POST MEMBERSHIP QUALIFICATION COURSE IN CAPITAL MARKETS AND FINANCIAL SERVICES

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INTRODUCTION

In a world of expanding free markets, the financial services industry continues to evolve, shape and redefine its role. With the intense and ever increasing competition, the need of instantaneous information cannot be over emphasised. The institutions, which have the ability to anticipate changes in the markets in which they compete, will survive. Four major forces could be identified which are driving the changes in the financial services industry: globalisation, deregulation, technology and securitization.

The financial services industry is an information business that has an impact on the constant global movement on money (capital and credit). Technology has accelerated the speed and scope of information processing and, therefore, the flow of money. Securitization and global capital markets are changing the nature of money from paper to an electronic medium. Deregulation has provided financial service companies with great market opportunities and, at the same time, exposed financial accidents/scams caused by the mismanagement of market, credit, operational and institutional risks. Banks, non-banks, and investment banks have experienced varying degree of success and failure as globalisation, deregulation, technology and securitization change the financial services industry.

Evolution accelerated by technological changes and revolution in competitive conditions from global integration and deregulation are shaking traditional financial institutions. Further, recent developments such as increase in the cross-border capital flows, globalization, competition, the rise of market economies, deregulation and corporate restructuring are not only mind boggling but has also raised regulatory concerns in financial services sector. It has, therefore, become imperative for financial experts to debate the volatile regulatory issues.

In this Paper, an attempt has been made to review the WTO agenda and developments in financial services sector and to discuss the existing regulatory structures of the financial services sector in select countries viz., USA, UK, Germany and Japan with a view to find out gaps, if any, in their regulatory mechanisms. Efforts have also been made to identify issues requiring attention of Policy Makers and Legislators to expedite the reform processes already initiated and bring about the desired changes in regulatory mechanisms to meet the aspirations of the WTO regime so as to ensure smooth integration of global markets.

* Secretary, The ICSI. The views expressed are the personal views of the author and do not necessarily reflect those of the Institute. In view of the relevance of article in the context of Convention theme, this article has been reproduced from the backgrounder of 28th National Convention, after incorporating developments in the Regulation of Financial Services Sector.
The links between trade and finance have received more attention on account of the Asian financial crisis and a more cautious approach may be warranted in financial services trade liberalisation which should take place in the appropriate macroeconomic and regulatory policy environment. The importance of the link between trade and finance is obvious in view of the fact that trade entirely depends on the effective functioning of the financial system, as without finance, economic activity and trade are likely to be greatly affected. The empirical evidence shows a positive correlation between opening of markets and development of the trade and finance and finance sector. WTO’s special study on financial services and trade shows that the financial services stability are complementary if they are accompanied by a stable economic environment and minimal political interference such as forcelending which results into undermining of the soundness of the financial institution.

The General Agreement on Trade in Services (GATS) is the first multi-lateral agreement to provide legally enforceable rights to create any of the services. It has an in-built commitment for continuous liberalisation through periodic negotiations. The GATS agreement has 29 articles, covering all service sectors and providing ground rules for all internationally traded services. The agreement is based on following three basic principles:

1. It covers all services except those provided in the exercise of Governmental Authority;
2. There should be no discrimination in favour of national providers - the national treatment principles; and
3. There should be no discrimination between other members of the Agreement – the most-favoured-nation (MFN) principle.

Multi-lateral trading system also affects the relationship between trade and finance in two ways viz.,

1. it should be noted that the WTO framework increases the stability and predictability of trade policies through tariff bindings and Members’ other trade policy commitments. Because of this framework, producers and traders are likely to experience less deteriorating business conditions as a result of the sudden and unexpected closing of markets. Therefore, they are also likely to burden the financial system less through bad debt. In other words, the WTO framework helps to avoid the repetition of the Great Depression experience when financial sector problems were worsened by spreading protection.

2. it concerns the relationship between capital account liberalisation and market access commitments in services under the General Agreement on Trade in Services (GATS). Governments are committed to allow capital account transactions to the extent required by specific market access commitments, although such capital flows may be curtailed in certain circumstances in order to safeguard the balance of payments or at the request of the International Monetary Fund. The GATS does not, therefore, call for capital account liberalisation per se. Moreover, the GATS explicitly recognises Members’ right to proper prudential regulation and supervision (except as a form of hidden protection). The GATS also does not curtail Members’ ability to pursue stable macroeconomic policies.

In summary, well functioning trade and financial systems are mutually beneficial. In the area of financial services, liberalisation should take place within an appropriate policy framework. The absence of such a framework calls for a cautious approach.

It is, therefore, imperative that the Indian policy makers/regulators understand the WTO related process in order to reap competition advantage.

THE FINANCIAL SERVICES NEGOTIATIONS UNDER GATS
Developments relating to financial services negotiations are stated below. These developments call for a relook at the regulatory framework, so as to make it responsive to the needs of the changing world economic order.

(i) At the end of the Uruguay Round negotiations in 1993, negotiations on financial services, along with those on basic telecommunications and maritime transport, remained unfinished. Specific commitments to provide market access and national treatment were made in the sector, but they were not considered enough to conclude the negotiations.

(ii) The Second Annex on financial services to the General Agreement on Trade in Services (GATS) and the decision on financial services adopted at the end of the Uruguay Round provides for extended negotiations in this sector.

(iii) The negotiations were to be held during a six-month period following the entry into force of the GATS; i.e. until the end of June 1995. At the conclusion of this period, Members of the WTO had the possibility to improve, modify or withdraw all or part of their commitments. They were also allowed to introduce additional MFN exemptions. Until the end of this period, existing broad MFN exemptions based on reciprocity were not applied.

(iv) The 1995 negotiations were actually concluded on 28 July, 1995 instead of 30 June as initially planned. The agreement was called the “interim” agreement, since negotiators again decided that the result of the negotiations were not satisfactory and envisaged further negotiations in two –years time; i.e. in 1997. As a result of the 1995 negotiations, 29 WTO Members (counting the EU as one) improved their schedules of specific commitments and/or removed, suspended or reduced the scope of their MFN exemption in financial services. Those improved commitments were annexed to the Second Protocol to the GATS. Three other countries — Colombia, Mauritius and the United States decided not to improve their commitments, and took broad MFN exemptions based on reciprocity. As a result of those extended negotiations, and with new accessions to the WTO, 97 Members of the WTO (counting the EU individually) had commitments in financial services by mid-1997 in the area of financial services, compared to some 76 countries at the end of the Round. The Second Protocol and the commitments annexed to it entered into force on 1st September 1996 except for a small number of countries which were unable to complete their internal ratification procedures and formally accept the Protocol before 1st July, 1996. For those remaining countries, the commitments entered into force 30 days after acceptance.

(v) The Negotiations were reopened in April 1997. Members again had an opportunity to improve, modify or withdraw their commitments in financial services and to take MFN exemptions in the sector from 1st November to 12 December 1997. As a result of the negotiations a new and improved set of commitments in financial services under the GATS was agreed on 12 December, 1997. A total of 56 schedules of commitments representing 70 WTO Members governments and 16 lists of MFN exemptions (or amendments thereof) were annexed to the Fifth Protocol to the GATS, which was open to ratification and acceptance by Members until 29 January 1999. 52 Member governments accepted the Protocol by the due date, and those Members decided to put the Protocol into force on 1st March 1999 in accordance with the terms of the Protocol. It was also decided by the Council for Trade in Services that the Protocol would be kept open for acceptance until 15 June, 1999 for the remaining 18 Members. With five countries making commitments in financial services for the first time, the total number of WTO Members with commitments in financial services increased to 104 upon the entry into force of the Fifth Protocol. As a result of the negotiations, the United States, India and Thailand decided to withdraw their broad MFN exemptions based on reciprocity; only a small number of countries submitted limited MFN exemptions or maintained existing broad MFN exemptions. Several countries, including Hungary, Mauritius, the Philippines and Venezuela reduced the scope of their MFN exemptions. The United States submitted a limited MFN exemption in insurance service providers operating in WTO Member countries. The new commitments contain *inter alia* significant improvements allowing commercial presence of foreign financial service suppliers by eliminating or relaxing limitations on foreign ownership of local financial institutions, limitations on the juridical form of commercial presence (branches, subsidiaries, agencies, representative offices, etc.) and limitations on the expansion of existing operations.
Important progress was also made in “grandfathering” existing branches and subsidiaries of foreign financial institutions that are wholly or in majority-owned by foreigners. Improvements were made in all of the three major financial service sectors – banking, securities and insurance, as well as in other services such as asset management and provision and transfer of financial information.

(vi) A new study by economists from WTO Secretariat discusses the benefits and challenges related to the liberalization of financial services trade in both developing and developed countries. The study highlights the importance of international competition in banking, securities and insurance markets while acknowledging the critical need for preserving prudential policies to safeguard financial systems for the benefit of investors and consumers. The study titled “Open Market in Financial Services and the Role of the GATS” explains that trade liberalisation in this sector will:

— enhance competition and improve sectoral efficiency, leading to lower costs, better quality, and more choice of financial services;
— improve financial intermediation and investment opportunities through better resource allocation across sector, countries and time, and through better means of managing risks and absorbing shocks;
— induce governments to improve macroeconomic management, domestic policy interventions in credit markets, and financial sector regulation and supervision; and
— liberalization of financial services can have strong positive effects on income and growth. Developed and developing countries with open financial sectors have typically grown faster than those with closed regimes. The economic success of Hong Kong, China and Singapore has been greatly facilitated by internationally-oriented financial service sectors. Many developing countries such as Argentina, Brazil, Ghana, Hungary, Indonesia, and Pakistan have become increasingly integrated in the world’s financial markets.

(vii) WTO Annual Report 1998 emphasizes that while the difficulties facing the world economy clearly have their origins in the financial system, the trading system has an important role to play in helping to address these problems. The WTO provides a valuable bulwark against protectionist pressures emerging from significant changes in trade flows as a result of the crisis. It can also help to advance and anchor trade policy-related reforms in the affected economies. A notable and timely example was the successful completion of negotiations on further liberalization of trade in financial services in December 1997. Seventy WTO Members representing 95 per cent of the global financial service market, including some of the East Asian economies most affected by the financial crisis, agreed to open their financial service sectors. The agreement deals with liberalization of trade in banking, insurance and other financial services. The agreement does not cover liberalisation of the capital account of WTO Members.

FINANCIAL REGULATION — GLOBAL PERSPECTIVE

Recently, there has been worldwide significant attention to regulatory aspects of financial sector. Thus, a unified regulator was announced in UK in 1997; changes have been considered in Australia and reform has been brought about in Japan. Further, legislative changes in the USA have to some extent diluted the compartmentalization of financial activities and regulatory framework.

The international status in regard to the regulatory structures reviewed by the International Monetary Fund says that in approximately half of the countries examined in a recent study, showed their preference for a regulatory structure based on specialised agencies. The study shows that 35 countries have separate agencies for each main sector, 3 have combined securities and insurance regulators, 9 have combined banking and securities regulators, 13 have central banking and insurance regulators, 3 have unified supervision (in central bank) and 10 have unified supervision (outside central bank).

While there are only a few advocating a unified model, it is pertinent to point out that almost all of them are developed countries. In this context, it is important to consider the organizational status of
banking supervision since banking is more special in developing countries. "The evidence appears to be that the weight of argument is moving towards the adoption of a separate unified supervisory body within more developed economies. But does that same balance hold for emerging and transitional countries?" is a question of debate. "It is possible that international pressures, e.g. through the IMF, will interact with domestic forces to lead towards better funded, more skilled and more independent supervisory bodies irrespective of how these are structurally organized".

**Regulation in the United States**

The regulatory structure in the United States is largely the result of financial crisis that have occurred at various times. Most regulations are the product of the Stock Market Crash of 1929 and the Great Depression in the 1930s. The United States is firmly committed to disclosure regulations. These regulations are contained in two important federal legislations, i.e., Securities Act of 1933 and Securities Exchange Act of 1934, as amended from time to time.

The Securities Act of 1933, deals primarily with the distribution of new securities and works on two basic objectives. Firstly, it requires that investors be given adequate and accurate disclosure concerning the securities distributed to the public. Secondly, it prohibits fraudulent acts and practices, mis-representations and deceit in the sale of securities.

While the Securities Act of 1933, deals with the disclosure requirements for securities when they are first issued, the Securities Exchange Act of 1934, deals with the periodic disclosure requirements for seasoned securities. The Securities Exchange Commission (SEC) created by the Exchange Act is empowered to administer the two Acts in full legal spirit.

The organised exchanges, such as the New York Stock Exchange and the American Stock Exchange also play a role in regulation by setting conditions for listing traded stocks and bonds and by monitoring the relationships of brokers with the public. In this regard, the National Association of Securities Dealers (NASD) is an important contributor to the regulation of trading. The NASD is a self regulatory organisation whose members must meet certain standards of conduct in issuing securities and selling them to the public.

The US government has imposed an extensive array of regulations on financial institutions. Most of these regulations restrict what financial institutions do in the markets and how those institutions manage their liabilities and assets.

The Federal Reserve System, an independent agency responsible for the nations money and banking system, places numerous restrictions on depository institutions. US regulations permit foreign-owned banks to function generally under the same complicated rules that apply to US domestic banks. Several hundred offices of foreign banks operate now in the United States. Through the Federal Reserve System, the government controls the money supply. Commercial banks and other depository institutions participate in that process by following rules made by the Federal system.

The history of financial regulations in the United States has also been characterised by overlapping jurisdiction among the federal or federal and state regulatory agencies. In some instances Congress has adopted a concurrent jurisdiction approach; in other words, it provided an exemption from the relevant Federal Law; while in others, it has vested one of two relevant agencies with exclusive jurisdiction. During the recent past the practical issue has been how well agencies do with overlapping jurisdictions and harmonize their efforts to avoid unnecessary conflicts. The results have been mixed and have involved considerably over time.

The Brady Report, after the October 1987 Stock Market Crash, also proposed that one agency must have the authority to co-ordinate critical inter-market regulatory issues, monitor inter-market activities and mediate inter-market concerns. Though the Brady Report distinguished inter-market regulatory issues from intra-market issues, the authors of the Brady Report in May, 1998 withdrew the single inter-market regulatory authority. The examination of various issues confronting the United States Financial Services Industry reveals that the issue is still being debated whether to have a multiple regulatory authority or single regulatory authority.
The examination of the literature in the United States of America clearly reveals that the evolution of financial services over the past two decades has brought out a substantial but incomplete, convergence in the banking and non-banking financial services industry. In some respects, the issue relating to vesting of power has been resolved. Banks are engaged in a wide variety of securities, insurance and other financial services activities, just as non-bank financial services organisations are engaged in activities traditionally considered banking (although the question as to whether banks may affiliate with nonfinancial commercial and industrial companies remains an issue).

The United States, therefore, attempted to have a unified structure but the initiatives remained unsuccessful in part due to the historical Glass Steagall Act, and partly due to political considerations. Despite this, the US regulators have remained effective primarily due to the efforts of the individuals heading treasury resources and banks.

Indian situation is similar and whether we can follow the example of USA is a very difficult proposition. No doubt, we can draw upon the development in the South Asian countries, but it will be more expeditious if we draw on the developments in the financial sector industry in the United Kingdom and create a Financial Services Authority.

Regulation in the United Kingdom

In the ‘Big-Bang’ of the mid-1980s, which was a sweeping liberalisation and restructuring of the securities industry, the British government made a firm commitment to disclosure as a major element in its regulation of securities markets. The Financial Services Act of 1986 imposes ‘general duty of disclosure’ and applies it to any foreign or domestic firm that issues new debt or equity securities, whether or not the securities are to be listed on the London International Stock Exchange.

The Financial Services Act of 1986, assigns responsibility for regulating financial activity to the Department of Trade and Industry (DTI). It delegates much of the task to the Securities and Investment Board (SIB), which is similar in many ways to the US Securities and Exchange Commission. The SIB is the primary agency that authorises institutions to conduct investment business and monitors their dealings with the public and the adequacy of their funding.

The Bank of England regulates most banking institutions in a way that is similar to the actions of the Federal Reserve Bank in the US. In addition to managing the money supply, the Bank of England supervises and sets rules for the capital adequacy of banks, as set forth in the Basle Agreement.

The United Kingdom has been a leader in the process of opening domestic securities markets to participation by foreign firms. Non-British firms may be part of, and even lead, the groups of underwriting firms that sell to the public new issues of debt and equity denominated in pound sterling. The shares of numerous foreign companies are listed on London’s International Stock Exchange, and subsidiaries of foreign corporations may hold memberships on the exchange. The same process of liberalisation has affected the U.K.’s banking laws; foreign banks operate in large numbers within Great Britain.

Establishment of Financial Services Authority (FSA)

In UK, the Financial Services Authority (FSA) was established in October, 1997 in preparation for the creation of the single statutory regulator for authorising all statutory financial services business in the United Kingdom. Further, UK enacted the Bank of England Act, 1998 with a view to initiate the process of regulating by banking supervision to the FSA with effect from first June, 1998. A draft on Financial Services and Markets Bill in July, 1998 was also published as a part of the Treasury consultation document setting out a framework for a single regulator for the Financial services.

Regulation in Germany

The German system uses disclosure regulation to some extent in connection with the issuance of equities. Issuing companies must make public salient facts about the firm in the form of a prospectus. Further, the firm must make annual and semi-annual reports to investors on its operations and finances. As the German Accounting Rules are vague, the requirements to disclose are actually weak, and in the process the investors could be easily misled.
The bond market has an interesting structure. A privately owned firm that wishes to issue a bond must obtain approval of its financial standing and of the bond’s collateral. The agency that must give approval is the Central Bank or the ‘Bundesbank’, which is a largely autonomous unit of the Federal Government. The Bundesbank controls the money supply and the availability of credit. Its primary goal is to safeguard the value of the German currency or to keep price inflation as close to zero as possible. This cumbersome regulation has led many German firms to rely on banks for debt capital or to issue bonds in the unregulated Eurobond market, with the result that the bond market in Germany is not strong or active.

There are eight German stock exchanges, and the State Government, where an exchange is located, is an important regulator of the exchange. German regulation of financial institutions is significantly less stringent than the United States. Most German banks are universal banks which take part in all types of financial activity, including commercial banking operations and such lines of securities business as underwriting, trading and investing in shares. For this reason, banks are the largest investors in Germany, and the German secondary markets for bonds and stocks tend to be interbank markets.

Until recently, Germany’s regulation of financial activities by foreign firms and investors was quite strict. In the 1980s, foreign firms were given greater freedom to sell their securities in Germany, as a result, more than one-third of the shares listed on the main stock market are foreign stocks.

**Regulation in Japan**

The Japanese Ministry of Finance is responsible for the regulation of securities markets in Japan. Statutes and laws give the Ministry vast direct powers for this purpose. Ministry of Finance has substantial indirect power, including duty to provide ‘administrative guidance’ to financial institutions of all kinds and authority to audit all securities houses that are members of the Tokyo Stock Exchange.

The Japanese approach differs from the United States in several notable respects. Firstly, the Ministry of Finance has a long standing policy of directing funding in the bond markets to only a small group of large and efficient firms in an industry. Secondly, the system does discourage certain issuers at certain times from issuing debt securities. The regulating body is the Bond Flotation Committee, a group consisting of over 40 institutions entrusted with functions - (i) to establish eligibility standards for companies wishing to issue bonds; (ii) to monitor the terms and amounts of new issues; and (iii) to control the flow of new issues in order to avoid flooding the market.

Japanese government imposes numerous restrictions on the activities of its financial institutions. Unlike the United States, Japan allows a few large national banks to do business in every part of the country. In recent years, Japan has moderated or discontinued many restrictions against participation in financial securities markets by foreign firms and financial institutions. While numerous official and unwritten rules may remain, Japan has achieved meaningful gains in internationalising and freeing its financial markets.

Japan’s financial sector is undergoing a big bout of reforms. The capital markets are expanding, new global practices, new companies are penetrating the market, and competition is shaking the hitherto protected Japanese banks and brokers. The major question now being debated in Japan is as to whether Japan can manage these changes without damaging its economy and triggering a financial crises, and without resorting to protectionism. A study of the Japanese financial reforms show that they incorporate two strands.

(i) the Government is embroiled in the momentous task of cleaning out the financial mess that Japanese banks, brokers and life insurance companies inherited after the collapse of the 1980s ‘bubble’; and

(ii) it is trying to encourage the rapid growth of capital markets through a process of ‘Big Bang’ deregulation.

Policy makers in Japan are taking several initiatives and have introduced several changes, but these initiatives are making reform implementation doubly complex. However, considerable progress has been made in respect of cleaning up of financial sector.
FINANCIAL REGULATION — INDIAN PERSPECTIVE

In India the regulation of financial sector has evolved as an instrument of planned development. In such a situation the objectives are mobilisation of savings, and allocation of investible resources mainly through public sector and administered prices of financial products.

Irrespective of the actual policy preferences or reforms across the globe, the structural issue of financial regulation has recently gained attention for following reasons.

(i) The growth of financial sector is characterised by the blurring of distinction between banking, securities and insurance activities; and

(ii) Globalisation has resulted in multifunctional global conglomerates warranting appropriate changes in structural aspects of domestic regulation.

Traditionally, financial intermediaries in India were mainly commercial banks and term lending and investment institutions, which provided the means and mechanisms of mobilising short-term and long-term funds from a large number of savers and make these savings available to the users in industry. In recent years, financial services industry has diversified into new areas like merchant banking, underwriting, portfolio management, equity research, credit rating, leasing, hire purchase, housing finance, mutual funds, credit card, factoring, inter-corporate investment/loans, bill discounting, ventures capital funds, custodians and depositories.

Today, the role of financial services industry has assumed great significance due to rapid changes taking place in money market. In fact, due to phenomenal increase in number of investors and companies in the nineties, deregulation and emergence of a variety of new financial instruments in capital and money markets, the utility of financial services has increased manifold for users.

Financial services industry in India has undergone a complete metamorphosis over the last three decades. While in 1960’s there were traditional methods of financing (debt or equity), inactive primary and money markets, traditional and disorganised stock exchanges and few bankers and individuals dominated the financial services industry, today there is a modern, automated, multi-activity institutional and organised financial services industry dominated by professionals, institutions and a regulated capital market.

With liberalisation and globalisation of the Indian economy, the financial sector is gearing itself to provide sophisticated, innovative services in the field of industry, trade and commerce and also to the investor community. In fact, the process of liberalisation and globalisation is being facilitated by the entry of various financial services and new products. Financial services are primarily rendered by financial intermediaries such as All India Financial Institutions, Commercial banks, Non-Banking Financial companies, Mutual Funds, Merchant Bankers, Stock Exchanges, Depositories and Venture Capitalists.

Financial Services sector is passing through global competition and a lot of restructuring is taking place all over the world. It is increasingly becoming difficult for the regulators to keep pace with the developments in this sector. The question such as whether the multiple-regulators should be allowed to continue to regulate the various financial services remains unanswered. Further, there is an emerging trend of parallel intermediaries. The progressive deregulation of financial markets, both external and internal; the internationalisation of financial markets; the introduction of innovative financial instruments and emergence of new players, particularly, financial services, are matters of great concern and pose challenges to the regulators. In the phase of these revolutionary changes, policy makers and the regulators have to ensure that this sector adds value and provides services which are being demanded. Proper analysis of risks involved have also to be rationally understood. Both managers and regulators have to deal cautiously with these critical factors.

Financial Regulation — Existing Framework

In India there are several agencies entrusted with the task of regulation and supervision of different institutions and market participants in the financial sector, aiming at maintaining financial stability. The
RBI regulates and supervises the major part of the financial system through its various departments. The Board for Financial Supervision, which operates as a Committee of the Central Board of Directors of the RBI functions as an oversight supervisory body in respect of banks, NBFCs and AIFIs. The Registrars of Cooperatives of different states are a joint regulator for the banks in the cooperative sector, both urban and rural.

SEBI regulates the capital markets and supervises several institutions such as the Stock Exchanges, Mutual Funds and other Asset Management Companies, securities dealers and brokers, Merchant Bankers, Credit Rating Agencies Venture Capital Funds. The Securities and Exchange Board of India (SEBI) since its inception as a statutory body in 1992 has been trying to regulate the intermediaries involved, by legislating rules and regulations relating to financial services. SEBI has been involving experts from different disciplines and constituted several committees which have examined the problems relating to each category of the services. SEBI has been making a continuous exercise of review of the various rules and regulations framed by it and amendments are also being made on continuous basis wherever necessary, so as to ensure that the intermediaries provide services in a fair and transparent manner and also ensure that high standards of ethics are observed.

Companies in the insurance sector are regulated by IRDA. Banks are permitted to be involved in insurance activity through joint ventures / equity participation/selling agency type arrangements. The Department of Company Affairs regulates the deposit taking activities of non-banking non-financial companies and also some activities of NBFCs.

Financial Regulation — Debate in India

Currently, the debate on streamlining the regulation of financial sector in India is underway. In this respect various committees have been constituted and submitted their reports.

The Committee on the Financial System, 1991 had strongly recommended that the “duality of control over the banking system between the Reserve Bank and the Banking Division of the Ministry of Finance should end and the Reserve Bank should be the primary agency for the regulation of the banking system”.

The Report of the Working Group for Harmonising the Role and Operations of DFIs and Banks raised the concept of a Super Regulator and recommended the establishment of a Super Regulator to supervise and coordinate the activities of the multiple regulators in order to ensure uniformity in regulatory treatment.

The Report of the Narsimham Committee on Banking Sector Reforms, recommended restructuring of the existing Board of Financial Supervision. The Committee also recommended putting in place of an integrated system of regulation and supervision to regulate and supervise the activities of the banks, financial institutions and NBFCs. It also recommended that the Section 58 of the RBI Act should be amended to enable the RBI Central Board to frame regulations to set up a separate and distinct Board for Financial Regulation and Supervision.

Subsequently, the Report of the Advisory Group on Banking Supervision, making elaborations on the subject said that “Because of Reserve Bank of India/Government Ownership of the banks, there is some overlap in the role of the Reserve Bank of India as owner/owner’s representative and as the regulator/supervisor. This overlap needs to be corrected so that Reserve Bank of India can perform its regulatory /supervisory role without any hindrance. The Advisory Group on Securities Market Regulation, headed by Shri Deepak Parekh also referred to the diffusion of regulatory responsibilities.

CONCLUSION

To conclude, financial services industry nationally and internationally, which is huge in size and growing very fast, is of critical significance to the health of the global economy as well as that of corporate sector and consumers. Technological advancements will require innovations in E-business and internet banking. Reforms in financial sector are being debated/implemented by both developed and developing countries. Empirical evidence shows that there are multiple agencies regulating the functioning of intermediaries and financial markets. Consensus seems to have emerged on the issue of having a unified agency as regulatory authority so as to ensure proper monitoring of the activities of the financial services
industry in addition to the development of self regulatory organisations (SROs). Under the WTO and GATS regime, it has become imperative for the countries to review their existing regulatory structures and bring them in line with the directives of the Global Regulatory Authority (WTO), so that multilateral trading system functions smoothly and the desired global integration takes place.

ISSUES FOR DELIBERATION

In the light of the foregoing discussions the following major issues emerge requiring intense discussion:

(i) Whether the multiple regulators shall be allowed to continue to regulate the various financial services, or a unified agency is to be preferred.

(ii) How to manage the changes without damaging the economy and triggering a financial crisis in a volatile global financial environment.

(iii) What can financial intermediaries bring to foreign markets to add value to their customers and investors.

(iv) What are the lessons to be learnt from the problems experienced by Japan and other South Asian countries.

(v) What should be the ideal and appropriate policy framework within which the liberalisation in the area of financial services should take place.

References

STRAIGHT DOWN THE MIDDLE — ARTFULLY SPLITTING CREDIT RISK

Andrew Yeung

The spectacular growth of the global derivatives market over the past several years has provided corporates with a number of alternatives to controlling the credit risk of its treasury activities. Andrew Yeung of law firm Shearman & Sterling in New York, discusses the potential benefits – and the pitfalls – of a credit risk management strategy.

Created in 1993, the worldwide market for credit derivatives has grown phenomenally since, to an estimated $300 billion in 1998, with growth forecasted to reach $1 million by 2002. Credit are over-the-counter derivatives and are similar in some respects to other derivative instruments in their ability to transfer risk between parties. However, unlike interest rate or currency swaps which transfer interest rate or currency risk, credit derivatives transfer credit risk.

Credit risk is one of the oldest forms of risk in the financial marketplace. Consequently, there have been many attempts to minimize exposure to this form of risk. Credit protection tools such as bond insurance, standby letters of credit and asset securitization have been used in the industry to minimize the age-old problem of credit risk. Therefore, while the basic premise of a credit derivative is not revolutionary, its effectiveness is.

The exponential growth of this industry is not without reason. The distinctive manner and implementation of the credit derivative has impressed the investment community with its ability to minimize credit risk. Given the mass interest and market growth of credit derivatives, participants in the financial industry would be well advised to understand the utility of this product and assess the potential benefits it presents.

Let’s first analyze in greater detail the general concepts of credit derivatives and credit risk, later we will discuss selected structures and considerations in implementing credit derivatives. Finally we will look at some corporate governance concerns and legal issues surroundings the use of credit derivatives.

JUST THE FACT, MA’AM

Credit derivatives are off-balance sheet arrangements, formally defined as any financial contract governing the exchange of future cash flows in which one of those cash flows is determined by performance of some underlying, credit sensitive instrument.

Therefore, in a typical credit derivative transaction, the beneficiary transfers the credit risk of the underlying reference sheet to the guarantor. The reference asset in question can involve any form of debt obligation, be it bond or loan. It is important to note, however, that although credit risk is transferred between the beneficiary and guarantor, the underlying reference asset is not and remains on the books of beneficiary. This has significant implication as the original party borrowing from the beneficiary is not a party to the credit derivative and confidential client information is not released to the guarantor. By separating only the credit risk from the original financial obligation, the beneficiary does not have to resort to selling the debt on the secondary market in order to alleviate credit risk, jeopardizing their future relationship with the client.

In fact, this aspect of credit derivatives in hailed as a qualitative benefit to banks, as selling debt on the secondary market poses potential losses in future underwriting or advisory contracts with the client. Many banks would rather protect and maintain the relationship than resell the debt in order to eliminate its credit risk. With the use of credit derivatives, banks can both transfer credit risk and maintain client relationships.

The participants in the credit derivatives market are primarily commercial banks, investment banks, insurance companies and other major financial institutions. However, the true focus and biggest benefactor of credit derivatives are commercial banks, which are the largest holders of risky debt — a recent estimate of their bank loan holdings was valued at $2.7 trillion.
An interesting development in the banking industry may occur as a result of credit derivative use. If credit risk can be transferred from a bank to a third party, the traditional relationship between the bank and the borrower may dissipate as the bank's interest in monitoring the borrower's potential for default may not be as compelling as it once was. It is argued that the economic incentive for banks to perform their traditional 'delegated monitoring' activities of the borrowers will be minimised. Although the delegated monitoring function has been a traditional, competitive advantage for banks, some have suggested that this is exactly the direction that the commercial banks wish to take as they look forwards fee-based income rather than risk-based income.

There are many reasons while commercial banks and other financial institutions would enter into a credit derivative transactions, the most common of being a reduction of deteriorating credit exposure. Other reasons include yield enhancement, diversification of overall risk and protection against down grades in credit quality.

So then, what exactly is "credit risk"? Credit risk is defined as `any laws that stems from a change in the ability of a borrower to repay a debt`. Applying this definition, the most apparent form of credit risk would be default risk – the risk that the debtor / borrower cannot meet its key financial obligations, thereby exposing the creditor / lender to the possibility that they will not receive all of their payments to which they are entitled.

In addition to default risk, there are other forms of credit risk. Down grade risk is the risk that a rating firm will reduce a debtor / borrowers credit rating based on an analysis of the debtors financial statement. A down grade in credit rating can severely reduce the value of the credit, thereby exposing the creditor to the declined in the market value of the debt. Another form of credit risk is credit-spread risk. If a decline in the value of the credit occurs, this risk is the increase or decline of the credit risk premium – which is the spread between the borrowing rate and the interest rate or may default free security such as a government of Canada T-BILL.

Given the multifarious nature of credit risk, the strength of a credit derivative is its flexibility in accommodating such risk. As we will see, a credit derivative can be designed to achieve a transfer of any form of credit risk with a specialised, custom fit approach.

**STRUCTURING**

Although there are numerous credit derivatives in the market place, credit default swaps the total rate of return (TROR) currently dominate the market.

A credit default swap is a bilateral financial contract in which a buyer of protection pays a periodic fixed fee to a seller of protection. In return, the seller incures a contractual obligation to pay a one-time payment in the event of a default on the underlying reference security. The one-time payment could be in the form of a cash settlement, or a physical settlement. If the underlying reference security in question is a bond, then a payment of cash equal to the decline in the market value of the bond is paid to the buyer.

However, if the underlying reference security is a bank loan, then the buyer will physically deliver the defaulted debt to the Seller in return for the face value of the obligation. Upon physically settlement, the seller will own the underlying reference security and will have the opportunity to participate in the working out process with the original defaulting reference entity. The default event itself can be defined by the participating parties and would generally include matters such as non-payment of obligations due to downgrading of that, repudiation, insolvency and bankruptcy. If the defined default credit event does not occur, the seller will not make any payment. Exhibit 1 below illustrates the credit default swap process.

**Exhibit 1 : Credit default swap process**
The reduction in exposure to the reference entity achieved by a buyer of protection is a major consideration for the buyer to enter into a swap; however, there are also great benefits for the seller. In fact, there is growing interest in the credit default swap as a means to gain exposure to credit risk. A few reasons why a seller would enter into a swap transaction to gain credit exposure include:

— Solid income source without any balance sheet or funding implications;
— Minimal incremental administration and marketing costs;
— Premium return as compared to traditional bank assets due to the absence of relationship pricing factors; and
— Customised size, structure and term of agreement, without intervention by the reference party.

An interesting variation of the credit default swap is a loan portfolio swap. This product provides a bilateral credit exposure effect, as opposed to a unilateral transfer of credit risk in a standard default swap. In a typical transaction, a bank will swap some of the debt payments it receives for debt payments received from another bank which has similar risk assets. This is an attractive feature for those banks which are over exposed and limited by region or industry. For these banks which have developed specialities in discrete regions or businesses, and do not have the capacities to unbundled their concentration of credit exposure outside these constrains, loan portfolio swaps offer an ideal avenue to diversify its credit risk to another region or industry.

The applications and uses of credit default swaps are multifaceted. As we've seen, they may be used to reduce exposure to credit risk, increase exposure to credit risk or as a means to reengineer a loan portfolio. All of these purposes can be achieved with a flexible and customized agreement, and most importantly, without risking client relationships.

Similar to credit default swaps, TROR swaps are also bilateral contracts in which the buyer and seller periodically exchange payments. However, the fundamental distinction between credit default swaps and TROR swaps is that the total economic performance of the reference asset is exchanged for a periodic fee.

In this context, a buyer of protection (often called the payer) will pay to the seller of protection (called the receiver) the total return on the reference asset, which would include all contractual cash flow payments, plus any change-in-value payments. A change-in-value payment is the net appreciation or depreciation value of the underlying reference asset. (It is interesting to note that if the market value of the reference asset depreciates, this will result in a net depreciation payment from the receiver to the payer). In return, the receiver will pay Libor plus a spread and any depreciation payments.

There is a broader degree of credit risk transferred in a TROR swap as compared to a credit default swap. The payer receives protection from not only default risk, but against any risk which may deteriorate the credit quality of the reference asset. Therefore, in addition to default risk, TROR swaps effectively transfer exposure to other forms of risk and even interest rate risk. The resulting transaction is akin to synthetic ownership, in which the payer has effectively sold the reference asset to the receiver and has invested in default-free bonds.

The benefits of the swap are mutual, the payer achieves a near complete reduction of its exposure to the reference asset without selling the reference asset, and the receiver gains access to assets.
without having to incur the initial outlay costs of an outright purchase. Exhibit 2 below illustrates the TROR swap process.

Exhibit 2 : TROR swap process

Total Return (all contractual payments plus appreciation)

Acme Bank A (Payer) Libor (plus spread and depreciation) Acme Bank (Receiver)

Source : Shearman & Sterling

On the other hand, credit spread options provide a more limited and discrete form of credit risk protection and are intended for a specific target market. A credit spread option is defined as a bilateral financial contract in which the protection buyer pays a premium, usually up front, and receives present value of the difference between a floating spread between the yield of the reference obligation and some benchmark yield (usually Treasuries) and the strike, if positive, and pays the difference, if negative.

Credit spread options are structured products that provide protection against credit spread risk, unlike credit default swaps which hedge against default risk. The option purchaser is effectively hedging against adverse changes in the credit quality of the reference obligation. The primary sellers of credit options are insurance companies, when the tactic is considered to be a “logical extension” of their business. The benefits for the insurance industry are twofold: fee-based income is generated from insuring against credit spread risk, and the insurance companies can diversify their own risk by offering credit spread options throughout different regions and industries.

IMPLEMENTATION

Since the credit event is probably the single most important aspect of a credit default swap, it is imperative to analyze the construction of this concept in greater detail. The triggering effect of a credit event is the defining moment that activates the one time payment from the seller to the buyer. As discussed earlier, matters such as the reference entity’s bankruptcy or insolvency are strong indicators that the original reference obligation has gone sour and is generally more risky and less desirable from its original status.

These circumstances can be readily ascertained and verified. However, the International Swaps and Derivatives Association (ISDA) has created a condition referred to as publicly available information to clarify the circumstances in which a credit event or default is less apparent, in order to aid in the determination of whether a credit event has actually occurred.

Two typical situations in which a credit event could cause conceptual difficulties are a cross default of the reference entity or the passing of a resolution to wind up the reference entity. These are situations could technically trigger the credit event definition and could cause heated interpretive concerns between the buyer and seller as to whether a credit even has occurred. In most circumstances, it is unlikely that the buyer or seller would have such intimate and internal information of the reference entity at such an early stage, however, the ISDA addresses this concern up front, before the potential for dispute arises and allows the parties to activate the credit default swap only upon a public disclosure of a reference entity’s credit event.

The publicly available information condition will be satisfied if the credit event has been published by a predetermined number of recognised international publications. Another interesting aspect of this condition is that the credit event does not actually have to be proven, there must only be a reasonable
indication that the credit event has occurred. The objective standard is used to prevent the need for
over-intrusive means of verify the credit event and protect the privacy of the reference entity.

Parties to a credit default derivative stand to benefit from the use of the publicly available condition. It
strikes an appropriate time balance for exercising the swap and avoids the potential for an
overzealous triggering of the credit event mechanism. Additionally, this condition will clarify the
expectations with an objective standard in which to enforce their rights under the Conformation,
alleviating the risk of bitter interpretation disputes.

There is also another incidental benefit associated with the use of this condition. If the Ontario
Securities Act applies to a credit derivative transaction, the publicly available information condition
may provide protection from a potential insider tripping violation. It is an offence under of the OSA for a
party in a special relationship with a reporting issuer to tip another party with undisclosed information
with respect to the reporting issuer.

Assuming that the reference entity is a reporting issuer, severe implications can arise as a result of
the credit default derivative relationship. Both the buyer and the seller stand in a special relationship
with the reference entity. By way of its lending arrangement with the reference entity, the buyer is
implicated by “engaging in …any business or professional activity with or on behalf of the reporting
issuer.” The seller stands in a special relationship with the reference entity through its relationship with
the buyer as it, “…knows or ought reasonable to have known that the other person or company is a
person or company in such a relationship.”

Given the severity of these provisions, an extra-sensiti ve, heightened statutory definition of a
“security” is provided for in the context of the insider rules, easily encompassing derivative transactions.
Therefore, a potential for an insider tipping violation exists could all be unwitting actors in an insider
offence.

For instance, the buyer may already have access to the internal and private affairs of the reference
entity by way of its lending relationship, which could provide the buyer with an informational advantage
to detect credit events prior to public disclosure. The buyer could implicate itself as an insider tipper by
conveying this information to the seller in its attempt to initiate the swap. Another potential violation
could also occur if confidential information concerning a credit event was leaked from the reference
tity to the seller or buyer. If this information was acted upon by the buyer or seller to initiate the
swap, (before it was publicly disclosed) liability for the reference entity under the insider provisions
could arise.

Although the buyer and seller may simply be activating their swap upon internal information, they
are technically breaching the OSA. The use of information in this manner does not seem to be a typical
insider tipping scenario, but when one looks at the basis for these rules, (which is the promotion of
equal access to information), it does violate the heart of the provisions of the OSA. Insider tippers can
be implicated in a broad array of enforcement, administrative and civil liability provisions.

If the parties adhere to the ISDA’s publicly available information condition, then implicitly, any hint of
insider liability is removed. According to the condition, the triggering of a credit default derivative
cannot occur until the credit event has been published by specified number of news sources. The
public disclosure condition would provide a solid defence for an insider tipping breach pursuant to the
statutory defence of general disclosure. Although there is a low probability of such confidential
information being leaked, it is imperative to safeguard against this contingency given the magnitude of
the consequences that could result from a breach of the insider rules.

Parties to a credit default swap would be well advised to insert the publicly available information
condition in their agreement. Not only does it provide a clear standard of definition for a credit event,
but it also provides protection against an inadvertent violation of the insider tipping rules of the OSA.

Another qualification to a credit event determination suggested by the ISDA is the use of a
materiality requirement. Before a credit default derivative can be activated, not only must there be a
significant change in the price or spread of the reference obligation. This is a practical addition to the
agreement that avoids technical defaults of the reference obligation which do not alter the true value of
the obligation. For example, one late payment is a technical default however this one time occurrence should not justify a swap.

CORPORATE GOVERNANCE AND CREDIT DERIVATIVES

The board of directors of an institution bear the ultimate responsibility for their entity's involvement in credit derivative transactions. They owe a fiduciary duty to act in good faith and in the best interests of their institution. This duty must be maintained and upheld with the care and diligence of a reasonably prudent person. The classic equitable duty can be found in statutes, such as the Canada Business Corporations Act and the Bank Act. Credit derivatives offer interesting diversification and investment opportunities, however, directors must weigh the benefits and the costs of these products in order to fulfill their fiduciary obligations to their institutions. There may even be a positive obligation upon directors to at least consider or even implement credit derivatives.

In the case of Brane V. Roth in the United States, the Indiana Court of Appeal found the directors of a grain cooperative in breach of their duty of care by failing to protect their position by adequately hedging in the grain market.

Liability stemmed from the directors’ failure to avail themselves of hedging techniques and opportunities, or retain and supervise a manager experienced in hedging activities. Although Brane is an American case, it’s a warning to directors of the duty to supervise, inform themselves of protective opportunities and retain experienced and competent management and personnel are key considerations equally applicable in the international context.

International directors should heed the warning set forth in Brane. As the use of credit derivatives becomes widespread and standardized in the financial industry, directors should be aware of them and understand their use in order to reach an informed decisions as to whether they should be implemented by their banks. Although directors may not necessarily implement a credit derivative scheme, they should at least consider the product as a part of their risk management strategy. The reasonably prudent person may be required to understand the techniques and tools of modern portfolio management. Therefore, the prospect of credit derivative may not only be a wise derivative investment, but a source of future liability.

Since credit derivatives are risk engineering tools which are used to unbundled and transfer risk, they have, like any other derivative, inherent risks of their own and must be used sensibly. Recent derivative disasters have been highly publicized in the media, questioning the safety of these products. Public concern over the riskiness of derivatives is, to some extent, warranted. The losses suffered by Barings, Orange Country and Gibson Greetings are strong reminders of the dangers associated with derivative use. Specific statutory recognition is given to the field of risky investments. Despite public concern and restrictive fiduciary obligations, the risk of derivatives can be controlled and managed. In accordance with proper risk management principles, directors may utilize the benefits of credit derivatives without jeopardizing their fiduciary duties.

THE RISK MANAGEMENT PROCESS

The first step in the process of risk management is the identification of the risks present in a credit derivative transaction. Thankfully, the risks at hand are not new and a practical approach can be adopted. The Office of the Comptroller of Currency (OCC) has created a general risk framework for credit derivatives:

1. counterparty risk — a form of credit risk, it is the risk that the counterparty to the credit derivative transaction will default or not meet the terms of the agreement.
2. transaction risk — attributable to flaws in service or product delivery due to employee incompetence.
3. liquidity risk — arising from an inability to meet obligations as they come due.
4. strategic risk — risk arising from adverse business decisions or improper implementation of those decisions.
5. legal risk — risk that the credit derivative contract may be illegal.
The next stage of the process is to incorporate these risks into a single, coherent risk management infrastructure. There is considerable consensus between American and Canadian regulators when it comes to risk management. The OCC and OSFI both demand integral involvement and oversight by directors and senior management in the drafting and implementation of a risk management system. The organisation’s rationale for entering into credit derivative transactions should be document with a clearly drafted mission statement and written policies regarding the business strategy and its objective. The strategies and policies are then implemented into a system which will continually into monitor and control the risks of credit derivative transactions. The five risk are incorporated into a risk management model. The manner in which each risk is minimised is provided below.

Strategic risk is managed during the policy and business objective drafting stage. Initial considerations such as the “risk appetite” – or risk tolerance limit – should be identified. The forms of credit derivatives and the amount of exposure or diversification of credit risk should be selected. These objectives and criteria will provide the initial template for managerial decision making. These policies must then be communicated to the staff, who will be trained to understand the credit derivative products and their use. In the Brane case, liability was imposed upon directors for failing to retain a manager knowledgeable in hedging practices. Educating employees is a mechanism to minimize the effects of transaction risk. Regular cashflow projections and regular credit checks of counterparties and reference obligations will enable a bank to monitor and control liquidity risk and counterparty risk.

While the structure of a risk management process is very dynamic, interconnecting each risk into a single infrastructure. However, the process of managing legal risk is undertaken in a distinct fashion. Credit derivative legal documentation should be evaluated to ensure that there is sufficient documentation and the terms are in compliance with applicable laws. There is also a preference for counterparties to use standardized documentation.

Aside from the securities legislation compliance issues, accounting bodies are also voicing concern over the financial reporting of derivatives. Greater disclosure and recognition of derivative transactions on balance sheets is being proposed as traditional accounting methods do not sufficiently report derivative activity. Therefore, in the near future, one of the major legal risk concerns may be the need for greater financial reporting disclosure.

**FROM DONKEY PATH TO SUPERHIGHWAY**

There is no doubt that credit derivatives can be risky, however this risk is not insurmountable. As we have discussed, proper identification of the risks present and an effective risk management scheme can provide directors and management with the tools necessary to satisfy their fiduciary obligations and to take advantage of credit derivatives’ utility without exposing their organisations to excessive risk.

Credit derivatives have offered an innovative and effective solution to the dangers posed by credit risk. This pervasive form of risk can now be minimized and controlled in a tolerable manner with the use of credit derivatives. However, the utility of credit derivatives is not one-dimensional in nature. Not only can these structured products provide credit risk protection, but they can also be used as a means to access credit exposure, to diversify a loan portfolio, or simply viewed as a good investment.

There are a variety of credit derivatives available to facilitate a party’s objectives, the most common products being the credit default swap, the TROR swap and the credit option. With the release of the ISDA Confirmation for credit default swaps, the efficiency and consistency of structuring and implementing a credit default swap transaction is sure to improve.

Major financial institutions have already caught on to the opportunities that credit derivatives present. Banks such as JP Morgan, Nationas Bank, and Banker’s Trust have all entered the credit derivative market and all expect credit derivatives to be a significant growth area and are expanding their practices accordingly. While expectations are high and the growth potential enormous, credit derivatives may not be suitable for all institutions.

A risk management strategy to control and monitor risk, such as legal risk, should be adopted if credit derivatives are considered to be appropriate.
All in all, credit derivatives have proven to be an exciting development in the world of corporate finance, providing the promise of challenge and ingenuity in the world of financial engineering. Although a relatively new product, the momentum of credit derivative interest and sophistication is building at an exponential rate. As one commentator stated, “the road itself is evolving from a donkey path to a super highway”.

THE INTER-RELATIONSHIP BETWEEN STOCK MARKETS AND THE FOREIGN EXCHANGE MARKET

Prakash G Apte*

This paper investigates the relationship between the volatility of the stock market and that of the nominal exchange rate in India. Using the EGARCH specification proposed by Nelson (1991) it addresses the question whether innovations in stock returns have an impact on the volatility in the foreign exchange market and vice versa. The model specification incorporates asymmetric effects of positive and negative returns surprises on volatility both in the same market as well as spillovers across the two markets. Empirical analysis with one of the major stock market indices supports the hypothesis of such volatility linkages while for the other index there appears to be a spillover from the foreign exchange market to the stock market but not the other way round.

SECTION I — INTRODUCTION

The connection between a country’s stock market and its foreign exchange market has been a subject of theoretical and empirical investigation for over two decades. The nature and magnitude of the interdependence between stock prices and exchange rates have implications for a number of crucial issues in international finance. First, there is the question of whether stock markets price exchange rate risk. Or rather the question should be whether the market views exchange rate risk as a separate source of risk over and above market risk in valuing individual stocks. Second, the presence of exchange risk and its relationship with stock market risk has implications for models of international asset pricing. The extension of the traditional CAPM to a multi-country context under the assumption of integrated capital markets must account for exchange rate risk and its covariance with the world market portfolio. Third, the risk-reward tradeoff of international diversification and therefore management of multi-currency equity portfolios must come to grips with the question of how exchange rate risk and stock price risk interact. With significant rise in cross-border equity investments and in particular investments in emerging markets, this has become a critical issue for fund managers. Finally, the asset market approach to exchange rate determination [Branson (1983), Frankle (1983), among others] regard the equilibrium exchange rate of a currency as the result of the interaction of the demand for and supply of financial asset such as stocks and bonds denominated in that currency. With open capital accounts, the demand for these assets would obviously depend upon, among other things, their risk-return tradeoffs from the point of view of domestic and foreign investors.

A number of researchers have addressed the question of the relation between the levels of stock market returns and exchange rate changes. Studies have been undertaken both for broad market indices, industry indices and individual stocks. Representative examples are Bodnar and Gentry (1993), Bartov and Bodnar (1994), Choi and Rajan (1997), Jorion (1990, 1991), Ma and Rao (1990), Apte (1997). By and large, these investigations have failed to discover significant relationship between stock returns and exchange rate changes either at aggregate level such as a market or industry indices or at the level of individual firms. There have also been studies of dynamic linkages between stock returns and exchange rate changes using the cointegration framework (Ajayi and Mougoue (1996)). All these studies focus on the first moments, i.e., relationship between mean stock returns and exchange rate returns.

1. Or rather the question should be whether the market views exchange rate risk as a separate source of risk over and above market risk in valuing individual stocks.
2. See for example Hekman (1989).
3. A good reference on this is Solnik (1993).
4. It has been estimated that since mid-1980’s cross-border equity investment has grown at a rate in excess of 30 per cent per annum. Tesar and Werner (1995).

* Dr. Prakash G Apte is Professor, Indian Institute of Management Bangalore.
The behaviour of volatility of stock returns has been extensively studied using the ARCH framework pioneered by Engle (1982) and further developed by Bollerslev (1986), Nelson (1991) and others. As far back as 1976, Black (1976) that volatility of stock returns changes over time and responds asymmetrically to good and bad news. Representative references are Bollerslev Ich, Schwert and Stambaugh (1987), Schwert (1989), Akgiray (1989), and Ng (1993). A number of researchers have also investigated transmission or spillovers or volatility between different stock markets (Karolyi Koutmos and Booth (1995)). Similarly, there have been investigations of time varying volatility of exchange rates (Jorion (1995)). A good survey of applications of ARCH-GARCH models in finance can be found in Bollerslev, Chou and Kroner (1992). A good exposition of the basic ARCH-GARCH models and their different variants can be found in Campbell, Lo and McKinley (1997).

In a recent paper Kanas (2000) has investigated volatility spillovers between ns and exchange rate changes. This is an important question. The variance of returns on a multi-currency portfolio depends on the variances of individual stock market returns, variances of the exchange rates and their pair-wise covariances. If in addition, the stock market and exchange rate variances are interconnected, this would certainly affect the nonsystematic, i.e. non-diversifiable risk of multi-currency equity portfolios and hence valuation of stocks by foreign investors which in turn has Implications for extending the CAPM to a multi-country context.

The purpose of this paper is to investigate the inter-relationship between the volatilities of the Indian stock market and the rupee-dollar exchange rate. It also addresses the question of whether this spillover effect is asymmetric, i.e. whether “good” and “bad” news from the stock market has differential impact on the exchange rate and vice-versa. In keeping with the current literature it of course includes ARCH-GARCH effects within each market. In Section II, we describe the data used for the empirical analysis. Section III reports the results of a cointegration analysis of stock prices and exchange rates. In Section IV the model which incorporates volatility spillovers between stock and foreign exchange markets is specified. Section V presents the results of estimation of this model and section VI contains the concluding remarks.

SECTION II — THE DATA

The study uses daily closing data on two stock market indices, viz. BSE-30 (SENSEX), and the NIFTY-50 and the daily closing USD/INR exchange rate. The period covered by the data is from January 2, 1991 to April 24, 2000. The main limitation of the data is the fact that during the early part of the data series, there are sometimes long gaps due to the stock markets having been closed for several days at a stretch.

Foreign institutional investors were permitted to directly invest in the Indian stock market only after 1997. Since this can be expected to have significant implications for the inter-relationship between the stock and forex markets, we have carried out a separate estimation exercise for the sub-sample covering the period March 1998 to April 2000. The stock market data were obtained from the respective exchanges -BSE and NSE -while the historical exchange rate data were supplied by HDFC Bank.

5. These include pairwise covariances between the individual stock market returns, individual exchange rates and these between exchange rates and stock returns.

6. As usual. the variables are taken in log form.
SECTION III — PRELIMINARY DATA ANALYSIS

Table I presents some descriptive statistics for the two stock indices and the USD/INR exchange rate. Table 2 presents the same statistics for the stock returns and exchange rate returns series. In all the cases daily returns are computed as lag differences of successive observations, viz. \((\ln X_t - \ln X_{t-1})\). Because of the data gaps mentioned above, these are not always "daily" returns and hence may impound information which may have arrived during the interval between two successive trading days.7.

### TABLE 1
Descriptive Statistics: Stock Indices and the Exchange Rate Levels

<table>
<thead>
<tr>
<th>Statistics</th>
<th>BSE-30</th>
<th>NIFTY-50</th>
<th>USD/INR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3354.530</td>
<td>934.500</td>
<td>33.320</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>930.730</td>
<td>270.320</td>
<td>6.740</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.304</td>
<td>-0.559</td>
<td>-0.438</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>0.292</td>
<td>-0.227</td>
<td>-0.123</td>
</tr>
<tr>
<td>Ljung-Box (25)</td>
<td>43627.430</td>
<td>47228.550</td>
<td>50705.430</td>
</tr>
<tr>
<td>ADF Statistics*</td>
<td>-2.808</td>
<td>-2.636</td>
<td>-2.842</td>
</tr>
</tbody>
</table>

* The ADF unit root test statistic is for natural logs of the levels of the respective variables. The 5 per cent critical value is -3.41. The test included a trend.

### TABLE 2
Descriptive Statistics: Stock and Exchange Rate Returns

<table>
<thead>
<tr>
<th>Statistic</th>
<th>BSE-30</th>
<th>NIFTY-50</th>
<th>USD/INR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.00075</td>
<td>0.00076</td>
<td>0.00043</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.01974</td>
<td>0.01947</td>
<td>0.00556</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.529</td>
<td>0.366</td>
<td>11.289</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>7.027</td>
<td>8.418</td>
<td>219.797</td>
</tr>
<tr>
<td>Ljung-Box (25),</td>
<td>72.570</td>
<td>74.290</td>
<td>92.690</td>
</tr>
<tr>
<td>ADF Statistics</td>
<td>-17.000</td>
<td>-18.470</td>
<td>-17.830</td>
</tr>
<tr>
<td>Squared Returns</td>
<td>559.990</td>
<td>825.210</td>
<td>179.160</td>
</tr>
</tbody>
</table>

As a preliminary check on volatility clustering, the Ljung-Box statistic for 25 lags for the series of squared returns were also computed. They are also reported in Table 2. All of them are significant at 1 per cent level indicating strong autocorrelation among squared returns.

The ADF unit root tests with the returns series uniformly fail to reject the hypothesis of stationarity. The (log) levels series have one unit root.

The next step was to examine the dynamic relationship between the (log) levels of exchange rate and the various stock indices. This was done using the cointegration tests proposed by Johansen and Juselius (1990,1992). The results are reported in Table 3. In each case, the null hypothesis is that the two series (log exchange rate and log of the relevant stock index) are not cointegrated versus the alternative hypothesis of one cointegrating relationship between the two variables.

7. To the extent such information affected both the forex and the stock market and only one of them was closed while the other was open, this would distort the estimated volatility linkages between the two.
Cointegration Tests for the Exchange Rate and Stock Indices

<table>
<thead>
<tr>
<th>BSE-30-USD/INR</th>
<th>NIFTY-50-USD/INR</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMax</td>
<td>Trace</td>
</tr>
<tr>
<td>23.49</td>
<td>27.90</td>
</tr>
<tr>
<td>BSE-30-USD/INR</td>
<td></td>
</tr>
<tr>
<td>Sub-Sample</td>
<td></td>
</tr>
<tr>
<td>13.82</td>
<td>14.64</td>
</tr>
</tbody>
</table>

Critical Values at 10% Significance Levels:
LMax: 10.60 Trace: 13.31

In all the three cases, both the trace and LMax tests support the alternative hypothesis of one cointegrating relationship between the rupee exchange rate and the respective stock index. This implies that in the returns equations to be specified later, an error correction term which captures the departure from long-run equilibrium must be included. A similar procedure was implemented with the BSE-30 index and the exchange rate for the sub-sample covering the period April 2, 1998 to April 24, 2000. Here too, the presence of one cointegrating vector is indicated.

To summarize, the level series exhibit non-stationarity and stock index and exchange rates are cointegrated. The stock returns and exchange rate returns series show no evidence of unit roots.

SECTION IV — MODEL SPECIFICATION

The model employed in the present study is an extension of the model proposed by Nelson (1991) which is a member of the extended GARCH family of models and has been designated as E-GARCH or Exponential GARCH model. In the context of models of asset returns, the two main innovations of the E-GARCH model are: first, it is possible to allow for asymmetrical response of the conditional variance of asset returns to positive and negative innovations in the returns generating process, and, second, it ensures non-negative conditional variance without having to impose complicated restrictions on the parameters.

The essential E-GARCH specification can be written as follows:

\[
R_t = \alpha^t_{-1} X_t + \epsilon_t
\]

\[
\epsilon_t = \sigma_t \Gamma_t
\]

\[
E(\epsilon_t) = 0, \quad V(\epsilon_t) = \sigma_t^2
\]

and \( (s_t^2) \) follows the process given by:

\[
\ln(s_t^2) = a_t \Gamma_t \quad k \quad g(Z_t)
\]

with the function specified as:

\[
g(z_t) = \gamma_t d z_t \quad k \quad E(z_t) \quad ?
\]

Equation (1) specifies the return as a function of a set of variables \( X_t \) with a random disturbance which has a non-constant variance \( s_t^2 \) which in turn depends upon the past values of the disturbances as seen in equations (3) and (4). The specification in (4) permits negative and positive values of \( Z_t \) to have different impacts on the variance. As specified in (4), the function \( g(Z_t) \) is linear in \( Z_t \) with slope \( d \) when \( Z_t \) is positive and \( -y \) when \( Z_t \) is negative. Such a specification can account for the observed phenomenon that “bad” news -i.e. returns below expected returns -has
greater impact on subsequent volatility than an equal amount of “good” news. Since (3) is an
exponential function, the conditional variance would always be non-negative.

The model used in the present study uses the E-GARCH specification in modeling the volatility of
stock and exchange rate returns with innovations in stock return affecting its own conditional variance
as well as the conditional variance of the exchange rate return and vice versa. The model is set out in
equations (5) to (9) below.

\[
RS_t \sim A_{S,O}^{P} A_{S,k}^{k=1} RS_{t-k} \sim \ldots A_{E,k}^{k=1} RE_{t-k} \sim C_S EC_{S,E,t-1} \sim e_{S,t} \\
\begin{align*}
\text{(5)}
\end{align*}
\]

\[
e_{S,t}/O_{t-1} \sim N[0, (s_{S,t})^2] \\
\begin{align*}
\text{(6)}
\end{align*}
\]

\[
RE_t \sim B_{E,O}^{m} B_{E,k}^{k=1} RE_{t-k} \sim \ldots B_{S,k}^{k=1} RS_{t-k} \sim D_E EC_{E,S,t-1} \sim e_{E,t} \\
\begin{align*}
\text{(6)}
\end{align*}
\]

\[
\text{Log } s_{S,t}^2 \sim \{F_{S,O} \sim \ldots F_{S,k}^{k=1} \text{ Log } s_{S,t-k}^2 \sim \beta_{SS}^{k=1} Z_{S,t-1} \mid E \mid Z_{S,t-1} \mid \ldots \sim S_{S,t-1} \\
\begin{align*}
\text{(7)}
\end{align*}
\]

\[
\beta_{SS}^{k=1} Z_{S,t-1} \mid E \mid Z_{S,t-1} \mid \ldots \sim S_{S,t-1} \\
\begin{align*}
\text{(7)}
\end{align*}
\]

\[
\text{Log } s_{E,t}^2 \sim \{G_{E,O} \sim \ldots G_{E,k}^{k=1} \text{ Log } s_{E,t-k}^2 \sim \beta_{EE}^{k=1} Z_{E,t-1} \mid E \mid Z_{E,t-1} \mid \ldots \sim E_{E,t-1} \\
\begin{align*}
\text{(8)}
\end{align*}
\]

\[
\beta_{EE}^{k=1} Z_{E,t-1} \mid E \mid Z_{E,t-1} \mid \ldots \sim E_{E,t-1} \\
\begin{align*}
\text{(8)}
\end{align*}
\]

\[
s_{S,E,t} \sim \ldots s_{S,t} s_{E,t} \\
\begin{align*}
\text{(9)}
\end{align*}
\]

\[
\text{In equations (5) and (6) } R_S \text{ and } R_E \text{ denote respectively, stock returns and exchange rate returns}
\text{ from } t-1 \text{ to } t. \text{ Each return is modeled as depending on lagged values of itself and the other return. In}
\text{ addition, the stock return equation, equation (5) contains the lagged “disequilibrium” term, } \text{viz.}
\text{ the error correction term } EC_{S,E,t-1} \text{ from the cointegrating regression of (log of) stock index on (log of) exchange}
\text{ rate while the exchange rate returns equation, equation (6) contains similar term from the cointegrating}
\text{ regression of exchange rate on the stock index. The random errors in these equations. } \text{viz. } e_{S,t} \text{ and}
\text{ } e_{E,t} \text{ have conditional variances } (s_{S,t})^2 \text{ and } (s_{E,t})^2 \text{ conditional on the information set at time } t-1.
\text{ These are modeled in equations (7) and (8) using the Nelson E-GARCH specification with the added}
\text{ feature that lagged innovations in Stock returns (exchange rate returns) affect not only the conditional}
\text{ variance of StO4 returns (exchange rate returns) but also exchange rate returns (stock returns) with}
\text{ asymmetric impact of positive and negative returns. The own effect is captured by the parameters}
\beta_{SS}, \beta_{EE} \text{ and } \beta_{EE} \text{ while the cross-mark volatility spillovers are captured by the parameters}
\beta_{SE}, \beta_{ES} \text{ and } \beta_{SE}. \text{ The } \beta \text{’s permit the own and cross effects to be asymmetric. Persistence}
\text{ of volatility, in other words “volatility clustering” depends on the “GARCH” terms, viz. } F_{S,k}^{k=1} \text{ for}
\text{ stock returns and } G_{E,k}^{k=1} \text{ for exchange rate returns. The terms } Z_{S,t} \text{ and } Z_{E,t} \text{ in these equations}
\text{ denote respectively, standardized residuals } (e_{S,t} / s_{S,t}) \text{ and } (e_{E,t} / s_{E,t}).
Finally equation (9) specifies the covariance between stock and exchange rate returns. The correlation \( p_{SE} \) is assumed to be time-invariant.

Equations (5) to (9) specify the general structure of the model. For each specific stock index, the number of lags \( p, q, m, n, p_s \) and \( p_e \) were decided on the basis of preliminary regressions and the significance of resulting estimates. The final models chosen for maximum likelihood estimation were as follows:

**The NIFTY-50 Index**

\[
\begin{align*}
RS_t & \sim A_{01} \cdot A_{11} \cdot RS_{t-1} \cdot A_{12} \cdot RS_{t-2} \cdot A_{13} \cdot RS_{t-3} \cdot B_{11} \cdot RE_{t-1} \cdot C_{11} \cdot EC_{SE,t-1} \\
RE_t & \sim A_{02} \cdot A_{12} \cdot RS_{t-1} \cdot A_{22} \cdot RS_{t-2} \cdot A_{32} \cdot RS_{t-3} \cdot B_{12} \cdot RE_{t-1} \cdot B_{22} \cdot RE_{t-2} \cdot B_{32} \cdot RE_{t-3} \cdot B_{42} \cdot RE_{t-4} \cdot C_{12} \cdot EC_{ES,t-1} \\
\log(s^2)_{St} & \sim \{D_{01} \cdot D_{11}\log(s^2)S_{t-1} \cdot D_{21}[Z_{S,t-1} \cdot E \mid Z_{S,t-1} ] \} \\
& \sim D_{31}Z_{S,t} \cdot D_{41} [Z_{E,t-1} \cdot E \mid Z_{S,t-1} ] \sim D_{51}Z_{E,t-1} \}
\end{align*}
\]

**The BSE-30 Index (SENSEX) Full Sample Estimation**

\[
\begin{align*}
RS_t & \sim A_{01} \cdot A_{11} \cdot RS_{t-1} \cdot B_{11} \cdot RE_{t-1} \cdot C_{11} \cdot EC_{SE,t-1} \\
RE_t & \sim A_{02} \cdot A_{12} \cdot RS_{t-1} \cdot B_{12} \cdot RE_{t-1} \cdot B_{22} \cdot RE_{t-2} \cdot C_{12} \cdot EC_{ES,t-1} \\
\log(s^2)_{St} & \sim \{D_{01} \cdot D_{11}\log(s^2)S_{t-1} \cdot D_{21}[Z_{S,t-1} \cdot E \mid Z_{S,t-1} ] \} \\
& \sim D_{31}Z_{S,t} \cdot D_{41} [Z_{E,t-1} \cdot E \mid Z_{S,t-1} ] \sim D_{51}Z_{E,t-1} \}
\end{align*}
\]

**The BSE-30 Index (SENSEX) Sub-Sample Estimation**

\[
\begin{align*}
RS_t & \sim A_{01} \cdot A_{11} \cdot RS_{t-1} \cdot B_{11} \cdot RE_{t-1} \cdot C_{11} \cdot EC_{SE,t-1} \\
RE_t & \sim A_{02} \cdot A_{12} \cdot RS_{t-1} \cdot A_{22} \cdot RS_{t-2} \cdot A_{32} \cdot RS_{t-3} \cdot A_{42} \cdot RS_{t-4} \cdot B_{12} \cdot RE_{t-1} \cdot B_{22} \cdot RE_{t-2} \cdot C_{12} \cdot EC_{ES,t-1} \\
\log(s^2)_{St} & \sim \{D_{01} \cdot D_{11}\log(s^2)S_{t-1} \cdot D_{21}[Z_{S,t-1} \cdot E \mid Z_{S,t-1} ] \} \\
& \sim D_{31}Z_{S,t} \cdot D_{41} [Z_{E,t-1} \cdot E \mid Z_{S,t-1} ] \sim D_{51}Z_{E,t-1} \}
\end{align*}
\]

The log-likelihood function for the E-GARCH specification is given by
\[
\log(\hat{\theta}) - 0.5(N\times T)
\log(2\pi \cdot 0.5) - \sum_{t=1}^{T} \left( \log |V_t| + e_{t}^T V_t^{-1} e_t \right)
\]

(22)

Here denotes the parameter vector to be estimated, \(N\) is the number of equations, \(T\) is the number of data points, \(e_t\) denotes the \(2 \times 1\) column vector with \(e_{S,t}\) and \(e_{E,t}\) as elements and \(V_t\) is the conditional variance-covariance matrix with the conditional variances \(\sigma^2_{S,t}\) and \(\sigma^2_{E,t}\) on the diagonal and the covariance \(\sigma_{SE,t}\) off-diagonal.

These models were estimated with the GARCH estimation procedure in RATS using the BFGS (Broyden, Fletcher, Goldfarb and Shanno) algorithm. As can be seen from the equations given above, estimation involves non-linear optimization and the algorithm is very sensitive to starting values of the parameters. Ten iterations of Simplex algorithm were run to provide the starting values before initiating BFGS procedure.

SECTION V — ESTIMATION RESULTS

Since the focus of the paper is on examining the inter-relation between .ties of stock and exchange rate returns, we will present only results pertaining to the conditional variance equations —equations (12) and (13) for -50. equations (16) and (17) for SENSEX full sample and equations (20) and (21) for SENSEX sub sample. Full results including those of the returns equations are available from the author.

These results present an interesting picture. The significant estimate of the parameter \(D_{41}\) implies that innovations in exchange rate returns do influence the conditional variance of stock returns. Further, since the parameter \(D_{51}\) is also significant, this cross-equation volatility spillover has asymmetric effect. Surprisingly, there is no evidence of asymmetric autoregressive effect in the conditional variance of stock returns nor any impact of stock returns surprises on the conditional variance. This is indicated by the insignificant estimates parameters \(D_{21}\) and \(D_{31}\). Turning to exchange rate returns, there is evidence significant evidence of asymmetric ARCH effects —both \(E_{21}\) and \(E_{31}\) are highly significant but no evidence of autoregression in the conditional variance exchange rate returns. There is also evidence of spillover from stock return surprises into the conditional variance of exchange rate returns. Since the parameter \(E_{51}\) is significant, this effect appears to be asymmetric. The signs and relative magnitudes of \(E_{21}\) and \(E_{31}\) indicate that exchange rate return surprises reduce the conditional variance of exchange rate returns but more so when the surprise is negative - a less than expected depreciation of the rupee.

**TABLE 4**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Std. Error</th>
<th>t-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOI</td>
<td>-9.986</td>
<td>0.830</td>
<td>-12.02</td>
</tr>
<tr>
<td>D11</td>
<td>0.004</td>
<td>0.085</td>
<td>0.05</td>
</tr>
<tr>
<td>D21</td>
<td>0.009</td>
<td>0.242</td>
<td>0.04</td>
</tr>
<tr>
<td>D31</td>
<td>-0.025</td>
<td>0.017</td>
<td>-1.44</td>
</tr>
<tr>
<td>D41</td>
<td>0.024</td>
<td>0.004</td>
<td>5.32</td>
</tr>
<tr>
<td>D51</td>
<td>-0.022</td>
<td>0.001</td>
<td>-11.04</td>
</tr>
<tr>
<td>E01</td>
<td>-15.705</td>
<td>0.502</td>
<td>-31.28</td>
</tr>
<tr>
<td>E11</td>
<td>0.006</td>
<td>0.030</td>
<td>0.23</td>
</tr>
<tr>
<td>E21</td>
<td>-0.016</td>
<td>0.000</td>
<td>-32.84</td>
</tr>
<tr>
<td>E31</td>
<td>0.009</td>
<td>0.000</td>
<td>15.77</td>
</tr>
<tr>
<td>E41</td>
<td>0.014</td>
<td>0.092</td>
<td>0.15</td>
</tr>
<tr>
<td>E51</td>
<td>0.024</td>
<td>0.012</td>
<td>1.97</td>
</tr>
</tbody>
</table>

Autoregressive effect in the conditional variance of stock returns nor any impact of stock returns surprises on the conditional variance. This is indicated by the insignificant estimates parameters \(D_{21}\) and \(D_{31}\). Turning to exchange rate returns, there is evidence significant evidence of asymmetric ARCH effects —both \(E_{21}\) and \(E_{31}\) are highly significant but no evidence of autoregression in the conditional variance exchange rate returns. There is also evidence of spillover from stock return surprises into the conditional variance of exchange rate returns. Since the parameter \(E_{51}\) is significant, this effect appears to be asymmetric. The signs and relative magnitudes of \(E_{21}\) and \(E_{31}\) indicate that exchange rate return surprises reduce the conditional variance of exchange rate returns but more so when the surprise is negative - a less than expected depreciation of the rupee.
Next we turn to the results with BSE SENSEX covering the same sample period. These are presented in Table 5.

The results with SENSEX are broadly similar to those of NIFTY -50. The GARCH term in the stock returns equation is significant suggesting volatility persistence. Also, like in the case of NIFTY -50, there is volatility spillover from exchange rate returns innovations to the stock market as indicated by the significant value of the estimate of the parameter D41 but this effect is not asymmetric since the estimate OD51 is not significantly different from zero.

TABLE 5
Bivariate EGARCH Model: BSE SENSEX and USD/INR Exchange Rate

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate Std.</th>
<th>Error</th>
<th>t-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>D01</td>
<td>-12.10649202</td>
<td>0.07139159</td>
<td>-169.57870</td>
</tr>
<tr>
<td>D11</td>
<td>0.01007225</td>
<td>0.00611568</td>
<td>1.64695</td>
</tr>
<tr>
<td>D21</td>
<td>-0.00442026</td>
<td>0.00744624</td>
<td>-0.59362</td>
</tr>
<tr>
<td>D31</td>
<td>-1.51410673</td>
<td>1.29330899</td>
<td>-1.17072</td>
</tr>
<tr>
<td>D41</td>
<td>0.00119252</td>
<td>0.00007639</td>
<td>15.61138</td>
</tr>
<tr>
<td>D51</td>
<td>-0.02789435</td>
<td>0.05646507</td>
<td>-0.49401</td>
</tr>
<tr>
<td>E01</td>
<td>-23.67255103</td>
<td>0.05746939</td>
<td>-411.91584</td>
</tr>
<tr>
<td>E11</td>
<td>0.00469564</td>
<td>0.00280486</td>
<td>1.67411</td>
</tr>
<tr>
<td>E21</td>
<td>0.00119406</td>
<td>0.00008350</td>
<td>14.30019</td>
</tr>
<tr>
<td>E31</td>
<td>-0.02042187</td>
<td>0.05275715</td>
<td>-0.38709</td>
</tr>
<tr>
<td>E41</td>
<td>-0.00532441</td>
<td>0.00360624</td>
<td>-1.47644</td>
</tr>
<tr>
<td>E51</td>
<td>-7.21588086</td>
<td>5.76530608</td>
<td>-1.25160</td>
</tr>
</tbody>
</table>

Turning to the conditional variance of exchange rate returns, there is evidence of persistence as well as ARCH effects of exchange rate returns innovations on their conditional variance but no evidence of any asymmetric effects of negative and positive surprises as also no evidence of any spillover effects from stock returns innovations to the forex market.

Finally, Table 6 contains results with the SENSEX for the truncated sample from March 2, 1998 to April 24,2000.

By the start of this period, FII activity on Indian bourses had begun and one would have expected significant spillovers from the foreign exchange market to the stock market and vice versa. It therefore comes as a surprise that the estimates for this period show no evidence at all of such an interconnection. Further, this period also shows no evidence of any ARCH-GARCH effects either in the stock returns or in exchange rate returns.

Diagnostics were performed with the residuals from the two returns equations. With the NIFTY -50 data, the Ljung-Box test with 25 lags shows that residuals from neither equation have any autocorrelation. However, squared residuals from the stock returns equation exhibit autocorrelation. Squared residuals from the exchange rate equation are free of autocorrelation. Similar tests with the BSE SENSEX full sample however indicate that there is significant residual autocorrelation in the estimated disturbances and their squares for both stock returns and exchange rate returns.

TABLE 6
Bivariate EGARCH Model: BSE SENSEX and USD/INR Exchange Rate

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate Std.</th>
<th>Error</th>
<th>t-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOI</td>
<td>-1.5734648</td>
<td>0.1757995</td>
<td>-8.95034</td>
</tr>
<tr>
<td>D11</td>
<td>0.0029934</td>
<td>0.1088030</td>
<td>0.02751</td>
</tr>
</tbody>
</table>

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SECTION VI - CONCLUSION

With the globalization of capital markets and liberalization of the capital account, investors would be expected to diversify their portfolios across currencies and national stock markets. Since exchange rate risk and its association with the local stock market is an important component of the overall portfolio risk, this trend can be expected to link the stock market and the forex market more closely. Such linkages can be expected to be manifest not only in the behaviour of mean returns in the two markets but also in cross-market volatility spillovers. The evidence presented in this paper does indeed bear out such an expectation. Analysis with one of the major sto indices, viz. the NSE NIFTY -50 and the rupee-dollar exchange rate supports the hypothesis of returns innovations in one market impacting not only on the conditional variance in the same market but also in the other market. One would have expect such linkages to exhibit themselves all the more strongly after the Indian market was opened up - albeit with restrictions - to foreign institutional investors. Surprisingly data pertaining to the period following this event do not show up such linkages.

It must be admitted that during the period covered by the data - in particular till April 1993- the exchange rate was not really market determined. Also, certain events in the stock market during 1992 had led to long gaps in the data in the early part of the sample. Hence, the conclusions based on the evidence at hand must be treated with some caution, and further analysis is needed to strengthen the findings.

REFERENCES


AN OVERVIEW OF THE SECURITIES MARKET IN INDIA

M S Sahoo*

INTRODUCTION

Efficient transfer of resources from those with idle resources to others who have a pressing need
for them is achieved through securities markets. Stated formally, securities markets provide channels
for allocation of savings to investments and thereby decouple these two activities. As a result, the
savers and investors are not constrained by their individual abilities, but by the economy's abilities to
invest and save respectively, which inevitably enhances savings and investment in the economy.

MARKET SEGMENTS

The securities market has two interdependent and inseparable segments, the new issues (primary
market) and the stock (secondary) market. The primary market provides the channel for sale of new
securities while the secondary market deals in securities previously issued. The price signals, which
subsume all information about the issuer and his business including associated risk, generated in the
secondary market, help the primary market in allocation of funds. The issuers of securities issue
(create and sell) new securities in the primary market to raise funds for investment and/or to discharge
some obligation. They do so either through public issues or private placement. It is a public issue if
any body and everybody can subscribe for the securities. If the issue is made to select people, it is
called private placement. In terms of the Companies Act, 1956, an issue becomes public if it results in
allotment to more than 50 persons. There are two major types of issuers of securities – the corporate
issue mainly debentures and shares and the governments (central/state governments and municipal
authorities) issue dated securities, treasury bills and bonds.

The secondary market enables participants who hold securities to adjust their holdings in response
to changes in their assessment of risk and return. They also sell securities for cash to meet their
liquidity needs. The secondary market has further two components, namely the over-the-counter (OTC)
market and the exchange-traded market. OTC is different from the market place provided by the Over
The Counter Exchange of India Limited. OTC markets are essentially informal markets where trades
are negotiated. Most of the trades in government securities are in the OTC market. All the spot trades
where securities are traded for immediate delivery and payment take place in the OTC market. The
exchanges do not provide facility for spot trades in a strict sense. Closest to spot market is the cash
market in exchanges where settlement takes place after some time. Trades taking place over a trading
cycle (a day under rolling settlement or five days under account period settlement) are settled together
after a certain time. All the 23 stock exchanges in the country provide facilities for trading of corporate
securities. 414 most active securities are traded under rolling settlement, while the balance is traded
under account period settlement. Trades executed on NSE only are cleared and settled by a clearing
corporation which provides novation and settlement guarantee. Over 99% of the trades settled by
delivery are settled in demat form. Two exchanges, namely NSE and BSE also provide a formal trading
platform for trading of government securities.

* M. S. Sahoo is Economic Adviser, NSE.

A variant of secondary market is the forward market, where securities are traded for future delivery and
payment. Pure forward is outside the formal market. The versions of forward in formal market

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are futures and options, called derivatives. In futures market, standardized securities are traded for future settlement. These futures can be on a basket of securities like an index or an individual security. In case of options, securities are traded for conditional future delivery and payment. There are two types of options—a put/call option permits the owner to sell/buy a security to/from the writer of option at a predetermined price. These options can also be on individual stocks or basket of stocks like index. Two exchanges, namely NSE and BSE provide trading of derivatives (index futures/options and stock options).

PRODUCTS AND PARTICIPANTS

Savings are linked to investments through a range of financial products called “securities”. The Securities Contracts (Regulation) Act, 1956 defines “securities” to include shares, scrips, stocks, bonds, debentures, debenture stock or other marketable securities of like nature in or of any incorporated company or body corporate, government securities, derivatives of securities, units of collective investment scheme, interest and rights in securities, or any other instruments to declared by the central government. There are a set of economic units who demand securities in lieu of funds and others who supply securities for funds. These demand for and supply of securities and funds determine, under competitive market conditions in goods and securities market, the prices of securities.

It is not that the users and suppliers of funds met each other and exchange funds for securities. The amount of funds supplied by the supplier may not be the amount needed by the user. Similarly, the risk, liquidity and maturity characteristics of the securities issued by the issuer may not match preferences and bring the suppliers and users of funds together. The intermediaries may act as agents to match the needs of users and suppliers of funds for a commission, help suppliers and users in creation and sale of securities for a fee or buy the securities issued by users and in turn, sell their own securities to suppliers to book profit. It is, thus, a misnomer that securities market disintermediates by establishing a direct relationship between the suppliers and the users of funds. The market does not work in a vacuum; it requires services of a large variety of intermediaries. The disintermediation in the securities market is in fact an intermediation with a difference; it is a risk-less intermediation, where the ultimate risks are borne by the savers and not the intermediaries. A large variety and number of intermediaries provide intermediation services in the Indian securities market as may be seen from Table 1.

TABLE 1
Market Participants in Securities Market

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Number as on March 31, 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Securities Appellate Tribunal</td>
<td>1</td>
</tr>
<tr>
<td>Regulators</td>
<td>4</td>
</tr>
<tr>
<td>Depositories</td>
<td>2</td>
</tr>
<tr>
<td>Stock Exchanges</td>
<td>23</td>
</tr>
<tr>
<td>Listed Securities</td>
<td>9,922</td>
</tr>
<tr>
<td>Brokers</td>
<td>9,782</td>
</tr>
<tr>
<td>Sub-brokers</td>
<td>9,957</td>
</tr>
<tr>
<td>Portfolio Managers</td>
<td>40</td>
</tr>
<tr>
<td>Custodians</td>
<td>14</td>
</tr>
<tr>
<td>Share Transfer Agents</td>
<td>186</td>
</tr>
<tr>
<td>Primary Dealers</td>
<td>15</td>
</tr>
<tr>
<td>Merchant Bankers</td>
<td>233</td>
</tr>
<tr>
<td>Bankers to an Issue</td>
<td>69</td>
</tr>
<tr>
<td>Debenture Trustees</td>
<td>37</td>
</tr>
<tr>
<td>Underwriters</td>
<td>56</td>
</tr>
<tr>
<td>Venture Capital Funds</td>
<td>35</td>
</tr>
</tbody>
</table>
The securities market, thus, has essentially three categories of participants, namely the issues of securities, investors in securities and the intermediaries and two categories of products, namely the services of the intermediaries and the securities. The issuers and investors are the consumers of services rendered by the intermediaries while the investors are consumers of securities issued by issuers. Those who receive funds in exchange for securities and those who receive securities in exchange for funds often need the reassurance that it is safe to do so. This reassurance is provided by the law and by custom, often enforced by the regulator. The regulator develops fair market practices and regulates the conduct of issuers of securities and the intermediaries so as to protect the interests of suppliers of funds. The regulator ensures a high standard of service from intermediaries and supply of quality securities and non-manipulated demand for them in the market.

A Profile

The past decade in many ways has been remarkable for securities market in India. It has grown exponentially as measured in terms of amount raised from the market, number of stock exchanges and other intermediaries, the number of listed stocks, market capitalization, trading volumes and turnover on stock exchanges, and investor population. Along with this growth, the profiles of the investors, issuers and intermediaries have changed significantly. The market has witnessed fundamental institutional changes resulting in drastic reduction in transaction costs and significant improvements in efficiency, transparency and safety.

Dependence on Securities Market

The securities market in India is now a far more important source of finance for corporate and governments (Tables 2 and 3). The corporate sector is increasingly depending on external sources for meeting its funding requirements. There is a growing preference for direct financing (equity and debt) to indirect financing (bank loan) within the external sources. External sources accounted for 65-77% of funds raised during 1990s. the share of capital market based instruments in total resources raised externally increased to 53.4% in 1993-94, but declined thereafter to 31.8% by 1999-00. Along with increase in fiscal deficits of the governments, the dependence on market borrowings to finance fiscal deficits has increased over the years. During the year 1990-91, the state governments and the central government financed nearly 14% and 18% respectively of their fiscal deficit by market borrowing. In percentage terms, dependence of the state governments on market borrowing did not increase much during the decade 1991-2001. In case of central government, it increased to 70% by 2000-01.

Household sector accounted for 88% of gross domestic savings during 1999-2000; 53% of their savings were in financial assets. They invested 37% of financial savings in deposits, 35% in insurance provident funds, 11% on small savings, and 7.5% in securities, including government securities and units of mutual funds during 1999-2000. Thus the fixed income bearing instruments are the most preferred assets of the household sector. In contrast, the share of financial savings of the household sector in securities (shares, debentures, bonds and units of UTI and other mutual funds and government securities) is estimated to have gone down from 22.9% in 1991-92 to 4.1% in 1997-98, which increased to 7.5% in 1999-2000. Though there was a major shift in the saving pattern of the household sector from physical assets to financial assets and within financial assets, from bank deposits to securities, the trend got reversed in the recent past due to high real interest rates, prolonged subdued conditions in the secondary market, lack of confidence by the issuers in the success of issue process as well as of investors in the credibility of the issuers and the systems and poor performance of mutual funds. The portfolio of household sector remains heavily weighted in favour of physical assets and fixed income bearing instruments.

TABLE 2
Dependence on Securities Market

(In per cent)

<table>
<thead>
<tr>
<th></th>
<th>Mutual Funds</th>
<th>Collective Investment Schemes</th>
<th>Investors (Estimated)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>39</td>
<td>4</td>
<td>20 million</td>
</tr>
</tbody>
</table>
TABLE 3

Resource Mobilization from the Primary Market

(Rs. crore)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate Securities</td>
<td>14,219</td>
<td>16,366</td>
<td>25,537</td>
<td>44,498</td>
<td>36,689</td>
<td>37,147</td>
<td>42,125</td>
<td>60,192</td>
<td>72,450</td>
<td>78,119</td>
<td></td>
</tr>
<tr>
<td>Domestic Issues</td>
<td>14,219</td>
<td>16,366</td>
<td>23,286</td>
<td>37,044</td>
<td>36,193</td>
<td>33,872</td>
<td>37,738</td>
<td>59,044</td>
<td>68,963</td>
<td>73,922</td>
<td></td>
</tr>
<tr>
<td>Non-Govt. Public Companies</td>
<td>4,312</td>
<td>6,193</td>
<td>19,803</td>
<td>19,330</td>
<td>16,075</td>
<td>10,410</td>
<td>3,138</td>
<td>5,013</td>
<td>5,153</td>
<td>4,949</td>
<td></td>
</tr>
<tr>
<td>PSU Bonds</td>
<td>5,663</td>
<td>7,510</td>
<td>1,062</td>
<td>5,586</td>
<td>2,292</td>
<td>3,394</td>
<td>2,982</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Govt. Companies</td>
<td>—</td>
<td>—</td>
<td>430</td>
<td>819</td>
<td>888</td>
<td>1,000</td>
<td>650</td>
<td>43</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Banks &amp; FIs</td>
<td>—</td>
<td>—</td>
<td>356</td>
<td>3,843</td>
<td>425</td>
<td>3,465</td>
<td>4,352</td>
<td>4,352</td>
<td>2,551</td>
<td>1,472</td>
<td></td>
</tr>
<tr>
<td>Private Placement</td>
<td>4,244</td>
<td>4,463</td>
<td>1,635</td>
<td>7,466</td>
<td>11,174</td>
<td>13,361</td>
<td>15,066</td>
<td>30,099</td>
<td>49,679</td>
<td>61,259</td>
<td>67,500</td>
</tr>
<tr>
<td>Euro Issues</td>
<td>—</td>
<td>—</td>
<td>702</td>
<td>7,898</td>
<td>6,743</td>
<td>1,297</td>
<td>5,594</td>
<td>4,009</td>
<td>1,148</td>
<td>3,487</td>
<td>4,197</td>
</tr>
<tr>
<td>Government Securities</td>
<td>11,585</td>
<td>12,284</td>
<td>17,690</td>
<td>54,533</td>
<td>43,231</td>
<td>46,783</td>
<td>42,688</td>
<td>67,386</td>
<td>1,06,067</td>
<td>1,13,336</td>
<td>1,26,833</td>
</tr>
<tr>
<td>Central Governments</td>
<td>8,989</td>
<td>8,919</td>
<td>13,885</td>
<td>50,388</td>
<td>38,108</td>
<td>40,509</td>
<td>36,152</td>
<td>59,637</td>
<td>93,953</td>
<td>99,630</td>
<td>1,15,183</td>
</tr>
<tr>
<td>State Governments</td>
<td>2,596</td>
<td>3,364</td>
<td>3,805</td>
<td>4,145</td>
<td>5,123</td>
<td>6,274</td>
<td>6,536</td>
<td>7,749</td>
<td>12,114</td>
<td>13,706</td>
<td>11,650</td>
</tr>
<tr>
<td>Total</td>
<td>25,777</td>
<td>28,650</td>
<td>41,227</td>
<td>99,031</td>
<td>91,315</td>
<td>83,472</td>
<td>79,835</td>
<td>1,09,511</td>
<td>1,66,259</td>
<td>1,85,786</td>
<td>2,04,952</td>
</tr>
</tbody>
</table>

INVESTOR POPULATION

The Society for Capital Market Research and Development carries out periodical surveys of household investors to estimate the number of investors. Their first survey carried out in 1990 placed the total number of share owners at 90-100 lakh. Their second survey estimated the number of share owners at around 140-150 lakh as of mid-1993. Their latest survey estimates the number of shareowners at around 2 crore at 1997 end, after which it remained stagnant upto the end of 1990s. The bulk of increase in number of investors took place during 1991-94 and tapered off thereafter. 49% of the share owners at the end of 2000 had entered the market for the first time before the end of 1990, 44% entered during 1991-94, 6.3% during 1995-96 and 0.8% since 1997. The survey attributes such tapering off to persistent depression in the share market and investors bad experience with many unscrupulous company promoters and managements.

According to the SEBI-NCAER survey, an estimated 12.8 million, or 7.6%, of all Indian households representing 19 million individuals had directly invested in equity shares and or debentures at the end of financial year 1998-99. The investor households increased at a compound growth rate of 22%
between 1985-86 and 1998-99. About 35% of investor households became investors in equity shares prior to 1991, while 47% of the investors entered the market during 1991-95 and 17% after 1995. More than 156 million, or 92%, of all Indian households were non-investor households who did not have any investments in equity/debentures. Low per capita income, apprehension of loss of capital, and economic insecurity, which are all inter-related factors, significantly influenced the investment attitude of the households. The lack of awareness about securities market and absence of a dependable infrastructure and distribution network coupled with aversion to risk inhibited non-investor households from investing in the securities market.

An estimated 15 million, or nearly 9%, of all households representing at least 23 million unit holders had invested in units of mutual funds. Total investible resources of mutual funds account for about 23% of market capitalization compared to more than 50% in developed countries. The mutual funds have not yet become an attractive investment avenue for the low and middle-income groups.

Primary Market

The resources raised by non-government public companies rose sharply to Rs. 26,417 crore in 1994-95. The market, however, appears to have dried up since 1995-96. In real terms, the amount raised by non-government public companies during 2000-01 is about 53% of that raised a decade back in 1990-91. Many investors who were lured into the market during 1992-94 seem to be adopting a very cautious approach because of their frustration with some of the issuers and intermediaries associated with the securities market. The number of quality issues has declined due to stricter eligibility criteria for public issues imposed by SEBI and the general slowdown in the economic activity.

Simultaneously, issuers have shifted focus to other avenues for raising resources like private placement where compliance is much less. Available data, although scanty, indicate that private placement has become a preferred means of raising resources by the corporate sector. It accounted for about 91% of total resources mobilized through domestic issues by the corporate sector during 2000-01. It is believed in some circles that private placement has crowded out public issues. Rapid dismantling of shackles on institutional investments and deregulation of the economy are driving growth of this segment. There are several inherent advantages of relying on private placement route for raising resources. While it is cost and time effective method of raising funds and can be structured to meet the needs of the entrepreneurs, it does not require detailed compliance with formalities as required in public or rights issues.

Indian market is getting integrated with the global market though in a limited way through euro issues. Since 1992, when they were permitted access, Indian companies have raised about Rs. 31,000 crore through ADRs/GDRs.

The market is getting institutionalized as people prefer mutual funds as their investment vehicle, thanks to evolution of a regulatory framework for mutual funds, tax concessions offered by government and preference of investors for passive investing. The net collections by mutual funds picked up during the 1990s and increased to Rs. 19,953 crore in 1999-2000. This, however, declined to Rs. 13,339 crore in 2000-2001. Starting with an asset base of Rs. 25 crore in 1964, the industry has grown exponentially to nearly Rs. 1,00,000 crore at the end of June 2001. The number of households owning units of MFs exceeds the number of households owning equity and debentures.

The primary issues of the Central Government have increased thirteen-fold during the decade of 1990s from Rs.8,989 crore in 1990-91 to Rs. 11,15,183 crore in 2000-01. The issues by state governments increased by about five times from Rs. 2,569 crore to Rs. 11,650 crore during the same period.

Secondary Market

Selected indicators in the secondary market are presented in Table 4. The number of stock exchanges increased from 11 in 1990 to 23 now. All the exchanges are fully computerized and offer 100% on-line trading. 9,922 companies were available for trading on stock exchanges at the end of March 2001. The trading platform of the stock exchanges was accessible to 9,792 members from over 400 cities on the same date.
Table 4
Secondary Market-Selected Indicators

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Brokers</th>
<th>No. of Listed Companies</th>
<th>S&amp;P CNX Nifty</th>
<th>Market Capitalisation (Rs. Crore)</th>
<th>Turnover Ratio (%)</th>
<th>Market Capitalisation Ratio (%)</th>
<th>Turnover (Rs. Crore)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990-91</td>
<td>—</td>
<td>6,299</td>
<td>366.45</td>
<td>1,10,279</td>
<td>20.6</td>
<td>45.6</td>
<td>2,03,703</td>
</tr>
<tr>
<td>1991-92</td>
<td>—</td>
<td>6,480</td>
<td>1261.65</td>
<td>3,54,106</td>
<td>57.4</td>
<td>2,28,780</td>
<td>50.9</td>
</tr>
<tr>
<td>1992-93</td>
<td>—</td>
<td>6,925</td>
<td>660.51</td>
<td>2,28,780</td>
<td>32.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1993-94</td>
<td>—</td>
<td>7,8111</td>
<td>177.11</td>
<td>4,00,077</td>
<td>45.6</td>
<td>2,03,703</td>
<td>50.9</td>
</tr>
<tr>
<td>1994-95</td>
<td>6,711</td>
<td>9,077</td>
<td>990.24</td>
<td>4,73,349</td>
<td>45.6</td>
<td>1,62,905</td>
<td>34.4</td>
</tr>
<tr>
<td>1995-96</td>
<td>8,476</td>
<td>9,100</td>
<td>985.30</td>
<td>5,72,257</td>
<td>47.0</td>
<td>2,27,368</td>
<td>39.7</td>
</tr>
<tr>
<td>1996-97</td>
<td>8,867</td>
<td>9,890</td>
<td>968.85</td>
<td>4,88,332</td>
<td>34.6</td>
<td>6,46,116</td>
<td>132.3</td>
</tr>
<tr>
<td>1997-98</td>
<td>9,005</td>
<td>9,833</td>
<td>1116.65</td>
<td>5,89,816</td>
<td>37.7</td>
<td>9,08,681</td>
<td>154.1</td>
</tr>
<tr>
<td>1998-99</td>
<td>9,069</td>
<td>9,877</td>
<td>1078.05</td>
<td>5,74,064</td>
<td>34.1</td>
<td>10,23,382</td>
<td>178.3</td>
</tr>
<tr>
<td>1999-00</td>
<td>9,192</td>
<td>9,871</td>
<td>1528.45</td>
<td>11,92,630</td>
<td>84.7</td>
<td>20,67,031</td>
<td>173.3</td>
</tr>
<tr>
<td>2000-01</td>
<td>9,792</td>
<td>9,922</td>
<td>1148.20</td>
<td>7,68,863</td>
<td>54.5</td>
<td>28,80,990</td>
<td>374.7</td>
</tr>
</tbody>
</table>

Note: Turnover figures for the respective year.

The market capitalization grew ten fold between 1990-91 and 1999-2000. All India market capitalization is estimated at Rs. 7,68,863 crore at the end of March 2001. The market capitalization ratio, which indicates the size of the market, increased sharply to 57.4% by March 1992 and to 85% by March 2000. It, however, declined to 55% at the end of March 2001. Traditionally, manufacturing companies and financial services sector accounted for a major share in market capitalization. The importance of these traditional sectors has declined in the recent past and new sectors like information technology, pharmaceuticals and fast moving consumer goods have picked up.

The trading volumes on exchanges have been witnessing phenomenal growth during the 1990s. The average daily turnover grew from about Rs. 150 crore in 1990 to Rs. 12,000 crore in 2000, peaking at over Rs. 20,000 crore. One-sided turnover on all stock exchanges exceeded Rs. 10,00,000 crore during 1998-99, Rs. 20,00,000 crore during 1999-2000 and approached Rs. 30,00,000 crore during 2000-01. The turnover ratio, which reflects the volume of trading in relation to the size of the market, has been increasing by leaps and bounds after the advent of screen based trading system by the NSE. The turnover ratio for the year 2000-01 increased to 375, which is one of the highest in the world.

The relative importance of various stock exchanges in the market has undergone dramatic change during this decade. Century old BSE gave way to NSE in the very first year of latter's operation. The increase in turnover took place mostly at big exchanges and it was partly at the cost of small exchanges that failed to keep pace with the changes. NSE is the market leader with over 53% of total turnover (volumes on all segments) in 2000-01. Top 6 stock exchanges accounted for 99% of turnover, while the rest 17 exchanges for less than 1% during 2000-1. About a dozen exchanges reported nil turnover during 2000-01. The big exchanges now report higher turnover from its trading terminals in the home turf of most of the corresponding regional exchanges.

The sectoral distribution of turnover has undergone significant change over last few years. The share of manufacturing companies in turnover of top '50' companies, which was nearly 80% in 1995-96, declined sharply to less than 10% in 2000-01. During the same period the share of information technology companies in turnover increased sharply from nil in 1995-96 to 76% in 2000-01.

Trades also concentrate on a few securities/members. The top '5' and '100' members accounted for 7.8% and 49% of turnover respectively.
Many securities listed on stock exchanges are not traded and trading in many others is negligible. The percentage of companies traded on BSE was quite low at 33.5% in April 2000, and it declined further to 26.5% in March 2001. Further, only 40.6% of companies traded on BSE were traded for more than 100 days in case of 59.4% of companies traded during the year, and for less than 10 days during 2000-01. There was no trade in several companies listed on a number of regional stock exchanges. Thus trading is concentrated among only a limited number of stocks and is very thin in a large number of stocks.

The movement of the S&P CNX NIFTY, the most widely used indicator of the market, is presented in Chart 1. In the very first year of liberalization, i.e., 1991-92, it recorded a growth of 267%, followed by sharp decline of 475 in the next year as certain irregularities in securities transactions were noted. The market picked up next year thanks to increased inflow of foreign funds, the increased investor interest. It remained subdued till 1999-2000 when the Nifty firmed up by 42% due to the perception about strength of the Government and also its commitment towards second generation reforms, improved macro-economic parameters and better corporate results. The trend got reversed during 2000-01, which witnessed large sell-offs in new economy stocks in global markets and deceleration in the growth of the domestic economy, payment crisis on certain exchanges, large scale manipulations in stock prices and revelation of large scale corruption in the procurement of defence equipments. The trend precipitated further with suspension of repurchase facility under the UTI's 64 scheme and withdrawal of deferral products during the current fiscal.

Chart 1: Movement of S&P CNX Nifty

The aggregate turnover in central and state government dated securities, including treasury bills, through SGL transaction increased 12 times between 1994-95 and 2000-2001, which reported a turnover of Rs. 6,98,121 crores, reflecting deepening of the market. The share of outright transactions in government securities increased from 23.2% in 1995-96 to 82% in 2000-01. The share of repo transactions declined correspondingly from 76.8% in 1995-96 to 18.1%. The share of dated securities in total turnover of government securities increased from 69% in 1996-97 to 89 in 2000-01. The T-bills accounted for remaining SGL turnover.

DERIVATIVES MARKET

The monthly turnover in derivative market rose from Rs. 92 crore in June 2000 to Rs. 824 crore in June 2001. A total of 1.6 lakh contracts with a total turnover of Rs. 3,918 crore were traded during the June-March 2001. With introduction of index options from June 2001 and stock options from July 2001
and ban on deferral products in the cash market, the derivative volumes are picking up fast, September 2001 reported a total turnover of nearly Rs. 6,000 crore.

MARKET DESIGN

Primary Market

Corporate Securities: The Disclosure and Investor Protection (DIP) guidelines prescribe a substantial body of requirements for issuers/intermediaries, the broad intention being to ensure that all concerned observe high standards of integrity and fair dealing, comply with all the requirements with due skill, diligence and care, and disclose the truth, whole truth and nothing but truth. The guidelines aim to secure fuller disclosure of relevant information about the issuer and the nature of the securities to be issued so that investors can take informed decisions. For example, issuers are required to disclose any material ‘risk factors’ and give justification for pricing in their prospectus. An unlisted company can access the market up to 5 times its pre-issue networth, it can access the market only through book building with minimum offer of 60% to qualified institutional buyers. Infrastructure companies are exempt from the requirement of eligibility norms if their project has been appraised by a public financial institution and not less than 5% of the project cost is financed by any of the institutions, jointly or severally, by way of loan and/or subscription to equity. The debt instruments of maturities more than 18 months require credit rating. If the issue size exceeds Rs. 100 crore, two ratings from different agencies are required. Thus the quality of the issue is demonstrated by track record/appraisal by approved financial institutions/credit rating/subscription by QIBs.

The lead merchant banker discharges most of the pre-issue and post-issue obligations. He satisfies himself about all aspects of offering and adequacy of disclosures in the offer document. He issues a due diligence certificate stating that he has examined the prospectus, he finds it in order and that it brings out all the facts and does not contain anything wrong or misleading. He also takes care of allotment, refund and dispatch of certificates.

The admission to a depository for dematerialisation of securities is a prerequisite for making a public or rights issue or an offer for sale. The investors, however, have the option of subscribing to securities in either physical form or dematerialized form. All new IPOs are compulsorily traded in dematerialized form. Every public listed company making IPO of any security for Rs. 10 crore or more is required to do so only in dematerialized form.

Government Securities: RBI announces the auction of government securities through a press notification and invites bids. The sealed bids are opened at an appointed time, and the allotment is based on the cut off price decided by the RBI. Successful bidders are those that bid at a higher price, exhausting the accepted amount at the cut-off price. All successful bidders pay the price (yield) they bid for.

Secondary Market

Corporate Securities: The stock exchanges are the exclusive centers for trading of securities. Though the area of operation/jurisdiction of an exchange is specified at the time of its recognition, they have been allowed recently to set up trading terminals anywhere in the country. The three newly set up exchanges (OTCEI, NSE and ICSE) were permitted since their inception to have nation wide trading. The trading platforms of a few exchanges are now accessible from many locations. Further, with extensive use of information technology, the trading platforms of a few exchanges are also accessible from anywhere through the Internet and mobile devices. This made a huge difference in a geographically vast country like India.

Exchange Management: Most of the stock exchanges in the country are organized as “mutuals” which was considered beneficial in terms of tax benefits and matters of compliance. The trading members, who provide brokering services, also own, control and manage the exchanges. This is not an effective model for self-regulatory organizations as the regulatory and public interest of the exchange conflicts with private interests. Efforts are on to demutualise the exchanges whereby ownership, management and trading membership would be segregated from one another. Two
exchanges viz. OTCEI and NSE are demutualised from inception, where ownership, management and trading are in the hands of three different sets of people. This model eliminates conflict of interest and helps the exchange to pursue market efficiency and investor interest aggressively.

Membership: The trading platform of an exchange is accessible only to brokers. The broker enters into trades in exchanges either on his own account or on behalf of clients. No stock broker or sub-broker is allowed to buy, sell or deal in securities, unless he or she holds a certificate of registration granted by SEBI. A broker/sub-broker complies with the code of conduct prescribed by SEBI. Over time, a number of brokers – proprietor firms and partnership firms – have converted themselves into corporates. Out of 9,782 brokers registered with SEBI at the end of March 2001, 3,808 brokers, accounting for nearly 39% of total, were corporate entities. At end March 2001, there were 9,957 sub-brokers registered with SEBI. The standards for admission of members stress on factors, such as corporate structure, capital adequacy, track record, education, experience, etc. and reflect a conscious endeavour to ensure quality broking services.

Listing: A company seeking listing satisfies the exchange that at least 10% of the securities, subject to a minimum of 20 lakh securities, were offered to public for subscription, and the size of the net offer to the public (i.e. the offer price multiplied by the number of of securities offered to the public, excluding reservations, allotment and promoters’ contribution) was not less than Rs. 100 crore, and the issue is made only through book building method with allocation of 60% of the issue size to the qualified institutional buyers. In the alternative, it is required to offer at least 25% of the securities to public. The company is also required to maintain the minimum level of non-promoter holding on a continuous basis.

In order to provide an opportunity investors to invest/trade in the securities of local companies, it is mandatory for the companies, wishing to list their securities, to list on the regional stock exchange nearest to their registered office. If they so wish, they can seek listing on other exchanges as well. Monopoly of the exchanges within their allocated area, regional aspirations of the people and mandatory listing on the regional stock exchange resulted in multiplicity of exchanges.

The basic norms for listing of securities on the stock exchanges are uniform for all the exchanges. These norms are specified in the listing agreement entered into between the company and the concerned exchanges. The listing agreement prescribes a number of requirements to be continuously complied with by the issuers for continued listing and such compliance is monitored by the exchanges. It also stipulates the disclosures to be made by the companies and the corporate governance practices to be followed by them. SEBI has been issuing guidelines/circulars prescribing certain norms to be included in the listing agreement and to be complied with by the companies.

A listed security is available for trading on the exchange. 9,922 securities are listed on exchanges at the end of March 2001. The stock exchanges levy listing fees-initial fees and annual fees – from the listed companies. It is a major source of income for many exchanges. A Security listed on other exchanges is also permitted for trading.

A listed company can voluntary delist its securities from non-regional stock exchanges after providing an exit opportunity to holders of securities in the region where the concerned exchange is located. An exchange can, however, delist the securities compulsorily following a very stringent procedure.

Trading Mechanism: The exchanges provide an on-line fully-automated screen based trading system (SBTS) where a member can punch into the computer quantities of securities and the prices at which he likes to transact and the transaction is executed as soon as it finds a matching order from a counter party. SBTS electronically matches orders on a strict price/time priority and hence cuts down on time, cost and risk of error, as well as on fraud resulting in improved operational efficiency. It allows faster incorporation of price sensitive information into prevailing prices, thus increasing the informational efficiency of markets. It enables market participants to see the full market on real-time, making the market transparent. It allows a large number of participants, irrespective of their geographical locations, to trade with one another simultaneously,
improving the depth and liquidity of the market. It provides full anonymity by accepting orders, big or small, from members without revealing their identity, thus providing equal access to everybody. It also provides a perfect audit trail, which helps to resolve disputes by logging in the trade execution process in entirety.

Trading Rules: Regulations have been framed to prevent insider trading as well as unfair trade practices. The acquisitions and takeovers are permitted in a well-defined and orderly manner. The companies are permitted to buy back their securities to improve liquidity and enhance the shareholders’ wealth.

Price Bands: Stock market volatility is generally a cause of concern for both policy makers as well as investors. To curb excessive volatility, SEBI has prescribed a system of price bands. The price bands or circuit breakers bring about a coordinated trading halt in all equity and equity derivatives markets nation-wide. An index-based market-wide circuit breaker system at three stages of the index movement either way at 10%, 15% and 20% has been prescribed. The movement of either S&P CNX Nifty or Sensex, whichever is breached earlier, triggers the breakers. As an additional measure of safety, individual scrip-wise price bands of 20% either way have been imposed for all securities except those available for stock options.

Demat Trading: While the investors have a right to hold securities in either physical or demat form, SEBI has mandated compulsory trading and settlement of securities in select securities in dematerialized form. All investors are required to mandatorily trade in dematerialized form in respect of 2,335 securities as at end-June 2001. All actively traded securities are held, traded and settled in demat form.

The securities of public limited companies are freely transferable subject to certain exceptions. Two depositories, viz. NSDL and CDSL, maintain ownership records of dematerialized securities in a book entry form and transfer ownership of securities electronically without making the securities move from person to person. At the end of June 2001, 39,948 million securities worth Rs. 3,265 billion have been dematerialized with NSDL. The market capitalization of the companies that have joined NSDL has reached Rs. 5,398 billion at the end of June 2001. 202 depository participants are rendering depository services at 2,639 locations all over the country serving 4 million investors who have opened beneficial accounts with NSDL. The securities of 3,154 companies are available for demat trading. Demat settlement accounts for over 99% of turnover settled by delivery. This has almost eliminated the bad deliveries and associated problems.

Charges: A stock broker is required to pay a registration fee of Rs. 5,000 every financial year, if his annual turnover does not exceed Rs. 1 crore. If the turnover exceeds Rs. 1 crore during any financial year, he has to pay Rs. 5,000 plus one-hundredth of 1% of the turnover in excess of Rs. 1 crore. After the expiry of five years from the date of initial registration as a broker, he has to pay Rs. 5,000 for a block of five financial years. Besides, the exchanges collect transaction charges from its trading members. NSE levies Rs. 4 per lakh of turnover.

The maximum brokerage a trading member can levy in respect of securities transactions is 2.5% of the contact price, exclusive of statutory levies like SEBI turnover fee, service tax and stamp duty. However, brokerage charges as low as 0.15% are also observed in the market.

Trading Cycle: The trades accumulate over a trading cycle and at the end of the cycle, these are clubbed together, and positions are netted and payment of cash and delivery of securities settle the balance. In respect of 414 securities, which are traded and settled under rolling settlement, the trading cycle comprises one day and transactions in these securities are settled after 5 days from the trade date w.e.f. July 2001. The balance securities are traded and settled under uniform weekly settlement cycle. The market also had a variety of deferral products like modified carry forward system, which permitted leveraged trading by enabling postponement of settlement. These have been banned and the market has moved close to spot/cash market.

Risk Management: To pre-empt market failures and protect investors, the regulator/exchanges have developed a comprehensive risk management system, which is constantly monitored and upgraded. It encompasses capital adequacy of members, adequate margin requirements, limits on
exposure and turnover, indemnity insurance, on-line position monitoring and automatic disablement, etc. They also administer an efficient market surveillance system to curb excessive volatility, detect and prevent price manipulations. Exchanges have set up trade/settlement guarantee funds for meeting shortages arising out of non-fulfillment/partial fulfillment of funds obligations by the members in a settlement. A clearing corporation assures the counterparty risk of each member and guarantees financial settlement in respect of trades executed on NSE.

**Government Securities** : The secondary market for government securities is wholesale in nature, with most deals negotiated on telephone. The WDM segment of NSE provides a screen-based order-driven trading platform for trading of a wide range of government securities. Many of the negotiated deals are reported on this segment. RBI is setting up a Negotiated Dealing System, which will facilitate electronic bidding in auctions and secondary market transactions in government securities. RBI provides SGL account facilities to large banks and FIs to hold government securities in dematerialized form and follows a DvP style system for settlement of transactions.

**Derivatives Market**

The enabling legislation for derivatives trading came through in early 2000. This defined derivatives to include: (a) 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, and (b) a contract which derives its value from the prices, or index of prices, or underlying securities. Derivatives are legal and valid only if such contracts are traded on a recognized stock exchange, thus precluding OTC derivatives.

SEBI permitted the derivative segments of two stock exchanges, i.e. NSE and BSE, and their clearing house/corporation to commence trading and settlement in approved derivative contracts. To begin with, SEBI approved trading in index futures contracts based on S&P CNX Nifty Index and BSE-30 Index. This was followed by approval for trading in options based on these two indices and options on individual securities. The trading in index futures commenced in June 2000, index options in June 2001 and stock options in July 2001. The market design for these products traded on NSE are presented in Table 5.

**REGULATORY FRAMEWORK**

The four main legislations governing the securities market are: (a) the SEBI Act, 1992 which establishes SEBI to protect investors and develop and regulate securities market; (b) the Companies Act, 1956, which sets out the code of conduct for the corporate sector in relation to issue, allotment and transfer of securities, and disclosures to be made in public issues; (c) the Securities Contracts (Regulation) Act, 1956, which provides for regulation of transactions in securities through control over stock exchanges; and (d) the Depositories Act, 1996 which provides for electronic maintenance and transfer of ownership of demat securities.

Government have framed rules under the SCRA, SEBI Act and the Depositories Act. SEBI has framed regulations under the SEBI Act and the Depositories Act for registration and regulation of all market intermediaries, and for prevention of unfair trade practices, insider trading.

### TABLE 5

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Index Futures</th>
<th>Stock Futures (Proposed)</th>
<th>Index Options</th>
<th>Stock Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security Description</td>
<td>N FUTIDX NIFTY</td>
<td>N FUTSTK NIFTY</td>
<td>N OPTIDX NIFTY</td>
<td>N OPTSTK NIFTY</td>
</tr>
<tr>
<td>Underlying</td>
<td>S&amp;P CNX Nifty Index</td>
<td>Individual Securities</td>
<td>S&amp;P CNX Nifty Index</td>
<td>Individual Securities</td>
</tr>
<tr>
<td>Style of Option</td>
<td>NA</td>
<td>NA</td>
<td>European</td>
<td>American</td>
</tr>
<tr>
<td>Contract Size</td>
<td>200 or multiples, may be specified by NSE</td>
<td>Multiples of 100, as</td>
<td>200 or multiples</td>
<td>Multiples</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Price steps</th>
<th>may be specified by NSE multiples of as may be specified thereof (minimum value thereof (minimum value of Rs. 2 lakh) of Rs. 2 lakh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expiration months</td>
<td>Rs.0.05</td>
</tr>
<tr>
<td>Trading cycle</td>
<td>A maximum of three month trading cycle – the near month (one), the next month (two) and the far month (three). New contract is introduced on the next trading day following the expiry of near month contract.</td>
</tr>
<tr>
<td>Last Trading/Expiration Day</td>
<td>Last Thursday of the expiry month or the preceding trading day, if last Thursday is a trading holiday.</td>
</tr>
<tr>
<td>No. of Strike Prices</td>
<td>Minimum of 5 (two 'in the money', one 'at the money' and two 'out of the money') for every option type (i.e. call and put) Minimum of 5 (two 'in the money', one 'at the money' and two 'out of the money') for every option type (i.e. call and put)</td>
</tr>
<tr>
<td>Strike Price Interval</td>
<td>NA NA 20 Between 5 and 100 depending on the price of underlying</td>
</tr>
<tr>
<td>Settlement</td>
<td>In cash on T+1 basis In cash on T+1 basis In cash on T+1 basis Daily settlement on T+1 basis and final settlement on T+3 basis</td>
</tr>
<tr>
<td>Daily settlement price</td>
<td>Closing price of futures contract Closing price of futures contract Premium value (net) Premium value (net)</td>
</tr>
<tr>
<td>Final settlement price</td>
<td>Closing value of index on expiry day Closing value of securities on expiry day Closing value of index on expiry day Closing price of underlying on exercise day or expiry day</td>
</tr>
<tr>
<td>Settlement day</td>
<td>Last trading day</td>
</tr>
</tbody>
</table>

NA : Not applicable  
Source: NSE  
etc. Under these Acts, Government and SEBI issue notifications, guidelines, and circulars which need to be complied with by market participants. The SROs like stock exchanges have also laid down their rules of game.

The responsibility for regulating the securities market is shared by Department of Economic Affairs (DEA), Department of Company Affairs (DCA), Reserve Bank of India (RBI) and SEBI. The activities of these agencies are co-ordinated by the High Level Committee on Capital Markets. Most of the powers under the SCRA are exercisable by DEA while a few others by SEBI. The powers of the DEA under the SCRA are also con-currently exercised by SEBI. The powers in respect of the contracts for sale and purchase of securities, gold related securities, money market securities and securities derived from these securities and ready forward contracts in debt securities are exercised concurrently by RBI. The SEBI Act and the Depositories Act are mostly administered by SEBI. The rules and regulations under the securities laws are administered by SEBI. The powers under the Companies Act relating to issue and transfer of securities and non-payment of dividend are administered by SEBI in case of listed public companies and public companies proposing to get their securities listed. The SROs ensure compliance with their own rules as well as with the rules relevant for them under the securities laws.

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TOUGH TIMES : LOOK TO SECURITIZATION

Charles Olivier*

Securitization has evolved from a niche product used only by banks and project financiers into a flexible acquisition finance and balance sheet restructuring tool. But how useful is it for ordinary corporates? Charles Olivier reports.

Companies such as Whitbread and British Land have been using assets like property as security for bonds, or more accurately debentures, since the 1970s. But securitization – the packaging of debt backed by revenue streams into bonds – is a relatively new concept. However, securitizations traditionally do well in times of economic slowdown or large-scale conflicts, both of which suggest that this tool may prove invaluable for corporates looking to raise funds over the coming months. And in the wake of Telecom Italia’s Eu700 million ($628.95 million) securitization of a pool of local telephone bill receivables in July 2001, it is a good time to take a look back at how the structured finance market developed in Europe.

The idea was first introduced in Europe in the mid-1980s when financial institutions began to issue bonds secured against mortgage payments and credit card receipts. The structure of these transactions is often extremely complicated but the principle behind them is not. The company simply sets up a special purpose vehicle (SPV) into which it transfers a pool of assets, for example credit card bills. The SPV issues bonds secured by these assets and then passes the proceeds back to the company via a loan.

All the revenue generated by the assets within the SPV is used to pay back the debt and cannot be used by the issuer. If the company goes bankrupt, the bondholders are allowed to control the insolvency proceedings through an administrative receiver so that any assets in the SPV go to them, not other creditors.

In the mid-1990s project financiers got hold of the idea of issuing secured bonds to finance infrastructure projects. The big breakthrough came in 1995 when Edison Mission Energy, the US utility group, raised £400 million of asset-backed bonds to finance its acquisition of First Hydro, the Welsh hydro-electricity company.

This was the first time that securitization was used to finance an acquisition, and also the first time that a long-dated asset-backed bond was issued by a European corporate. And it introduced the European market to the concept of whole business securitization—the diversion of an entire company’s income stream into an SPV.

REASSESSING THE POSSIBILITIES

But the transaction that really caught the market’s attention was the £320 million bond issued by Investcrop in 1997 to pay for its acquisition of Welcome Break, the UK motorway service station chain. Unlike First Hydro, Welcome Break was not a monopoly and operated in an unregulated market. Consequently, its revenues were much less predictable. And the amount raised in relation to the company’s overall size was huge – 8.5% of the value of Welcome Break’s assets compared to 40% on the First Hydro deal.

The Welcome Break deal led to a fundamental reassessment of the possible uses of securitization. If investors were willing to buy bonds secured against the income stream of a motorway service chain, finance directors argued, then surely they would buy bonds secured against the cash flows of other companies as well.

And the first corporate to try the theory out was Formula One, the car racing company, raising $2 billion via a securitisation of its revenues in 1998. But a slew of other companies soon followed, including the London City Airport, Wightlink (the UK ferry company), the London International Exhibition Centre and the Really Useful Theatre Company. In May 1999, Madame Tussauds raised £230 million of twenty-five year debt backed by cash flows from its theme parks and waxwork museums.

Getting the deal done
One of the biggest deals to come to the market since the introduction of securitizations in Europe was the £1.48 billion deals by Punch Taverns, the UK pub group, secured against the cash flows of its acquired pub interests of Allied Domecq. And July this year saw Telecom Italia’s Eu700 million structured finance deal, securitizing a pool of local telephone bill receivables, which was the first euro-denominated asset-backed bond of any size to come to market and the first by a telecom company. The UK water companies have been particularly active. In March 2001, Sutton and East Surrey Water issued a £100 million bonds backed by its cash flows. Two months later, Welsh water company Glas Cymru raised £2 billion.

A common feature of all these deals is that the companies concerned (with the exception of Formula One) are all relatively easy to analyze, single strand businesses with land or property that can be sold off in the event of default. They all also have extremely strong market positions. Madame Tussauds, for example, may not have a monopoly on theme parks but the enormous cost of setting up a rival to, say, Alton Towers, means that it is almost invulnerable to competition.

But over the past nine months, several companies without these advantages have managed to securitize their cash flows and issue asset-backed bonds. Earlier this year, Tesside and Hartlepool Ports managed to raise £305 million of long-term debt backed by its facility and cargo handling revenues. In February 2001, Rank Hovis, the UK baked goods manufacturer, raised £650 million of debt secured by cash flows from a pool of key products such as Mother’s Pride bread.

Richard Stow, a director at Barclays Capital, believes these two deals show that almost any European company can now issue asset-backed bonds and find buyers: “Securitization is not a niche product any more. It is something that can benefit companies of all industries and of all sizes.” So how much money can corporates save by switching from ordinary bond and loan financing to asset-backed debt, and which are likely to benefit the most from doing so?

Growing market

The cost of issuing asset-backed debt varies considerably according to the industry of the issuer, the amount of money required and the maturity and rating of the bonds. Historically, asset-backed bonds have been more expensive than loans or Eurobonds because of the time it takes investors to evaluate such deals and the small number of active buyers. But the gap has narrowed considerably over the past two years as investors become more comfortable with the concept, and the number of buyers has increased.

“In the mid-1990s there were less than 50 active asset-backed investors in Europe. Today there are well over 500 and interest is growing fast, particularly among European pension funds and insurance companies,” explains Richard Mann, head of structured debt syndication at Deutsche Bank in London.

Beating the global downturn

The global economic slowdown, and the resulting rise in corporate earnings volatility, has also boosted demand. “At a time when many companies are getting downgraded, investors are looking for bonds that are stable and free from event risk,” says Mann. “Asset-backed bonds performed very well during the Gulf War and the Russian crisis of 1998 and as a result are now extremely popular.”

Whether asset-backed bonds are cheaper than other forms of debt depends largely on the structure and business of the company concerned. For AAA-rated single-business corporate, the answer would seem to be no. Most can raise funds for much less in the syndicated loan market.

But for BBB-rated corporates – especially those able to split off the best bits of their business into a separate special purpose vehicle (and therefore getting a better rating) – the savings can be significant, sometimes as much as 200 basis points.

The key advantage of securitization, however, is not that it allows companies to raise debt at lower rates of interest but that it enables them to raise much more of it. In 1998, the Unique Pub Company, for example, raised debt equivalent to 95% of its enterprise value. Most bankers agree that it could not have raised even half that in the loan or ordinary bond markets. This is hugely helpful to companies
making acquisitions and in particular those making leveraged acquisitions. For example, between 1998 and 2000. LBO houses Nomura Principal Finance, BC Partners, Nikko Principal Investments and Cinven, among others, all used asset-backed bonds to finance or refinance LBOs – many of those in the UK pub industry.

But other companies can benefit as well. Says one banker: “If you are a non-investment grade corporate in a cyclical industry, asset-backed bonds are perhaps the only way you can raise money in the present economic climate.” And the longer maturity available on asset-backed bonds is another advantage. One cannot say for sure but it seems extremely unlikely that any bank would have lent £135 million to Wightlink for 25 years, for example, on an unsecured basis.

THE DRAWBACKS

But – and it is a big but – there are a number of downsides to securitization. First, asset-backed bonds take a long time to arrange: at least three months and sometimes as much as a year. They also require extensive road showing by senior management. And for companies based in continental Europe another issue is that the rights of secured creditors to take control of assets in the event of bankruptcy are far from clear, and bankers need to come up with ingenious deal structures to get the deal rated. Lawyers say that the anti-solvency laws of Italy and the United Kingdom are the most generous to secured creditors – which would account for the high percentage of European asset-backed deals issued out of these two countries.

In addition, securitization covenants can be extremely restricting, including bans on acquisitions and disposals, for example and limits on the amount the company can invest in new facilities. However bankers can will lift some of these restrictions to suit the needs of the individual client. Madame Tussauds, for example, had no limits set on its capital expenditure with the asset-backed bond. But the more you tinker with the covenant, the more you have to pay for the debt. To secure reasonably priced debt financing, companies have to cede a huge amount of operational control.

Another disadvantage is that issuing asset-backed debt can have a negative effect on a company’s existing ratings. If you ring-fence cash flow to pay back asset-backed debt, naturally that leaves less money to redeem other bonds. To date, no company has been downgraded as a direct result of securitization but it is an issue that the rating agencies are taking increasingly seriously.

Whether the pros outweigh the cons is a difficult question to answer. How do you put a price on management time, for example, or operational control? If you are a non-investment grade company in need of a large amount of debt, it is probably worthwhile. If you are an AAA-rated cash-rich company, it is certainly not.

Most firms fall between these two stools – able to raise the money they need but at a relatively high rate of interest. For such companies, the benefits of securitization are much less clear. But regardless, the initial step is to work out if you have anything that can be securitized in the first place.

CHOOSING THE SECURITY

In principle, any asset that produces revenues can be securitized. It could be an entire business spanning dozens of different industries or simply an office block and a pile of unpaid invoices. In practice, securitization only really works with assets producing extremely predictable cash flows year-in and year-out.

Unfortunately, there are no fixed rules as to how volatile a revenue stream can be before it becomes too unpredictable to use as security. “It is impossible to generalize,” says one leading structured financier. “Mobile phone receivables would obviously be harder to securitize than rental income from a chain of British pubs, but you cannot be more specific.”

Property clearly falls into the predictable category, providing it can be used for other commercial purposes in the event of bankruptcy. There are already dozens of banks willing to buy and then lease back offices and factories to corporate clients and the number of firms offering this service are growing fast. Last year, for example, British Telecommunications raised £2 billion by selling a pool of properties to a consortium led by Goldman Sachs. UK grocery store chain Sainsbury’s has carried out a number
of similar sale/lease back transactions, and Marks & Spencers, another UK retailer, is in the process of doing the same.

Stock inventories are also eminently securitizable. Last year Imperial Tobacco raised £1.45 billion of debt backed by its inventory of unsold cigarettes. Another company to have gone down this route is Chargeurs, the French wool company that raised $201 million of debt secured against its stockpiles.

But bankers warn that the stock must be sellable by a third party unless the end-customer is investment grade. Commodity products like oil and gold are acceptable security as are items with a high value relative to their size. Barclays Capital recently carried out a stock inventory securitization for a French champagne producer. Nomura is in the process of executing a similar deal on behalf of Rosy Blue, a diamond company.

Receivables such as invoices, rental and ticket income and long-term client contracts are another possibility, but more challenging because of the lack of a physical asset that can be sold on behalf of bond holders in the event of default.

Broadly speaking, the receivables should be either due from a very large number of clients (so that the risk of non-payment is spread wide enough to avoid mass default) or from two or three large institutions, such as governments or multinationals. To date, only three companies have issued public bonds backed by trade receivables – Italian food company Cremonini, Glencore – the Swiss metal trading company, and Telecom Italia. But several firms are preparing similar deals, such as France Telecom and Deutsche Telekom, and there are rumours of a number of electricity bill backed bonds in the pipeline, including one by London Electricity.

And the idea of using intellectual property rights (IPR) as security for bonds has been around since the early – 1990s. But so far it has only been used publicly in the entertainment industry. Polygram and Walt Disney have both raised large amounts of debt backed by future revenues from their films and music libraries, as have singers like David Bowie. However, several pharmaceutical companies have issued private bonds secured by IPR over the past twelve months, a development that suggests that the concept could be applied to other sectors in future.

**ASSESSING PREDICTABILITY**

The issue of predictability becomes particularly difficult to assess without in-depth analysis when the company concerned is planning to use general corporate cash flow as security rather than receivables, inventory or property leases. As a general rule, investors prefer companies to ring-fence all of their cash flow into a bankruptcy remote SPV rather than cash flow arising simply from individual products.

As the success of deals such as the Really Useful Theatre Group shows, investors are willing to consider whole or partial business securitizations of companies in any industry and of any size. And Rank Hovis has shown that product cash flow deals can be achieved if they generate a reasonable amount of revenue each year and are split off into separate companies. But bankers warn that investors will probably focus on companies with easily transferable assets, such as property, and those with extremely strong market positions; and will be wary of anything that is vulnerable to changes in consumer taste or rival competitors.

Whether and to what extent investors will be willing to accept a strong brand alone as evidence of cash flow predictability is a matter of some debate. So far, the only companies to have issued asset-backed bonds on this basis are Formula One and Rank Hovis. Both had trouble convincing investors that their product was immune from competition. That said both got the deals done.

But how many corporates will try to use such a complex and time-consuming product remains to be seen. The mortgage and credit-backed market may be highly developed but the corporate asset-backed sector is still relatively illiquid and badly needs more supply if it is to evolve into a must-have financial tool. “It is still seen by some finance directors as alchemy,” concedes Stephen Din, managing director of structured finance at Morgan Stanley in London.
This view is borne out by a straw poll of British treasurers conducted by Corporates Finance magazine. Of the 20 contacted, only one expressed a serious interest in securitization. “It is very complicated and to be honest I don’t have the time,” says one. “I can still raise all the money I need from my relationship banks.”

But Richard Stow of Barclays Capital believes attitudes will change soon. “The loan and equity markets are tight and getting tighter. I am confident corporate issuance will increase in the coming months.”

And Sue Dale, co-head of securitization at ABN Amro, believes the threat of a hostile takeover will also act as a spur. “Companies with a lot of property on their balance sheets are being actively targeted by LBO funds,” she warns. “It makes sense to securitize these assets before the LBO funds do it for you.”

There are one or two storm clouds on the horizon, however. For example, in the UK the government is planning to reform Britain’s insolvency law. In a while paper published in July 2001, the Department of Trade and Industry made a proposal to abolish the right of secured creditors to appoint receivers in the case of bankruptcy. Such a change would not result in the end of securitization. Deals have been done in France, where they don’t have the right to appoint receivers either, and new structures getting round the change would undoubtedly be devised. But it would certainly make deals more difficult to structure and therefore more time-consuming and more closely. Finance directors in the UK considering asset-backed deals should move quickly.

Most bankers agree that the active issuers going forward are likely to be electricity, water, logistics, airline, transport and property companies. But the pipeline, at the moment, is not overflowing. The Isle of Man Steam Packet Company, a UK ferry operator, was in the process of road showing a £65 million deal. And the Anglian water Group, France Telecom, Deutsche Telekom and RBG Resources, a UK-based metal trading company, were also said to be looking at securitization. There are deals being done, and with a squeeze in the equity and debt capital markets unlikely to ease any time soon, it may be time for more finance directors to look to securitization.

ON CONSTRUCTION OF A COMPOSITE INDICATOR FOR PREDICTING STOCK PRICE INDEX IN INDIA

G P Samanta*
Rajashree Rajpathak**

ABSTRACT

This paper aims at constructing a composite indicator for capturing the behaviour of the stock market in India. Based on an assessment of the leading qualities of a number of potential leading indicators, using monthly data from January 1993 to March 1999, it was found that money, index of industrial production, exchange rate, E/P ratio and yield on stock index portfolio, inflation, spread between E/P ratio and interest rate are important indicators containing partial information about the future stock price index. This finding is more or less consistent with the existing literature. Accordingly, all these indicators are combined into a single composite indicator (making adjustment for lead period) by using principal component analysis. Performance of the composite indicator, in terms of out-of-sample forecast error is quite impressive. The associated error is even lower than the same obtained from the random walk hypothesis.

INTRODUCTION

THE DEBATE ON stock market predictability has a long history. Under the celebrated Efficient Market Hypothesis (EMH) of Fama (1965), all market information is reflected in the current price and there would be no predictor for future price better than current price. In other words, it states that an investor cannot earn super normal profits by predicting stock price based on historical data. Accordingly, market efficiency remains as the perceived theory of maintaining investment climate, number of studies/ however, have cast serious doubts on the validity of EMH. Shiller (1981,1989), for example, is the pioneer to challenge the standard efficient markets model in explaining asset prices by emphasizing the significant role that popular opinion or psychology (bubble, fad/fashion, etc.) can play in price volatility. Following Shiller’s works, the focus of a number of studies shifted towards identifying the sources of variations in stock prices and searching for possible strategies/techniques for predicting stock price/return. In practice, however, the performance of traditional time series or model-based forecasts of stock price/return, in general, is seen to be poor. Still individuals and financial institutions continue to put efforts on predicting the stock market. A possible explanation of the motivation behind putting efforts in the forecasting exercise is that researchers and investors always look for possibility of discovering some information which is overlooked and not modelled by others (Qi and Maddala, 1999). Moreover, researchers try to exploit and uncover the complex pattern of stock price movement with the help of previously unused and/or newly developed techniques. In particular, with the advent of highly sophisticated techniques, viz., patter recognition, neural network, fuzzy logic, etc., the researchers’ quest on predictability of stock price movements has gathered momentum tremendously. A few methodologies also produce promising results in a sense that they generate forecasts better than random walk forecasts. For instance, in a recent study, Qi and Maddala (1999) established the influence of various economic factors, viz., money growth, dividend yields, interest rates, inflation rate, growth in index of industrial production, etc., on future excess return.

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** Research Officer, Department of Statistical Analysis and Computer Services of the Reserve Bank of India.
They show that a simple linear regression model using past information on these economic factors is able to beat random walk. Their result also showed further improvement in forecast accuracy when this information is used in a Neural Network framework. In another recent study, Rolph and Shen (1999) documented that the extreme values of spreads between E/P ratio of stock price index and interest rate, relative to their historical ranges, do contain useful information on future stock market movements.

In the Indian context, empirical results on the EMH are mixed. Lists of studies in both categories — in favour of and against EMH — are very long. For example/ while the EMH is supported in the studies by Sharma and Kennedy (1977), Cooper (1982), Bhalla (1983), Sharma (1983), Rao (1988), Yalawar (1988), Ranganathan and Subramanian (1993), Mittal (1994-95), Belgaumi (1995). The hypothesis is refuted by Rao and Mukherjee (1971), Chaudhuri (1991), Barman and Madhusoodanan (1993), Subramanian (1993), Balakumar (1995), Reddy (1997), Barman and Samanta (1998). These studies differ with respect to database and/or methodology¹ used, and that could be a possible source of diverse opinions. Empirical results supporting similar line of argument is available in Barua (1981) and Gupta (1985). In both these studies, the authors found conflicting results for market efficiency mainly due to difference in either database or the technique of testing EMH. Thus, it is seen that, despite having a huge body of empirical literature on investigating the validity of EMH in the Indian stock market, the issue still remains unresolved. In this background, inspired with the recent result on predictability of stock market return on other economies (Qi and Maddala, 1999; Rolph and Shen, 1999), this paper assesses the role of various economic factors in predicting the future stock market/return in India using the relatively unexplored ‘leading indicator approach’. The entire study is divided into five sections. Section 2 presents a brief discussion on selection of target/reference series for representing the market movements. Important leading indicators of the target series are identified in Section 3. Thereafter, in Section 4, a construction of the composite index is attempted. Usefulness of the composite index is assessed in Section 5. Finally, Section 6 is devoted to summary and broad conclusions.

2. CHOICE OF TARGET/REFERENCE SERIES

To study the movements in the capital market, one has to decide on an appropriate measure, which would reflect the ups and downs in the stock market. In India, a number of stock price indices are available. Notable among them are BSE 30 share price index (Sensitive Index or Sensex), The Economic Times 30 Index, The Financial Express 30 Index, the NSE-50, The BSE National Index consisting of 100 shares (BSE-100), The Economic Times 100, The Financial Express 100, the BSE-200, The Business Line 250, CRISIL 500 index and several other regional exchange indexes.² These indices differ from each other basically in the coverage of the companies. The companies to be included in the index are selected based on different attributes such as liquidity, depth, floating-stock-adjusted depth, market activity, etc. The number of companies and attributes considered also vary from index to index. In an interesting study, Balasubramanian and Narasimhan (1999) made an attempt to assess the extent to which various indexes reflect the market performance. For this purpose they assumed that (i) the BSE Sensex represents other similar indexes like the Economic Times 30 index, the Financial Times 30 index, (ii) the BSE National index represents The Economic Times 100 index. Financial Express 100 Index, the NSE-50 and several other regional exchange indexes which consist of 100 shares, and

1. For a detailed survey on database and methodologies used in most of these studies, one may refer to Reddy (1997).

2. Apart from these indexes, the Reserve Bank of India (RBI) also had its own Security Price Index. But recently, RBI has stopped publishing this index.

(iii) the BSE-200 represents some of the new indexes like The Business Line 250 index and the CRISIL 500 index. Accordingly, they analysed in detail, various aspects of the BSE Sensex, the BSE-100 and the BSE-200. Their empirical results suggest that there is no significant difference among these three indexes, even though the Indian stock market may be segmented into different groups in terms of
monthly returns. The similarity in behaviour of various indexes point out the fact that the existing indexes merely reflect a few high market capitalised stocks but not the overall market. In the absence of any market representative index, one is compelled to choose one from the existing indexes. As their behaviour is similar, empirical results will not differ qualitatively on the choice of any one among them. In this paper, the BSE-100 index is chosen to represent the Indian stock market as the index covers scrips quoted in the nation-wide exchanges. Thus the BSE-100 index may be a possible candidate for target series. However, the investors' interest lies mainly in predicting return series. Accordingly, the return on the closing value of BSE-100 index is chosen as target series without entering into any debate on its ability to reflect the Indian stock market movement. The stock market return at time point \( t \), say \( R_t \), is simply defined as

\[
R_t = \log (P_t); \text{ where } P_t \text{ is the closing BSE-100 index at time point } t. \quad \text{ .................. (1)}
\]

The estimates of \( R_t \)'s using monthly data from January 1993 to March 1999, are plotted in Figure 1. It can be seen that this series exhibits periodic behaviour with repetition of upward and downward movements. In the leading indicator approach, it is assumed that the periodic movement of target series is the reflection of past influence of a number of variables. Generally these variables are referred to as leading indicators as they lead the ups and downs of target series. Once the target series is selected, the primary concern remains to choose important leading indicators for future values of the target series.

![Figure 1: Target/Return Series](image)

### 3. POTENTIAL LEADING INDICATORS AND THEIR IMPORTANCE

Based on the existing literature, it appears that a number of economic indicators may contain information about future stock price behaviour. Orphanides and Douvogianis (1997), for instance, used linear combinations of \( E/P \) ratio and bond yields to predict returns on the S&P 500 index in a regression framework. Both interest rates and \( E/P \) ratios were among the possible explanatory variables in Pesaran and Timmermann’s (1995) attempt to explain stock market movements. Recently, Qi and Maddala (1999) documented the importance of six variables, viz., dividend yield, treasury bill rate, change in short-term interest rate, growth rate of industrial production, inflation rate and money growth rate in capturing excess stock returns on S&P 500 index portfolio in both regression and neural network frameworks. Finally, Rolph and Shen (1999) established

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3. Of course, in this study, forecasts are generated for both return and price index series. For doing so, first of all, the forecasts of return series are obtained. Then the forecasts of price index are derived by applying inverse transformation on return forecasts.

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that the spread between the E/P ratio and interest rates contain information on future equity market movements. In the Indian context, Brahmanada, et. al. (1992), found significant influence of money, call money rates, exchange rate (Indian Rupees per US Dollar), etc. on stock price movement. Following these findings, on an a priori ground, a number of variables, viz., E/P ratio and Yield in BSE-100 portfolio, spread between E/P ratio and interest rate, money growth, inflation rate, growth in Index of Industrial Production (IIP), interest rate (proxied by call money rate), exchange rate have been considered as potential indicators for future return in BSE-100 index. A list of potential indicators under various categories discussed above is given in Table 1.

**TABLE 1**

Potential Leading Indicators

<table>
<thead>
<tr>
<th>Indicator Name</th>
<th>Indicator Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monetary Aggregates</strong></td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>Narrow Money Stock</td>
</tr>
<tr>
<td>M3</td>
<td>Broad Money Stock</td>
</tr>
<tr>
<td><strong>Interest Rate</strong></td>
<td></td>
</tr>
<tr>
<td>Call</td>
<td>Call Money Rate</td>
</tr>
<tr>
<td><strong>Price Index</strong></td>
<td></td>
</tr>
<tr>
<td>WPI</td>
<td>Wholesale Price Index (Base 1981-82 == 100)</td>
</tr>
<tr>
<td>CPI - IW</td>
<td>Consumer Price Index for Industrial Workers (Base 1982=100)</td>
</tr>
<tr>
<td><strong>Yield, E/P Ratio</strong></td>
<td></td>
</tr>
<tr>
<td>WPI</td>
<td>Yield on BSE-100 Portfolio (last working day of the month)</td>
</tr>
<tr>
<td>E/P</td>
<td>E/P Ratio in BSE-100 Portfolio (last working day of the Month)</td>
</tr>
<tr>
<td><strong>Spread (between E/P Ratio and Interest Rate)</strong></td>
<td></td>
</tr>
<tr>
<td>SP1</td>
<td>Spread between E/P and Call Money Rate</td>
</tr>
<tr>
<td>SP2</td>
<td>Spread between E/P and Yield on 91 Days Treasury Bills</td>
</tr>
<tr>
<td><strong>Exchange Rates</strong></td>
<td></td>
</tr>
<tr>
<td>Rs USD</td>
<td>Exchange Rate - Indian Rupees Per US $</td>
</tr>
<tr>
<td>REER 36</td>
<td>36-country Based Trade Weighted Real Effective Exchange Rate</td>
</tr>
<tr>
<td>NEER 36</td>
<td>36-country Based Trade Weighted Nominal Effective Exchange Rate</td>
</tr>
<tr>
<td><strong>Industrial Production Index</strong></td>
<td></td>
</tr>
<tr>
<td>IIPGE</td>
<td>Index of Industrial Production - General (Base 1981-82=100)</td>
</tr>
<tr>
<td>IIPMF</td>
<td>Index of Industrial Production - Manufacturing (Base 1981-82=100)</td>
</tr>
</tbody>
</table>

Most of these series show some trend in their mean process and thus they are passed through some transformation to reveal cyclical movements with a view to capturing the future cyclical behaviour of the target series. Useful transformations in this context are detrending, taking log-differenced series, differencing series, etc. In this study, various possible transformations were considered for each and every indicator, and the final transformations are selected by seeing the performance of the composite index in generating out-of-sample forecasts of the target series. Based on experimentation, the first difference in log-series is considered for all indicators except for spreads, interest rate and yield where the first difference in original series is found suitable. Further, as required by the type of analysis used in this paper, all transformed series are normalised to give them a common span, such that they are expressed/measured in comparable scale. The normalisation of any series, say \( X(t) \), is done as below:

\[
X^*(t) = \frac{X(t) - \text{MinX}}{\text{MaxX}-\text{MinX}} \quad ............... (2)
\]
where \( X^*(t) \) is the normalised series and \( \text{MinX} \) and \( \text{MaxX} \) are the minimum and maximum values of \( X(t) \) respectively.

Henceforth, all calculations and model estimation will be carried out using these normalised series. However, for convenience, they shall still be referred to as leading indicators. Obviously, at the first stage the forecast of return series will be generated based on all information in transformation and normalised space. The forecast of original stock price index (BSE -100 series) may be obtained easily by applying inverse transformation on the return forecasts.

The performance of any composite index heavily depends on the quality of indicators used in it. Thus, the selection of leading indicators is a very crucial stage in constructing any composite index. From Table 1 it can be seen that many potential indicators can be measured by a number of alternative/competing variables. For example, (i) possible choices for monetary indicators are M1 and M3, (ii) inflation rate can be calculated based on either WPI or CPI\_IW, (iii) exchange rate may be represented by any one from RsUSD, REER36 and NEER, and so forth. Thus there is a need to select appropriate variables from potential indicators.

### 3.1 Assessment of Leading Qualities of Potential Leading Indicators

A comparison with target series reveals the quality of any variable as a leading indicator. Two complementary criteria can be used to assess the leading character of a variable: correlation analysis and turning point analysis (Bikker and Kennedy, 1999). The first is to calculate correlation coefficients between a variable and reference/target series for different leads. The magnitudes of the correlation help assess the information content in a variable about future values of target series. The second criterion highlights the turning points: the average number of time points (months in this study) by which the variable pre-dates (i.e. leads) the turning points in target series. To that end, all turning points in all variables (considered to be potential leading indicator) must be identified and numbered according to those of target series. The standard deviation of the leads of the turning points serve as a measure of the reliability of the variable as leading indicator. Missing observed turning points in target series or a false alarm (that is indicating a turning point of target series which did not subsequently occur) would, in general, lead to disqualification of a variable. Note that while the first criterion uses all available observations, the second criterion ignores some information (as it concentrates only on turning points). However, they generally produce comparable results (Bikker and Kennedy, 1999). In this study leading characters of various variables are assessed by both these techniques though the final selection of leading indicators is made by correlation analysis.

#### 3.1.1 Turning Point Analysis

The leading indicator approach exploits the phenomenon that the cyclical movements in some variables predate those in target variable. As discussed earlier, the turning point analysis tries to trace the cyclical movements in the target as well as the indicator series in terms of the turning points. This involves the determination of all the major turning points marking a transition from one phase to another in all the series. A phase may be an expansionary, the one between a trough and a consecutive peak, or a contraction phase, the one between a peak and a consecutive trough. But identification of major turning points of any series is a difficult task mainly because of the presence of erratic short-term fluctuations in the monthly change (or percentage change) of all series considered in the study. As a simple solution to the problem, it was felt to smooth all series to some extent and it is assumed that the major turning points of the original series will coincide/correspond with the turning points in the smoothened series. This assumption is quite justified in the sense that any false turning point (which occurs mainly due to erratic short-term fluctuations) of the original series will ultimately get eliminated in the process of smoothing the series. Accordingly, in this paper, the widely used HP-filter technique is used to smoothen the series. As is well known, the degree of smoothness obtained through HP-filter is controlled by a smoothing parameter. While the high value of the parameter produces a filtered series, which is more close to the large-term trend of the series, a low value generates filter series close to the original series. For extracting the trend component of a monthly series, generally the value of the parameter is taken to be 14400 (for details of the HP-
filter see Appendix). The requirement of the present study, however, is not to estimate the trend components, as it eliminates most of the turning points. At the same time, use of the original series also generates (possibly) many false turning points. Thus, the smoothing parameter should be so chosen that it does not over-smooth the series but eliminates the erratic short-run fluctuations to some extent. Naturally, on a priori basis, the indication is towards the selection of a sufficiently small value of the smoothing parameter. Through experimentation, it was found that fixing the value of smoothing parameter at 6 produces quite satisfactory results in the sense that it does not produce too many or too less number of turning points in the data period and also reduces a bit of subjectivity/conflicts involved in selecting major turning points. Based on the identified major turning points and the theoretical relationship between the target series and the different indicators, the point-by-point lead periods for each of the leading indicators were found out. If any indicator has a positive impact on future return, point-by-point leads are estimated from the time gaps between peaks (troughs) in the reference series and immediately preceding peaks (troughs) in the indicator. In case of negative impact, the peaks (troughs) in the return series are compared to troughs (peaks) of indicators. According to finance theory, exchange rate (RsUSD), dividend yield, money growth, E/P ratio and spread (between E/P ratio and interest rate) are expected to have a positive impact on stock price return. Of course, note that if one is using Nominal/Real Effective Exchange Rate (NEER or REER) as proxy for exchange rate, then the expected signs for NEER and REER would be negative. On the other hand, inflation rate, change in interest rate (call money rate) are anticipated to be negative. As regards the sign of output growth there is divergent opinion in the literature. Though Qi and Madala (1999) have considered negative sign to explain excess return, the study by Brahmananda and et. al. (1992) in the Indian context found the sign to be positive. The positive sign of output is also supported by the model of Smets (1992) where dividend is proportionally related to the output and the expected dividend has a positive impact on real stock price return. In the present study, the positive sign of output growth is considered on the argument that the possibility of a recovery in real economic activity may kindle high expectation about the future growth of the economy and thereby create a favourable climate for investment in the stock market. (Brahmananda, et. al. 1992).

The lead period of an indicator is then estimated by the average of the point-by-point lead periods and the standard error (s.e.) by the standard deviations of these point-by-point leads.

---


3.1.1.1 Efficiency of the Indicators

The leading qualities of potential leading indicators can be assessed by the turning point analysis approach. The efficiency of a leading indicator depends on its success in indicating the turning points in the future path of the target series in advance. A good indicator should predict each of the turning points in advance and, moreover, shouldn’t give any false signal for a turning point. A measure suggested for the efficiency should be such that takes into account the true signals while it penalises for a false signal. Such a measure is proposed by Cabrero and Delrieu (1996).

This efficiency measure of an indicator is given
where $\text{?}_1$ = the measure of efficiency

$s$ = the Standard Deviation of all the leads of the indicator with respect to the reference

$T$ = Number of points in which the indicator leads the nearest turning point in the reference series.

$N$ = Number of turning points identified in the reference series

$H$ = Number of turning points identified in the indicator.

### 3.1.1.2 Improved Measure of Efficiency

As can be seen in equation (3), the present measure of the efficiency, $\text{?}_1$, is inversely proportional to the standard deviation of the lead period of an indicator. This measure takes care of the spread of the average lead period but fails to consider the spread relative to the value of the lead period itself. The leading quality of an indicator should worsen a bit if the standard deviation of its leads is higher than its average lead. For taking care of this fact, a modified measure of efficiency may be given by

$$\text{?}_1 \frac{\text{MT}}{\text{sNH}} \quad ........(4)$$

Where $M$ = average lead period for the indicator series under consideration.

### 3.1.1.3 Empirical Estimates of Efficiency Measures

In Table 2, the average and standard deviation of point-by-point leads as well as efficiency measures based on turning-point analysis (i.e. $\text{?}_1$ and $\text{?}_2$) of all potential indicators are presented. As could be seen from Table 2, the improved efficiency measure (i.e. $\text{?}_2$) indicates M3 to be a better indicator than M1. Between the two price indicators, CPIIW show greater efficiency. Between the spread indicators, SP2 shows a higher efficiency while the two Indices of industrial production have almost similar efficiencies. The rupee-dollar (RsUSD) exchange rate seems to be the most efficient exchange rate indicator. However, as discussed earlier, the turning point analysis considers only a few points in the time series, which may be misleading when the data period is very short. Hence, the observations may be further confirmed by the correlation analysis, which uses all the data points of the time series. The next section studies the leading properties using the correlation analysis. The selection of the indicators for inclusion in the construction of the composite index is finalised based on the correlation analysis.

**TABLE 2**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Average Lead</th>
<th>Standard</th>
<th>$H$</th>
<th>$T$</th>
<th>$\text{?}_1$</th>
<th>$\text{?}_2$</th>
</tr>
</thead>
</table>

Ivi
### Monetary Aggregates

<table>
<thead>
<tr>
<th>Period (M)</th>
<th>Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>3.2</td>
</tr>
<tr>
<td>M3</td>
<td>10</td>
</tr>
</tbody>
</table>

### Interest Rate

| Call       | 8.1       | 2.4 | 19 | 11 | 0.2413 | 1.9443 |

### Price Indices

| WPI       | 1.2       | 2.3 | 12 | 8  | 0.2108 | 0.2500 |
| CPI-IW    | 4.3       | 2.6 | 10 | 10 | 0.3517 | 1.5123 |

### Yield and V/P Ratio

| Yield      | 6.5       | 1.0 | 12 | 9  | 0.5900 | 3.8300 |
| E/P ratio  | 6.4       | 0.8 | 8  | 7  | 0.6960 | 4.4500 |

### Spread Between E/P Ratio and Interest Rate

| SP1       | 2         | 2.6 | 14 | 8  | 0.2078 | 0.5400 |
| SP2       | 6.7       | 0.8 | 16 | 11 | 0.2370 | 1.5879 |

### Exchange Rate

| RsUSD     | 6.3       | 1.7 | 12 | 11 | 0.5392 | 3.3970 |
| REER 36   | 11.1      | 2.9 | 7  | 6  | 0.1612 | 1.7893 |
| NEER36    | 7.7       | 4.9 | 7  | 7  | 0.1299 | 1.0003 |

### Industrial Production

| IIPGE     | 6.0       | 2.4 | 11 | 11 | 0.4167 | 2.5002 |
| IIPMF     | 6.1       | 2.5 | 11 | 11 | 0.4000 | 2.4000 |

#### 3.1.2 Selection of Important Leading Indicators - A Correlation Analysis

For any potential indicator (variable), say $X_t$, the correlation coefficients between $X_{t-k}$ and stock index return $R_t$ are estimated for $k = 1, 2, 3, ..., 12$. Let $p_k$ be the correlation coefficient for $k$. Obviously, the higher the magnitude of $p_k$ the better is the leading characteristics of a potential indicator. Thus, in this study the selection of a leading indicator and its lead is made by looking at the correlation of the highest magnitude. Of course, while doing so, variables or leads with correlations, which are wrong from a theoretical ground, are ignored. As stated earlier, money, output, exchange rate (RsUSD), yield and E/P ratio of the stock index portfolio, spread between E/P ratio and interest rate are expected to have a positive impact on stock index return. On the other hand, inflation and interest rate would have a negative impact. Based on these considerations and seeing the signs and magnitudes of estimated correlation for various leads associated with various variables,

### TABLE 3

**Correlations Between Leading Indicator & Target Series at Different Lead**

<table>
<thead>
<tr>
<th>Indicator Name</th>
<th>Lead of Indicator (in Months)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td></td>
<td>0.04</td>
<td>0.00</td>
<td>0.06</td>
<td>0.06</td>
<td>-0.07</td>
<td>-0.16</td>
<td>-0.13</td>
<td>-0.15</td>
<td>0.19</td>
<td>0.04</td>
<td>0.19</td>
<td>-0.09</td>
</tr>
</tbody>
</table>
important leading indicators and their lead period (in months) can be selected. The estimated correlation for leads of up to 12 months are presented in Table 3. These estimates are calculated by using monthly data covering the period from January 1993 to March 1999.

As can be seen, between the two alternative monetary aggregates, M3 has the maximum correlation (-0.23) magnitude for a lead period of eight months. However, the sign is not appropriate. The next highest correlation pertains to the nine months lead of both M1 (correlation 0.19) and M3 (correlation 0.17). Thus, as per expected sign, the choice for a monetary indicator may refer to nine months lead of M1 growth. However, on consideration of the twin facts that (i) M3 is the policy variable in India and (ii) the magnitudes of correlations associated with nine months lead of M1 and M3 are very close, in this study the growth of M3 is chosen to represent monetary indicator in the composite indicator. In the case of inflation indicator, the choice may be made out of growth in WPI and CPI_IW is associated with a lead of one month. However, as WPI is the official measure of inflation in India and has stronger relationship with return (as magnitude of correlation is higher), the natural choice for representing the indicator for inflation pressure is the WPI. The Yield and E/P ratio in BSE-100 have their highest correlation with appropriate signs for leads of seven and eight months respectively. As regards spread, however, the maximum correlation with desirable sign corresponds to 12 months lead of SP1, followed by six months lead of SP2 (with a correlation 0.15). As per the sign and magnitude of correlation coefficients spread variable could relate to SP1. However, it is seen that though the use of lead of 12 months of SP1 series produced good results, further improvement in forecast accuracy is obtained if the six months lead of SP2 variable is considered in place of SP1. On this consideration for the construction of the composite indicator, SP2 is used as a measure of spread variable. Based on the signs and magnitudes of correlation coefficients, IIPMF is preferred to IIPGE to lead return series by 11 months. As regards exchange rate, the growth in NEER36 has the maximum correlation (0.32) for the lead of one month followed by growth in REER36 (0.28) at the same lead but the signs of the correlations are not appropriate. Moreover, as the information on these variables are available with a lag of about 2-3 months, the usefulness of these leads for construction of the composite indicator is practically lost. The data on RsUSD, on the other hand, are disseminated substantially faster and the required correlation associated with its growth is also quite high (0.27) with the desired sign. Therefore, growth in RsUSD is chosen to represent exchange rate signal in the composite indicator. Based on the magnitude of correlation, IIPMF is considered to lead return series by 10 months. The selected leading indicators and their lead times considered for construction of the composite indicator are given in Table 4.
TABLE 4
Important Leading Indicators of Return and Their Lead Time
Considered for Construction of Composite Indicator

<table>
<thead>
<tr>
<th>Indicator Name</th>
<th>Transformation Used before Normalisation</th>
<th>Lead Period in Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3</td>
<td>First Difference in Log</td>
<td>9</td>
</tr>
<tr>
<td>CALL</td>
<td>First Difference</td>
<td>12</td>
</tr>
<tr>
<td>WPI</td>
<td>First Difference in Log</td>
<td>1</td>
</tr>
<tr>
<td>Yield</td>
<td>First Difference</td>
<td>7</td>
</tr>
<tr>
<td>E/P</td>
<td>First Difference in Log</td>
<td>8</td>
</tr>
<tr>
<td>SP2</td>
<td>First Difference</td>
<td>6</td>
</tr>
<tr>
<td>RsUSD</td>
<td>First Difference in Log</td>
<td>5</td>
</tr>
<tr>
<td>IIPMF</td>
<td>First Difference in Log</td>
<td>11</td>
</tr>
</tbody>
</table>

4. CONSTRUCTION OF COMPOSITE INDICATOR

In the earlier section, it was found that a number of series contained information about future return. Thus for assessing the prospects of future stock price return, one may keep a close watch on the behaviour of these indicators. This task involves processing of information on multiple indicators at every time point and to arrive at a consolidated view about future return. In practice, the task becomes complex when some indicators indicate a possible rise in return while others predict a fall leading to divergent scenarios and hence creating a conflict in making an overall assessment about future return. A readymade solution to the problem may be to consider the view indicated by a majority of these indicators. But this solution assigning equal importance/weights to all indicators, may not be a realistic one. A more reasonable and logical approach is to assign weights to each indicators as per their importance and take the weighted average of the signal generated from various indicators to form what is called a composite index or a composite leading indicator. For this purpose, the principal component analysis is widely used in the literature. In this paper, same methodology is used to combine individual indicators.

4.1 Principal Component Analysis

Through the principal component analysis, one essentially tries to simplify the multivariate (multiple indicator) data, without following any model set \textit{a priori}, in order to explain a major part of the information context of data with the smallest number of uncorrelated components (Cabrero and Delrius, 1996). Any principal component is actually a weighted sum of all indicators. If multivariate data pertain to \( k \) indicators (variables), \( k \) principle components are obtained satisfying two conditions, viz., (i) all components are uncorrelated to each other, and (ii) first principal component should explain greatest possible variation of the data set, the second the greatest possible variance among those components which are uncorrelated to the first, and so forth. Typically, the form of principal components based on indicators \( X_t(t) \)'s, \( 1 = 1, 2, \ldots, k \) is as below:

\[
P_j(t) = a_{j1} X_1(t) + a_{j2} X_2(t) + \ldots + a_{jp} X_p(t); j = 1, 2, \ldots, k.
\]

where \( P_j(t) \) is the \( j \)-th principal component and \( a_{j1}, \ldots, a_{jp} \) are the coefficient, known as factor loadings, of 1-th indicator in \( j \)-th principal component. In practice the first (or at least the first few) principal component(s) normally captures sufficient information to represent the multivariate data.

4.2 Principal Component-based Composite Indicator
Suppose \( k \) leading indicators are selected to form the composite index. Let \( j = 1, 2, ..., k; \) be the lead period of \( j^{th} \) indicator/series \( X_j(t) \), which is suitably transformed. Thus to assess the prospect of return at time point \( t \), one has to combine \( X_j(t-1) \), \( j = 1, 2, ..., k \) values. Therefore, the principal components (PCs) may be derived based on past information on \( X_j(t-1) \)'s. Of course, before estimating PCs, one may normalise each indicator values to a comparable scale, say within the interval \([0,1]\). This can simply be achieved by subtracting the minimum value first and then dividing the adjusted values by the range (i.e. difference between maximum and minimum values) of the series. Let \( P_j(t) \) be the \( j \)-th principal component satisfying the condition stated in the previous section. The composite index can be constructed by following two possible approaches; first by regressing target series on a few PCs and second, by regressing target series on summation of the first few PCs. In both the approaches, one needs to choose the first few PCs. The PCs can be chosen based on either of the two criteria. One is based on the cumulative contribution of chosen PCs to the total data variation where the number of PCs chosen is decided by some cut-off for the cumulative contribution. The other criteria is based on the out-of-sample forecast performance of the PCs. Obviously, the number of chosen PCs corresponds to the minimum out-of-sample forecast error. As the primary interest of the present study is forecasting of the targeted series, the second criterion was preferred for the selection of PCs. Based on this criterion, the first three PCs were chosen for further computation of the composite index. These three PCs altogether explain about 63 per cent of the total data variation. Accordingly, the forms of composite indices can be expressed as:

**Approach 1**: In this approach, the three PCs chosen as above are first added and the composite index, say \( CI_1(t) \), is calculated from the relationship

\[
CI_1(t) = \sum \left[ P_1(t) + P_2(t) + P_3(t) \right] \quad \text{(6)}
\]

where and are estimated from the following regression equation

\[
Y(t) = \sum \left[ P_1(t) + P_2(t) + P_3(t) \right] + e(t); \ e(t) \text{ being the residual series.}
\]

**Approach 2**: In this approach, the target series, \( Y(t) \) is regressed on the first three PCs chosen as above and the estimated value of \( Y(t) \) is treated as the composite index. Thus, the form of this composite index, denoted by \( CI_2(t) \), looks like

\[
CI_2(t) = \sum \left[ P_1(t) + P_2(t) + P_3(t) \right] \quad \text{..... (7)}
\]

Where \( 1, 2, 3 \) are estimated coefficients in the regression equation

\[
Y(t) = \sum \left[ P_1(t) + P_2(t) + P_3(t) \right] + e(t); \ e(t) \text{ being the residual series.}
\]

### 4.3 Estimation of Composite Indices

Before constructing composite indices, as stated above, the entire data set is divided into two subsets, viz., estimation set and validation set. The estimation set refers to the data which will be used to estimate PCs and hence coefficients in composite indices. This set covers the data from January 1993 to March 1998. The validation set will be used to assess the efficiency of composite indices in generating out-of-sample forecasts. This set covers data for the last 12 months (i.e. from April 1998 to March 1999).

### 5. Efficiency of Composite Indicators

In this section the performance of composite indices in predicting the target series as well as the stock price index, is assessed. If EMH is valid, the stock price would follow a Random Walk (RW) and no forecast would be better than RW forecast. But if forecasting for any systematic strategy beats RW forecasts, the validity of EMH is at stake. In this study, therefore, the forecast performance of composite indices are compared with that of RW hypothesis. The forecast comparison is done in the validation set of the data. For the purpose, initially
coefficients of different indicators in PCs and coefficients of PCs in composite indices are estimated based on the data from estimation set. One-step ahead forecasts of target series are then generated for time points in the validation set. Thus, to generate the forecast of return at time point \( t \), one can plug in the past values of all indicators (i.e. value of \( j \)-th indicator at time point \( t-1, j = 1, 2 \ldots \)) in the estimated relations in Equations (5) to (7) described in Section 4.

Now, varying the time point \( t \), from April 1998 to March 1999, the desired forecasts of target series in validation set are generated. The forecasts of BSE-100 index were obtained by using the relationship in Equation 1. Comparing the forecast with the actual, the performance of any forecasting technique can be assessed. It is common practice to employ Mean-Square-Error (MSE) or equivalently, Root-Mean-Square-Error (RMSE) as a measure of forecast performance. Lower values of these measures indicate better forecast performance. However, these measures are not appropriate if the underlying series contain trends in mean (Ray, 1988) as in such a case both MSE and RMSE are very likely to be a function of time. To eliminate the time effect, Mean-Square-Percentage-Error (MSPE) or equivalently Root-Mean-Square-Percentage-Error (RMSPE) are used. On these considerations, in the present study, the performance of various techniques are assessed in terms of (i) RMSE for return forecast and (ii) RMSPE for forecast of BSE-100 index. For detailed calculation of these measures, one may refer to Ray (1988) and Samanta (1999). The relevant results are presented in Table 5. From this table it is easy to see that CI1 performs better than RW hypothesis. However, a further improvement in forecast accuracy is achieved in the case of CI2.

### TABLE 5

<table>
<thead>
<tr>
<th>Forecasting from</th>
<th>RMSE for Return</th>
<th>RMSPE for Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI1</td>
<td>0.0595</td>
<td>6.0074</td>
</tr>
<tr>
<td>CI2</td>
<td>0.0604</td>
<td>6.0743</td>
</tr>
<tr>
<td>Random Walk</td>
<td>0.0731</td>
<td>7.4695</td>
</tr>
</tbody>
</table>

### 6. SUMMARY AND BROAD CONCLUSIONS

In this paper, an attempt has been made to constructing a composite indicator for forecasting the return on the BSE-100 index. The basic data are collected at monthly frequency covering the period from January 1993 to March 1999. The leading qualities in terms of lead period as well as strength in relationship of a number of potential indicators/variables are assessed and a few of them are chosen for further computation. Further, two methods for construction of the composite indicator are adopted by using the principal components of the chosen indicators (suitably adjusted for lead periods). The out-of-sample forecast from both these composite indicators found to be better than the random walk hypothesis. Thus it appears that the composite indicator approach is quite powerful for exploiting the pattern of stock market movement. The finding, however, is tentative and only says that it is possible to forecast the stock market return with better accuracy than the random walk model. This, however, is not enough to say whether profitable investment opportunities exist or not. Further, exploratory research and empirical evidence are needed to take a view on the issue. Moreover, future research in the topic may also concentrate on assessing the usefulness of the composite indicators for predicting stock market return in high frequency data.

### REFERENCE


**APPENDIX**

**HODRICK - PRESCOTT (HP) FILTER**

The HP filter essentially estimates the filtered series (say Y^* t) by solving the minimisation problem (Apel, 1995; Girono et. el. 1995; Srimani & Samanta, 1998; Samanta 1999)

\[ \text{Min} \alpha \sum_{t=1}^{n} \left( \ln Y_t - \ln Y_t^* \right)^2 + \left( \ln Y_{t-1} - \ln Y_{t-1}^* \right)^2 - \left( \ln Y_{t-1}^* \right)^2 \]

where 'Min' denotes minimisation over Y^* t, Y t is the actual series, Y^* t is filtered series, n is the number of data points of the time series, is a factor, sometimes known as smoothing parameter, that determine the degree of conformity between filtered and actual series. A small \( \alpha \) causes filtered series to follow actual series fairly closely. With a high value of \( \alpha \) on the other hand, the filtered series is relatively unsusceptible to short-run fluctuations in actual series. For estimating trend, the general practice is to select \( \alpha = 100 k^2 \), where k is data frequency in a year (i.e. for quarterly data k = 4, for monthly data k-12, and so on). As stated earlier, the basic requirement of using filtering technique in the present paper is not to extract the trend component of Y t. Rather, the requirement is to retain the basic pattern of the original series almost unchanged but to eliminate the erratic short-run fluctuation, so that false/minor peaks are removed and the selection of major peaks become unambiguous/easier. This surely points towards the selection of a sufficiently small value of the smoothing parameter. Through experimentation it was found that fixing \( \alpha = 6 \) produces quite satisfactory results for all the series (i.e. target as well as potential leading indicators), though there may be further scope for improvement.
Question 1

As a Finance Director of LP Products Ltd., you are investigating the possible acquisition of PT Ltd. You have gathered the following basic data for your decision making:

<table>
<thead>
<tr>
<th>Item</th>
<th>LP Products Ltd.</th>
<th>PT Ltd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings per share (Rs.)</td>
<td>5.00</td>
<td>1.50</td>
</tr>
<tr>
<td>Dividend per share (Rs.)</td>
<td>3.00</td>
<td>0.80</td>
</tr>
<tr>
<td>Number of shares</td>
<td>10,00,000</td>
<td>6,00,000</td>
</tr>
<tr>
<td>Market price per share (Rs.)</td>
<td>90.00</td>
<td>20.00</td>
</tr>
</tbody>
</table>

You have estimated that the investors currently expect a steady rate of growth of about 6% in LP Products Ltd’s earnings and dividends. Under new management, this growth rate would increase to 8% per year, without additional capital investment.

(i) What are the gains from the acquisition?

(ii) What is the cost of the acquisition if LP Products Ltd. pays Rs.25 in cash for each share of PT Ltd.?

(iii) What is the cost of the acquisition if one share of LP Products Ltd. is offered for every three shares of PT Ltd.?

Answer 1

(i) Acquisition of a company by another brings many gains for the acquiring company. These gains can be broadly identified as follows:

(a) Superior management talents can be attracted & thereby better and efficient running of the company can be ensured.

(b) Big-push can be given to research and development activities and new technologies may be acquired.

(c) The combined technological, managerial and financial resources enhance the competitive ability of the firm both locally and globally.

(d) Efficient use of available resources, better return to shareholders, consolidation of production activity etc. are possible.

(ii) The cost of the acquisition if LP Products Ltd. pays Rs.25/- in cash for each share of PT Ltd., is Rs.1,50,00,000. i.e. 6,00,000 x Rs.25.

(iii) The cost of acquisition if one share of LP Products Ltd., is offered for every three shares of PT Ltd., is: Rs. 1,80,00,000 i.e. 2,00,000 x Rs.90.

Question 2

Determine the cost of capital of Hindustan Paper Ltd. using the book value (BV) and market value (MV) weights from the following information:

<table>
<thead>
<tr>
<th>Sources</th>
<th>Book Value (Rs.)</th>
<th>Market Value (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity shares</td>
<td>1,20,00,000</td>
<td>2,00,00,000</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>30,00,000</td>
<td>—</td>
</tr>
<tr>
<td>Preference shares</td>
<td>9,00,000</td>
<td>10,40,000</td>
</tr>
<tr>
<td>Debentures</td>
<td>36,00,000</td>
<td>33,75,000</td>
</tr>
</tbody>
</table>

Additional information:

I. *Equity*: Equity shares are quoted at Rs.130 per share and a new issue priced at Rs.125 per share will be fully subscribed; flotation costs will be Rs. 5 per share.
II. **Dividend**: During the previous 5 years, dividends have steadily increased from Rs.10.60 to Rs.14.19 per share. Dividend at the end of the current year is expected to be Rs. 15 per share.

III. **Preference shares**: 15% Preference shares with face value of Rs.100 would realise Rs.105 per share.

IV. **Debentures**: The company proposes to issue 11-year 15% debentures but the yield on debentures of similar maturity and risk class is 16%; flotation cost is 2%.

V. **Tax**: Corporate tax rate is 35%. Ignore dividend tax.

**Answer 2**

\[
K_e = \frac{D_1}{P_0(1-f)+g} = \frac{10.6(1+r)^5}{1} = 14.19 \text{ (or Re 1 compounds to Rs. 1.338)}
\]

Table (compound) suggests that Re 1 compounds to Rs. 1.338 in 5 years at the compound rate of 6 per cent. Therefore, \( g \) is 6 per cent.

\[
K_e = \frac{(Rs. 15/Rs. 120)+0.06}{1} = 18.5 \text{ per cent}
\]

\[
K_f = \frac{(D_1/P_0)+g}{1} = \frac{15/125}{1} + 0.06 = 18 \text{ per cent}
\]

\[
K_p = \frac{D_1/P_0(1-f)}{1} = \frac{15/105}{1} = 14.3 \text{ per cent}
\]

\[
K_d = \frac{[I(1-t)+(RV-SV)/n]}{(RV+SV)/2} = \frac{[Rs. 15(0.65) + Rs. 100-91.75]}{11} \cdot \frac{(Rs.100 + Rs. 91.75)}{2}
\]

\[
= 11 \text{ per cent}
\]

*Since yield on similar type of debentures is 16 per cent, the company would be required to offer debentures at discount.

Market price of debentures = Coupon rate · Market rate of interest = Rs. 15/0.16 = Rs. 93.75.

Sale proceeds from debentures = Rs. 93.75 – Rs. 2, floatation cost = Rs. 91.75

Cost of capital [BV weights and MV weights] (amount in lakh of rupees)

<table>
<thead>
<tr>
<th>Source of capital</th>
<th>Weights</th>
<th>Specific Cost</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BV</td>
<td>MV</td>
<td>(BVxK)</td>
</tr>
<tr>
<td>Equity</td>
<td>120</td>
<td>160*</td>
<td>0.185</td>
</tr>
<tr>
<td>Retained Earnings</td>
<td>30</td>
<td>40*</td>
<td>0.18</td>
</tr>
<tr>
<td>Preference Shares</td>
<td>9</td>
<td>10.4</td>
<td>0.143</td>
</tr>
<tr>
<td>Debentures</td>
<td>36</td>
<td>33.75</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>195</td>
<td>244.15</td>
<td></td>
</tr>
</tbody>
</table>

*MV of equity has been apportioned in the ratio of BV of equity and retained earnings

\[
K_0(\text{BV weights}) = \frac{(Rs. 32.85/195)\times 100}{1} = 16.85 \text{ per cent}
\]

\[
K_0(\text{MV weights}) = \frac{(Rs. 42/244.15)\times 100}{1} = 17.20 \text{ per cent}.
\]

**Question 3**

You are analysing the dividend policy of Z Tools and Products Ltd., a manufacturer of electric tools and appliances. The following table summarises the dividend payout ratios, yields, and expected growth rates of other companies in the same business.

<table>
<thead>
<tr>
<th>Company</th>
<th>Dividend Payout</th>
<th>Dividend Yield</th>
<th>Expected Growth</th>
</tr>
</thead>
</table>

lxv
(i) Compare Z Tools and Products Ltd.'s dividend policy to those of its peers, using the average dividend payout ratios and yields.

**Answer 3**

<table>
<thead>
<tr>
<th>Company</th>
<th>Dividend Pay Out (% )</th>
<th>Dividend Yield (% )</th>
<th>Expected Growth (% )</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Tools &amp; Products</td>
<td>11</td>
<td>1.2</td>
<td>22</td>
</tr>
<tr>
<td>B Tools &amp; Products</td>
<td>37</td>
<td>2.8</td>
<td>23</td>
</tr>
<tr>
<td>C Tools &amp; Products</td>
<td>67</td>
<td>4.9</td>
<td>13.5</td>
</tr>
<tr>
<td>D Tools &amp; Products</td>
<td>15</td>
<td>1.5</td>
<td>16.5</td>
</tr>
<tr>
<td>E Tools &amp; Products</td>
<td>30</td>
<td>2.5</td>
<td>20.5</td>
</tr>
<tr>
<td>Z Tools &amp; Products</td>
<td>24</td>
<td>1.3</td>
<td>23.0</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>30.67</strong></td>
<td><strong>2.37</strong></td>
<td><strong>19.75</strong></td>
</tr>
</tbody>
</table>

The dividend policy of Z Tools & Products Ltd. As compared to others can be explained at follows:

a. The dividend pay out of Z Tools & Products Ltd., is 24% as against average payout of 30.67%. This shows conservative dividend policy.

b. The dividend yield of Z Tools & Products Ltd., is 1.3% against average level of 2.37%. This indicates that investment in this company is not very promising from current income point of view. Dte. market price is also higher.

c. Though the average growth expected by the industry works out to 19.75%, the expected growth in Z Tools & Products Ltd is higher at 23%. This points towards better dividend payout in future.

**Question 4**

You have recently joined Tambi-Yumbi Ltd. as a Company Secretary. Tambi-Yumbi Ltd. manufactures musical instruments. The products of the company are commonly sold under the brand name of ‘Sweet India’ in the international markets. Tambi-Yumbi Ltd. has total assets of Rs.200 lakh, EBIT of Rs.40 lakh, and preference dividend of Rs. 4 lakh. The company is taxed at a rate of 40%.

The management of the company is not certain about the optimal capital structure of Tambi-Yumbi Ltd. In an effort to determine the optimal capital structure, you have collected the following data on the cost of debt, the number of equity shares for various levels of indebtedness, and the overall required rate of return on investment:

<table>
<thead>
<tr>
<th>Capital Structure</th>
<th>Cost of Debt</th>
<th>Number of Equity Shares</th>
<th>Required Return</th>
</tr>
</thead>
</table>

Ixvi
Debt Ratio

<table>
<thead>
<tr>
<th>(%)</th>
<th>(%)</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>2,00,000</td>
</tr>
<tr>
<td>15</td>
<td>8</td>
<td>1,70,000</td>
</tr>
<tr>
<td>30</td>
<td>9</td>
<td>1,40,000</td>
</tr>
<tr>
<td>45</td>
<td>12</td>
<td>1,10,000</td>
</tr>
<tr>
<td>60</td>
<td>15</td>
<td>80,000</td>
</tr>
</tbody>
</table>

You are required to —

(i) calculate the EPS for each level of indebtedness;
(ii) calculate the price per share for each level of indebtedness; and
(iii) choose the optimal capital structure. Justify your choice.

Also prepare a report to show the impact of the calculated values on the wealth of the shareholders.

**Answer 4**

Levels of Indebtedness

<table>
<thead>
<tr>
<th></th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt Ratio (%)</td>
<td>0</td>
<td>15</td>
<td>30</td>
<td>45</td>
<td>60</td>
</tr>
<tr>
<td>Total Capital Employed (Rs.in lakhs)</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Debt Amount (Rs. in lakhs)</td>
<td>0</td>
<td>30</td>
<td>60</td>
<td>90</td>
<td>120</td>
</tr>
<tr>
<td>Cost of debt (%)</td>
<td>0</td>
<td>8</td>
<td>9</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Equity (Rs.in lakhs)</td>
<td>200</td>
<td>170</td>
<td>140</td>
<td>110</td>
<td>80</td>
</tr>
<tr>
<td>EBIT(Rs. in lakhs)</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Interest (Rs. in lakhs)</td>
<td>—</td>
<td>2.40</td>
<td>5.40</td>
<td>10.80</td>
<td>18.00</td>
</tr>
<tr>
<td>EBT (Rs.in lakhs)</td>
<td>40.00</td>
<td>37.60</td>
<td>34.60</td>
<td>29.20</td>
<td>22.00</td>
</tr>
<tr>
<td>Tax 40% (Rs. in lakhs)</td>
<td>16.00</td>
<td>15.04</td>
<td>13.84</td>
<td>11.60</td>
<td>8.80</td>
</tr>
<tr>
<td>EAT (Rs. in lakhs)</td>
<td>24.00</td>
<td>22.56</td>
<td>20.76</td>
<td>17.60</td>
<td>13.20</td>
</tr>
<tr>
<td>Preference Dividend</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Equity Earnings (Rs.in lakhs)</td>
<td>20.00</td>
<td>18.56</td>
<td>16.76</td>
<td>13.60</td>
<td>9.20</td>
</tr>
<tr>
<td>No. of equity shareholders</td>
<td>2,00,000</td>
<td>1,70,000</td>
<td>1,40,000</td>
<td>1,10,000</td>
<td>80,000</td>
</tr>
<tr>
<td>EPS</td>
<td>10.00</td>
<td>10.91</td>
<td>11.97</td>
<td>12.36</td>
<td>11.50</td>
</tr>
<tr>
<td>Cost of equity (Ke)%</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>Mkt.value of equity (Rs. in lakhs)</td>
<td>333.34</td>
<td>289.23</td>
<td>247.14</td>
<td>182.50</td>
<td>110.00</td>
</tr>
<tr>
<td>Price per share (Rs.)</td>
<td>166.67</td>
<td>170.13</td>
<td>176.53</td>
<td>165.90</td>
<td>137.50</td>
</tr>
<tr>
<td>Mkt.value of equity(Rs.in lakhs)</td>
<td>—</td>
<td>30.00</td>
<td>60.00</td>
<td>90.00</td>
<td>120.00</td>
</tr>
<tr>
<td>Total Mkt.Value(TMV) (Rs.in lakhs)</td>
<td>333.34</td>
<td>319.23</td>
<td>307.14</td>
<td>272.50</td>
<td>230.00</td>
</tr>
<tr>
<td>Overall cost of capital (Ko) [EBIT/TMV]</td>
<td>12.00</td>
<td>12.53</td>
<td>13.02</td>
<td>14.68</td>
<td>17.40</td>
</tr>
</tbody>
</table>

The optimal capital structure is the debt level with 15% debt ratio as at this level the Overall Cost of Capital is the lowest at 12.53%. At this level total market value is the maximum.

**Question 5**
The Swadeshi Rubber Industries Ltd. (SRIL) manufactures small rubber components for the local market. It is presently using 6 machines which were acquired 3 years ago at a cost of Rs. 18 lakh each. Each of the machines has a useful life of 8 years, with no salvage value. The policy of the firm is to depreciate all the machines in 5 years. Their production capacity is 37 lakh units while the annual demand is 30 lakh units. The SRIL has received an order from a leading automobile manufacturer from Japan for the supply of 20 lakh rubber bushes @ Rs.15 per unit. The existing machines can be sold @ Rs.12 lakh per machine. It is estimated that the removal cost of one machine would be Rs.50,000. In order to meet the increased demand, the SRIL can acquire 2 new machines at an estimated cost of Rs.100 lakh each which will have a combined production capacity of 52 lakh units.

The operating parameters of the existing machines are summarised below:

(i) Labour requirements (unskilled – 18; skilled – 18; supervisor – 3; and maintenance – 2), their respective monthly salaries are Rs.3,500, Rs.5,500, Rs.6,500 and Rs.5,000 with a 10% annual increase to provide for inflation.

(ii) Raw materials cost inclusive of wastage is 60% of revenues.

(iii) Maintenance cost for year 1-5 is Rs.22.5 lakh per year and for year 6-8 is Rs.67.5 lakh per year.

(iv) Operating expenses are Rs.52.10 lakh expected to increase annually by 5%.

(v) Insurance premium for year-1 is 2% of the original cost of the machine; afterwards reduced by 10% each year.

(vi) Sale price is Rs. 15 per unit.

The projected operating parameters with the replacement by the new machines are:

(i) Additional working capital is Rs. 45 lakh.

(ii) Savings in cost of utilities is Rs.2.5 lakh.

(iii) Maintenance cost: year 1-2 is Rs.7.5 lakh per year and year 3-5 is Rs.37.5 lakh per year.

(iv) Raw material cost is 55% of sales.

(v) Employee requirement (6 skilled) at monthly salary of Rs.7,000 and maintenance (1) at monthly salary of Rs. 6,500.

(vi) Laying-off cost of workers (unskilled 18, skilled 12, supervisors 3 and maintenance 1), Rs. 9,21,000.

(vii) Insurance premium is 2% of purchase cost of machine in the first year and reduced by 10% in each of the subsequent years.

(viii) Life of the machines is 5 years and salvage value is Rs. 10 lakh per machine.

As the finance manager of the SRIL, prepare a report for submission to the top management. What recommendation would you make? The company uses straight line method of depreciation and same is accepted for tax purposes. Corporate tax rate is 35% and cost of capital is 20%.

**Answer 5**

Financial analysis whether to replace the existing machines (using NPV method)

Incremental cash outflows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of two new machines (Rs. 100 lakh x2)</td>
<td>Rs. 2,00,00,000</td>
</tr>
<tr>
<td>Additional working capital</td>
<td>45,00,000</td>
</tr>
<tr>
<td>Less sale proceeds of existing machines (Rs.12 lakh x 6)</td>
<td>(72,00,000)</td>
</tr>
<tr>
<td>Add: removal cost of existing machines (Rs.50,000 x 6)</td>
<td>3,00,000</td>
</tr>
<tr>
<td>Tax on profit on sale of machines (working note 1)</td>
<td>9,03,000</td>
</tr>
<tr>
<td>Cost of laying off 34 workers</td>
<td></td>
</tr>
<tr>
<td>(Rs. 9,21,000- tax advantage at 0.35, i.e., to Rs. 3,22,350)</td>
<td>5,98,650</td>
</tr>
</tbody>
</table>
### Incremental CFAT and NPV (amount in lakh of rupees)

<table>
<thead>
<tr>
<th>Particulars</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td><strong>Add cost savings:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance (note 2)</td>
<td>15</td>
<td>15</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Cost of utilities</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Labour cost (note 3)</td>
<td>17.16</td>
<td>18.87</td>
<td>20.76</td>
<td>22.84</td>
<td>25.12</td>
</tr>
<tr>
<td><strong>Less incremental costs:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw material (note 4)</td>
<td>142.50</td>
<td>142.50</td>
<td>142.50</td>
<td>142.50</td>
<td>142.50</td>
</tr>
<tr>
<td>Depreciation (note 5)</td>
<td>14.40</td>
<td>14.40</td>
<td>36.00</td>
<td>36.00</td>
<td>36.00</td>
</tr>
<tr>
<td>Insurance (note 6)</td>
<td>2.43</td>
<td>2.18</td>
<td>1.96</td>
<td>1.77</td>
<td>1.59</td>
</tr>
<tr>
<td>Earnings before taxes</td>
<td>175.33</td>
<td>177.29</td>
<td>172.80</td>
<td>175.07</td>
<td>177.53</td>
</tr>
<tr>
<td>Less taxes (0.35)</td>
<td>61.37</td>
<td>62.05</td>
<td>60.48</td>
<td>61.27</td>
<td>62.14</td>
</tr>
<tr>
<td>Earnings after taxes</td>
<td>113.96</td>
<td>115.24</td>
<td>112.32</td>
<td>113.80</td>
<td>115.39</td>
</tr>
<tr>
<td>CFAT (EAT+Depreciation)</td>
<td>128.36</td>
<td>129.64</td>
<td>148.32</td>
<td>149.80</td>
<td>151.39</td>
</tr>
<tr>
<td>Salvage value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Release of working capital</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(x) PV factor at 0.20</td>
<td>0.833</td>
<td>0.694</td>
<td>0.579</td>
<td>0.482</td>
<td>0.402</td>
</tr>
<tr>
<td>PV</td>
<td>106.92</td>
<td>89.97</td>
<td>85.88</td>
<td>72.20</td>
<td>86.99</td>
</tr>
<tr>
<td>Total present value(t=1-5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less cash outflows</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPV</td>
<td>250.94</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Recommendation:** Since the NPV is positive, replacement of the existing machines is financially viable.

**Working notes**

1. **Tax on profit on sale of existing machines**
   - Sale proceeds of existing machines: Rs. 72,00,000
   - Less book value: Rs. 43,20,000
   - Profit (Gross): Rs. 28,80,000
   - Less removal cost (Rs. 50,000x6): Rs. 3,00,000
   - Profit (Net): Rs. 25,80,000
   - (x) Tax rate: x 0.35
   - Taxes payable on profit: Rs. 9,03,000

2. **Savings in maintenance costs (amount in lakh of rupees)**
<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old machine</td>
<td>22.50</td>
<td>22.50</td>
<td>67.50</td>
<td>67.50</td>
<td>67.50</td>
</tr>
</tbody>
</table>
New machine      7.50  7.50  37.50  37.50  37.50  
Cost savings     15.00  15.00  30.00  30.00  30.00  

3. Savings in labour cost
Existing labour cost:
Unskilled (18 x Rs. 3,500 x 12 months)    Rs.  7,56,000  
Skilled (18 x Rs. 5,000 x 12 months)         11,88,000  
Supervisor (3 x Rs. 6,500 x 12 months)            2,34,000  
Maintenance (2 x Rs. 5,000 x 12 months)   1,20,000 Rs.  22,98,000  

Proposed labour cost:
Skilled (6 x Rs. 7,000 x 12 months)                                             5,04,000  
Maintenance (1 x Rs. 6,500 x 12 months)                              78,000  5,82,000  

Cost savings                                                  17,16,000  
Savings in subsequent years will increase by 10 per cent.

4. Incremental cost of raw materials (Rs. In lakh)
Raw material required for old machine (30 lakh units x Rs. 15 per unit x 0.6) 270  
Raw material required for new machine (50 lakh units x Rs. 15 per unit x 0.55) 412.5  
Additional raw material cost                                          142.5  

5. Incremental depreciation (Rs. In lakh)

<table>
<thead>
<tr>
<th>Years</th>
<th>1-2</th>
<th>3-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depreciation (with new machine) (Rs.200 lakh-Rs. 20 lakh)/5 years</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>Less depreciation (with old machine) (Rs.108 lakh/5 years)</td>
<td>21.60</td>
<td>—</td>
</tr>
<tr>
<td>Incremental depreciation</td>
<td>14.40</td>
<td>36</td>
</tr>
</tbody>
</table>

6. Insurance (Rs. in lakh)

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>New machine</td>
<td>4.00</td>
<td>3.60</td>
<td>3.24</td>
<td>2.92</td>
<td>2.62</td>
</tr>
<tr>
<td>Old machine</td>
<td>1.57</td>
<td>1.42</td>
<td>1.28</td>
<td>1.15</td>
<td>1.03</td>
</tr>
<tr>
<td>Incremental insurance</td>
<td>2.43</td>
<td>2.18</td>
<td>1.96</td>
<td>1.77</td>
<td>1.59</td>
</tr>
</tbody>
</table>

Assumptions:
VI. SRIL is expected to have demand of 20 lakh units for the next 5 years.
VII. Tax advantage will accrue on retrenchment costs.

Question 6

You are given the following information about Shiam and Co. which is interested in acquiring a manual lathe machine. The machine may be acquired either on lease or outright purchase. You are required to advise the company to take a decision whether to buy or to acquire the machine on lease?

Annual revenue : Rs.7,000
Expected operating life of the machine : 4 Years
Tax rate : 50%
Increase in net working capital : NIL

For buying the machine :
Purchase price : Rs. 12,000
Machine’s life : 3 Years
Annual operating cost : Rs. 2,000

Straight line depreciation with 3-year recovery period.

To acquire the machine on lease:
Annual lease rent payable at the end of the year : Rs. 5,000
Duration of lease : 4 Years
Annual operating cost : Rs. 2,000
Required rate of return : 12%

PV factors at 12% are: 0.8929, 0.7972, 0.7118, 0.6355 for year 1, 2, 3 and 4 respectively. Further PV factors at 6% cost of capital are: 0.9434, 0.9246, 0.8890 and 0.8548 for the respective years.

Answer 6

We have to analyse the given data in following cash flow statements about buy decision and leasing decision and compare the NPV of cash flows after tax (CFAT) of both alternatives and take decision in the light of the above indicators.

### TABLE 1

<table>
<thead>
<tr>
<th>Year</th>
<th>CFBT</th>
<th>Depreciation</th>
<th>Taxable</th>
<th>Tax at 50%</th>
<th>Tax at 6%</th>
<th>CFAT</th>
<th>PV Factor</th>
<th>Discount</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-11280</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.000</td>
<td>-11280</td>
</tr>
<tr>
<td>1</td>
<td>5000</td>
<td>2000</td>
<td>3000</td>
<td>1500</td>
<td>-11280</td>
<td>0.8929</td>
<td>3125</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5000</td>
<td>4000</td>
<td>1000</td>
<td>500</td>
<td>3500</td>
<td>0.7972</td>
<td>3587</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>5000</td>
<td>4000</td>
<td>1000</td>
<td>500</td>
<td>4500</td>
<td>0.7118</td>
<td>3203</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>5000</td>
<td>2000</td>
<td>3000</td>
<td>1500</td>
<td>4500</td>
<td>0.6355</td>
<td>2860</td>
<td></td>
</tr>
</tbody>
</table>

NPV = +1495

Cash Flow Before Tax (CFBT) = Revenue – Operating costs.

Full year’s depreciation = Rs. 12,000 ÷ 3 Years = 4,000 which has been arbitrarily split in Col. 3.

Taxable income = CFBT – Depreciation
Tax = (Taxable Income) x (0.5)

CFAT = CFBT(-) Tax

Here, CFAT-NPV is positive favouring buying decision

**Lease alternative**: Looking at the problem from the lessee’s angle, lease should offer to lessee advantages more than available in purchasing the asset. Apparently lessee has the advantages but against the cost of sacrifice of some benefits. Let us see NPV of CFAT from leasing in the following Table.

### TABLE - II

NPV of CFAT from leasing alternative

<table>
<thead>
<tr>
<th>Year</th>
<th>Initial investment saved</th>
<th>Depreciation tax shield lost</th>
<th>Lease payment</th>
<th>Total cash using</th>
<th>PV factor</th>
<th>PV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fixed lease rental</td>
<td>Tax benefit on lease rental as allowed operating expenses</td>
<td>Net lease payment</td>
<td>Col.(3+6)</td>
<td>At 6% cost of capital (k)</td>
<td>Product of (Col. 7 &amp; 8)</td>
</tr>
<tr>
<td>0</td>
<td>+11280</td>
<td></td>
<td></td>
<td>(5000)</td>
<td>+11280</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>-1500</td>
<td>5000</td>
<td>2500</td>
<td>-2500</td>
<td>-4000</td>
<td>0.9434</td>
</tr>
<tr>
<td>2</td>
<td>-500</td>
<td>5000</td>
<td>2500</td>
<td>-2500</td>
<td>-3000</td>
<td>0.9246</td>
</tr>
<tr>
<td>3</td>
<td>-500</td>
<td>5000</td>
<td>2500</td>
<td>-2500</td>
<td>-3000</td>
<td>0.8890</td>
</tr>
<tr>
<td>4</td>
<td>-1500</td>
<td>5000</td>
<td>2500</td>
<td>-2500</td>
<td>-4000</td>
<td>0.8548</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

**NPV(-) 1354**

Cost of borrowing is calculated as \( K = (1-T) \) (Interest rate on borrowing) = (1-0.05) (0.12) = 0.06

Here, NPV of CFAT from lease is negative; The decisional indicator compels to take decision in favour of buying than leasing.

### PROBLEMS & SOLUTIONS

**Question 1(a)**
The Goodyear Belt Company is proposing to replace its old belt-making machinery with more modern equipment. The new equipment costs Rs.10 million and the company expects to sell its old equipment for Rs.1 million. The attraction of the new machinery is that it is expected to cut manufacturing costs from their current level of Rs.8 a belt to Rs.4. However, as the following table shows, there is some uncertainty both about future sales and about the performance of the new machinery:

<table>
<thead>
<tr>
<th>OPTIMISTIC</th>
<th>PESSIMISTIC</th>
<th>EXPECTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales, millions of belts</td>
<td>.4</td>
<td>.5</td>
</tr>
<tr>
<td>Manufacturing cost with new machinery, rupees per belt</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Economic life of new machinery, years</td>
<td>7</td>
<td>10</td>
</tr>
</tbody>
</table>

Conduct a sensitivity analysis of the replacement decision, assuming a discount rate of 12 percent. Goodyear Belt does not pay taxes.

Answer 1(a)

If Goodyear replaces now rather than in 1 year, several things happen:

(a) It incurs the equivalent annual cost of the Rs.10 million capital investment.
(b) It reduces manufacturing costs.
(c) It earns a return for 1 year on the Rs.1 million salvage value.

For example, for the “Expected” case, analyzing “Sales” we have (all rupees figures in millions):

(i) The economic life of the new machine is expected to be 10 years, and so the equivalent annual cost of the new machine is:
    \[
    \frac{10}{5.650} = 1.77
    \]

(ii) The return earned on the salvage value is:
    \[.5(4) = 2.00\]

(iii) The return earned on the salvage value is:
    \[.12 (1) = .12\]

Thus, the equivalent annual cost savings is:

\[2.00 - 1.77 + .12 = .35\]

Continuing the analysis for the other cases, we find:

<table>
<thead>
<tr>
<th>Equivalent Annual Cost Savings (Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pessimistic</td>
</tr>
<tr>
<td>Sales</td>
</tr>
<tr>
<td>Manufacturing Cost</td>
</tr>
<tr>
<td>Economic Life</td>
</tr>
</tbody>
</table>
Question 1(b)

Goodyear Belt could commission engineering tests to determine the actual improvement in manufacturing costs generated by the proposed new belt machines. The study would cost Rs.450,000. Would you advise the company to go ahead with the study?

Answer 1(b)

We know that—in terms of potential negative outcomes—manufacturing cost is the key variable. Goodyear should go ahead with the study, because the cost of the study is considerably less than the possible annual loss if the pessimistic manufacturing cost estimate is realized.

Question 2

Little Oil has outstanding 1 million shares with a total market value of Rs.20 million. The firm is expected to pay Rs.1 million of dividends next year, and thereafter the amount paid out is expected to grow by 5 percent a year in perpetuity. Thus the expected dividend is Rs.1.05 million in year 2, Rs.1.105 million in year 3, and so on. However, the company has heard that the value of a share depends on the flow of dividends, and therefore it announces that next year’s dividend will be increased to Rs.2 million and that the extra cash will be raised immediately by an issue of shares. After that, the total amount paid out each year will be previously forecasted, i.e., Rs.1.05 million in year 2 and increasing by 5 percent in each subsequent year:

(a) At what price will the new shares be issued in year 1?

(b) How many shares will the firm need to issue?

(c) What will be the expected dividend payments on these new shares, and what therefore will be paid out to the old shareholders after year 1?

(d) Show that the present value of the cash flows to current shareholders remains Rs.20 million.

Answer 2

(a) At \( t = 0 \) each share is worth Rs.20, and this value is based on the expected stream of dividends: Rs.1 at \( t = 1 \), and increasing by 5% every year thereafter. Thus, we can find the appropriate discount rate for this company:

\[
p_0 = \frac{D_1}{r - g}
\]

\[
20 = \frac{1}{(r - .05)}
\]

\[
r = .10, \text{ or } 10\%
\]

Beginning at \( t = 2 \), all shares in the company will enjoy a perpetual stream of growing dividends: Rs.1.05 million at \( t = 2 \), and increasing by 5% each year thereafter. Thus, the total value of the shares at \( t = 1 \) (after the \( t = 1 \) dividend is paid and after \( N \) new shares been issued) is given by:

\[
V_1 = \frac{1.05}{.10 - .05}
\]

\[
V_1 = Rs. 21 \text{ million}
\]

If \( P_1 \) is the price per share at \( t = 2 \), then:

\[
V_1 = P_1 (1,000,000 + N) \text{ and } P_1 N = 1,000,000
\]

Solving, we find that \( P_1 \) is Rs.20.

(b) With \( P_1 \) equal to Rs. 20, and Rs. 1,000,000 to raise, the firm will sell 50,000 new shares.
(c) The expected dividends paid out are Rs. 1,050,000 at $t = 2$, increasing by 5% thereafter; with 1,050,000 shares outstanding, dividends per share are Rs.1 at $t = 2$, increasing by 5% thereafter. Thus, total dividends paid to old shareholders after $t = 1$ are Rs.1,000,000 at $t = 2$, increasing by 5% thereafter.

(d) For the old shareholders:

$$\text{PV (t = 0)} = \frac{2,000,000}{.10} \cdot \frac{1,000,000}{(1.10 - .05)(1.10)}$$

$$\text{PV (t = 0)} = \text{Rs. 20 million}$$

**Question 3**

Two firms, U and L, are identical except for their capital structure. Both will earn Rs.150 in a boom and Rs.50 in a slump. There is a 50 percent chance of each event. U is entirely equity-financed, and therefore shareholders receive the entire income. Its shares are valued at Rs. 500. L has issued Rs. 400 of risk-free debt at an interest rate of 10 percent, and therefore Rs. 40 of L’s income is paid out as interest. There are no taxes or other market imperfections. Investors can borrow and lend at the risk-free rate of interest.

(a) What is the value of L’s stock?

(b) Suppose that you invest Rs. 20 in U’s stock. Is there an alternative investment in L that would give identical payoffs in boom and slump? What is the expected payoff from such a strategy?

(c) Now suppose that you invest Rs. 20 in L’s stock. Design an alternative strategy with identical payoffs.

(d) Now show that MM’s proposition II holds.

**Answer 3**

(a) Because the firms are identical except for financial structure, and there are no taxes or other market imperfections, the total value of these companies must be the same. Thus, L’s stock is worth Rs. 500 - Rs. 400, or Rs. 100.

(b) If you own Rs. 20 of U’s common stock, you own 4% of the outstanding shares and, thus, are entitled to .04 (Rs. 150), or Rs. 6, if there is a boom and .04 (Rs. 50), or Rs.2, if there is a slump. The equivalent investment is to purchase 4% of L’s outstanding stock, which will cost .04 (Rs.100), or Rs.4, and to invest Rs.16 in the risk-free rate. The total invested is the same (Rs.20); further, in a boom you are entitled to [.10 (Rs.16) + .04 (Rs.150 - Rs.40)], or Rs.6, and in a slump you are entitled to [.10 (Rs.16) + .04 (Rs.50 - Rs.40)], or Rs.2.

(c) If you own Rs. 20 of L’s common stock, you own 20% of the outstanding shares and, thus, are entitled to .20 (Rs. 150 - Rs. 40), or Rs. 22, if there is a boom and .20 (Rs.50 - Rs.40), or Rs.2, if there is a slump. The equivalent investment is to purchase 20% of U’s outstanding stock, which will cost .20 (Rs.500), or Rs.100, and to borrow Rs.80 at the risk-free rate. The total invested is the same
(Rs.20); further, in a boom you are entitled to \([- .10 \text{ (Rs.} 80) + .20 \text{ (Rs.} 150)\] , or Rs.22, and in a slump you are entitled to \([- .10 \text{ (Rs.} 80) + .20 \text{ (Rs.} 50)\] , or Rs.2.

(d) Proposition II may be stated as the following relationship:

\[ r_E \neq r_A \neq \frac{D}{E} (r_A - r_D) \]

For U, the expected return on assets is:

\[ \frac{.5(\text{Rs.} 50) + .5(\text{Rs.} 150)}{\text{Rs.} 500} \neq \frac{100}{500} \neq .20, \text{ or } 20\% \]

Thus, for both companies \( r_A \) is 20\%. For L, the expected return on equity is:

\[ \frac{.5(50 - 40) + .5(150 - 40)}{\text{Rs.} 100} \neq \frac{60}{100} \neq .60, \text{ or } 60\% \]

This is exactly what we calculate, using the Proposition II formula:

\[ r_E = .20 + 4 (.20 - .10) = .60, \text{ or } 60\% \]

**Question 4**

The price of Indiana Mining stock is Rs.100. During each of the next two six-month periods the price may either rise by 25 percent or fall by 20 percent (equivalent to a standard deviation of 31.5 percent a year). At month 6 the company will pay a dividend of Rs.20. The interest rate is 10 percent per six-month period. What is the value of a one-year American call option with an exercise price of Rs.80? Now recalculate the option value, assuming that the dividend is equal to 20 percent of the with-dividend stock price.

**Answer 4(a)** The future stock prices of Indiana Mining are:

With dividend

```
        100
         /    \\
        /
       80
       /\  \\
      /
  60  105
  /    /  \
/    /    \\
48 75 84 131.25
```

Ex-dividend
Let \( p \) equal the pseudo-probability the stock price will rise. In a risk-neutral world,

\[ p (.25 + (1 - p) (-.20) = .10 \]

\[ p = .67 \]

Now, calculate the call value at month 6, if it is held to expiration:
But if the share price rises during the first 6 months, it will be better to exercise call immediately (the payoff is $125 - 80 = Rs. 45$), rather than miss out on the dividend and have a call worth $Rs. 32.42$. Thus, the value of the Indiana Mining call is:

\[
\frac{.67 \times (125 - 80)}{1.1} = 27.41
\]

(b) The future stock prices of Indiana Mining are:

\[
\begin{array}{c}
\text{With dividend} \\
\phantom{100} 80 \quad 125 \\
\text{Ex-dividend} \\
\phantom{64} 51.2 \phantom{0} 80 \quad 125
\end{array}
\]

Let $p$ equal the pseudo-probability the stock price will rise. In a risk-neutral world,

\[
p \times (.25) + (1 - p) \times (-.20) = .10
\]

\[
p = .67
\]

Now calculate the call value at month 6, if it is held to expiration:

\[
\frac{.67(45)}{1.1} = 27.41
\]

But if the share price rises during the first 6 months, it will be better to exercise call immediately (the payoff is $125 - 80 = Rs. 45$), rather than miss out on the dividend and have a call worth $Rs. 27.41$. Thus, the value of the Indiana Mining call is:

\[
\frac{.67 \times 3 \times (125 - 80)}{1.1} = 27.41
\]

**Question 5**

(a) At present, a share is being sold at $Rs. 70$. After one holding period, its price may be $Rs. 140$ with probability 0.6 and $Rs. 35$ with probability 0.4. Assume that you are planning to buy a call European option on this share at a strike price of $Rs. 100$ for one holding period. If risk-free
interest is 10%, suggest what is maximum call option premium you can pay in this case. Why? Explain with reasons.

(b) You are given the following summary statistics about five investment portfolios:

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>Average Return</th>
<th>Standard Deviation</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>0.07</td>
<td>0.03</td>
<td>0.4</td>
</tr>
<tr>
<td>P2</td>
<td>0.10</td>
<td>0.08</td>
<td>1.0</td>
</tr>
<tr>
<td>P3</td>
<td>0.13</td>
<td>0.06</td>
<td>1.1</td>
</tr>
<tr>
<td>P4</td>
<td>0.15</td>
<td>0.13</td>
<td>1.2</td>
</tr>
<tr>
<td>P5</td>
<td>0.18</td>
<td>0.15</td>
<td>1.4</td>
</tr>
</tbody>
</table>

The risk-free rate of return is 6%. Which of the portfolios would perform (i) the best; and (ii) the worst according to Sharpe's measure of performance?

(c) Over the last 12 months, XX, a student of finance, has collected the following information about returns on equity of Smatha Steel Ltd. and BSE Sensex for your analysis and decision making:

<table>
<thead>
<tr>
<th>Month</th>
<th>Return on Smatha Steel Ltd. (%)</th>
<th>Return on BSE Sensex (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>February</td>
<td>09</td>
<td>07</td>
</tr>
<tr>
<td>March</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>April</td>
<td>-10</td>
<td>-05</td>
</tr>
<tr>
<td>May</td>
<td>05</td>
<td>08</td>
</tr>
<tr>
<td>June</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>July</td>
<td>50</td>
<td>34</td>
</tr>
<tr>
<td>August</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>September</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>October</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>November</td>
<td>05</td>
<td>15</td>
</tr>
<tr>
<td>December</td>
<td>-15</td>
<td>-18</td>
</tr>
</tbody>
</table>

You are required to calculate the following:

(i) The covariance and coefficient of correlation between return on the equity of Smatha Steel Limited and the BSE Sensex.

(ii) The beta coefficient for Smatha Steel Limited.

What is the total risk if YY, a bank employee, invests in the equity of Smatha Steel Limited? How much are the systematic and the unsystematic risks?

**Answer 5(a)**

Initial Investment = Rs. 70

Expected Price of share

\[
140(0.6) + 35 (0.4) = 84 + 14 = Rs. 98
\]

\[
\text{Expected Returns } \frac{98 - 70}{70} \times \frac{28}{70} \times 40\%
\]
Actual Returns

If price is Rs. 140
\[
\frac{140 - 70}{70} = 100\% \quad 0.6
\]

If price is Rs. 35
\[
\frac{35 - 70}{70} = -50\% \quad 0.7
\]

Standard deviation of return
\[
\sigma = \sqrt{(0.4)^2} = 0.4 \quad 0.735
\]

We are given the following information:

\[\begin{align*}
P_s &= Rs. 70 \\
P_e &= Rs. 100 \\
T &= 1 \\
R_t &= 0.10 \\
\end{align*}\]

\[
= 0.735 \text{ (free drive)}
\]

\[
P_c = P_s \left[N(d_1)\right] = [P_e]\left[\text{anti}1_0(-R_f)\right] \left[N(d_2)\right]
\]

\[
d_1 = \frac{\ln \left(\frac{P_s}{P_e}\right) + (R_f - 0.5\sigma^2)T}{\sigma \sqrt{T}}
\]

\[
d_2 = d_1 - \left(\frac{\sigma \sqrt{T}}{s}\right)
\]

\[
d_1 = \frac{\ln \left(\frac{70}{100}\right) + 0.10 - 0.5(0.735)^2}{0.735 \times 1}
\]

\[
= -0.155 \quad 1.541 \quad 1.386 \quad 1.885
\]

\[
\frac{0.735}{0.735} \quad \frac{1.386}{0.735} \quad 1.885
\]

\[
d_2 = 1.885 - (0.735) = 1.15
\]

\[
N(d_1) = (1 - 0.0297) = 0.9703
\]

\[
N(d_2) = (1 - 0.1251) = 0.8749
\]

\[
P_c = 70(0.9703) - 100 \left[\text{anti}1_0(-0.10)\right] (0.8749)
\]

\[
= 67.92 - 69.49 = -1.57
\]

\[\text{Ans. } 70(0.9703) \quad 100(0.7943)(0.8749)\]

Answer 5(b)

\[
\frac{R_p - R_f}{\sigma}
\]

Sharpe's index

Portfolio
P₁ : \[ \frac{0.07 - 0.06}{0.03} \cdot \frac{0.01}{0.03} = \frac{1}{3} \cdot 0.333 \]

P₂ : \[ \frac{0.10 - 0.06}{0.08} \cdot \frac{0.04}{0.08} = \frac{1}{2} \cdot 0.5 \]

P₃ : \[ \frac{0.13 - 0.06}{0.06} \cdot \frac{0.07}{0.06} = \frac{7}{6} \cdot 1.167 \]

P₄ : \[ \frac{0.15 - 0.06}{0.13} \cdot \frac{0.09}{0.13} = \frac{9}{13} \cdot 0.693 \]

P₅ : \[ \frac{0.18 - 0.06}{0.15} \cdot \frac{0.12}{0.15} = \frac{4}{5} \cdot 0.80 \]

(i) From the above we see that value of index is highest for P₃ so that portfolio P₃ perform best.

(ii) As the value of index in lowest for Portfolio P₁, the portfolio P₁ has performed worst.

Answer 5(c)(i)

<table>
<thead>
<tr>
<th>Month</th>
<th>Return on swatha steel (%)</th>
<th>Return on BSE sensex (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rₐ</td>
<td>(Rₐ-Rₐ)²</td>
</tr>
<tr>
<td>JAN</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td>FEB</td>
<td>09</td>
<td>-4</td>
</tr>
<tr>
<td>MAR</td>
<td>20</td>
<td>7</td>
</tr>
<tr>
<td>APR</td>
<td>-10</td>
<td>-23</td>
</tr>
<tr>
<td>MAY</td>
<td>05</td>
<td>-8</td>
</tr>
<tr>
<td>JUNE</td>
<td>12</td>
<td>-1</td>
</tr>
<tr>
<td>JULY</td>
<td>50</td>
<td>37</td>
</tr>
<tr>
<td>AUG</td>
<td>19</td>
<td>6</td>
</tr>
<tr>
<td>SEPT</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td>OCT</td>
<td>25</td>
<td>12</td>
</tr>
<tr>
<td>NOV</td>
<td>05</td>
<td>-8</td>
</tr>
<tr>
<td>DEC</td>
<td>-15</td>
<td>-28</td>
</tr>
</tbody>
</table>

\[ \text{covariance } \frac{1}{n} \cdot (Rₐ-Rₐ)(Rₘ-Rₘ) = \frac{3106}{12} = 258.83 \]

\[ s²_{Rₐ} \cdot \frac{1}{n} \cdot (Rₐ-Rₐ)^2 = \frac{2430}{12} = 202.5 \]
\[ s_A = 16.09 \]
\[ s_M = \frac{1}{n} \sum (R_M - R) \]
\[ = \frac{2271}{12} = 189.25 \]
\[ s_M = \sqrt{189.25} = 13.76 \]
\[ \text{Covariance} = \frac{202.5}{16.09 \times 13.76} = 221.40 \]
\[ \text{Correlation} = \frac{202.5}{16.09 \times 13.76} = 0.91 \]

**Note:** If the student uses \((n-1)\) rather than \(n\) for calculating covariance & variance etc. that may be considered also correct. The exact answer will undergo change accordingly.

**Answer 5(c)(ii)**

\[ \sigma_A^2 = \frac{\text{Covariance}}{\sigma_M^2} \]
\[ = \frac{202.5}{189.25} = 1.07 \]

**Total Risk** \[ \sigma_A^2 = 258.83 \]

**Systematic Risk** \[ \sigma_A^2 \text{ var } (R_M) = (1.07)^2 (189.25) \]
\[ = 216.68 \]

**Unsystematic Risk** \[ = \text{Total Risk} - \text{Systematic Risk} = 258.83 - 216.68 = 42.15 \]

**Question 6**

The performance parameters of three portfolios, J, K and L are given below, based upon their performance of the last five years:

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>Return (%)</th>
<th>Standard Deviation (%)</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>15</td>
<td>16</td>
<td>1.15</td>
</tr>
<tr>
<td>K</td>
<td>13</td>
<td>18</td>
<td>1.25</td>
</tr>
<tr>
<td>L</td>
<td>12</td>
<td>11</td>
<td>0.90</td>
</tr>
</tbody>
</table>

If the risk-free rate is 7%, rank the funds for their performance according to:

(i) Sharpe's index;

(ii) Treynor's index; and

(iii) Jensen's index.

**Answer 6**

According to Sharpe Index
Treynor’s Index is
\[ T^*_p = \frac{r_p - R}{B} \]

Jensen’s Index
Jensen’s Index is measured as alpha (or abnormal return) which is Actual Return – Return implied by Security Market Line
Market return (Rm) is not given; assume it is 15% i.e. 0.15

For Portfolio
\[ J: 0.15 - [0.07 + (0.15-0.07)1.15] = -0.012 \text{ First Rank} \]
For Portfolio
\[ K: 0.13 - [0.07 + (0.15-0.07)(1.25)] = -0.04 \text{ Third Rank} \]
For Portfolio
\[ L: 0.12 - [0.07 + (0.15-0.07)0.90)] = -0.022 \text{ Second Rank} \]

**Question 7**
From the monthly rates of return of last five years, the following regression statistics were generated using the market model and a broad equity index:

<table>
<thead>
<tr>
<th>Security</th>
<th>( b_i )</th>
<th>( \beta_i )</th>
<th>( r_{it} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-0.32</td>
<td>9.8</td>
<td>0.32</td>
</tr>
<tr>
<td>B</td>
<td>0.23</td>
<td>4.2</td>
<td>0.17</td>
</tr>
</tbody>
</table>
Historical coefficient of correlation between i and t is 1.

(i) Calculate an estimate of $\beta_i$ for each of the securities.

(ii) Do you think that the market model betas during next five years period will be the same, higher or lower? Why?

(iii) Assuming that the index used is the market portfolio, and the rate of return is 8%, calculate the expected rate of return on each of the securities.

(iv) Calculate the beta of a portfolio with equal proportion of investment in all the securities.

**Answer 7**

(i) Calculation of $\beta_i$ for each security

<table>
<thead>
<tr>
<th>Security</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>(9.8 2.9) 0.32 = 1.08</td>
</tr>
<tr>
<td>B</td>
<td>(4.2 2.9) 0.17 = 0.25</td>
</tr>
<tr>
<td>C</td>
<td>(7.5 2.9) 0.34 = 0.88</td>
</tr>
<tr>
<td>D</td>
<td>(3.5 2.9) 0.63 = 0.76</td>
</tr>
<tr>
<td>INDEX</td>
<td>(2.9 2.9) 1.00 = 1.00</td>
</tr>
</tbody>
</table>

(ii) Beta estimates smaller than 1.0 will probably increase towards 1.0. Beta estimates larger than 1.0 will probably decrease towards 1.0.

(iii) Security $E(R)$

<table>
<thead>
<tr>
<th>Security</th>
<th>$E(R)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>8+1.08(6) = 14.48</td>
</tr>
<tr>
<td>B</td>
<td>8+0.25(6) = 9.50</td>
</tr>
<tr>
<td>C</td>
<td>8+0.88(6) = 13.28</td>
</tr>
<tr>
<td>D</td>
<td>8+0.76(6) = 12.56</td>
</tr>
<tr>
<td>INDEX</td>
<td>8+1.00(6) = 14.00</td>
</tr>
</tbody>
</table>

(iv) $\beta_p = 0.25(1.08)+0.25(0.25)+0.25(0.88)+0.25(0.76) = 0.74$
THE CASE OF CLASSIC AUTO LTD.

Classic Auto Ltd. is an Indore based auto part manufacturing company. The company had been in this business for the last 30 years. Mr. Raj Kumar is the owner-director of the company. The company is operating at about 80% capacity utilization and making good profits. Telco and HM are two main customers of the company. Nearly 50% of the plant capacity is committed to these two customers. 30% capacity is utilized to manufacture parts for retailers.

During the last couple of years, many new automobile companies had made their entries into the Indian market. This had affected the sales of vehicles manufactured by its main customers and so the business of the company.

Classic Auto was forced to cut down the prices of the products to enable its customers to sell their automobiles at cheaper rates. Price cut had seriously affected the company profitability. To recover the ground, Classic Auto was thinking of entering into new market by utilizing its idling capacity.

Keeping the above in mind, the owner called a meeting of his managers. The entire scenario was discussed. The decision was taken that marketing department would go in search of new business. The department was asked to make a beginning with MUL, Delhi who had been interested in their range of products.

Soon marketing department was able to develop contacts with MUL, who was ready to listen to Classic Auto and discuss business in Delhi. The company took a team of experts to Delhi and gave a detailed presentation. MUL was interested in number of products and asked company to submit commercial offers at the earliest.

Team returned to Indore. A meeting was organized and the owner, Marketing Manager, Plant Manager and Design Engineer were present. Suddenly, the owner realized that Finance Manager should also be present. Finance Manager was called. Since, Finance Manager was not present in the earlier meetings; he was given full picture of the case.

The owner asked Finance Manager to work out details and prepare commercial offer in consultation with Marketing and Production Departments. Finance Manager immediately swung into action. In about two weeks time commercial offer was submitted to customer.

MUL found the offer attractive and immediately called for Classic Auto to hold further negotiations. The owner and Marketing Manager visited Delhi once again and held discussions with MUL. During discussion it emerged that MUL was ready to give the business provided company was ready to commit nearly 50% of its plant capacity for production of their products.

The proposal was either to be accepted in full or refused. The owner was not sure. It was difficult for him to give outright commitment. Business was lucrative and profitable but the owner wanted to see it in black and white. The owner pleaded for sometime which Maruti Udyog granted.

On return from Delhi the owner called another meeting of his Managers and apprised them of the details of his discussion with Maruti Udyog. He told members that he wanted business but without incurring extra cost on additional resources.

Financial Manager sprung an idea. He suggested that by dropping a few of the retailers, company might be able to commit 50% of its capacity for Maruti Udyog. Once of the Plant Managers suggested that why not we tried to boost the sales through retailers, thus increased profits without having to go for new business.

The plant Manager suggested that we might consider reducing the prices of products supplied to retailers by 10% and see the profitability. Price reduction was likely to boost the sales by 15 to 20% and we had spare capacity to match the demand.

Marketing Manager wanted to add to what Plant Manager had said. He said, “It is not easy to sell the product in open market unless it is backed by enough advertisement.” In his view, the advertisement cost could work out to Rs. 6 lac.
The owner was appreciative of the views expressed by the members. He was a visionary. He knew that tough days were ahead. He also knew that retailers in any case would not be able to take the company business to greater heights. Therefore, he asked his financial manager to prepare answer for the following:

TABLE 1
Statement of Account : CLASSIC AUTO LTD.

<table>
<thead>
<tr>
<th></th>
<th>TELCO</th>
<th>HM</th>
<th>RETAILERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity utilization</td>
<td>30%</td>
<td>20%</td>
<td>30%</td>
</tr>
<tr>
<td>Yearly sale (in lacs)</td>
<td>2500</td>
<td>2000</td>
<td>2200</td>
</tr>
<tr>
<td>Expenditure in % of sales</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Raw Material (variable)</td>
<td>60%</td>
<td>65%</td>
<td>70%</td>
</tr>
<tr>
<td>Labour (variable)</td>
<td>10%</td>
<td>12%</td>
<td>18%</td>
</tr>
<tr>
<td>Electricity (variable)</td>
<td>3%</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>Other overheads (variable)</td>
<td>7%</td>
<td>5%</td>
<td>3%</td>
</tr>
<tr>
<td>Fixed overheads</td>
<td></td>
<td></td>
<td>300 lacs</td>
</tr>
<tr>
<td>Next year sale</td>
<td></td>
<td></td>
<td>Expected to be the same</td>
</tr>
</tbody>
</table>

Projections of Sales to Maruti Udyog (yearly) :
(i) Sales 3800 lacs
(ii) Total variable expenses in % of sales 88%
(iii) Travelling expenses 15 lacs

Questions
(a) What is profitability based on statement of account (Table 1) of the company running at 80% capacity.
(b) Should the owner accept the proposal made by Maruti Udyog or refuse it?

Solution
The management issue covered in this case is Cost Volume Profit (CVP) analysis. CVP analysis is the most used financial technique for financial planning and control. The present case talks about how a company faced with the problem of declining profit is trying to find an alternative through CVP analysis.

Profitability calculations for various proposals made in the case are done as under:

1. Current Profitability :

<table>
<thead>
<tr>
<th></th>
<th>TELCO</th>
<th>HM</th>
<th>RETAILERS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales (A)</td>
<td>2500</td>
<td>2000</td>
<td>2200</td>
<td>6700</td>
</tr>
</tbody>
</table>
2. Profitability if 10% price is decreased for retailers:

Sales through retailers 2200 lacs
Effect of decrease in sales by 10% 2200 \times 0.9 = 1980.00 lacs
Effect of increase in capacity by 15% (A) 1980 \times 1.15 = 2277.00 lacs
Variable cost 93% (B) 2200 \times 0.93 = 2117.61 lacs
Contribution C = A – B 159.30 lacs
Contribution from TELCO (D) 500 lacs
Contribution from HM (E) 280 lacs
Total contribution F = C+D+E 939.39 lacs
Fixed Cost (G) 300 lacs
Expenditure towards advertisement (H) 6 lacs
Net Profit (F-G-H) 633.39 lacs

3. Profitability if Maruti Udyog’s proposal is accepted:

Sale projection of MUL (A) 3800 lacs
Expenses 88% (B) 3800 \times 0.88 = 3344 lacs
Contribution from MUL (C) 456 lacs
Contribution from TELCO (D) 500 lacs
Contribution from HM (E) 280 lacs
Total contribution F = C+D+E 1236 lacs
Fixed Cost (G) 300 lacs
Travelling expenses (H) 15 lacs
Net Profit (F-G-H) 921 lacs

Thus, if the proposal of Maruti Udyog is accepted, the company shall be generating extrac profit of Rs. 921 – 634= Rs. 267 lacs. Profit coming through concession made to retailers works out more or less the same as the existing profit; Rs. 633.39 lacs against Rs. 634 lacs. Therefore, the owner can take decision in favour of Maruti Udyog instead of giving it to retailers.

But this would create a situation where the parts are not available in the spares market, for which the company would have to then increase capacity. Therefore, the calculations would have to be reworked taking the project expansion into picture something that cannot be done in this case for the lack of sufficient information.

Source: Prof. Nitin Balwani, Associate Professor Finance & Strategic Management, All India Management Association, New Delhi.
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