GOVERNMENT SECURITIES MARKET IN INDIA: -

A STUDY IN THE CONTEXT OF

FINANCIAL LIBERALISATION

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M.Phil Programme in Applied Economics
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To My Parents

I hereby affirm that the work for the dissertation, titled *"Government securities market in India: A study in the Context of Financial Liberalisation,"* being submitted to the Jawaharlal Nehru University, New Delhi, as part of the requirements of the M Phil Pogramme in applied Economics, was carried out by myself. This has not formed part of any other programme and not submitted to any other institutions/university for the award of any degree or programme of study.
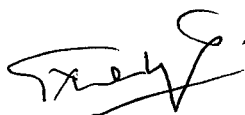
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Certified that this study is the bona fide work of *Ranjan Kumar Dash*, carried out under my supervision at the Centre for Development Studies. This dissertation may be forwarded for evaluation.

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The place and role of government securities market within the Indian financial system came into scrutiny in the 80's but more particularly in the discourse on financial sector reforms after 1991. The opening up the government securities market has wider implication not only for the internal structure and functioning of the gilt market, but also for the even development of other segments of the financial system. The development of government securities market must be understood in relation to the policies of monetary and public debt management. Yet there is hardly any systematic study presently available that views the development of the government securities market in this broader framework. The present study is an attempt to fill this gap in the literature and may be seen as a contribution the ongoing debate on the financial sector liberalisation in India.

In this backdrop, the study seeks to analyse the growth and structure of government securities market, yield curve analysis for government securities and interlinkages of government securities market with other segments of financial sector. The study mainly relies on published literature and secondary source of data. The relevant date is collected from, RBI, Monthly Bulletin, Annual report, Report on Currency and Finance, Handbook of statistics on Indian Economy. Simple statistical, graphical and time series tools are used.

Our study shows that Automatic monetisation, Low rate of interest on government securities, and financial repression were the major constraints for the development of government securities market in pre-reform period. Structure of the government securities market has changed in term of players, instruments, and type of trading in post-liberalisation period. Secondary segment of government securities market is very active in the reform period. But the investor's base has not change significantly. Structure of the market has changed significantly following the introduction of Primary Dealers and Satellite Dealers and various types of trading in primary and secondary market. Yield rates are sometimes expressed as a function residual term to maturity and this is known as the term structure of interest rates. The graphical representation of the function is called the yield curve. Yield curve is a multi-purpose tool with many applications. It can be used for monetary policy, debt management policy, measurement of market risk etc. In the Indian context, we found that yield curves are either upward slopping or flat. We also found that there are some humps in the yield curve supporting market segmentation theory. In Indian case short term yields are more volatile than long-term rates. Yield spreads is an increasing function of maturity. This implies that government can reduce average interest cost by shortening the maturity of marketable debt. In the pre-reform period the maturity structure of central government marketable debt was skewed in favour of long-term. But after liberalisatioin share of long-term debt has come down. Our study also indicates that government securities market is interlinked with credit, money, and forex market. But capital market remains isolated. We found that due to liberalisation of financial market and government secretaries market all the segments of financial sector getting integrated. 91-day Treasury bill is emerging as the reference rate in the Indian case. Now RBI can successfully affect the forex market, money market and credit market by conducting monetary policy through open market operation by using government securities and TBs.

In the reform period activity in the primary and secondary market increased considerably. Yield curve analyses for India shows that the liquidity conditions, monetary policy and fluctuation in the exchange rate influenced short-term yields. But long-term yields were influenced by market exceptions on real interest rates and economic fundamentals. Yields on government securities continuously declined since 1996-97 on annual basis. Our study also shows that many humps and slumps are in the yield curves. Its implication is that conduct of monetary policy through open market operations would be ineffective. The depth of the government securities market was reflected on the volume of trading not on the price of securities.

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Chapter I

INTRODUCTION

The critical role that financial system plays in promoting overall economic development is well documented in theoretical and empirical literature[1]. The place and role of government securities market within the Indian financial system came in for scrutiny in the 1980's but more particularly in the discourse on financial sector reforms after 1991[2]. The structure of financial market and government securities are presented in appendix 1. In the latter discourse the stress is on the progressive reduction in the pre-emption of bank funds by the government of India as means to improve the profitability of the commercial banking system. Consequently, such a move was expected to lead to the use of the market as a disciplinary device in restricting the size of fiscal deficit, because the government would then be forced to borrow at market rates.

However, the issue of opening up the government securities market as part of the larger programme of structural adjustment has wider implication not only for the internal structure and functioning of the gilt market but also for the even development of other segments of the financial system. Above all, the evolution of the gilt market must be understood in relation to the policies of monetary and public debt management. Yet there is hardly any study presently available that views the development of the government securities market in this broader framework. The present study is an attempt to fill this important gap in the literature and may be seen as a contribution to the ongoing debate on the process of financial sector liberalisation in India.

Although extensive, the financial system has functioned in an environment of financial repression, driven primarily by fiscal compulsion[3]. The overall outcome has been an inefficient and underdeveloped financial sector in India.

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[1] The role of the financial sector in promoting economic growth has been emphasised by several economists, prominent among them being Patrick (1966), McKinnon (1973, 76). Shaw (1973), Fry (1978), King and Levine (1993), Gregorio, Jose and Pabloc (1995) and Levine (2000)

[2] A vibrant government securities market is required for active internal debt management and effective conduct of monetary policy.

[3] The extent to which fiscal factors could influence the financial system depends on the existing fiscal position and the policy stance of government.

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Particularly since the early 1960s, monetary and internal debt management policy in India was undermined by excessive monetisation of the central government's fiscal deficit by the central bank. As a result, money and government securities market lost their vibrancy and ceased to provide the basis for the indirect conduct of monetary policy. The bank rate and open market operations lost their effectiveness as policy tools (Rangarajan, 1997).

The pitfalls and weaknesses of Indian financial system were recognised in the Report of the Committee to Review the Working of the Monetary System (Chakravarthy, 1985). Later, the Vaghul Working Group (1987) examined in detail the problems of Indian money market and recommended several remedial measures. In 1990-91, the Government of India set up a committee to review the financial system under the chairmanship of N. Narasimham. Financial sector reform started as part of structural adjustment programme in India from early 1990s on the basis of the recommendation of Narasimham committee.

Experience from the developed countries shows that, they have switched from direct instruments to indirect instruments for the conduct of monetary policy. The advantages of indirect instruments over direct instruments, in managing the macro economic variables, particularly, in the face of changing structure of financial sector, are being increasingly realised by these countries. These countries have developed government securities market, which is well integrated with the other components of the financial system. These countries are now relying on the government securities, which is best instruments for conducting monetary policy. (Dattels, 1995)

The globalisation and liberalisation followed since nineties paved way for radical change in the fundamental structure of country's financial system particularly the debt market in India. The Indian debt market is the third highest in Asia after Japan and South Korea.[4] The debt market in India consists of:

(a) Government Securities Market.

(b) Corporate Bond Market.

(c) PSU Bond Market.

(d) Financial Institution/ Bank Bonds.

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[4] The volume of total debt as per 1997 was Rs. 9, 20, 000 crores in India. This figure includes outstanding of government securities (central and state), outstanding of private and public sector and corporate debt. This reflects the large dimension of the existing bond market in India.

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Out of these four markets, government securities market is the largest and forms approximately 78 per cent of the total debt. Government securities in a broad sense include term securities of different maturities issued by the central and state governments. In India, these securities are referred to as "dated" securities. Again government securities market consists of two major components; primary or new issue market and secondary market where old securities are traded among the holders. They have an initial maturity in excess of one year, and interest is usually payable by coupon. The Reserve Bank of India determines the size, maturity, and coupon rates of these securities. Apart from government securities market, Treasury bill market has also became very active in the reform period. Treasury bills are short-term instruments to manage liquidity in the economy. They are short-term securities having the maturity period of less than one year. Since government securities market is the major constituent of the debt market, it is well recognised that for the overall development of debt market, we have to take cognisance of development in the government securities market.

1.1.2 Role of Government Securities Market

The government securities market, one of the major components of the financial sector in a modern economy, performs many important roles. From the viewpoint of the government, it is the principal source for raising funds from the public and from the investors' viewpoint; it is also an investment free from default risk. It is generally the most liquid form of debt instrument. It helps the investors to properly estimate the market risk of other securities. From the viewpoint of the central bank, the government securities market constitutes the main vehicle for open market operations by which the central bank can influence both the cost and volume of liquidity available in the financial system of a country. However, to perform this role as a medium of transmission of monetary policy stances, the government securities market should be sufficiently broad and deep in terms of number of players, instruments, volume and forms of trade. A developed government securities market plays a crucial role in guiding the other segments of the financial sector. Government securities market in the market economy plays the following roles:

a) It forms the benchmark for the entire financial system. Yields on government securities are considered as benchmark rate in the financial system.

b) It is an ideal indirect instrument for the conduct of monetary policy.

c) It influences the cost and availability of credit.

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d) It manages liquidity in the economy.

e) It helps to achieve the macro economic stability in the economy.

1.1.3 Review of Literature

The early studies on government securities market in India by Ray (1970), Rangarajan (1971), and Bhole (1978), concluded that government securities market truly reflects the mixed characteristics of Indian economy. They called it as captive market, because majority of the government marketable debt was held by Commercial banks and financial institutions such as, Insurance companies and provident funds. The investment policies of these financial institutions were regulated by statutory regulation imposed on them. They hold the government securities not because of attractiveness of these papers, but due to the statutory regulation. Coupon rates on government securities were well below the market rate of interest, in order to keep down the borrowing cost of government. Secondary transaction in government securities was negligible, this is mainly because of low coupon rate on government papers. Since there was hardly any secondary transaction in government papers, liquidity of these papers was ensured by Reserve Bank's repurchase of securities not by market as such.

Porter (1965) pointed out that government securities markets in underdeveloped countries (UDCs) are extremely narrow. The observed narrowness of the market in UDCs is largely due to the policies of the government. He also found that three major characteristics of broad government securities market such as, large number of buyers and sellers, position-takers and wide spectrum of owners and ownership are absent in the underdeveloped countries.

Bhole (1978) pointed out that "open market operations" in India was not used for the purpose of monetary policy, because of narrowness of government securities market. If open market operation could be done on a large scale, it might affect the price of the government securities. Later, the Chakravarthy committee (1985) concluded that, the captive market for government securities market and the relatively low returns to banks on their holding of government securities affected the growth of the capital market. Among other things, it suggested was to sell the government securities at market rate and bring down the average maturity of securities. Rangarajan (1997) found that, the average maturity of securities was fairly long - above 20 years - reflecting more the preference of the issuers than those of the investors. The

combination of a tightly - controlled interest rate structure and statutory requirements to hold these securities along with the skewed nature of maturity structure of the government securities in favour of longer term actually robbed the secondary market of any vibrancy.

Reddy (1997) pointed out that for the effective conduct of monetary policy through indirect instruments, integrated financial system with developed government securities market is a necessary condition. Nag and Ghose (2000) also supported the findings of earlier studies on government securities in India. According to them, in the pre-reform period coupon rate on government securities were artificially kept low. The objectives of the RBI were to reduce the cost of public borrowing. Captive investors were the major investors in government papers. Because of these two features, there was very little activity in the secondary market. In fact, due to the above reason, RBI had little leverage in using indirect instrument of monetary policy such as open market operations and the bank rate.

Along with the primary market, secondary market in government securities is also very important. Secondary market performs two basic functions: - first, it distributes debt to private investor. Second, the secondary market facilitates the resale of govt securities when these investors decide to alter their government securities portfolio. If there is information asymmetry between secondary and primary dealers in the secondary market, bid-ask spread in secondary market centre will be larger than primary market centre. (Steven, 1990)

An auction is simply an allocative mechanism. Since auctions can play a valuable role in the price discovery process, they are most useful in situations where the items being auctioned do not have fixed or determinable market values or where the seller is uncertain about the market price (Feldman and Mehra, 1993). Vickery (1961) distinguishes four types of auctions: (a) English auction, (b) Dutch auction, (c) first price auction, and (d) Second price auction. Under specific assumptions, the theory demonstrates that all four basic types of auctions will yield the same expected price and revenue to the seller (Chari and Weber, 1992).

The term structure literature is useful in judging the effect of debt management on interest costs, but the choice of a debt management policy involves some broader issues. From the beginning it is important to keep in mind that there are circumstances under which debt management policy does not matter at all. If we assume the analogy between government and corporation, then Modigliani-Miller theorem apparently supports this idea. According to this theory "a firm's

investment policy determines its value regardless of its financial policy". The Modigliani-Miller theorem breaks down if firm's financial policy affects cash flow in some states.

The analogous irrelevance theorem for the government says that debt management policy has no real effect, given spending policy, if markets are complete and the government can levy non-distortionary taxes. (Sill, 1994), (Barrow, 1979) and (Bohn, 1988 and 1990) pointed out that" debt should be used to equate the marginal welfare cost of distortionary taxation across states." In this type of model, one can think of government optimal debt management policy as minimizing average risk-adjusted interest costs. The evidence from the term structure literature is a necessary input to this process.

The term structure literature, however, takes the historical behaviour of interest rate as given and does not ask how debt management policy might affect interest rates. Agell, Persson and Friedman (1992) argued that "shifts in relative supplies of short- and long-term bonds have large effect on their yields and expected returns". Missale and Balchand (1994) emphasised that "debt management policy can change nominal interest rate by changing the expectations of investors regarding inflation". Government with long-term nominal debt have incentive to inflate to erode the real value of their obligation. Understanding this, investors may expect higher inflation when debt is long-term and nominal than it is short-term or indexed. But this argument is based on the situation where a single authority sets both fiscal and monetary policy. Campbell (1995) argued that "when the yield curve is steep the government can reduce its average interest costs if it shorten debt maturity."

The shape of the yield curve reflects the relationship among yields of securities that differ only with respect to their term to maturity. The general perception is that the curve will be upward moving up to a point when it gets to flatten. There are at least three competing theories that attempt to explain the term structure of interest rates, viz., the expectations, liquidity preference and preferred habitat theories. According to expectations theory, the shape of the curve can be explained by the expectations of investors about future interest rates. If short-term rates are expected to be relatively low in the future, then the long rates will be below the short rate. Similarly, long rates will exceed the current short rate if there is an expectation that rates would be higher in the future. [Hicks (1939), Lutz (1940), and Malkiel (1966)]

Keynes' liquidity preference theory as advanced by Hicks (1939) accepts the fact that expectations influence the shape of the curve. Nevertheless, short-term issues, particularly in a world of uncertainty, would be more desirable to most investors because of their liquidity property than the long-term issues. If no premium exists for holding long-term securities, investors would prefer to hold short-term securities in order to minimise the possible variations in the nominal value of their portfolio.

Critics of the expectations theory, point out that liquidity preference cannot be the main consideration for all classes of investors. In their view, insurance companies, pension funds and even retired persons will prefer the long-term rather than short-term securities to avoid the possible fluctuations in interest rate. On the other hand, commercial bank or corporate investors may prefer liquidity and therefore short-term securities. Investors thus have preferred habitats and the markets are likely to be segmented, with yields being determined by the forces of demand and supply in each market. [Culberston (1957), Modigliani and Sutch (1966)]

Bernake (1990), Estrella and Hardouvelis (1991), Plosser and Rouwenhorst (1994) and Zulu Hu (1993) concluded that "domestic term spreads are useful in predicting real growth of advanced economies". Estrella and Mishkin (1995) provided further evidence that "term spreads can predict recessions in the US as much as eight quarters in advance. They concluded that term spread would dominate many other indicators as predictors of real growth". Bernard and Gerlach (1996) undertook a rigorous study for predicting recession in as many as eight countries such as Belgium, Canada, France, Germany, Japan, Netherlands, the UK and the US. They found that "movements in term spread are procyclical in nature".

Yield curve is a multi-purpose tool with many applications. It can be use for monetary policy, measurement of market risk and debt management [Campbell (1995) and Nag and Ghose (2000)]. Bhoi and Dhal (1998) evaluating the extent of Integration of India's financial market found that "there exists fair degree of convergence of interest rates among the short-term markets - money, credit, and gilt markets - the capital market exhibits fairly isolated behaviour. The 91-day Treasury bill rate has the potential to emerge as reference rate in Indian context".

Development of government securities market in India can be divided into three major periods: Pre-independence period (1916-1950), pre-liberalisation period (1950-91) and post liberalisation period (1991-onwards). The government securities market had a wide base in

the pre-independence period, with active secondary trading. (Ranagarajan, 1997) The treasury bills market was relatively free up to the early 1960's. Its development thereafter was retarded by the trends in deficit finance. The bulk of the Treasury bill issue was ad hoc 91-day treasury bills, first introduced in the 1950s. (Rangarajan, 1993)

From the above survey of studies on government securities in India, we found that, government securities market could not grow because of the policy of the authority. Government securities market was used only for mobilising resources, but not for monetary purpose. As a result other segments of the financial sector could not develop. Secondary transaction in government securities was very negligible. Marketability of these securities was ensured by Reserve Bank's activity as the last resort of lending.

A major objective of the financial liberalisation is that to make the financial sector into an integrated one so that, RBI could use indirect instrument for monetary policy. Another important objective is that to develop broad, deep and transparent and efficient government Securities market in India. The present study mainly focuses on the development of government securities market in India.

1.1.4 Objectives of the Study

1. To analyses the growth and structure of government securities market in pre and post liberalisation periods.
2. To analyses the Yield of government securities and its usefulness for debt management.
3. To find out the interlinkages of government securities market with other segments of financial sector.

1.1.5 Data Sources and Methodology

The study mainly relies on published literature and secondary sources of data. The relevant data were collected from various issues of RBI, Report on Currency and Finance, Annual Report, Monthly Bulletin, Statistical Table relating to Banks, Handbook of Statistics on Indian economy, CMIE, Monthly review of Indian economy, Economic survey of India. According to our objectives we have collected Annual, and Monthly data from the above source. Data also collected from various issues of 'India in', India, Report of the Controller of the Currency, and India Budget. Simple Statistical, Graphical and Time series techniques are used.

1.1.6 Chapter Scheme

After this introductory chapter, Chapter II analysed the size and structure of government securities market before 1991. Chapter III mainly focused on the development of government securities market under liberalisation.

Chapter IV and V focused on the role of government securities market in macro economic management. Fourth chapter discussed the usefulness of yield curve in modern economy. In chapter V we have analysed the internal debt management policy of government in pre and post liberalisation period. In chapter VI we tried to find out interlinkages of government securities market with other segments of financial markets. Chapter VII gives the summary and findings of the study.

FIGURE 1.1   FINANCIAL MARKET STRUCTURE

Money Market

Call Money Market
Certificate Of Deposit
Treasury Bills
Repos
Commercial Bills
Commercial Papers
Inter-Corporate Funds

Foreign Exchange Market

Customers
Authorised Dealers
The Reserve Bank

Debt Market

Government Securities market
Private Corporate Debt
PSU Bonds
DFIs Bonds

Insurance Market

Life Insurance (LIC)
Non-Life Insurance

Capital Market

New Issue Market
Secondary Market

Derivatives Market

OTC Contracts
Forward Contracts

Credit Market

Unorganised

Organised Market

Banks   Non Banking Financial Institution

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FIGURE 1·2   GOVERNMENT SECURITIES MARKET

State Government Securities   Central Government Securities

Primary Market   Major Instruments   Secondary Market

Zero-Coupon Bonds
Capital-Indexed Bonds
Floating Rate Bonds
Partly Paid Bonds

Major Payers   Major Players

Insurance Companies
Commercial Banks
Primary Dealers
Reserve Bank Of India
Others

Clearing System ◄——

Commercial Banks
Co-operative Banks
Primary Dealers
Satellite Dealers
Corporate Entities
Provident Funds
Insurance Companies
Others

Auction System
Tap Issues

Delivery Vs Payment System

Trading Systems

National Exchange of Automated Trading
Over The Counter

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Chapter II

SIZE AND STRUCTURE OF GOVERNMENT SECURITIES MARKET BEFORE 1991

Introduction

The role of an integrated financial system in stimulating and sustaining economic growth is well recognised. A network of financial institutions helps an economy to augment its saving, investment and allocational efficiency. Before 1991, the financial system in India has functioned in an environment of financial repression. The financial system was directed to provide significant credit support for government expenditure and also to preferred economic sectors such as small-scale industry, agriculture and the weaker sections of the society. Monetary and internal debt management policy in India was undermined by excessive monetisation of the Central government's fiscal deficit. Most of the financial markets were characterised by controls over the pricing of financial asset, restriction on the flows or transaction, barriers to entry, low liquidity and high transaction costs.

The financial institutions are considered, as an integral part of the infrastructure required for the development of an economy. The mixed pattern of Indian economy where government has come to play a dominant role had influenced the structure of the capital market. Direct participation of State in investment activity and State ownership of major financial institutions had shaped the structure of the government securities market. Because of these two factors, the government securities markets become a major part of capital market and the secondary market could not get its depth. The government securities market was constrained by the system of automatic monetisation and by relatively low coupon rate offered on government securities. Because of the above two reasons, it had adverse effect on the growth and structure of the government securities market.

An overview of the size and structure of the government securities market before 1991, is presented in this chapter. It is structured as follows: section 2.1 deals with the volume and size of internal and marketable debt. Section 2.2 analyses the ownership pattern of marketable debt. Section 2.3 deals with interest rates on government securities. Section 2.4 discusses market structure. Finally, section 2.5 gives summary and conclusions.

Volume and Size of the Internal[1] and Marketable Debt

2.1.1 Volume of Internal Debt.

The internal debt of the Central government rose from Rs. 20 billion in 1950-51 to Rs. 39 billion in 1960-61 and further to Rs. 1539 billion by the end of 1990-91.

Table 2.1.1 Volume of Internal Debt (Rs. in crores)

Year	Total Internal Debt	Central Government (%)	State Government (%)	% to GDP
1950-51	2187	97.25	2.75	23.35
1955-56	2772	90.18	9.82	27.00
1958-59	4239	90.68	9.32	30.20
1959-60	4756	89.71	10.39	32.15
1965-66	6593	82.13	17.87	25.21
1969-70	8608	82.08	17.92	21.31
1975-76	21,613	82.60	13.40	27.43
1979-80	31,330	89.08	10.92	27.39
1980-81	35,307	89.08	10.20	26.00
1985-86	79,078	89.60	10.40	30.15
1988-89	1,27,711	89.20	10.80	32.26
1989-90	1,49,287	88.50	11.50	32.67
1990-91	1,73,215	88.90	11.10	32.34

Source: "Economic Survey 1999-00, RBI, Report on Currency and Finance", Various Issues.

During the same period internal debt of the State government increased from Rs. 0.6 billion to Rs. 6 billion and further to Rs 21 billion dollar. Total internal debt increased from Rs. 21 billion to Rs. 47 billion by the year end 1959-60 and further increased to Rs. 353 billion by 1980-81. BY the end of 1990-91 it reached Rs. 1732 billion. The major share of total internal debt belongs to Central government. Throughout this period (1951-1991) The Central government's

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[1] Internal debt consists of marketable debt of Central and State government and other liabilities of Central and State government.

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share remained more than 80 per cent. The share of Central government was the highest (97 per cent) in 1950-51 and least (82.08) in 1969-70. In comparison to Central government, the share of State governments was very low. As a percentage of GDP, internal debt varied between 23 per cent to 33 per cent. It was 23.35 per cent in 1950-51, which increased to 32.15 per cent by 1959-60. But then it started falling and reached a minimum of 21.31 per cent in 1969-70. By the close of the year 1990-91 it was 32.34 per cent. (Table 2.1.1)

The annual compound growth of the internal debt was 11.3% from 1951-91. The growth of internal debt may be mainly contributed by the growth of the government marketable rupee loans. The growth of the Central government internal debt in the pre-liberalised era was 11.1% whereas that of the State governments was 14.8 per cent during the same period.

2.1.2 Volume of Marketable[2] Debt

Total marketable debt consists of outstanding of treasury bills, dated securities of Central and State government. Total marketable debt was Rs. 19.58 billion in 1950-51 and increased to Rs. 71.53 billion by March-end 1969-70. It stood at Rs. 260.97 billion in 1979-80. It further increased to Rs. 943 billion by 1990-91. The major component of marketable debt is Central government's marketable debt. It comprised more than 80 per cent of total marketable debt. The Central government's marketable debt was highest (93 per cent) in 1950-51 and least (83 per cent) in 1970-71. The marketable debt of Central government can be divided into treasury bills and dated securities. Dated securities were the major part of marketable debt of Central government. The share of Treasury Bills with maturity of 91 days[3] in marketable debt of the Central government fluctuated from year to year and ranged between 34.2 per cent and 47.9 per cent during the period 1970-71 - 1983-85. In the subsequent period its share varied between 35 per cent to 9 per cent. There was no constant trend in the ratio of marketable debt to internal debt. The marketable debt as the % of total internal debt was 89.5 per cent by 1950-51 and got reduced to 84.7 per cent in 1959-60. It marginally increased to 85.2 in 1985-86. But after 1985-86 it was continuously falling and stood at 54.1 per cent in the end of 1990-91. (Table 2.1.2)

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[2] Marketable debt is that part of internal debt which government borrows from the market.
[3] Only 91 days treasury bill was available for trading before 1989.

Table 2.1.2 Volume of Marketable Debt

Year	Total Debt (Rs in crores)	Central Government (%)	Dated Securities (%)	Treasury Bills (%)	Marketable Debt to Internal Debt	% to GDP
1950-51	1,958	93.0	81.0	19.0	89.5	20.9
1954-55	2,135	91.0	78.0	22.0	77.0	21.1
1959-60	3,876	88.6	66.6	33.0	84.7	26.2
1964-65	5,767	88.1	75.0	25.0	87.4	23.2
1969-70	7,153	81.0	68.8	31.2	83.0	17.7
1970-71	8,291	84.0	69.3	30.7	78.3	19.2
1975-76	15,044	86.0	61.4	38.6	69.4	19.1
1979-80	26,097	89.0	61.0	39.0	83.2	22.8
1983-84	47,612	90.0	67.3	32.6	83.7	22.9
1985-86	67,426	86.0	61.5	38.5	85.2	25.7
1988-89	80,103	82.2	83.0	17.0	62.7	20.2
1989-90	1,01,542	87.2	74.4	25.6	68.0	22.2
1990-91	94,310	84.5	91.0	9.0	54.4	17.6

Source: Report on Currency and Finance, Various issues.

As the marketable debt issued by the Central government has gone up markedly since 1970-71, the relative share of the State governments in marketable debt outstanding which was 16 per cent in march 1971 declined to 10 per cent in march 1984 and in later period (1985-1991) it varied between 18 per cent and 14 per cent. Total marketable debt as percentage of GDP ranged between 17.6 and 26.2 percentages between 1950-51 and 1990-91.

2.1.3 Growth of Marketable Debt

From the figure-1, 2 and 3 we can see the trend of the outstanding total government securities, Central and State governments securities. All the three show increasing trends (see appendix 2.1).

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Table 2.1.3 Annual Compound Growth of Outstanding Marketable Debt

Period	Compound growth Central government Marketable debt	Compound growth State government Marketable debt	Compound growth Total marketable debt
1951-60	6.4	14.2	6.9
1961-70	7.2	7.9	7.4
1971-80	12.5	8.7	12.2
1981-91	10.2	15.7	11.5
1951-91	9.7	12.6	10.4

Note: These Figures are Compound Growth Rates.

The compound growth of the government securities is not uniform in different periods. Growth of the outstanding of government securities during 1950-60 was only 6.9 per cent. During the same period growth of the outstanding of Central and State government securities were 6.4 and 14.2 respectively. During 1961-70 growth of the debt held by the public was 5.4 per cent and that of State and Central government was 5.3 and 5.9% respectively. During 1971-80 annual compound growth of total marketable debt was12.2 per cent more than previous decade. While marketable debt of Central government grew at an average of 12.5 per cent per annum and that of State government 8.7 per cent during the same period.

In the eighties the growth of outstanding marketable government debt showed a marginal decline and it reached a level of 11.5 per cent. But growth of outstanding marketable debt of State governments accelerated from 8.7 per cent to 15.7 per cent per annum where as the same in case of Central government marketable debt declined to 10.2 per cent during this period. Annual compound growth rate of debt held by public was 11.5 per cent during the period 1981-1991. During the same period outstanding of Central and State governments securities rose at an average of 10.2 per cent and 15.7 per cent respectively. (Table 2.1.3)

This implies that growth of the State governments securities market was higher than growth rate of Central government securities market except for the period 1971-80. As we know market borrowing of the Central government and State government was high under the Sixth and

Seventh plans which contributes higher growth rates in both State and Central government securities held by public.

During the period (1951-91) annual growth rate of outstanding marketable debt of government was 10.4 per cent. The annual compound growth rates of State and Central government marketable securities were 12.6 and 9.6 per cent for the same period respectively. There is no specific relationship between GDP growth rate and growth rate of marketable debt. In the first period (1951-60) marketable debt grew at an average of 6.9 per cent where as GDP grew at an average of 3.45 per cent. In the next period (1961-70) marketable debt grew at an average of 7.4 per cent but the growth rate GDP was 3.19 per cent. In the next decade the growth rate of marketable debt was 12.2 per cent but the growth rate of GDP was 2.95 per cent per annum. But in the 1980's performances of GDP (5.86 per cent) improved drastically but growth of marketable debt marginally declined (11.5 per cent) compared with the previous decade.

SECTION 2.2

Ownership Pattern

The extent of diversification of holdings and the nature of market may be understood from the pattern of ownership of the marketable debt shown in the Table 2.2.1. Actually the ownership pattern of government securities have been examined according to two different periods, pre-liberalised (before 1991) and under liberalisation (after 1991). The government securities market has been described by some as a 'captive' market [Rangarajan (1971), Roy (1975), Porter (1967)]. The investors in the government securities market can be divided into three possible groups such as investors belonging to captive market and investors belonging to non-captive market, official and non-official sector, and banking and non-banking sector. The market is called a captive market if majority of the investors who hold government securities are either State-owned or under statutory regulation regarding their investment policy and rate of interest offered on government papers is below the competitive level. Let us now test this proposition for the pre-liberalised period.

Share of the 'official sector,' comprising the governments (Central and State) and the Reserve Bank of India (on its account) went down from 28.3 per cent in December 1951 to 26.5 per cent by end-December 1957, and increased to 35.5 per cent by March 1969. While the share of governments declined from 10.2 per cent in 1951 to 6.7 per cent in 1969, that of RBI went up from 22.8 per cent to 29.0 per cent during the same period. Again, the share of official sector went down from 32.9 per cent in 1971 to 21.9 percent in 1981 and further declined to 19.1 per cent by end-March 1990. While the share of governments declined from 4.9 per cent in 1971 to 0.4 per cent in 1990 and that of RBI went down from 28.0 per cent to 18.7 per cent during the same period. Reserve Bank's holding on accounts other was negligible after 1969-70. Government securities market in developed countries like UK and USA, the holding of official sector was below 5 per cent. But in the Indian context its share was much higher. The share of non-official sector comprising commercial banks, Insurance companies and provident funds has increased from 33.7 in 1951 to 43 percent in 1957. But its share has gone up to 47.6 in 1965 and reached maximum of 76.8 by end-March 1980. Coming to 1980's we found that holding of nonofficial sector has slightly come down to 72.7 per cent in by 1990.

Table 2.2.1 Ownership Pattern of Outstanding Government Dated Securities

YEAR	State Governments	RBI+,	RBI*,	C.B#,	LIC,	P.F,	Others@,	captive investors
1951	10.2	22.8	4.4	26.2	7.5	- ﹟	26.7	69.7
1957	10.9	15.6	1.4	24.0	13.5	5.5	30.1	55.5
1961	9.6	26.8	1.4	21.6	13.9	7.8	20.3	79.7
1965	8.9	29.9	1.0	21.4	14.1	12.1	12.6	86.4
1969	6.7	29.0	-	24.7	14.3	17.9	8.7	92.6
1971	4.9	28.0	-	25.2	14.1	18.5	9.3	90.7
1975	2.8	28.2	-	32.9	14.1	18.9	3.1	96.9
1979	1.7	16.2	-	44.3	13.3	17.7	6.8	93.1
1980	1.5	16.7	-	46.5	12.8	17.5	4.9	95.0
1985	0.7	27.6	-	43.1	10.6	11.9	6.9	93.9
1989	0.4	16.8	-	56.6	11.3	10.0	7.6	91.2
1990	0.4	18.7	-	57.9	11.9	1.9	7.8	90.8
1991	-	20.3	-	59.4	12.2	1.7	6.3	93.7

Source: RBI Bulletin, 1954, Feb 1960, March 1961, April 1962, Oct 1964, Dec 1966, RBI "Report on Currency and Finance".
+ RBI own account, * RBI on accounts others. # Commercial banks and co-operative banks.
@ Others includes, industrial finance/ State finance corporation, non-residents, joint stock companies, local authorities trusts and Individuals

The commercial banks are the largest holders of securities whose shares had increased since 1961. Its share, which was 26.2 per cent in 1951, went down to 21 per cent by end 1961. Ever since its share has been increasing steadily and by 1990 it stood at 57.9 %.

The holdings of insurance companies increased from 1951 to 1975 and then started declining afterwards. Insurance companies whose share was only 7.5 per cent in 1951 went up to 12.8 per cent by1980 but ever since its share has been declining. In 1991 its holding was 12.2 per cent. Ownership pattern for provident funds showed the same pattern. The share of provident funds increased from 5.5 per cent in 1957 to 18.9 per cent by 1975, and then steadily declined to 1.9 per cent in 1990. The holdings of RBI (on accounts of others), also declined from 4.54 percent in 1951 to 1.0 per cent in 1965.

The charge that government securities market was a captive one can be proved by taking into account the shares of investors belonging to captive. The share captive investors went up from 66.7 per cent in 1951 to 95 per cent in 1980, and marginally declined to 90.5 per cent in 1990. This proves our hypothesis that government securities market in India was a captive market in the pre-liberalised period.

2.2.2 Share of Banking and Non-Banking Sector

There is yet another way we can classify the investors in government securities market into Banking to non-banking sectors. The share of banking sector was very high in India. Table 2.2.2 gives details about the share of banking and non-banking sector before 1991.

Table 2.2.2: Share of Banking and Non-Banking Sector

Year	Banking Sector	Non-Banking Sector
1950-51	58.4	41.6
1956-57	41.0	59.0
1960-61	49.8	50.2
1964-65	52.3	47.7
1968-69	53.7	46.3
1971-72	53.2	46.8
1972-73	55.0	45.0
1974-75	61.1	38.8
1979-80	60.5	39.5
1980-81	63.2	36.7
1984-85	66.4	33.6
1988-89	70.5	29.1
1990-91	76.7	24.0

Source: RBI Report on Currency and Finance, Various Issues.

If the share of banking sector is very high, as per the IMF guidelines this has a direct effect on domestic credit expansion. So in order to manage money supply and to control domestic credit, government papers should be sold to non-banking sector. But in India the banking sector had acquired the lion's share of total outstanding government securities. Its share was 58 per cent in 1951 but went down to 41 per cent in 1957, following which a consistent increase in its share result in 77 per cent by the end of March 1991. This is because of share of commercial bank's has increased steadily. But in UK the share of banking sector was very low and the share of non-bank sector was well above 90 per cent in 1983. (Wormell, 1985)

Table 2.2.3 Ownership Pattern of Outstanding Treasury Bills (Rs. in crores)

Year	Total	RBI (%)	Banks (%)	Sate Governments (%)	Others (%)
1971	2518	96.2	0.6	1.1	1.8
1975	5063	95.1	1.5	2.7	0.7
1978	8619	83.7	12.4	3.2	0.6
1980	10196	90.3	0.6	8.2	0.9
1983	17431	91.2	6.6	1.7	0.4
1984	15756	92.9	5.9	0.1	1.0
1986	26015	93.2	-	5.8	0.7
1988	8028	88.3	-	11.0	-
1989	14273	86.3	-	12.1	1.0
1990	25184	93.6	-	6.0	0.4
1991	6955	71.6	-	27.0	1.2

Source: Report on Currency and Finance, Various Issues.

The Indian Treasury Bills market was relatively free up to 1960s. Its development was retarded by the trends in deficit financing. The ownership pattern of Treasury Bills shows a very interesting picture. Reserve Bank of India held 96.2 in 1971 and its share has come down marginally to 95.1 per cent by 1975 and further decreased to 83.7 per cent in 1978. In the subsequent years its share increased and stood at 93.6 per cent by the end of 1990. In the following year its share has declined to 71.6 per cent. This is because buyers of Treasury Bills do not hold them till maturity in view of their very low yield but rediscount bills with the Reserve Bank of India before maturity, thus leading to a concentration of holding with the Reserve Bank of India. The process of funding of Treasury Bills by the government was introduced in 1958-59, with the funding of Rs. 300 crores of ad hoc Treasury Bills. Other investors were marginal investors in the Treasury Bills market (Table 2.2.3). Treasury Bills issued by the government of India in favour of the Reserve Bank of India for the purposes of replenishing the cash balance maintained by it with the Reserve Bank is referred to as ad hoc Treasury Bills. Treasury Bills are sold throughout the year on demand. Treasury Bills once rediscounted by the Reserve Bank of India are not sold again.

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SECTION 2.3

Rate of Interest on Government Securities and Treasury Bills

In order to prove the government securities market to be a captive market before liberalisation we need two criteria :-(i) the share of the banks and financial institutions be very high and (ii) the rate of interest offered on government securities be low. The first condition is valid for India. The second criteria can be asserted from Table 2.3.1. The rate of interest offered on government papers was well below the market rate of interest. But from the early 1950's the interest rate on government securities has been increasing. In the pre-liberalisation period the intention of the government policy was to divert resources from the financial institution into the hands of the government. We could assume that the idea behind the diversion of funds was because of public investment having a higher 'social benefit ' than the private investment.

Why did banks maintain a high ratio of investment to deposit even at the peak of the busy season? The possible answers may be two. Firstly, it may be due to lack of demand for credit or at the rate at which banks were willing to lend. Secondly, banks want to insure against the fluctuation in deposits level and loan demand. In this context banks are risk averters. The requirements of liquidity had forced to hold these securities even though the return on government securities was less than that on loans. In India because of the inactive and narrow market in Government Securities, Reserve Bank's policies both with respect to price support of securities and lending to commercial banks give the necessary liquidity needs. However, it does raise other question of how to estimate the liquidity of an asset, which forms part of a legal requirement. When assets are frozen can any one legitimately claim that there is still liquidity? It was interesting to note that in the US even though there is no secondary reserve requirement banks still held between 25 to 30 percent of their deposit in US government securities market (Rangarajan, 1971).

Table 2.3.1 Rate of Interest Rates on Loans and on Government Securities (%)

Year	Investments*	Loans @	Treasury Bills	State Government
1950	2.7	4.6	2.2	2.8
1955	2.9	4.8	2.5	3.1
1960	3.3	5.3	2.7	3.6
1965	3.5	7.7	3.5	3.9
1971	5.3	9.5	3.5	5.6
1973	5.3	9.7	4.0	5.7
1974	5.2	13.3	4.2	5.9
1981	7.0	14.1	4.6	6.7
1982	7.2	15.4	4.6	7.0
1884	9.2	14.6	4.6	8.5
1985	9.9	14.7	4.6	9.0
1990	11.4	14.6	4.6	11.5
1991	11.4	14.8	4.6	11.5

Source: "Statistical Tables Relating to banks" and "Handbook of Statistics on Indian Economy, RBI, 1999.
* Weighted average of interest rate on Central government dated securities on primary issue.
@ Weighted average of interest rate on advances made by banks.

From Table 2.3.1 it is clear that the gap between the return on loans and interest on Central government securities was very wide and it increased from 1.9 in 1950 to 7.07 in 1981. But this gap has come down to 3.11 in 1990. This was because of increase in interest rate on government securities following the recommendation of Chakravarthy committee. So the government securities market remains a captive market characterised by tightly controlled interest rates, well below the market rates. The main guiding feature of the pre-reform period was the pre-setting of the coupon rate by the RBI in primary issues of government securities. These coupon rates were artificially kept low in order to reduce the cost of public borrowing. We also find a similar pattern in case of State government securities. Though coupon rate on Central and State government securities has increased continuously, it is far less than the rate of interest on advances by commercial banks. The discount rate on Treasury Bills was fixed at 3.5 per cent per annuam in 1965. Subsequently the rate was revised as follows: March 1968 (3 per cent); January

1971 (3.5 per cent); May 1973 (4 per cent); April 1974 (4.2 per cent); July 1974 (4.6 per cent). There has been no change in the discount rate since July 1974.

SECTION 2.4

Market Structure[4]

The structure of a market is usually defined in terms of the factors constituting the market and their interrelations. The structure of the government securities market consists of the types of investors, their activity in primary and secondary market, the method of issuing the government papers, the types of instruments available for trading, and the forms of trading. If we take into account all the above factors, we find that the structure of the market before 1991 was narrow. A broad market should require three major conditions: - large numbers of buyers and sellers operating in the market; there should be primary dealers in the market not as the final investors but as the intermediate investors, who could operate on their own; and there should be wide spectrum of owners so that there can be a matching of buyers and sellers. All these three conditions in government securities market were absent in the pre-liberalisation period.

The major investors were commercial banks, insurance companies, provident funds, and others. RBI plays an important role in the gilt-edged market in India. RBI performing as a wholesaler in the securities market, buys the new issues in bulk and unloads them in the market as and when it can absorb. As we have already shown that the government securities market was confined among the captive investors in the pre-reform period. Major proportion of the marketable debt was held by captive investors. Share of others was declining since 1957. The important character of these investors is that they were final investors and had same expectation i.e. that the securities were to be hold till maturity. Again, as all major players had identical profiles, either they were buyers or sellers at any point if time. Thus, a two-way market with different perceptions did not exist in the pre-reform period.

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[4] Market structure refers to the organisation of the secondary and primary market including market access, order handling, the trading mechanism, transparency, the role intermediaries, clearing and settlement services and so forth.

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Trading activity in primary and secondary market was confined mainly to commercial and insurance corporations. Secondary market was non-existent in the pre-reform period. There were no primary dealers in the securities market. Neither the commercial banks nor the insurance companies were position-takers-for most part, they purchased only newly issued debt, with the intention of holding it to maturity. The yield was low and the marketability of the securities was ensured by Reserve Bank's actions, not by the market itself. This was the main cause for the business, individuals and brokers to stay away from the government securities market.

2.4.1   Activities in the Primary Market[5].

Activities in the primary market were confined to RBI, commercial banks, LIC, provident funds and others. RBI issued loan after setting of the coupon rate in the primary issue of government securities. This had an adverse effect by way of distorting the pattern of yields in the entire financial structure of India. A corollary feature was that only captive investors like banks, insurance companies and provident funds participated in the primary issue of the government securities. Because of these two features, there was very little activity in the secondary market.

Table 2.4.1 reveals that the activity in the primary market was confined among the players like banks, LIC, provident funds and others. There were no primary dealers in the government securities market.   RBI subscriptions often exceeded 50 per cent. Since the government securities markets was narrow and low yielding, RBI sometimes had to subscribe all the securities in the first instances and then sell in the market whenever it could absorb. All this meant there was little activity in the secondary market. While these fact sets a limit to the conduct of monetary policy through the indirect instruments such as open market operations and the bank rate. (Table 2.4.1)

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[5] The market in which a security is first sold by the issuer.

Table 2.4.1 Issue of Central Government Dated Securities (Rs. in crores)

Year	Total Amount	Devolved Amount on RBI	Subscribed by Others*
1969-70	535	7 (1.6)	538 (98.4)
1970-71	455	89 (20.0)	366 (80.0)
1979-80	2,259	1,042 (46.0)	1,217 (56.0)
1981-82	3,190	1,235 (38.6)	1,955 (61.4)
1982-83	4,160	1,040 (25.0)	3,120 (75.0)
1983-84	4,345	1,338 (30.8)	3,007 (69.2)
1984-85	4,591	1,644 (35.8)	2,947 (64.2)
1895-86	5,764	2,906 (50.4)	2,858 (49.6)
1986-87	6,351	2,266 (35.7)	4,095 (64.3)
1987-88	7,821	2,200 (28.1)	5,621 (71.9)
1988-89	7,725	2,513 (32.3)	5,212 (67.7)
1989-90	8,004	4,861 (61.7)	3,143 (38.7)
1990-91	8,989	4,332 (49.3)	4,657 (50.7)

Source: RBI, Annual Report, various issues.
* Others include banks, LIC and provident funds
Figures in the bracket are percentages

2.4.2 Activities in the Secondary Market[6]

In the pre-reform period there were only limited variety of securities available for trading in the government securities market in India. The maturity of these securities was very long, 30 years. There were no zero coupon bonds available for trading. Major proportion of the securities held by commercial banks was with maturities of less than five year and that of LIC and provident funds was with maturities more than five years. Both the LIC and provident funds were interested primarily in long-term securities. Both LIC and provident funds were holding the securities up to maturity. They were coming to secondary market only to sell long-term securities, which are approaching the date of maturity. Commercial banks can perhaps take these securities but they cannot sell long-term securities that are needed by LIC and provident funds, since bulk of the securities hold by commercial banks are short term in nature.

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[6] A market in which a security sold by one investor to another, as opposed to the primary market.

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Table 2.4.2 Switch Operation in Government Securities (Rs. in crores)

Year	Banks	Insurance	Others	Total
1950	4.4	-	8.9	13.3
1951	29.1	3.6	29.5	62.2
1952	12.6	1.4	15.3	29.3
1953	4.1	0.2	4.1	8.5
1954	6.6	1.7	6.3	14.6
1955	10.6	5.2	11.1	26.9
1959	18.0	0.6	2.2	20.8
1960	0.9	-	1.9	2.8
1961	1.2	-	1.6	2.8
1962	2.9	-	4.3	7.2
1963	0.4	-	2.9	3.3

Source: RBI Bulletin, 1964.

For the necessary transaction among the players you need, their liabilities and assets to be different. As we know that the assets and liabilities of LIC and provident funds are long term in nature. They want to hold long-term securities or medium dated securities. In this case some switch operation was possible with the help of RBI. The broker who is not able to match the selling order of a bank with the buying order of LIC or provident funds can do both the transactions in the form of switch with the RBI. However, 'switch' operations were negligible in the pre-liberalised period. This was due to very low profit to brokers on these activities.

The switching operation was very low in the 1960's. Actually after the nationalisation of life insurance companies in 1956 and the consolidation of these 200 companies into one corporation led to a considerable shrinkage in the activities of the market. Data on these activities are not available since 1964. But data on switch operation given by the Reserve Bank of India show the virtual disappearance of 'insurance companies' from the switch transaction. This may indicate that other transactions might have also been reduced to a considerable extent It follows that if government securities possess 'liquidity' it came not from 'marketability' as between constituents

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of the market, but from the actions of the Reserve Bank. Although secondary transactions in government securities was limited in pre-reform period, data on these transactions was not available. (Table 2.4.2)

2.4.3   Impact on Other Sector of Capital Market

To what extent had the growth in the government securities market affected other segments of the capital market, particularly the new issues market and the stock market? Since the major institutions were State owned and government diverts a greater part of these resources for its own purposes, the private sector was 'starved' of the necessary funds. With the rapid growth of these institutions, the government had been able to meet its requirements much more easily than the private sector. This was even cited as one of the factors that had hampered the growth of stock market in India. Since the capital market was controlled and investor's base was narrow, companies could not attract enough investors. The other segments of the capital market could not develop due to government policy regarding the investment policy of the major financial institutions. The amount of new capital issued by private corporate sector went up from Rs. 289 crores in the fifties, (1951-60) to Rs. 728 crores in the sixties, (1961-70) and further to Rs. 992 crores in the seventies, (1971-80). During the eighties (1981-91), the amount of capital issues aggregated Rs. 23. 357 crores, around two-third of the amount coming through issue of debentures. In comparison to amount of capital issued by private corporate sector, resource mobilised by government was much higher.

So we found that structure of government securities market period prior to 1991 was narrow and the market was fully controlled. The principal objective of the RBI was to mobilise resource for public sector and reduce the cost of borrowing for the government. Thus, public debt management took precedence over monetary policy operations and that explained the specific type of structure of the market, which existed in the pre-reform era.

SECTION 2.5

Summary and conclusion

The government securities market in the pre-reform period reflected the mixed character of Indian Economy. Government securities market is called as 'captive' market because 85 to 90 per cent of total debt held by government owned financial institutions, and rate offered on government paper were well below the competitive level. Government regulated investment policy of Commercial banks, LIC, and provident funds. Share of banking sector remained more than 50 per cent. This had a major implication for the money supply. These financial institutions were invested because of statutory regulation. Since there was no active secondary market, liquidity of the government securities came from the Reserve Bank's readiness to buy back the securities. Structure of the securities was narrow and the government securities were confined to captive investors. Other segments of the capital market were also underdeveloped. Segments of the financial sector were disintegrated. There were two major factors that shaped the nature, characteristics and structure of government securities market before 1991. These two factors were the direct and dominant role of the government in the total investment outlays of the economy and government ownership of the major financial institution outlays. The statutory restriction imposed on the financial institutions made the government securities market into a captive one.

The rate of interest offered on bonds was not strictly competitive. However, with the increase in the resources of the major financial institutions the marketable debt grew at an average of 10.2 per cent during 1951-91. The annual compound growth rates of Central and State governments marketable debt were 9.7 and 12.6 per cent respectively during the same period. The bulk of the Treasury Bills was of ad hoc treasury Bills, first introduced in the year 1958-59. From 1965 the Treasury Bills were sold on under tap system at fixed discount rate.

The government securities market could not develop due to lack of definite limits on the automatic monetisation on the Central government budget deficit and low coupon rates offered on the government securities. As regards the secondary market, there was not much activity, which was hindered by low bond yield and predominance of captive investors.

Figure 2.1

Trends in Total Marketable debt
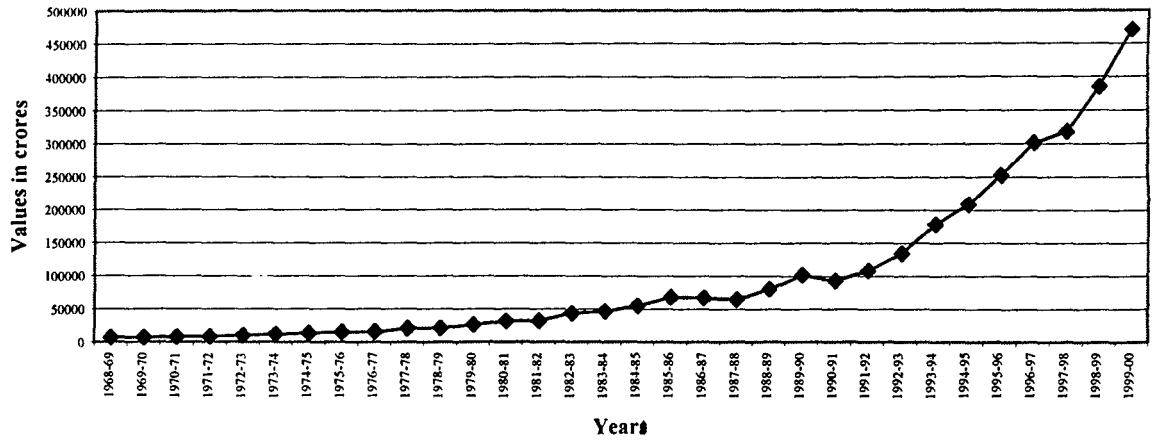
Figure 2.2   **Trends in outstanding Marketable Debt of Central Government**
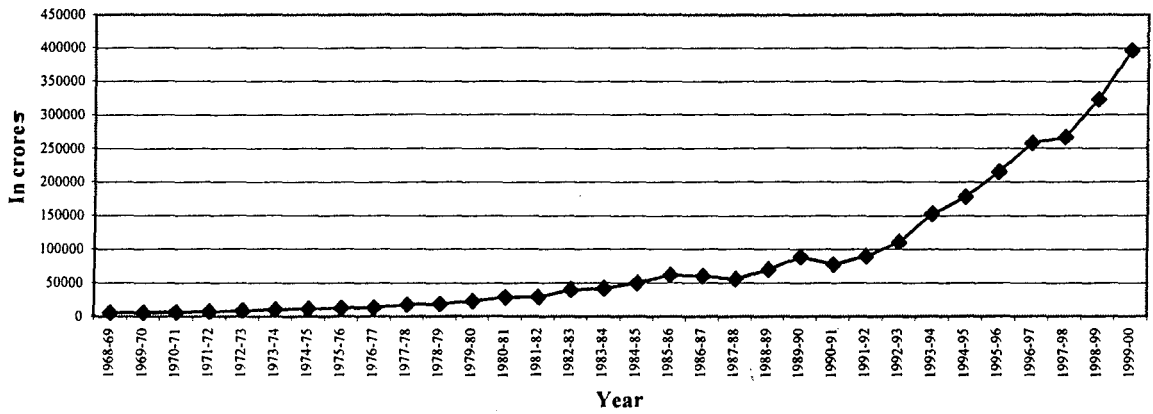
Figure 2.3   Trends in Outstanding State Governments Securities
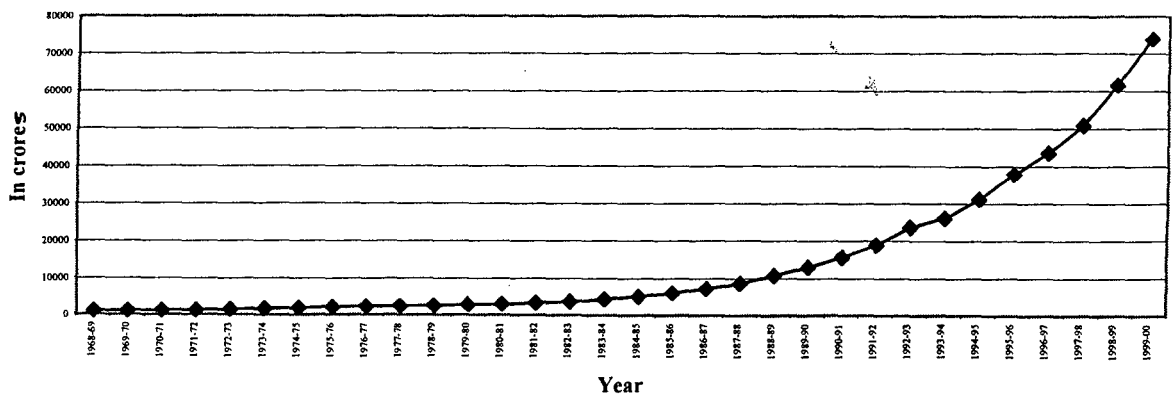
Chapter III

GOVERNMENT SECURITIES MARKET UNDER REFORM

Introduction

The Indian financial system is in a process of rapid transformation. Financial sector reform initiated in July 1991, aimed at raising the allocative efficiency of available savings, increasing the return on investment and promoting the accelerated growth and development of the real sector. The role of an integrated financial infrastructure in stimulating and sustaining economic growth is well recognised now. Under the impact of economic liberalisation, the industrialised countries as a group improved their relative economic position in the economy and posted high growth rates in the 1980s and thereafter. Financial development, as a major objective of financial reforms, required the deepening and widening of the existing financial markets as well as the introduction of new products and instruments to cater to needs of savers and investors. The evidence from developed as well as developing countries suggest that financial repression contribute to inflationary pressures, lower savings and economic growth (Fry, Goodhart and Almeida, 1996).

The main impetus for undertaking policy reform in respect of the government securities market was provided first by the report of the 'Chakravarty Committee' (RBI, 1985) to review the working of the monetary system and subsequently by the report of the 'Narasimham Committee on the Financial System' in November 1991 (RBI, 1991). The Chakravarty Committee noted that 'the yields on treasury bills and government dated securities were at levels which led to a considerable monetisation of public debt, leading to high level of monetary expansion. The captive market for government securities and the relatively low returns to banks on their holdings of government securities have adversely affected the growth of the capital market on the one hand and profitability of banks on the other' (p. 173)

The report also noted, 'for the conduct of open market operations as a monetary instrument the market for government securities market should be well organised, broad-based and deep so that the Central bank is in a position to sell and buy to the extent it considers desirable. A prerequisite for the emergence of such a market is that the rate of interest offered on government securities be competitive' (p 263). One of the major recommendations of the Narasimham Committee was that, government should borrow at market related rates of interest and phased reduction of

Statutory Liquidity Ratio (SLR). On the basis of recommendations of these two Committees, the government initiated a process of financial sector reforms in India.

This chapter presents the size and structure of government securities market under reform. The chapter is structured as follows: Section 3.1 deals with reforms in government securities market. Section 3.2 analyses the size and volume of internal and marketable debt. Section 3.3 describes the ownership pattern. Section 3.4 deals with rate of interest rate on government securities. Section 3.5 presents the market structure and finally section 3.6 offers concluding remarks.

SECTION 3.1

Reforms in the Government Securities Market

Since 1991 the government securities market has seen some radical change as part of main economic reforms. The activation of internal debt management policy will stand out as an important element in the reform process. Measures have been taken to broaden and deepen government securities market. The first step was the introduction in phases the sale of securities at market related coupon rates through a system of auctions. The important objective to be achieved through auction system was the price discovery.

Limits have been placed on the use of the instrument of ad hoc Treasury Bills at artificially low rate of interest, the introduction of new technique of floating (auction system) and new instruments (zero coupon bonds, floating rate bonds and capital indexed bonds), securing of transactions through a Delivery Verses Payment system, installing of greater transparency of operations and setting up of a comprehensive system of primary dealers (here onwards PDs) are among major reforms initiated in the government securities market.

(i) Earlier, the market used to be illiquid due to the absence of market makers with almost all the institutions dealing on their own account. However, with the introduction of six primary dealers in 1996, this problem is likely to get resolved in a phased manner. The number of PDs rose to 13 in 1999 and further to 15 in 2000. Primary Dealers now acts as active market makers, both in Treasury bills and dated securities, in wholesale segment of the market. PDs would have an obligation to participate in the primary market auctions but it is not as if it is intended to banish

other participants from the primary market. Facts from the developed countries suggest that numbers of participants along with PDs are operating in the primary auctions. PDs have to play significant role in stabilizing the markets for Government Securities. Any measures by market players to contain volatility can greatly contribute to the orderly development of market. PDs are not final investor but an institution that has the capacity to participate in the primary market auction and hold the securities till it is able to access the securities in the secondary market. The profitability of the PDs would be contingent on its ability to optimise its turnover. PDs is not a final repository for the unwanted securities of large holders. Rather, it is an institution, which will help investors to buy and sell by offering two-way quotes in a few select securities. Thus PDs would be transient holder of securities. RBI would provide special liquidity support to the PDs. PDs would, need to be well capitalised as they should use a wide gamut of instrument of financing. PDs also have to look for alternate source of funds and more and more recourse to repos market is expected.

(ii) Adoption of Delivery verses Payment system for settlement of government securities transaction was made in order to facilitate secondary market trading in 1997-98. The National Stock Exchange (NSE) introduced a wholesale debt segment, primarily to activate a secondary market in non-government issues. But it can be found that 90% of the turnover in the debt market segment of NSE is accounted by government securities. In order to make the trading system transparent, the transaction can be made on the stock exchange or over-the-counter in the 'telephone" market. The transactions on the NSE are transparent and so are those in the telephone market as all transaction through the Subsidiary General Ledger (SGL) accounts of the RBI are published. Thus it helps all buyers to know about the prices and yields in the secondary market. Ultimately, transaction will gravitate to the more efficient market. Under DVP system transfer of securities from seller to the buyer and the payment therefore by the buyer to the seller would be simultaneous in respect of those who have an SGL account.

(iii) For a secondary market to be effective, the institutional structure should be in place. It needs to be recognised that development of institutional structure requires time and there are no short cuts. RBI has introduced nine Satellite Dealers (SDs) in 1996-97.

RBI has commenced a project for complete automation of the operation of the RBI's public debt office in 2000. This will provide for connectivity between different PDOs, and facilitate on-line screen based execution for trade settlement in government securities transaction.

(iv) Phased reduction in reserve requirements like bank rate, CRR and SLR. SLR has been reduced from 38 per cent to 25 per cent in 1991.

(v) Government of India entered into an agreement with the RBI to phase out the automatic magnetisation of the budget deficit by eliminating the use of ad hoc Bills in 1996-97.

(vii) Non-Banking financial companies are now required to maintain a higher level of liquid assets in the form of government securities and government guaranteed bonds.

(viii) The RBI has liberalised the financial market significantly. The CRR and SLR requirements on inter-bank liabilities have been removed, and correspondingly the inter-bank transactions have been activated. Foreign Financial Institutions (FFIs) were allowed to invest in gilts and forward covers and banks are allowed to invest in corporate debt securities without restriction.

(ix) Repurchase of securities (repos) has been introduced in 1992 to manage the liquidity in the economy. This facility has been extended to all government securities and Treasury bills. Non-bank entities-holders of SGL accounts with the RBI are allowed to enter reverse repos transaction with banks and primary dealers. Banks are allowed to undertake the retailing of government securities with non-bank clients.

(x) FIIs have now been allowed to invest in the category of 100 % debt funds, in corporate debt and in dated securities with the objective to encourage flow of foreign capital into India to impart more depth and liquidity to the debt market.

(xi) Abolition of TDS on interest income from government securities, introduced with effect from June 1997 under 193 of the Income Tax Act.

(xii) Introduction of TBs of varying maturities. All the TBs are issued through auctions.

Lack of market clearing yields on government bonds at Primary auction of government debt, which is a major cause as after being cited as a significant factor slowing down the development of the secondary market. Because it creates the following problems: -

(a) It hampers effort to broaden the investors base. At times, when cut-off[1] yields in the primary market are lower than prevailing secondary market yield, it curbs secondary market trading.

(b) To the extent the cutoff yields are lower than secondary market yields, it constrains inventory build up by primary dealers. Availability of floating stock in the secondary market will be less

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[1] Cut-off yields are calculated on the basis cut-off price prevailing in the primary market.

since primary auction is reduced due to interest rate differentials. There are four factors, which are ingredient for market clearing mechanism. These are viz.: notifying auction size, type of auction, elements of non-competitive bids and frequency of auction of TBs.

(xiii) For a well-developed government securities market, it is necessary to have a broad-based retail market. For this purpose maturity and interest rate and infrastructure for speeding settlement is very important. RBI started providing liquidity support to mutual funds, which is dedicated to develop retailing in government securities. It is a major step in the development of the retail market of the government securities. Commercial banks and LIC have started retailing in government securities.

3.1.1 Deregulation of Interest Rates

Some of the important policies in the deregulation of interest rates have been: Overtime, the lending and deposit rates have been considerably freed. Lending rates are now largely linked to the prime lending rates. Banks have been given the freedom to determine the rates depending on their risk perceptions. Deposit rates beyond one year have been freed, and deposit rates under one year linked or pegged to the bank rate. All re-finance, the RBI open market operations, and liquidity to the Primary Dealers, have again been linked to the bank rate. We now expect that Bank Rate would emerge as a kind of reference rate in the interest rate scenario.

The present system of valuation of government securities in the portfolio of banks, which are by far the largest holders of these securities, has an important bearing on secondary market trading. The absence of mark to market discipline is a major hindrance to the development of an active secondary market. As part of a gradual move towards standard valuation norms banks were required to mark to market 40 per cent of their investments in government and approved securities. Over time banks will have to mark to market 100 per cent of their securities portfolio and this would need to be phased in expeditiously.

Although there are different types of repos transaction available in the international repos market, in India the only type of repos prevalent is buy/sell back, where agreements are entered into simultaneously for the sale and repurchase of securities at different prices. The repos transaction essentially involves a contract between a holder of securities, who wants to raise funds and an investor (purchase) for sale of the securities to the purchaser and repurchase of the securities later

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at a fixed price on a fixed date. The transaction thus involves a forward contract in securities. The problem of the Indian government security is that all the players are final investors and all these players invariably have the same perception and therefore, the same liquidity need. In such a situation it is not surprising that secondary market with depth has not developed. It is in the context of developing a securities market with different perception that a primary dealers system is being introduced.

Considering the above reforms taken to activate government securities market, we expect there may be change in structure and RBI can conduct the monetary policy effectively with the help of market-based instruments. For such purposes we need well-developed money and government securities market. The effective presence of such markets is felt, once a well-developed financial system is in place, wherein both financial markets and financial institutions have important roles to play. It is noted that, the East Asian crisis is an outcome of the lack of well-developed money and capital market.

The significant feature of the financial market activity during the 90's has been the growing interlinkages among the money, foreign exchange and government securities markets. Among the several recent developments, the development of Liquidity Adjustment Facility, (LAF, 2000) intended for providing desirable quantum of liquidity according to needs of the system with flexible rates and help impart greater liquidity have received much attention.

SECTION 3.2

Size and Volume of Internal and Marketable Debt

3.2.1 Volume of Internal Debt

The total internal debt rose from Rs. 1,957 billion in 1991-92 to Rs. 3,960 billion in 1996-97 and further to Rs. 8252 billion at the end of 1999-00. The internal debt of Central and State government rose from Rs 1,727 billion and Rs. 229 billion in 1992 to Rs. 3,444 billion and Rs. 515 billion in 1996-97 and further to Rs. 7,286 and Rs. 966 billion at the end of March 1999-00 respectively. The total internal debt increased at an average of 32 per cent per annuam during the period 1992-2000. The internal debt of Central and State governments increased at an average

of 32.2 and 31.5 per cent per annum during the same period. Total internal debt as percentage of GDP was 29.9 per cent in 1991-92, it marginally declined to 29 per cent in 1996-97 and increased to 35.6 per cent at the end of March 2000. The share of Central government in total internal debt is around 88 per cent and the remaining balance is that of State government. (Table 3.2.1)

Table 3.2.1 Volume of Total Internal Debt. (Rs. in crores)

Year	Total Internal Debt	Share of Central Government (%)	Share of State Governments (%)	% to GDP
1991-92	1,95,722	88.3	11.7	29.9
1992-93	2,25,574	88.4	11.6	30.1
1993-94	2,76,021	89.1	10.3	32.1
1994-95	3,01.68	88.4	11,6	29.8
1995-96	3.51,086	87.7	12.3	29.7
1996-97	3,96,071	87.0	13.0	29.0
1997-98	4,48,337	86.8	13.2	29.4
1998-99	5,36,816	85.7	14.3	29.4
1999-00	8,25,296	88.3	11.7	35.6

Source: RBI, Handbook of Statistics on Indian Economy, 2000.

3.2.2 Volume of Marketable Debt

Total marketable debt was Rs. 1087 billion in 1992 and increased to Rs. 2531 billion at the end of 1995-96 and further to Rs. 4718 billion at the end of March 2000. Central government marketable debt constitutes the major share of total marketable debt. It was 82 per cent of total debt in 1991-92 and increased to 85.6 per cent at the end of 1996-97 but marginally declined there after to reach 83 per cent in the end of 1999-00. The share of dated securities in total marketable debt was 88 per cent in 1991-92 and declined to 76.9 per cent at the end of March 1993-94. Then after it increased to 82.6 per cent in 1995-96. But after 1997-98 its share remained well above 90 per cent. Marketable debt as the percentage of internal debt steadily increased from 55.4 per cent in 1991-92 to 76 per cent at the end of March 1996-97. But following which it declined to 57 per cent at the end of mach 1999-00. As a proportion of gross domestic product at current market prices the outstanding amount of marketable debt

ranged between 16.6 per cent and 22.8 per cent between 1991-92 and 1999-00. The share of Treasury Bills in marketable debt fluctuated from year to year and ranged between 3.5 per cent and 23.8 per cent during the same period. (Table 3.1.2)

Table 3.1.2 Volume of Marketable Debt (Rs. in crores)

Year	Total Marketable Debt	Central Government (%)	Dated Securities (%)	Marketable debt to Internal debt	% to GDP
1991-92	1,08,705	82.0	88.2	55.4	16.6
1992-93	1,34,729	86.9	78.1	59.7	18.0
1993-94	1,77,649	85.3	76.9	64.3	20.6
1994-95	2,09,246	85.0	80.6	69.3	20.7
1995-96	2,53,132	85.0	82.6	72.0	21.4
1996-97	3,01,253	85.4	76.2	75.0	22.1
1997-98	3,17,695	84.0	94.3	70.8	20.9
1998-99	3,84,833	83.7	96.9	71.6	21.8
1999-00	4,71,852	84.3	96.5	57.1	22.8

Source: RBI, Handbook of Statistics on Indian Economy, 2000.

The annual compound growth rate of total marketable debt was 17.8 per cent during the period 1991-92 to 1992-2000. The marketable debt of Central government grew (19.6%) much faster than the State government's (16.5%) marketable debt. The Annual compound growth rate of the internal debt was 17.1 per cent during the same period.

SECTION 3.3

Ownership Pattern of Government Securities

The ownership pattern of marketable debt of government throws very interesting insight in to the market for government securities. The so called captive investors are holding around 90% of total outstanding dated securities of the Central and State governments. The main investors in the government securities market in India are commercial banks, co-operative banks, insurance companies, provident funds, financial institutes, mutual funds, primary dealers, satellite dealers,

non-bank finance companies and corporate entities. The Reserve Bank also absorbs primary issuance of government securities, either through private placement or devolvement. The ownership pattern of government securities is presented in Table 3.2.1.

3.2.1   Ownership Pattern of Government Dated Securities (per cent)

Year	RBI	CB@	LIC	Others	Captive Investors	Banking Sectors	Non-Banking Sectors
1991-92	17.9	63.2	13.3	5.1	94.9	81.2	18.8
1992-93	8.2	66.4	14.7	10.7	89.3	74.6	25.4
1993-94	2.4	72.5	15.8	8.3	91.8	74.9	25.1
1994-95	2.0	69.6	16.2	12.3	87.7	71.6	28.4
1995-96	7.3	64.9	16.8	10.9	89.0	72.2	27.8
1996-97	2.8	62.9	18.7	15.5	84.5	65.7	34.8
1997-98	10.7	62.3	18.0	9.0	91.0	73.0	27.0
1998-99	9.1	59.5	17.9	13.5	86.5	68.8	31.4
1999-00	6.7	61.0	17.9	14.5	84.5	67.7	32.3

Source: RBI, Handbook of Statistics on Indian Economy, 2000.
@ Commercial Banks.

Commercial banks are the major players in the government securities market. Their share has gone up from 59.4% in 1991 to 72.5 % at end March 1994 before declining to 61 per cent as at end March 2000. Share of the LIC has gone up from 13.3 per cent in 1992 to 16.8 per cent at the end March 1996 and further to 18 per cent at the end March 2000. The share of others category fluctuated from year to year and ranged between 5.1 per cent and 15.5 per cent. The share of provident funds has come down drastically. Now its share is marginal. Its Share was only 2 per cent at the end of March 2000. But the share of captive investors still remains high. Their share was 94.9 per cent in 1991 and declined to 91 per cent at the end of March 1998 and further declined to 84.5 per cent at the end of March 2000. Share of banking sector also remained high even in the reform period. In fact it has gone up in the nineties. It was the highest in 1992-93 i.e. 81.2 percent and came down to 73 per cent at the end of March 1998-99. At the end of March 2000 it reached the level of 67.7 per cent.

From the above analyses it is clear that there is no change in investor- base in government securities market. The present structure of the government securities market is predominantly institutional, while the household participation is absent. Participation of FIIs is negligible. In the reform period, only the enlargement of the captive investors broadens the base of government securities. So the RBI has not succeeded in widening the investor base in government securities market. Share of non-captive investors is still very low. This has a major implication for the monetary and debt management policy. Considering the investors base in government securities market we can safely conclude that, still the market is narrow. Despite the various reforms measure to develop and widen the primary market for government securities the predominance of captive investors has not come down. The ownership pattern of Central and State government securities exhibited predominant holding by commercial banks and LIC. The proportion of investment to total assets made by Commercial banks' and LIC's in government securities is given in Table 3.3.2.

Table 3.3.2 Proportion of Investment to Total Assets of Commercial Banks and LIC. (Per cent)

Year	Commercial Banks	SLR Rate	LIC
1991-92	27.0	38.50	42.0
1992-93	28.2	38.75	42.6
1993-94	32.1	31.50	48.8
1994-95	30.4	31.50	51.0
1995-96	30.4	31.50	53.5
1996-97	31.4	25.00	56.6
1997-98	30.8	25.00	57.5
1998-99	31.2	25.00	58.4
1999-00	34.2	25.00	59.2

Source: RBI, Handbook of Statistics on Indian Economy, 2000.

Although the SLR ratio of banks has been significantly lowered down from 38% in 1992-93 to 25 % with effect from Oct 1997, but commercial banks' investment as proportionate of total assets has gone up from 27 per cent in 1992 to 32.1 per cent at end of March 1994 and further to 34.2 per cent by march 2000. Attractive interest rate offered on government securities since 1992-93 apart from zero risk nature of such investment and depressed credit market are some of

the factors which contributed to banks' investment in government securities much beyond this stipulated SLR

After commercial banks the next major holder of government securities is Insurance Companies. After liberalisation their share is slowly going up. Investment of LIC in government securities as proportion of total assets has gone up from 42.6 per cent in 1992-93 to 51 per cent at the end of March 1995 and further to 59.2 per cent by March 2000. On the one hand this may be contributed to the attractiveness of government securities. On the other hand there was a depression in credit market, low yields on industrial securities and its liabilities.

SECTION 3.4

Rate of Interest on Government Securities

We have already elaborated the measures undertaken by the RBI for the deregulation of interest rate after liberalisation. Government of India has moved from an artificially low and controlled interest rate on government securities, to a market determined interest rate. Table 3.4.1 represents the weighted coupon rate on government securities (State and Central), weighted cut-off yield on Treasury Bills and weighted averages of interest rate on loans by commercial banks.

Table 3.4.1 Rate of Interest on Government Securities (Percent)

Year	Central	State	Loans	Treasury Bills
1991-92	11.78	11.82	16.36	8.57
1992-93	12.46	13.00	16.54	9.59
1993-94	12.63	13.50	16.37	7.68
1994-95	11.91	12.50	15.99	10.37
1995-96	13.75	14.00	16.75	10.89
1996-97	13.69	13.83	16.09	9.25
1997-98	12.01	12.82	16.26	9.87
1998-99	11.81	12.35	16.25	8.34
1999-00	11.77	11.89	15.85	9.16

Source: RBI, Statistical Tables Relating to banks and Handbook of Statistics on Indian Economy, 2000.

From Table 3.4.1, it is clear that the interest rate on State government securities is higher than Central government securities. This may be because of the high risk attached to State government securities. Another reason is that RBI is not the underwriter of State government securities. The interest rate difference between government securities and loans has come down after liberalisation. It is not true now to categorise as the government securities market as captive market. Because interest rates on government papers are not unattractive. We have already pointed out that in case of government securities market, strong subscription support is coming from banks, insurance companies and financial institutions. Another important point to be noted in this regard is that, this category of investors has been investing strongly in gilts, not because of statutory or regulatory compulsion any more, but in pursuit of their commercial judgement. If we compare the difference between interest rate on government securities and interest on loans, we find that the gap has been reduced after liberalisation.

A comparison of the bank rate with the interest rate on government securities is also important in this context. This is given in Table 3.4.2

Clearly, the bank rate is lower than the interest on government securities since 1986-87. The bank rate, which stood at 12 per cent in 1991, was reduced to 9 percent in 1997. Again, it increased to 11 per cent in 1998, further falling to 8 percent in 1999. The cut-off yield on Treasury bills fluctuated from year to year and ranged between 7.68 per cent and 10.89 per cent during the period1991-92 – 1999-00. This is in contrast to the situation that prevailed during pre-liberalised period. Throughout the 1970's and up to 1985 the bank rate was higher than the average coupon rate on government securities. Actually since 1986 coupon rate on securities was more than the bank rate.

Form the Table 3.4.2 we can make two conclusions about the behaviour of the interest rates on government securities. First, given the maturity, the rate of interest on them has increased over a period of time. Secondly after liberalisation rates of interest on government papers became market related.

Table 3.4.2 Interest Rate Offered on New Loans issued by Government of India.

Year	Maturity Period (Year)	Coupon Rate[2] (%)	Bank Rate (%)
1961-62	6	3.5	4
	8	3.5	
	20	4.0	
1964-65	6	4.0	6
	25	4.5	
1970-71	7	4.5	5
	30	5.5	
1980-81	5	6.0	9
	10	6.5	
	18	7.0	
	30	7.5	
1986-87	5	10.0	10
	7	10.2	
	10	10.5	
	20	11.5	
1991-92	5	10.0	12
	10	10.2	
	15	10.5	
	20	11.5	
1992-93	5	12.0	12
	6	12.3	
	8	12.6	
	9	12.7	
	10	12.7	
1995-96	5	13.8	12
	7	13.8	
	10	14.0	
1997-98	6	11.8	9
	7	12.5	
	8	11.1	
	10	13.0	
1998-99	8	11.7	9
	9	11.9	
	10	12.0	
	12	12.2	
	15	12.4	
	20	12.6	
1999-2000	11.71	12.0	8
	14.33	12.2	
	16.92	12.3	
	17.00	12.3	
	19.13	12.0	
	19.61	12.4	
	19.51	12.4	

Source: RBI, Report on currency and Finance, Various Issues

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[2] Coupon rate which is known as the bond rate, paid on the face value of the bond. This rate is mentioned on the bond itself. Generally coupon rate is paid half yearly.

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SECTION 3.5

Market Structure

A crucial issue in the development of the Government Securities market is the need for a well functioning secondary market. The characteristics of a well functioning secondary market are, a transparent system of trading, a secure system of settlement of transactions, an institutional structure whereby the market players have divergent perceptions about liquidity and interest rates and a liquid market with a matured system of price determination. The Central bank often plays the role of market maker, by providing two-way quotes through their sales window to infuse liquidity in the secondary market. Other than RBI, PDs also act in the secondary market as market makers by providing continuous two-way quotes thereby ensuring liquidity.

In the post-liberalisation period, there has been a change in the structure of the government securities market. Introduction of PDs in government securities market helps the development of secondary market transaction, because they are the intermediate investors in government securities. RBI has promoted the Discount and Finance House of India (DFHI) and Securities Trading Corporation of India (STCI) to promote the development of the money market and a secondary market for government securities.

The current structure of the market is more broad-based and integrated than it used to be in the pre-reform period in terms of players in the market, the types of instruments available for trading and the forms of trading. For instance, earlier trading activity both in primary and secondary market used to be confined mainly to commercial banks, insurance companies and provident funds. Now financial institutions other than banks and private corporate sector, primary dealers, satellite dealers, mutual funds especially the gilt funds and non-bank finance companies have also become important players in the government securities market.

3.5.1 Activity in the Primary Market

Now commercial banks, insurance companies, provident funds, financial institutions like NABARD, IDBI, SDBI, EXIM BANK, and UTI, foreign investors and primary dealers are

active players in the primary market of government securities. Table 3.5.1 shows the transaction activities in the primary market.

Table 3.5.1   Issue of Central Government Dated Securities

Year	Total Amount (Rs. in crores)	RBI(%)	PDs (%)	Others (%)
1991-92	8,919	54.0	-	46.0
1992-93	4,821	45.9	-	54.1
1993-94	28,790	0.15	-	99.8
1994-95	38,108	-	-	99.9
1995-96	38,634	30.8	-	69.2
1996-97	27,911	13.2	1.3	85.5
1997-98	43,390	30.01	4.4	65.6
1998-99	83,752	45.6	3.7	50.6
1999-00	86,630	31.5	4.2	64.3

Source: RBI, Report on Currency and Finance, Various Issues.

In the reform period PDs and other financial institution have participated in primary issue of dated securities of Central and State governments. The primary market purchase of PDs in government securities and treasury bills rose from Rs. 208.3 billion in 1996-97 to Rs. 537.9 billion in 1999-2000. All the dated securities and treasury bills are issued through the system of auctions. Both discriminatory and uniform price auction methods are used, as appropriate to each of the T-Bills. Apart from the allotment through auctions, the practice of entertaining non-competitive bids in Treasury Bills to State governments, non-government provident funds and other Central banks at the weighted average of price determined in auctions also exists. Non-competitive bids are however, accepted outside the notified amount. This is done to encourage participants, who do not have expertise in such bidding. Most of the current issues are, reissuance of existing stock through reopening, and this has helped in consolidation of government debt to some extent as also in creating a critical fungible mass for active trading and enhanced liquidity in the secondary market. In 1996-97 with a view to moderating the impact of the large borrowing programme on interest rates, the Reserve Bank has accepted private placement of government stocks and released them to the market when the interest rate expectations turned out to be favourable.

There exists a fixed calendar for auctions of all types of treasury bills. But auctions/issues of dated securities are not based on any fixed calendar. However, the auctions/ issues of Treasury bills and dated securities are announced in advance through a public notification. While the 14-day and 91-day Treasury bills are auctioned on a weekly basis, the auctions of 182- day and 364-day Treasury bills are held on a fortnight basis. The Treasury bills/bonds are issued to successful bidders in the form of stock certificate or by credit to their Subsidiary General Ledger (SGL) account. The systems of treasury bills auctions are explained in Table 3.5.2.

Table 3.5.2 System of Treasury Bills Auction

Types of Treasury Bill	*Periodically*	*Notified Amount (Rs. in crores)*	*Day of auction*	*Day of payment*
14-day	Weekly	100	Every Friday	Following Monday
91-day	Weekly	100	Every Friday	Following Monday
182-day	Fortnightly	100	Wednesday Preceding the non-reporting Friday	Following Thursday
364-day	Fortnightly	500-750	Wednesday Preceding the non-reporting Friday	Following Thursday

Source: RBI, Report on Currency and Finance, 2000.

3.5.2 Secondary Transactions in Government Securities

After liberalisation secondary transaction in government securities have increased substantially over the year. The average annual growth in secondary market transaction since 1994-95 was over 55 per cent, reflecting the increasing depth attained by secondary market in government securities. As a result, the government securities market in India is gradually approaching a stage of maturity. For instance, the average annual transaction increased over 10-fold between 1994-95 and 1999-2000. Table 3.5.3 shows the secondary transaction in government securities.

Table 3.5.3 Secondary Transactions in Government Securities (Both outright and Repo transaction) (in crores)

Year	Annual	Monthly	Total Turnover	% Change	Turn Over Ratio
1994-95	50,569	7,224	3,10,650	-	1.84
1995-96	1,27,179	10,598	4,42,499	42.4	2.13
1996-97	1,22,942	10,245	3,13,926	- 29.0	1.32
1997-98	1,85,708	15,476	4,20,655	33.9	1.40
1998-99	2,27,228	18,935	5,33,850	28.0	1.70
1999-00	5,35,602	44,633	12,36,678	131.6	3.20

Source: RBI, Report on Currency and Finance, various issues.

Total secondary transaction in Government securities was Rs. 98 billion in 1994-95 and it increased to Rs. 5350 billion at the end of March 2000. This implies that secondary transaction grew at an average of 91 per cent during the period 1994-95 to 1999-2000. Likewise, monthly trends in secondary transaction also showing increasing trend. Monthly transaction increased from Rs 7 billion from 1994-95 to Rs 44 billion at the end of March 2000, reflecting growing activity in secondary market

The turnover in government securities (calculated by twice the volume of transaction in the case of outright transaction and counting four times the volume of transaction in the case of repos) during fiscal year 1999-2000 amounted to 12,370 billion of which the outright turnover aggregated Rs. 9,060 billion. The aggregate volume of transaction in Central government dated securities and Treasury Bills (outright and repo) more than doubled to Rs. 5,35,602 crores in 1999-00 from Rs. 2,27,228 crores in 1998-99 reflecting the substantial improvement in demand conditions in the government securities market. The turnover in government securities has increased from Rs. 3,10,650 in 1994-95 to Rs. 5,33,850 in 1998-99. The daily turnover has also witnessed a significant increase and is about Rs. 34 billion in 1999-2000. Reflecting this, the turnover ratio in dated securities (defined as the ratio of total turnover to total outstanding securities) increased to 3.2 as on March 31,2000 from 2.2 as on March 31,1999. Notwithstanding the surge in liquidity in money market, a steady growth in transaction in the secondary market is a reflection of the depth of the secondary market in government securities. Government securities in the post-liberalisation period are no longer facing the problem of marketability as that in the case of pre-liberalised period.

3.5.3 Types of Instruments Available for Trading

As compared to 1970s and 1980s, a variety of bonds and Treasury Bills are now available for trading in the government securities market in India reflecting its maturity. Zero coupon bonds[3] that carry no re-investment risk were introduced for the first time on January 18, 1994. The floating rate bonds[4] were introduced on September 29, 1995. Other than that capital indexed bonds[5], partly paid bond[6] and fixed coupon bonds also introduced. Treasury Bills of 14/91/182/364-day are introduced in a phased manner. This might increase the breadth and depth of government securities market. From the investors' point of view, a range of Treasury Bills gives a variety of options for managing cash surpluses. There is active trading in secondary market in the T-Bills segments in the recent years. Table 3.5.4 represents the secondary trading in treasury bills.

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[3] A bond with no coupon, only a single principal payment at maturity.

[4] A debt instrument issued in the market and whose principal renews periodically at its face value, while its interest rate changes with market rates.

[5] A debt instrument whose value is hedged against the inflation level.

[6] A securities on which there is a liability to pay a call, or calls of a specified amount on a specified day.

Table 3.5.4 Secondary Transaction in Treasury Bills (Rs. in crores)

YEAR	14-DAY	91-DAY	182-DAY	364-DAY	TOTAL
1999					
April	646	472	-	4,965	6,083
May	1,235	688	-	3,008	4,941
June	785	779	-	2,033	3,597
July	3,084	1,970	-	3,562	8,616
August	3,184	1,287	-	2,297	6,768
Sept	100	1,396	-	1,832	3,328
Oct	1,986	5,353	-	1,771	9,110
Nov	526	10,935	-	4,461	15,922
Dec	582	4,369	-	1,525	6,476
Feb	867	3,545	-	2,234	6,646
March	791	1,427		3,815	6,033
2000					
April	528	1,100	-	6,632	8,260
May	914	782	-	2,757	4,453
June	1,074	1,082	123	3,679	6,958
July	978	1,081	674	3,337	6,070
August	640	1,079	234	7,144	9,097
Sept	72	994	434	3,052	4,552
Oct	515	776	352	6,609	8,250
Nov	777	766	585	2,706	4,834
Dec	1,074	1,822	1,076	6,087	10,059
Jan	1,273	1,947	1,045	3,681	7,946
Feb	629	1,612	451	6,575	9,267
March	585	2,007	640	14,296	17,528

Source: RBI, Monthly Bulletin, January 2001.

3.5.4 Types of Trading

In India, as in many other countries, the government debt market is essentially an Over-The-Counter (OTC) market where deals are struck over telephone. A large and broad-based market usually provides for different types of trading, viz., OTC trading, trading on stock exchange through brokers and electronic trading. On the basis of value of transaction in the secondary market, it is now possible to identify benchmark maturities in the Indian context as in the case of developed countries. We have selected five such securities for each year of the two year on the basis of value of secondary transaction.

Table 3.5.5 Benchmark Securities for 1998-99 and 1999-00 (Rs. in crores)

Name of the Securities	Value of Transaction
11.99 % GOI 2009	5479.41
12.40 % GOI 2013	5216.29
12.50 % GOI 2004	3627.25
12.32 % GOI 2011	3575.25
11.90 % GOI 2007	2035.89
Benchmark Securities for 1999-00	
11.03 % GOI 2012	8122
11.40 % GOI 2008	6707
11.30 % GOI 2010	6298
11.50 % GOI 2011	3828
11.99 % GOI 2009	2685

Source: CMIE, Monthly Review of Indian Economy, September 1999 and January 2001

Many of the commercial companies, primary dealers and LIC have started retail marketing in government securities. This is a welcome step towards expanding the base of the government securities market.

SECTION 3.6

Summary and Conclusion

The size and volume of internal and marketable debt has increased at a rapid rate under reform period than before. There were radical changes in the structure of the government securities market since the liberalisation. The current structure of the market is more broad-based and integrated than it used to be in the pre-reform period in terms of players in the market, the types of instruments available for trading and the forms of trading.

Investors base has changed only marginally from pre-liberalised period to post liberalised period. In both the period dominant participants are the captive investors, owning around 90 per cent of total marketable securities. Among them, the commercial banks have increased their share from around 25 per cent in 1970 to 65 percent in 1998-99. Other than commercial banks insurance companies have also increased their share. Although the share of other categories is increasing,

their share is still marginal. Retail marketing in government securities has just started in the recent year. Household and foreign institutional investors' holdings of government bonds are negligible. All these players are in the government securities market are final investors constraining secondary transaction. Institutional structure has changed since liberalisation with the introduction of PDs and SDs. Primary Dealership has been introduced in 1996 in government securities. Now the number of Primary Dealers (PDs) in government securities has increased from 6 in 1996 to 15 in 2000. The PDs are allowed access to call money market as well as repos/ reverse repos markets and to trade in all money market instruments. The RBI also conducts exclusive open market operations (OMO) in dated securities and T-Bills through PDs. A second level satellite dealer (SDs) system exists, with the main objective of retailing government securities. These PDs and SDs are given some liquidity support by the RBI. The network of PDs and SDs provides retail outlets thereby encouraging voluntary holding of government securities among a wide investor base. Auction system has been introduced in dated securities as well as in treasury bills.

The depth of government securities market has broadened and liquidity of government bonds is ensured by market structure as such. Marketability of government securities now means transaction of securities among the market constituents. Secondary transaction in dated securities and treasury bills has witnessed a sharp rise. As compared to 1970s and 1980s, a variety of instruments are now available for trading. Even though investors' base has not changed after liberalisation, the institutional structure did undergo a drastical change.

Interest rates on government securities are on par with market rate of interest, thus refuting the charge of captive market partially. Growth and structure have changed in post-liberalised period because of several reforms have been taken by RBI in order to make the dormant securities market into a developed securities market. Since the government securities market is now some how broad and active, the objective of the RBI is now to use indirect instruments of the monetary policy operation through the Central bank's sale and purchases of money and capital market instruments. Much more operating freedom is given to financial institutions regarding their portfolio decision. Since the degree of development of government securities market is dependent upon policy and institutional setting, the ongoing financial reform programme needs to be accelerated to further widen and deepen the government securities market towards achieving the desired objectives.

Chapter IV

YIELD CURVE ANANLYSIS OF GOVERNMENT SECURITIES

Introduction

As all of us know, government securities market was captive and narrow in the pre-reform period. The coupon rates on the Government securities were pre-set by RBI in primary issues and were artificially kept low in order to reduce the cost of borrowing of the government. This had an adverse impact by way of distorting the pattern of yield rates in the financial structure of India. So the yield on government securities could not be considered as benchmark market rate for the economy. Only captive investors participated in the primary issue of government securities because of statutory regulation on them. The impact of financial reform, which was initiated in 1991-92, had a significant bearing on the development of government securities market in India. Government securities market is now broad based and integrated than it was in the pre-reform period. Both primary and secondary market is now more active in terms of players, instruments and volume of trades. As a result, the government securities market in India is approaching a stage of maturity and is a key instrument for RBI for the conduct of monetary policy through open market operations and repo transactions. Now the yields on money market instruments like, (91-day TBs, 182-day TBs and 362-day TBs) could be considered as reference rate for the economy. Ideally a reference rate should emerge from the secondary market in government securities market.

Theoretically, a reference rate is defined as the price of short-term low risk instruments in a free liquid market. Usually, a reference rate is chosen among the class of short-term interest rates prevailing in the money market or gilt market. Since the secondary market was not active in the pre-reform period reference rate could not be taken from gilt market.

Considering the above, we might now analyse the nature of transaction mechanism of monetary policy. There are mainly four types of monetary transaction channels, viz., (a) credit channel, (b) the interest rate channel, (c) exchange rate channel and (d) asset price channel. Out of the four channels, the first two channels are considered as the most important ones. According to the recent report of the RBI working group (1998) on "'Money Supply: Analysis and Methodology of Compilation" (RBI Bulletin 1998), the transmission mechanism working through the interest rate channel appears to be getting stronger than the transmission mechanism of the credit

(quantum) channel. This evidence suggests that interest rate targeting may prove to be more useful than money supply targeting in Indian context as well. However, an effective policy of interest rate targeting should take into account the market's perception and expectation about future real interest rates and inflation rate. In other words, a targeted value of interest rate should not be out of alignment with market expectations. Hence, a realistic policy of interest rate targeting presupposes the existence of proper yield curve in the economy, as the yield curve is the best indicator of market expectations. Plotting yield rates as against residual maturity will give the yield curve.

Empirical analysis of the yield curve has a long history in developed countries like UK and US [McCulloch (1972,1975), Vasicek and Fong (1982), Shea (1985), Nelson and Siegel (1987) and others]. But work on yield curve analysis in India by comparison, is of more recent origin [Nag and Ghose (2000), Thomas and Shaple (2000), Subramanin (2000)]. This is mainly due to dormant sovereign debt market in India prior to the financial sector reform. An estimation of the sovereign yield curve would provide an indication of the prices that can be reasonably expected at primary auction. This in turn would help RBI to manage debt successfully. An analysis of yield curve would help the financial institution to manage their portfolio efficiently.

Considering the importance of yield curve analysis in the Indian context, the present chapter attempts to provide a detailed analysis of sovereign yield curve. The structure of the chapter is as follows: Section 4.1 presents conceptions issues. Section 4.2 deals with yield curve for India. Section 4.3 provides the shape and shift in the yield curve and its implication. Section 4.4 offers summary and conclusion.

SECTION 4.1

Meaning and Usefulness of Yield Curve

The yield to maturity (YTM) is the true rate of return investors would receive if the securities were held until maturity. In other words, yield is the discount rate that determines the present value of a single payment at a given time. Conventionally, the yield to maturity (or internal rate of return) of a bond maturing n years at a given time t is the single rate (r) at which the price of a bond is equal to the present value of the stream of cash flows (P). It is derived from the bond

price equation, constraining all cash flows to be discounted at a single rate. The yield relation is expressed as: -

$$P= C/(1+r) + C/(1+r)^2 + \ldots\ldots\ldots+ C+F/ (1+r)^n \ldots\ldots\ldots\ldots(1)$$

Where, F represents Principal.

Yield rates (also called spot interest rates) are sometimes expressed as function of (residual term to) maturity and this is known as the term structure of interest rates. The graphical representation of the function is called the yield curve. Spot rates are not directly observable since there are few pure discounted bonds of maturities beyond one year. Hence, spot rates have to be estimated from the yields on coupon bonds by means of a term structure model The YTM is typically stated as annual rate of interest though it is derived on the basis of semi annual compounding of interest. The term structure on any given date is determined exclusively by the bond prices quoted on that day

The curves actually observed show a great variety of shapes; however, the general perception is that the curve will be upward moving up to a point and then gets to be flattened. The most general form of yield curve is the one depicted in Fig-4.1.The yield curves empirically obtained are normally based on yearly, quarterly, monthly, weekly or daily market observations.

FIGURE-4.1

YTM (%)

TERM TO MATURITY
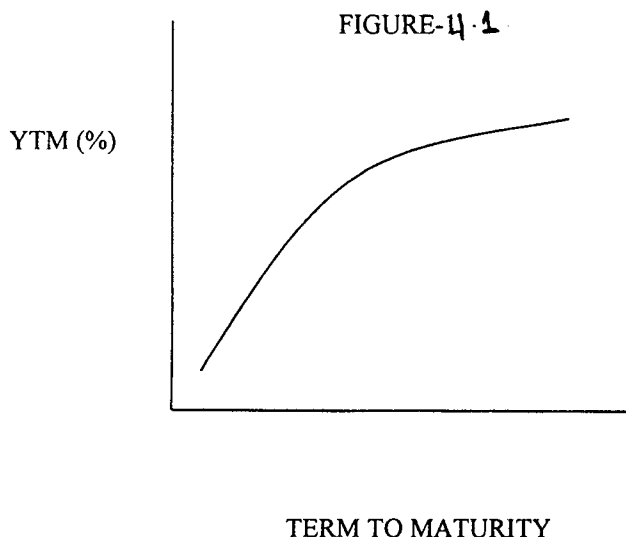
4.1.1 Construction of Yield Curve

For the measurement of YTM, the most suitable bonds are the pure discount bonds such as the treasury bills and zero coupon bonds as these securities do not involve periodic coupon payments. So, an ideal yield curve could be constructed on the basis of zero coupon bonds with

wide ranging maturities alone. However, in India, zero coupon bonds have limited maturity only up to 5 years. Hence, yield curves need to be constructed on the basis of coupon bonds. Coupon bonds are not suitable for yield curve analysis, because there are intermediate cash flows which are supposed to be re-invested at the same discount rate. For example, if the yield rate an a coupon bond maturing after 10 years is 12 per cent, then it is assumed that all coupons from this bond are re-invested at 12 per cent rate. So, yield curve construction based on coupon bonds can be constructed by assuming coupon bonds as sum of individual zero coupon bonds.[1]

4.2.1 Importance of Yield Curve

The yield curve is one of the most important indicators of the level and changes in interest rates in the economy. Any change in rates across the maturity spectrum can be observed by comparing the position and the slope of yield curves for different periods. It is true that yields on government securities form only one part of a series of yield rates that prevail across the financial system of a country. However, the importance of the yields on the government securities lie in the fact that they form the basis of this structure of yield rates in the economy. The yield curve has the following important applications.

(1) **For Monetary Policy**: In a modern and dynamic economy, instead of relying on a few indicators, one should consider a wide range of economic indicators for guiding monetary policy decisions. In this regard, the information derived from bond prices on market expectation of future inflation and interest rates is considered very important. Earlier, past and current data on variables like measures of money supply, inflation, growth rate of the economy were considered reasonably adequate for policy formulation by a government or a central bank. However, now there is recognition of the need to know market's expectations about the future values of the key macro-economic variables. The yield curve contains the expectations of future values of macro-economic fundamentals. The term structure of interest rates and a comparison of nominal and index-linked government bond prices provide useful information on market expectations about future movements in inflation.

(2) **Management of Public Debt**: - The slope and shape of the yield curve helps authorities to manage public debt. For example, if the yield curve is steep, the government can reduce the cost

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[1] For procedure of estimation of yield curve see McCullouch (1971,1975), Shea (1985), Nelson and Siegel (1987), Nag and Ghose (2000), Subramanin (2000).

of borrowing by shortening the maturity of securities and when the yield curve is flat or inverted government can reduce the average cost by borrowing by long-term securities.

(3) **Measurement of Market Risk**: Market risk refers to the risk of loss in and off balance sheet positions of the financial institutions due to adverse movements in market prices. Though in India, financial institutions are not exposed to market forces as much as they are in developed countries, the magnitude of market risk faced by them is expected to increase with progressive deregulation of the interest rates and increase in the size of their current portfolio. Commercial banks in India are not allowed to trade in commodities and derivatives, and equities forms a very small part of Indian bank's portfolio. Hence in Indian case, market risk can be approximated by the sum of interest rate risk and foreign exchange risk affecting the debt portfolio of a bank. Measurement of market risk presupposes the existence of a proper yield curve as market risk is measured with respect to the market value of the debt portfolio. The existence of a yield curve also facilitates pricing (marking to market) of securities that were not traded on the reference date.

The yield curve has got other uses, viz. (a) it helps in pricing of bonds and loans to public corporation and local authorities. One important point that need to be mentioned here is that in a very regulated financial market, the informational content of a yield curve is relatively less as the slope of the yield curve is partly determined by the deliberate policy of the central bank. However, as the financial market become more and more deregulated, the informational content of the yield curve rises progressively.

SECTION 4.2

Yield Curve Analyses for India

There are at least two competing theories that attempts to explain the term structure of interest rates, viz., expectation theories and market segmentation theory. The expectation theories can be divided into three major categories, viz., the pure expectation theories, liquidity theory and preferred habitant theory. According to the expectation theory, the shape of the curve can be explained by the expectations of investors about future interest rates. If short-term rates are expected to be relatively low in the future, then the long rates will be below the short rate. Similarly, long rates will exceed the current short rate if there is an expectation that rates

would be higher in the future. A positively sloped yield curve implies that spot interest rates are expected to rise in future while a negatively yield curve implies the reverse. A flat yield curve implies the stability in spot rates while a humped yield curve implies that the interests are expected to rise in the intermediate horizon followed by decline in the long term. The liquidity theory asserts that in addition to market expectations regarding future short-term rates the liquidity premium or risk premium also matters in explaining the observed shapes of the yield curve. According to market segmentation theory, insurance companies, pension funds and even retired persons will prefer the long rather than short-term securities to avoid the possible fluctuations in interest rate. On the other hand commercial banks or corporate investors may prefer liquidity and therefore short-term issues. Investors thus have preferred habitat and the markets are likely to be segmented, with yields being determined by the factors by the demand and supply in each market. Hence, the market segmentation theory predicts that the shape of the yield curve is explained by the asset-liability management constraints. The slope of yield curve is usually best explained by a combination of the afore-mentioned theories.

Let's now move on to a discussion of the yield curve for India. The government securities market happens to be the largest segment of bond market in India. The construction of yield curve is essentially an exercise in reaching a compromise between theoretically desirable properties and practical convenience. You have to adjust the prices of securities when there are taxes on bonds. In our discussion we use the monthly yield rate given by RBI for the period 1996 to 2000.

In India, yields on short-term bonds are likely to be influenced by liquidity consideration and monetary measures. While the medium and long term securities are likely to be influenced by market expectations about future real interest rates, inflation expectation and exchange rate movements, it may also be the case that many of the participants do not have a view on future behaviour of exchange rates and interest rates. The yield rates on short-term securities can change dramatically when the central bank follows an active monetary policy operation. They can also change if there are significant foreign exchange inflows/outflows in the short run. In India yields on government securities are market related not market determined. The main reason is that the RBI participates as non-competitive bidder in the primary issue of 91-day Treasury bills and all dated securities. This makes the cut-off yield rate in the primary market, market related but not market determined. Given the link between the primary and secondary

market, this also implies that the yields in the secondary market are market related but not market-determined. However, there is some argument for the central bank to play the role of a non-competitive bidder, as when competition is low this might be necessary to prevent collusion amongst the bidder.

There are three curves, for three months that are displayed in Fig-4.2.4. The yield curves for 1996-97 is almost flat except the maturity period for short end. This implies that expectation about spot interest rate is stable in near future. There was fall in short-term yield rates due to easy liquidity condition following a reduction in CRR from 14 per cent to 10 percent. The yield rates declined across the maturity period from May 1996 to May 1997. On point to point basis the yield rate for 10-year maturity declined by 108 points from May 1996 to May 1997. The yield rate for 1-year and 5-year had declined from 12.51 per cent and 13.68 per cent to 9.93 per cent and 12.55 per cent during the same period. This implies that on a point-to-point basis the decline was of the order of 208 and 113 basis points. Same pattern is also observed in the case of Treasury Bills yield rate. The yields on 14-day, 91-day, 182 day and 364-day decreased by 334, 662, 389 and 407 points from May 1996 to May 1997, indicating easy liquidity condition in the economy. The yield difference between different months is presented in Table 4.2.1. Yield curve for 1997-98 is displayed in Fig –4.2.5. The curves are upward sloping indicating market expectation of rise in spot interest rate.

The yield curve for May 1997, which was upward slopping moved down in March 1998. The yield rates decreased across the maturities from May 1997 to March 1998. The yields on 1-year, 3-year, 5-year and 10-year declined by 10, 167, 148 and 135 basis points during this period. When we compare yield rate in 1996-97 with 1997-98, we find a general decline in yield rates across the maturity spectrum due to relatively easy liquidity condition and lowering of inflationary expectations in 1997-98. It is generally believed that while the short-term yields are most affected by the liquidity conditions in the market and Reserve Bank's monetary policy. The long-term yield rates are most affected by inflationary expectations, which determine the size of inflation premium. The decline in long-term yield rates in 1997-98 can be ascribed to lowering of inflationary expectations in 1997-98 due to low levels of inflation in 1996-97 and in 1997-98. Inflation measured in WPI (on average basis) was only 6.4 per cent in 1996-97 and declined 4.8 per cent in 1997-98 as compared to 10.2 per cent during the period 1990-91 to 1995-96. In 1997-98, the yields on ten-year bond ranged from 10.86 to 13.43 as compared to the range of 13.67-13.95 in 1996-97. This provides evidence in

favour of expectation theory according to which the yields on long-term bonds reflect expectation regarding the future real rate of interest rate (i.e. nominal interest rate adjusted for inflation). The data do not provide any support to market segmentation theory during this period. The yields on Treasury Bills in 1997-98 are strengthened reflecting tight liquidity condition. Yields on 13-day, 91-day, 182-day and 364-day increased by 157, 237, 20 and 72 points from previous year respectively.

Figure 4.2.❶ represents yield curve for 1998-99. All the three curves are upward sloping. Yield rates on bonds increased from May 1998 to October 1998 but declined in March 1999. On a point to point basis 1-year yield decreased by 4 basis point from May 1998 to October 1998 and again it decreased by 24 basis point at the end of March 1999. Yields on 3-year bond increased by 23 basis point and then declined by 46 basis point during the same period. The yield on 1-year, 3-year and 5-year increased from 10.49, 11.04 and 11.48 at the end of March 1998 to 10.65, 11.19 and 11.55 at the end of March 1999. On the point-to-point basis 1-year yield increased by 15 basis point. In the medium-term segment, the 5-year yield rate hardened from 11.48 percent in March 1998. Consequently, the 5-year yield rate strengthened by 7 basis point during 1998-99. At the larger end, the 10-year yield rate declined from 12.12 per cent in March 1998 to 12.03 per cent in March 1999, recording a declined of 9 basis point during 1998-99. The trends in the yield movements in the government securities during the 1998-99 showed that short-term rates responded quickly and pronouncedly to changes in monetary policy. Long-term rates exhibit somewhat sticky behaviour reflecting the ripple impact of policy changes in the economy. The yields on 14-day, 91-day and 364-day declined by 150, 79 and 45 basis point respectively in 1998-99, where as the yield on 182-day Treasury bills increased by 127 basis point. This reflects easy liquidity condition in the economy.

The yield curves for 1999-00 were upward sloping indicating a positive slope. You can see that one humps in yield curve in October 1999. The hump is around seven-year maturity. As mentioned earlier, the market segmentation theory postulates that individual investors are restricted to specific maturity sectors, they do not have complete flexibility across maturity bands. Hence, the relative demand and supply conditions determine the interest rate in any given maturity band largely independent of interest rates in other maturity bands. In other words, the yield curve represents a series of sub-markets of funds. The yield rates declined from December, 1999 to march, 2000 across the maturity except at the short end. (Fig-4.2.❷). Yield rates on 1-year, 3-year, 5-year and 10-year declined from 10.65 per cent, 11.65 per cent,

11.94 per cent and 12.29 per cent respectively at end-march 1999 to 10.38 per cent, 10.35 per cent, 10.44 per cent and 10.85 percent at end-march 2000. This implies that the yield curve moved successively down during 1999-2000. On point-to-point basis the yield for 1-year, 3-year, 5-year, and 10-year declined by 27 basis point, 84 basis point, 111 basis point and 118 basis point between end march 1999 to end March 2000. The yields on treasury Bills shows mixed result. Yields on 14-day and 91-day increased by 162 and 150 basis point between end-March 1999 and end-March 2000. But yields on 182-day and 364-day declined by 43 and 30 basis point during the same period. During this period RBI reduced CRR from 11 per cent to 8 per cent. The Reserve bank also cut the fixed repos rate from 7 per cent to 5 per cent. Responding to monetary signals and enhancing measures, long-term interest in all segments of the financial sector, viz., the government securities, market credit market and private bond market, softened during 1999-2000. Inflation level also declined from 6.9 per cent in 1998-99 to 3.3 per cent in 1999-00 on average basis according to WPI index. Yield rates declined across the maturity spectrum from 1998-99 to 1999-2000 following the stable money market and the absence of major domestic and international constraints. All the above factors might contribute to the declining of yield rate on government securities.

The yield curve successively moved downward from March 2000 to May 2000. But moved up at the end of August 2000. Yield rates increased from March 2000 to August 2000 across the maturity spectrum. But yield rates on Treasury bills declined during the same period. We also found two humps in yield curve for August 1999 and March 2000. The humps are around 4-year and 12 year maturity bands. When there are humps in the yield curve, we know that this supports the market segmentation theory. In our case, a hump in the yield curve would imply that the supply was more than the demand in a relative sense for intermediate maturity range than those observed at either end of the hump. This implies that yield curves were not smooth in the Indian case (see appendix 4.1).

This segmentation of the gilt market has significant implications for interest rate targeting. An active policy of interest rate targeting can influence the entire range of maturities in the gilt market if it is very closely integrated. It is well known that the monetary authorities can effectively act upon only the short end of the market. However, there are distinct largely independent sub-markets, the signals emanating from the monetary authorities may fail to propagate beyond the short end of the gilt market in a smooth and frictionless way. This

results in loss of effectiveness of the monetary policy in influencing the targeted real and financial sector variables in the desired way.

Though the lack of smoothness in the yield curve indicates continuing lack of depth of secondary market, another indicator (the aggregate value of outright and repo transactions in government of India dated securities) points to increasing maturity of the gilt market in India. This is due both to increase in the number of participants in the gilt market and high trading activity on the part of some institution like multinational banks, private corporate and mutual funds. Usually the maturity of a market is reflected both in the price and volume data. It appears that in the Indian case, the impact of the increasing maturity has already reflected in the quantity side. However, its impact on the price side is yet to be felt. Table-4.2.1 represents the yield differences from its previous year across the maturities spectrum. It is seen that in all the years yields have declined from its previous year except in1998-99. Actually in this year yields on long-term securities declined from 1997-98.

Table 4.2.1 Average Yield Differences According to Maturity-wise

Term To Maturity	1997-96	1998-97	1999-98	2000-1999
1	-2.58	-0.10	0.35	-0.27
2	-1.78	-1.56	0.22	-0.74
3	-1.29	-1.67	0.15	-0.84
4	-1.31	-1.82	0.07	- 0.98
5	-1.13	-1.48	0.07	-1.11
6	-1.22	-1.50	0.00	-1.14
7	-1.23	-1.40	-0.25	-1.12
8	-1.18	-1.43	-0.17	-1.12
9	-1.13	-1.40	-0.14	-1.14
10	-1.08	-1.32	-0.08	-1.17

The yield difference between March and May, and March and August 2000 is shown in table 4.2.2. From Table 4.2.2 it is evident that yield rates increased from March 2000 to May 2000, but softened in August 2000. Yields on 1-year, 3-year, 5-year and 10-year securities increased by 101, 77, 61 and 50 basis point in May 2000 but decreased by 43, 46, 58 and 52 basis point in August 2000.

Table 4.2.2 Average Yield Differences

March-May	March-August
1.01	-0.43
0.85	-0.49
0.77	-0.46
0.64	-0.6
0.61	-0.58
0.58	-0.54
0.57	-0.62
0.55	-0.56
0.52	-0.52
0.50	-0.51
0.4	-0.54
0.13	-0.8
0.3	-0.62
0.41	-0.52
0.44	-0.49

SECTION 4.3

4.3.1 Volatility in Yield Rates: - It is generally accepted that the short-term yields are more volatile than long-term rates because short-term yield rates are more sensitive to monetary policy and liquidity condition in the economy. They are also influenced by external inflow and outflow of foreign exchange. We tried to testify this hypothesis in respect of our data. For this purpose we calculated average yield spreads of dated securities over 91-day Treasury bill yield and over 1-year maturity yield. The difference between the long-term yield and the short-term yield is known as the yield spread. Table 4.2.3 represents yield spreads over 91-day Treasury Bills.

Table 4.2.3 Means and Standard Deviation of Term Structure Variables (Over 91-Day TBs)

Variables	Maturity period									
	1	2	3	4	5	6	7	8	9	10
Yield spread (avg.)	1.64	2.3	2.57	2.8	2.95	3.07	3.19	3.35	3.34	3.48
STD	1.42	1.94	2.01	2.07	2.1	2.07	1.95	2.01	2.02	1.95
C.V	86.3	84.6	78.4	74.6	71.2	67.3	61.3	60.1	60.4	56.1

Avg. Average yield spreads
STD. Standard deviation
CV. Co-efficient of variation

Table 4.2.4 Mean and Standard Deviation of Term Structure Variables (Over 1-year maturity)

Variables	Maturity Period								
	2	3	4	5	6	7	8	9	10
Yield Spread (average)	0.59	0.85	0.98	1.14	1.27	1.41	1.56	1.63	1.63
Standard deviation	0.59	0.71	0.75	0.75	0.74	0.73	0.72	0.71	0.71
Co-efficient of variation	100	83.4	76.3	65.4	58.3	52.2	46.2	43.5	42.7

Table 4.2.3 represents yield spreads over 91-day Treasury Bills. Average yield spreads is going up as against the maturity during the sample period, and this caused capital losses on long zero-coupon bonds, which outweighed the higher yields offered by these bonds. There is a specific pattern for standard deviation. But co-efficient of variation is declining as the maturity period increases. This implies that volatility of short-term yields is more than long-term yields in Indian case. Table 4.2.4 represents the yield spreads over 1-year maturity. Average yield spreads shows an increasing function of term to maturity. There is no specific pattern as far as standard deviation is concerned. But standard deviation is increasing up to maturity period four and then began to decline. The better measure of volatility is co-efficient of variation. Co-efficient of variation is a decreasing function of term to maturity. This implies that short rates are more volatile than medium rates, which in turn is more volatile than long rates. We also observe that volatility has increased across all maturity bands and over the period.

4.3.2 Nature of Shift of the Yield Curve: - Our interest lies in knowing whether or not the shift in the yield curve between any two contiguous years has been parallel. We are focusing attention on contiguous years, as normally an investor would be concerned with the nature of shift at an interval of a week or a month or a year depending upon the time interval for assessment of

portfolio. We also note that all such shifts might appear to be non-parallel unless a smooth curve is drawn to represent the original curve. We found that in four cases there is a parallel shift in yield curve, viz., (a) between September and October 1997, (b) February and March 1999, (c) October and November 1999, and (d) January and February 2000. Fig- 4.3.$ represent the yield curves which belongs to parallel shift. The significance of non-parallel shift lies in the fact that conventional measures of riskiness of a portfolio such as duration and convexity are not adequate when shifts in yields curve are not parallel.

There are too many discontinuities, erratic humps and slumps in these yield curves in the Indian case. The utility of a yield curve as an analytical tool for various policies depends on the nature of the market. A gilt market, or for that matter any bond market, if it has sufficient depth and breadth in terms of quantity and quality of traded instruments, will include market and speculators who are ready to adopt a trading position on the basis of their perceptions about the market prices. However, such players and market makers are yet to emerge in the Indian context. Most of the traders in the Indian market trace their origin in the asset-liability mis-match of participating institutions or in their statutory obligation. As a result, the prices are reflective more of the specific condition of buyer and seller rather, than general condition of current and future markets.

SECTION 4.4

Summary and Conclusion

Yield curve is a very important tool with many applications in the modern economy. It can be used for debt management, monetary management, measurement of market risk etc. The construction of sovereign yield curve is possible in case of India due to increase in the secondary market transactions in government securities of varying maturities in recent years. Liquidity condition and monetary policy influence the yields on short-term securities. While yields on medium and short-term securities are influenced by market expectation of future interest rates and inflation level. Most of the yield curves are upward sloping supporting the market expectations theory. The data also support the liquidity and market segmentation theory. Since yield curves were not smooth as in the case of developed countries, monetary authorities can not effectively influence the interest rates. Yield spreads are an increasing function of maturity. Short-term yields are more volatile than long-term yields.

Government securities market is gradually reaching a stage of maturity in India. This is due to both increases in the number of participants in the gilt market and high trading activity on the part of some institution like multinational banks, private corporate and mutual funds. Generally the maturity of a market is reflected both on the price of the securities and volume of trading. But our study shows that, in the Indian case, the impact of the increasing maturity has already reflected in the quantity side. However, its impact on the price side is yet to be felt. That's why Yield curves are not smooth in the Indian case. This implies the loss of effectiveness of the monetary policy.

Figure 4.2.9 Yield Curve for Dated Security

Yield curve for 1996, 1997 1nd 1998

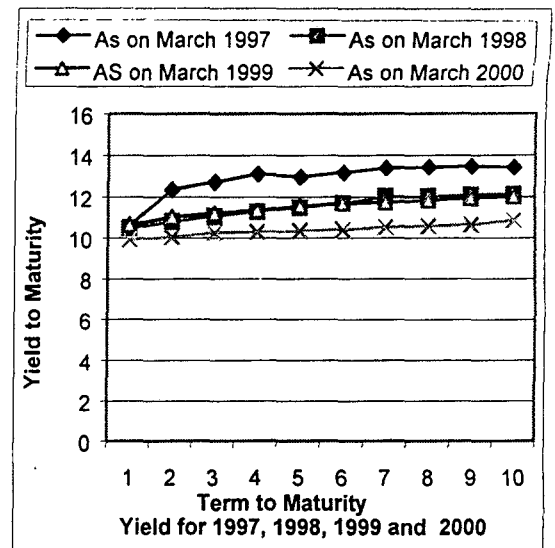Yield curve for 1998,1999 and 2000

Yield curve for 1996-97

Yield for 1997, 1998, 1999 and 2000

Figure 4.2.5 Yield Curve for Dated Security

Yield curve for 1999-2000

Yield curve for 1999-2000

Yield curve for 1996-97

Yield curve for 199-2000
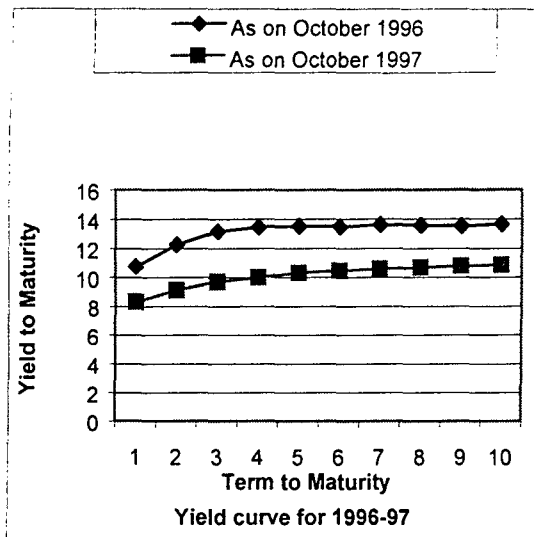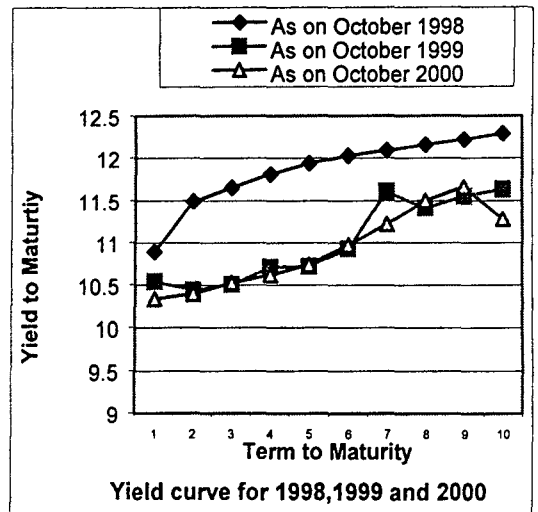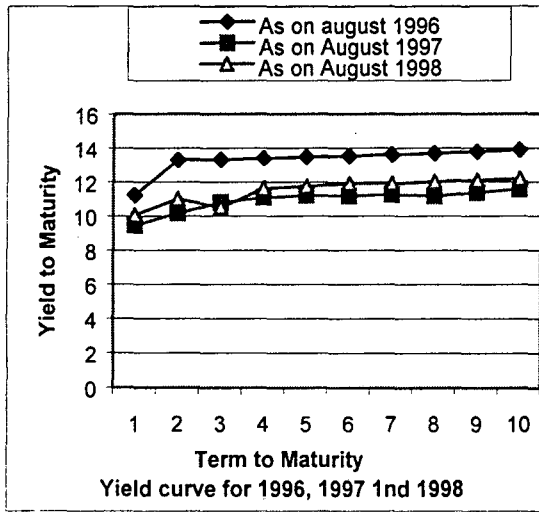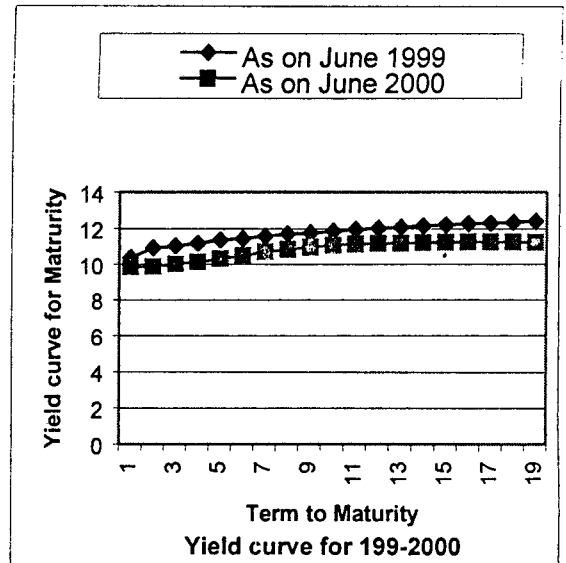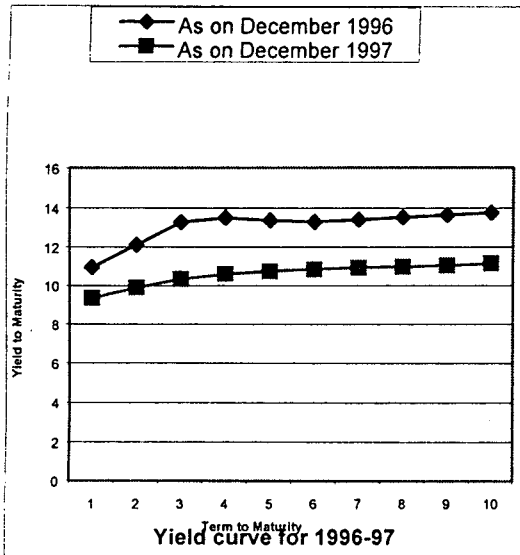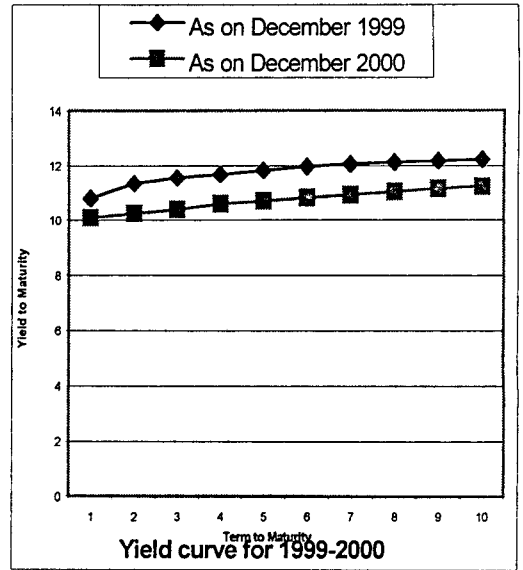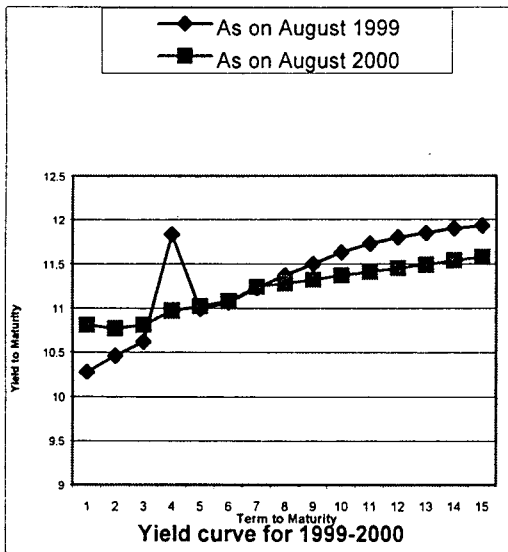
Figure 4.2.1 Parallel Shift in Yield Curves

Yield curve for 1997-98

Yield curve for 1999

Yield curve for 1999

Yield curve for 2000

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Figure 4.14 Yield Curve for Treasury Bills

As on May 1996
As on May 1997

Yield to Maturity

14-DAY 91-DAY 182-DAY 364-DAY

Term to Maturity
Yield curve for Treasury bills 1996-97

As on May 1998
As on March 1999

Yield to Maturity

14-DAY 91-DAY 182-DAY 364-DAY

Term to Maturity
Yield Curve for Treasury Bills 1998-99

As on may 1997
As on March 1998

Yield to Maturity

14-DAY 91-DAY 182-DAY 364-DAY

Term to Maturity
Yield curve for Treasury bills 1997-98

As on April 1999
As on March 2000

Yield to Maturity

14-DAY 91-DAY 182-DAY 364-DAY

Term to Maturity
Yield Curve for Treasury Bills 1999-00

Chapter V

INTERNAL DEBT MANAGEMENT IN INDIA

Introduction

The domestic liabilities of Central and State governments increased from 40 per cent in 1982 to 59 per cent of GDP at current prices in the end of March 1990 and further increased to 60.7 per cent at the end of March 2000. The annual percentage change in Central government internal debt was 32 per cent during the period 1991-92 to 1999-2000. Total marketable debt of the government sector was 16.6 per cent of GDP in 1991-92, which increased to 22.8 per cent of GDP by end March 2000. (Table 3.1.2) So the increase in marketable debt of the Central government poses the problem of managing public debt.

The maturity and ownership pattern of government securities holds an important position in the study of public debt as it has implications for fiscal as well as monetary policy. The size of the debt is determined by fiscal policy. While the ownership and composition of debt is influenced by an active internal debt management policy which is a prerequisite for an effective monetary policy. The maturity pattern indicates the composition of public debt i.e., whether the debt is in favour of short term, medium term or long term, depending upon the monetary/liquidity position of the market. There is no set pattern in evidence with regards to the maturity. For instance, in the USA and Canada, they have short-term debt while in the UK, they have long term debt. In India we have both short and long term debt. In this regard, the yield curve analysis (Chapter IV) would help for managing debt.

The present chapter tries to analyse the debt management policy in India in the pre-reform as well as the under reform period. Since the Maturity pattern of State government's securities is not available, we have excluded State government's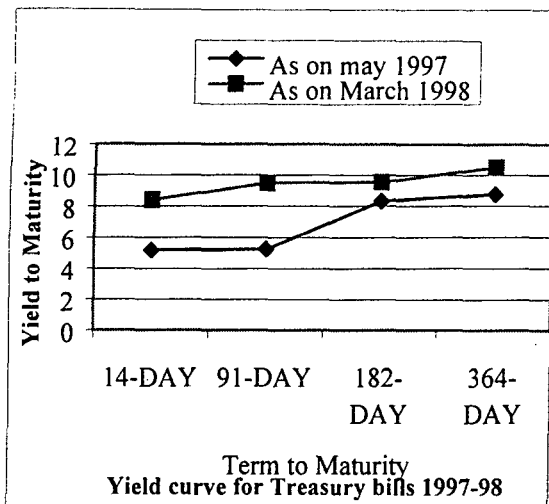 securities from our analysis. In our analysis we have also excluded outstanding of Treasury Bills. This chapter is structured as follows: Section 5.1 deals with the maturity pattern of Central government marketable debt. Section 5.2 analyses debt rolling. Section 5.3 deals with the question whether government should borrow in long or short. Section 5.4 gives the summary and conclusions.

SECTION 5.1

Maturity Pattern

The marketable debt of Central government can be divided into three categories such as (i) short-dated securities maturing within 5 years, (ii) medium term securities maturing between 5 and 10 years. (iii) long-dated securities maturing above 10 years. Following the recommendations of the Chakravarthy Committee Report, the maturity period has been reduced from as high as 31 years prevalent during the period 1982-1986 to 20 years in the period between 1987-1990.

There has been a shift in the maturity structure of Central government securities from the pre-liberalisation period to post-liberalisation period. In the pre-reform period the composition of Central government securities was in favour of long-dated securities since its relative share increased from 48.9 per cent in 1971 to 72 per cent in 1981 and further to 85.8 per cent by the end of March 1991. This implies that in over 20 years outstanding of long-dated securities increased by 36 per cent. The share of short dated securities declined from 36.6 per cent in 1971 to 11.2 per cent in 1981. This decreasing pattern of short-dated securities continued up to 1991-92. It was 7.4 per cent by March-end 1991-92, indicating a net decline of 28 per cent. But the share of medium dated increased from 14.5 per cent to 16. 6 and then declined to 5.6 per cent during the same period (Table 5.1.1). The implication of this is that a huge overhang of long dated securities leads to market expectation of high interest premium on longer maturity debt. The benefit of maturity structure in favour of long-term loans is that it does not create pressure on short-term interest rates.

But the composition of Central government dated securities tended to favour the short and medium term securities. The share of short dated securities, which was 7.4 per cent in 1992, increased to as high as 45.2 per cent in 1997 and it declined to 30.2 per cent by March-end 2000. The share of medium dated securities increased from 16.8 per cent in 1991-92 to 29.0 per cent in 1996-97 and further to 45.5 per cent by end March 2000. The share of long-dated securities declined from 75.8 per cent to 25.8 per cent in 1997 and further to 24.3 per cent at the end of March 2000.

Table 5.1.1 Maturity Structure of Central Government Dated Securities (per cent)

Year	Below 5 Years	Below 5 to 10 Years	Over 10 Years
1970-71	36.6	14.5	48.8
1972-73	25.7	16.0	58.3
1973-74	16.1	22.6	61.3
1974-75	16.8	22.0	61.2
1977-78	15.1	17.0	67.9
1979-80	13.6	14.3	72.0
1980-81	11.9	16.6	71.6
1981-82	13.2	16.4	71.3
1983-84	12.4	14.2	73.4
1984-85	11.2	14.9	73.9
1985-86	10.2	15.5	73.6
1986-87	10.5	14.3	73.8
1987-88	9.8	9.8	80.4
1988-89	9.2	9.0	81.8
1989-90	11.0	6.0	83.0
1990-91	8.6	5.6	85.8
1991-92	7.4	16.8	75.8
1992-93	8.1	14.2	77.8
1993-94	21.4	22.3	56.3
1994-95	25.3	27.4	47.3
1995-96	38.4	30.3	31.3
1996-97	45.2	29.0	25.8
1997-98	41.0	40.8	18.2
1998-99	32.3	52.1	15.8
1999-2000	30.2	45.5	21.3

Source: RBI, Report on Currency and Finance, Various Issues.

Table 5.1.2 Weighted* Average Time and Cut-off yield of New Issues

Year	Average Time (in years)	Cut-off yield (%)
1971-72	17.49	5.35
1972-73	11.27	5.27
1974-75	12.61	5.39
1975-76	12.76	6.35
1978-79	19.18	6.75
1980-81	18.14	7.03
1982-83	17.07	8.36
1983-84	18.94	9.29
1984-85	16.43	9.98
1985-86	20.37	11.08
1986-87	13.53	11.38
1987-88	14.64	11.25
1988-89	13.76	11.4
1990-91	14.88	11.4
1991-92	12.48	11.41
1992-93	12.47	11.78
1993-94	7.24	12.46
1994-95	6.14	12.63
1995-96	6.48	11.91
1996-97	4.9	13.75
1997-98	6.5	13.69
1998-99	7.78	12.01
1999-00	12.6	11.77

Source: RBI, Report on Currency and Finance, Various Issues.
*Weight is given according to volume.

It is clear from Table 5.1.2 that average time of new issues ranged between 11.27 to 20.37 during 1972 and 1991. Through out the seventies and eighties the average time of new issues remained more than 10 years. This implies that the government tries to lengthen the maturity profile of dated securities. The authorities tried to avoid the debt roll over problem. So we can conclude that debt management policy in pre-reform period was in favour of long term loans. This reflects

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inter-temporal choice in favour of spending more (through issuing new long-term securities) in the short run over the revenue of the government.

The cut-off yield of new issues increased continuously throughout the seventies and eighties. It was 5.35 in 1972 and increased to 9.98 in 1984-85 and further to 11.41 per cent at the end of March 2000. (Table 5.1.2) Actually the government did not optimise interest cost of borrowing in the pre-reform period. In the reform period the debt authority tried to shorten the maturity structure of outstanding marketable debt by issuing short and medium term securities. The major policy change after 1991-92 was the greater reliance on market borrowing to finance government deficit. The increased recourse to borrowing from the market has put pressure on interest rate and triggered concomitant policy response to minimise the cost of borrowing by placing a large part of borrowing at the shorter end of the market. This has compressed the average maturity of new issues and given rise to the problem of debt rollover. Average maturity period of new issues has declined from 12.47 years to 4.9 years in 1996-97, but after then it increased to 12.6 years by end March 2000. The average cut-off yield fluctuated from year to year and ranged between 11.77 per cent and 13.75 per cent during 1991-92 and 1999-00. From 1997-98 onwards the cut-off yield on new issues has softened, following the easy liquidity condition and the falling inflation level.

SECTION 5.2

The Problem of Debt Rolling

In the reform period major portion Central government borrowing was at short and medium-end. This combined with the existing stock of marketable debt and debt servicing tend to push up the magnitude of market borrowing in excess of absorptive capacity of the market and this could have a three-fold implication on the stability of the financial sector. Firstly, it puts pressure on the interest rates in the government securities market, which leads to hardening of interest rates in other market segments like credit market, money market and capital market. Another problem is that in the presence of high stock of domestic debt, it leaves little scope for the debt management authority to minimise the borrowing cost in the face of continuous increase in bond supply. This may lead an increase in interest rate premium on fresh loans and therefore, hardening of yields. Secondly, a high stock of domestic marketable debt can raise future interest

rate uncertainty and shift the market preference for short-term securities, giving rise to adverse inflation expectation. Thirdly, high levels of domestic debt and interest rates pose challenges for the management of capital inflows in the context of liberalisation of capital account. High level of interest rate provides incentives for inflow of short-term capital (portfolio investment) into the economy. Hence, it is necessary to manage these flows and carry out sterilisation operation in the money market, which may require raising the interest rates to unsustainable levels.[1]

Shortening of maturities in the reform period however led to some bunching of redemption of securities and there is a need for frequent rollovers from the market. The repayment burden in the nineties has gone up from Rs. 1,418 crores in 1992 to Rs. 28,862 crores in 1993-94 and further to Rs. 41,321 crores in the end of 2000-01. This is due to placing of larger government borrowing at the shorter end of maturity during 1990's. Considering the repayment burden, all borrowing in 1999-00 was above 5 to 20 years, in order to lengthen the maturity profile of market loans. Table 5.2.1 shows the repayment profile of market loans of Central government.

Table 5.2.1 Repayment on Market Loans (Rs. in crores)

Year	Gross Market Borrowing	Repayment of Market Loans	Ratio of Gross to Net Borrowing*
1991-92	8,919	1,418	0.84
1992-93	13,885	4,424	0.76
1993-94	50,388	21,862	0.56
1994-95	38,108	18,034	0.52
1995-96	40,509	13,719	0.66
1996-97	36,152	9,796	0.76
1997-98	59,637	19,143	0.67
1998-99	93,953	31,050	0.67
1999-2000	99,630	26,533	0.73
2000-01(BE)	118,704	41,321	0.64

Source: RBI, Report on Currency and Finance, various issues.
BE   Budget Estimates
*Net market borrowing is defined as the difference between gross borrowing and repayment liabilities.

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[1] In the face of continuous inflow of short-term capital, Central bank has to sell the securities in the open market to sterilise the short-term capital. Interest rate on securities may go up due to continuous upward pressure caused by frequent selling of government papers. But in the long continuous strilisation is difficult.

Table 5.2.1 reveals that in the 90's a major portion of the rising proportion of borrowed funds is used for financing current consumption. The high overhang of debt has resulted in bulging repayment obligations. The repayment liability of the interest bearing public debt of the Central government witnessed a steady rise from Rs. 31,171 crore in 1991-92 to Rs. 86,962 in 1997-98. This has further gone up to Rs. 1,08,091 crore in 1998-99. (*RBI, Annual Report, 1998-99.*) Another major worrying factor is that net borrowings were progressively declining. The ratio between gross and net borrowing, which was 0.84 in 1991-92, and had declined to 0.67 in 1998-99. This position had slightly improved to 0.73 in 1999-00 but again deteriorated to 0.64 in 2000-01. (Table 5.2.1)

SECTION 5.3

Should the Government Borrow in Short or in Long?

Growth in India government debt over the last 30 years has helped to revive the vital debate over the best way for the government to manage its liabilities. Central government debt held by the public reached around 50 percent of GDP in the 1990's. Interest outlays roughly equal the entire Central government budget deficit. The summary statistics (Table 4.2.3 and Table 4.2.4) about the term structure presented earlier can help to answer whether the government should borrow in short-term or in long term. Table 4.2.3 shows that for the period 1996-2000 the average yield spread on one-year securities exceeds the yield on 91-day treasury Bills by about 1.64 percent. This suggests that shortening the maturity of long-term securities reduce average interest costs. As you can see the average yield spreads is an increasing function of maturity over 91-day Treasury bills. Table 4.2.4 represents average yield spreads over one-year maturity. Similar pattern of average yield spreads can be found from the Table 4.2.4. It shows that in 1996-2000, 10-year zero-coupon bond yields were on an average about 1.66 per cent above 1-year yields. This suggests that there would be a good saving from shortening the average maturity of long-term government debt. Even if there is little to be gained from permanently shortening the maturity of the public debt, the government could save some interest cost by shortening debt maturity when the yield curve is particularly steep and lengthening when the yield curve is flat. From our data it is evident that yield curves are mostly upward sloping except a few yield curves

which are flat. Again Table 4.2.3 and Table 4.2.4 confirms that average yield spreads is an increasing function of maturity. So our study suggests that the government should shorten its debt by issuing short-term securities, so that it can save interest cost. Opponents of short-term borrowing often argue that it would increase the risk of debt management. While short-term borrowing might be cheaper, on average it would be expensive when short-term nominal interest rates are high. Since long-term bond yields are more stable than short-term yields, the argument runs that long-term borrowing is less risky for the government.

There is one problem with this argument, for it confuses nominal returns with real returns- the latter, presumably, being of primary concern to the government. In nominal terms, the volatility of returns depends on the horizons, with short bonds offering known returns at short horizons and long bonds offering known returns at long horizons. But in real terms, it turns out that long bond returns are more volatile than short bond returns at all horizons.[2] To understand the point intuitively, consider what happens to the government's financial position if its debt is financed long and there is a permanent increase in the inflation rate. The government's future nominal liabilities do not change, but inflation now erodes the real value of the government's fixed nominal payments more rapidly, so the government's financial position is improved. This is reflected immediately in a decline in the market value of the government debt. Conversely, if inflation falls, the real market value of the government debt rises. Thus the government is exposed to the risk of a possible change in inflation. If the government has issued short-term debt, on the other hand, an increase in inflation drives up the government's nominal interest cost; this roughly offsets the faster erosion of the nominal debt by inflation, leaving the government's real position unaffected. While the risks of short-term borrowing are commonly exaggerated, several caveats are worth noting. First, standard deviation and co-efficient of variation are in general an inadequate measure of risk: a more satisfactory analysis would measure risk within the context of an asset pricing model. Second, changes in nominal interest costs may have political effects even if real interest costs are constant. Third, if the government wishes to limit the variability of real return on its debt over long horizons, it can do so most effectively with long term indexed bonds like, floating rate, inflation-indexed bonds, and foreign currency linked debt. Such bonds guarantee investors a fixed long-run real rate of return regardless of variations in inflation, exchange rate and short-term real interest rates.

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[2] Return is equal to the initial yield; minus the change in the yield during the year the bond is held times the maturity of the bond when it is sold. If no change in yield occurs, then the initial yield is the same as the return.

Prior to liberalisation there was no active debt management policy as such and the main feature of debt management policy was to support the government's financing at least cost and risk. But after liberalisation we have an active debt management policy. Now with the development of financial market and monetary instruments our debt management policies are to support and complement monetary policy, to avoid distorting financial market, to minimise over the long-term the cost of meeting the government's financing needs and to ensure that the debt management policy is consistent with monetary policy. Debt management operations also have an impact on banking system liquidity. For this reason, debt management operations may need to be coordinated with monetary and fiscal operations[3]. Most of the industrialized countries use government securities market for monetary policy along with debt management policy. In India both primary and secondary market are used for the conduct of debt and monetary management, by using government securities.

SECTION 5.4

Summary and Conclusion

In the pre-liberalisation period, major portion of the central government borrowing was in long-term. A readjustment in the maturity structure of government debt has taken place after reform. The share of short-term maturity bonds in total securities has recorded a sharp rise from 8.6 per cent to 30.2 per cent between 1991 and 2000. On the contrary, share of long-term bonds declined from 85.6 per cent in 1991 to 21.3 per cent in 2000. This caused the problem of debt rollovers from the market. Repayment of market loans has increased from Rs. 1,418 crores in 1991-92 to Rs. 41, 321 crores in 2000-01. Considering the average yield spread the Central government has done well by shortening the maturity of market loan in order to reduce interest cost.

But from 1998-99 the Central government again tried to lengthen the maturity profile of marketable debt following the problem of debt roll over. It is well recognised that, debt, monetary and fiscal policy should be coordinated with each other for the stability of financial market. Now secondary yield on government securities can be actively use for monetary control

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[3] The government budget and the way it is financed impacts interest rates as well as inflation in the economy. The magnitude of the impacts of fiscal deficit on interest rates and inflation level depends on the size of the fiscal deficit. Fiscal discipline is, therefore important for financial market stability.

and debt management. Shape of the yield curves might help for debt management. In the Indian case yield spreads is an increasing function of maturity. This implies that government could save interest cost by borrowing at short.

Chapter VI

INTERLINKAGES OF GOVERNMENT SECURITIES MARKET WITH OTHER FINANCIAL MARKETS

Introduction

As seen in chapter II India's financial sector in the pre-liberalisation period was repressed i.e., interest rates were regulated. Capital, money, credit and government securities markets were underdeveloped. Deployment of credit was directed by the authorities. The process of transition from financial repression to free operating/ market oriented financial system started form 1990s.

A major objectives of reform process has been to develop the various segments of the financial sector in an integrated way, so that their interlinkages can reduce arbitrage opportunities. (Bhoi and Dahl, 1998) An integrated financial sector helps to achieve higher levels of efficiency in market operations and increases the effectiveness of monetary policy in the economy (Vasudevan and Menon 1978). An efficient, stable and healthy financial sector is critical not only for an overall efficiency in financial intermediation but also forms the bedrock for successful conduct of monetary policy- particularly through indirect instruments (Reddy, 1998). The objectives of the RBI in this regard relate to the development of money, debt and forex market. At the same time, interlinkages between these markets and global financial markets have to be well crafted. The autonomy of the conduct of monetary policy as well as efficiency in the monetary transmission mechanism required an integrated financial market.

The purpose of the present chapter is to find out the degree of interlinkages of government securities market with rest of the financial markets. The chapter is structured as follows: section 6.1 deals with efficiency of financial sector. Section 6.2 analyses the selection of variables. Section 6.3 deals with market efficiency and selection of reference rate. Section 6.4 analyses the result of correlation coefficient. Section 6.5 presents co-integration results. Section 6.6 offers concluding observation.

SECTION 6.1

Efficiency of Financial Sector[1]

The financial sector can be used as an effective channel for the transmission of policy impulses provided the financial markets are competitive, efficient and integrated. A typical competitive financial market has the following characteristics:

    (a) There should be large number of buyers and sellers of the financial product;

    (b) The price of the product is determined by the market forces of demand and supply;

    (c) There should be an active secondary market for the instruments;

    (d) Turnover of the instruments in both primary and secondary markets should be fairly large; and

    (e) Dealers involved in the process of intermediation between buyers and sellers should provide intermediation services at a minimum spread.

Three commonly discussed form of market efficiency is found in the literature, such as weak form of efficiency, semi-strong from of efficiency and strong efficiency. Our analysis is based on weak form efficiency. In ordinary language, a market is said to be efficient if the rate prevailing at any point of time contains all information about the market. If the realised rate contains all information, then the future rate cannot be appropriately predicted. In fact, the future rate may move either way; it can go up, remain steady, or it can go down depending on the information that would be available at that point of time. In other words, the future rates may adapt a path of random walk (Fisher, 1907). One way to find out the random walk hypothesis is by plotting the changes in the rate against time. If the variables follow random walk, one would expect the changes in rate variables to move around zero over a period of time. In other words the series should be a stationary one[2]. This is the case of efficiency of individual market. Along with efficiency of individual markets, effective interlinkages of financial markets depend on some more characteristics. These are:

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[1] Financial sector efficiency reflects efficiency of both financial markets and financial institutions. Financial markets are efficient when market prices reflect all information, so that it is not possible for any trader to earn excess profit, based on the available information. A financial institution could be considered as efficient when it offers competing services at relatively lower price, without exposing it to a higher level of risk. [See Rai (1996), Mester (1996) and Lo and Mackinly (1997).]

[2] A series is said to be stationary if its Mean, Variance and Autocovariance remain the same no matter at what time we measure them.

(a) Financial markets are efficient and the rates are market determined;

(b) Across the broad differences in returns of the financial product are based on the risk and maturity profile of the instruments;

(c) The rates are related to a benchmark or reference rate;

(d) There is free flow of resources from one segments of the market to the other and thereby the arbitrage opportunity is wiped out; and

(e) The rates of various segments of the financial sector move in tandem.

If a financial market is competitive, it is also efficient but an efficient market is not necessarily be competitive. Moreover, if all the segments of the financial sector are competitive, there is a great probability that they are fairly integrated.

SECTION 6.2

Selection of Variables

The instruments available for transaction in both the short-term and long-term markets are given below.

6.2.1 Short-term Instruments (up to one year maturity)

1. Call money / Notice money

2. Certificate of deposits

3. Commercial papers

4. participation certificates

5. Money market mutual fund units

6. Deposit and lending

7. Treasury Bills of various maturities

8. Repo market

9. One month forward premia

10. Three month forward premia

11. Six month forward premia

6.2.2 Long-term Instruments (more than one-year maturity)

1. Dated securities of Central government and State governments

2. Special government securities, like Zero coupon bonds, Deep Discount bonds, Tap stocks, Partly paid stocks, Floating rate bonds, Capital index bonds, etc.

3. PSU bonds

4. UTI units

5. Shares and Equities

6.Debuntures (convertible, partly convertible, Non-convertible)

7. Mutual fund Units various schemes

8. Special instruments such as, Zero coupon bonds, Deep discount bonds, Floating rate Notes, issued by PSU and private sector units

9. Fiscal incentive induced instruments, such as, NSC, NSS, Indira Vikas Patra, Provident Fund, Tax free PSU Bonds, etc.

On the basis of availability of monthly data we have selected twelve variables all together. The variables are:

(a) Call Money rate (CLR)

(b) Commercial paper rate (CPR)

(c) Certificate of deposits (CDR)

(e) Deposit rate (DPR)

(e) Lending rate (LDR)

(f) 91-day Treasury bill rate (G91)

(g) 364-day Treasury bill rate (G364)

(h) Yields on government securities (GSR)

(i) Yields on Industrial securities (ISR)

(j) Price earning-ratio of Bombay Sensex (PERN)

(k) Three month forward premia (FP3)

(l) Six month forward premia (FP6)

We have tried to find out the interlinkages of various monthly rates/returns covering 97 months starting from January 1993 to January 2001. We have excluded Twenty months of reforms starting from 1991-92 and up to December 1992, considering it, as the transition period. Because some of the rates were still under regulation such as deposit rate, lending rate, 3-month and 6-month forward premia.

SECTION 6.3

Testing Market Efficiency and Reference Rate Selection

Testing for the efficiency of financial markets has generated enormous attention. As emphasised by Fama (1970; 1991), any test for market efficiency necessarily involves a joint hypothesis regarding the equilibrium expected rate of return and market rationality. The market efficiency test typically assumes that the expected return is constant over time. It follows that if markets are efficient, the realized returns should be serially uncorrelated.

Most of the empirical studies on interlinkages of financial sector have focused on operating efficiency rather than allocative efficiency [Cole et al.1997]. Financial markets achieve operating efficiency if all the interest rates in financial system move together with a reference rate. There are various empirical approaches to test whether a financial market achieves operating efficiency. Again operating efficiency can be tested for short-horizon and long-horizon. One way to test the operating efficiency is by taking correlation coefficients among the interest rates. However, the statistical correlation coefficient as a measure of market efficiency has been rejected recently in view of non-stationary nature of rate variables. So we mainly rely on time series techniques, test for unit root, and co-integration, in particular for analysing market efficiency.

The first step for co-integration is to identify a reference rate from the class of interest rates prevailing in the financial market. Theoretically, a reference rate is defined as the price of a short-term low risk instrument in a free liquid market. Preferably a reference is identified from the gilt market. Since Treasury bills are risk free (default risk) and most liquid, reference rate should be from this market. Rates from other market may be liquid but not risk free. In addition to these characteristics, it should be statistically well behaving and satisfy some regularity conditions consistent with the theoretical implications. First, it should follow a random walk process that is consistent with the efficient market hypothesis. In an efficient market, all relevant information relating to demand and supply conditions prevailing in the market are supposed to be fully utilised and the rate variable follows a random walk process. Second, the first difference of the reference rate should exhibit a pattern similar to Gausian distribution i.e., independently and identically distributed (i.i.d) process. In simple language it should follow a normal distribution. This criterion is very important in determining a

reference rate when several rate variables are characterised by unit root, and their first difference are also stationary process. In fact, in practice, a number of statistical properties of interest rates including unit root test, and a stylised facts i.e., mean, standard deviation skewness and kurtosis measures are simultaneously taken into consideration while identifying a reference rate.

Figure 6.3.1 represents the plot of the rate variables. All the variables look like non-stationary process except the deposit rate. Another way to check the market efficiency is to plot the first difference of the rate variables. Figure 6.3.2 shows the first difference of rates under consideration. All the rates move around zero mean, except price earning ratio and to some extent call money rate (see appendix 6.1). Hence, call money market and capital market have not achieved the desired level of efficiency. This evidence, however, need to be put to more rigorous tests. We conduct Dickey-Fuller test (DF) and Augmented Dickey-Fuller test (ADF) to verify whether the rates have unit root. Table 6.3.1 represents the unit root test of the rate variables at level and at first difference. The results from DF unit test indicate that interest rate variables (excluding return on Government securities and call rate) are, indeed, non-stationary and have unit root. But all the rate variables are stationary at first difference, hence they are I (1) process in level.

Table 6.3.1 Dickey-Fuller and Augmented Dickey-Fuller test for unit root.

Variables	Level form (DF) (2.89)	First difference (DF) (2.89)	First difference(ADF) (3.50)
FP3	-2.87	-8.59**	-8.87**
FP6	-2.45	-8.40**	-8.87**
CPR	-2.29	-8.76**	-5.87**
CDR	-2.54	-10.75**	-7.59**
G91	-1.72	-9.93**	-7.95**
G364	-1.23	-7.43**	-5.25**
GSR	-3.05*	-12.95**	-9.01**
ISR	-1.19	-10.08**	-6.91**
PENR	-1.66	-7.50**	-5.59**
DPR	-2.44	-9.81**	-6.84**
LDR	-2.71	-9.57**	-7.22**
CLR	-5.52**	-13.69**	-10.62**

Note: figures in Brackets indicate critical value at 5 per cent level of significance.
* Indicate level of significance at 5 per cent.
** Indicate level of significance at 1 per cent.

From Table 6.3.1 it is evident that all the variables are stationary at first difference even at 1 per cent level which means that all the variables follow I (0) stochastic process. This implies that in level all are an I (1) time series, essentially, all follow random walk. ADF values are also significant at 1 per cent level.

After checking the stationarity propoties of rate variables let us now move to select the reference rate from these rates. For this purpose we have reported the basic statistics of various rates in their first difference. (Table 6.3.2)

Table 6.3.2 Basic Statistics of Various Rates (at first Difference)

Rates	Mean	STD	SK	Kurtosis	Normality Ch^2
FP3	-0.06	2.40	-0.35	6.36	76.79 (0.00) **
FP6	-0.06	1.82	0.25	4.43	49.13 (0.00) **
CPR	-0.03	1.00	0.05	0.56	4.72 (0.94)
CDR	-0.06	1.41	1.68	10.69	52.25 (0.00) **
G91	-0.006	0.63	-1.08	4.04	21.18 (0.00) **
	(0.03) @	(0.49)	(-0.01)	(-0.04)	0.22 (0.89)
G364	-0.01	0.39	-0.26	4.19	45.30 (0.00) **
	(-0.01) #	(0.30)	(0.66)	(2.10)	12.41 (0.00) **
GSR	-0.02	2.11	-4.89	47.11	119.09 (0.00) **
ISR	-0.03	0.26	-0.11	3.56	37.93 (0.00) **
PERN	-0.06	2.30	0.51	1.36	8.12 (0.00) **
DPR	-0.02	0.51	1.88	11.46	46.76 (0.00) **
LDR	-0.07	0.49	-0.77	-2.00	38.92 (0.00) **
CLR	-0.02	5.14	-0.23	6.23	77.32 (0.00) **

Figures in the bracket are p-value.
* Implies significant at 5 per cent level.
** Implies significant at 1per cent level.
@ Values of 91-day Treasury bill by dropping 4 observations
 # Values of 182-day Treasury bill by dropping 4 observations

Though CPR satisfies the second property (i.i.d. process) of reference rate, but it does not fulfill the characteristics of a reference rate. It is not the most liquid and risk free instrument. Going by the basic feature of a typical reference rate, the choice of reference rate boils down

to the choice between G91 and G364. Table 6.3.2 shows that standard deviation and skewnes of G364 is smaller than G91. But in terms of Kurtosis G91 is preferable than G364. The Chi-square statistics of first difference series indicate that both of them could not pass through normality assumption i.e., the series could not be approximated as an independently and identically distributed (i.i.d.) process. But by dropping four extreme observations we find that G91 turned into an i.i.d. Process but not G364. In the case of G364, we need to drop as many as ten observations so as to arrive at an i.i.d. Process. Hence our choice automatically fall upon on G91. So G91 is considered as a reference rate.

SECTION 6.4

Analysis of Cross Correlation Coefficients

A very simple way to find out the interlinkages of government securities market with other segments of financial market is to examine the cross-correlation coefficients among the interest rates. In ordinary language, cross correlation coefficients represent the degree of association of various rates. Bohi and Dhal (1998) analysing the integration of Indian financial markets, found that return on capital and price-earning ratios are moving almost in the opposite direction compared to those for other rate variables. All other rates display positive correlation among them, indicating varying levels of association. The period of analysis was April 1993 to March 1998. (Table 6.4.1)

Table 6.4.1 Cross Correlation Coefficients of Various Rates

	Call	CDR	CPR	DRT	LRT	G91	G364	RE	PERN	FP3	FP6
Call	1	0.58	0.39	0.57	0.15	0.62	0.4	-0.27	-0.16	0.7	0.65
CDR		1	0.58	0.69	0.54	0.60	0.59	-0.57	-0.47	0.82	0.85
CPR			1	0.70	0.61	0.75	0.71	-0.25	-0.1	0.53	0.59
DRT				1	0.64	0.85	0.80	-0.44	-0.2	0.54	0.58
LRT					1	0.61	0.77	-0.28	0.09	0.19	0.26
G91						1	0.89	-0.35	-0.05	0.49	0.52
G364							1	-0.46	-0.21	0.62	0.65
RE								1	0.77	-0.49	-0.5
PERN									1	-0.53	-0.58
FP3										1	0.99
FP6											1

Source: RBI, Occasional paper, Vol.19, No.4 December 1998
CDR Commercial Deposit Rate LRT Lending Rate CPR Commercial Paper Rate
G91 91-day Treasury Bill G364 364-day Treasury Bill RE Return on Equities
PERN Price Earning Ratio FP3 Three Month Forward Premia FP6 Six Month Forward Premia

Table 6.4.2 represents the cross correlation coefficients among the various rates for the period January 1993 to January 2001. Return on industrial securities is positively correlated with 3-month forward premia and 6-month forward premia but negatively correlated with rest of the rates. We also find that Price-earning ratio is negatively correlated with other rate variables except with G364, GSR, DPR and LDR. There is high degree of positive correlation between gilt market with money market and gilt market with credit market. Again we find that there is high degree of positive correlation between government securities market with money market, and government securities with credit market. Both Treasury bill market and government securities market are reasonably well integrated with forex market and call money market, but negatively correlated with capital market except G364 and GSR with PREN.

Table 6.4.2 Cross Correlation Coefficient among Interest Rates

	FP3	FP6	CPR	CDR	G91	G364	GSR	ISR	PERN	DPR	LDR	CLR
FP3	1	0.98	0.70	0.70	0.46	0.35	0.27	0.08	-0.46	0.41	0.42	0.64
FP6		1	0.73	0.75	0.46	0.39	0.33	0.10	-0.50	0.44	0.47	0.56
CPR			1	0.79	0.79	0.74	0.50	-0.35	-0.05	0.72	0.73	0.54
CDR				1	0.48	0.49	0.39	-0.17	-0.24	0.59	0.66	0.40
G91					1	0.88	0.43	-0.31	-0.01	0.61	0.47	0.62
G364						1	0.62	-0.44	0.05	0.60	0.59	0.39
GSR							1	-0.44	0.07	0.53	0.61	0.10
ISR								1	-0.74	-0.53	-0.70	-0.07
PERN									1	0.24	0.22	-0.11
DPR										1	0.70	0.39
LDR											1	0.22
CLR												1

6.4.1 Volatility of Interest Rates.

The variability of rates under consideration measured by standard deviation is reported in Table 6.4.3. It is clear that standard deviation is the highest for Call money rate and Price-earning ratio. Surprisingly, standard deviation of return on industrial securities is very smaller. Both short-end and long-ends of the financial market are relatively more volatile.

Table 6.4.5 Mean and Standard Deviation of Various Rates

Rates	Mean	Standard Deviation
FP3	6.54	4.33
FP6	6.75	3.88
CPR	12.43	2.54
CDR	11.8	2.42
G91	9.29	1.80
G364	10.47	1.47
GSR	13.59	3.42
ISR	4.22	1.75
PENR	23.26	10.77
DPR	10.26	1.12
LDR	14.15	1.71
CLR	9.45	5.14

SECTION 6.5

Co-integration and Causality Analyses

Theoretically before we go for a causal analysis, we have to check for co-integration between the variables. Already we know that rate variables are characterised by integrated process i.e., I (1) series. So the appropriate way of looking for the interlinkages of financial market is to examine whether there exists co-integrating relationship between different segments of the market. But it would be necessary to examine the co-integrating relationship between reference rate on the one hand and other market on the other. After examining the co-integrating relationship, we have to find out the causal relationship between reference rate with other rates. Although the stylised statistics (Table 6.3.2) help us to select a reference rate among a class of short-term rates; this is not a sufficient condition to derive meaningful inferences on the interlinkages of financial market. Because the sufficient condition requires that the chosen reference rate should substantially induce changes in several other rate variables.

The concept of co-integration is a powerful one because it allows us to describe the existence of an equilibrium or stationary, relationship among two or more time-series, each of which is individually non-stationary. That is, while the component time-series may have moments such as means, variances, and covariances varying with time, some linear combination of these series, which defines the equilibrium relationship, has time-invariant linear properties. Informally, a series is said to be integrated if it accumulates some past effects; such as a series is non-stationary because its future path depends upon all such past influences, and is not tied to some mean to which it must eventually return. The co-integration results are represented in Appendix 5.1. The appropriate lag order was chosen in terms of AIC values suggested that a Maximum of 5 to 6 months lag order could be chosen.

In case of forex market, two pairs are found to be co-integrated. They are FP3-FP6, and FP3-G91. The long run elasticity is found to be 1.07 and 1.63 respectively. Between money and gilt market CDR, CPR and CLR are co-integrated with G91. Long run elasticities are 0.67, 0.87 and 1.53 respectively. But in case of money market three pairs are found to be co-integrated. They are CDR-CPR, CPR-CLR and CDR-CLR. Long run elasticity of CDR with respect to CPR is 0.90 and CPR with respect to call money rate is 0.49 and CDR with respect to call money market is 0.50. In case of gilt market two pairs i.e., G364-G91 and GSR-G91 are found to co-integrate. Long run elasticity of G364 with respect to G91 is 0.81 and that of GSR with respect to G91 is 1.01. Between credit market and gilt market, lending rate is co-integrated with C91. Long run elasticity is found very low (0.77). But both DPR and LDR are co-integrated with call money rate. The long run elasticity of DPR and LDR with respect to call money rate were estimated around 0.27 and 0.25 i.e., less than the effect of G91. Co-integration relations are also found between forex market and call money market. Both FP3 and FP6 are found co-integrated with call money market. Long run elasticity with respect to call money rate is very high i.e., 1.58 and 1.58. Capital market is not co-integrated with either gilt market or call money market.

6.5.1 Causality Test

The causal relation among the rates will help us to select the reference rate. This is the sufficient condition which requires that the chosen reference rate should substantially induce changes in several other rate variables. In other words, the causal relationship and the size of

long-run elasticity are important factors for any meaningful study of integration of different segments of the financial sector. Accordingly, the Granger causality test is carried out within a bivariate framework. The results are reported in Table 6.5.2.

Table 6.5.2 Granger Causality between Gilt Market with Other Segments

Variables	F-Test	Significance Level*
G91-FP3	3.92	B
FP3-G91	3.12	B
G91-FP6	3.62	B
FP6-G91	2.79	NS
G91-CPR	11.67	A
CPR-G91	4.43	B
G91-CDR	3.78	B
CDR-G91	0.67	NS
G91-G364	47. 72.	A
G364-G91	30.87	A
G91-GSR	3.49	B
GSR-G91	2.99	NS
G91-ISR	0.03	NS
ISR-G91	0.32	NS
G91-PENR	1.57	NS
PERN-G91	1.02	NS
G91-DPR	5.73	A
DPR-G91	4.93	A
G91-LDR	4.18	B
LDR-G91	1.44	NS
G91-CLR	13.60	A
CLR-G91	7.46	A

* `A' and `B' indicates level significance at 1 per cent and 5 per cent respectively. NS implies not significance at 1 or 5 per cent levels.

From Table 6.5.2 it is seen that between FP6 and G91 there is bi-directional causality but between G91 and FP6 unidirectional causality could be established. There is bi-directional

causality between G91 on the one hand and money market (CPR, CLR) on the other but unidirectional causality between G91 and CDR. In the gilt market bi-directional causality could be established between G91 on one hand and G364 and GSR on the other. In the credit market, bi-directional causality found between G91 and DPR but unidirectional causality found between G91 and LDR. There is no causal relation between gilt market and capital market.

Table 6.5.3 Causality between Money Market, Credit Market and Forex Market

Variables	F-Test	Significance Level*
FP6-FP3	881.73	A
FP3-FP6	912.76	A
FP3-CLR	42.07	A
CLR-FP3	42.25	A
CLR-FP6	37.74	A
FP6-CLR	35.22	A
CLR-CPR	22.63	A
CPR-CLR	13.21	A
CLR-CDR	19.09	A
CDR-CLR	2.31	NS
CLR-G364	4.41	B
G364-CLR	0.22	NS
CLR-DPR	14.33	A
DPR-CLR	12.42	A
CDR-CPR	5.45	A
CPR-CDR	14.07	A
DPR-LDR	5.43	A
LDR-DPR	3.85	B
CLR-ISR	1.00	NS
CLR-PERN	1.80	NS

* `A' and `B' indicates significance at 1 per cent and 5 per cent level.
NS implies not significant at 1 or 5 per cent level

Table 6.5.3 shows that there is a highly significant two-way causality between FP6 and FP3. When we take call money rate, it causes FP3 and FP6 bi-directionally. Call money also causes LDR, DPR, and CPR bi-directionally. It also causes CDR and G364 unidirectionally. In the money market, bi-directional causality could be established between CPR and CDR. Finally, no causal link could be established between capital market and money market, capital market and credit market, capital market and forex market. G91-FP6, G91-DPR, CLR- G364, CPR-CDR and LDR-DPR have causal relationship but these pairs are not co-integrated.

The multiple co- integration result shows that there exists a long run relationship among CDR, CPR and CLR and CPR, CDR and G91 and DPR, PLR and CLR. The long run coefficient G91was estimated at 0.79 where as the coefficient of CLR was 0.46. In case of the third model the long run coefficient of CLR was 0.20 thus G91 has substantial effect on the long run movement of the money market. Our study shows that government securities market is getting integrated with other financial markets except capital market. Earlier studies found that gilt market is only integration with credit and money market.

6.5.2 Partial Adjustment Model

The degree and speed of integration of different segments of financial market can be analysed by using partial adjustment model. This model also helps us find out the adjustment coefficient and mean lag response of the rate variable with respect to reference rate. The model can be written as:

$$Y_t = B_0 + B_1 Y_{t-1} + B_2 X_t + B_3 X_{t-1} + u_t \quad \dots(1)$$

Where Y_{t-1} is lagged dependent variable, X_{t-1} lagged independent variable, $b=(1-B_1)$ is called the adjustment coefficient and $(1/1-B_1)$ is called speed of adjustment. The estimated results are presented in Appendix 6.1.

The adjustment coefficient of FP3, FP6, CPR and CDR with respect to G91 is lower than the adjustment coefficient with respect to CLR. But the adjustment coefficient of G364, GSR, DPR and LDR, with respect to G91 is higher than the adjustment coefficient with respect to CLR. (Table 9). Consequently the period of adjustment for FP6, FP3, CPR, and CDR with

respect to G91 are 5.26, 6.66, 4.1, and 3.84 more than the period of adjustment with respect to CLR (4.3, 5, 3.7 and 3.3). The period of adjustment of G91 with respect to CLR is 6.6. Most of the short-term rates have substantial relationship with the G91 AND CLR. The value of lagged dependent variable of the partial adjustment model turned out to be significantly different from zero and reflecting the low degree of adjustment in the market. On an average the speed of adjustment, with respect reference rate in other market is 0.30 and with reference to call money rate is 0.19. So, the speed of adjustment is not very high in the Indian context.

SECTION 6.6

Summary and Conclusion

The attempt to find out interlinkages of government securities market with other segments has yielded mixed result. The cross correlation coefficient and co-integration result indicates that the gilt market is integrated with forex, money and credit markets. From the gilt market, G91 emerged as the reference in the Indian context. There exist a fair degree of interlinkages of interest rates among short-term markets in the financial sector following the policy reform. But we do not find any interlinkages between capital market and gilt market. Another finding is that Capital market in India is not integrated with any other segments of financial sector. The cross correlation coefficient between capital market and other segments of the financial market is negative. So it is not surprising to have a negative correlation as Indian stock market have often moved in opposite direction to the fundamentals of the economy. Particularly, Indian capital market is greatly influenced by foreign condition.

Both G91 and call money rates have a substantial impact on other rate variables. We do not find any causal relationship between rates variable in the capital market and G91 or call money rate. The speed of adjustment with respect G91 or call money rate is low in the Indian context. But the speed of adjustment of other interest rates with respect to G91 is higher than the speed of adjustment with respect to call money rate. There exists a long run relationship between forex market and gilt market and money market.

The movement of various interest rates in uniform direction nevertheless shows an encouraging sign of the growing maturity of the financial markets. It has a great relevance to

monetary policy. This has significant implication for the transmission of monetary policy, particularly, in so far as the credit channel is becoming increasingly obsolete in view of rising importance of interest rate channel and asset price channels. With the active government securities and Treasury bill market along with an integrated financial market, it is sufficient to move from the conduct of monetary policy through direct instruments to indirect instruments. It is the indirect instrument through which monetary policy is more effective given the development of financial market, particularly, in the presence of new instruments and technologies in the financial market. Considering this finding we can now conclude that the role of government securities and Treasury bill market is very important for successfully conducting the monetary policy by using it as an indirect instrument. In the presence of integrated financial market and active and broad government securities market, RBI can influence the availability of credit, cost of credit and monetary aggregates. This may help control prices and interest rate in the economy.

Appendix 6.1

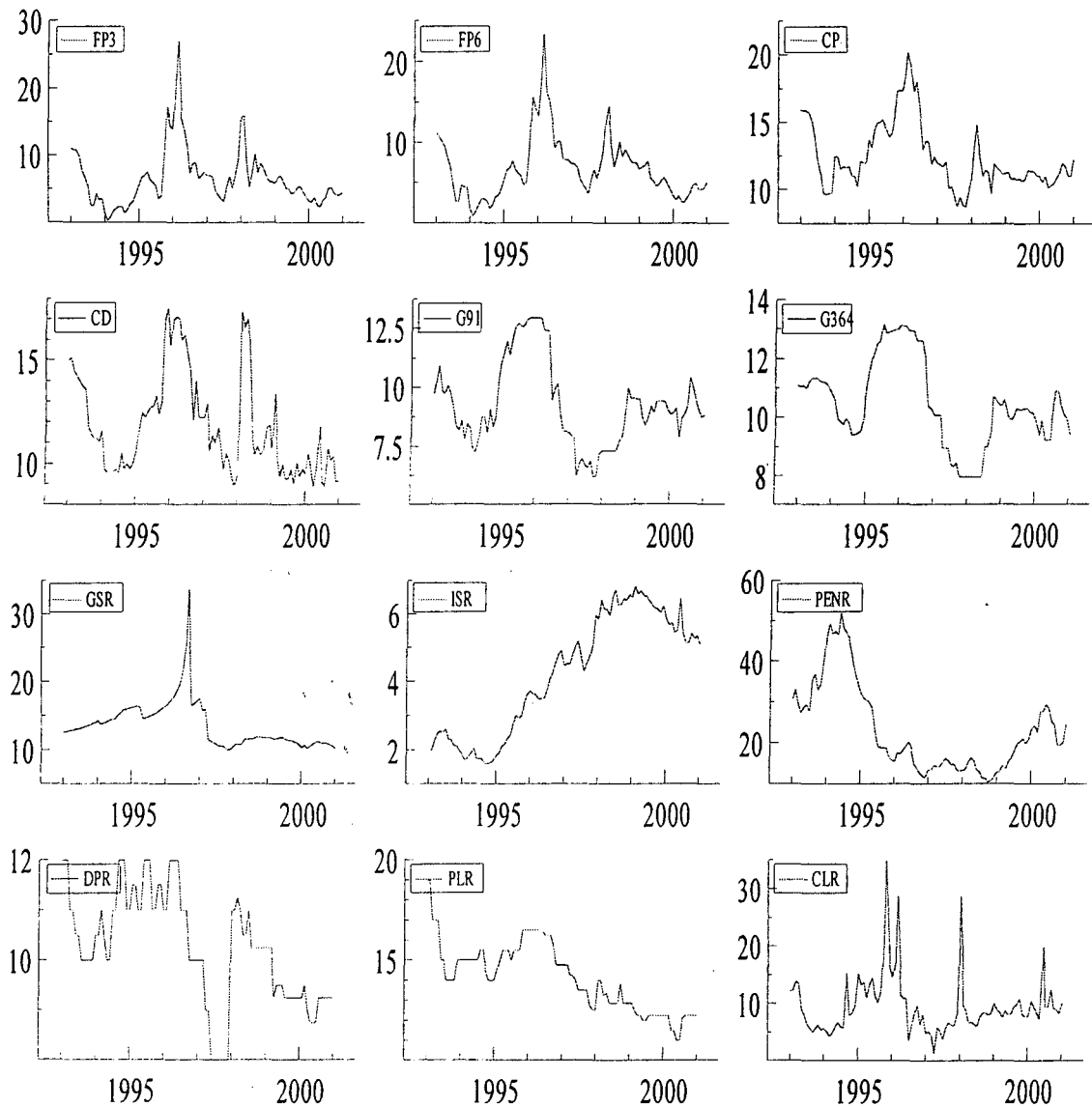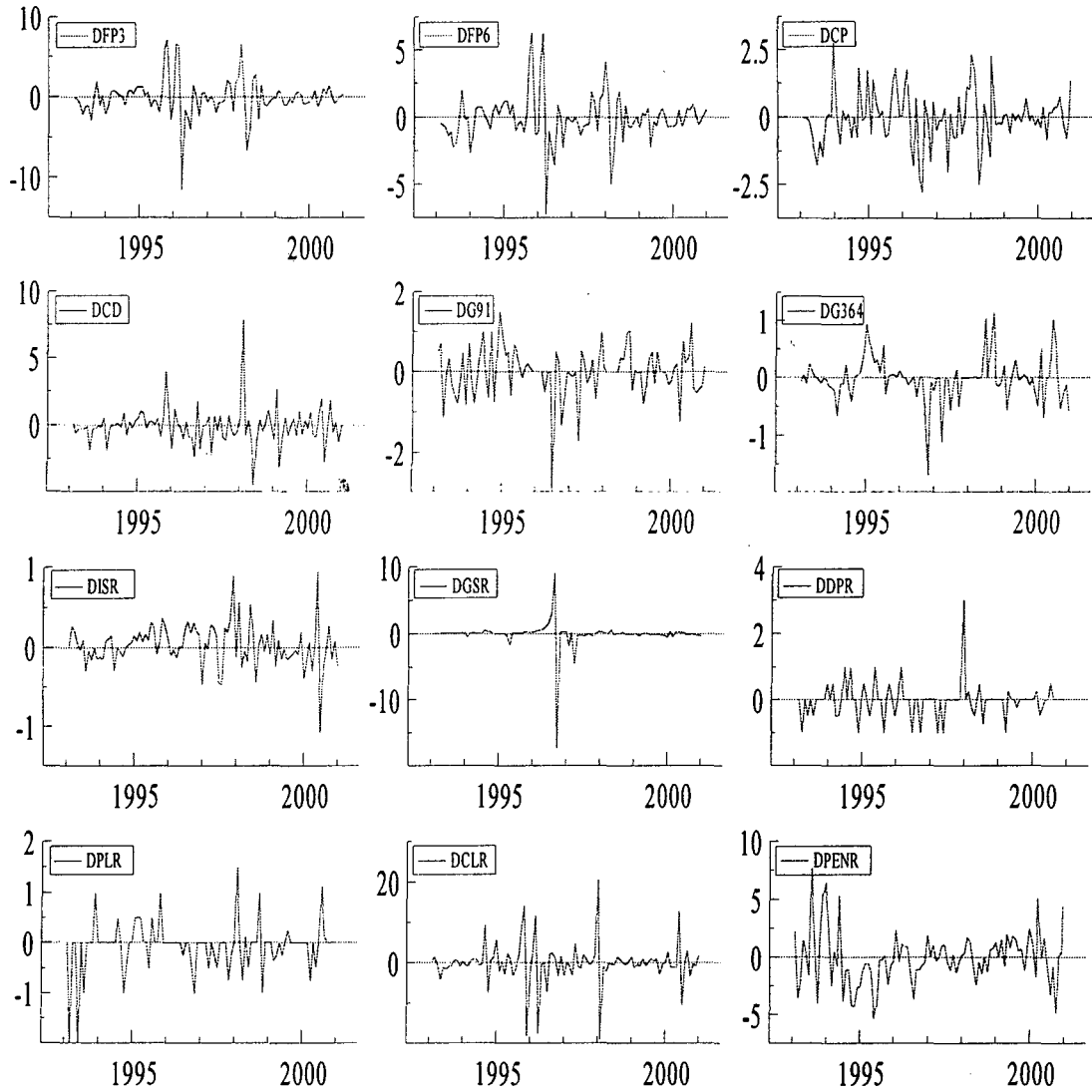## Figure 6.1: Plot of the Rate Variables at Level

Figure 6.2: Plot of the Rate Variables at First Difference

Co-integration Result: Forex and Gilt Market.

(a) FP3 = f (CONSTANT, G91)

Regressors	OLS	Residual	JJ-LR Vector k=2, r=1
Constant	-4.397 (5.828)	ADF(2)	
G91	1.154 (0.614)		1.63
R^2, DW	0.74 , 1.9		

Co-integration Result: Between Money Market and Gilt Market

(b) CPR = F (CONSTANT, G91)

Regressors	OLS	Residual	JJ-LR Vectors k=2, r=1
Constant	1.32 (1.97)	ADF (2)	
G91	1.17 (0.20)		0.87
R^2, DW	0.87, 2.00		

(c) CDR = F (CONSTANT, G91)

Regressors	OLS	Residual	JJ-LR Vector K=2, r=1
Constant	3.48 (3.13)	ADF (2)	
G91	0.86 (0.32)		0.67
R^2, DW	0.70, 2.01		

Co-integration Result: Between G91 and G364 and Between G91 and GSR.

(d) G364 = F (CONSTANT, G91)

Regressors	OLS	Residual	JJ-LR Vector k=2, r=2
Constant	1.80 (0.96)	ADF(2)	
G91	0.92 (0.10)		0.81
R^2, DW	0.96, 1.97		

(e) GSR = F (CONSTANT, G91)

Regressors	OLS	Residual	JJ-LR Vector k=2, r=2
Constant	-0.48 (4.26)	ADF(2)	
G91	1.49 (0.45)		1.01
R^2, DW	0.70, 1.93		

Co-integration Result: Credit and Gilt Market

(f) LDR= F (CONSTANT, G91)

Regressors	OLS	Residual	JJ-LR Vector K=2, r=2
Constant	2.51 (6.65)	ADF(2)	
G91	1.18 (0.68)		0.77
R^2, DW	0.93, 2.02		

Co-integration Result: Money and Gilt Market

(g) CLR = F (CONSTANT, G91)

Regressors	OLS	Residual	JJ-LR Vector k =3, r=2
Constant	-4.8 (2.85)	ADF(3)	
G91	1.56 (0.30)		1.53
R^2, DW	0.41, 1.97		

(h) CDR = F (CONSTANT,CPR)

Regressors	OLS	Residual	JJ-LR Vectors k= 1, r=
Constant	0.98 (1.64)	ADF(1)	
CDR	0.86 (0.13)		0.90
R^2, DW	0.74, 1.95		

(i) CPR = (CONSTANT, CLR)

Regressors	OLS	Residuals	JJ-LR Vector k= 1, r=2
Constant	6.02 (0.90)	ADF (1)	
CLR	0.64 (0.08)		0.49
R^2, DW	0.88, 2.02		

(j) CDR = F (CONSTANT, CLR)

Regressors	OLS	Residual	JJ-LR Vector k = 2, r=2
Constant	5.38 (1.51)	ADF(2)	
CLR	0.62 (0.14)		0.50
R^2, DW	0.77, 2.01		

Co-integration Result: Forex Market

(k) FP3= F (CONSTANT, FP6)

Regressors	OLS	Residual	JJ-LR Vector k=2, r=2
Constant	-0.47 (0.21)	ADF(2)	
CLR	1.04 (0.02)		1.07
R^2, DW	0.98, 1.78		

(l) DPR = F (CONSTANT, CLR)

Regressors	OLS	Residual	JJ-LR Vector k= 1, r=2
Constant	7.12 (1.42)	ADF(1)	
CLR	0.30 (0.09)		0.27
R^2, DW	0.84, 1.79		

(l)LDR = F (CONSANT, CLR)

Regressors	OLS	Residual	JJ-LR Vector k=1, r=2
Constant	10.29 (1.42)	ADF(1)	
CLR	0.38 (0.12)		0.25
R^2, DW	0.91, 2.13		

Co-integration Result: Forex and Money Market

(o) FP3 = F (CONSTANT, CLR)

Regressors	OLS	Residual	JJ-LR Vector k= 1, r=2
Constant	-4.413 (2.22)	ADF(1)	
CLR	1.1 (0.21)		1.58
R^2, DW	0.85, 1.93		

(n) FP6 = F (CONSTANT, CLR)

Regressors	OLS	Residual	JJ-LR Vector k=1, r=1
Constant	-4.48 (2.3)	ADF(1)	
CLR	1.13 (0.22)		1.58
R^2, DW	0.88, 1.97		

Note: k and r indicate lags and number of co-integrating relations. All the models do not satisfy normality criterion. Figures in the bracket are standard error. All the models are free from residual autocorrelation.

Partial Adjustment Result

Y= F [Y (-1), G91, G91 (-1)]

Regressors	FP3	Regressors	FP6	Regressors	CPR
Constant	-1.12 (1.28)	CONSTANT	-0.87 (0.98)	CONSTANT	0.29 (0.50)
FP3(-1)	0.81 (0.006)	FP6(-1)	0.85 (0.05)	CPR(-1)	0.76 (0.06)
G91	0.86 (0.37)	G91	0.66 (0.9)	G91	0.84 (0.14)
G91(-1)	-0.61 (0.38)	G91(-1)	-0.47 (0.29)	G91(-1)	-0.56 (0.16)
R^2, DW	0.74, 1.68	R^2, DW	0.80, 1.68	R^2, DW	0.87, 1.86
B	0.19	B	0.15	B	0.24
1/b	5.26	1/b	6.66	1/b	4.1

Regressors	CDR	Regressors	G364	Regressors	GSR
Constant	0.74 (0.83)	Constant	0.39 (0.23)	Constant	0.33 (1.19)
CDR(-1)	0.74 (0.06)	G364(-1)	0.79 (0.04)	GSR (-1)	0.75 (0.07)
G91	0.23 (0.22)	G91	0.44 (0.04	G91	0.59 (0.33)
G91(-1)	0.007 (0.22)	G91(-1)	-0.25 (0.06)	G91(-1)	-0.28 (0.35)
R^2, DW	0.71, 1.95	R^2, DW	0.96, 1.93	R^2, DW	0.66, 2.19
B	0.26	B	0.21	B	0.25
1/b	3.84	1/b	4.76	1/b	4

Regressors	DPR	Regressors	LDR
Constant	1.12 (0.44)	Constant	0.79 (0.42)
DPR(-1)	0.83 (0.05)	LDR(-1)	0.88 (0.03)
G91	0.21 (0.08)	G91	0.15 (0.07)
G91 (-1)	-0.15 (0.08)	G91(-1)	-0.07 (0.08)
R^2, DW	0.81, 1.88	R^2, DW	0.92, 2.1
B	0.17	b	0.12
1/b	5.9	1/b	8.3

$Y = F [Y (-1), CLR, CLR (-1)]$

Regressors	FP3	Regressors	FP6	Regressors	CPR
Constant	-1.01₊ (0.42)	Constant	-0.84 (0.34)	Constant	1.67 (0.47)
FP3(-1)	0.77 (0.05)	FP6(-1)	0.80 (0.04)	CPR(-1)	0.73 (0.04)
CLR	0.36 (0.03)	CLR	0.26 (0.03)	CLR	0.09 (0.02)
CLR(-1)	-0.10 (0.04)	CLR(-1)	-0.04 (0.03)	CLR(-1)	0.06 (0.02)
R^2, DW	0.85, 2.03	R^2, DW	0.88, 1.97	R^2, DW	0.87, 2.42
B	.23	b	0.20	B	.27
1/b	4.3	1/b	5	1/b	3.7

Regressors	CDR	Regressors	G391	Regressors	G364
Constant	1.7 (0.61)	Constant	0.79 (0.01)	Constant	0.54 (0.31)
CDR (-1)	0.7 (0.05)	G91(-1)	0.85 (0.01)	G36(-1)	0.91 (0.030
CLR	0.05 (0.02)	CLR	0.05 (0.04)	CLR	0.01 (0.02)
CLR (-1)	0.01 (0.02)	CLR (-1)	-0.01 (0.39)	CLR (-1)	0.01 (0.01)
R^2, DW	0.78, 2.15	R^2, DW	0.89, 2.11	R^2, DW	0.92, 1.75
B	0.3	B	.15	B	0.09
1/b	3.3	1/b	6.6	1/b	11.11

Regressors	GSR	Regressors	DPR	Regressors	LDR
Constant	2.24 (0.97)	Constant	1.06 (0.44)	Constant	1.07 (0.41)
GSR(-1)	0.79 (0.06)	DPR	0.85 (0.04)	LDR (-1)	0.89 (0.03)
CLR	0.03 (0.04)	CLR	0.05 (0.01)	CLR	0.01 (0.01)
CLR(-)	0.02 (0.04)	CLR (-1)	-0.01 (0.01)	CLR (-1)	0.02 (0.01)
R^2, DW	0.63, 2.28	R^2, DW	0.84, 1.79	R^2, DW	0.91, 2.13
B	0.21	B	0.15	B	0.11
1/b	4.76	1/b	6.6	1/b	9.09

Figures are in the bracket indicating standard error.

Y is dependent variable. Y (-1) lagged dependent variable.

Models are free from serial autocorrelation.

Result of Multiple Co-integration

CPR = F (CONSTANT, CDR, CLR)

Regressors	OLS	Residual	JJ-LR Vector k=1, r=2
Constant	4.38 (1.55)	ADF(1)	
CDR	0.28 (0.1)		0.29
CLR	0.46 (0.1)		0.39
R^2, DW	0.87, 2.17		

CPR = F (CONSTANT, CDR, G91)

Regressors	OLS	Residual	JJ-LR Vector k=1, r=2
Constant	-0.60 (1.23)	ADF(1)	
CDR	0.46 (0.10)		0.41
G91	0.79 (0.13)		0.58
R^2, DW	0.77, 1.92		

DPR = F (CONSTANT, PLR, CLR)

Regressors	OLS	Residual	JJ-LR Vector K=1, r=1
Constant	4.48 (2.04)	ADF(1)	
PLR	0.27 (0.16)		0.46
CLR	0.20 (0.07)		0.20
R^2, DW	0.85, 1.81		

Figures are in the bracket represent standard error. K and r indicates number of co-integrating relations, respectively.

CHAPTER VII

SUMMARY AND CONCLUSIONS

Government securities market, one of the important components of a modern economy performs many vital roles. Government securities are near zero risk and most liquid. They help the investors to measure the *market risk* of other fixed income securities. Overall government securities market helps achieve the macroeconomic stability in the economy. In order to perform theses roles it has to be very broad and deep.

The financial system in India had functioned in an environment of financial repression driven primarily by fiscal compulsion. The financial *repression* led to a large-scale inefficiency in the financial sector. As a result all the segments of the financial sector could not grow. The system of *automatic monetisation* and low coupon rate on government papers were the major constraints of development of government securities market.

Our study shows that before 1991, the government securities market was *narrow, dormant and captive.* Commercial banks, Insurance companies and provident funds were the major investors in the government securities market. *Captive investors* were accounted for about 80 per cent of the total marketable debt. These financial institutions invested in these securities as part of their *statutory* requirement, not by their commercial judgment. Rate of interest offered on government papers was well below the *competitive rate.* Investment by households in government securities was negligible. More over with the increase in resources of these institutions, the marketable debt grew at 10.4 per cent per annum. The share of central government marketable debt was more than 80 per cent of total marketable debt. Out of total marketable debt, the share of dated securities was more than 70 per cent. Total marketable debt as per cent of GDP fluctuated between 17.6 per cent and 25.7 per cent. The share of *banking* sector remained more than 60 per cent.

These captive investors were *final* investors. They hold the securities till maturity. As a result secondary transactions in government securities were largely absent. *Marketability* of these securities depended upon the Reserve bank's repurchase and not by market it self. Since the major institutions were state-owned and their investment policy was controlled by a statutory

regulation, the private sector was 'starved' for funds. This had a major implication for the growth of other segments of financial markets.

Reforms in government securities market started following the recommendation of Chakrabarthy Committee Report. But the major reform was introduced in 1991-92. Among them important measures were introduction of *auction system, primary dealers, new instruments*, abolition of automatic monetisatiom and *delivery vs. payment system*.

In the reform period the structure of market has broadened in term of *participants,* types of *instruments* and *form of trading* in the secondary transactions. Now other than commercial and insurance companies, private corporators, mutual funds, foreign investors, primary dealers and non-banking financial institutions were investing in government securities. But still *captive investors* were holding major portion of securities and the *households* are yet to emerge as the significant investors in government securities. Activity in the primary segment has increased following an auction system. The primary issues of central government registered more than ten-fold increase during 1991-92 and 1999-2000, reflecting a high demand for government securities. The annual compound growth rate of marketable debt was 17.8 per cent under the reform period, following greater reliance on market borrowing by both state and central government.

Activity in the secondary market also increased considerably. Total transaction in government securities increased by more than fifty per cent during the same period. Primary dealers are acting as market maker in the government securities market. Liquidity of government securities has improved because of active secondary trading and presence of intermediate investors like PDs and SDs. Structure of government securities has bordened in the liberalisation period.

Secondary market yields on government securities and treasury bills are available from 1996-97. Based on these yields we have constructed *yield curves.* Yield curves are important indicators of macroeconomic variables. In Indian case yield curves were *upward slopping*, indicating market expectations of rise in spot interest rates in the future. Liquidity condition and monetary measures taken by RBI influenced short-term yields, where as long-term yields were influenced by *market expectations* on *interest rates* and *inflation level*. Indian case, data support market expectations, liquidity and market segmentation theory. Yields on

government securities continuously declining since 1996-97 on annual basis. This is because of easy liquidity condition, reduction in bank rate and cash reserve ratio, high GDP growth rate and stability in the foreign exchange market. Short-term yields were more volatile than long-term yields. Yield spreads is an increasing function of maturity. We also found that most of the *shift of the yield curves were non-parallel*. The implication of this is that you cannot calculate riskiness of portfolio when shifts in yield curves are non-parallel. Our study shows that there are *many humps and slumps* in the Indian case. This implies that conduct of monetary policy through *indirect instruments* might not be *effective*.

The maturity structure of marketable debt has important implication for monetary policy and portfolio management. In fact the maturity pattern set by debt authority depends upon monetary and fiscal policies pursued by the government from time to time. Prior to reform there was no active debt management policy in India. The objective of the RBI was to reduce the cost of public borrowing. The maturity pattern of central government dated securities was in favored of *long-end*. In the reform period debt authority have *shorten the maturity profile* of securities in order to reduce interest cost. This created the problem of *debt rolling*. The ratio of net market borrowing to gross borrowing has deteriorated under reform period. The *yield curves* and *yield spreads* are relevance for debt management. Since yield curves were upward sloping and *yield speards* were increasing function of maturity in Indian case, debt authority could *save interest cost* by borrowing at short-end. Another way government can reduce its borrowing cost by *issuing index-linked bonds*. Our study suggests that government could save interest cost by borrowing at short-end and issuing index-linked bonds.

The financial markets India are in *getting integrated*. By using *time series* tools, we found that yield on 91-day Treasury bill is emerging as the *reference rate* in India. By using *ADF* and *DF* test, we also found that all the segments have achieved desired level of *efficiency*. *Cross correlation* result suggests that there is fair degree of *association* between gilt market and credit market, gilt market and money market, and between gilt market and forex market. But *capital market is not integrated* with any of the segments of financial markets. *Co-integration* result also shows that there is *long run equilibrium relationship* among various rates. But capital market remains isolated. *Partial adjustment* result shows that a slow adjustment in rates with respect 91-day treasury bills. The *speed of adjustment* is not high in the Indian case. The benefit of an integrated financial system is that RBI could conduct monetary policy through open market operation effectively.

Our study shows that government securities market was captive and dormant in pre-reform period. Its structure was narrow. This was due to policies pursued by the authority. In the reform period the depth of the government securities market has increased. Structure of the market has bordened. Short-term yields were influenced by the monetary policy and long-term yields by future expectation of real interest rate. The depth of the government securities market was reflected on the volume of secondary trading and not on the price of the securities in India. Prior to liberalisation the maturity of Central government securities was skewed in favour of long-term securities. Under reform period debt authorities have shortened the maturity structure. There exist a fair degree of convergence of interest rates among the short-term markets- money, credit, forex and government securities market. But capital market is least integrated with any of the segments of financial markets. *Deepening government securities* market would help RBI to conduct monetary policy through open market operations in a large scale and *managing internal debt*. Our study shows that government securities market in India would be a major policy vehicle for RBI in the near future.

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