26,316^* \quad \dots(\text{B})$$

$$\text{Expected Exchange Loss (A - B)} = ₹ 26,316 \quad \dots(\text{C})$$

If a forward contract is taken for 3 months @ \$0.0273/₹ 1 then

$$\text{Net amount payable} = \frac{\$13,750}{\$0.0273/\text{Re } 1} = ₹ 5,03,663$$

$$\begin{aligned}\text{So, Exchange Loss will be} &= ₹ 5,00,000 - ₹ 503,663 \\ &= ₹ 3,663 \quad \dots(\text{D})\end{aligned}$$

Thus, by comparing C and D, by forward contract, the firm can cover ₹ 22,653 (i.e.) ₹ 26,316 – ₹ 3,663)

Therefore, firm can take a forward contract.

$$^* \frac{\$13,750}{\$0.026126/\text{Re } 1} = \text{Rs. } 5,26,316$$



TABLE 1 : PRESENT VALUE OF RUPEE ONE

RATE	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5%	0.9524	0.9070	0.8638	0.8227	0.7835	0.7462	0.7107	0.6768	0.6446	0.6139	0.5847	0.5568	0.5303	0.5051	0.4810
6%	0.9534	0.8900	0.8396	0.7921	0.7473	0.7050	0.6651	0.6274	0.5919	0.5584	0.5268	0.4970	0.4688	0.4423	0.4173
7%	0.9346	0.8734	0.8163	0.7629	0.7130	0.6663	0.6227	0.5820	0.5439	0.5083	0.4751	0.4440	0.4150	0.3878	0.3624
8%	0.9259	0.8573	0.7938	0.7350	0.6806	0.6302	0.5835	0.5403	0.5002	0.4632	0.4289	0.3971	0.3677	0.3405	0.3152
9%	0.9174	0.8417	0.7722	0.7084	0.6499	0.5963	0.5470	0.5019	0.4604	0.4224	0.3875	0.3555	0.3262	0.2992	0.2745
10%	0.9091	0.8264	0.7513	0.6830	0.6209	0.5645	0.5132	0.4665	0.4241	0.3855	0.3505	0.3186	0.2897	0.2633	0.2394
11%	0.9009	0.8116	0.7312	0.6587	0.5935	0.5346	0.4817	0.4339	0.3909	0.3522	0.3173	0.2858	0.2575	0.2320	0.2090
12%	0.8929	0.7972	0.7118	0.6355	0.5674	0.5066	0.4523	0.4039	0.3606	0.3220	0.2875	0.2567	0.2292	0.2046	0.1827
13%	0.8850	0.7831	0.6931	0.6133	0.5428	0.4803	0.4251	0.3762	0.3329	0.2946	0.2607	0.2307	0.2042	0.1807	0.1599
14%	0.8772	0.7695	0.6750	0.5921	0.5194	0.4556	0.3996	0.3506	0.3075	0.2697	0.2366	0.2076	0.1821	0.1597	0.1401
15%	0.8696	0.7561	0.6575	0.5718	0.4972	0.4323	0.3759	0.3269	0.2843	0.2472	0.2149	0.1869	0.1625	0.1413	0.1229
16%	0.8621	0.7432	0.6407	0.5523	0.4761	0.4104	0.3538	0.3050	0.2630	0.2267	0.1954	0.1685	0.1452	0.1252	0.1079
17%	0.8547	0.7305	0.6244	0.5337	0.4561	0.3898	0.3332	0.2848	0.2434	0.2080	0.1778	0.1520	0.1299	0.1110	0.0949
18%	0.8475	0.7182	0.6086	0.5158	0.4371	0.3704	0.3139	0.2660	0.2255	0.1911	0.1619	0.1372	0.1163	0.0985	0.0835
19%	0.8403	0.7062	0.5934	0.4987	0.4190	0.3521	0.2959	0.2487	0.2090	0.1756	0.1476	0.1240	0.1042	0.0876	0.0736
20%	0.8333	0.6944	0.5787	0.4823	0.4019	0.3349	0.2791	0.2326	0.1938	0.1615	0.1346	0.1122	0.0935	0.0779	0.0649
21%	0.8264	0.6830	0.5645	0.4665	0.3855	0.3186	0.2633	0.2176	0.1799	0.1486	0.1228	0.1015	0.0839	0.0693	0.0573
22%	0.8197	0.6719	0.5507	0.4514	0.3700	0.3033	0.2486	0.2038	0.1670	0.1369	0.1122	0.0920	0.0754	0.0618	0.0507
23%	0.8130	0.6610	0.5374	0.4369	0.3552	0.2888	0.2348	0.1909	0.1552	0.1262	0.1026	0.0834	0.0678	0.0551	0.0448
24%	0.8065	0.6504	0.5245	0.4230	0.3411	0.2751	0.2218	0.1789	0.1443	0.1164	0.0938	0.0757	0.0610	0.0492	0.0397
25%	0.8000	0.6400	0.5120	0.4096	0.3277	0.2621	0.2097	0.1678	0.1342	0.1074	0.0859	0.0687	0.0550	0.0440	0.0352

TABLE 2 : PRESENT VALUE OF AN ANNUITY OF RUPEE ONE

RATE	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5%	0.9524	1.8594	2.7232	3.5460	4.3295	5.0757	5.7864	6.4632	7.1078	7.7217	8.3064	8.8633	9.3936	9.8986	10.3797
6%	0.9434	1.8334	2.6730	3.4651	4.2124	4.9173	5.5824	6.2098	6.8017	7.3601	7.8869	8.3838	8.8527	9.2950	9.7122
7%	0.9346	1.8080	2.6243	3.3872	4.1002	4.7665	5.3893	5.9713	6.5152	7.0236	7.4987	7.9427	8.3577	8.7455	9.1079
8%	0.9259	1.7833	2.5771	3.3121	3.9927	4.6229	5.2064	5.7466	6.2469	6.7101	7.1390	7.5361	7.9038	8.2442	8.5595
9%	0.9174	1.7591	2.5313	3.2397	3.8897	4.4859	5.0330	5.5348	5.9952	6.4177	6.8052	7.1607	7.4869	7.7862	8.0607
10%	0.9091	1.7355	2.4869	3.1699	3.7908	4.3553	4.8684	5.3349	5.7590	6.1446	6.4951	6.8137	7.1034	7.3667	7.6061
11%	0.9009	1.7125	2.4437	3.1024	3.6959	4.2305	4.7122	5.1461	5.5370	5.8892	6.2065	6.4924	6.7499	6.9819	7.1909
12%	0.8929	1.6901	2.4018	3.0373	3.6048	4.1114	4.5638	4.9676	5.3282	5.6502	5.9377	6.1944	6.4235	6.6282	6.8109
13%	0.8850	1.6681	2.3612	2.9745	3.5172	3.9975	4.4226	4.7988	5.1317	5.4262	5.6869	5.9176	6.1218	6.3025	6.4624
14%	0.8772	1.6467	2.3216	2.9137	3.4331	3.8887	4.2883	4.6389	4.9464	5.2161	5.4527	5.6603	5.8424	6.0021	6.1422
15%	0.8696	1.6257	2.2832	2.8550	3.3522	3.7845	4.1604	4.4873	4.7716	5.0188	5.2337	5.4206	5.5831	5.7245	5.8474
16%	0.8621	1.6052	2.2459	2.7982	3.2743	3.6847	4.0386	4.3436	4.6065	4.8332	5.0286	5.1971	5.3423	5.4675	5.5755
17%	0.8547	1.5852	2.2096	2.7432	3.1993	3.5892	3.9224	4.2072	4.4506	4.6586	4.8364	4.9884	5.1183	5.2293	5.3242
18%	0.8475	1.5656	2.1743	2.6901	3.1272	3.4976	3.8115	4.0776	4.3030	4.4941	4.6560	4.7932	4.9095	5.0081	5.0916
19%	0.8403	1.5465	2.1399	2.6386	3.0576	3.4098	3.7057	3.9544	4.1633	4.3389	4.4865	4.6105	4.7147	4.8023	4.8759
20%	0.8333	1.5278	2.1065	2.5887	2.9906	3.3255	3.6046	3.8372	4.0310	4.1925	4.3271	4.4392	4.5327	4.6106	4.6755
21%	0.8264	1.5095	2.0739	2.5404	2.9260	3.2446	3.5079	3.7256	3.9054	4.0541	4.1769	4.2784	4.3624	4.4317	4.4890
22%	0.8197	1.4915	2.0422	2.4936	2.8636	3.1669	3.4155	3.6193	3.7863	3.9232	4.0354	4.1274	4.2028	4.2646	4.3152
23%	0.8130	1.4740	2.0114	2.4483	2.8035	3.0923	3.3270	3.5179	3.6731	3.7993	3.9018	3.9852	4.0530	4.1082	4.1530
24%	0.8065	1.4568	1.9813	2.4043	2.7454	3.0205	3.2423	3.4212	3.5655	3.6819	3.7757	3.8514	3.9124	3.9616	4.0013
25%	0.8000	1.4400	1.9520	2.3616	2.6893	2.9514	3.1611	3.3289	3.4631	3.5705	3.6564	3.7251	3.7801	3.8241	3.8593

## PROFESSIONAL PROGRAMME

## FINANCIAL, TREASURY AND FOREX MANAGEMENT

## PP-FT&amp;FM

## TEST PAPER

**A Guide to CS Students**

To enable the students in achieving their goal to become successful professionals, Institute has prepared a booklet 'A Guide to CS Students' providing the subject specific guidance on different papers and subjects contained in the ICSI curriculum. The booklet is available on ICSI website and students may download from <http://www.icsi.edu/Portals/0/AGUIDETOCSSSTUDENTS.pdf>

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In the event of any misconduct by a registered student or a candidate enrolled for any examination conducted by the Institute, the Council or the Committee concerned may suo motu or on receipt of a complaint, if it is satisfied that, the misconduct is proved after such investigation as it may deem necessary and after giving such student or candidate an opportunity to state his case, suspend or debar the person from appearing in any one or more examinations, cancel his examination result, or studentship registration, or debar him from future registration as a student, as the case may be.

Explanation - Misconduct for the purpose of this regulation shall mean and include behaviour in a disorderly manner in relation to the Institute or in or near an Examination premises/centre, breach of any regulation, condition, guideline or direction laid down by the Institute, malpractices with regard to postal or oral tuition or resorting to or attempting to resort to unfair means in connection with the writing of any examination conducted by the Institute".

## PROFESSIONAL PROGRAMME

**FINANCIAL, TREASURY AND FOREX MANAGEMENT****TEST PAPER**

*(This Test Paper is for recapitulate and practice for the students. Students need not to submit responses/answers to this test paper to the Institute.)*

*Time Allowed : 3 Hours*

*Maximum Marks : 100*

*Attempt All Questions*

1. Balwinder has been retained as a management consultant by Square Pants, Inc., a local specialty retailer, to analyze two proposed capital investment projects, projects X and Y. Project X is a sophisticated working capital and inventory control system based upon a powerful personal computer, called a system server and PC software specifically designed for inventory processing and control in the retailing business. Project Y is a similarly sophisticated working capital and inventory control system based upon a powerful personal computer and general-purpose PC software. Each project has a cost of ₹ 10,000, and the cost of capital for both projects is 12%. The project's expected net cash flows are as follows :

Years	Expected Net Cash Flows	
	Project X	Project Y
0	(₹ 10,000)	(₹ 10,000)
1	6,500	3,500
2	3,000	3,500
3	3,000	3,500
4	1,000	3,500

- (a) Calculate each project's nominal payback period, net present value (NPV), internal rate of return (IRR), and profitability index (PI). (12 marks)
  - (b) Should both projects be accepted if they are interdependent? (4 marks)
  - (c) Which project should be accepted if they are mutually exclusive? (4 marks)
2. (a) Distinguish between the following with reference to foreign exchange market:
- (i) Fixed exchange rate and Flexible exchange rate.
  - (ii) Forward exchange contract and future contract. (4 marks each)
- (b) In considering the most desirable capital structure for a company, the following estimates of the cost of debt and equity capital (after tax) have been made at various levels of debt-equity mix :

Debt as percentage of total capital employed	Cost of debt (%)	Cost of equity (%)
(1)	(2)	(3)
0	7.0	15.0
10	7.0	15.0
20	7.0	15.5
30	7.5	16.0
40	8.0	17.0

50	8.5	19.0
60	9.5	20.0

You are required to determine the optimal debt-equity mix for the company by calculating composite cost of capital. (8 marks)

OR

2A. (a) Discuss the relationship between Treasury Management and Financial Management. (6 marks)

(b) Given are the details of three companies A Ltd, B Ltd and C Ltd.

<i>A Ltd.</i>	<i>B Ltd.</i>	<i>C Ltd.</i>
R= 15%	R= 10%	R = 8%
Ke= 10%	Ke= 10%	Ke= 10%
E = Rs. 10	E = Rs. 10	E = Rs. 10

When the terms R, Ke and E have their usual meanings,

(i) Calculate the value of an equity share of each company when dividend pay-out ratio is (x) 20% (y) 50% (z) 0% and (w) 100% (8 marks)

(ii) Comment on the results drawn. (2 marks)

3. (a) The following table summarizes risk premiums for stocks relative to treasury bills and bonds, for different time periods:

	Stocks - T. Bills		Stocks - T. Bonds	
	Arithmetic Mean	Geometric Mean	Arithmetic Mean	Geometric Mean
1926-2010	8.41%	6.41%	7.24%	5.50%
1962-2010	4.10%	2.95%	3.92%	3.25%
1981-2010	6.05%	5.38%	0.13%	0.19%

(i) What does this premium measure?

(ii) Why is the geometric mean lower than the arithmetic mean for both bonds and bills?

(iii) If you had to use a risk premium, would you use the most recent data (1981-2010), or would you use the longer periods? Give reasons. (2 marks each)

(b) Write short note on

(i) Intrinsic Value of Option

(ii) Time Value of Option (5 marks each)

OR

3.A (a) Discuss the settlement of Option Contracts (6 marks)

(b) The following information is available in respect of Security-X and Security-Y:

<i>Security</i>	<i>P</i>	<i>Expected Rate of Return</i>
X	1.8	22.00%
Y	1.6	20.40%

Rate of return of market portfolio is 15.3%.

If risk-free rate of return is 7%, are these securities correctly priced? What would be the risk-free rate of return, if they are correctly priced? (10 marks)

4. Lockers Pvt. Ltd. is considering the use of a lockbox system to handle its daily collections. The company's credit sales are ₹ 160 crore per year, and it currently processes 1,300 cheques per day. The cost of the lockbox system is ₹ 95,000 per year. The system allows for up to 1,000 cheques per day. Any additional cheques are processed at an additional charge of ₹ 1.50 per cheque. The company estimates that the system will reduce its float by 3 days. The firm's discount rate for equally risky projects is 15 per cent, its tax rate is 40 per cent, and its cost of short-term capital is 12 per cent. (Assume a 360-day year).

- How much cash will be released for other uses if the lockbox system is used?
- What net benefit will Lockers Ltd. gain from using lockbox system?
- Should Lockers Ltd. adopt the proposed lockbox system?
- Assume now that the institution that offers the lockbox system requires a ₹ 7,00,000 compensating balance to be held for the complete year in a non-interest-bearing account. Should Lockers Ltd. adopt the system? (4 marks each)

5. (a) Given the details of 'M Limited'

Installed capacity is 5000 units. Annual Production and sales at 60% of installed capacity. Selling price per unit is ₹ 25 Variable cost per unit is ₹ 15

Fixed cost:

Situation 1 : ₹ 10,000

Situation 2 : ₹ 12,000

Capital structure:

	Financial Plan	
	X (₹)	Y (₹)
Equity	25,000	50,000
Debt (10%)	50,000	25,000
	75,000	75,000

Calculate the operating, financial and combined leverage under situations 1 and 2 and the financial plans for X and Y respectively from the following information relating to the operating and capital structure of a company, and also find out which financial plan gives the highest and the least value ? (8 marks)

- A futures contract is available on a company that pays an annual dividend of ₹ 5 and whose stock is currently priced at ₹ 200. Each futures contract calls for delivery of 1,000 shares of stock in one year, daily marking to market, an initial margin of 10% and a maintenance margin of 5%. The corporate treasury bill rate is 8%.
  - Given the above information, what should be the price of one futures contract? (2 marks)
  - If the company stock price decreases by 7%, what will be the change, (if any), in futures price? (2 marks)
  - As a result of the company stock price decrease, will an investor that has a long position in one

futures contract of this company realizes a gain or loss? Also calculate, the amount of this gain or loss?  
(4 Marks)

6. Write short notes on:

- (a) Advantages of mutual funds
- (b) Operating cycle
- (c) Securitisation of mortgages
- (d) Social cost-benefit analysis.

(4 marks each)

