A Study of the Indian Corporate Bond Market

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Abstract

Within any country's capital market, it is essential that there exist a well-developed bond market with a sizeable corporate bond segment alongside the banking system, so that the market mechanism ensures that funds flow in accordance with the productivity of individual investments and the market exerts a competitive pressure on commercial banks' lending to private business and helps improve the efficiency of the entire capital market. Further, the debt market must emerge as a stable source of finance to business when the equity markets are volatile. However, most countries do not have corporate bond markets comparable in efficiency with their equity markets, as the secondary market for corporate debt is mostly Over-the-Counter (and/or telephonic), rather than exchange traded, and it is extensively dominated by a few institutional investors and professional money managers. The market for non-sovereign debt (particularly, the corporate debt segment) in India also has a number of shortcomings: a primary market structure where private placements, sans mandatory credit ratings, dominate in an overwhelming manner, lack of transparent market making, and a tendency on the part of institutional investors to hold securities to maturity. The secondary market is thus prone to suffer from low liquidity and fragmentation and the consequent pricing anomalies.

In this paper, we make an attempt to understand the nature and extent of imperfection of the Indian market for corporate bonds using available data on secondary market trading channelled through the major stock exchanges. We examine some aspects of the market which include depth of the market in terms of frequency of trading of outstanding bonds; composition of the market in terms of trading of debt of various risk categories as indicated by their credit ratings; relationship between Yield-to-Maturity (YTM) and volatility of return; nature

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of the spread between YTM of different risk categories of bonds; relationship between market depth and price/YTM ; and the market pricing of risk. Our findings bring out that the secondary market for (exchange traded) corporate bonds is characterised by shrinking depth and width in recent years, borne out by the decreasing number of trades and the rising concentration of trading in an increasingly lesser number of securities. Our sample period witnesses a qualitative change in the composition of the market, characterised by dwindling of trade in highly rated bonds and a rise in the trading of downgraded bonds, concentrated in particular, in bonds which have liquidity (irrespective of their present credit quality). The usual distortionary effects of a shallow market are seen to be manifest in the high volatility of YTMs, this being more severe for bonds with higher credit risk compared with the ones of high credit quality. The observed patterns of over time movement of spreads also suggest that in a number of instances, private information/expectations work strong enough so that investors tend to ignore the public information contained in the declared credit rating of corporate bonds. Further, our estimates indicate that the market fails to evolve a uniform market price of risk across rating categories.

We observe that much needs to be done for ameliorating the problems of information asymmetry, low liquidity and the consequent distortions from the corporate debt segment of the Indian capital market, to give the debt market a much stronger base than it currently enjoys.

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Introduction

Generally a domestic capital market has several segments—viz., commercial banks, the equity market, non-bank financial institutions and the bond market. What should be the nature of composition of the capital market for a given economy is largely a policy matter, although policies alone cannot determine the compositional structure of the market. In most countries the debt market segment of the capital market develops later, as the financial sector becomes mature. In the pre-globalisation era, when the paradigm of state-initiated mixed-economic development dominated the minds of development economists and policy makers, developing countries like India favoured a capital market structure having an overwhelmingly large commercial bank sector—mostly publicly owned. The reason for such a preference is rather obvious. Given the approved industrial policy, a relatively large and centrally controlled banking system would apparently serve as a powerful instrument for achieving the targeted pattern of economic development. The shortcomings of such a view are too well known today. An over-sized, mostly publicly owned and controlled banking system would often amass huge deposits and channel these to preferred investment plans charging administered interest rates (generally set below the rate that would have cleared the market). Such lending decisions would often be taken violating prudent banking principles. Operating in an environment of state-protection and being heavily

leveraged, such a banking system would accumulate bad loans, and more importantly, prevent development of other segments of the capital market.

As is well known, in a situation where the capital market has all the three segments, three different kinds of funding for investment may, in principle, be available to business firms—viz., issuance of equity and/or bond and bank lending. Now, if the banking system is largely publicly owned, overreaching, highly regulated and dominates the other segments, bank lending to business firms may frequently go bad and become unrecoverable. This is because banks, operating under virtual state guarantee, may frequently miscalculate lending risk and misdirect loans to investment demands that are not among the most productive ones. In contrast, when a well developed bond market with a sizeable corporate bond segment exists alongside the banking system, it is likely that funds will flow in the right direction in accordance with the productivity of individual investment demands. This will be so essentially for two reasons—viz., (1) a developed and freely operating corporate bond market will judge the intrinsic worth of investment demands better in view of the disciplinary role of free market forces and (2) the corporate bond market will exert a competitive pressure on commercial banks in the matter of lending to private business and thus help improve the efficiency of capital market and the economy as a whole.

A developed and freely operating corporate bond market will judge the intrinsic worth of investment demands better in view of the disciplinary role of free market forces.

In fact, it is often argued that the Asian financial crisis of 1997, which was largely a manifestation of the weakness of the financial system in the countries concerned, was accentuated by the fragility of the banking system of the affected countries. The banks, with their load of excessive business lending in the form of both short term working capital loans and long term fixed capital loans that went bad as borrowing firms collapsed due to the impact of currency crisis, themselves collapsed. Had there been a well functioning corporate bond market, neither business firms could have amassed debt liabilities that turned out to be disproportionate relative to their risk adjusted asset positions nor the banks would have become vulnerable to the shocks their borrowers got exposed to (Rakshit, 2000; see also Herring and Chatusripitak, 2000 and Corsetti et al , 1998).

It is in the above perspective that an examination of the nature of the Indian capital market and its different segments assumes importance as day by day the country's economy opens up through a variety of reforms and adjustments, thus getting more and more exposed to external shocks. Earlier, we looked into issues relating to the government bond segment of the Indian bond market (Bose et al, 1999; Bose and Coondoo, 1999 and Bhaumik et al, 2003). Here, we shall try to take a glimpse of the corporate bond segment of the country's bond market and discuss the issues relating to the development of a well functioning corporate bond market in the country. The next two sections describe the Global and the Indian scenarios with respect to the

corporate bond market. This is followed by the results of our empirical investigations trying to quantify the imperfections in the secondary market for Indian corporate bonds.

Corporate Bond Market: The Global Scenario

For business investments debt capital is generally considered to be more suitable for large-scale, long-term financing of fixed assets and investments, whereas bank loans are thought to be more appropriate for financing short-term investments in working capital, inventories and other current assets.[1] Equity capital is usually costlier than debt, as investors would expect a risk premium and hence a higher return on equity investment over that from a comparable debt investment.[2] However, although debt financing may be an efficient means, most countries do not have a well developed corporate bond market. [Box 1 presents an overview of the role of the corporate bond market in a developing economy and the environment necessary for its development.] The only country that has such a market is the United States. Company financing from bonds for non-financial corporations in the USA is about 50 per cent, whereas the same in Italy, is only 2 per cent (McGee, 1998). In contrast, bank lending as percentage of GDP for Japan in 1995 was about three times that for the USA (Sapsford, 1997).

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Table 1 gives the structure of the capital market in the late 1990's of selected developed and developing countries, including India. As this Table suggests, if the relative size of the corporate bond market

TABLE 1
Equities, Government Bonds and Corporate Bonds as percentage of GDP, in Selected Developing and Developed Countries, late 1990's

Country	Equities	Bank Claims on Private Sector	Total Bonds	Share of Corporate Bonds (%) in aggregate of Equities, Bank Claims and Total Bonds	Share of Corporate Bonds (%) in Total bonds
USA	158.0	63.6	164.2	18.20	42.75
Japan	65.9	133.3	137.7	11.87	29.05
Germany	51.5	125.9	94.5	19.75	56.83
UK	169.7	120.8	61.0	7.91	45.57
Korea	35.7	82.5	86.5	15.10	35.72
India	28.3	26.6	29.3	5.23	15.02
Thailand	30.9	127.8	18.6	1.75	16.67
Hungary	29.2	17.2	25.1	0.70	1.99
Poland	13.0	19.5	8.0	8.00	0.00

Source: Endo, 2000, World Bank.

[1] Since deposits with the banks are mainly short/medium term, extending term loans becomes relatively risky.

[2] Also, interest expenses on debt are usually tax-deductible at a corporate level, whereas corporate profits are usually taxed before dividends on shares are retained or distributed to shareholders. (See Endo, 2000).

BOX 1: Roles of the Corporate Bond Market and the Environment Required to Foster its Development

A corporate bond market is generally expected to play the following roles:

- Diffusing stresses on the banking sector by diversifying credit risks across the economy;
- Diffusing foreign exchange, interest rate and refunding risk;
- Supplying long-term funds for long-term investment needs;
- Supplying long-term investment products for long-term investors;
- Lowering funding costs by avoiding a liquidity premium;
- Providing products with flexibility to meet the specific needs of investors and borrowers;
- Allocating capital more efficiently;
- Reducing reliance on foreign funds, the flow of which can be highly volatile.

The environment conducive to the development of an efficient bond market consists of:

- Macroeconomic and political stability, with a stable and conducive policy environment, relatively low and stable interest rates;
- Good savings rate and limited crowding out;
- Tax policies that do not disadvantage bonds;
- Supportive legal environment; securities laws, bankruptcy codes etc and committed regulators;
- Developed Government securities market which provides market infrastructure and supports a profitable, skilled dealer community and provides the benchmark yield curve for default risk-free securities;
- Developed equity market culture;
- Infrastructure including, cost effective trading, clearing and settlement systems;
- Market participants, i.e., issuers of size and quantity and institutional investors who see the mutual benefits.

Note: Studies have found some direct relationships between the relative size of the corporate bond market in a given country and the relative size of its equity, bank loan, or government bond market. The latter three markets are generally instituted ahead of a corporate bond market, in developed countries and their correlation is seen to be strong. The leading role of the government bond market is more obvious as a well functioning government bond market helps facilitate the growth and functioning of a corporate bond market, in part by establishing a benchmark yield curve for pricing fixed-income instruments like bonds. The relationship between the bank loan and corporate bond markets in developed countries is found to be inverted, while that in developing countries is direct. This is suggestive of the corporate bonds' potential to substitute bank loans on the longer end of the yield curve and thus the ability of a corporate bond market to relieve the burdens of banking systems in developing countries (Endo, 2000).

. . . value of outstanding corporate bonds in the aggregate value of equity market capitalisation, bank lending to private sector and all outstanding bonds . . . is a little over 5% for India.

is measured in terms of value of outstanding corporate bonds in the aggregate value of equity market capitalisation, bank lending to private sector and all outstanding bonds (i.e., government and corporate bonds combined), then among the countries considered, the share is above 10 per cent only for the USA, Germany, Korea and Japan. This share is a little over 5 per cent for India. If, on the other hand, the share

of corporate bonds in the value of all outstanding bonds is considered, this share is much higher for Germany, the UK, the USA, and Korea compared with those of the other countries, the share for India being around 15 per cent. It may, however, be noted that these shares need not reflect the importance of the effective corporate bond market in these countries as in many countries the size of the secondary market for corporate bonds may be rather small.

Many researchers have discussed the issue of corporate bond market development in the Asian countries (particularly in Southeast Asia in the post-Asian Crisis period) and noted the relatively small size of the corporate bond market and its sluggish growth in these countries. The main reason put forward by them is the peculiarity of the financing patterns of business firms in most of these countries. To be specific, it is pointed out that family based corporations/business conglomerates in Thailand, Malaysia and Indonesia tended to prefer a combination of internal earnings and bank borrowing to bond issuance for financing their fixed capital investments primarily due to their close and interlocking links with banks and the government. Thus, it is the institutional setting that works against the development of a well functioning corporate bond market in these countries (Sharma, 2000).

. . . with the start of the deregulation process in the 1990s, the DFIs increasingly withdrew from project lending. Thus the need for opening alternative sources of term finance to industry came to the forefront.

The Indian Corporate Debt Market: A Brief Description

During the initial phase of expansion of private industry in post-Independence India, mostly the government-nurtured development financial institutions (DFIs) supplied long term finance to private industries through various types of financial incentives and supportive measures. The commercial banks were naturally not keen on providing such loans for fear of asset-liability mismatch. Working capital finance, however, was provided mostly by commercial banks in a regime of administered interest-rate with a differentiated rate structure. This pattern of financing changed completely with the start of the deregulation process in the 1990's. The DFIs increasingly withdrew from project lending. Their withdrawal created a vacuum and thus the need for opening alternative sources of term finance to industry and infrastructure development came to the forefront. At present, efforts are being made to fill up this vacuum by enlarging the scope of the bond market and more particularly encouraging the growth of an active bond market.[3]

In pursuit of overcoming the financial crisis of the early 1990s and evolving a well functioning capital market in the country, a number of reform measures were introduced during the last decade.[4] These have improved the functioning of the equity market and the market for government securities a lot. However, these improvements

[3] See for example, Patil, 2000; The India Infrastructure Report, June 1996.

[4] These included several reforms in the securities market—e.g., the establishment and empowerment of the Securities and Exchange Board of India (SEBI), market determined allocation of resources, nation-wide screen based trading

notwithstanding, the equity market has not yet become attractive to the majority of private investors because of the inherent high risk involved in equity market investment. The debt market (even for government bonds) has also not become popular yet as a destination of savings of individual savers either. This has been so essentially because of the absence of an active secondary market for debt instruments, which makes investors feel that their investment in debt is highly illiquid.[5]

BOX 2: Risks Associated with Corporate Debt Securities

In the market for corporate securities investment decisions are based on the information on risk associated with the securities, the investors' requirements with respect to cash flow and their risk return preferences. The risks associated with investment in a corporate bond are as follows:

- Interest rate risk, that is, the risk that interest rates will rise in the future and thereby reduce a bond's price. This leads to chances of capital loss to the investor if (s)he wants to sell off the bond at a time when market interest rates are higher (prices lower).
- Reinvestment risk refers to the probability of a fall in market interest rates in the future, which would in turn reduce the additional income from reinvesting the cash flows from a bond (at a lower rate).
- Inflation risk reduces the effective income from an investment in terms of purchasing power. All these risks are obviously higher over a longer holding period.
- Liquidity risk, or the degree of accessibility to cash prior to maturity.
- Default risk or credit risk refers to the risk that the issuer of the bond may be unable to make timely (principal and) interest payments on the issue. Default risk is gauged by quality ratings assigned by the credit rating agencies. The higher the default risk of an issue, the higher is the risk premium, and hence yield, associated with it. Characteristics of prices/yields of bonds are expected to vary according to different degrees of default risk. Thus for the corporate bond market the analysis focuses on the bonds' price/yield behaviour in relation to their credit ratings.

The debt market has also not become popular yet as a destination of savings of individual savers essentially because of the absence of an active secondary market for debt instruments.

in securities, de-materialisation and electronic transfer of securities, rolling settlement and ban on deferral products, sophisticated risk management and introduction of derivatives trading. All these have helped improve the regulatory framework and efficiency of trading and settlement. The equity segment of the Indian capital market is now comparable with that of many developed markets in terms of a number of qualitative parameters. For developing a deep and liquid secondary markets in government securities, the Reserve Bank of India (RBI) has initiated legal, regulatory and taxation reform, infrastructure and technology improvement, safe settlement systems, and market dissemination of information on all trades in the wholesale market. It has also improved methods of issuance of securities such as re-openings and price-based auctions that allow fungibility of securities, introduced derivatives such as interest rate swaps, enlarged the repo markets and ensured adequate liquidity in the secondary markets through the dealers.

[5] The main financial instruments popular with private investors/households are bank deposits, provident funds, insurance, income-oriented mutual funds and postal savings schemes [see NSE, 2001]. Liquidity generally refers to the ability to get out without moving the price against the seller. This is only possible in a market where trading is frequent.

Box 3: Features of Corporate Debt Securities

Corporate bonds are issuers' IOUs and rank senior to both common and preferred stocks in a corporation's capital structure. As creditors, bondholders receive priority status over the subordinate status of owners, or the corporation's stockholders. Corporate bonds are a direct obligation of the issuing corporations and, at times, are additionally secured by a lien on specific property, plant or equipment.

In most instances, corporate bonds offer semiannual, fixed interest payments till a final stated maturity date. Certain bonds also have early retirement features, known as *call* options* that allow issuers to redeem bonds prior to maturity at a specified time and price**. As an alternative, certain bonds are *put*able, giving bondholders an option to redeem their bonds prior to maturity. There are other instruments with embedded options, whose structure and returns are based on a mix between debt and equity attributes. These include (*partially* or *fully*) *convertible* debentures or debt instruments that are convertible into equity shares and (*share*) *warrants* which are options to buy a specified number of the issuing firm's shares, at a specified price, over a given period of time.

Worldwide, the majority of transactions in corporate bonds is conducted in the over-the-counter (OTC) market, while certain bonds are also listed on the Stock Exchanges. There are several *yield* figures to consider when evaluating a bond offering; these different yields take into consideration the coupon rate, the purchase price and the number of years to a bond's maturity or call date. Yield to maturity (YTM) represents the return an investor will receive if the bond is held to term. Yield to call (YTC) is the return earned if a bond is called prior to maturity.

Note: * *Options* are contracts which given the holder the right, but not an obligation, to buy (sell) a particular financial instrument from (to) the option writer, both the price and time for buying (or selling) are specified in the contract.

** Callable bonds have a greater chance of being redeemed in a lower interest rate environment, thus creating reinvestment risk for bondholders. Consequently, callable bonds tend to provide higher rates of return than non-callable bonds. Other bonds have special call features that are triggered upon the occurrence of an extraordinary event.

With the abolition of the office of the Controller of Capital Issues and removal of the administrative control over the pricing of new issues, corporate debt issues expanded both in number and variety.

Coming to the corporate bond segment of the debt market, such a market has been in existence since Independence in 1947. Public limited companies have been raising capital by issuing term debt securities since then mostly through private placement. [Box 2 explains the risks associated with corporate debt securities; Box 3 briefly describes some features of corporate bonds; Box 4 describes the implications of credit ratings and Box 5 gives information on private placements of bonds.] From 1985-86, following some debt market reforms, state-owned public sector units (PSUs) began issuing PSU bonds. However, in the absence of a well functioning secondary market, such debt instruments remained highly illiquid and unpopular among the investing population at large. As things stand today, the participants in the Indian debt market are the Central Government, State Governments, PSUs, Corporates, and Banks on the issuing side, and the RBI, commercial banks, insurance companies, mutual funds, other non-bank financial companies, corporate treasuries and individuals on the

Box 4: Default Risk and Credit Rating

Credit analysis involves analyses of information on companies and their bond issues in order to estimate the ability of the issuer to live up to its future contractual obligations—the conclusions are given in the form of ratings. Ratings take into consideration factors like the likelihood of default (particularly under adverse circumstances), provisions of the debt obligation, protection offered by and the relative position of the debt obligation in case of bankruptcy, etc.

Though various rating agencies use different symbols, generally:

Tripe-A denotes the highest safety category
Double A denotes high safety
Single-A denotes adequate safety
Triple B represents moderate safety
Double B is inadequate safety
Single B denote risk prone
C denotes substantial risk and
D denotes defaulted paper

Except for triple A, in other categories use of + or— suffixes indicate above average or below average credit quality within that letter grade. Paper with ratings up to BBB—is considered to be investment grade, while those below that are regarded as non investment-grade or junk-bond quality.

A credit rating system is an essential component of any well-functioning corporate bond market, as it encourages the most efficient allocation of capital raised by debt issues. Such a system (i) augments the quality and quantity of information on issuers, (ii) provides the measurement of the relative risk of bonds in question, (iii) provides bond issuers an incentive for financial improvements, and (iv) alleviates a loss of liquidity due to security fragmentation. Thus, a credit rating system essentially facilitates the "transferability" of corporate bonds. Investors will demand a higher interest rate, commonly known as a risk premium, to compensate for the higher credit risk implied by a lower rating; this differentiation of interest rates on the basis of risk in turn helps ensure the efficient allocation of resources by investors while further encouraging companies to improve their financial performance. A well functioning credit rating system also encourages greater transparency, increased information flows, and improved accounting and auditing practices. In addition, the limited number of creditworthiness symbols alleviates issuer based fragmentation of bonds and allows for the bundling of bond issues of the same or very similar creditworthiness into a single category from among the universe of issues. This creates the ground for interchangeability of bond issues by different issuers and facilitates arbitrage activities, which in turn can make the bond market more liquid.

Dominance of private placement is attributed to several factors—viz., involved issuance procedure for public issues, considerably higher cost of public issues, much higher subscription in case of private placements etc.

investment[6] side. With the abolition of the office of the Controller of Capital Issues (CCI) and the consequent removal of the administrative control over the pricing of new issues, corporate debt issues expanded to some extent both in number and variety. However, corporate issuers

[6] As issuers, corporates issue instruments, namely bonds, debentures and commercial papers with maturity period varying from 15 days to 1 year (for commercial papers) and 1 to 12 years (for bonds and debentures).

Box 5: Private Placement

The convenience of structuring of issues to match the needs of issuers with those of investors coupled with savings in terms of time and cost has contributed to rapid growth of the market for private placement. The rationale for investing in the private placement market lies in the convenience and flexibility to the issuers as well as investors.

This route is generally preferred by corporates wishing to issue securities with complex or non-standard features, as deals can be tailor-made to suit the requirements of both issuer and investor. Many companies may prefer private placements if they wish to raise funds quickly to take advantage of interest rate change in volatile market conditions. This market is also preferred by new entrants who do not have track record of performance and hence are unsure about generating adequate public response for their public issues. Again corporates may prefer this route if the general market environment is not conducive for floating public issues.

The investors also have advantages in subscribing to private placements, particularly, when there is no adequate supply of good public issues to match the amount of investible funds available, investors look for bonds at attractive rates in the private placement market. Further, the private placement market provides investors with securities with more or less fixed/predictable cash inflows, which help the investor to match the expected stream of returns with the expected cash outflows.

No regulatory compliance is another important reason why corporate issuers prefer this route and avoid public issues. In the private placement market, it is not mandatory to obtain rating on debt instruments, even though some issues are accompanied by rating. The issuer is also not required to make fair disclosure of all the credit ratings obtained.

. . . lack of market making results in poor liquidity, and tendency on the part of institutional investors to hold these securities to maturity reduce market supply.

continued to prefer private placement to public issues. Such a dominance of private placement is attributed to several factors—viz., involved issuance procedure for public issues, considerably higher cost of public issues, much higher subscription in case of private placements etc. Essentially for these reasons, financial institutions have tended to dominate public issues in the primary corporate debt market. The secondary market for non-sovereign debt (particularly the corporate debt segment) also has a number of shortcomings—lack of market making in these securities resulting in poor liquidity, tendency on the part of institutional investors to hold these securities to maturity and thereby reduce market supply of these securities, etc. Tables 2 & 3 give the composition of the Indian debt market in respect of resource mobilisation and issue size in the wholesale debt market (WDM), respectively. Both the Tables clearly indicate the relative unimportance of the corporate segment.

As already mentioned, not only is the size of the corporate segment of the Indian capital market small compared with the size of the government segment, but the secondary market for corporate bonds is also extremely thin and shallow with very little participation of individual investors. However, this is not an exclusive feature of the

TABLE 2
Resources Raised from the Debt Market excluding Treasury Bills
(Rs. Thousand Crores)

Issuer	1999-00	2000-01	2001-02
Corporate			
Public Issue	4.5	3.3	6.1
Private Placement	61.3	67.8	64.9
Total	65.8	71.1	71.0
Government	113.3	128.5	132.9
Total	179.1	199.6	203.9

Source: Mohammad Tahir, Development of Bond Market in India, www.rbi.org.in

TABLE 3
Composition of Indian Debt market: WDM Segment

Type of Security	No. of Securities	Issue Size (nearest million)
	as on 30 January, 2003	
Govt. (Central & State) Bonds	685	6046086
PSU Bonds	453	379026
Bank/Financial Institution Bonds	420	291327
Corporate Bonds	257	164845
Total*	1815	6881284

* Excludes Treasury Bills, Certificate of Deposits, Commercial Papers, and other Debt
Source: Indian Fixed Income Securities Market, January 2003, Vol. 6, No. 1, NSE Ltd. Website

Indian corporate bond market. Even in most developed countries, the secondary market for corporate bonds, except for a limited number of major issues, is generally illiquid, and institutional investors, rather than individuals, are the key players in these markets. Moreover, over-the-counter (OTC) and/or the telephonic market, rather than exchanges, is in fact extensively used by these institutional investors and profes sional money managers in most countries. However, as the major corporate issuers in these countries enjoy a fairly liquid secondary market for their bonds (such that the available market price data are adequate for constructing a benchmark yield curve), both major and minor issuers can have the benefit of a well functioning corporate bond market.[7] In

In India, the lack of credit rating requirements for private placement of corporate debt has fostered a primary market structure where private placement dominates in an overwhelming manner . . .

[7] The "buy and hold" strategy for corporate debt securities, which is often quoted as a major cause of the illiquidity of their secondary market, is generally legitimate strategy for institutional investors, who buy in large lots and hold the securities to maturity, as a substantial part of an institutional investor's investment portfolio does not need to be kept liquid all the time. With the coexistence of both major and minor issuers' bonds, these investors may find it profitable to trade in the more liquid bonds and hold the less liquid ones. (See for example, Endo, 2000.)

India, the lack of credit rating requirements for private placement of corporate debt has fostered a primary market structure where private placement dominates in an overwhelming manner, leading to further lack of liquidity in the secondary market. The private placement of debt as well as transactions in debt securities are generally made through opaque negotiations with poor disclosures and ineffective audits, thus resulting in an inefficient secondary market which suffers from fragmentation, low liquidity and inefficient price discovery.[8]

Market Imperfections: Some Quantification

We made an attempt to understand the nature and extent of imperfection of the Indian secondary market for corporate bonds by examining the following aspects: (1) depth of the market, (2) composition of the market, (3) relationship between yield-to-maturity (YTM) and volatility of return, (4) nature of the spread between YTMs of different risk categories of bonds, (5) relationship between market depth and price/YTM and (6) market pricing of risk. As regards the data source, we have used available data on that fraction of trading in corporate bonds that are routed through the Bombay Stock Exchange (BSE) and the Capital Market (CM) and WDM segments of the National Stock Exchange (NSE). Naturally, given the lack of width of the market itself, we could not have a large data set for our analysis.[9]

We used available daily trading information for the corporate debt segment of both the BSE and the NSE from April 1997 to March 2001.

In our analysis, we used available daily trading information for the corporate debt segment of both the BSE and the NSE.[10] This daily data set covers a 38-month period from April 1997 to March 2001 (with some gaps due to non-availability of data). Only non-convertible debentures (NCDs)[11] (i.e., debt securities with no equity component linked to them) were considered. Further, the trading data

[8] See IOSCO, 2002, for a comparison of the market microstructure of the Indian corporate debt market vis-a-vis other emerging markets. For a discussion on similar problems in the Canadian corporate debt market see Powley (2000).

[9] It may be mentioned that there is no unique and reliable source of information on all transactions of corporate bonds. For government bonds, even though not all secondary market transactions are routed through the WDM of the NSE, all trades are recorded with the RBI and therefore one gets the entire data from the RBI sources. However, in the case of corporate bonds a significant portion of the trade is done as bilateral agreements between two counter-parties, information on which is not readily available. Also, for our purpose, data on exchange-traded transactions was of greater relevance, since it is the exchanges that provide the basis for efficient market making by reducing information asymmetry. Hence, we focussed on that fraction of trading in corporate bonds that were routed through the BSE and the Capital Market (CM) and WDM segments of the NSE.

[10] The data were collected from daily trade papers.

[11] In the USA, debentures are defined as debt instruments which are not secured by any pledge of assets (either fixed assets or financial obligations of other companies). In the UK, on the other hand, debentures usually refer to secured debt. In India, debentures are defined as "debenture stock, bonds and any other securities of a company, whether constituting a charge on the assets of the company or not", under Section 2(12) of the Companies Act, 1956.

for bonds issued by financial institutions (FIs) were excluded.[12]

It should be pointed out here that our chosen sample period, unfortunately, was a period when several external shocks struck the economy and the industry suffered a protracted period of slowing down of growth. A major disturbance, one that had a direct impact on bond markets, was the weakening of the Indian rupee and the consequent policy measures of the RBI to counter this weakening. Specifically, the RBI reversed its easy money policy and as a result the interest rate increased significantly.[13] At the same time, with a slowdown of economic growth, it was strongly anticipated that the high interest rate policy itself would be reversed as soon as the rupee had been able to consolidate its position vis-à-vis the US dollar at a new "equilibrium" level. Further, since there was no obvious indication as to how soon such stabilisation might occur, given the experience of the Southeast Asian countries, there was apprehension about the future of weaker companies (that had faced a rise in interest cost and a possible slowdown in economic activities simultaneously). Thus, the interest rate condition was strongly influenced by short-term developments on the foreign exchange front till the financial year 1998-99. The interest rate in the Indian economy moved downward during 1999-2000 following the reversal of the RBI's monetary policy in March 1999. Signs of industrial recovery, improved corporate sector performance and strengthened macro economic fundamentals (such as, low inflation along with a sharp rise in the prices of information technology stocks world-wide) led to a sustained rise in share trading during 1999-00, which continued until the bursting of the asset price bubble affected financial markets all over the world. These events set the background for the present analysis of the nature of the secondary corporate bond segment of the Indian capital market.

A major disturbance, one that had a direct impact on bond markets, was the weakening of the Indian rupee and the consequent policy measures of the RBI to counter this weakening.

As regards the health of the secondary market for corporate bonds during the period of our study, as our data set indicates, frequency of trading in corporate bonds (on exchanges) declined from February 1998 onwards. This declining trend continued till the end of our sample period with occasional short reversals (e.g., during the September-December 1998 period). Trading in corporate debenture almost halved during 1999 and our data showed a drastic decline from November 1999 onwards. It can be seen from Table 4 that the trading in non-government bonds as a whole declined by more than half from its April 1997–March 1998 level during the next two years. This was followed by another

[12] This was done for the following reasons: First of all, FIs are perceived to be quasi-government institutions with significantly low default-risk. Therefore, unlike the bonds issued by corporate entities, bonds issued by FIs are highly traded. Further, in recent years most bonds issued by FIs are hybrid instruments with a variety of features like embedded options, and therefore it is difficult to compare these bonds with NCDs issued by corporates.

[13] For details about the RBI's direct and indirect interventions in the market for foreign currencies, see Mukhopadhyay (1999).

similar sharp decline during April 2000–March 2001, which could partly be due to crowding out effect as these periods were also periods of increasing volumes in the gilt market and the equity market.[14] The bonds of financial institutions were heavily traded between April 1998 and February 1999, which could have accounted for part of the reduced trading of corporate bonds during that period. Table 4 also shows that there was a significant gap between the number of transactions in non-government bonds and the number of trades in FI and corporate bonds put together. There were a number of outstanding corporate debt instruments, which were hybrid in nature, combining features of both debt and equity (convertible debentures and warrants); these accounted for most of the trading during the latter period,[15] while there was a decline in trading in the FI bonds as well as non-convertible debentures. In what follows, we summarise the various results that were obtained.

If the *n*-bond concentration ratio turns out to be high for a small value of *n*, one may safely conclude that the market lacks depth.

Depth of the Market

In order to verify the extent of depth (or lack of depth, to be specific) of the secondary corporate bond market, we tracked the n-bond concentration ratio for frequency of trading over time. To be precise, for each month we identified a set of n most frequently traded corporate bonds and measured their share in the total frequency of trading during that month. Clearly, if the n-bond concentration ratio turns out to be high for a small value of n, one may safely conclude that the market lacks depth, because in that case the probability will be low that a bond that does not belong to the chosen set will be traded. Since it is the frequency of trading of bonds that determines the extent of market efficiency associated with determination of their prices,[16] a high n-bond concentration ratio should, in turn, imply presence of a large number of perverse prices in the secondary market. In our exercise, we used three n-bond concentration ratios for n = 5, 10 and 15, respectively.

As the values of the three n-bond concentration measures presented in Table 4 suggest, there was a rather high level of concentration of trading in the secondary corporate bond market during the period under review. More importantly, this concentration showed a

[14] The boom in the equity market did not seem to have any positive impact on the corporate debt market, at least not on secondary market trading. Campbell and Taksler (2002), show that during the late 1990's even the US equity and corporate bond markets behaved very differently; stock prices rose strongly, while corporate bonds performed poorly.

[15] Particularly, a series of bonds from Reliance Petro and Nirma accounted for the majority of these trades.

[16] Low frequency of trading implies that (a) trading takes place between very few players, and (b) there is inadequate signalling of interest rate expectations prevailing in the market. Hence, players are then more vulnerable to price manipulation. Further, in the absence of adequate information about expected interest rates, it would be difficult for the investors to converge to a unique set of theoretically correct prices, and hence price volatility would be exacerbated.

broad rising trend over the period of study, reaching extremely high levels during April 2000 to March 2001. It may be mentioned that a similar time trend of increasing concentration of trading was also observed in the gilt market in our study of the Indian government bond market conducted earlier.[17] Possibly, the uncertainties related to the Asian financial crisis showed up in these ratios. As a closer look at the time series of these concentration measures shows, the concentration first increased during mid-1997 and after coming down for a brief period during November 1997 to January 1998 by about 10 percentage points, again went up. There was a jump of about 15 percentage points in these ratios during September 1998, coinciding with the interest rate hike effected by the RBI in late August1998. As Table 4 shows, the 15-bond concentration ratio went up in each financial year, from around 70 per cent in 1997-98 to over 76 per cent in April-November 1999. During the 2000-01 period, when most of the trading might have shifted to other markets like the gilt or equity markets, the 15-bond concentration ratio was alarmingly high at around 94 per cent. The seriousness of the situation is also reflected by the value of the 5-bond concentration ratio, which was consistently near 50 per cent and jumped to 85 per cent in 2000-01.[18]

We also approach the issue of depth in another way—viz., by identifying the extent to which trading is concentrated among bonds with high credit rating. For this purpose, we consider only the fre-

TABLE 4
Trade in non-government bonds: Apr97-Mar01

Sub-period	Average monthly frequency of trade of			Relative frequency** of trading of		
	non-govt. bonds	Institutional bonds	Corporate bonds*	5 most frequently traded corporate bonds	10 most frequently traded corporate bonds	15 most frequently traded corporate bonds
Apr97 to Mar 98	24209	1253	4895	47.45%	60.86%	69.73%
Apr98 to Feb 99	9128	1746	2755	50.44%	65.57%	73.95%
Apr99 to Nov 99	10163	791	1277	49.59%	67.01%	76.38%
Apr 00 to Mar 01	4240	617	450	84.89%	92.24%	94.37%
Apr 97 to Mar01	12740	1168	2630	58.45%	71.29%	78.31%

Source: Daily trade papers
* Refers to NCDs(non-convertible debentures only)
** Frequency of trading of the 5/10/15 most frequently traded bonds, in each month, as a percentage of total frequency of trading in corporate bonds.

[17] Even at present, when the secondary market for gilts has grown manifold, it is evidenced that at any approximate point in the yield curve only a single paper may get traded, e.g. the 9.81 per cent 2013 paper was the only paper in the 10 year tenure range to trade through January, February and part of March, 2003.

[18] The concentration ratio for the most-traded 10 and 25 gilts also went up by more than 15 percentage points between 1998-99 and 2000-01, to 58 and 81 per cent, respectively.

quency of trading and do not explore the volume of trade (i.e., the total value of trade). The preference for frequency of trading over the volume of trade is essentially due to our presumption that the efficiency of the market and the pricing mechanism is more closely related to the former.

Composition of the Market

As is well known, corporate bonds issued in India are rated for their credit worthiness. Bonds of a variety of ratings are outstanding at any point of time. The rating categories start at the top from triple A, and move down through double A, A, triple B and non-investment grades, starting with double B and ending at D. Within each letter category, differences over and below the average are indicated by suffixes of + or –. All rating categories of bonds are equally important so far as secondary market trading is concerned. In fact, an indicator of the degree of market efficiency would be whether or not, bonds of various ratings get transacted regularly in the market. In our exercise, we examined the month-wise frequency of trading of bonds of different ratings among the 20 most frequently traded bonds during a month and the share of bonds of different rating categories in the total frequency of trading.

An indicator of the degree of market efficiency would be whether or not, bonds of various ratings get transacted regularly in the market.

Charts 1A-1D present the distribution of total trading by categories of bond for four sub-periods—viz., April 1997 to March 1998, April 1998 to February 1999, April to November 1999 and April 2000 to March 2001. Chart 2 shows the over time movements of the share in the total trading of bonds of different ratings for the study period.[19] The following picture emerges from these charts:

For April 1997 to March 1998 (i.e., the first sub-period of our 38-month study period), the share of triple A and double A rated bonds together was about 35 per cent, and as Chart 2 would suggest, this share showed a downward trend. Among AAA rated bonds, NCDs of Reliance Industries were traded heavily. Single A rated bonds, on the other hand, accounted for 24 per cent of this trading and maintained this share more or less. Bonds of Mangalore Refinery and Petrochemicals (MRPL) accounted for bulk of the trading in this group.

During the second sub-period (that is, April 1998 to February 1999), the share of AAA and AA rated bonds together went down to 22 per cent, whereas the share of A rated bonds went up to 30 per cent, with bonds of MRPL, and Deepak Fertilisers and Chambal Fertilisers, contributing to the bulk of this increase. This sub-period is also marked by a sharp increase in the share of non-investment grade bonds (that is, category marked Rest in the Chart).

[19] From this point onwards we have ignored all papers which do not have a declared credit rating (for any month). We have also seen that the problem of multiple ratings from the three rating agencies (namely ICRA, Crisil and Care) does not occur at any point of time.

During the third sub-period (April to November 1999), while the pooled share of AAA and AA rated remained at 22 per cent, the share of AAA rated bonds fell to 5 per cent from its previous 8 per cent level and that of the non-investment category rose to 42 per cent from the 29 per cent level of the previous sub-period.

Finally, during the last sub-period April 2000 to March 2001, no trading of AAA rated bonds was observed. The shares of A and BBB rated securities went down further to 15 and 11 per cent, respectively, and trading in non-investment grade bonds surged. Indeed, the share of such bonds swelled to 52 per cent (during a period when total number of reported trades declined sharply). During the last three sub-periods, trading was concentrated in the Rest category consisting of BB+ to D rated corporate papers like Jindal Vijaynagar Steel, Hotel Leela Venture, Torrent Gujarat Biotech, Timex Watches, Essar Oil and Hindusthan Development Corporation, among others.

CHART 1A
Type of Bonds Traded During Apr97 to Mar98

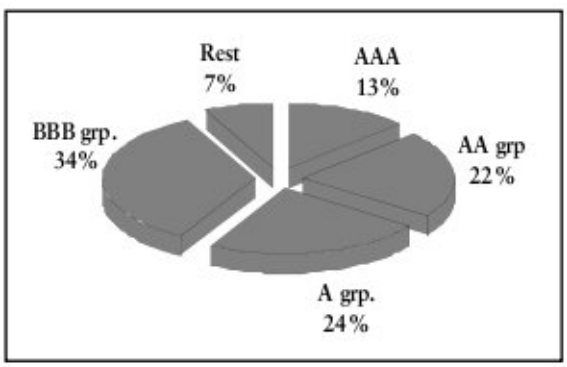


CHART 1B
Type of Bonds Traded During Apr98 to Feb99

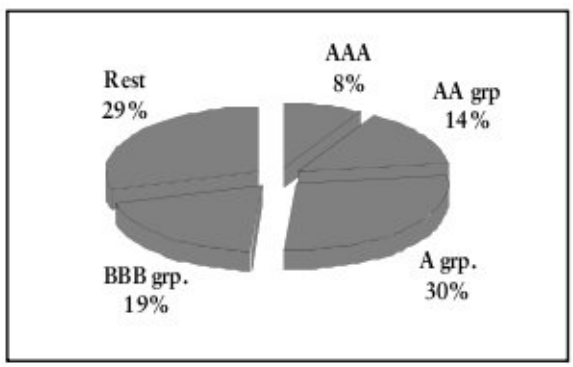


CHART 1C
Type of Bonds Traded During Apr99 to Nov99

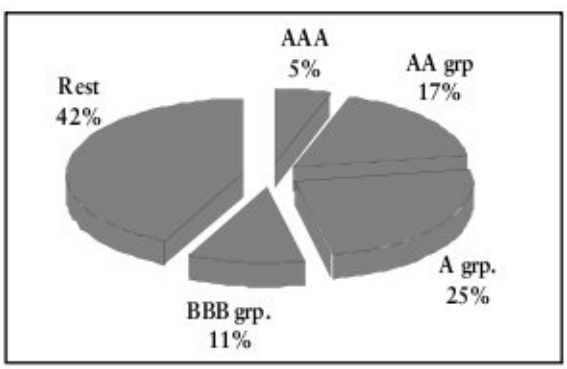
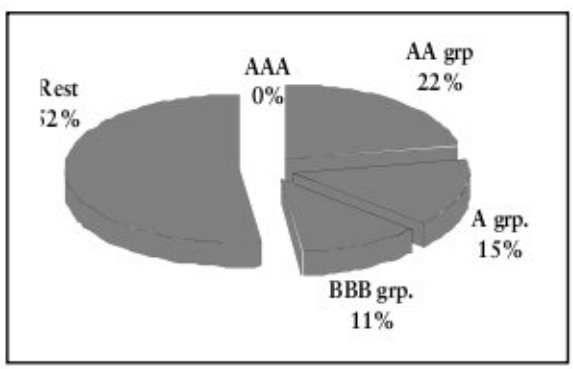


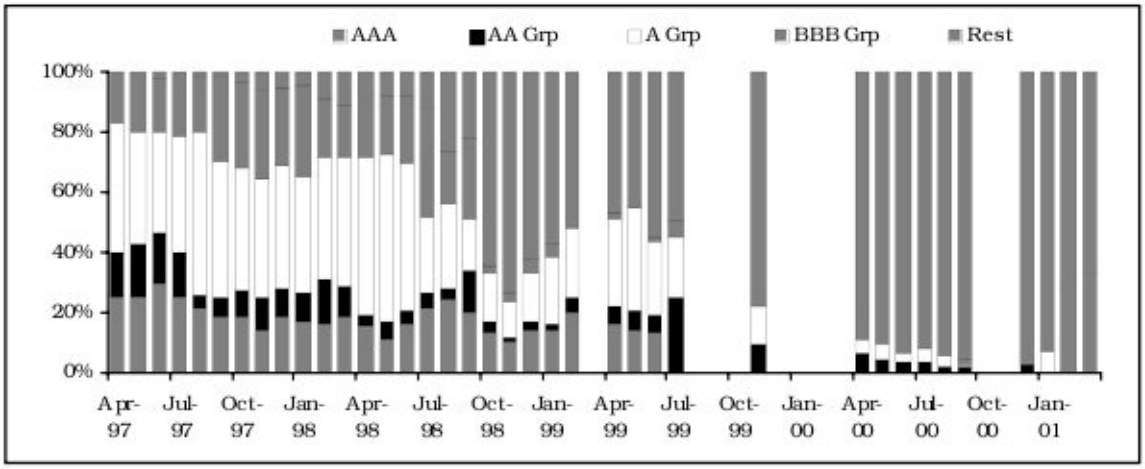
CHART 1D
Type of Bonds Traded During Apr00 to Mar01



Note: By any rating group X we mean ratings X+, X and X-. Rating changes have been counted separately if the rating group changes, i.e., a rating change from say BBB to D within a month has been recorded both under BBB group and Rest group; the last rating has been counted if the change is within a group. From this point onwards we exclude any bonds which do not have a declared credit rating.

On the whole, thus, the period witnessed a qualitative change so far as the composition of the market was concerned—viz., a dwindling of trade in highly rated bonds and a sharp rise in the trading of non-investment grade bonds. The first phenomenon may be interpreted as an expression of market participants' strong preference for security (as the holders of highly rated corporate bonds evidently preferred not to part with these). The second phenomenon may apparently be suggestive of the emergence of a junk bond market in a regime where interest rate has been moving downward. In fact, towards the end of our study period, the share of these bonds soared to the 75-80 per cent level. However, a closer scrutiny indicated that these bonds were not typically high risk/return (junk) bonds, but were rather medium risk bonds (downgraded ones) that managed to retain their liquidity in the thinning market. One may regard such predominance of trading in downgraded bonds as an indication of a specific type of portfolio management technique adopted by some institutional investors, who, given their weak balance sheets, might have been trying out a high risk-return strategy, leading to a surge in trading of high yielding bonds. However, this phenomenon could also be an indication of the inability of investors to access higher rated bonds as, in a situation of extreme economic uncertainty, investors may be holding on to higher rated bonds. Hence those who traded to meet their liquidity requirements might have been forced to trade in lesser quality bonds.

CHART 2
Relative frequency of transaction of 20 most frequently traded debentures; Apr 97-Mar 01.



See note below Chart 1.

YTM and its Volatility

In contrast to a government bond, which involves only interest rate risk, a corporate bond carries both a default risk and an interest rate risk. Bond rating helps investors distinguish between high risk and low risk bonds, so to say. If the rating is done correctly and the market

functions efficiently, it is expected that market prices will move such that the YTM of a bond of higher rating will be lower than that for a bond of lower rating (the difference being the risk premium), given that the bonds have the same number of years maturity. In other words, market efficiency would minimise perverse pricing of bonds that might result in YTM -rating mismatches. We tried to examine the extent of such mismatches for the Indian corporate bond market.

Given the available bond price data, we calculated corresponding YTMs [Box 6 gives our method of estimation of the YTMs].[20] The results suggested that on the whole the pricing mechanism of the Indian corporate bond market, in spite of its underdeveloped state, was consistent with the theory of bond pricing. Thus, for example, it was found that for all categories of rating, YTM of a bond declined as the bond approached maturity and also, given the number of years to maturity, YTM of a higher rated bond was lower than that of a lower rated bond, on an average. However, lack of depth of the market seemed to result in significant variations in the price/YTM of even AAA

BOX 6
Estimating Yield to Maturity

The price data is used to estimate the YTMs using the approximation*

$$AYTM \approx \frac{[(M-P) + AC]}{N} / [(M+P)/2]$$

Where:
M is the maturity value;
P is the price;
N is the no. of years to maturity ;
AC is the total coupon payments per year.

The spreads are calculated from the reported YTMs of gilts of similar maturity, averaged over the relevant time period.

*Note:** This approximation suggested by Meir Kohn in *Financial Institutions and Markets* (p.88) gives estimates that may differ from the actual YTMs by 10-15 basis points, this is a reasonably good indicative figure for the average annual YTM at least from the point of view of any economic analysis. *Current yield*, which is conventionally reported in the debt market, fails to capture capital gains (losses) arising out of the difference between the issue price and traded price of the bond, which does matter significantly, particularly if the bond matures in the near future.

The usual distortionary effects of shallow market possibly got manifested in high volatility of YTMs, this being more severe for bonds with higher credit risk compared with the ones of high credit quality.

[20]We cannot claim to produce very accurate results on the YTMs and spreads of corporate bonds as the various redemption features and lack of certain information on these, make YTM calculations difficult, and the derived YTMs may not be strictly comparable across bonds. Neither have all bonds been uniformly traded in all months during the sample period, making comparisons even more difficult.

and AA rated bonds. Volatility (measured as standard deviation of YTM) was found to be larger for lower rated bonds than for higher rated bonds [see Table 5]. In other words, the usual distortionary effects of shallow market possibly got manifested in high volatility of YTMs, this being more severe for bonds with higher credit risk compared with the ones of high credit quality.

TABLE 5
Price/ Yield Volatility of bonds over rating categories, during Apr 97 - Mar 01.

		C.V(%) of prices				S.D of YTMs			
	No. of securities	average	Minimum C.V	Maximum C.V	range	average	Minimum S.D	Maximum S.D	range
Gilts	6					0.55%	0.02%	0.85%	0.83%
AAA	6	2.49%	1.06%	3.94%	2.88%	1.28%	0.74%	2.46%	1.71%
AA+	6	2.88%	0.63%	5.58%	4.95%	0.87%	0.40%	1.98%	1.58%
AA	7	2.71%	0.44%	6.22%	5.78%	1.84%	0.57%	4.15%	3.58%
AA-	5	3.54%	1.29%	6.67%	5.38%	1.12%	0.42%	1.81%	1.39%
A+	7	4.10%	1.67%	8.53%	6.86%	2.03%	0.57%	5.75%	5.18%
A	5	3.37%	1.14%	7.00%	5.86%	1.72%	0.88%	3.16%	2.29%
A-	2	2.67%	2.35%	3.00%	0.64%	1.00%	0.82%	1.18%	0.36%
BBB+	6(4)	4.12%	1.65%	7.37%	5.72%	2.03%	0.60%	4.18%	3.58%
BBB	7(3)	2.66%	1.62%	3.79%	2.18%	1.62%	0.88%	2.92%	2.04%
BBB-	4	4.35%	2.21%	9.65%	7.43%	2.12%	0.86%	4.51%	3.65%
D	7(3)	11.62%	4.81%	30.67%	25.87%	4.89%	3.48%	6.95%	3.47%

Note: Figures in brackets are the number of securities for which YTM was estimated; for the rest proper information on maturity dates and options were not available.
The gilts cover maturities similar to the corporate bonds considered.

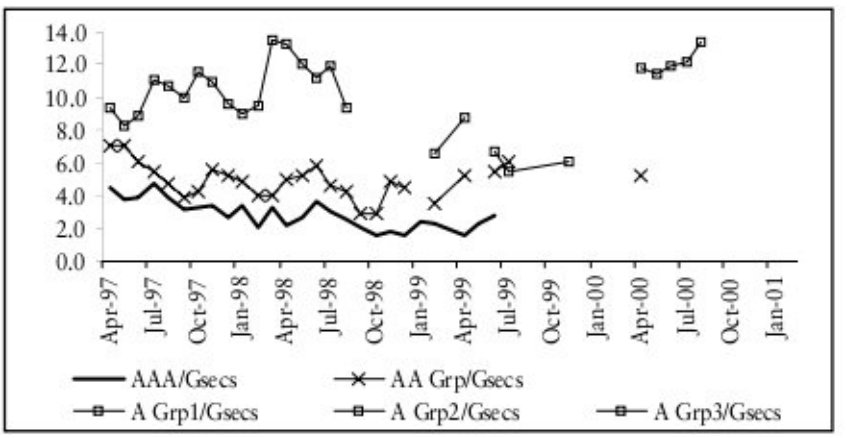
Spread between YTM of Corporate and Government Bonds

Given the estimated YTM of bonds of different ratings, we have estimated the spread between the YTM of corporate bond and government bond (i.e., the excess of YTM of corporate bond over that of government bond) for corporate bonds of different rating categories. The YTM of government bond is always found to be smaller than that of a corporate bond of comparable maturity—thus indicating that the market behaves in such a manner that the resulting prices allow the expected risk premium. However, the YTM of a lower rated bond is not always observed to be systematically larger than that of a higher rated bond, indicating thereby that the market prices of bonds of different ratings sometimes fail to yield the expected risk premium. The measured spread of YTM for bonds with less than 3 years of residual maturity and that for bonds with 4 to 5 years of residual maturity are seen to vary rather considerably over months. This is true even for AAA rated corporate bond.[21] Further, while the spread of YTM of , say, BBB

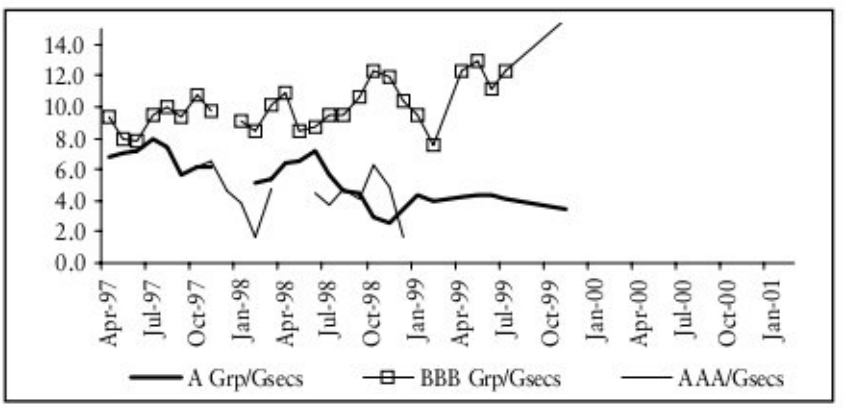
[21] This could happen due to fluctuation in yields of both the corporate bond and the Government bond from which the spread is calculated, as these bonds were close to maturity.

rated bond over AAA rated bond, is observed to be positive and large always, the spread of YTM of A rated bond over AAA rated bonds with residual maturity of less than 3 years is not always found positive, although the spread works out to be positive on the average. Such results are observed for bonds with greater than 3 years to maturity as well, when the spread is calculated for bonds of adjacent rating categories (i.e., say, between AA and AAA or between A and AA, etc.).[22] A closer look suggests that the impact of rating revision (or even an expected one) may be strong enough to cause such aberrations. Charts 3A & 3B

CHARTS 3A
Spreads of Corporate Securities by Rating with 3-5 years to maturity



CHARTS 3B
Spreads of Corporate Securities by Rating with less that 3 years. to maturity



. . . at times private information works strong enough so that investors tend to ignore the public information contained in the declared credit rating of corporate bonds.

[22] Diaz and Navaroo's (2002) analysis of yield spreads between Spanish Treasury and non-Treasury securities and its relation with term to maturity showed a downward sloping term structure of yield spreads of investment grade bonds, contrary to theoretical literature, but they found that this outcome was caused mainly by the effect of liquidity on spreads. Similar indications were also found in our data, where the spread of a AAA rated bond with less than 3 years to maturity could be higher than a similarly rated bond with greater than 3 years residual maturity.

show the over time movement of spread of bonds of different rating categories (vis-a-vis government bonds). It may be seen in Chart 3A that the spread of YTM of single A rated bond over AA rated bond was the consequence of the YTM of A rated bond (which had a positive outlook and was in fact upgraded to the AA group after a few months) dipping sharply enough to cause a negative spread with the next rating category. In Chart 3B, the A rated bond has been upgraded one notch to A+ leading to a decline in its YTM, which is sharp enough in a shallow market to cause a lower spread compared with even a AAA rated bond of near similar maturity. The observed patterns of over time movement of these spreads thus possibly suggest that at times private information (or the belief of the investors) works strong enough so that investors tend to ignore the public information contained in the declared credit rating of corporate bonds.

Whether Depth affects Price and YTM

As already mentioned, a major advantage of having a well functioning corporate bond market with an active secondary market segment in an economy is that such a market ensures cautious evaluation/screening of the risk and viability of proposed investment plans of enterprises by the market mechanism itself. In fact, in an efficient corporate bond market, the price of a bond reflects buyers' perceived yield/return (duly adjusted for the risk involved) from the bond, given their expectation about the macro economic fundamentals. A market lacking depth will naturally give rise to perverse prices that will fail to reflect these expectations accurately and, more importantly, will not be able to judge the viability of proposed investment plans correctly. Essentially for this reason, it is worthwhile to examine whether or not the depth of market affects the price/YTM of bonds.

The results broadly support the hypothesis of an inverse relationship between credit worthiness (i.e., the rating) and extent of volatility of price/ YTM.

To examine the extent of perverse pricing of bonds, we estimated the volatility of the price/YTM of bonds of different rating categories and compared the volatility across rating categories. Anecdotal evidence suggests that the secondary market for corporate bonds becomes progressively thinner as the default risk of bond increases. If it was so, volatility of price/YTM should decline as rating went up. We also brought in the standard deviation (SD) of YTM of government bonds in this comparison. Table 5 presents the average, minimum, maximum and range of coefficient of variation (CV) of price and SD of corresponding YTM for gilt and 11 rating categories of corporate bonds over the entire study period April 1997 to March 2001. For a given rating category, the CV of price and SD of YTM for each month were computed using all the observed price data for that category of bond ignoring the period to maturity. The results broadly support the hypothesis of an inverse relationship between credit worthiness (i.e., the rating) and extent of volatility of price/YTM. It may be noted that the average value of CV of price rises as rating goes down. The range of volatility also shows a broad tendency to increase as rating goes down.

For SD of YTM, however, the tendency of such inverse relationship with rating is far less prominent.

Market Pricing of Risk

As is well known, holding of a corporate bond involves bearing of a composite of default risk and return risk. The rating of a bond reflects the default risk involved in holding the bond whereas the return risk is governed by the volatility of price/YTM of the bond. As we have already seen, the degree of volatility of YTM of bonds of different ratings is not the same across rating categories. In other words, bonds of different ratings carry return risk of different degrees. Now, if the market is well functioning and efficient, it should give rise to prices of bonds of different ratings (of equal residual maturity) such that the implied market price of risk is the same across bond categories, where the market price of risk for a given category of bond is measured by the value of Sharpe Ratio for this category of bond (viz., [YTM for the bond category—rate of riskfree return]/SD of YTM for the bond category). Table 6 presents the estimated values of the Sharpe Ratio for different categories of bond rating based on available price data for the period up to end-1999 (as comparable data for the remaining period were not available). We used the YTM of government bonds of comparable residual maturity as the measure of the risk-free return in these calculations. As these available estimates suggest, the market was quite far from being efficient and well functioning as it failed to evolve a uniform market price of risk across rating categories.

Indeed, it was rated bonds in the BBB category, with residual maturity less than or equal to 3 years, for which the excess return per unit of risk borne turned out to be the highest. This was followed by AA+ rated bonds with residual maturity between 4 and 5 years. These results also keep open the possibility that bonds belonging to the same

Available estimates suggest, the market was quite far from being efficient and well functioning as it failed to evolve a uniform market price of risk across rating categories.

TABLE 6
Sharpe Ratio for Corporate Bonds with different Ratings

	Residual Maturity	
Rating	4-5 years	< 3 years
AAA	2.78	
AA+	5.88	
AA+/AAA		3.85
AA+/AA	4.00	
AA	3.33	
A/A+		2.94
AAA/A	2.22	
AA+/A	2.08	
A-/BB		3.85
BBB+/BBB-		6.25
BBB-/D	1.72	

Note: These estimates are based on data for the period up to end 1999.

rating category may have YTM and its volatility such that the implied Sharpe Ratio value may vary from bond to bond.[21, 22] Interestingly enough, in our exercise we got some clear evidences of reduction in Sharpe Ratio value following downgrading of a bond from AAA to AA+ rating category or from investment to non-investment category, say. Needless to mention, all these are indicative of the immaturity of the Indian corporate bond market.

Conclusion

In this paper we made an attempt to examine the nature of the Indian corporate bond market using available data on secondary market trading channelled through the NSE and BSE during the 38 months from April 1997 to March 2001, with some gaps in between. Our primary objective was to judge the extent of inefficiency of this market in view of the well-known fact that this market is quite thin and shallow. For this purpose, we examined several aspects of the market—such as, depth and composition of the market, relationship between YTM and volatility of return as implied by observed price movements, nature of spread between YTM of different categories of bond, relationship between market depth and price/YTM and, finally, market pricing of risk.

Our exercise suggests the following qualitative feature of the Indian corporate bond market, as it stands now. Like the government bond market, the secondary market for corporate bonds too is marked by lack of depth and width. However, as opposed to the former, which has been expanding, the secondary market for (exchange traded) corporate bond has been characterised by shrinking depth and width in recent years. Despite the problems of measurement of YTMs, and hence comparison of the same between bonds, the picture we obtained would cause concern about the state of the corporate debt market. The imperfections in the secondary market for corporate bonds are manifest in infrequent trading, high liquidity risk, a high degree of dispersion of price/YTM over time, and a lack of strong and unidirectional relationship between a bond's credit rating (risk) and its market price/YTM in

Imperfections in the secondary market for corporate bonds are manifest in infrequent trading, high liquidity risk, a high degree of dispersion of price/YTM over time, and a lack of strong and unidirectional relationship between a bond's credit rating (risk) and its market price/YTM.

[23] The divergence of risk perceptions of individual bonds, within a rating category is however, not an uncommon phenomenon. There has been extensive development of rating based reduced-form models, which take as a premise that bonds when grouped by ratings are homogeneous with respect to risk, Elton et al (2002) examine Moody's and Standard & Poor's ratings of corporate bonds and show they are not sufficient metrics for determining spot rate curves and pricing relationships.

[24] In our exercise, we did notice cases of widely different Sharpe Ratio values of bonds belonging to the same rating category. This shows that in a shallow market risk/return may vary quite widely for individual bonds within a rating category. Evidence to this effect has been provided by studies like that of Campbell and Taksler (2002), who used US panel data for the late 1990's and showed that idiosyncratic firm-level equity volatility might explain as much cross-sectional variation in yields as could credit rating, perhaps because equity volatility would reflect recent information that might not yet be reflected in the credit rating.

quite a number of instances. Given the current slack in overall investment activity in the Indian economy, the primary and secondary markets for corporate debt, represented by the private placements market and an OTC market, may seem to be sufficient. But once th investment climate improves and the demand for long term funds pi cs up, the need for a vibrant secondary market for corporate debt wo d definitely be felt rather acutely.[25]

Given its present state, the basic questions about the develc ment of the Indian (secondary) market for corporate bonds are (1) ho.. essential is it that the market grows and becomes a matured one and (2) what steps will facilitate such a growth. So far as the issue of essentiality is concerned, as is well known, leaving aside the international financial market, the three principal sources finance for business investment are the commercial banks, the equity market and the corporate debt market. Of these, a commercial bank loan is typically appropriate for short-term requirements, whereas finance obtained from the equity or the debt market would serve long-term investment requirements well. Since capital markets, in developing countries, in particular, are far from being frictionless and efficient, the effective costs of capital in these two markets are not the same. It is generally agreed that equity financing of investment turns out to be more expensive because of the associated risk involved. However, in the absence of a well functioning corporate bond market, particularly in the developing countries, business investors turn to commercial banks for loans. In such a situation, development of the corporate bond market (its secondary market segment, in particular) becomes an essential prerequisite for efficient financing.

Recently, a set of comprehensive policy measures has been taken by the monetary authority for promoting the corporate bond segment of the capital market, particularly, the secondary market for corporate bonds.

As Hakansson (1999) puts it, when the relative sizes of the banking system and the corporate bond market are more balanced, as would be the case when a well developed corporate bond market is present, market forces have a much greater opportunity to assert themselves, thereby reducing systemic risk and probability of a crisis. This is because such an environment is associated with greater accounting transparency, a large community of professional financial analysts, respected rating agencies, a wide range of corporate debt securities and derivatives demanding sophisticated credit analysis, an opportunity to make private placements, and efficient procedures for corporate reorganisation and liquidation.

In the literature it has been stressed that factors which could help boost liquidity in bond markets relate to the existence of a diversified and heterogeneous investor base. Diversity of investment horizons,

[25] The experiences of many other Asian countries are similar to India's; while efforts to develop government bond markets have been fairly successful, there has been much less success in developing corporate bond markets. Exceptions are cases like Malaysia and Korea, where stock exchanges account for a significant share of corporate bond trading.

risk tolerance levels and investment objectives among investors provides opportunities for trading, which in turn helps enhance market liquidity and efficiency of pricing. The role of the fund management industry is shown to be crucial in this respect, particularly if regulators provide them with incentives to trade (Mihaljek et al, 2002 and Turner, 2002).

In India, recently, a set of comprehensive policy measures has been taken by the monetary authority for promoting the corporate bond segment of the capital market, particularly, the secondary market for corporate bonds. One of these is de-materialisation of instruments, which should go a long way in encouraging exchange-based trading of debt securities. FIs and dealers (both primary and secondary dealers) have been asked to make fresh investments and hold bonds and debentures, privately placed or otherwise, only in dematerialised form.[26] Alongside, National Securities Depository Limited (NSDL) and Central Depository Services (India) Limited (CDSL) have started admitting debt instruments such as debentures, irrespective of whether these debt instruments are listed, unlisted or privately placed. In addition, the SEBI has already mandated that all trades on the BSE and the NSE be executed on the basis of the price and order matching mechanism of the stock exchanges as in the case of equities. The NSE, on the other hand, insists on credit rating for listing of all privately placed debt issues by PSUs, FIs, scheduled commercial banks, and private corporates.

The need to have mandatory credit ratings, irrespective of whether the debt is publicly issued or privately placed, has been stressed in recent times.

While the infrastructure is being developed extensively, in the corporate debt segment, the RBI's concern, as a supervisor, remains the large number of private placements/unlisted bonds for which the disclosure and documentation standards are rather unsatisfactory (Reddy, 2002). The need to have a standard practice in this regard (mandatory credit ratings), irrespective of whether the debt is publicly issued or privately placed, has been stressed in recent times. Such measures should be collectively effective in ameliorating problems of information asymmetry, low liquidity and consequent distortions from the corporate debt segment, and hence help it to grow to maturity.

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