NCFM

NSE's CERTIFICATION IN FINANCIAL MARKETS

FIMMDA-NSE-DEBT MARKET (BASIC) MODULE WORK BOOK

NATIONAL STOCK EXCHANGE OF INDIA LIMITED AND FIXED INCOME MONEY MARKET AND DERIVATIVES ASSOCIATION OF INDIA

FIMMDA

FIXED INCOME MONEY MARKET AND
DERIVATES ASSOCIATION OF INDIA

Test Details:

Sr. No.	Name of Module	Fees (Rs.)	Test Duration (in minutes)	No. of Questions	Maximum Marks	Pass Marks (%)	Certificate Validity (in yrs)
	FOUNDATION						
1	Financial Markets: A Beginners' Module ^	1686 *	120	60	100	50	5
2	Mutual Funds : A Beginners' Module	1686 *	120	60	100	50	5
3	Currency Derivatives: A Beginner's Module	1686 *	120	60	100	50	5
4	Equity Derivatives: A Beginner's Module	1686 *	120	60	100	50	5
5	Interest Rate Derivatives: A Beginner's Module	1686 *	120	60	100	50	5
6	Commercial Banking in India: A Beginner's Module	1686 *	120	60	100	50	5
7	FIMMDA-NSE Debt Market (Basic) Module	1686 *	120	60	100	60	5
8	Securities Market (Basic) Module	1686 *	120	60	100	60	5
	INTERMEDIATE						
1	Capital Market (Dealers) Module ^	1686 *	105	60	100	50	5
2	Derivatives Market (Dealers) Module ^ [Please refer to footnote no. (i)]	1686 *	120	60	100	60	3
3	Investment Analysis and Portfolio Management Module	1686 *	120	60	100	60	5
4	Fundamental Analysis Module	1686 *	120	60	100	60	5
5	Options Trading Strategies Module	1686 *	120	60	100	60	5
6	Operations Risk Management Module	1686 *	120	75	100	60	5
7	Banking Sector Module	1686 *	120	60	100	60	5
8	Insurance Module	1686 *	120	60	100	60	5
9	Macroeconomics for Financial Markets Module	1686 *	120	60	100	60	5
10	NSDL–Depository Operations Module	1686 *	75	60	100	60 #	5
11	Commodities Market Module	2022 *	120	60	100	50	3
12	Surveillance in Stock Exchanges Module	1686 *	120	50	100	60	5
13	Corporate Governance Module	1686 *	90	100	100	60	5
14	Compliance Officers (Brokers) Module	1686 *	120	60	100	60	5
15	Compliance Officers (Corporates) Module	1686 *	120	60	100	60	5
16	Information Security Auditors Module (Part-1)	2528 *	120	90	100	60	2
	Information Security Auditors Module (Part-2)	2528 *	120	90	100	60	
17	Technical Analysis Module	1686 *	120	60	100	60	5
18	Mergers and Acquisitions Module	1686 *	120	60	100	60	5
19	Back Office Operations Module	1686 *	120	60	100	60	5
20	Wealth Management Module	1686 *	120	60	100	60	5
21	Project Finance Module	1686 *	120	60	100	60	5
22	Venture Capital and Private Equity Module	1686 *	120	70	100	60	5
23	Financial Services Foundation Module ###	1123 *	120	45	100	50	NA
24	NSE Certified Quality Analyst $	1686 *	120	60	100	50	NA
25	Certified Credit Research Analyst – Level 1 ~	1686 *	120	80	120	50	NA
	ADVANCED						
1	Financial Markets (Advanced) Module	1686 *	120	60	100	60	5
2	Securities Markets (Advanced) Module	1686 *	120	60	100	60	5
3	Derivatives (Advanced) Module [Please refer to footnote no. (i)]	1686 *	120	55	100	60	5
4	Mutual Funds (Advanced) Module	1686 *	120	60	100	60	5
5	Options Trading (Advanced) Module	1686 *	120	35	100	60	5
6	FPSB India Exam 1 to 4**	2247 per exam *	120	75	140	60	NA
7	Examination 5/Advanced Financial Planning **	5618 *	240	30	100	50	NA
8	Equity Research Module ##	1686 *	120	49	60	60	2
9	Issue Management Module ##	1686 *	120	55	70	60	2
10	Market Risk Module ##	1686 *	120	40	65	60	2
11	Financial Modeling Module ###	1123 *	120	30	100	50	NA
	NISM MODULES						
1	NISM-Series-I: Currency Derivatives Certification Examination ^	1250	120	100	100	60	3
2	NISM-Series-II-A: Registrars to an Issue and Share Transfer Agents – Corporate Certification Examination	1250	120	100	100	50	3
3	NISM-Series-II-B: Registrars to an Issue and Share Transfer Agents – Mutual Fund Certification Examination	1250	120	100	100	50	3
4	NISM-Series-III-A: Securities Intermediaries Compliance (Non-Fund) Certification Examination	1250	120	100	100	60	3
5	NISM-Series-IV: Interest Rate Derivatives Certification Examination	1250	120	100	100	60	3
6	NISM-Series-V-A: Mutual Fund Distributors Certification Examination ^	1250	120	100	100	50	3
7	NISM-Series-V-B: Mutual Fund Foundation Certification Examination	1000	120	50	50	50	3
8	NISM-Series-V-C: Mutual Fund Distributors (Level 2) Certification Examination	1405 *	120	68	100	60	3
9	NISM-Series-VI: Depository Operations Certification Examination	1250	120	100	100	60	3
10	NISM Series VII: Securities Operations and Risk Management Certification Examination	1250	120	100	100	50	3
11	NISM-Series-VIII: Equity Derivatives Certification Examination	1250	120	100	100	60	3
12	NISM-Series-IX: Merchant Banking Certification Examination	1250	120	100	100	60	3
13	NISM-Series-X-A: Investment Adviser (Level 1) Certification Examination	1250	120	100	100	60	3
14	NISM-Series-X-B: Investment Adviser (Level 2) Certification Examination	1405 *	120	68	100	60	3
15	NISM-Series-XI: Equity Sales Certification Examination	1405 *	120	100	100	50	3
16	NISM-Series-XII: Securities Markets Foundation Certification Examination	1405 *	120	100	100	60	3

*   in the 'Fees' column - indicates module fees inclusive of service tax

^   Candidates have the option to take the tests in English, Gujarati or Hindi languages.

Candidates securing 80% or more marks in NSDL-Depository Operations Module ONLY will be certified as 'Trainers'.

**   Following are the modules owf Financial Planning Standards Board India (Certified Financial Planner Certification)

-     FPSB India Exam 1 to 4 i.e. (i) Risk Analysis & Insurance Planning (ii) Retirement Planning & Employee Benefits (iii) Investment Planning and (iv) Tax Planning & Estate Planning

-     Examination 5/Advanced Financial Planning

Modules of Finitiatives Learning India Pvt. Ltd. (FLIP)

Module of IMS Proschool

$ Module of SSA Business Solutions (P) Ltd.

~   Module of Association of International Wealth Management of India

The curriculum for each of the modules (except Modules of Financial Planning Standards Board India, Finitiatives Learning India Pvt. Ltd. and IMS Proschool) is available on our website: www.nseindia.com > Education > Certifications.

Note: (i) SEBI / NISM has specified the NISM-Series-VIII-Equity Derivatives Certification Examination as the requisite standard for associated persons functioning as approved users and sales personnel of the trading member of an equity derivatives exchange or equity derivative segment of a recognized stock exchange.

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FIMMDA-NSE Debt Market (Basic) Module Curriculum

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Note: Candidates are advised to refer to NSE's website: www.nseindia.com, click on 'Education' link and then go to 'Updates & Announcements' link, regarding revisions/updations in NCFM modules or launch of new modules, if any.

CHAPTER 1:   DEBT INSTRUMENTS: FUNDAMENTAL FEATURES

Debt instruments are contracts in which one party lends money to another on pre-determined terms with regard to rate of interest to be paid by the borrower to the lender, the periodicity of such interest payment, and the repayment of the principal amount borrowed (either in installments or in bullet). In the Indian securities markets, we generally use the term 'bond' for debt instruments issued by the Central and State governments and public sector organisations, and the term 'debentures' for instruments issued by private corporate sector.[1]

1.1   INSTRUMENT FEATURES

The principal features of a bond are:

a)   Maturity

b)   Coupon

c)   Principal

In the bond markets, the terms ***maturity*** and ***term-to-maturity,*** are used quite frequently. Maturity of a bond refers to the date on which the bond matures, or the date on which the borrower has agreed to repay (redeem) the principal amount to the lender. The borrowing is extinguished with redemption, and the bond ceases to exist after that date. Term to maturity, on the other hand, refers to the number of years remaining for the bond to mature. Term to maturity of a bond changes everyday, from the date of issue of the bond until its maturity.

Coupon Rate refers to the periodic interest payments that are made by the borrower (who is also the issuer of the bond) to the lender (the subscriber of the bond) and the coupons are stated upfront either directly specifying the number (e.g.8%) or indirectly tying with a benchmark rate (e.g. MIBOR+0.5%). Coupon rate is the rate at which interest is paid, and is usually represented as a percentage of the par value of a bond.

Principal is the amount that has been borrowed, and is also called the **par value** or **face value** of the bond. The coupon is the product of the principal and the coupon rate. Typical face values in the bond market are Rs. 100.

Though there are bonds with face values of Rs. 1000 and Rs. 100000 and above. All Government bonds have the face value of Rs.100. In many cases, the name of the bond itself conveys the key features of a bond. For example a GS CG2015 11.40% bond refers to a Central Government bond maturing in the year 2015, and paying a coupon of 11.40%. Since Central Government bonds have a face value of Rs.100, and normally pay coupon semi-annually, this bond will pay Rs. 5.70 as six-monthly coupon, until maturity, when the bond will be redeemed.

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[1] In this workbook the terms bonds, debentures and debt instruments have been used inter-changeably.

The term to maturity of a bond can be calculated on any date, as the distance between such a date and the date of maturity. It is also called the term or the tenor of the bond. For instance, on February 17, 2010, the term to maturity of the bond maturing on May 23, 2014 will be 4.32 years. The general day count convention in bond market is 30/360European which assumes total 360 days in a year and 30 days in a month.

There is no rigid classification of bonds on the basis of their term to maturity. Generally bonds with tenors of 1-5 years are called short-term bonds; bonds with tenors ranging from 4 to 10 years are medium term bonds and above 10 years are long term bonds. In India, the Central Government has issued up to 30 year bonds.

Box 1.1: Computing term to maturity in years

The distance between a given date and the date on which a bond matures is the term to maturity of a bond. This distance can be calculated in years, as follows:

Use function "YEARFRAC" in Excel. The inputs are 'start date' which is the date on which we want to measure the term to maturity of the bond; 'end date' is the date on which the bond matures; "basis" is the manner in which the number of days between the start and the end dates are to be counted. The numbers 0-4 represent the various ways in which days can be counted. We have used "4" which is a 30/360 days convention. Another option is to use the function called DAYS360 and provide the start and end date as well as the logical values. It would provide the days to maturity. Divide the same by 360 would give the years.

The result is 4.32, which is the term to maturity of the bond, in years, on February 17, 2010.

1.2 MODIFYING THE COUPON OF A BOND

In a plain vanilla bond, coupon is paid at a pre-determined rate, as a percentage of the par value of the bond. Several modifications to the manner in which coupons / interest on a bond are paid are possible.

Zero Coupon Bond

In such a bond, no coupons are paid. The bond is instead issued at a discount to its face value, at which it will be redeemed. There are no intermittent payments of interest. When such a bond is issued for a very long tenor, the issue price is at a steep discount to the redemption value. Such a zero coupon bond is also called a *deep discount bond.* The effective interest earned by the buyer is the difference between the face value and the discounted price at which the bond is bought. There are also instances of zero coupon bonds being issued at par, and redeemed with interest at a premium. The essential feature of this type of bonds is the absence of intermittent cash flows.

Treasury Strips

In the United States, government dealer firms buy coupon paying treasury bonds, and create

out of each cash flow of such a bond, a separate zero coupon bond. For example, a 7-year coupon-paying bond comprises of 14 cash flows, representing half-yearly coupons and the repayment of principal on maturity. Dealer firms split this bond into 14 zero coupon bonds, each one with a differing maturity and sell them separately, to buyers with varying tenor preferences. Such bonds are known as treasury strips. (Strips is an acronym for Separate Trading of Registered Interest and Principal Securities). We do not have treasury strips yet in the Indian markets. RBI and Government are making efforts to develop market for strips in government securities.

Floating Rate Bonds

Instead of a pre-determined rate at which coupons are paid, it is possible to structure bonds, where the rate of interest is re-set periodically, based on a benchmark rate. Such bonds whose coupon rate is not fixed, but reset with reference to a benchmark rate, are called floating rate bonds. For example, IDBI issued a 5 year floating rate bond, in July 1997, with the rates being reset semi-annually with reference to the 10 year yield on Central Government securities and a 50 basis point mark-up. In this bond, every six months, the 10-year benchmark rate on government securities is ascertained. The coupon rate IDBI would pay for the next six months is this benchmark rate, plus 50 basis points. The coupon on a floating rate bond thus varies along with the benchmark rate, and is reset periodically.

The Central Government has also started issuing floating rate bonds tying the coupon to the average cut-off yields of last six 364-day T-bills yields.

Some floating rate bonds also have caps and floors, which represent the upper and lower limits within which the floating rates can vary. For example, the IDBI bond described above had a floor of 13.5%. This means, the lender would receive a minimum of 13.5% as coupon rate, should the benchmark rate fall below this threshold. A ceiling or a cap represents the maximum interest that the borrower will pay, should the benchmark rate move above such a level. Most corporate bonds linked to the call rates, have such a ceiling to cap the interest obligation of the borrower, in the event of the benchmark call rates rising very steeply. Floating rate bonds, whose coupon rates are bound by both a cap and floor, are called as *range notes,* because the coupon rates vary within a certain range.

The other names, by which floating rate bonds are known, are variable rate bonds and adjustable rate bonds. These terms are generally used in the case of bonds whose coupon rates are reset at longer time intervals of a year and above. These bonds are common in the housing loan markets.

In the developed markets, there are floating rate bonds, whose coupon rates move in the direction opposite to the direction of the benchmark rates. Such bonds are called inverse floaters.

Other Variations

In the mid-eighties, the US markets witnessed a variety of coupon structures in the high

yield bond market (junk bonds) for leveraged buy-outs. In many of these cases, structures that enabled the borrowers to defer the payment of coupons were created. Some of the more popular structures were: (a) *deferred interest bonds,* where the borrower could defer the payment of coupons in the initial 3 to 7 year period; (b) *Step-up bonds,* where the coupon was stepped up by a few basis points periodically, so that the interest burden in the initial years is lower, and increases over time; and (c) *extendible reset bond,* in which investment bankers reset the rates, not on the basis of a benchmark, but after re-negotiating a new rate, which in the opinion of the lender and borrower, represented the rate for the bond after taking into account the new circumstances at the time of reset.

1.3   MODIFYING THE TERM TO MATURITY OF A BOND

Callable Bonds

Bonds that allow the issuer to alter the tenor of a bond, by redeeming it prior to the original maturity date, are called callable bonds. The inclusion of this feature in the bond's structure provides the issuer the right to fully or partially retire the bond, and is therefore in the nature of call option on the bond. Since these options are not separated from the original bond issue, they are also called embedded options. A call option can be a European option, where the issuer specifies the date on which the option could be exercised. Alternatively, the issuer can embed an American option in the bond, providing him the right to call the bond on or anytime before a pre-specified date.

The call option provides the issuer the option to redeem a bond, if interest rates decline, and re-issue the bonds at a lower rate. The investor, however, loses the opportunity to stay invested in a high coupon bond, when interest rates have dropped. The call option, therefore, can effectively alter the term of a bond, and carries an added set of risks to the investor, in the form of call risk, and re-investment risk. As we shall see later, the prices at which these bonds would trade in the market are also different, and depend on the probability of the call option being exercised by the issuer. In the home loan markets, pre-payment of housing loans represent a special case of call options exercised by borrowers. Housing finance companies are exposed to the risk of borrowers exercising the option to pre-pay, thus retiring a housing loan, when interest rates fall. The Central Government has also issued an embedded option bond that gives options to both issuer (Government) and the holders of the bonds to exercise the option of call/put after expiry of 5 years. This embedded option would reduce the cost for the issuer in a falling interest rate scenario and helpful for the bond holders in a rising interest rate scenario.

Puttable Bonds

Bonds that provide the investor with the right to seek redemption from the issuer, prior to the maturity date, are called puttable bonds. The put options embedded in the bond provides the investor the rights to partially or fully sell the bonds back to the issuer, either on or before

pre-specified dates. The actual terms of the put option are stipulated in the original bond indenture.

A put option provides the investor the right to sell a low coupon-paying bond to the issuer, and invest in higher coupon paying bonds, if interest rates move up. The issuer will have to re-issue the put bonds at higher coupons. Puttable bonds represent a re-pricing risk to the issuer. When interest rates increase, the value of bonds would decline. Therefore put options, which seek redemptions at par, represent an additional loss to the issuer.

Convertible Bonds

A convertible bond provides the investor the option to convert the value of the outstanding bond into equity of the borrowing firm, on pre-specified terms. Exercising this option leads to redemption of the bond prior to maturity, and its replacement with equity. At the time of the bond's issue, the indenture clearly specifies the conversion ratio and the conversion price. The conversion ratio refers to the number of equity shares, which will be issued in exchange for the bond that is being converted. The conversion price is the resulting price when the conversion ratio is applied to the value of the bond, at the time of conversion. Bonds can be fully converted, such that they are fully redeemed on the date of conversion. Bonds can also be issued as partially convertible, when a part of the bond is redeemed and equity shares are issued in the pre-specified conversion ratio, and the non-convertible portion continues to remain as a bond.

1.4   MODIFYING THE PRINCIPAL REPAYMENT OF A BOND

Amortising Bonds

The structure of some bonds may be such that the principal is not repaid at the end/maturity, but over the life of the bond. A bond, in which payment made by the borrower over the life of the bond, includes both interest and principal, is called an amortising bond. Auto loans, consumer loans and home loans are examples of amortising bonds. The maturity of the amortising bond refers only to the last payment in the amortising schedule, because the principal is repaid over time.

Bonds with Sinking Fund Provisions

In certain bond indentures, there is a provision that calls upon the issuer to retire some amount of the outstanding bonds every year. This is done either by buying some of the outstanding bonds in the market, or as is more common, by creating a separate fund, which calls the bonds on behalf of the issuer. Such provisions that enable retiring bonds over their lives are called sinking fund provisions. In many cases, the sinking fund is managed by trustees, who regularly retire part of the outstanding bonds, usually at par. Sinking funds also enable paying off bonds over their life, rather than at maturity. One usual variant is applicability of the sinking fund provision after few years of the issue of the bond, so that the funds are available to the borrower for a minimum period, before redemption can commence.

1.5 ASSET BACKED SECURITIES

Asset backed securities represent a class of fixed income securities, created out of pooling together assets, and creating securities that represent participation in the cash flows from the asset pool. For example, select housing loans of a loan originator (say, a housing finance company) can be pooled, and securities can be created, which represent a claim on the repayments made by home loan borrowers. Such securities are called mortgage-backed securities. In the Indian context, these securities are known as structured obligations (SO). Since the securities are created from a select pool of assets of the originator, it is possible to 'cherry-pick' and create a pool whose asset quality is better than that of the originator. It is also common for structuring these instruments, with clear credit enhancements, achieved either through guarantees, or through the creation of exclusive preemptive access to cash flows through escrow accounts. Assets with regular streams of cash flows are ideally suited for creating asset-backed securities. In the Indian context, car loan and truck loan receivables have been securitized. Securitized home loans represent a very large segment of the US bond markets, next in size only to treasury borrowings. However, the market for securitization has not developed appreciably because of the lack of legal clarity and conducive regulatory environment.

The Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest Act were approved by parliament in November 2002. The Act also provides a legal framework for securitization of financial assets and asset reconstruction. The securitization companies or reconstruction companies shall be regulated by RBI. The security receipts issued by these companies will be securities within the meaning of the Securities Contract (Regulation) Act, 1956. These companies would have powers to acquire assets by issuing a debenture or bond or any other security in the nature of debenture in lieu thereof. Once an asset has been acquired by the asset reconstruction company, such company would have the same powers for enforcement of securities as the original lender. This has given the legal sanction to securitized debt in India.

Model Questions

1. **On value date September 10, 2013, what is the term to maturity in years, of a government security maturing on 23rd June 2017?**

   Use the "yearfrac" function in Excel, with the following specifications:

   Settlement date: September 10, 2013

   Maturity Date: June 23, 2017

   Basis: 4. (Government securities trade on 30/360 European basis. We therefore use "4", in the Excel function, which applies this day count convention).

Ans: 3.786 years.

2. **Which of the following about a callable bond is true?**

   a. Callable bonds always trade at a discount to non-callable bonds.

   b. Callable bonds expose issuers to the risk of reduced re-investment return.

   c. Callable bonds are actually variable tenor bonds.

   d. Callable bonds are not as liquid as non-callable bonds.

Ans: c.

3. **Coupon of a floating rate bond is** ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

   a. modified whenever there is a change in the benchmark rate.

   b. modified at pre-set intervals with reference to a benchmark rate.

   c. modified for changes in benchmark rate beyond agreed levels.

   d. modified within a range, for changes in the benchmark rate.

Ans: b.

CHAPTER 2: INDIAN DEBT MARKETS: A PROFILE

Indian debt markets, in the early nineties, were characterised by controls on pricing of assets, segmentation of markets and barriers to entry, low levels of liquidity, limited number of players, near lack of transparency, and high transactions cost. Financial reforms have significantly changed the Indian debt markets for the better. Most debt instruments are now priced freely on the markets; trading mechanisms have been altered to provide for higher levels of transparency, higher liquidity, and lower transactions costs; new participants have entered the markets, broad basing the types of players in the markets; methods of security issuance, and innovation in the structure of instruments have taken place; and there has been a significant improvement in the dissemination of market information.

2.1 MARKET SEGMENTS

There are three main segments in the debt markets in India, viz., Government Securities, Public Sector Units (PSU) bonds, and corporate securities. The market for Government Securities comprises the Centre, State and State-sponsored securities. In the recent past, local bodies such as municipalities have also begun to tap the debt markets for funds. The PSU bonds are generally treated as surrogates of sovereign paper, sometimes due to explicit guarantee and often due to the comfort of public ownership. Some of the PSU bonds are tax free, while most bonds including government securities are not tax-free. The RBI also issues tax-free bonds, called the 6.5% RBI relief bonds, which is a popular category of tax-free bonds in the market. Corporate bond markets comprise of commercial paper and bonds. These bonds typically are structured to suit the requirements of investors and the issuing corporate, and include a variety of tailor-made features with respect to interest payments and redemption. The less dominant fourth segment comprises of short term paper issued by banks, mostly in the form of certificates of deposit.

The market for government securities is the oldest and most dominant in terms of market capitalisation, outstanding securities, trading volume and number of participants. It not only provides resources to the government for meeting its short term and long term needs, but also sets benchmark for pricing corporate paper of varying maturities and is used by RBI as an instrument of monetary policy. The instruments in this segment are fixed coupon bonds, commonly referred to as dated securities, treasury bills, floating rate bonds, zero coupon bonds and inflation index bonds. Both Central and State government securities comprise this segment of the debt market.

The issues by government sponsored institutions like, Development Financial Institutions, as well as the infrastructure-related bodies and the PSUs, who make regular forays into the market to raise medium-term funds, constitute the second segment of debt markets.

The gradual withdrawal of budgetary support to PSUs by the government since 1991 has compelled them to look at the bond market for mobilising resources. The preferred mode of issue has been private placement, barring an occasional public issue. Banks, financial institutions and other corporates have been the major subscribers to these issues. The tax-free bonds, which constitute over 50% of the outstanding PSU bonds, are quite popular with institutional players.

The market for corporate debt securities has been in vogue since early 1980s. Until 1992, interest rate on corporate bond issuance was regulated and was uniform across credit categories. In the initial years, corporate bonds were issued with "sweeteners" in the form of convertibility clause or equity warrants. Most corporate bonds were plain coupon paying bonds, though a few variations in the form of zero coupon securities, deep discount bonds and secured promissory notes were issued.

After the de-regulation of interest rates on corporate bonds in 1992, we have seen a variety of structures and instruments in the corporate bond markets, including securitized products, corporate bond strips, and a variety of floating rate instruments with floors and caps. In the recent years, there has been an increase in issuance of corporate bonds with embedded put and call options. The major part of the corporate debt is privately placed with tenors of 1-12 years.

Information on the size of the various segments of the debt market in India is not readily available. This is due to the fact that many debt instruments are privately placed and therefore not listed on markets. While the RBI regulates the issuance of government securities, corporate debt securities fall under the regulatory purview of SEBI. The periodic reports of issuers and investors are therefore sent to two different regulators. Therefore, aggregated data for the market as a whole is difficult to obtain. The NSE provides a trading platform for most debt instruments issued in India. Therefore, Table 2.1 on market capitalization can be said to be indicative of the relative size of the various segments of the debt market.

The debt markets also have a large segment which is a non-securitized, transactions based segment, where players are able to lend and borrow amongst themselves. These are typically short term segments and comprise of call and notice money markets, which is the most active segment in the debt markets, inter-bank market for term money, markets for inter-corporate loans and markets for ready forward deals (repos).

Table 2.1: Market Capitalisation - NSE-WDM Segment as on March 31, 2013.

Security Type	Market Capitalisation (Rs.cr.)	Share in Total (%)
Government Securities	27,69,002	56.19
PSU Bonds	3,05,606	6.20
State Loans	9,04,143	18.35
Treasury Bills	2,98,488	6.06
Others	6,51,093	13.21
TOTAL	**49,28,332**	**100.00**

* Others include securitized debt and bonds of local bodies.

2.2   PARTICIPANTS IN THE DEBT MARKETS

Debt markets are pre-dominantly wholesale markets, with dominant institutional investor participation. The investors in the debt markets concentrate in banks, financial institutions, mutual funds, provident funds, insurance companies and corporates. Many of these participants are also issuers of debt instruments. The smaller number of large players has resulted in the debt markets being fairly concentrated, and evolving into a wholesale negotiated dealings market. Most debt issues are privately placed or auctioned to the participants. Secondary market dealings are mostly done on telephone, through negotiations. In some segments such as the government securities market, market makers in the form of primary dealers have emerged, who enable a broader holding of treasury securities. Debt funds of the mutual fund industry, comprising of liquid funds, bond funds and gilt funds, represent a recent mode of intermediation of retail investments into the debt markets, apart from banks, insurance, provident funds and financial institutions, who have traditionally been major intermediaries of retail funds into debt market products.

The market participants in the debt market are:

1.   Central Governments, raising money through bond issuances, to fund budgetary deficits and other short and long term funding requirements.

2.   Reserve Bank of India, as investment banker to the government, raises funds for the government through bond and t-bill issues, and also participates in the market through open-market operations, in the course of conduct of monetary policy. The RBI regulates the bank rates and repo rates and uses these rates as tools of its monetary policy. Changes in these benchmark rates directly impact debt markets and all participants in the market.

3.   Primary dealers, who are market intermediaries appointed by the Reserve Bank of India who underwrite and make market in government securities, and have access to the call markets and repo markets for funds.

4.   State Governments, municipalities and local bodies, which issue securities in the debt markets to fund their developmental projects, as well as to finance their budgetary deficits.

5.   Public sector units are large issuers of debt securities, for raising funds to meet the long term and working capital needs. These corporations are also investors in bonds issued in the debt markets.

6.   Corporate treasuries issue short and long term paper to meet the financial requirements of the corporate sector. They are also investors in debt securities issued in the market.

7.   Public sector financial institutions regularly access debt markets with bonds for funding their financing requirements and working capital needs. They also invest in bonds issued by other entities in the debt markets.

8. Banks are the largest investors in the debt markets, particularly the Treasury bond and bill markets. They have a statutory requirement to hold a certain percentage of their deposits (currently the mandatory requirement is 25% of deposits) in approved securities (all government bonds qualify) to satisfy the statutory liquidity requirements. Banks are very large participants in the call money and overnight markets. They are arrangers of commercial paper issues of corporates. They are also active in the inter-bank term markets and repo markets for their short term funding requirements. Banks also issue CDs and bonds in the debt markets.

9. Mutual funds have emerged as another important player in the debt markets, owing primarily to the growing number of bond funds that have mobilised significant amounts from the investors. Most mutual funds also have specialised bond funds such as gilt funds and liquid funds. Mutual funds are not permitted to borrow funds, except for very short-term liquidity requirements. Therefore, they participate in the debt markets pre-dominantly as investors, and trade on their portfolios quite regularly.

10. Foreign Institutional Investors are permitted to invest in Dated Government Securities and Treasury Bills within certain specified limits.

11. Provident funds are large investors in the bond markets, as the prudential regulations governing the deployment of the funds they mobilise, mandate investments pre-dominantly in treasury and PSU bonds. They are, however, not very active traders in their portfolio, as they are not permitted to sell their holdings, unless they have a funding requirement that cannot be met through regular accruals and contributions.

12. Charitable Institutions, Trusts and Societies are also large investors in the debt markets. They are, however, governed by their rules and byelaws with respect to the kind of bonds they can buy and the manner in which they can trade on their debt portfolios.

The matrix of issuers, investors, instruments in the debt market and their maturities are presented in Table 2.2.

Table 2.2: Participants and Products in Debt Markets

Issuer	Instrument	Maturity	Investors
Central Government	Dated Securities	2-30years	RBI, Banks, Insurance Companies, Provident Funds, Mutual Funds, PDs, Individuals
Central Government	T-Bills	91/182/364 days	RBI, Banks, Insurance Companies, Provident Funds, PDs, Mutual Funds, Individuals
State Government	Dated Securities	5-13 years	Banks, Insurance Companies, Provident Funds, RBI, Mutual Funds, Individuals, PDs.

Issuer	Instrument	Maturity	Investors
PSUs	Bonds, Structured Obligations	5-10 years	Banks, Insurance Companies, Corporate, Provident Funds, Mutual Funds, Individuals
Corporates	Debentures	1-12 years	Banks, Mutual Funds, Corporates, Individuals
Corporates, PDs	Commercial paper	7 days to 1 year	Banks, Corporate, Financial institutions, Mutual Funds, Individuals, FIIs
Scheduled Commercial Banks	Certificates of Deposit (CDs)	7 days to 1 year	Banks, Corporations, Individuals, Companies, Trusts, Funds, Associations, FIs, NRIs
Financial Institutions		1 year to 3 years	
Scheduled Commercial Banks	Bank Bonds	1-10 years	Corporations, Individual Companies, Trusts, Funds, Associations, FIs, NRIs
Municipal Corporation	Municipal Bonds	0-7 years	Banks, Corporations, Individuals, Companies, Trusts, Funds, Associations, FIs, NRIs

2.3 SECONDARY MARKET FOR DEBT INSTRUMENTS

The NSE- WDM segment provides the formal trading platform for trading of a wide range of debt securities. Initially, government securities, treasury bills and bonds issued by public sector undertakings (PSUs) were made available for trading. This range has been widened to include non-traditional instruments like, floating rate bonds, zero coupon bonds, index bonds, commercial papers, certificates of deposit, corporate debentures, state government loans, SLR and non-SLR bonds issued by financial institutions, units of mutual funds and securitized debt. The WDM trading system, known as NEAT (National Exchange for Automated Trading), is a fully automated screen based trading system that enables members across the country to trade simultaneously with enormous ease and efficiency. The trading system is an order driven system, which matches best buy and sell orders on a price/time priority.

Central Government securities and treasury bills are held as dematerialised entries in the Subsidiary General Ledger (SGL) of the RBI. In order to trade these securities, participants are required to have an account with the SGL and also a current account with the RBI. The settlement is on Delivery versus Payment (DvP) basis. The Public Debt Office which oversees the settlement of transactions through the SGL enables the transfer of securities

from one participant to another. Since 1995, settlements are on delivery-versus-payment basis. However, after creation of Clearing Corporation of India, most of the institutional trades are being settled through CCIL with settlement guarantee. The settlement through CCIL is taking place on DvP-III where funds and securities are netted for settlement.

Government debt, which constitutes about three-fourth of the total outstanding debt, has the highest level of liquidity amongst the fixed income instruments in the secondary market. The share of dated securities in total turnover of government securities has been increasing over the years. Two-way quotes are available for active gilt securities from the primary dealers. Though many trades in gilts take place through telephone, a larger chunk of trades gets routed through NSE brokers.

The instrument-wise turnover for securities listed on the NSE-WDM is shown in Table 2.3. It is observed that the market is dominated by dated government securities (including state development loan).

Table 2.3: Security-wise Distribution of Turnover on NSE WDM

Securities	Percentage Share of Turnover		
	2012-13	**2011-12**	**2010-11**
Government Securities	56.19	57.86	60.80
Treasury Bills	6.06	6.07	3.83
PSU/Institutional Bonds	6.20	5.71	5.31
Others	19.41	18.35	18.06

The major participant in the WDM is Trading Members, who accounts for over 53.37% of turnover during 2012-13. The share of Indian banks in turnover is about 16.49% in same period while foreign banks constitute about 22.10% and primary dealers account for 3.70%. Financial institutions and mutual funds contribute about 4.35% of the turnover. The participant-wise distribution of turnover is presented in Table 2.4.

Participant	2010-11	2011-12	2012-13
Foreign Banks	26.78	21.57	22.10
Indian Banks	13.09	15.25	16.49
Primary Dealers	4.21	4.17	3.70
FIs, MF and Corporates	2.41	4.51	4.35
Trading Members	53.51	54.51	53.37
TOTAL	**100.00**	**100.00**	**100.00**

As seen in Table 2.5, the share of top '10' securities in turnover is 44.36% in 2012-13 and top '50' securities accounted for nearly 62.32% of turnover in the same period.

Year	Percentage Share of Turnover				
	Top 5	Top 10	Top 25	Top 50	Top 100
1999-00	37.11	55.57	82.12	90.73	95.28
2000-01	42.20	58.30	80.73	89.97	95.13
2001-02	51.61	68.50	88.73	94.32	97.19
2002-03	43.10	65.15	86.91	92.74	96.13
2003-04	37.06	54.43	81.58	90.66	95.14
2004-05	43.70	57.51	71.72	80.59	89.55
2005-06	47.42	59.78	72.02	81.04	89.36
2006-07	40.90	51.29	65.82	77.15	86.91
2007-08	39.65	53.31	68.35	79.64	89.55
2008-09	31.31	43.05	60.42	72.45	83.87
2009-10	24.19	35.14	53.05	65.63	77.89
2010-11	26.65	38.63	51.69	61.49	74.22
2011-12	36.35	44.22	52.63	61.54	72.09
2012-13	34.02	44.36	53.04	62.32	73.29

Retail Debt Market

With a view to encouraging wider participation of all classes of investors across the country (including retail investors) in government securities, the Government, RBI and SEBI have introduced trading in government securities for retail investors.

Trading in this retail debt market segment (RDM) on NSE has been introduced w.e.f. January 16, 2003.

RDM Trading:

Trading takes place in the existing Capital Market segment of the Exchange and in the same manner in which the trading takes place in the equities (Capital Market) segment. The RETDEBT Market facility on the NEAT system of Capital Market Segment is used for entering transactions in RDM session. The trading holidays and market timings of the RDM segment are the same as the Equities segment.

Trading Parameters:

The trading parameters for RDM segment are as below:

Face Value	Rs. 100/-
Permitted Lot Size	10
Tick Size	Rs. 0.01
Operating Range	+/- 5%
Mkt. Type Indicator	D(RETDEBT)
Book Type	RD

Trading in Retail Debt Market is permitted under Rolling Settlement, where in each trading day is considered as a trading period and trades executed during the day are settled based on the net obligations for the day. Settlement is on a T+2 basis. National Securities Clearing Corporation Limited (NSCCL) is the clearing and settlement agency for all deals executed in Retail Debt Market.

Negotiated Dealing System

The first step towards electronic bond trading in India was the introduction of the RBIs Negotiated Dealing System in February 2002.

NDS, interalia, facilitates screen based negotiated dealing for secondary market transactions in government securities and money market instruments, online reporting of transactions in the instruments available on the NDS and dissemination of trade information to the market. Government Securities (including T-bills), call money, notice/term money, repos in eligible securities are available for negotiated dealing through NDS among the members. NDS members concluding deals, in the telephone market in instruments available on NDS, are required to report the deal on NDS system within 15 minutes of concluding the deal. NDS interfaces with CCIL for settlement of government securities transactions for both outright and repo trades done/reported by NDS members. Other instruments viz, call money, notice/ term money, commercial paper and certificate of deposits settle as per existing settlement procedure.

With the objective of creating a broad-based and transparent market in government securities and thereby enhancing liquidity in the system, the NDS was designed to provide:

- Electronic bidding in primary market auctions (T-Bills, dated securities, state government securities) by members,
- Electronic bidding for OMO of RBI including repo auctions under LAF,
- Screen based negotiated dealing system for secondary market operations,
- Reporting of deals in government securities done among NDS members outside the system (over telephone or using brokers of exchanges) for settlement,
- Dissemination of trade information to NDS members,
- Countrywide access of NDS through INFINET,
- Electronic connectivity for settlement of trades in secondary market both for outright and repos either through CCIL or directly through RBI, and Creation and maintenance of basic data of instruments and members.

The functional scope of the NDS relating to trading includes:

- Giving/receiving a Quote,
- Placing a call and negotiation (with or without a reference to the quote),
- Entering the deals successfully negotiated,

- Setting up preferred counterparty list and exposure limits to the counterparties,

- Dissemination of on-line market information such as the last traded prices of securities, volume of transactions, yield curve and information on live quotes,

- Interface with Securities Settlement System for facilitating settlement of deals done in government securities and treasury bills.

- Facility for reporting on trades executed through the exchanges for information dissemination and settlement in addition to deals done through NDS.

The system is designed to maintain anonymity of buyers and sellers from the market but only the vital information of a transaction viz., ISIN of the security, nomenclature, amount (face value), price/rate and/ or indicative yield, in case applicable, are disseminated to the market, through Market and Trade Watch.

The benefits of NDS include:

- Transparency of trades in money and government securities market,

- Electronic connectivity with securities settlement systems, thus, eliminating submission of physical SGL form, Settlement through electronic SGL transfer,

- Elimination of errors and discrepancies and delay inherent in manual processing system, and

- Electronic audit trail for better monitoring and control.

NDS-OM

NDS was intended to be used principally for bidding in the primary auctions of Gsecs conducted by RBI, and for trading and reporting of secondary market transactions. However, because of several technical problems and system inefficiencies, NDS was being used as a reporting platform for secondary market transactions and not as a dealing system. For actual transactions, its role was limited to placing bids in primary market auctions. Much of secondary market in the bond market continued to be broker intermediated.

It was therefore, decided to introduce a screen-based (i.e. electronic) anonymous order matching system integrated with NDS. This system (NDS-OM) has become operational with effect from August 1, 2005.

NDS-OM is an electronic, screen based, anonymous order driven trading system introduced by RBI as part of the existing NDS system to facilitate electronic dealing in government securities. It is accessible to members through RBIs INFINET Network. The system facilitates price discovery, liquidity, increased operational efficiency and transparency. The NDS-OM System supports trading in all Central Government Dated Securities and State Government securities in T+1 settlement type. Since August 1, 2006 the system was enhanced to facilitate trading in Treasury Bills and When Issued transaction in a security authorized for issuance but not as yet actually issued. All 'WI' transactions are on an Mf basis, to be settled if and when the actual security is issued. Further, RBI has permitted the execution of intra-day short sale

transaction and the covering of the short position in government securities can be done both on and outside the NDS-OM platform i.e. through telephone market.

The order system is purely order driven with all bids/offers being matched based on price/time priority for securities traded on price terms and yield/time priority for securities traded on yield, ensuring transparency and fairness to all users. This ensures a level playing field for all participants. The trader gets the best bid/offer in the system. It then tries to match the sale orders with the purchase orders available on the system. When a match occurs, the trade is confirmed. The counterparties are not aware of each others identities- hence the anonymous nature of the system.

While initially only banks and primary dealers could trade on it, NDS-OM has been gradually expanded to cover other institutional players like insurance companies, mutual funds, etc.

Further, NDS-OM has been extended to cover all entities required by law or regulation to invest in Government securities such as deposit taking NBFCs, Provident Funds, Pension Funds, Mutual Funds, Insurance Companies, Cooperative Banks, Regional Rural Banks, Trusts, etc.

The NDS-OM has several advantages over the erstwhile telephone based market. It is faster, transparent, and cheaper, and provides benefits to its users like straight through processing, audits trails for transactions. Straight through processing (STP) of transactions means that, for participants using CCILs clearing and settlement system, once a deal has been struck on NDS-OM, no further human intervention is necessary right until settlement, thus eliminating possibilities human errors. The trades agreed on this system flow directly to CCIL for settlement.

Model Questions

1. **Which of the following about the market capitalisation of corporate bonds in the NSE WDM in 2012-13 is true?**

    a. Corporate bonds account for over 10% of the total market capitalisation.

    b. Corporate bonds represent the second largest segment of bonds, after Government securities.

    c. Market capitalisation of corporate bonds is lower than that of listed state loans.

    d. None of the above.

Ans: c

2. **The most active participants in the WDM segment of the NSE in 2012-13 are:**

    a. Primary dealers

    b. Scheduled banks

    c. Trading members

    d. Mutual Funds

Ans: c

3. **Which of the following statements are true about NDS-OM ?**

    a. NDS-OM is a screen-based anonymous order matching system

    b. NDS-OM became operational with effect from August 1, 2005

    c. NDS-OM is faster, transparent and cheaper and provides benefits like audit trail.

    d. All of the above

Ans: d

CHAPTER 3: CENTRAL GOVERNMENT SECURITIES: BONDS

3.1 INTRODUCTION

The government bond market, made up of the long-term market borrowings of the government, is the largest segment of the debt market.

The government securities market has witnessed significant transformation in the 1990s in terms of market design. The most significant developments include introduction of auction-based price determination for government securities, development of new instruments and mechanisms for government borrowing as well as participation by new market participants, increase in information dissemination on market borrowings and secondary market transactions, screen based negotiations for trading, and the development of the yield curve for government securities for marking-to-market portfolios of banks. During the last one decade, RBI introduced the system of primary dealers (PDs) and satellite dealers (since discontinued from December 2002), introduced delivery *versus* payment (DvP) in securities settlement, expanded the number of players in the market with facility for non-competitive bidding in auctions, and allowed wider participation in constituent Subsidiary General Ledger (SGL) accounts. The government securities market also benefited from emergence of liquidity arrangement through the Liquidity Adjustment Facility (LAF), expansion of the repo markets, complete stoppage of automatic monetisation of deficits, and emergence of self regulatory bodies, such as, the Primary Dealers Association of India (PDAI) and the Fixed Income Money Markets and Derivatives Association (FIMMDA).Continuous reforms in the G Sec market are being undertaken for improving market design and liquidity.

To enhance liquidity and efficiency, some important initiatives have been taken such as: (i) introduction of repo/reverse repo operations in government securities to facilitate participants of manage short term liquidity mismatches (ii) operationalisation of Negotiated Dealing system (NDS), an automated electronic trading platform (c) establishment of Clearing Corporation of India Ltd. (CCIL) for providing an efficient and guaranteed settlement platform (d) introduction of G-secs in stock exchanges (e) introduction of Real time Gross Settlement System (RTGS) which addresses settlement risk and facilitates liquidity management, (g) adoption of a modified Delivery-versus-Payment mode of settlement which provides for net settlement of both funds and securities legs and (h) announcement of an indicative auction calendar for Treasury Bills and Dated Securities.

Several initiatives have been taken to widen the investor base for government securities. To enable small and medium sized investors to participate in the primary auction of government securities, a 'Scheme of Non Competitive Bidding' was introduced in January 2002, this scheme is open to any person including firms, companies, corporate bodies, institutions, provident funds and any other entity prescribed by RBI.

In order to provide banks and other institutions with a more efficient trading platform, an anonymous order matching trading platform (NDS-OM) was made operational from August 1, 2005. Access to NDS OM was initially allowed to commercial banks and PDs but later extended to other NDS members such as insurance companies, mutual funds and bigger provident funds. In addition to the direct access, indirect access through the Constituent Subsidiary General Ledger (CSGL) route was permitted from May 2007 to select category of participants, viz, deposit taking NBFCs, provident funds, pension funds, mutual funds, insurance companies, cooperative banks, regional rural banks and trusts. With effect from November 2007, the CSGL facility was extended to the Systemically Important Non-Deposit taking NBFCs (NBFC-ND-SI). From May 2008, access to the CSGL facility on NDS-OM was further extended to other non-deposit taking NBFCs, corporates and FIIs. These entities are allowed to place orders on NDS-OM through direct NDS-OM members viz, banks and PDs, using the CSGL route. Such trades would settle through the CSGL account and current account of the NDS-OM member.

To provide an opportunity to market participants to manage their interest rate risk more effectively and to improve liquidity in the secondary market, short sales was permitted in dated government securities during February 2006. 'When Issued' (WI) trading in Central government securities was also introduced in May 2006. WI trades are essentially forward transactions in a security which is still to be issued. The short sale and 'when issued' transactions introduced in February 2006 and May 2006 respectively were initially permitted to be undertaken only to NDS-OM. With a view to encouraging wider market participation, the cover transactions of short sales and 'when issued were permitted to be undertaken outside NDS-OM i.e. through the telephone market or through purchases in primary issuance with effect from January 1, 2008.

The settlement system for transactions in government securities was standardized to T+1 cycle with a view to provide the participants with more processing time at their disposal and therefore, to enable better management of both funds as well as risk.

Holding a current account and SGL account with the Reserve Bank of India was mandatory for settlement of Government security transactions by the NDS members. However, the medium term objective of the Reserve Bank is to allow current account facility only to banks and PDs, which necessitates phasing out of current accounts held by the non-bank and non PD entities. In this regard, to facilitate the settlement of Government security transactions undertaken by the non-bank and non-PD NDS members, a system of 'Multi Modal Settlements' (MMS) in Government Securities market was put in place. Under this arrangement, the funds leg of the transaction is settled through the fund accounts maintained by these entities and select commercial banks chosen as 'designated settlement banks' (DSB). All Government securities related transactions, viz secondary market, primary market and servicing of Government securities (interest payments and repayments) for these entities will be carried out through the current account of the 'DSB' with whom the non-bank and non-PD entities open the settlement account. The system became effective from June 16, 2008.

As a result of the gradual reform process undertaken over the years, the Indian G-Sec market has now become increasingly broad-based, characterised by an efficient auction process, an active secondary market and a fairly liquid yield curve up to 30 years. An active Primary Dealer (PD) system and electronic trading and settlement technology that ensure safe settlement with Straight Through Processing (STP) and central counterparty guarantee support the market now.

The Reserve Bank initiated significant measures during 2007-08 to further broaden and deepen the Government Securities market in consultation with market participants. The salient features of the developmental measures undertaken during the year included:

i.   Permitting short sales and 'when issued' transactions to be covered outside NDS-OM platform.

ii.   Extension of NDS-OM platform to certain qualified gilt account holders and

iii.   Putting in place a settlement mechanism to permit settlement of Government securities transactions through fund accounts maintained with commercial banks.

These reforms have resulted in a marked change in the nature of instruments offered, a wider investor base and a progressive movement towards market-determined interest rates. The market for government securities has, however, remained largely captive and wholesale in nature, with banks and institutions being the major investors in this segment. While the primary market for government securities witnessed huge activity due to increased borrowing needs of the government, only a small part of the outstanding stock finds its way into the secondary market.

The number of transactions in the secondary market continues to be small relative to the size of outstanding debt and the size of the participants. The liquidity continues to be thin despite a shift to screen-based trading on NSE.

The holding of G-Secs among the financial institutions has been more diversified, particularly, with the emergence of insurance and pension funds as a durable investor class for the long-term securities. This became possible due to the sustained efforts devoted to elongation of the maturity profile of government securities.

3.2   G-SECS: TRENDS IN VOLUMES, TENOR AND YIELDS

The government raises resources in the debt markets, through market borrowings, pre-dominantly to fund the fiscal deficit. Market borrowings, which funded about 18% of the gross fiscal deficits in 1990-91, will finance 93% of the fiscal deficit in 2012-13, and have emerged as the dominant source of funding of the deficit.

During 2012-13, the Central Government and state government's borrowed 558000 crores was successfully completed. Securities amounting 1800 crores, however devolved on primary dealers as compared with 12100 crores during the previous year. The gross and net amounts raised through dated securities in 2012-13 were higher by around 9 per cent and 7 per cent,

respectively than those raised in the previous year. The state governments borrowing for 2012-13 was placed at 188100 crores. Taking into account the repayments of 30600 crores, the gross allocation amounted to 218700 crores.

For Central Government, the weighted average yield of dated securities declined to 8.36 per cent in 2012-13 compared to 8.52 per cent in 2011-12 due to easing of yield mainly for the long dated securities. The weighted average coupon on the outstanding stock of Government dated securities, however, increased to 7.97 per cent as on March 31, 2013 from 7.88 per cent as on March 31, 2012. For State Government, the weighted average yield firmed up to 8.84 per cent (2012-13) from 8.79 per cent during the previous year (2011-12).

Year	Range of YTM's at Primary Issue			Issue during the year			Outstanding Stock (At the end of March)	
	Under 5 years	5-10 years	Over 10 years	Weighted Average Yield	Tenor of Securi-ties	Weighted Average Securi-ties	Weighted Average Maturity	Weighted Average Coupon
1	2	3	4	5	6	7	8	9
2008-09	7.71-8.42	7.69-8.77	7.77-8.81	7.69	Jun -30	13.8	10.45	8.23
2009-10	6.09-7.25	6.07-7.77	6.85-8.43	7.23	May-15	11.16	9.82	7.89
2010-11	5.98-8.67	7.17-8.19	7.64-8.63	7.92	May-30	11.62	9.78	7.81
2011-12	8.21-8.49	7.80-10.01	8.25-9.28	8.52	Jul-30	12.66	9.6	7.88
2012-13	8.82-8.21	7.86-8.76	7.91-8.06	8.36	May-30	13.5	9.67	7.97

Souce : RBI Annual Report

Market Borrowings - Average Tenor and Yield

Table VII.3: Issuance of GoI Dated Securities – Maturity Pattern

(In billion)

Residual Maturity	2010-11		2011-12		2012-13	
	Amount raised	Percent-age to total	Amount raised	Percent-age to total	Amount raised	Percent-age to total
1	2	3	4	5	6	7
Less than 5 years	110	2.52	180	3.53	470	8.42
5 -9.99 years	1,520	34.78	2,340	45.88	1,910	34.23
10-14.99 years	1,640	37.53	1,230	24.12	1,730	31
15 -19.99 years	540	12.36	650	12.75	270	4.84
20 years & above	560	12.81	700	13.73	1,200	21.51
Total	4,370	100	5,100	100	5,580	100

Source: RBI Annual Reports

3.3　PRIMARY ISSUANCE PROCESS

The issuance process for Gsecs has undergone significant changes in the 1990s, with the introduction of the auction mechanism, and the broad basing of participation in the auctions through creation of the system of primary dealers, and the introduction of non-competitive bids. RBI announces the auction of government securities through a press notification, and invites bids. The sealed bids are opened at an appointed time, and the allotment is based on the cut-off price decided by the RBI. Successful bidders are those that bid at a higher price, exhausting the accepted amount at the cut-off price.

The design of treasury auctions is an important issue in government borrowing. The objectives of auction design are:

1.　Enabling higher auction volumes that satisfy the target borrowing requirement, without recourse to underwriting and/or devolvement;

2.　Broadening participation to ensure that bids are not concentrated or skewed; and

3.　Ensuring efficiency through achieving the optimal (lowest possible) cost of borrowing for the government.

The two choices in treasury auctions, which are widely known and used, are:

•　Discriminatory Price Auctions (French Auction)

•　Uniform Price Auctions (Dutch Auction)

In both these kinds of auctions, the winning bids are those that exhaust the amount on offer, beginning at the highest quoted price (or lowest quoted yield). However, in a uniform price auction, all successful bidders pay a uniform price, which is usually the cut-off price (yield). In the case of the discriminatory price auction, all successful bidders pay the actual price (yield) they bid for.

If successful bids are decided by filling up the notified amount from the lowest bid upwards, such an auction is called a yield-based auction. In such an auction, the name of the security is the cut-off yield. Such auction creates a new security, every time an auction is completed. For example, the G-sec 10.3% 2016 derives its name from the cut-off yield at the auction, which in this case was 10.3%, which also becomes the coupon payable on the bond. A yield-based auction thus creates a new security, with a distinct coupon rate, at the end of every auction. The coupon payment and redemption dates are also unique for each security depending on the deemed date of allotment for securities auctioned.

If successful bids are filled up in terms of prices that are bid by participants from the highest price downward, such an auction is called a price-based auction. A price-based auction facilitates the re-issue of an existing security. For example, in March 2001, RBI auctioned the 11.43% 2015 security. This was a G-sec, which had been earlier issued and trading in the market. The auction was for an additional issue of this existing security. The coupon rate and the dates of payment of coupons and redemption are already known. The additional

issue increases the gross cash flows only on these dates. The RBI moved from yield-based auction to price-based auction in 1998, in order to enable consolidation of G-secs through re-issue of existing securities. Large issues would also facilitate the creation of treasury strips, when coupon amounts are large enough for ensuring liquidity in the secondary markets. The RBI however, has the flexibility to resort to yield-based auctions, and notify the same in the auction notification.

For example, assume that the bids as given in Table 3.2 are received in a price-based auction for 12.40% 2015 paper, with a notified amount of Rs. 3000 crore. If the RBI decides that it would absorb the entire notified amount from the bids, without any devolvement on itself or the PDs, it would fill up the notified amount from the highest

price (lowest yield) bid in the auction. At a cut-off price of Rs. 111.2 (yield 10.7402), the cumulative bids amount to Rs. 3700 crore. All the bids up to the next highest price of Rs. 111.2952 will be declared as successful, while bidders at the cut-off price will receive allotments on a pro-rata basis.

If all the successful bidders have to pay the cut-off price of Rs. 111.2, the auction is called a Dutch auction, or a uniform price auction. If the successful bidders have to pay the prices they have actually bid, the auction fills up the notified amounts, in various prices at which each of the successful bidders bid. This is called a French auction, or a discriminatory price auction. Each successful bidder pays the actual price bid by him.

Table 3.2: Illustration of Auctions

Amount bid (Rs. cr.)	Implied YTM at bid price (% per annum)	Price (Rs.)
100	10.6792	111.6475
650	10.6922	111.5519
300	10.7102	111.4198
1400	10.7272	111.2952
1250	10.7402	111.2000
1000	10.7552	111.0904
750	10.7722	110.9663
400	10.7882	110.8497
300	10.8002	110.7624

A treasury auction is actually a common value auction, because the value of the auctioned security is the secondary market price that prevails after the auction, which is uniform for all bidders. Therefore, the loss to a successful bidder is less in a Dutch rather than a French auction. In our earlier example, assume that the secondary market price for the security, after the auction, was Rs. 110.65. If the auction was Dutch, the loss to all successful bidders is uniform, at 55 paise per bond. However, if the auction was French, the highest successful bidder will make a large loss of nearly a rupee 99 paise per bond. The discriminatory price

auction, thus creates a "winner's curse" where a successful bidder is one who has priced his bid higher than the cut-off, but will immediately suffer a loss in the market, if the after-market price is closer to cut-off, rather than his bid. There is a loss in the secondary markets, even in a Dutch auction, if the after-market price is lower than the cut-off.

The difference, however, is that the loss is the same for all successful bidders. In markets with discriminatory price auctions, players have an incentive to bias their bids downward, relative to their own assessment of the bond's resale value, to mitigate the impact of the winner's curse. If players resort to such downward adjustments, the impact is on the yields for the government in the auction, where the yields would be higher than optimal, to adjust for players' "winner curse" effect. In a Dutch auction, the Government is able to get a better price, as this effect is eliminated from the bidding process. However, Dutch auctions are known to suffer from noisy bids, and relatively lower levels of participation, as players are aware that they would not pay what they bid, but the cut-off price.

Discriminatory price auctions are more common across treasuries of the world, than uniform price auctions. 90% of the 42 countries surveyed by IMF, in a study on auctions, used discriminatory price auctions. It is observed that participants would like to bid on the basis of their view of valuation of the bond, rather than accept the consensus valuation of all bids, as most believe that there could be noise in the bidding process. An outcome that penalizes successful bidders to the extent of the actual distance between their valuation, and the cut-off, rather than a uniform penalty for all is preferred. Such auctions, therefore, attract larger competitive participation. Research on the efficiency of the two alternate methods, is largely inconclusive.

In the Indian markets, discriminatory price auction as well as uniform price auction is used for all bond issuances. Whether an auction will be Dutch or French is announced in the notification of the auction.

The RBI has the discretion to reject bids when the rates at which bids are received are higher than the rates at which RBI wants to place the debt. Depending on the pricing objective RBI wants to achieve and the bidding pattern of participants, bidding success and devolvement take place.

Non-competitive bids can also be submitted in treasury auctions. Allotments to these bids will be first made from the notified amount, at the weighted average price of all successful bids. The current regulations of RBI provide for reservation of 5% of the notified amount in all the auctions for non-competitive bids from retail investors, who can apply through PDs and other market participants.

Government of India issued a revised general notification on October 08, 2008 specifying the general terms and conditions applicable to all issues of government securities. The revised notification incorporates the following additional features:

i. The auctions for issue of securities (on either yield basis or price basis) would be held either on 'Uniform price' method or on 'Multiple price' method or any other method as may be decided. Under 'Uniform price' method, competitive bids offered with rates up to and including the maximum rate of yield or the prices up to and including the minimum offer price, as determined by RBI, would be accepted at the maximum rate of yield or minimum offer price so determined. Bids quoted higher than the maximum rate of yield or lower than the minimum price as determined by RBI would be rejected. Under 'Multiple price' method, the competitive bids offered at the maximum rate of yield or the minimum offer price as determined by RBI would be accepted. Other bids tendered at lower than the maximum rate of yield or higher than the minimum offer price determined by RBI would be accepted at the rate of yield or price as quoted in the respected bid.

ii. Individuals and institutions can participate in the auctions on 'non-competitive' basis, indirectly through a scheduled bank or a primary dealer offering such services or any other agency permitted by RBI for this purpose. Allocation of securities to non-competitive bidders would be at the discretion of RBI and at a price not higher than the weighted average price arrived at on the basis of the competitive bids accepted at the auction or any other price announced in the specific notification. The nominal amount of securities allocated on such basis would be restricted to a maximum percentage of the aggregate nominal amount of the issue, within or outside the nominal amount, as specified by GOI/RBI.

iii. Government securities can also be issued to the investors by credit to their Subsidiary General Ledger Account or to the Constituents' Subsidiary General Ledger Account of the institution as specified by them, maintained with RBI or by credit to their Bond Ledger Account maintained with RBI or with any institution authorised by RBI.

iv. Offer for purchase of government securities can be submitted in electronic form. Payment for the government securities can be made by successful participants through electronic fund transfer (EFT) in a secured environment.

v. Government may issue securities with embedded derivatives. Such securities may be repaid, at the option of Government of India or at the option of the holder of the security, before the specified redemption date, where a "call option"/"put option" is specified in the specific notification relating to the issue of a government security. Where neither a call option nor a put option is specified or exercised, the government security would be repaid on the date of redemption specified in the specific notification.

vi. RBI would have discretion to accept excess subscriptions to the extent specified in the 'Specific Notification' pertaining to the issue of the Security and make allotment of the security accordingly.

vii. RBI can participate in auction as a 'non competitor' and will be allocated securities at cut-off price/yield in the auctions or at any other price/yield decided by Government.

Valuation of Central Government Securities:

Fixed Income Money Market and Derivatives Association of India (FIMMDA) have issued guidelines / clarifications in respect of the methodology to be followed for valuation of Government Securities, bonds and debentures etc. at periodical intervals based on guidelines issued by Reserve Bank of India.

Central Government Securities, which qualify for SLR

The prices as well as the yield curve for the Central Government Securities is published by FIMMDA. The curve is termed as the Base Yield Curve for the purpose of valuation. The Base Yield Curve starts from six month tenor. The yield for six-month tenor would also be applicable for maturities less than six months.

Central Government Securities, which do not qualify for SLR

The Central Government Securities, which do not qualify for SLR shall be valued after adding 25 basis points (bps) above the corresponding yield on Government of India Securities.

3.4   PARTICIPANTS IN GOVERNMENT BOND MARKETS

Traditionally, debt market has been an institutional market all over the world. Banks and Institutions contribute more in term of trading value. In India, banks, financial institutions (FIs), mutual funds (MFs), provident funds, insurance companies and corporates are the main investors. Banks have been investing in this market mainly due to statutory requirement of meeting Statutory Liquidity Ratio (SLR). Many of these participants are also issuers of debt instruments. The small number of large players has resulted in the debt markets being fairly concentrated, and evolving into a wholesale negotiated dealings market. Most debt issues are privately placed or auctioned to the participants. Secondary market dealings are mostly undertaken through telephonic negotiations among market participants. In some segments, such as the government securities market, market makers in the form of primary dealers have emerged, which enable a broader holding of treasury securities. Debt funds of the mutual fund industry, comprising of liquid funds, bond funds and gilt funds, represent a recent mode of intermediation of retail investments into the debt markets.

The market participants in the debt market are described below:

i.   Central Government raises money through issuance of bonds and T-bill to fund budgetary deficits and other short and long-term funding requirements through Reserve Bank of India (RBI).

ii.   RBI participates in the market through open-market operations as well as through Liquidity Adjustment facility (LAF) in the course of conduct of monetary policy. RBI also regulates the bank rates and repo rates, and uses these rates as indirect tools of its monetary policy. Changes in these benchmark rates directly impact debt markets and all participants in the market as other interest rates realign themselves with these changes.

iii. Primary Dealers (PDs), who are market intermediaries appointed by RBI, underwrite and make market in government securities by providing two-way quotes, and have access to the call and repo markets for funds. Their performance is assessed by RBI on the basis of their bidding commitments and the success ratio achieved at primary auctions. They normally hold most liquid securities in their portfolio.

iv. State governments, municipal and local bodies issue securities in the debt markets to fund their developmental projects as well as to finance their budgetary deficits.

v. Public Sector Undertakings (PSU) and their finance corporations are large issuers of debt securities. They raise funds to meet the long term and working capital needs. These corporations are also investors in bonds issued in the debt markets.

vi. Corporates issue short and long-term paper to meet their financial requirements. They are also investors in debt securities issued in the market.

vii. DFIs regularly issue bonds for funding their financing requirements and working capital needs. They also invest in bonds issued by other entities in the debt markets. Most FIs hold government securities in their investment and trading portfolios.

viii. Banks are the largest investors in the debt markets, particularly in the government securities market due to SLR requirements. They are also the main participants in the call money market. Banks arrange CP issues of corporates and are active in the inter-bank term markets and repo markets for their short term funding requirements. Banks also issue CDs and bonds in the debt markets. They also issue bonds to raise funds for their Tier-II capital requirement.

ix. The investment norms for insurance companies make them large participants in government securities market.

x. MFs have emerged as important players in the debt market, owing to the growing number of debt funds that have mobilised significant amounts from the investors. Most mutual funds also have specialised debt funds such as gilt funds and liquid funds. They participate in the debt markets pre-dominantly as investors, and trade on their portfolios quite regularly.

xi. Foreign Institutional Investors (FIIs) are permitted to invest in Dated Government Securities and Treasury Bills within certain limits.

xii. Provident and pension funds are large investors in the debt markets. The prudential regulations governing the deployment of the funds mobilised by them mandate investments pre-dominantly in treasury and PSU bonds. They are, however, not very active traders in their portfolio, as they are not permitted to sell their holdings, unless they have a funding requirement that cannot be met through regular accruals and contributions.

xiii. Charitable institutions, trusts and societies are also large investors in the debt markets. They are, however, governed by their rules and bye-laws with respect to the kind of

bonds they can buy and the manner in which they can trade on their debt portfolios.

xiv.   Since January 2002, retail investors have been permitted to submit non-competitive bids at primary auction through any bank or PD. They submit bids for amounts of Rs. 10,000 and multiples thereof, subject to the condition that a single bid does not exceed Rs. 1 crore. The non-competitive bids upto a maximum of 5% of the notified amount are accepted at the weighted average cut off price/yield.

xv.   NDS, CCIL and WDM segment of NSEIL are other important platforms for the debt market which are discussed in greater detail in subsequent sections.

3.5   CONSTITUENT SGL ACCOUNTS

Subsidiary General Ledger (SGL) account is a facility provided by RBI to large banks and financial institutions to hold their investments in government securities and treasury bills in the electronic book entry form. Such institutions can settle their trades for securities held in SGL through a delivery-versus-payment (DvP) mechanism, which ensures simultaneous movement of funds and securities. As all investors in government securities do not have access to the SGL system, RBI has permitted such investors to open a gilt with any entity authorized by RBI for this purpose and thus avail of the DvP settlement. RBI has permitted NSCCL, NSDL, CDSL, SHCIL, banks and PDs to offer constituent SGL account facility to an investor who is interested in participating in the government securities market.

The facilities offered by the constituent SGL accounts are dematerialisation, re-materialisation, buying and selling of transactions, corporate actions, and subscription to primary market issues. All entities regulated by RBI [including FIs, PDs, cooperative banks, RRBs, local area banks, NBFCs] should necessarily hold their investments in government securities in either SGL (with RBI) or CSGL account.

3.6   PRIMARY DEALERS

Primary dealers are important intermediaries in the government securities markets introduced in 1995. In order to broad base the Primary Dealership System, banks were permitted to undertake Primary Dealership business departmentally in 2006-07. There are now 19 primary dealers in the debt markets. They act as underwriters in the primary debt markets, and as market makers in the secondary debt markets, apart from enabling the participation of a number of constituents in the debt markets.

The objectives of setting up the system of primary dealer's are[2]:

i.   To strengthen the infrastructure in the government securities market in order to make it vibrant, liquid and broad-based;

ii.   To develop underwriting and market making capabilities for government securities outside the Reserve Bank, so that the Reserve Bank could gradually shed these functions;

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[2] The following sections on primary dealers and satellite dealers have been downloaded from www.rbi.org.in.

iii. To improve secondary market trading system that would contribute to price discovery, enhance liquidity and turnover and encourage voluntary holding of government securities among a wider investor base; and

iv. To make primary dealers an effective conduit for conducting open market operations.

3.6.1 Eligibility

The following institutions are eligible to apply for primary dealership:

i. Subsidiaries of scheduled commercial banks and all India financial institutions dedicated predominantly to the securities business and in particular to the government securities market;

ii. Company incorporated under the Companies Act, 1956 and engaged predominantly in securities business and in particular the government securities market;

iii. Subsidiaries/joint ventures set up by entities incorporated abroad under Foreign Investment Promotion Board (FIPB) approval; and

iv. Banks which do not have a partly or wholly owned subsidiary undertaking PD business and fulfill the following criteria:

   a. Minimum net owned funds (NOF) of Rs.1,000 crore

   b. Minimum CRAR of 9 percent.

   c. Net NPAs of less than 3 percent and a profit making record for the last three years.

3.6.2 Bidding Commitment

A primary dealer has to make an annual commitment to bid for the Government of India dated securities and auction treasury bills auctions on annual basis. However success ratio requirement of 40% of bidding commitment in respect of T-Bills auction which will be monitored on a half yearly basis. The aggregate bids should not be less than a specified amount. The agreed minimum amount of bids has to be separately indicated for dated securities and treasury bills.

While bidding, the primary dealer has to achieve a minimum success ratio of 40 per cent for dated securities and 40 per cent for treasury bills. The Reserve Bank holds discussions with the primary dealers in the month of March, immediately after the announcement of the Central Government's budget, to finalise the annual business plan of each primary dealer. The business plan is inclusive of bidding commitment and underwriting obligation.

3.6.3 Underwriting

Concomitant with the objectives of the PD system, the PDs are expected to support the primary issues of dated securities of Central Government and State Government and Treasury Bills of Central Government, through underwriting/bidding commitments.

Dated Securities of Central Government

1. The underwriting commitment on dated securities of Central Government will be divided into two parts (i) Minimum Underwriting Commitment (MUC) and ii) Additional Competitive Underwriting (ACU).

2. The MUC of each PD will be computed to ensure that at least 50% of the notified amount of each issue is mandatorily underwritten equally by all PDs. The share under MUC will be uniform for all PDs, irrespective of their capital or balance sheet size. The remaining portion of the notified amount will be underwritten through an Additional Competitive Underwriting (ACU) auction.

3. RBI will announce the MUC of each PD and the balance amount which will be underwritten under the ACU auction. In the ACU auction, each PD would be required to bid for an amount atleast equal to its share of MUC. A PD cannot bid for more than the 30 percent of the notified amount in the ACU auction.

4. The auction could either be uniform price-based or multiple price-based depending upon the market conditions and other relevant factors which will be announced before the underwriting auction of each issue.

5. Bids will be tendered by PDs within the stipulated time, indicating both the amount of the underwriting commitment and underwriting commission rates. A PD can submit multiple bids for underwriting. Depending upon the bids submitted for underwriting, RBI will decide the cut-off rate of commission and inform the PDs.

6. All successful bidders in the ACU auction will be paid underwriting commission on the ACU segment as per the auction rules. Those PDs who succeed in the ACU for 4 per cent and above of the notified amount of the issue, will be paid commission on the MUC at the weighted average of all the accepted bids in the ACU. Others will get commission on the MUC at the weighted average rate of the three lowest bids in the ACU.

7. In the GOI securities auction, a PD should bid for an amount not less than their total underwriting obligation. If two or more issues are floated on the same day, the minimum bid amount will be applied to each issue separately.

8. Underwriting commission will be paid on the amount accepted for underwriting by the RBI irrespective of the actual amount of devolvement, by credit to the current account of the respective PDs at the RBI, Fort, Mumbai, on the date of issue of security.

9. In case of devolvement, PDs would be allowed to set-off the accepted bids in the auction against their underwriting commitment accepted by the Reserve Bank. Devolvement of securities, if any, on PDs will take place on pro-rata basis, depending upon the amount of underwriting obligation of each PD after setting off the successful bids in the auction.

10. RBI reserves the right to accept any amount of underwriting up to 100 percent of the

notified amount or even reject all the bids tendered by PDs for underwriting, without assigning any reason.

Dated Securities of State Governments

1. On announcement of an auction of dated securities of the State Governments for which auction is held, RBI may invite PDs to collectively bid to underwrite upto 100 percent of the notified amount of State Development Loans (SDL).

2. A PD can bid to underwrite up to 30 per cent of the notified amount of the issue. If two or more issues are floated on the same day, the limit of 30% is applied by taking the notified amounts separately.

3. Bids will be tendered by PDs within the stipulated time, indicating both the amount of the underwriting commitments and underwriting commission rates. A PD can submit multiple bids for underwriting.

4. Depending upon the bids submitted for underwriting, the RBI will decide the cut-off rate of commission and the underwriting amount up to which bids would be accepted and inform the PDs.

5. RBI reserves the right to accept any amount of underwriting up to 100 per cent of the notified amount or even reject all the bids tendered by PDs for underwriting, without assigning any reason.

6. In case of devolvement, PDs would be allowed to set-off the accepted bids in the auction against their underwriting commitment accepted by the Reserve Bank. Devolvement of securities, if any, on PDs will take place on pro-rata basis, depending upon the amount of underwriting obligation of each PD after setting off the successful bids in the auction.

7. Underwriting commission will be paid on the amount accepted for underwriting by the RBI, irrespective of the actual amount of devolvement, by credit to the current account of the respective PDs at the RBI, Fort, Mumbai, on the date of issue of security.

3.6.4 Other Obligations

PDs are expected to play an active role in the government securities market, both in its primary and secondary market segments. The major roles and obligations of PDs are as below:

1. Support to Primary Market: PDs are required to support auctions for issue of Government dated securities and Treasury Bills as per the minimum norms for underwriting commitment, bidding commitment and success ratio as prescribed by RBI from time to time.

2. Market making in Government securities: PDs should offer two-way prices in Government securities, through the Negotiated Dealing System-Order Matching (NDS-OM), over-the-counter market and recognised Stock Exchanges in India and take principal positions in the secondary market for Government securities.

3. PDs should maintain adequate physical infrastructure and skilled manpower for efficient

participation in primary issues, trading in the secondary market, and to advise and educate investors.

4. A Primary Dealer shall have an efficient internal control system for fair conduct of business, settlement of trades and maintenance of accounts.

5. A Primary Dealer will provide access to RBI to all records, books, information and documents as and when required.

6. PDs should annually achieve a minimum turnover ratio of 5 times for Government dated securities and 10 times for Treasury Bills of the average month-end stocks. The turnover ratio in respect of outright transactions should not be less than 3 times in government dated securities and 6 times in Treasury Bills (Turnover ratio is computed as the ratio of total purchase and sales during the year in the secondary market to average month-end stocks).

7. A PD should submit periodic returns as prescribed by RBI from time to time.

8. PDs operations are subject to prudential and regulatory guidelines issued by RBI from time to time.

3.6.5 Facilities for Primary Dealers

The Reserve Bank currently extends the following facilities to PDs to enable them to effectively fulfill their obligations:

i. Access to Current Account facility with RBI.

ii. Access to Subsidiary General Ledger (SGL) Account facility (for

Government securities) with RBI.

iii. Permission to borrow and lend in the money market including call money market and to trade in all money market instruments.

iv. Memberships of electronic dealing, trading and settlement systems

(NDS platforms/INFINET/RTGS/CCIL).

v. Access to the Liquidity Adjustment Facility (LAF) of RBI.

vi. Access to liquidity support from RBI under a scheme separately notified for standalone PDs.

vii. Favored access to open market operations by Reserve Bank of India. The facilities are, however, subject to review, depending upon the market conditions and requirement.

3.6.6 Reporting System

Statements / Returns required to be submitted by Primary Dealers to Reserve Bank of India

Sr. No.	Return/Report	Periodicity
1.	PDR-I	Fortnightly
2.	PDR-II	Monthly

Sr. No.	Return/Report	Periodicity
3.	PDR-III	Quarterly
4.	PDR-IV	Quarterly
5.	Returns on FRAs/IRS(to IDMD)	Monthly and Fortnightly
6.	Annual Report & Annual Audited A/c s	Annual
7.	Auditor's Certificate on Net Owned Funds	Yearly
8.	Reconciliation of holdings of Govt. Securities in own A/c and constituent A/c	Yearly
9.	Investments in non-Government securities	Yearly
10.	Details of dividend declared during the accounting year	Yearly
11.	Return on FRAs / IRS	Fortnightly
12.	Statement showing balances of Govt. Securities held on behalf of each Gilt A/c holder	Ha If-Yearly
13.	Return on Call Money transactions with Commercial Banks	Fortnightly
14.	Daily Return on Call/Notice/Term Money Transactions	Daily
15.	Call and Notice Money Operations during the Fortnight	Fortnightly
16.	Total Investments and Resources invested in short-term Instruments	Monthly
17.	Information for Issue of Commercial Paper	On each issue of CP

3.7 SATELLITE DEALERS

RBI introduced a system of Satellite Dealers (SDs) with, the objective of widening the scope of organized dealing and distribution arrangements in Government securities market. However, the Satellite Dealers System has been discontinued by RBI w.e.f May 31, 2002.

3.8 SECONDARY MARKETS FOR GOVERNMENT BONDS

Government bonds are deemed to be listed as soon as they are issued. Markets for government securities are pre-dominantly wholesale markets, with trades done on telephonic negotiation. NSE WDM provides a trading platform for Government bonds, and reports over 65% of all secondary market trades in government securities. Since participants have to report their trades to the PDO, and effect settlement through the SGL, RBI's reports on SGL transactions provide summary data on secondary market transactions in government bonds. SGL holders are expected to report their trades within 24 hours, due to which the time sequence of trades is not observed in the debt markets. Since most trades done on the NSE are also in the form of negotiated trades that are subsequently reported, the "last traded price" is not observed in the secondary markets. The trading system at the NSE WDM is described in Chapter 11.

Currently, transactions in government securities are required to be settled on the trade date or next working day unless the transaction is through a broker of a permitted stock exchange in which case settlement can be on T+2 basis. In NDS, all trades between members of NDS have to be reported immediately. The settlement is routed through CCIL for all NDS members.

3.9 SETTLEMENT OF TRADES IN G-SECS

All trades in government securities are reported to RBI-SGL for settlement. The trades are settled on DvPIII basis (net settlement of securities and funds simultaneously). Central government securities and T-bills are held as dematerialised entries in the SGL of RBI. The PDO, which oversees the settlement of transactions through the SGL, enables the transfer of securities from one participant to another. Transfer of funds is effected by crediting/debiting the current account of the seller/buyer, maintained with the RBI. Securities are transferred through credits/debits in the SGL account. In order to do this, the SGL Form is filled by the seller, countersigned by the buyer, and sent to the RBI. The buyer transfers funds towards payment. The SGL form contains transfer instruction for funds and securities signed by both counter-parties and has to be submitted to RBI within one working day after the date of signing the form. The SGL form provides details of the buyer and the seller, the security, the clean price, accrued interest and details of credit in the current account.

Most transactions in government securities are placed through brokers. Buyers and sellers confirm transactions through phone and fax, after the deal is made. Brokers are usually paid a commission of 0.50 paise per market lot (of Rs. 5 crore), for deals upto Rs. 20 crore. Larger deals attract fixed commissions.

Gross settlement occasionally leads to gridlock in the DvP system due to shortfall of funds on a gross basis in the current accounts of one or more SGL account holders, though sufficient balance are available to settle on net basis. To take care of such unusual occurrences, the scheme of special fund facility provides intra-day funds to banks and primary dealers against un-drawn collateralised lending facility and liquidity support facility from RBI.

Clearing Corporation of India Limited

CCIL promoted by the banks and financial institutions, was incorporated in April 2001 to support and facilitate clearing and settlement of trades in government securities (and also trades in forex and money markets). It facilitates settlement of transactions in government securities (both outright and repo) on Delivery versus Payment (DvP-II) basis which provides for settlement of securities on gross basis and settlement of funds on net basis simultaneously up to March 31, 2004.

As per notification issued by RBI dated March 29, 2004 the settlement of government securities transaction is switched over to the DVP III mode w.e.f. April 02, 2004. A new guideline permits sale of a government security already contracted for purchase, provided:

•   the purchase contract is confirmed prior to the sale,

- the purchase contract is guaranteed by CCIL or the security is contracted for purchase from the Reserve Bank and,

- the sale transaction will settle either in the same settlement cycle as the preceding purchase contract, or in a subsequent settlement cycle so that the delivery obligation under the sale contract is met by the securities acquired under the purchase contract(e.g. when a security is purchased on T+0 basis, it can be sold on either T+0 or T+l basis on the day of the purchase; if however it is purchased on T+l basis, it can be sold on T+l basis on the day of purchase or on T+0 or T+l basis on the next day); and,

- to shift the settlement of government securities transactions carried out through CCIL to the DVP-III mode so that each security is deliverable/receivable on a net basis for a particular settlement cycle.

- It is clarified that so far as purchase of securities from the Reserve Bank through Open Market Operations (OMO) is concerned, no sale transactions should be contracted prior to receiving the confirmation of the deal/advice of allotment from the Reserve Bank.

- As a corollary to the above changes, it is also advised that ready forward (repo) transactions in government securities, which are settled under the guaranteed settlement mechanism of CCIL, may be rolled over, provided the security prices and repo interest rate are renegotiated on roll over. It is clarified that the purchase contract referred to in paragraph 3(a)(i) above will include the second (repurchase) leg of a repo transaction. That is, the borrower of funds(i.e., seller in the first leg) in a repo may sell the securities contracted for repurchase, on T+0 or T+l basis for a settlement cycle coinciding with the second leg of the repo or for a subsequent settlement cycle. However, the lender of funds (i.e.; the buyer in the first leg) in a repo, should not sell the securities purchased in the repo, during the tenor of the repo contract.

- The modifications in the existing guidelines in accordance with the above proposals are expected to improve the liquidity in government securities market by enabling sale of a government security on the day of purchase, reducing the price risk on the part of the market participants. Further, as the relaxation enables rollover of repos, it would facilitate non-banks to move away from the call/notice money market and also enable banks to reduce their dependence on the call money market.

CCIL acts as a central counterparty for clearing and settlement of government securities transactions done on NDS. CCIL receives trades reported by the members on the Negotiated Dealing System of the Reserve Bank of India and the NDS-OM in batches (batch I and II) with the status 'ready for settlement'. The trades received by CCIL in batches are subjected to initial validation and the Risk management department checks for margin availability in respective members SGF account. The trades which pass the exposure check are accepted for guaranteed settlement through the process of novation in which the CCIL becomes the

Central Counter Party. All such trades received, accepted and due for settlement are taken for netting on the settlement date to arrive at memberwise securities and fund obligations. The net obligations for each member in respect of securities and funds are arrived at as per DVP III method of netting arrangement. Member-wise obligations for securities and funds are then electronically transmitted to RBI-PDO/DAD for settlement. PDO/DAD undertakes settlement of securities/funds in the respective member's account through CCIL's settlement accounts and advises CCIL on completion. CCIL has well defined process for handling any settlement shortage either in funds or in securities. All instances of such shortages are immediately reported to RBI for necessary action at their end.

The scheme of Securities Lending and Borrowing (SLB) in government securities, made operational from October 25, 2004, the first in the Country enabled CCIL to borrow government securities from a member approved by RBI for the exclusive purpose of meeting shortages in the settlement of transactions.

In order to participate in the clearing and settlement process, the market participants are required to enroll as members of CCIL. All the members of RBI-NDS are eligible for membership to the government securities segment of CCIL. The members pay a one-time membership fee of Rs. 1 lakh.

It provides guaranteed settlement for transactions in government securities through improved risk management practices viz., daily mark to market margin and maintenance of settlement guarantee fund..

CCIL has in place a comprehensive risk management system. During the settlement processes, CCIL assumes certain risks which may arise due to a default by a member to honour its obligations. Settlement being on Delivery Versus Payment basis, the risk from a default is the market risk (change in price of the concerned security). *CCIL processes are designed to cover the market risk through its margining process.*

CCIL collects Initial Margin and Mark to Market Margin from members in respect of their outstanding trades. Initial Margin is collected to cover the *likely risk from future adverse movement of prices* of the concerned securities. *Mark to Market Margin is collected to cover the notional loss (i.e. the difference between the current market price and the contract price of the security covered by the trade)* already incurred by a member. Both the margins are computed trade-wise and then aggregated member-wise. In addition, CCIL may also collect Volatility Margin in case of unusual volatility in the market.

Members are required to keep balances in Settlement Guarantee Fund (SGF) in such a manner that the same is enough to cover the requirements for both Initial Margin and Mark-to-Market Margin for the trades done by such members. In case of any shortfall, CCIL makes margin call and the concerned member is required to meet the shortfall before the specified period of the next working day. Members' contribution to the SGF is in the form of eligible Govt.

of India Securities/T-Bills and cash, with cash being not less than 10 % of the total margin requirement at any point of time.

Another important risk emanating from the process is Liquidity Risk. To ensure uninterrupted settlement, CCIL is required to arrange for liquidity both in terms of funds and securities. CCIL has arranged for Lines of Credit from Banks to enable it to meet any reasonable shortfall of funds arising out of a default by a member either in its Securities Segment or Forex Segment. In regard to the Securities Segment, member's contributions to SGF is mainly in the form of securities and through the list of specified securities acceptable for contribution to SGF, CCIL ensures that the most liquid securities in which a significant portion of the trades are settled are likely to be available in the SGF. For requirements of other securities, CCIL has put in place a limited purpose security borrowing arrangement with two major market participants

The details of trades settled by CCIL during 2002-03 to 2012-13 are given below:

Settlement of Trades in Government Securities

Amount in Millions

Settlement Period	Outright				Repo			
	Proprietary		Constituent		Proprietary		Constituent	
	Trades	Value	Trades	Value	Trades	Value	Trades	Value
2002-03	80.54	87.54	19.46	12.46	99.58	99.81	0.42	0.19
2003-04	75.82	85.03	24.18	14.97	88.11	89.96	11.89	10.04
2004-05	75.96	81.95	24.04	18.05	81.83	86.21	18.17	13.79
2005-06	78.55	85.37	21.45	14.63	70.00	82.77	30.00	17.23
2006-07	87.78	90.06	12.22	9.94	70.67	85.01	29.33	14.99
2007-08	90.26	90.55	9.74	9.45	70.74	83.79	29.26	16.21
2008-09	89.48	88.32	10.52	11.68	72.60	87.98	27.40	12.02
2009-10	90.16	90.56	9.84	9.44	81.01	94.03	18.99	5.97
2010-11	89.23	89.92	10.77	10.08	80.58	89.37	19.42	10.63
2011-12	90.81	88.35	10.77	11.65	81.39	88.46	18.61	11.54
2012-13	89.69	87.05	10.31	12.95	90.89	92.91	9.11	7.09
Apr-13	91.32	86.25	8.68	13.75	92.83	94.50	7.17	5.50
May-13	90.98	87.12	9.02	12.88	93.23	95.51	6.77	4.49
2013-14 (Upto May 2013)	91.10	86.82	8.59	13.18	93.05	95.06	6.95	4.94

Source: Rakshitra Monthly news letter of CCIL

Liquidity Adjustment Facility (LAF)

The liquidity Adjustment Facility introduced in June 2000, allows the Reserve Bank of India to manage market liquidity on a daily basis and also transmit interest rate signals to the market. The LAF, initially recommended by Narsimhan Committee was introduced in stages in consonance with the level of market development and technological advances in payment and settlement systems. The first challenge was to combine the various sources of liquidity available from the Reserve Bank into a single comprehensive window with a common price. Consequently, an interim LAF was introduced in April 1999 as a mechanism for liquidity management through combination of repo operations, export credit refinance facilities and collateralised lending facilities, supported by open market operations of the RBI, at set rates of interest. Banks could avail of a collateralised lending facility (CLF) supported by open market operations at set rates of interest, was upgraded into a full-fledged LAF. Most of the alternate provisions of primary liquidity have been gradually phased out and now the LAF has emerged as the principal operating instrument of monetary policy. The RBI manages its liquidity in the market through the operation of LAF as part of its monetary policy and money supply targets. It undertakes reverse repo transactions to mop up liquidity and repos to supply liquidity in the market. The two rates are different and the reverse repo rate is lower than the repo rate. The LAF transactions are currently being conducted on overnight basis. The procedure prescribed by RBI for operation of the LAF requires the banks to submit bids for repo/reverse repo transactions at specified times. The bids are submitted electronically through the NDS. These operations are conducted in the forenoon between 9.30 a.m. and 10.30 a.m. All scheduled banks and primary dealers having current and SGL accounts with the RBI are eligible to participate in the transactions with bids for a minimum amount of Rs.5 crore (or multiples thereof). The transactions are undertaken in SLR securities and/or treasury bills. A uniform margin of 5% in terms of the face value of the security, is kept on accepted bids. Thus, RBI practice is different from market repos, the latter are based on market values and not face values of the securities.

Secondary Liquidity Adjustment Facility (SLAF)

In response to suggestions from the market participants for fine-tuning the management of bank reserves on the last day of the maintenance period, it has been decided to introduce a second LAF (SLAF) on reporting Fridays, with effect from August 1, 2008. These operations are conducted between 4.00 p.m. and 4.30 p.m.

The salient features of the SLAF are same as those of LAF. However, the settlement for LAF and SLAF will be conducted separately and on gross basis.

Model Questions

1. **Which of the following is true about a uniform price auction?**

    a. An auction in which all successful bids are made for the same price.

    b. An auction in which all bidders have bid a uniform price.

    c. An auction in which all successful bidders are allotted bonds at the same price.

    d. An auction in which the cut-off price is derived as the weighted average of all successful bids.

Answer: c

2. **Which of the following is false about the devolvement of treasury issues on the primary dealer?**

    a. PDs can set-off the accepted bids in an auction against the devolvement on them.

    b. Devolvement on PDs is on pro-rata basis, depending on the underwriting obligation of each PD.

    c. Underwriting fee is payable on the net amount, after accounting for the devolvement on PDs.

    d. Devolvement on pro-rata basis is done after setting off successful bids in the auction.

Answer: c

3. **The bids received in a treasury auction are as follows:**

Number of Bonds	Price quoted by bidders (Rs.)
20,000,000	110.25
12,000,000	109.50
10,000,000	109.25
14,000,000	109.00
25,000,000	108.95

If the notified amount is Rs. 500 crore, what is the cut-off price, assuming there are no devolvements?

Answer:

Since it is a price-based auction, the bids will be filled from the highest price downwards. If the bids at the cut-off price exceed the notified amount, pro rata allotments will be made. On computing the amount (product of number of bonds and quoted price, and cumulating the amounts so arrived, we can reach the cut-off price). The cut-off price is Rs. 109.00.

The allotments are as follows:

Quantity	Price Quoted by bidders (Rs.)	Amount bid (Rs.)	Allotment (Rs.)
20,000,000	110.25	2,205,000,000	2,205,000,000
12,000,000	109.5	1,314,000,000	1,314,000,000
10,000,000	109.25	1,092,500,000	1,092,500,000
14,000,000	109	1,526,000,000	388,500,000
25,000,000	108.95	2,723,750,000	Nil

The allotment at the cut-off price is arrived at by finding the difference between the notified amount and the cumulative allotments up to the previous bid.

4. **Using the same data as in question 3, at what price non-competitive bids will be allotted?**

Answer:

Non-competitive bids will get allotment at the weighted average price of successful bids. The price and quantity for successful bids are as follows:

Number of Bonds	Price (Rs.)	Bid Amount	Weightage	Weighted Price
20,000,000.00	110.25	2,205,000,000	0.441	48.6203
12,000,000.00	109.5	1,314,000,000	0.2628	28.7766
10,000,000.00	109.25	1,092,500,000	0.2185	23.8711
3,564,220.18	109	388,500,000	0.0777	8.4693
				109.7373

The weighted average price is Rs. 109.7373

CHAPTER 4: CENTRAL GOVERNMENT SECURITIES: T-BILLS

Treasury bills are short-term debt instruments issued by the Central government. There are 3 types of T-bills which are issued: 91-day, 182-day and 364-day, representing the 4 types of tenors for which these instruments are issued.

Until 1988, the only kind of Treasury bill that was available was the 91-day bill, issued on tap; at a fixed rate of 4.5% (the rates on these bills remained unchanged at 4.5% since 1974!). 182-day T-bills were introduced in 1987, and the auction process for T-bills was started. 364 day T-bill was introduced in April 1992, and in July 1997, the 14-day T-bill was also introduced. RBI had suspended the issue of 182-day T- bills from April 1992, and revived their issuance since May 1999. RBI did away with 14-day and 182-day Treasury Bills from May 2001. It was decided in consultation with the Central Government to re-introduce, 182 day TBs from April 2005. All T-bills are now sold through an auction process according to a fixed auction calendar, announced by the RBI. Ad hoc treasury bills, which enabled the automatic monetisation of central government budget deficits, have been eliminated in 1997. All T-bill issuances now represent market borrowings of the central government.

4.1 ISSUANCE PROCESS

Treasury bills (T-bills) are short-term debt instruments issued by the Central government. Three types of T-bills are issued: 91-day, 182-day and 364-day,

T-bills are sold through an auction process announced by the RBI at a discount to its face value. RBI issues a calendar of T-bill auctions (Table 4.1). It also announces the exact dates of auction, the amount to be auctioned and payment dates. T-bills are available for a minimum amount of Rs. 25,000 and in multiples of Rs. 25,000. Banks and PDs are major bidders in the T-bill market. Both discriminatory and uniform price auction methods are used in issuance of T-bills. Currently, the auctions of all T-bills are multiple/discriminatory price auctions, where the successful bidders have to pay the prices they have actually bid for. Non-competitive bids, where bidders need not quote the rate of yield at which they desire to buy these T-bills, are also allowed from provident funds and other investors. RBI allots bids to the non-competitive bidders at the weighted average yield arrived at on the basis of the yields quoted by accepted competitive bids at the auction. Allocations to non-competitive bidders are outside the amount notified for sale. Non-competitive bidders therefore do not face any uncertainty in purchasing the desired amount of T-bills from the auctions.

Pursuant to the enactment of FRBM Act with effect from April 1, 2006, RBI is prohibited from participating in the primary market and hence devolvement on RBI is not allowed. Auction of all the Treasury Bills are based on multiple price auction method at present. RBI issues a Press Release detailing the notified amount and indicative calendar in the beginning of the financial

year. The auction for MSS amount varies depending on prevailing market condition. Based on the requirement of GOI and prevailing market condition, the RBI has discretion to change the notified amount. Also, it is discretion of the RBI to accept, reject or partially accept the notified amount depending on prevailing market condition

Table 4.1(a): Auction

Type of Treasury bill	Periodicity	Notified Amount (Rs. cr.)	Day of Auction	Day of Payment
91-day	Weekly	500	Every Wednesday	Following Friday
182 Day	Fortnightly	500	Wednesday preceding the non-Reporting Friday	Following Friday
364-day	Fortnightly	1000	Every alternate Wednesday	Following Friday

Table 4.1(b): Treasury Bills - Auction Calendar (Jan – Mar 2014)

Proposed Auctions of T-Bills during January-March, 2014				
				(In Rs.Crores)
Date of Auction	91 days	182 days	364 days	Total
01-Jan-14	4,000	3,000		7,000
08-Jan-14	4,000		3,000	7,000
15-Jan-14	4,000	3,000		7,000
22-Jan-14	4,000		3,000	7,000
29-Jan-14	4,000	3,000		7,000
05-Feb-14	7,000		6,000	13,000
12-Feb-14	7,000	6,000		13,000
18-Feb-14	7,000		6,000	13,000
26-Feb-14	7,000	6,000		13,000
05-Mar-14	8,000		6,000	14,000
12-Mar-14	8,000	6,000		14,000
19-Mar-14	8,000		6,000	14,000
26-Mar-14	8,000	6,000		14,000
Total	**80,000**	**33,000**	**30,000**	**1,43,000**

The summary of T-bill auctions conducted during the year 2013-14 is in Table 4.2.

Tablle 4.2 : T-bill Auction 2013-14 - A Summary

	91-day	182-day	364-day
No of issues	65	39	52
Number of bids received (competitive & non-competitive)	5,473	2,730	4,581
Amount of competitive bids (Rs. Cr.)	13,276	6,336	8,711
Amount of non-competitive bids (Rs. Cr.)	3,147	22	20
Number of bids accepted (competitive & non-competitive)	3,145	1,039	1,601
Amount of competitive bids accepted (Rs. cr.)	3,837	1,984	2,659
Amount of non-competitive bids accepted (Rs. Cr.)	3,147	22	20
Total Issue (Rs. cr.)	6,984	2,006	2,679
Cut-off price - minimum (Rs.)	97	94	91
Cut-off price - maximum (Rs.)	98	96	93
Implicit yield at cut-off price - minimum (%)	7	7	7
Implicit yield at cut-off price - maximum (%)	12	12	10

Source: RBI Bulletin, Various Issues.

4.2   CUT-OFF YIELDS

T-bills are issued at a discount and are redeemed at par. The implicit yield in the T-bill is the rate at which the issue price (which is the cut-off price in the auction) has to be compounded, for the number of days to maturity, to equal

the maturity value.

Yield, given price, is computed using the formula:

= ((100-Price)*365)/ (Price * No of days to maturity)

Similarly, price can be computed, given yield, using the formula:

= 100/(1+(yield% * (No of days to maturity/365))

For example, a 182-day T-bill, auctioned on January 18, at a price of Rs. 95.510 would have an implicit yield of 9.4280% computed as follows:

= ((100-95.510)*365)/(95.510*182)

9.428% is the rate at which Rs. 95.510 will grow over 182 days, to yield Rs. 100 on maturity. Treasury bill cut-off yields in the auction represent the default-free money market rates in the economy, and are important benchmark rates.

4.3 INVESTORS IN T-BILLS

At the end of March 2008, Treasury bills were pre-dominantly held by Commercial Banks followed by Insurance Companies. Table 4.3 presents holding pattern of outstanding T-bills.

Table 4.3 : Holding Pattern of Outstanding T-bills

Category	2010				2011				2012			
	Mar.	Jun.	Sep.	Dec.	Mar.	Jun.	Sep.	Dec.	Mar	Jun.	Sep.	Dec.
Commercial Banks	38.03	38.35	38.75	38.63	38.42	37.59	37.22	37.06	36.28	33.88	33.91	33.98
Bank-Primary Dealers	9.22	9.92	9.73	8.77	8.61	9.96	10.67	10.25	9.83	10.34	10.63	9.98
Non-Bank PDs	0.14	0.23	0.29	0.26	0.11	0.1	0.12	0.09	0.1	0.08	0.1	0.15
Insurance Companies	22.16	22.05	22.18	22.11	22.22	22.47	22.57	22.42	21.08	21.19	21.3	19.54
Mutual Funds	0.4	0.38	0.73	0.88	0.18	0.41	0.32	0.27	0.17	0.29	0.55	1.2
Co-operative Banks	3.35	3.4	3.5	3.38	3.41	3.31	3.28	3.21	2.98	3.07	3.03	2.89
Financial Institutions	0.35	0.34	0.35	0.33	0.35	0.34	0.35	0.34	0.37	0.34	0.37	0.64
Corporates	2.99	2.82	2.57	2.33	1.94	1.86	1.64	1.58	1.38	1.37	1.61	1.62
FIIs	0.59	0.62	0.55	0.61	0.97	0.89	0.97	0.85	0.88	0.89	1.1	1.24
Provident Funds	6.76	6.56	6.79	6.89	7.06	7.01	7.23	7.31	7.45	7.31	7.19	7.12
RBI	11.76	9.67	9.2	10.67	12.84	12.9	12.52	13.56	14.41	17.62	16.02	15.95
Others	4.24	5.65	5.36	5.14	3.89	3.15	3.13	3.07	5.07	3.63	4.2	5.68
Total	100	100	100	100	100	100	100	100	100	100	100	100

Source: RBI, Weekly Statistical Supplement, Various Issues

4.4 SECONDARY MARKET ACTIVITY IN T-BILLS

Treasury bills are mostly held to maturity by a majority of the buyers. Secondary market activity is quite sparse. The average turnover in T-bills is shown in Table 4.4. The 91-day T-bill is comparatively more actively traded, with an amount turnover of around Rs. 188900 crore.

Table: 4.4: Secondary Market Transactions in T-Bill

2012	91 Days	182 Days	364 Days
Amount	1,88,900	56,100	85,000
Min.	31,800	32,600	31,800
Max.	34,100	33,200	32,600

Source: RBI Bulletin

Model Questions

1.   **A treasury bill maturing on 3-Jan-2015 is trading in the market on 28-Jan-2014 at a price of Rs. 92.8918. What is the discount rate inherent in this price?**

Answer:

The yield is computed as:

= [(100-price)*365]/ (Price * No of days to maturity)

= [(100-92.8918)*365]/ (92.8918*340) = 8.21%

2.   **What is the price at which a treasury bill maturing on 3rd Jan 2015 would be valued on Jan 22, 2014 at a yield of 6.8204%?**

Answer:

The price can be computed as

= 100/ {1+ [yield% * (No of days to maturity/365)]}

= 100/ {1+ [6.8204 %*(346/365)]} = Rs. 93.9272

3.   **What is the day count convention in the Treasury bill markets?**

a.   30/360

b.   Actual/Actual

c.   Actual/360

d.   Actual/365

Answer: d

CHAPTER 5: STATE GOVERNMENT BONDS

5.1 GROSS FISCAL DEFICIT OF STATE GOVERNMENTS AND ITS FINANCING

In the year 2013 the gross fiscal deficit (GFD) of state governments has grown to Rs. 215266 crore from Rs. 90098 crore in 1999-2000. The market borrowings have emerged as a major source of financing of the GFD. Market borrowings are currently about 82.3% of the GFD (Table 5.1). The share of loans from Central Government as a means of financing the deficit has risen over the years, while the other sources, which include small savings, have decreased.

Table 5.1: Financing of the GFD of States   **(As % of GFD)**

Year	Receipts	Expendi-ture	Gross Fiscal Deficit (3-2)	Financing of Gross Fiscal Deficit			
				Loans from Central Govern-ment	Market Borrow-ings	Special Securi-ties Is-sued to NSSF	Others
1999-00	202927	293026	90098	12178	12664	26416	38840
2000-01	232509	320432	87922	8324	12519	32606	34473
2001-02	249422	343682	94261	10895	17249	35648	30468
2002-03	273674	373400	99727	-372	28484	48966	22649
2003-04	309187	429816	120631	13940	47286	18003	41402
2004-05	363512	471286	107774	-9781	34559	64192	18804
2005-06	431030	521114	90084	-44	15305	73815	1008
2006-07	532462	609971	77509	-8887	13083	56023	17289
2007-08	630703	706157	75455	-933	53925	5853	16610
2008-09	694923	829512	134589	-761	104041	1479	29830
2009-10	768949	957767	188819	-1700	112648	24158	53713
2010-11	936588	1098050	161461	710	88776	38626	33349
2011-12	1141672	1349548	207875	7545	156708	-2524	46147
2012-13	1331200	1546467	215266	11394	177156	1282	25434

Source: RBI, Annual Report 2012-13.

5.2 VOLUMES AND COUPON RATES

The composition of states' outstanding liabilities reveals increased reliance on market borrowings, which accounted for 40.2 per cent of their outstanding liabilities at end-March

2013. This is expected to rise further to 44.8 per cent by end-March 2014.

Market borrowings have emerged as the most important source for financing the resource gaps of state governments in recent years. The outstanding stock of state development loans (SDLs) increased by 18.0 per cent in 2012-13. The interest profile of outstanding stock of SDLs shows that the share of high-cost market loans with interest rates of 10 per cent and above declined sharply over the years and as at end-March 2012, the state governments ceased to have any market loans with interest rates above 10 per cent. On the other hand, the share of market loans with interest rates ranging between 7-9 per cent increased from 80.1 per cent as at end-March 2008 to 82.6 per cent at end March 2013. Within this, almost two-thirds of the outstanding market loans had interest rates between 8-9 per cent, indicating that a major proportion of the incremental debt was raised at rates in this range.

State governments' gross market borrowings raised in 2012-13 were higher by 11.8 per cent than in 2011-12. There were no instances of under subscriptions in SDL auctions of 28 states as against 18 such instances last year. The issuances, however, witnessed subdued bidding by major investors like insurance companies and in such instances, the cut-off yields tended to be higher, leading to an increase in the interest payments of these states. The weighted average cost of market borrowings of state governments increased marginally to 8.84 per cent in 2012-13 from 8.79 per cent in 2011-12, mainly on account of increased gross market borrowings over the previous year. The cut-off yields ranged between 8.42 per cent and 9.31 per cent. The weighted average spread 2 in 2012-13 at 71 basis points was higher than 44 basis points in 2011-12. During 2013-14 so far (up to January 10, 2014), state governments have raised an aggregate amount of 1,41,060 Cr on a gross basis, with cut-off yields ranging between 7.57- 9.94 per cent; weighted average interest rate during the period was 9.03 per cent.

5.3   OWNERSHIP PATTERN OF STATE GOVERNMENT BONDS

SBI and its associates are the single largest owners of state government securities. The banking system as a whole is a large investor in government securities. One of the reasons for banks to invest in state government bonds is the relatively lower risk-weighting on these bonds, compared to the risk weighting in case of corporate lending. The prudential investment norms of LIC and provident funds have also enabled a sizeable holding of state government securities by these entities. Table 5.2 provides the pattern of ownership of state government bonds.

Table 5.2: Pattern of Ownership of State Government Bonds

(In percent)

Investors	1991	2000	2001	2002	2003	2004	2005	2006
SBI and associates	22.18	18.36	17.47	17.88	20.06	21.59	17.38	16.48
Nationalised banks	49.27	39.88	39.87	39.38	36.75	36.01	29.90	31.37
Other Schedule Commercial Banks	7.11	3.63	3.4	3.03	2.17	2.16	1.70	1.78
LTC	6.91	16.15	16.57	17.62	19.47	19.79	21.34	25.19
UTI	0	0.022	0.019	0.009	0.01	0.008	0.0004	0
Employees Provident Fund Schemes	2.58	4.38	4.64	6.19	5.87	5.596	5.93	7.98
Coal Mines Provident Fund Scheme	1.03	0	0	3.87	3.55	1.25	1.10	1.23
Others	10.92	17.58	18.03	11.99	12.11	13.59	22.62	15.95
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Source :RBI, Handbook of Statistic on the Indian Economy

Model Question

1. Which of the following about state government borrowings is true?

    a. State government bonds are issued by the respective Finance Department of the States.

    b. State government bonds are fully guaranteed by the central government.

    c. Most state government bonds are issued by the RBI.

    d. State government bonds are issued by the RBI, at the same rates, along with central government bonds.

Answer: c

CHAPTER 6: CALL MONEY MARKETS

The call/notice money market forms an important segment of the Indian Money Market. Call and notice money market refers to the market for short-term funds ranging from overnight funds to funds for a maximum tenor of 14 days. Under Call money market, funds are transacted on overnight basis and under notice money market, funds are transacted for the period of 2 days to 14 days. Participants in call/notice money market currently include banks (excluding RRBs) and Primary dealers both as borrowers and lenders. Non Bank institutions are not permitted in the call/notice money market with effect from August 6, 2005. The regulators has prescribed limits on the banks and primary dealers operation in the call/notice money market.

In pursuance of the announcement made in the Annual Policy Statement of April 2006, an electronic screen-based negotiated quote-driven system for all dealings in call/notice and term money market was operationalised with effect from September 18, 2006. This system has been developed by Clearing Corporation of India Ltd. on behalf of the Reserve Bank of India. The NDS-CALL system provides an electronic dealing platform with features like Direct one to one negotiation, real time quote and trade information, preferred counterparty setup, online exposure limit monitoring, online regulatory limit monitoring, dealing in call, notice and term money, dealing facilitated for T+0 settlement type for Call Money and dealing facilitated for T+0 and T+1 settlement type for Notice and Term Money. Information on previous dealt rates, ongoing bids/offers on real time basis imparts greater transparency and facilitates better rate discovery in the call money market. The system has also helped to improve the ease of transactions, increased operational efficiency and resolve problems associated with asymmetry of information. However, participation on this platform is optional and currently both the electronic platform and the telephonic market are co-existing. After the introduction of NDS-CALL, market participants have increasingly started using this new system more so during times of high volatility in call rates.

6.1 VOLUMES IN THE CALL MARKET

Call markets represent the most active segment of the debt markets. Though the demand for funds in the call market is mainly governed by the banks' need for resources to meet their statutory reserve requirements, it also offers to some participants a regular funding source for building up short-term assets. However, the demand for funds for reserve requirements dominates any other demand in the market. Figure 6.1 displays the average daily volumes in the call markets.

Figure 6.1: Avg.Daily Volume in Call Market (Rs.Cr)
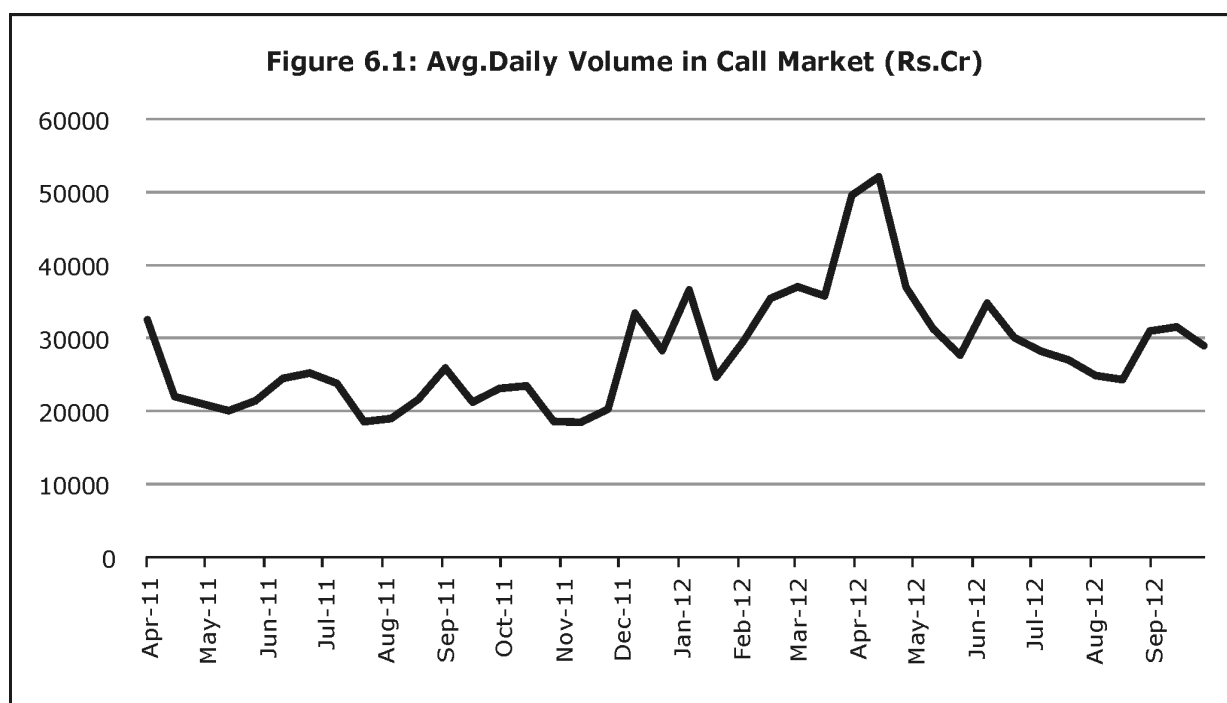
6.2   PARTICIPANTS IN THE CALL MARKETS

Whether call money markets should be pure inter-bank markets, or should other participants be encouraged, has been a matter of discussion for a number of years. The **Chakravarty Committee (1985)** felt that allowing additional non-bank participants into the call market would not dilute the strength of monetary regulation by the RBI, as resources from non-bank participants do not represent any additional resource for the system as a whole, and their participation in call money market would only imply a redistribution of existing resources from one participant to another. In view of this, the Chakravarty Committee recommended that additional non-bank participants may be allowed to participate in call money market.

The **Vaghul Committee (1990),** while recommending the introduction of a number of money market instruments to broaden and deepen the money market, recommended that the call markets should be restricted to banks. The other participants could choose from the new money market instruments, for their short-term requirements. One of the reasons the committee ascribed to keeping the call markets as pure inter-bank markets was the distortions that would arise in an environment where deposit rates were regulated, while call rates were market determined.

The **Narasimham Committee II (1998)** also recommended that call money market in India, like in most other developed markets, should be strictly restricted to banks and primary dealers. Since non-bank participants are not subject to reserve requirements, the Committee felt that such participants should use the other money market instruments, and move out of the call markets.

The RBI constituted a **Technical Group on Phasing out of Non-banks from Call/Notice**

Money Market in December 2000. The report of this technical group was presented in March 2001. The recommendation of this group was that complete withdrawal of non-bank participants from the call/notice money market should be co-terminus with full fledged operationalisation of the Clearing Corporation, and during the intermediate period, their operations should be phased out in such a manner that their migration to repo/reverse repo market becomes smooth and there is no disruption in the call money market.

Following the recommendations of the Reserve Banks Internal Working Group (1997) and the Narasimhan Committee (1998), steps were taken to reform the call money market by transforming it into a pure inter bank market in a phased manner.The non-banks exit was implemented in four stages beginning May 2001 whereby limits on lending by non-banks were progressively reduced along with the operationalisation of negotiated dealing system (NDS) and CCIL until their complete withdrawal in August 2005. In order to create avenues for deployment of funds by non-banks following their phased exit from the call money market, several new instruments were created such as market repos and CBLO.

Despite these reforms, however the behaviour of banks in the call market has not been uniform. There are still some banks such as foreign and new private sector banks which are chronic borrowers and public sector banks, which are the lenders. Notwithstanding excessive dependence of some banks on the call money market the short term money markets are characterized by high degree of stability. The RBI has instituted a series of prudential measures and placed limits on borrowing and lending of bank and PDs in the call/notice market to minimize development of various market segments. In order to improve transparency and strengthen efficiency in the money market, it was made mandatory for all NDS members to report all their call/notice money market transactions through NDS within 15 minutes of conclusion of the transaction. The RBI and the market participants have access to this information on a faster frequency and in a more classified manner, which has improved the transparency and the price discovery process. Further, a screen based negotiated quote-driven system for all dealings in the call/notice and the term money market (NDS-CALL) developed by CCIL and operationalised on September 18, 2006 facilitated transparency and better price discovery in these segments.

Various reform measures have imparted stability to the call money market. With the transformation of the call money market into a pure inter-bank market, the turnover in the call/notice money market has declined significantly. The activity has migrated to other overnight collateralized market segments such as market repo and CBLO.

The participants in the call markets increased in the 1990s, with a gradual opening up of the call markets to non-bank entities. Initially DFHI was the only PD eligible to participate in the call market, with other PDs having to route their transactions through DFHI, and subsequently STCI. In 1996, PDs apart from DFHI and STCI were allowed to lend and borrow directly in the call markets. Presently there are 18 primary dealers participating in the call markets. Then

from 1991 onwards, corporates were allowed to lend in the call markets, initially through the DFHI, and later through any of the PDs. In order to be able to lend, corporates had to provide proof of bulk lendable resources to the RBI and were not suppose to have any outstanding borrowings with the banking system. The minimum amount corporates had to lend was reduced from Rs. 20 crore, in a phased manner to Rs. 3 crore in 1998. There were 50 corporates eligible to lend in the call markets, through the primary dealers. The corporates which were allowed to route their transactions through PDs, were phased out by end June 2001.

Table 6.1: Number of Participants in Call/Notice Money Market

Category	Bank	PD	FI	MF	Corporate	Total
I. Borrower	154	19	-	-	-	173
II. Lender	154	19	20	35	50	277

Source: Report of the Technical Group on Phasing Out of Non-Banks from Call/Notice Money, March 2001.

UTI and LIC were permitted to lend in the call markets since 1971. Subsequently, 20 other financial institutions were permitted to lend. Initially public sector mutual funds could lend in the call markets. Since 1997, all SEBI registered mutual funds were eligible to lend. There were 277 participants in the call markets, with 105 participants, namely mutual funds, corporates and financial institutions, operating only on the lending side.

Banks and PDs technically can operate on both sides of the call market, though in reality, only the PDs borrow and lend in the call markets. The bank participants are divided into two categories: banks which are pre-dominantly lenders (mostly the public sector banks) and banks which are pre-dominantly borrowers (foreign and private sector banks).

Currently, the participants in the call/notice money market currently include banks (excluding RRBs) and Primary Dealers (PDs) both as borrowers and lenders.

6.3 CALL RATES

The concentration in the borrowing and lending side of the call markets impacts liquidity in the call markets. The presence or absence of important players is a significant influence on quantity as well as price. This leads to a lack of depth and high levels of volatility in call rates, when the participant structure on the lending or borrowing side alters.

Short-term liquidity conditions impact the call rates the most. On the supply side the call rates are influenced by factors such as: deposit mobilisation of banks, capital flows, and banks reserve requirements; and on the demand side, call rates are influenced by tax outflows, government borrowing programme, seasonal fluctuations in credit off take. The external situation and the behavior of exchange rates also have an influence on call rates, as most players in this market run integrated treasuries that hold short term positions in both rupee and forex markets, deploying and borrowing funds through call markets.

During normal times, call rates hover in a range between the repo rate and the reverse repo rate. The repo rate represents an avenue for parking short-term funds, and during periods of easy liquidity, call rates are only slightly above the repo rates. During periods of tight liquidity, call rates move towards the reverse repo rate. Table 6.2 provides data on the behavior of call rates. Figure 6.2 displays the trend of average monthly call rates.

Table 6.2: Weighted Avg. Call Money Rates

Year	Max (% p.a.)	Min (% p.a	Avg (% p.a.)
2001-02	22.00	3.61	7.16
2002-03	20.00	0.5	5.89
2003-04	12.00	1.00	4.62
2004-05	10.95	0.60	4.65
2005-06	8.25	0.60	5.60
2006-07	80.00	1.90	7.22
2007-08	55.00	0.01	6.07
2008-09	23.00	1.00	7.06
2009-10	9.00	0.50	3.24
2010-11	12.00	0.25	5.75
2011-12	15.00	0.70	8.22
2012-13	18.00	5.00	8.09

Source: Handbook of Statistics on Indian Economy 2012-13, BRI

The behavior of call rates has historically been influenced by liquidity conditions in the market. Call rates touched a peak of about 35% in May 1992, reflecting tight liquidity on account of high levels of statutory preemptions and withdrawal of all refinance facilities, barring export credit refinance. Call rates again came under pressure in November 1995 when the rates were 35% par

Figure 6.2: Monthly Average Call Rates (%)
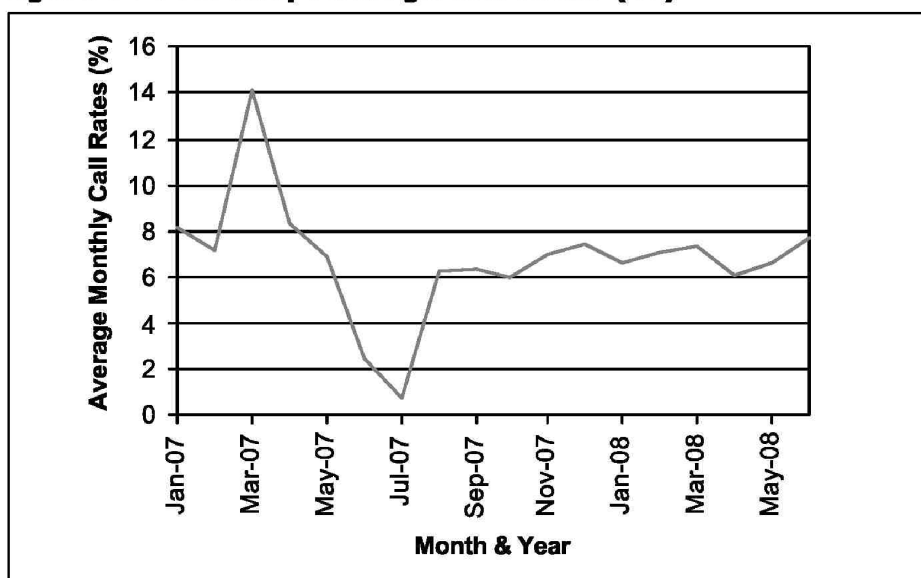
Model Questions

1. **Which of the following participants in the call markets are allowed to lend as well as borrow?**

    a. Mutual Funds

    b. Banks and Primary Dealers

    c. Corporates

    d. Financial Institutions

Answer: b

2. **The non-bank entities are allowed to participate in the call money market ?Is the statement true or false?**

    a. True

    b. False

Answer: b

3. **What are the features of NDS–Call System?**

    a. Electronic Dealing Platform

    b. Direct one to one negotiation

    c. Online Exposure Monitoring

    d. All of the Above

Answer: d

CHAPTER 7: CORPORATE DEBT: BONDS

7.1   MARKET SEGMENTS

The corporate bond market has been in existence in India for a long time. However, despite a long history, the size of the public issue segment of the corporate bond market in India has remained quite insignificant. The lack of market infrastructure and comprehensive regulatory framework coupled with low issuance leading to low liquidity in the secondary market, narrow investor base, inadequate credit assessment skills, high cost of issuance, lack of transparency in trades and underdevelopment of securitization of products are some of the major factors that hindered the growth of the private corporate debt market.

The market for long term corporate debt has two large segments:

i.   Bonds issued by public sector units, including public financial institutions, and

ii.   Bonds issued by the private corporate sector

In January 2007, Government discussed the relevant issues of market design of corporate bonds and decided as under:

i.   The market design for the secondary market of corporate debt market OTC as well as exchange based transactions need to be reported to reporting platforms(s);

ii.   All the eligible and willing national stock exchanges need to be allowed to set up and maintain reporting platforms if they approach SEBI for the same. SEBI needs to coordinate among such reporting platforms and assign the job of coordination to a third agency;

iii.   The trades executed on or reported to an Exchange need not be reported to a reporting platform;

iv.   The participants must have a choice of platform. They may trade on OTC or any exchange trading platform;

v.   Existing exchanges could be used for trading of corporate debts. NSE and BSE could provide trading platforms for this purpose. There is no need to create a separate infrastructure;

vi.   There would be no separate trading platforms for different kinds of investors. Institutional and retail investors would trade on the same platform;

vii.   Only brokers would have access to trading platform of an Exchange. Banks would have the option of becoming a broker or trading through a broker. RBI, may if considered necessary restrict a bank to trade only on proprietary account as a broker.

In order to facilitate development of a vibrant primary market for corporate bonds in India, Securities and Exchange Board of India (SEBI) has notified Regulations for Issue and Listing of Debt Securities to provide for simplified regulatory framework for issuance and listing of non-convertible debt securities (excluding bonds issued by Governments) issued by any company, public sector undertaking or statutory corporations. These regulations apply to public issue of debt securities and listing of debt securities issued through public issue or on private placement basis on a recognized stock exchange. The Regulations will not apply to issue and listing of, securitized debt instruments and security receipts for which separate regulatory regime is in place.

The Regulations provide for rationalized disclosure requirements for public issues and flexibility to issuers to structure their instruments and decide on the mode of offering, without diluting the areas of regulatory concern. In case of public issues, while the disclosures specified under Schedule II of the Companies Act, 1956 shall be made, the Regulations require additional disclosures about the issuer and the instrument such as nature of instruments, rating rationale, face value, issue size, etc.

While the requirement of filing of draft offer documents with SEBI for observations has been done away with, emphasis has been placed on due diligence, adequate disclosures, and credit rating as the cornerstones of transparency. Regulations prescribe certifications to be filed by merchant bankers in this regard. The Regulations emphasize on the role and obligations of the debenture trustees, execution of trust deed, creation of security and creation of debenture redemption reserve in terms of the Companies Act.

The Regulations enable electronic disclosures. The draft offer document needs to be filed with the designated stock exchange through a SEBI registered merchant banker who shall be responsible for due diligence exercise in the issue process and the draft offer document shall be placed on the websites of the stock exchanges for a period of seven working days inviting comments. The documents shall be downloadable in PDF or HTML formats. The requirements for advertisements have also been simplified.

While listing of securities issued to the public is mandatory, the issuers may also list their debt securities issued on private placement basis subject to compliance of simplified regulatory requirements as provided in the Regulations. The Regulations provide an enabling framework for listing of debt securities issued on a private placement basis, even in cases where the equity of the issuer is not listed. NBFCs and PFIs are exempted from mandatory listing. However, they may list their privately placed debt securities subject to compliance with the simplified requirements and Listing Agreement. A rationalized listing agreement for debt securities is under preparation.

7.2 SEBI (ISSUE AND LISTING OF DEBT SECURITIES) REGULATIONS, 2008

Issue Requirements for Public Issues

General Conditions

1. No issuer should make any public issue of debt securities if as on the date of filing of draft offer document and final offer document as provided in these regulations, the issuer or the person in control of the issuer, or its promoter, has been restrained or prohibited or debarred by the Board from accessing the securities market or dealing in securities and such direction or order is in force.

2. The following conditions have to be satisfied by an issuer for making any public issue of debt securities as on the date of filing of draft offer document and final offer document.

   i. If the issuer has made an application to more than one recognized stock exchange, the issuer is required to choose one of them as the designated stock exchange. Further, where any of such stock exchanges have nationwide trading terminals, the issuer should choose one of them as designated stock exchange. For any subsequent public issue, the issuer may choose a different stock exchange subject to the requirements of this regulation.

   ii. The issuer has to obtain in-principle approval for listing of its debt securities on the recognized stock exchanges where the application for listing has been made.

   iii. Credit rating has be obtained from at least one credit rating agency registered with SEBI and is disclosed in the offer document. If the credit ratings have been obtained from more than one credit rating agency, then all ratings including the unaccepted ratings have to be disclosed in the offer document.

   iv. It has to enter into an arrangement with a depository registered with SEBI for dematerialization of debt securities that are proposed to be issued to the public in accordance with the Depositories Act 1996 and regulations made thereunder.

3. The issuer should appoint one or more merchant bankers registered with SEBI at least one of whom should be a lead merchant banker.

4. The issuer should appoint one or more debenture trustees in accordance with the provisions of section 117 B of the Companies Act, 1956 and SEBI (Debenture Trustee) Regulations, 1993.

5. The issuer should not issue debt securities for providing loan to or acquisition of shares of any person who is part of the same group or who is under the same management.

Filing of Draft Offer Document

No issuer should make a public issue of debt securities unless a draft of offer document has been filed with the designated stock exchange through the lead merchant banker. The draft offer document filed with the stock exchange has to be made public by posting the same on the website of designated stock exchange for seeking public comments for a period of seven working days from the date of filing the draft offer document with such exchange. The draft offer document may also be displayed on the website of the issuer, merchant bankers. The lead merchant bankers should ensure that the draft offer document clearly specifies the names and contact particulars of the compliance officer of the lead merchant banker and the issuer including the postal and email address, telephone and fax numbers. The lead merchant banker should also ensure that all comments received on the draft offer document are suitably addressed prior to the filing of the offer document with the Registrar of Companies. A copy of the draft and final offer document should be forwarded to SEBI for its records, simultaneously with filing of these documents with the designated stock exchanges. The lead merchant bankers should prior to filing of the offer document with the Registrar of Companies, furnish to SEBI a due diligence certificate as per the format provided in Schedule II of SEBI (Issue and Listing of Debt Securities) Regulations, 2008.

Electronic Issuance

An issuer proposing to issue debt securities to the public through the on-line system of the designated stock exchange should comply with the relevant applicable requirements as may be specified by SEBI.

Price Discovery through Book Building

The issuer may determine the price of debt securities in consultation with the lead merchant banker and the issue may be at fixed price or the price may be determined through the book building process in accordance with the procedure as may be specified by SEBI.

Minimum Subscription

The issuer may decide the amount of minimum subscription which it seeks to raise by issue of debt securities and disclose the same in the offer document. In the event of non-receipt of minimum subscription all application moneys received in the public issue shall be refunded forthwith to the applicants.

Listing Of Debt Securities

An issuer desirous of making an offer of debt securities to the public has to make an application for listing to one or more recognized stock exchanges in terms of sub-section (1) of section 73 of the Companies Act, 1956 (1 of 1956). The issuer has to comply with the conditions of listing of such debt securities as specified in the Listing Agreement with the Stock exchanges where such debt securities are sought to be listed.

Conditions for listing of debt securities issued on private placement basis:

i.   An issuer may list its debt securities issued on private placement basis on a recognized stock exchange subject to the following conditions:

ii.   The issuer has issued such debt securities in compliance with the provisions of the Companies Act, 1956 rules prescribed thereunder and other applicable laws.

iii.   Credit rating has been obtained in respect of such debt securities from at least one credit rating agency registered with SEBI.

iv.   The debt securities proposed to be listed are in dematerialised form.

v.   The disclosures as prescribed under Regulation 21 of the Issue and Listing of Debt Securities Regulations, 2008 have to be made.

Further, the issuer has to comply with the conditions of listing of such debt securities as specified in the Listing Agreement with the stock exchange where such debt securities are sought to be listed.

Conditions of Continuous Listing and Trading of Debt securities:

Continuous Listing Conditions

1)   All the issuers making public issues of debt securities or seeking listing of debt securities issued on private placement basis should comply with the conditions of listing specified in the respective agreement for debt securities.

2)   Every rating obtained by an issuer should be periodically reviewed by the registered credit rating agency and any revision in the rating shall be promptly disclosed by the issuer to the stock exchange where the debt securities are listed.

3)   Any change in rating should be promptly disseminated to investors and prospective investor in such manner as the stock exchange where such securities are listed may determine from time to time.

4)   The issuer, the respective debenture trustees and stock exchanges should disseminate all information and reports on debt securities including compliance reports filed by the issuers and the debenture trustees regarding the debt securities to the investors and the general public by placing them on their websites.

5)   Debenture trustee should disclose the information to the investors and the general public by issuing a press release in any of the following events :(a) default by issuer to pay interest on debt securities or redemption amount; (b) failure to create a charge on the assets; revision of rating assigned to the debt securities.

Trading of debt securities

1)   The debt securities issued to the public or on a private placement basis, which are listed in recognized stock exchanges, shall be traded and such trades shall be cleared and settled in recognized stock exchanges subject to conditions specified by SEBI.

2) In case of trades of debt securities which have been made over the counter, such trades shall be reported on a recognized stock exchange having a nation wide trading terminal or such other platform as may be specified by the Board.

3) SEBI may specify conditions for reporting of trades on the recognized stock exchange or other platform.

Secondary Market for Corporate Debt Securities

Companies have been issuing debt securities on private placement basis from time to time. In order to provide greater transparency to such issuances and protect the interest of investors.

7.3 LISTING CRITERIA ON NSE - WDM

The security proposed for listing on the WDM segment of NSE should comply with the requirements as indicated hereunder:

Issuer	Eligibility Criteria for listing
	Public Issue /Private Placement
Corporates (Public limited companies and Private limited companies)	• Paid-up capital of Rs.10 crores; or • Market capitalisation of Rs.25 crores • (In case of unlisted companies Networth more than Rs.25 crores) • Credit rating
Public Sector Undertaking, Statutory Corporation established/ constituted under Special Act of Parliament / State Legislature, Local bodies/ authorities,	• Credit rating
Mutual Funds: Units of any SEBI registered Mutual Fund/scheme : • Investment objective to invest predominantly in debt or • Scheme is traded in secondary market as debt instrument	• Qualifies for listing under SEBI's Regulations

Infrastructure companies Tax exemption and recognition as infrastructure company under related statutes/regulations	• Qualifies for listing under the respective Acts, Rules or Regulations under which the securities are issued. • Credit rating	
Financial Institutions u/s. 4A of Companies Act, 1956 including Industrial Development Corporations	Public Issue	Private Placement
	Qualifies for listing under the respective Acts, Rules or Regulations under which the securities are issued.	Credit rating
Banks	• Scheduled banks • Networth of Rs.50 crores or above • Qualifies for listing under the respective Acts, Rules or Regulations under which the securities are issued.	• Scheduled Banks • Networth of Rs.50 crores or above • Credit rating

An Issuer shall ensure compliance with SEBI circulars/guidelines and any other law, guidelines/ directions of Central Government, other Statutory or local authority issued on regulating the listing of debt instruments from time to time.

7.4 SECONDARY MARKET FOR CORPORATE DEBT SECURITIES

SEBI had issued a circular No.SEBI/MRD/SE/AT/36/2003/30/09 dated September 30, 2003 stipulating the conditions to be complied in respect of private placement of debt securities. These conditions governed three aspects, viz., and issuance, listing and trading of privately placed debt securities.

In order to provide greater transparency to such issuances and to protect the interest of investors in such securities, it has been decided that any listed company making issue of debt securities on a private placement basis and listed on a stock exchange shall be required to comply with the following:

1.1   The company shall make full disclosures (initial and continuing) in the manner prescribed in Schedule II of the Companies Act, 1956, SEBI (Disclosure and Investor Protection) Guidelines, 2000 and the Listing Agreement with the exchanges. However, if the privately placed debt securities are in standard denomination of Rs.10 Lakh, such disclosures may be made only through web sites of the stock exchange where the debt securities are sought to be listed.

1.2   The debt securities shall carry a credit rating of not less than investment grade from a Credit Rating Agency registered with the Board.

1.3   The company shall appoint a debenture trustee registered with SEBI in respect of the issue of the debt securities.

1.4   The debt securities shall be issued and traded h demat form.

1.5   The company shall sign a separate listing agreement with the exchange in respect of debt securities and comply with the conditions of listing.

1.6   All trades with the exception of spot transactions, in a listed debt security, shall be executed only on the trading platform of a stock exchange.

1.7   The trading in privately placed debts shall only take place between Qualified Institutional Investors (QIBs) and High Networth Individuals (HNIs), in standard denomination of Rs.10 lakh.

1.8   The requirement of Rule 19(2)(b) of the Securities Contract (Regulation) Rules, 1957 will not be applicable to listing of privately placed debt securities on exchanges, provided all the above requirements are complied with.

1.9   If the intermediaries registered with SEBI associate themselves with the issuance of private placement of unlisted debt securities, they will be held accountable for such issues. They will also be required to furnish periodical reports to SEBI in such format as may be decided by SEBI. (SEBI also provides clarification regarding above circular vide its circular no SEBI/MRD/SE/AT/46/2003 dated December 22, 2003 attached as Appendix-1)

Further SEBI vide its circular no. SEBI/CFD/DIL/CIR-39/2004/11/01 dated November 01, 2004 provides Model Listing Agreement for Listing Debt Securities. As per above circular, listing of all debt securities irrespective of the mode of issuance i.e. whether issued on private placement basis or through public/rights issue, shall be done through a separate Listing Agreement.

The main features of the Model Listing Agreement are as under:

•   The Agreement may be used for listing of all debt securities issued by an issuer irrespective of mode of issuance. The debt securities have been referred as "debentures" in the agreement and includes debentures as defined in Section 2(12) of the Companies Act, 1956 and any other debt instruments, which are proposed to be listed on recognized Stock Exchange. Issuer means any person making an issue of debentures which are proposed to be listed excluding Supra National Organizations like Asian Development Bank, World Bank etc.

•   The Model Agreement has three parts. Part (I) contains clauses which shall be complied by all issuers irrespective of mode of issuance, Part (II) contains clauses which shall be complied with only if the debentures are issued either through public or rights issue and part (III) contains clauses which are required to be complied with only if the debentures are issued on private placement basis.

- In case of issuers whose equity shares are listed and which have already entered into a Listing Agreement for its equity shares, clauses of Equity Listing Agreement shall have an overriding effect over the Debenture Listing Agreement, in case of inconsistency, if any.

In the recent period, several measures have been taken to develop the debt market. The corporate bond reporting and trading platform have been operationalized at BSE, NSE and FIMMDA. SEBI has rationalized the provisions of continuous disclosures made by issuers who have listed their debt securities. It also implemented measures to streamline the activity in corporate bonds in line with Government securities, reduced tradable lots in corporate bonds in respect of all entities including Qualified Institutional investors to Rs.1 lakh and standardized the day count convention. In order to enhance the safety of investors, SEBI made it mandatory that the companies issuing debentures and the respective debenture trustees/stock exchanges shall disseminate all information through respective websites and press releases. Several other reforms such as simplification of the debt issuance process and rationalization of stamp duty are also under consideration.

In July 2008, the first meeting of the newly set up Corporate Bond and Securitization Advisory Committee (CoBoSAC) was convened under the Chairmanship of Dr. RH Patil. The Committee deliberated on streamlining mechanisms for reporting, clearing and settlement and on developments in the Corporate Bond Market to date. The Committee, after deliberation recommended implementation of mandatory DvP-III clearing and settlement on exchanges with RTGS. In the meantime, it was recommended to set up a sub-group that would look into issues related to trade reporting.

7.5 CREDIT RATING

Credit rating is primarily intended to systematically measure credit risk arising from transactions between lender and borrower. Credit risk is the risk of a financial loss arising from the inability (known in credit parlance as default) of the borrower to meet the financial obligations towards its creditor. The ability of a borrower to meet its obligations fluctuates according to the behavior of risk factors, both internal and external, that impact the performance of a business enterprise. Therefore, most lenders have to incur costs of analyzing these factors before a lending decision is made, and also create monitoring mechanisms that enable such evaluation when the borrowers' obligations are outstanding. If such specialist assessment of credit quality is done by an independent agency, it would be possible for the lender to not incur the costs, but rely on the assessment of such agency. We then have a system where, the borrower seeks the opinion of the specialized agency, pays the costs of these services, and then provides the assessment to the lender, for seeking funds.

Credit rating is one of the many ways of standardising the credit quality of borrowers, through a formal examination of risk factors, which enables classification of credit risk into defined categories. Such categorization standardises credit risk, in ways that enable measurement

and management of credit risk. Credit rating thus enables pricing of debt products, and their valuation in a balance sheet, over the period they are outstanding.

Credit rating is a well established enterprise in most economies, including India, where specialized agencies have evolved to create extensive methods of analysis of information, and provide ratings to borrowers. The acceptance of these ratings by lenders crucially hinges on the independence of the rating agency, and the expertise it brings to bear on the process of credit rating. In the recent years, the emphasis on internal credit risk evaluation systems has grown. While European and Japanese lending institutions have always emphasized an internal rating system, over external ratings, in countries outside these regions too, there is a parallel internal rating system being created in the recent years. While credit evaluation and monitoring have been traditionally in the banking domain, the formal conversion of these into rating systems is new. The impetus has been the supervisory risk assessment and early warning systems, now required by the BIS, which emphasizes the need for structured risk assessment systems.

In India, it is mandatory for credit rating agencies to register themselves with SEBI and abide by the SEBI (Credit Rating) Regulations, 1999. There are 5 SEBI registered credit rating agencies in India, namely, CRISIL, ICRA, CARE etc, which provide a rating on various categories of debt instruments.

Credit rating agencies assess the credit quality of debt issuers, on the basis of a number of quantitative and qualitative factors, employing specialized analysts, who focus on industry categories in which they have specialized knowledge. Apart from information provided by the borrower, these analysts independently collect and assess information, about the industry and company variables, and performance of peer group companies, and collate such data. Most rating agencies follow a committee approach, where a rating committee examines the information on the company, and judges the rating that should be assigned to the instrument on offer. Rating essentially involves the translation of information variables into a ranking, which places the company in a slot that describes the ability and willingness of the company to service the instrument proposed to be issued.

7.6   RATING SYMBOLS

The ranking of credit quality is usually done with the help of rating symbols, which broadly classify instruments into investment grade, and speculative grade. An illustrative rating list is provided below (representing CRISIL's rating symbols):

CRISIL assigns ratings to only rupee denominated debt instruments. CRISIL's rating is assigned to the issue or instrument alone and not to the issuer. Instruments which have the same rating are of similar but not identical investment quality. This is because the number of rating categories is limited and hence cannot reflect small differences in the degree of risks. CRISIL's credit ratings fall under three categories: long term, short term and fixed deposit

ratings. Long term ratings categories range from AAA to D; CRISIL may apply '+' or -' signs as suffixes for ratings from 'AA' to 'C to reflect comparative standings within the category. In the case of preference shares, the letters "pf" are prefixed to the debenture rating symbols. The fixed deposit rating symbols commence with "F" and the short-term instruments categories range from P1 to P5; CRISIL may apply '+' or -' sign for ratting from P1 to P3. Use the letter "P" from the concept of 'prime'.

High Investment Grades

AAA - (Triple A) Highest Safety

Debentures rated 'AAA' are judged to offer highest safety of timely payment of interest and principal. Though the circumstances providing this degree of safety are likely to change, such changes as can be envisaged are most unlikely to affect adversely the fundamentally strong position of such issues.

AA - (Double A) High Safety

Debentures rated 'AA' are judged to offer high safety of timely payment of interest and principal. They differ in safety from 'AAA' issues only marginally.

Investment Grades

A - Adequate Safety

Debentures rated 'A' are judged to offer adequate safety of timely payment of interest and principal. However, changes in circumstances can adversely affect such issues more than those in the higher rated categories.

BBB (Triple B) Moderate Safety

Debentures rated 'BBB' are judged to offer moderate safety of timely payment of interest and principal for the present; however, changing circumstances are more likely to lead to a weakened capacity to pay interest and repay principal than for debentures in higher rated categories.

Speculative Grades

BB (Double B) Inadequate Safety

Debentures rated 'BB' are judged to carry inadequate safety and principal, while they are less susceptible to default than other speculative grade debentures in the immediate future; the uncertainties that the issuer faces could lead to inadequate capacity to make timely interest and principal payments.

B - High Risk

Debentures rated 'B' are judged to have greater susceptibility to default; while currently interest and principal payments are met, adverse business of economic conditions would lead to lack of ability or willingness to pay, interest or principal.

C - **Substantial Risk**

Debentures rated 'C are judged to have factors present that make them vulnerable to default; timely payment of interest and principal is possible only if favorable circumstances continue.

D - **Default**

Debentures rated 'D' are in default and in arrears of interest or principal payments or are expected to default on maturity. Such debentures are extremely speculative and return from these debentures may be realized only on reorganization or liquidation.

Rating agencies may apply '+' (plus) or '—' (minus) signs for ratings from AA to C to reflect comparative standing within the categories.

Model Questions

1. **Which of the following statements is true about the offer document?**

   a. An offer document has to be filed with SEBI for all debenture issues, whether public or privately placed.

   b. Offer document has to be filed for all public issues only.

   c. An offer document need not be filed if the debentures are issued for maturities below 18 months.

   d. In the case of private placement, an abridged offer document is to be filed with SEBI.

Answer: b

2. **Which of the following statements is false regarding credit rating of corporate debentures?**

   a. All public issues of debentures should be compulsorily credit rated.

   b. Ratings have to be sought from agencies registered with SEBI.

   c. Debentures with maturity less than 18 months need not be rated.

   d. Mutual funds are not permitted to subscribe to unrated corporate paper.

Answer: c

3. **Which of the following statement is false regarding the SEBI "Issue and Listing of Debt Securities Regulation, 2008'?**

   a. Provides for issuance and listing of non-convertible debt securities (excluding bonds issued by Governments) issued by and company, PSU or statutory corporations.

   b. These regulations apply to public issue of debt securities and listing of debt securities and listing of debt securities through public issue or on private placement basis on a recognized stock exchange.

   c. These regulations apply to issue and listing of securitized debt instruments and security receipts for which separate regulatory regime is in place.

   d. The Regulations provide for rationalized disclosure requirements.

Answer: c

Appendix I

Sub: Secondary Market for Corporate Debt Securities- Clarifications

1. SEBI had issued a circular No.SEBI/MRD/SE/AT/36/2003/30/09 dated September 30, 2003 stipulating the conditions to be complied in respect of private placement of debt securities. These conditions governed three aspects, viz., and issuance, listing and trading of privately placed debt securities.

2. The said circular was issued by SEBI after a consultative paper on the subject was placed on the web site of SEBI for public comments. Subsequent to the issuance of the circular, market participants have made representations and suggestions and sought clarifications on the various provisions of the circular from SEBI. A series of meetings were also held with them. Meanwhile, SEBI has vide press release dated November 25, 2003 granted a transition period up to March 31, 2004 to those issuer companies who had issued privately placed debt securities but did not list those securities prior to September 30, 2003 (the date of the circular) to enable them to comply with the provisions of the circular.

3. The clarifications sought and representations covered the following aspects:

   Applicability of the circular to

   i. Type of issue r companies

   ii. Prospective and existing issues

   iii. Tenor of the debt instruments

   Extent of disclosures and applicability of DIP Guidelines

   3.3 Association of SEBI registered intermediaries, including merchant bankers

   3.4 Vetting of Offer document

   3.5 Whether the requirement of 1% deposit with the stock exchange/s is mandatory

   3.6 Applicability of minimum subscription clause as per DIP guidelines

   3.7 Credit rating

   3.8 Listing through a separate listing agreement

   3.9 Denomination for issuance and market lot for trading

   3.10 Trading of securities on the stock exchanges.

4. The clarifications to the above are as follows:

4.1 Applicability of the circular

   i. Type of Issuer companies

      a) The SEBI circular dated September 30, 2003 would be applicable to all listed companies which have any of their securities, either equity or debt, offered through an offer document, i.e., through a public issue and listed on

a recognized stock exchange and also includes Public Sector Undertakings whose securities are listed on a recognized stock exchange.

b) Further, unlisted companies/statutory corporations/other entities, if they so desire, may get their privately placed debt securities listed in the stock exchanges, by complying with the relevant provisions of the said circular.

ii. Prospective and existing issues

a) The SEBI circular is applicable to all debt securities that have been and would be issued on a private placement basis on or after the date of the circular, i.e., September 30, 2003.

b) The circular would also apply to those issuer companies whose outstanding debt securities were issued prior to September 30, 2003. However, such issuer companies are required to comply with the provisions of the circular before March 31, 2004 for which transition time was provided vide press release dated November 25, 2003.

c) If, however, the issuer companies do not comply with the aforesaid conditions for listing of such securities before March 31, 2004, then such securities would remain unlisted and, would, therefore, not be permitted for trading in the Stock Exchange trading platform from April 01, 2004.

iii. Tenor of the debt instruments: The SEBI circular would not be applicable for private placement of debt securities having a maturity of less than 365 days.

4.2 Extent of disclosures and applicability of DIP Guidelines

a) As already stipulated in the circular dated September 30, 2003 the issuer companies shall make full disclosures (initial and continuing) in the manner prescribed in schedule II of the Companies Act, 1956, Chapter VI of the SEBI (DIP) Guidelines, 2000 and the listing agreement with the stock exchanges.

b) Such disclosures may be made through the web site of the stock exchanges where the debt securities are sought to be listed if the privately placed debt securities are issued in the standard denomination of Rs. 10 lakh.

c) The issuer companies which make frequent private placements of debt securities would be permitted to file an umbrella offer document on the lines of a "Shelf prospectus" as applicable for a public issue.

d) As regards financial disclosures, issuer companies which are not in a position, for genuine reasons, to disclose audited accounts upto a date not earlier than six months of the date of the offer document, in terms of provisions of Clause 6.18 of SEBI (DIP) Guidelines, 2000 may disclose the audited accounts for the last financial year and unaudited accounts for the subsequent quarters with a limited review by a practicing Chartered Accountant.

e) It is also being clarified that the provisions other than Chapter VI of SEBI (DIP) Guidelines, 2000 will not be applicable for privately placed debt securities.

4.3   Association of SEBI registered intermediaries, including merchant bankers

a) The appointment of intermediaries (other than debenture trustee) for private placement of debt securities is not mandatory.

b) Since engaging the services of an intermediary (other than debenture trustee) is not mandatory, the appointment of such an intermediary would be left to the discretion of the issuer company, as it deems fit.

c) There is no prohibition on SEBI registered intermediaries to be associated with the privately placed unlisted debt securities. However, such intermediaries would be accountable for their activities. Further, they would be required to furnish periodical reports to SEBI in such format as specified by SEBI from time to time.

4.4   Vetting of offer document

There is no requirement of vetting of the offer document by SEBI.

4.5   Whether the requirement of 1% deposit with the stock exchange(s) is mandatory

There is no requirement to deposit 1% of the issue size of the privately placed debt securities with the stock exchanges.

4.6   Applicability of minimum subscription clause as per DIP guidelines

This clause will not be applicable for privately placed debt securities.

4.7   Credit rating

The debt securities shall carry a credit rating from a Credit Rating Agency registered with SEBI.

4.8   Listing through a separate listing agreement

The separate Listing Agreement for listing the privately placed debt securities is being finalized. Till such time, the issuance process would be allowed and the securities may be listed on the basis of disclosures subject to the issuer company furnishing an undertaking to the Stock Exchanges stating, inter-alia, that the issuer company shall sign the Listing Agreement as soon as the same comes into force.

4.9   Denomination for issuance and market lot for trading

a) The privately placed debt securities need not necessarily be issued in denomination of Rs. 10 lakh.

b) The securities shall be issued in demat form.

c) However, if an investor is allotted securities of Rs.1 lakh or less, such securities may be issued in physical form at the option of the investor. It shall be disclosed by the issuer companies that such investors would not be able to trade in such securities through the stock exchange mechanism.

4.10 Trading of securities on the stock exchanges

a) The trading in the privately placed debt securities would be permitted in standard denomination of Rs. 10 lakhs in the anonymous, order driven system of the stock exchanges in a separate trading segment. The marketable lot would be Rs. 10 lakh.

b) All class of investors would be permitted to trade subject to the said standard denomination/marketable lot.

c) The trades executed on spot basis shall be required to be reported to the stock exchange/s.

5. The stock exchanges are directed to:

a) Make necessary amendments to the listing agreement, bye- laws, rules and regulations for the implementation of the above decision immediately, as may be applicable and necessary.

b) Bring the provisions of this circular to the notice of the listed companies/member brokers/clearing members of the Exchange and also to disseminate the same on the website for easy access to the investors; and

c) Communicate to SEBI, the status of the implementation of the provisions of this circular in Section II, item no. 13 of the Monthly Development Report for the month of January, 2004.

6. This circular is being issued in exercise of powers conferred by section 11 (1) of the Securities and Exchange Board of India Act, 1992, to protect the interests of investors in securities and to promote the development of, and to regulate the securities market.

CHAPTER 8: COMMERCIAL PAPER & CERTIFICATE OF DEPOSITS

Commercial paper (CP) is a short-term instrument, introduced in 1990, to enable non-banking companies to borrow short-term funds through liquid money market instruments. CPs were intended to be part of the working capital finance for corporates, and were therefore part of the working capital limits as set by the maximum permissible bank finance (MPBF). CP issues are regulated by RBI Guidelines issued from time to time stipulating term, eligibility, limits and amount and method of issuance. It is mandatory for CPs to be credit rated.

8.1 GUIDELINES FOR CP ISSUE

Guidelines for Issue of Commercial Paper (CP) as amended up to Jan 01, 2013

Introduction

Commercial Paper (CP) is an unsecured money market instrument issued in the form of a promissory note. CP, as a privately placed instrument, was introduced in India in 1990 with a view to enabling highly rated corporate borrowers to diversify their sources of short-term borrowings and to provide an additional instrument to investors Subsequently, primary dealers, satellite dealers[3] and all-India financial institutions were also permitted to issue CP to enable them to meet their short-term funding requirements for their operations. Guidelines for issue of CP are presently governed by various directives issued by the Reserve Bank of India, as amended from time to time.

Who can Issue Commercial Paper (CP)?

Corporates and primary dealers (PDs), and the all-India financial institutions (FIs) that have been permitted to raise short-term resources under the umbrella limit fixed by Reserve Bank of India are eligible to issue CP.

A corporate would be eligible to issue CP provided: (a) the tangible net worth of the company, as per the latest audited balance sheet, is not less than Rs. 4 crore; (b) company has been sanctioned working capital limit by bank/s or all-India financial institution/s; and (c) the borrowable account of the company is classified as a Standard Asset by the financing bank/s/ institution/s.

Rating Requirement

Eligible participants/issuers shall obtain credit rating for issuance of CP from any one of the SEBI registered CRAs. The minimum credit rating shall be 'A3' as per rating symbol and definition prescribed by SEBI. The issuers shall ensure at the time of issuance of the CP that the rating so obtained is current and has not fallen due for review.

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[3] The system of satellite dealers has since been discontinued with effect from June 1, 2002.

Maturity

CP can be issued for maturities between a minimum of 7 days and a maximum up to one year from the date of issue. The maturity date of the CP should not go beyond the date up to which the credit rating of the issuer is valid.

Denominations

CP can be issued in denominations of Rs.5 lakh or multiples thereof. Amount invested by a single investor should not be less than Rs.5 lakh (face value).

Limits and the Amount of Issue of CP

CP can be issued as a "stand alone" product. The aggregate amount of CP from an issuer shall be within the limit as approved by its Board of Directors or the quantum indicated by the Credit Rating Agency for the specified rating, whichever is lower. Banks and FIs will, however, have the flexibility to fix working capital limits duly taking into account the resource pattern of companies' financing including CPs.

An FI can issue CP within the overall umbrella limit fixed by the RBI i.e., issue of CP together with other instruments viz., term money borrowings, term deposits, certificates of deposit and inter-corporate deposits should not exceed 100 per cent of its net owned funds, as per the latest audited balance sheet.

The total amount of CP proposed to be issued should be raised within a period of two weeks from the date on which the issuer opens the issue for subscription. CP may be issued on a single date or in parts on different dates provided that in the latter case, each CP shall have the same maturity date. Every issue of CP, including renewal, should be treated as a fresh issue.

Who can Act as Issuing and Paying Agent (IPA)

Only a scheduled bank can act as an IPA for issuance of CP.

Investment in CP

CP may be issued to and held by individuals, banking companies, other corporate bodies registered or incorporated in India and unincorporated bodies, Non-Resident Indians (NRIs) and Foreign Institutional Investors (FIIs). However, investment by FIIs would be within the limits set for their investments by Securities and Exchange Board of India (SEBI).

Mode of Issuance

CP can be issued either in the form of a promissory note or in a dematerialized form through any of the depositories approved by and registered with SEBI.

CP will be issued at a discount to face value as may be determined by the issuer.

No issuer shall have the issue of CP underwritten or co-accepted.

Preference for Dematerialisation

While option is available to both issuers and subscribers to issue/hold CP in dematerialised or physical form, issuers and subscribers are encouraged to prefer exclusive reliance on dematerialised form of issue/holding. However, with effect from June 30, 2001, banks, FIs and PDs are directed to make fresh investments and hold CP only in dematerialised form.

Payment of CP

The initial investor in CP shall pay the discounted value of the CP by means of a crossed account payee cheque to the account of the issuer through IPA. On maturity of CP, when the CP is held in physical form, the holder of the CP shall present the instrument for payment to the issuer through the IPA. However, when the CP is held in demat form, the holder of the CP will have to get it redeemed through the depository and receive payment from the IPA.

Stand-by Facility

In view of CP being a 'stand alone' product, it would not be obligatory in any manner on the part of the banks and FIs to provide stand-by facility to the issuers of CP. Banks and FIs have, however, the flexibility to provide for a CP issue, credit enhancement by way of stand-by assistance/credit, backstop facility etc. based on their commercial judgment, subject to prudential norms as applicable and with specific approval of their Boards.

Non-bank entities including corporates may also provide unconditional and irrevocable guarantee for credit enhancement for CP issue provided:

i.   the issuer fulfils the eligibility criteria prescribed for issuance of CP;

ii.   the guarantor has a credit rating at least one notch higher than the issuer given by an approved credit rating agency; and

iii.   the offer document for CP properly discloses the net worth of the guarantor company, the names of the companies to which the guarantor has issued similar guarantees, the extent of the guarantees offered by the guarantor company, and the conditions under which the guarantee will be invoked.

Procedure for Issuance

Every issuer must appoint an IPA for issuance of CP. The issuer should disclose to the potential investors its financial position as per the standard market practice. After the exchange of deal confirmation between the investor and the issuer, issuing company shall issue physical certificates to the investor or arrange for crediting the CP to the investor's account with a depository. Investors shall be given a copy of IPA certificate to the effect that the issuer has a valid agreement with the IPA and documents are in order.

Role and Responsibilities

The role and responsibilities of issuer, issuing and paying agent (IPA) and credit rating agency (CRA) are set out below:

(a)   Issuer

With the simplification in the procedures for CP issuance, issuers would now have more flexibility. Issuers would, however, have to ensure that the guidelines and procedures laid down for CP issuance are strictly adhered to.

(b)   Issuing and Paying Agent (IPA)

i.   IPA would ensure that issuer has the minimum credit rating as stipulated by the RBI and amount mobilised through issuance of CP is within the quantum indicated by CRA for the specified rating or as approved by its Board of Directors, whichever is lower.

ii. IPA has to verify all the documents submitted by the issuer viz., copy of board resolution, signatures of authorised executants (when CP in physical form) and issue a certificate that documents are in order. It should also certify that it has a valid agreement with the issuer.

iii. Certified copies of original documents verified by the IPA should be held in the custody of IPA.

iv. Every CP issue should be reported to the Chief General Manager, Financial Market Department, Reserve Bank of India, Central Office, Fort, Mumbai.

v.   IPAs which are NDS member, should report the details of CP issue on NDS platform within two days from the date of completion of the issue.

vi. Further, all scheduled banks, acting as an IPA, will continue to report CP issuance details hitherto within three days from the date of completion of the issue, incorporating details as per Schedule II till NDS reporting stabilizes to the satisfaction of RBI.

(c)   Credit Rating Agency (CRA)

i.   Code of Conduct prescribed by the SEBI for CRAs for undertaking rating of capital market instruments shall be applicable to them (CRAs) for rating CP.

ii. Further, the credit rating agency would henceforth have the discretion to determine the validity period of the rating depending upon its perception about the strength of the issuer. Accordingly, CRA shall at the time of rating, clearly indicate the date when the rating is due for review.

iii. While the CRAs can decide the validity period of credit rating, they would have to closely monitor the rating assigned to issuer's vis-à-vis their track record at regular intervals and would be required to make their revision in the ratings public through their publications and website.

Documentation Procedure

Fixed Income Money Market and Derivatives Association of India (FIMMDA) may prescribe, in consultation with the RBI, for operational flexibility and smooth functioning of CP market,

any standardised procedure and documentation that are to be followed by the participants, in consonance with the international best practices.

Violation of these guidelines will attract penalties and may also include debarring of the entity from the CP market.

Defaults in CP market

In order to monitor defaults in redemption of CP, scheduled banks which act as IPAs, are advised to immediately report, on occurrence, full particulars of defaults in repayment of CPs to the Monetary Policy Department, Reserve Bank of India, Central Office, Fort, Mumbai, in the prescribed format.

Non-applicability of Certain Other Directions

Nothing contained in the Non-Banking Financial Companies Acceptance of Public Deposits (Reserve Bank) Directions, 1998 shall apply to any non- banking financial company (NBFC) insofar as it relates to acceptance of deposit by issuance of CP, in accordance with these Guidelines.

DEFINITIONS

In these guidelines, unless the context otherwise requires:

a)   "bank" or "banking company" means a banking company as defined in clause (c) of Section 5 of the Banking Regulation Act, 1949 (10 of 1949) or a "corresponding new bank", "State Bank of India" or "subsidiary bank" as defined in clause (da), clause (nc) and clause (nd) respectively thereof and includes a "co-operative bank" as defined in clause (cci) of Section 5 read with Section 56 of that Act.

b)   "Scheduled bank" means a bank included in the Second Schedule of the Reserve Bank of India Act, 1934.

c)   "All-India Financial Institutions (FIs)" mean those financial institutions which have been permitted specifically by the Reserve Bank of India to raise resources by way of Term Money, Term Deposits, Certificates of Deposit, Commercial Paper and Inter-Corporate Deposits, where applicable, within umbrella limit.

d)   "Primary Dealer" means a non-banking financial company which holds a valid letter of authorisation as a Primary Dealer issued by the Reserve Bank, in terms of the "Guidelines for Primary Dealers in Government Securities Market" dated March 29, 1995, as amended from time to time.

e)   "Corporate" or "company" means a company as defined in Section 45 I (aa) of the Reserve Bank of India Act, 1934 but does not include a company which is being wound up under any law for the time being in force.

f)   "Non-banking Company" means a company other than banking company.

g)   "Non-banking financial company" means a company as defined in Section 45 I (f) of the Reserve Bank of India Act, 1934.

h) "Working capital limit" means the aggregate limits, including those by way of purchase/ discount of bills sanctioned by one or more banks/FIs for meeting the working capital requirements.

i) "Tangible net worth" means the paid-up capital plus free reserves (including balances in the share premium account, capital and debentures redemption reserves and any other reserve not being created for repayment of any future liability or for depreciation in assets or for bad debts or reserve created by revaluation of assets) as per the latest audited balance sheet of the company, as reduced by the amount of accumulated balance of loss, balance of deferred revenue expenditure, as also other intangible assets.

j) Words and expressions used but not defined herein and defined in the Reserve Bank of India Act, 1934 (2 of 1934) shall have the same meaning as assigned to them in that Act.

8.2 RATING NOTCHES FOR CPS

Credit rating agencies rate CPs on 5-notch scale as follows:

P1: Indicates that the degree of safety regarding timely payment is strong

P2: Indicates that the degree of safety regarding timely payment is strong, however, the relative degree of safety is lower than that of PI.

P3: Indicates that the degree of safety regarding timely payment on the instrument adequate; however the instrument is more vulnerable to adverse effects of changing circumstances than an instrument rated in the two higher categories.

P4: Indicates that the degree of safety regarding timely payment on the instrument is minimal and it is likely to be adversely affected by short-term adversity or less favorable conditions.

P5: Indicates that the instrument is expected to be in default on maturity or is in default. These ratings can be further tuned with the addition of "+" and "-" symbols after the rating.

8.3 GROWTH IN THE CP MARKET

CP was introduced in India in January 1990, in pursuance of the Vaghul Committee's recommendations, in order to enable highly rated non-bank corporate borrowers to diversify their sources of short term borrowings and also provide an additional instrument to investors. CP could carry on an interest rate coupon but is generally sold at a discount. Since CP is freely transferable, banks, financial institutions, insurance companies and others are able to invest their short-term surplus funds in a highly liquid instrument at attractive rates of return.

The terms and conditions relating to issuing CPs such as eligibility, maturity periods and modes of issue have been gradually relaxed over the years by the Reserve Bank. The minimum tenor

has been brought down to seven days (by October 2004) in stages and the minimum size of individual issue as well as individual investment has also been reduced to Rs.5 lakh with a view to aligning it with other money market instruments. The limit of CP issuance was first carved out of the maximum permissible bank finance (MPBF) and subsequently only to its cash credit. A major reform to impart a measure of independence to the CP market took place when the "stand by' facility[4] of the restoration of the cash credit limit and guaranteeing funds to the issuer on maturity of the paper was withdrawn in October 1994. As the reduction in cash credit portion of the MPBF impeded the development of the CP market, the issuance of CP was delinked from the cash credit limit in October 1997. It was converted into a stand alone product from October 2000 so as to enable the issuers of the service sector to meet short-term working capital requirements. Banks are allowed to fix working capital limits after taking into account the resource pattern of the companies finances, including CPs. Corporates, PDs and all-India financial institutions (FIs) under specified stipulations have permitted to raise short-term resources by the Reserve Bank through the issue of CPs. There is no lock in period for CPs. Furthermore, guidelines were issued permitting investments in CPs which has enabled a reduction in transaction cost. In order to rationalize the and standardize wherever possible, various aspects of processing, settlement and documentation of CP issuance, several measures were undertaken with a view to achieving the settlement on T+I basis. For further deepening the market, the Reserve Bank of India issued draft guidelines on securitization of standard assets on April 4, 2005. Accordingly the reporting of CP issuance by issuing and paying agents (IPAs) on NDS platform commenced effective on April 16, 2005. Activity in the CP market reflects the state of market liquidity as its issuances tend to rise amidst ample liquidity conditions when companies can raise funds through CPs at an effective rate of discount lower than the lending rate of bonds. Banks also prefer investing in CPs during credit downswing as the CP rate works out higher than the call rate. Table 8.1 shows the trends in CP rates and amounts outstanding.

Table 8.1: CPs - Trends in Volumes and Discount Rates

Year	At the End of	Total Outstanding	Range of Discount (per cent)	
			Low	High
2006	March	12718	6.69 - 9.25	
2007	March	17838	10.25 - 13.00	
2008	March	32592	9.50 - 14.25	
2009	March	44171	6.40 - 12.50	
2010	March	75506	5.30 - 9.00	
2011	March	80305	7.93 - 15.00	

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[4] A stand-by facility provided by a bank enables an issuer of CPs to have its bank finance limits restored when the CP matures, so that the CP can be redeemed. The credit quality of a CP depended on the availability of such a facility.

Year	At the End of	Total Outstanding	Range of Discount (per cent)	
			Low	High
2012	March	91188	9.75 - 15.25	
2013	March	109255	8.05 - 13.42	
2013	August	136341	7.82 - 12.84	

Source: RBI, Handbook of Statistics on Indian Economy, 2012-13

8.4 STAMP DUTY

The dominant investors in CPs are banks, though CPs are also held by financial institutions and corporates. The structure of stamp duties for banks and non-banks is presented in Table 8.2.

Table 8.2 Structure of Stamp Duty

(in per cent)

Period	Banks		Non-Banks	
	Past	Present	Past	Present
I. Upto 3 months	0.05	0.012	0.125	0.06
II. Above 3 months upto 6 months	0.10	0.024	0.250	0.12
III. Above 6 months upto 9 months	0.15	0.036	0.375	0.18
IV. Above 9 months upto 12 months	0.20	0.05	0.500	0.25
V. Above 12 months	0.40	0.10	1.00	**0.5**

Effective from March 1, 2004

Internationally, no stamp duty applicable on CP issuances in USA, UK and France.

Source: - RBI

8.5 CERTIFICATES OF DEPOSIT

With a view to further widening the range of money market instruments and giving investors greater flexibility in deployment of their short term surplus funds, Certificate of Deposits (CDs) were introduced in India in 1989. They are essentially securitized short term time deposits issued by banks and all-India Financial Institutions during the period of tight liquidity at relatively higher discount rates as compared to term deposits.

Certificates of Deposits (CDs) are short-term borrowings by banks. CDs differ from term deposit because they involve the creation of paper, and hence have the facility for transfer and multiple ownerships before maturity. CD rates are usually higher than the term deposit rates, due to the low transactions costs. Banks use the CDs for borrowing during a credit pick-up, to the extent of shortage in incremental deposits. Most CDs are held until maturity, and there is limited secondary market activity.

Certificates of Deposit (CDs) is a negotiable money market instrument and issued in

dematerialised form or as a Usance Promissory Note, for funds deposited at a bank or other eligible financial institution for a specified time period. Guidelines for issue of CDs are presently governed by various directives issued by the Reserve Bank of India.

CDs can be issued by (i) scheduled commercial banks excluding Regional Rural Banks (RRBs) and Local Area Banks (LABs); and (ii) select all-India Financial Institutions that have been permitted by RBI to raise short-term resources within the umbrella limit fixed by RBI.

Banks have the freedom to issue CDs depending on their requirements. An FI may issue CDs within the overall umbrella limit fixed by RBI, i.e., issue of CD together with other instruments, *viz.,* term money, term deposits, commercial papers and inter-corporate deposits should not exceed 100 per cent of its net owned funds, as per the latest audited balance sheet.

Minimum amount of a CD should be Rs. 1 lakh, i.e., the minimum deposit that could be accepted from a single subscriber should not be less than Rs. 1 lakh and in the multiples of Rs. 1 lakh thereafter. CDs can be issued to individuals, corporations, companies, trusts, funds, associations, etc. Non-Resident Indians (NRIs) may also subscribe to CDs, but only on non-repatriable basis which should be clearly stated on the Certificate. Such CDs cannot be endorsed to another NRI in the secondary market.

The maturity period of CDs issued ty banks should be not less than 7 days and not more than one year. The FIs can issue CDs for a period not less than 1 year and not exceeding 3 years from the date of issue. CDs may be issued at a discount on face value. Banks/FIs are also allowed to issue CDs on floating rate basis provided the methodology of compiling the floating rate is objective, transparent and market-based. The issuing bank/FI is free to determine the discount/coupon rate. The interest rate on floating rate CDs would have to be reset periodically in accordance with a pre-determined formula that indicates the spread over a transparent benchmark. Banks have to maintain the appropriate reserve requirements, i.e., cash reserve ratio (CRR) and statutory liquidity ratio (SLR), on the issue price of the CDs. Physical CDs are freely transferable by endorsement and delivery. Dematted CDs can be transferred as per the procedure applicable to other demat securities. There is no lock-in period for the CDs. Banks/ FIs cannot grant loans against CDs. Furthermore, they cannot buy-back their own CDs before maturity

The guidelines concerning CDs have been relaxed over time. These include

i.   Freeing of CDs from interest rate regulation in 1992.

ii.   Lowering of minimum maturity period of CDs issued by banks to 7 days (April 2005) with a view to aligning the minimum tenor for CPs and CDs as recommended by the Narsimhan Committee (1998).

iii.   Permitting select all-India financial institutions to issue CDs for a maturity period of 1 to 3 years.

iv.   Abolishing limits to CD issuances as a certain proportion of average fortnightly

outstanding aggregate deposits effective October 16, 1993 with a view to enabling it as a market determined instrument.

v.   Reducing the minimum issuance size from Rs.1 crore in 1989 to Rs.1 lakh in June 2002.

vi.   Withdrawal of restriction on minimum period for transferability with

vii.   a view to providing flexibility and depth to the secondary market activity.

viii.   Requiring banks and FIs to issue CDs only in dematerialised form

ix.   effective June 30, 2002, in order to impart more transparency and encourage secondary market and

x.   Permitting banks in October 2002 to issue floating rate CDs as a coupon bearing instrument so as to promote flexible pricing in this instrument.

Table 8.3 shows the trends in rates and volume outstanding of CDs. Banks and financial institutions are the largest issuers of CDs, and are also subscribers to the CDs of one another. There are limited other investors such as mutual funds, in the CD markets. Scheduled commercial banks rely on CDs to supplement their deposit resources to fund the credit demand. The flexibility of timing and return that can be offered for attracting bulk deposits has made CDs the preferred route for mobilizing resources by some banks.

Table 8.3: CDs - Trends in Volumes and Discount Rates

Year	At the End of	Total Outstanding	Range of Discount (per cent)	
			Low	High
2006	March	43568	6.50 - 8.94	
2007	March	93272	10.23 - 11.90	
2008	March	147792	9.00 - 10.75	
2009	March	192867	6.00 - 11.50	
2010	March	341054	4.52 - 7.12	
2011	March	424740	9.00 - 10.60	
2012	March	419530	9.30 - 11.90	
2013	March	389612	8.80 - 10.12	
2013	August	311056	9.64 - 11.70	

Source: RBI, Handbook of Statistics on Indian Economy, 2012-13

Model Questions

1. **Which of the following is the largest investor in CPs?**

    a. Mutual Funds

    b. Corporate Treasuries

    c. Financial Institutions

    d. Scheduled Banks

Ans: d

2. **Which of the following entities cannot issue CDs?**

    a. Banks

    b. Finance Companies

    c. Primary Dealers

    d. None of the above

Ans: d

CHAPTER 9: REPOS[5]

9.1 INTRODUCTION

Repo is a money market instrument, which enables collateralized short term borrowing and lending through sale/purchase operations in debt instruments. Under a repo transaction, a holder of securities sells them to an investor with an agreement to repurchase at a predetermined date and rate. In the case of a repo, the forward clean price of the bonds is set in advance at a level, which is different from the spot clean price by adjusting the difference between repo interest and coupon earned on the security.

In the money market, this transaction is nothing but collateralized lending as the terms of the transaction are structured to compensate for the funds lent and the cost of the transaction is the repo rate. In other words, the inflow of cash from the transaction can be used to meet temporary liquidity requirement in the short-term money market at comparable cost.

In a typical repo transaction, the counter-parties agree to exchange securities and cash, with a simultaneous agreement to reverse the transactions after a given period. To the lender of cash, the securities lent by the borrower serves as the collateral; to the lender of securities, the cash borrowed by the lender serves as the collateral. Repo thus represents a collateralized short term lending. The lender of securities (who is also the borrower of cash) is said to be doing the *repo;* the same transaction is a *reverse repo* in the books of lender of cash (who is also the borrower of securities).

A reverse repo is the mirror image of a repo. For, in a reverse repo, securities are acquired with a simultaneous commitment to resell. Hence whether a transaction is a repo or a reverse repo is determined only in terms of who initiated the first leg of the transaction. When the reverse repurchase transaction matures, the counter-party returns the security to the entity concerned and receives its cash along with a profit spread. One factor which encourages an organization to enter into reverse repo is that it earns some extra income on its otherwise idle cash.

A repo is also sometimes called *a ready forward* transaction as it is a means of funding by selling a security held on a spot (ready) basis and repurchasing the same on a forward basis. Though there is no restriction on the maximum period for which repos can be undertaken, generally, repos are done for a period not exceeding 14 days. Different instruments can be considered as collateral security for undertaking the ready forward deals and they include Government dated securities, treasury bills.

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[5] Substantial portions of this chapter have been drawn from the Report of the Sub-Group on Ready Forward (Repo) Transactions, Technical Advisory Committee on Government Securities Market, RBI, 1998. The summary of recommendations made by this group is in Appendix I to this chapter.

While banks and PDs are permitted to undertake both repos and reverse repos, other participants such as institutions and corporates can only lend funds in the repo markets. The recent policy changes announced in April 2001 have removed this restriction, and suggest a phased expansion in the participation in repo markets. This would, however, require the creation of enabling infrastructure such as the Clearing Corporation and electronic settlement of transactions.

Repos are settled on DvP basis on the same day. It is essential for participants in repo transactions to hold SGL accounts and current account with RBI. Repo transactions are also reported in the WDM segment of the NSE.

9.2 REPO RATE

Repo rate is nothing but the *annualised interest rate* for the funds transferred by the lender to the borrower. Generally, the rate at which it is possible to borrow through a repo is lower than the same offered on unsecured (or clean) inter-bank loan for the reason that it is a collateralized transaction and the credit worthiness of the issuer of the security is often higher than the seller. Other factors affecting the repo rate include the credit worthiness of the borrower, liquidity of the collateral and comparable rates of other money market instruments.

In a repo transaction, there are two legs of transactions viz. selling of the security and repurchasing of the same. In the first leg of the transaction which is for a nearer date, sale price is usually based on the prevailing market price for outright deals. In the second leg, which is for a future date, the price is structured based on the funds flow of interest and tax elements of funds exchanged. This is on account of two factors. First, as the ownership of securities passes on from seller to buyer for the repo period, legally the coupon interest accrued for the period has to be passed on to the buyer. Thus, at the sale leg, while the buyer of security is required to pay the accrued coupon interest for the broken period, at the repurchase leg, the initial seller is required to pay the accrued interest for the broken period to the initial buyer.

Transaction-wise, both the legs are booked as spot sale/purchase transactions. Thus, after adjusting for accrued coupon interest, sale and repurchase prices are fixed so as to yield the required repo rate. The excess of the coupon at the first leg of repo would represent the coupon interest for the repo period. Thus, the price adjustment depends directly upon the relationship between the net coupon and the repo amount worked out on the basis of the repo interest agreed upon the total funds transferred. When repo rate is higher than current yield repurchase price will be adjusted upward signifying a capital loss. If the repo rate is lower than the current yield, then the repurchase price will be adjusted downward signifying a capital gain.

If the repo rate and coupon are equal, then the repurchase price will be equal to the sale price of security since no price adjustment at the repurchase stage is required. If the repo rate is

greater than the coupon, then the repurchase price is adjusted upward (with reference to sale price) to the extent of the difference between the two. And, if the repo rate is lower than the coupon then, the repurchase price is adjusted downward (with reference to sale price). Specifically, in terms of repo rate, there will be no price adjustment when the current yield on security calculated on the basis of sale value (including accrued coupon) is equivalent to repo rate.

Although repos are collateralized transactions they are still exposed to counter-party risk and the issuer risk associated with the collateral. As far as the counter-party risk is concerned, the investor should be able to liquidate the securities received as collateral, thus largely offsetting any loss. Against this the seller /lender of bonds will hold cash or other securities as protection against non-return of the lent securities. In both the cases it is to be ensured that the realizable value equals or exceeds the exposure. There is also the concentration risk resulting from illiquid issues which are used as collateral in the transaction.

Generally, norms are laid down for accounting of repos and valuation of collateral are concerned. While there are standard accounting norms, generally the securities used as collateral in repo transactions are valued at current market price plus accrued interest (on coupon bearing securities) calculated to the maturity date of the agreement less "margin" or "haircut". The haircut is to take care of market risk and it protects either the borrower or lender depending upon how the transaction is priced. The size of the haircut will depend on the repo period, riskiness of the securities involved and the coupon rate of the underlying securities.

Since fluctuations in market prices of securities would be a concern for both the lender as well as the borrower it is a common practice to reflect the changes in market price by resorting to marking to market. Thus, if the market value of the repo securities decline beyond a point the borrower may be asked to provide additional collateral to cover the loan. On the other hand, if the market value of collateral rises substantially, the lender may be required to return the excess collateral to the borrower.

9.3 CALCULATING SETTLEMENT AMOUNTS IN REPO TRANSACTIONS

Repo transactions involve 2 legs: the first one when the repo amount is received by the borrower, and the second, which involves repayment of the borrowing. The settlement amount for the first leg consists of:

a.   Value of securities at the transaction price

b.   Accrued interest from the previous coupon date to the date on which the first leg is settled.

The settlement amount for the second leg consists of:

a.   Repo interest at the agreed rate, for the period of the repo transaction

b.   Return of principal amount borrowed.

Security offered under Repo	11.43% 2015	
Coupon payment dates	7 August and 7 February	
Market Price of the security offered under Repo (i.e. price of the security in the first leq)	Rs.113.00	**(1)**
Date of the Repo	19 January, 2003	
Repo interest rate	7.75%	
Tenor of the repo	3 days	
Broken period interest for the first leg*	11.43%xl62/360xl00=5.1435	**(2)**
Cash consideration for the first leg	(1) + (2) = 118.1435	**(3)**
Repo interest**	118.1435x3/365x7.75%=0.0753	**(4)**
Broken period interest for the second leg	11.43% x 165/360x100=5.2388	**(5)**
Price for the second leg	(3) + (4>(5) = 118.1435 + 0.0753 -5.2388= 112.98	**(6)**
Cash consideration for the second leg	(5) + (6) = 112.98 + 5.2388 = 118.2188	**(7)**

9.4 ADVANTAGES OF REPOS

Repos can provide a variety of advantages to the financial market in general, and debt market, in particular as under:

• An active repo market would lead to an increase in turnover in the money market, thereby improving liquidity and depth of the market;

• Repos would increase the volumes in the debt market, as it is a tool for funding transactions. It enables dealers to deal in higher volumes. Thus, repos provide an inexpensive and most efficient way of improving liquidity in the secondary markets for underlying instruments. Debt market also gets a boost as repos help traders to take a position and go short or long on security. For instance, in a bullish scenario one can acquire securities and in a bearish environment dispose them of thus managing cash flows taking advantage of flexibility of repos.

• For institutions and corporate entities, repos provide a source of inexpensive finance and offer investment opportunities of borrowed money at market rates thus earning a good spread;

• Tripartite repos offer opportunities for suitable financial institutions to intermediate between the lender and the borrower.

• A large number of repo transactions for varying tenors will effectively result in a term interest rate structure, especially in the inter-bank market. It is well known that absence of term money market is one of the major hindrances to the growth of debt markets and the development of hedging instruments.

• Central banks can use repo as an integral part of their open market operations with the objective of injecting/withdrawing liquidity into and from the market and also to reduce volatility in short term in particular in call money rates. Bank reserves and

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call rates are used in such instances as the operating instruments with a view to ultimately easing /tightening the monetary conditions.

9.5 REPO MARKET IN INDIA: SOME RECENT ISSUES

Repos being short term money market instruments are necessarily being used for smoothening volatility in money market rates by central banks through injection of short term liquidity into the market as well as absorbing excess liquidity from the system. Regulation of the repo market thus becomes a direct responsibility of RBI. Accordingly, RBI has been concerned with use of repo as an instrument by banks or non-bank entities and issues relating to type of eligible instruments for undertaking repo, eligibility of participants to undertake such transactions etc. and it has been issuing instructions in this regard in consultation with the Central Government.

After evidence of abuse in the repo market during the period leading to the securities scam of 1992, RBI had banned repos from the markets. It is only in the recent past that these restrictions have been removed, and after the acceptance of the report of the technical sub-group's recommendations, RBI has initiated efforts for creating an active market for repos. It was decided to adopt the international usage of the term 'Repo' and 'Reverse Repo' under LAF operations. Thus, when RBI absorbs liquidity it is termed as Reverse Repo and the RBI injecting liquidity is the repo operation. Since forward trading in securities was generally prohibited in India, repos were permitted under regulated conditions in terms of participants and instruments. Reforms in this market has encompassed both institutions and instruments. Both banks and non-banks were allowed in the market. All government securities and PSU bonds were eligible for repos till April 1988. Between April 1988 and mid June 1992, only inter-bank repos were allowed in all government securities. Double ready forward transactions were part of the repos market throughout the period. Subsequent to the irregularities in securities transactions that surfaced in April 1992, repos were banned in all securities, except Treasury Bills, while double ready forward transactions were prohibited altogether. Repos were permitted only among banks and PDs. In order to reactivate the repos market, the Reserve Bank gradually extended repos facility to all Central Government dated securities, Treasury Bills and State Government securities. It is mandatory to actually hold the securities in the portfolio before undertaking repo operations. In order to activate the repo market and promote transparency, the Reserve Bank introduced regulatory safeguards such as delivery versus payment system during 1995-96. The Reserve Bank allowed all non-bank entities maintaining subsidiary general ledger (SGL) account to participate in this money market segment. Furthermore, NBFCs, mutual funds, housing finance companies and insurance companies not holding SGL accounts were allowed by the Reserve Bank to undertake repo transactions from March 2003 through their 'gilt accounts' maintained with custodians. With the increasing use of repos in the wake of phased exit of non-banks from the call money market, the Reserve Bank issued comprehensive uniform accounting guidelines as well as documentation policy in March 2003.

Moreover, the DVP III mode of settlement in government securities (which involves settlement of securities and funds on a net basis) in April 2004 facilitated the introduction of rollover of repo transactions in government securities and provided flexibility to market participants in managing their collaterals.

The operationalisation of the Negotiated Dealing System (NDS) and the Clearing Corporation of India Ltd. (CCIL) combined with the prudential limits on borrowing and lending in the call/ notice market for banks also helped in the development of market repos.

9.6 SECONDARY MARKET TRANSACTIONS IN REPOS

Secondary market repo transactions are settled through the RBI SGL accounts, and weekly data is available from the RBI on volumes, rates and number of days. Though the NSE WDM also has the facility for reporting repo trades, there were no repo transactions recorded during 2005-06, 2006-07 and 2007-08.

9.7 REPO ACCOUNTING

Guidelines for uniform accounting for Repo / Reverse repo transactions

1. On a review of the accounting practices followed by all RBI regulated entities for accounting repo / reverse repo transactions, it emerged that there were divergent practices prevailing among them. In order to ensure uniform accounting treatment in this regard and to impart an element of transparency, RBI laid down uniform accounting principles, in consultation with Fixed Income Money Markets and Derivatives Association of India (FIMMDA), for repo/reverse repo transactions undertaken by all the regulated entities. These norms are not applicable to repo / reverse repo transactions under the Liquidity Adjustment Facility (LAF) with RBI.

2. The uniform accounting principles were applicable from the financial year 2003-04. Market participants were allowed to undertake repos from any of the three categories of investments, viz., Held For Trading, Available For Sale and Held To Maturity.

3. The legal character of repo under the current law, viz. as outright purchase and outright sale transactions were kept intact by ensuring that the securities sold under repo (the entity selling referred to as "seller") are excluded from the Investment Account of the seller of securities and the securities bought under reverse repo (the entity buying referred to as "buyer") are included in the Investment Account of the buyer of securities. Further, the buyer can reckon the approved securities acquired under reverse repo transaction for the purpose of Statutory Liquidity Ratio (SLR) during the period of the repo.

4. At present repo transactions are permitted in Central Government securities including Treasury Bills and dated State Government securities. Since the buyer of the securities will not hold it till maturity, the securities purchased under reverse repo by banks should not be classified under Held to Maturity category. The first leg of the repo should

be contracted at prevailing market rates. Further, the accrued interest received / paid in a repo / reverse repo transaction and the clean price (i.e. total cash consideration less accrued interest) should be accounted for separately and distinctly.

The other accounting principles to be followed while accounting for repos / reverse repos are as under:

(i) **Coupon**

In case the interest payment date of the security offered under repo falls within the repo period, the coupons received by the buyer of the security should be passed on to the seller on the date of receipt as the cash consideration payable by the seller in the second leg does not include

any intervening cash flows. While the buyer will book the coupon during the period of the repo, the seller will not accrue the coupon during the period of the repo.

In the case of discounted instruments like Treasury Bills, since there is no coupon, the seller will continue to accrue the discount at the original discount rate during the period of the repo. The buyer will not therefore accrue the discount during the period of the repo.

(ii) **Repo Interest Income / Expenditure**

After the second leg of the repo / reverse repo transaction is over, (a) the difference in the clean price of the security between the first leg and the second leg should be apportioned over the life of the repo and should be reckoned as Repo Interest Income / Expenditure in the books of the Seller buyer / Buyer seller respectively and should be debited / credited as an income / expenditure accrued but not due; (b) the difference between the accrued interest paid between the two legs of the transaction should be shown as Repo Interest Income/ Expenditure account, as the case may be; and (c) the balance outstanding in the Repo interest Income / Expenditure account should be transferred to the Profit and Loss account as an income or an expenditure . As regards repo / reverse repo transactions outstanding on the balance sheet date, only the accrued income / expenditure till the balance sheet date should be taken to the Profit and Loss account. Any repo income / expenditure for the subsequent period in respect of the outstanding transactions should be reckoned for the next accounting period.

(iii) **Marking to Market**

The buyer will mark to market the securities acquired under reverse repo transactions as per the investment classification of the security. To illustrate, for banks , in case the securities acquired under reverse repo transactions have been classified under Available for Sale category, then the mark to market valuation for such securities should be done at least once a quarter. For entities that do not follow any investment classification norms, the valuation for securities acquired under reverse repo transactions may be

in accordance with the valuation norms followed by them in respect of securities of similar nature. In respect of the repo transactions outstanding as on the balance sheet date:

a. The buyer will mark to market the securities on the balance sheet date and will account for the same as laid down in the extant valuation guidelines issued by the respective regulatory departments of RBI.

b. The seller will provide for the price difference in the Profit & Loss account and show this difference under "Other Assets" in the balance sheet. The net difference between if in case of the sale price of the security offered under repo is lower than the book value.

c. The seller will ignore the price difference for the purpose of Profit & Loss account but show the difference under "Other Liabilities" in the Balance Sheet, in case it is a profit, the balance sheet However, in case of if the sale price of the security offered under repo is higher than the book value; and of the securities (sold under repo) and the sale price, in respect of the repos outstanding in the books of the Seller as on the Balance Sheet date, will be taken to the Profit and Loss Account, in case it is a loss

d. Similarly, the accrued interest paid / received in the repo / reverse repo transactions outstanding on balance sheet dates should be shown as "Other Assets" or "Other Liabilities" in the balance sheet.

(iv)   Book value on re-purchase

The seller shall debit the repo account with the original book value (as existing in the books on the date of the first leg) on buying back the securities in the second leg.

(v)   Accounting methodology

a. The following accounts may be opened , viz. i) Repo Account, ii Repo Price Adjustment Account, iii) Repo Interest Adjustment Account, iv) Repo Interest Expenditure Account, v) Repo Interest Income Account, vi) Reverse Repo Account, vii) Reverse Repo Price Adjustment Account, and viii) Reverse Repo Interest Adjustment Account.

b. The securities sold/ purchased under repo should be accounted for as an outright sale / purchase.

c. The securities should enter and exit the books at the same book value. For operational ease the weighted average cost method whereby the investment is carried in the books at their weighted average cost may be adopted.

Repo

a. In a repo transaction, the securities should be sold in the first leg at market related prices and re-purchased in the second leg at the derived price. The sale and repurchase

should be accounted in the Repo Account.

b.   The balances in the Repo Account should be netted from the bank's Investment Account for balance sheet purposes.

c.   The difference between the market price and the book value in the first leg of the repo should be booked in Repo Price Adjustment Account. Similarly the difference between the derived price and the book value in the second leg of the repo should be booked in the Repo Price Adjustment Account.

Reverse repo

a.   In a reverse repo transaction, the securities should be purchased in the first leg at prevailing market prices and sold in the second leg at the derived price. The purchase and sale should be accounted for in the Reverse Repo Account.

b.   The balances in the Reverse Repo Account should be part of the Investment Account for balance sheet purposes and can be reckoned for SLR purposes if the securities acquired under reverse repo transactions are approved securities.

c.   The security purchased in a reverse repo will enter the books at the market price (excluding broken period interest). The difference between the derived price and the book value in the second leg of the reverse repo should be booked in the Reverse Repo Price Adjustment Account.

Other aspects relating to Repo / Reverse Repo

a.   In case the interest payment date of the security offered under repo falls within the repo period, the coupons received by the buyer of the security should be passed on to the seller on the date of receipt as the cash consideration payable by the seller in the second leg does not include any intervening cash flows.

b.   The difference between the amounts booked in the first and second legs in the Repo / Reverse Repo Price Adjustment Account should be transferred to the Repo Interest Expenditure Account or Repo Interest Income Account, as the case may be.

c.   The broken period interest accrued in the first and second legs will be booked in Repo Interest Adjustment Account or Reverse Repo Interest Adjustment Account, as the case may be. Consequently the difference between the amounts booked in this account in the first and second legs should be transferred to the Repo Interest Expenditure Account or Repo Interest Income Account, as the case may be.

d.   At the end of the accounting period the, *for outstanding repos,* the balances in the Repo / Reverse Repo Price Adjustment Account and Repo / Reverse repo Interest Adjustment account should be reflected either under item VI - 'Others' under Schedule 11 - 'Other Assets' *or* under item IV 'Others (including Provisions)' under Schedule 5 - 'Other Liabilities and Provisions' in the Balance Sheet, as the case may be.

e.   Since the debit balances in the Repo Price Adjustment Account at the end of the accounting period represent losses not provided for in respect of securities offered in

outstanding repo transactions, it will be necessary to make a provision therefore in the Profit & Loss Account.

f. To reflect the accrual of interest in respect of the outstanding repo/ reverse repo transactions at the end of the accounting period, appropriate entries should be passed in the Profit and Loss account to reflect Repo Interest Income / Expenditure in the books of the buyer / seller respectively and the same should be debited / credited as an income / expenditure accrued but not due. Such entries passed should be reversed on the first working day of the next accounting period.

g. In respect of repos in interest bearing (coupon) instruments, the buyer would accrue interest during the period of repo. In respect of repos in discount instruments like Treasury Bills, the seller would accrue discount during the period of repo based on the original yield at the time of acquisition.

h. At the end of the accounting period the debit balances (excluding balances for repos which are still outstanding) in the Repo Interest Adjustment Account and Reverse Repo Interest Adjustment Account should be transferred to the Repo Interest Expenditure Account and the credit balances (excluding balances for repos which are still outstanding) in the Repo Interest Adjustment Account and Reverse Repo Interest Adjustment Account should be transferred to the Repo Interest Income Account.

i. Similarly, at the end of accounting period, the debit balances (excluding balances for repos which are still outstanding) in the Repo / Reverse Repo Price Adjustment Account should be transferred to the Repo Interest Expenditure Account and the credit balances (excluding balances for repos which are still outstanding) in the Repo / Reverse Repo Price Adjustment Account should be transferred to the Repo Interest Income Account.

Model Questions

1. **If the RBI announces that it has done repos of Rs. 3000 crore, what does this imply?**

   a. RBI has lent securities worth Rs. 3000 crore through the repo markets to the participants.

   b. RBI has reversed the repo deals of participants who entered into a repo with RBI.

   c. RBI has inducted funds amounting to Rs. 3000 crores into the market.

   d. RBI has borrowed securities from the banking system, and lent them onward in the repo markets.

Answer: c

2. **A 3-day repo is entered into on July 10, 2001, on an 11.99% 2009 security, maturing on April 7, 2009. The face value of the transaction is Rs. 3,00,00,000. The price of the security is Rs. 116.42. If the repo rate is 7%, what is the settlement amount on July 10, 2001?**

Answer: Settlement amount on July 10, 2001 is the transaction value for the securities plus accrued interest.

Transaction Value:

3,00, 00, 000 * 116.42/100 = **Rs. 3, 49, 26, 000**

Accrued Interest:

The security's maturity date is April 7, 2009. Using the Coupdaybs function,

we can find the number of days from last coupon date. (Settlement: 10-Jul- 2001; Maturity: 7 April 2009; Frequency: 2; Basis: 4; The number of days is 93.

Accrued interest = 3, 00, 00, 000 * 11.99%* 93/360 = **Rs. 9, 29, 225.00**

Therefore, the settlement amount is: Rs. 3,49,26,000 + Rs. 9, 29, 225.00
= Rs. 3, 58, 55, 225.00

3. **Using the same data as in Question 2, determine the settlement amount for the second leg of the repo transaction.**

The settlement amount for the second leg involves the following:

Interest on the Amount borrowed:

= 35855225 * .07 * 3/365

= Rs. 20629.03

Amount to be settled: 35855225 + 20629.03 = Rs. 35875854.03

Appendix I

Summary of Recommendations of the Technical Sub Group on Repos:

1.   Need to Withdraw the Government Notification Dated June 27, 1969

As long as the June 1969 notification is operative, RBI would have to continue to take up with the Government to issue necessary notification exempting, such of those entities as deemed necessary by the Bank, from the prohibition contained in the notification. It will not be possible for most intending parties (other than the few permitted) to legally participate in repos unless the Notification is withdrawn by the Government. Hence, the first basic legal requirement for developing repos is to withdraw the Government Notification dated June 27, 1969. (Since withdrawn)

2.   RBI Needs to Acquire Regulatory Powers under 29A of SCR Act

Repo being short-term money market instrument is being used for smoothening volatility in money market rates by central banks through injection of short-term liquidity into the market as well as absorbing excess liquidity from the system. Regulation of repo market thus becomes a direct responsibility of RBI. As expansion of the repo market with wider participation and variety of instruments would require RBI to have enhanced regulatory powers over the debt market there is need to amend Section 29A of SCR Act, to enable the Government to delegate regulatory powers for of trading in Government Securities and other debt instruments. (Since empowered)

3.   Need to Replace Public Debt Act, 1944

The Group recognises the legal impediments in the way to electronic transfer of gilt securities which is not possible under the Public Debt Act, 1944 and the need to effect early replacement of the Public Debt Act by the proposed Government Securities Act has assumed great expediency. The Group urges that immediate steps should be taken to resolve the legal and procedural difficulties in the way to achieve a modern market infrastructure It may be worthwhile to take due cognizance of the changing face of securities settlement systems, the world over with the use of information technology.

4.   "Over The Counter" and "Tripartite" Repos to Expand the Market

The Group is of the view that keeping the needs of the market participants a system of "over the counter" and "exchange traded" repos with adequate checks and controls could be introduced, as under:

(a) All entities who have SGL Account and Current Account with RBI may be allowed to undertake "over the counter" repos and reverse repos in all Government securities (including those issued by the State Governments).

(b) For the present, such repos may be restricted to SGL Accounts at Mumbai and in due course with successful linking of all RBI offices, it could be extended to other RBI centres.

(c) All entities including corporates may be allowed to undertake repos and reverse repos in all Government securities, PSU bonds. Private Corporate Debt Securities and bonds issued by All India Financial Institutions Provided:

i. the debt instruments are held in dematerialised form in a depository; and

ii. the transactions are undertaken through approved stock exchange with a well capitalised clearing corporation functioning as legal counter party.

iii. Transactions under (c) above, involving triparty could be permitted provided:

(I) the triparty agent is a well capitalised Clearing Corporation licensed to function as a legal counterparty in all such transactions; and

(II) where such an agency would define acceptable securities from within the specified broad categories as mentioned above, execute required haircuts, do daily marking to market, ensure that all participants maintain adequate collateral at all times, the quantity traded is in standardised lots and the settlement is done under "novation", maintaining anonymity of counterparties all the time.

5. **Uniform Accounting Practices to be Introduced**

In order that there is uniform accounting treatment and sufficient transparency, the Group has accepted continuance of the "buy-sell back repo concept" while has suggested its own accounting norms for repos so that there is uniformity in approach towards accounting in general and applying haircuts/margins, booking of capital gains/loss and separation of the interest paid/received in the transaction, in particular.

6. **Day Light Overdraft Facility for Current Account Holders Required**

As regards settlement, the existing system of end of the day DVP cannot be considered risk free due to bottlenecks in movement of securities and cash, as explained above. A system of provision of daylight overdraft to the current account holders by RBI may be thought of to avoid such eventuality.

7. **Guidelines for Constituents' SGL Account Operations to be Issued**

In the context of gradual deepening of the Government securities market and the policy to promote the retail segment of the market, it is felt expedient to frame a set of guidelines governing the maintenance of the Constituents' SGL Accounts by these entities. The Working Group has, accordingly suggested outline for the draft guidelines providing for obligations and code of conduct in dealing with the Constituents' securities including transparency and safety. This could be finalised after discussion with representative self-regulatory organisations of the market participants.

8. **Date of deal and settlement date to be specified**

To avoid differences in practices followed it would be desirable to stipulate deal date and settlement date. At present deals undertaken take, often more than stipulated number of days for execution and settlement. In order that there is no confusion deals

can either be settled on the same day or the next day of the deal and this should be clearly indicated in the contract/terms of deal to ensure that there is no confusion/variance in settlement date of repos.

9.   A Master Re-Purchase Agreement for Repos to be Introduced

There is need for, as done internationally, a comprehensive master repurchase agreement which allows obligations under all outstanding repos to be set off against each other upon default or insolvency of the counterparty. Working Group has attempted a draft document, which could be modified suitably to meet actual requirements in repo transactions. The Draft Master Purchase Agreement has provisions for absolute transfer of title of securities (including any securities transferred through substitution or mark to market adjustment of collateral).

10.   Code of Conduct for Repos Transactions to be laid down

A code of conduct would include issues participants should address before undertaking repo transactions, legal agreements in prevalence, margins, marking to market, exposure limits on counterparties, custody of collaterals, right to declare a counterparty in default, confirmation of deals, matters to be covered before trading with a new counterparty, information to be exchanged at point of trade etc. The Group has included a draft of a code of conduct, which has been included as a part of this report for the benefit of the market practitioners.

11.   Repo Market to be Supervised and Closely Monitored by RBI

The memories of the irregularities committed in the Government securities market are still very fresh in the minds of the market participants and the regulators. As more participants and instruments are made eligible for undertaking repo transactions RBI may like to monitor the size, growth and orderliness of the repo market .As money market on line dealing system is installed and made operative it should become possible for RBI to monitor the market online focusing on participants, market rates, trading patterns etc.

12.   Roll Over of Repos to be permitted

Repos being in the nature of collateralised borrowing should be allowed to be rolled over with revaluation at the time of roll over at rates of interest/value of securities in alignment with prevailing market rates. Further, since there is no maximum period specified for repo by RBI, the absence of perception of short term interest rate for longer period repo horizon inhibits the parties to enter into repos for period longer than a fortnight. The rollovers could be for any period and should not have any relationship with the original contract period.

CHAPTER 10: BOND MARKET INDICES AND BENCHMARKS

Market benchmarks serve a purpose of providing information to the participants about the prices prevailing in the markets. In the bond markets, the most important market indicator, which every participant wants to track, is the movement in interest rates. Market indicators enable pricing, valuation and performance evaluation. In this chapter, we shall discuss 2 widely tracked benchmarks: the NSE-MIBOR which provides the money market benchmark, and the I-Sec bond indices, which track returns on government securities.

10.1 I-BEX: SOVEREIGN BOND INDEX[6]

A bond index is a product to accurately measure the performance of the bond markets. It is a benchmark against which fund managers and investment managers can measure their performance. Bond indices use additional liquidity criteria besides just returns. This is specifically required to meet the needs of active traders and investment managers.

10.1.1 Why a Sovereign Bond Index?

The sovereign bond market is the most liquid segment in the bond market. There is a need to provide a benchmark against which the performance of a government securities portfolio can be measured.

10.1.2 Features of a Bond Index

The index must be:

A. **Representative:** An index should span and weight the appropriate markets, instruments and individual securities to reflect the opportunities available to the domestic and international institutional investor.

B. **Markets:** The index should cover securities of a wide range of maturities, say one to ten years.

C. **Instruments:** The Instruments should have fixed coupons; they must be tradable and redeemable for cash. Thus, the index excludes most of the long dated securities and low coupon securities (which are not traded).

D. **Issues:** Each issue of a qualifying instrument must meet certain liquidity criteria to be included in the index. It should generally be traded and at acceptable bid-offer spreads. (Which have now defined as 10 paise) **Current Yield:** The principal appreciation of a low coupon bond is more than that of a high coupon bond to compensate for the lower interest accrual. To avoid a distortion of the principal returns index on this count,

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securities where the current yield and YTM differ by more than 100bps are excluded from the index.

E.   **Investible and Replicable:** An index should include only securities in which an investor can deal at short notice and for which firm prices exist. Firm prices should ideally exist for all constituent securities.

The benchmark issues included in the index ought to be

- widely recognised market indicators
- issues with high trading volume
- recent issues with current coupon

A security is excluded from the index if it does not have a market lot (Rs. 5 crore or Rs. 10 crore) trade for three continuous trading days.

F.   **Accurate and Reliable:** Index return calculations should accurately reflect the actual changes in the value of a portfolio consisting of the same securities.

G.   **Transparent:** Investment managers should know which securities are included in an index and how it is constructed. The fund manager must be able to create his own benchmark index and track it.

10.1.3 Methodology and Assumptions

Securities prices

The price used is the weighted average price of SGL trades as reported by RBI (after excluding all trades below Rs. 1 crore face value).

Weighting changes

The index measures the changing value of an index portfolio by weighting the total return on each constituent bond by the market value on the previous day. Each weight is equal to the amount outstanding at the beginning of each month multiplied by the security's gross price (net price plus accrued interest). For principal return calculations, the weights do not reflect accrued interest; instead, the outstanding amount is adjusted by the issue's net price.

Reinvestment

The index assumes that coupons received during the month are immediately reinvested into the bond index in proportion to the latest market values of the constituents. The index is fully invested at all times which is only possible with daily indices.

Transparent

Investment managers need to know which securities are included in on index and how it is constructed. This index will be documented with respect to the identities of its constituent bonds and its calculation methods.

Conventions

I	: List of bonds comprising the index
i	: A bond in the bond list
TR	: Total Return
PR	: Principal Return
TR	: Total Return for a given bond i
$TR_{,t}$	: Total Return for a given bond i today
$TR_{,t\_i}$	: Total Return for a given bond i yesterday
TRo	: Total Return for a given bond I on base date of the index
PR	: Principal Return for a given bond i
$PR_{,t}$	: Principal Return for a given bond i today
$PR_{,t}.i$	: Principal Return for a given bond i yesterday
PRi,o	: Principal Return for a given bond i on base date of the index
IRi	: Interest Return for a given bond i
IRit	: Interest Return for a given bond i today
IR:,t-I	: Interest Return for a given bond i yesterday
IRi,o	: Interest Return for a given bond i on base date of the index
GP	: Gross Price of a bond
GPj	: Gross Price of a given bond i
GPj,t	: Gross Price of a given bond i today
$GPj_{,t\_i}$	: Gross Price of a given bond i yesterday
GPJO	: Gross Price of a given bond i on base date of the index
NP	: Net price of a bond (clean price less voucher)
NPj	: Net price of a given bond i
NPj,t	: Net price of a given bond i today
NPjt-1	: Net price of a given bond i yesterday
NPi,o	: Net price of a given bond i on base date of the index
C	: Coupon on a bond
Cj	: Coupon on a given bond i
$Ci_{,t}$	: Coupon on a given bond i today

Q   : Number of bonds outstanding

Q i   : Number of bonds outstanding of a given bond i

Qi,t : Number of bonds outstanding of a given bond i today

MC : Market capitalisation of a bond

MC i : Market capitalisation of a given bond i

MCi,t : Market capitalisation of a given bond i today

D   : Duration of a bond

D i   : Duration of a given bond i

Y   : Yield of a bond

Yi   : Yield of a given bond i

10.1.4 Definitions

Bond List:

The selection of bonds for the purpose of the index between two rebalancing dates.

Market-cap of a bond:

It is the number of bonds outstanding times the market price. The market value of the total outstanding bond issues.

Gross Price:

Gross Price of bond = Market Price + Accrued Interest

Net Price:

Net Price of a bond = Market Price

Market - Cap Weight:

Market-cap of a bond =   Par amount outstanding x Gross Price

$$\text{Market - cap weight} = \frac{\text{Market - cap of a bond}}{\text{Sum of all market - caps of bonds in the bond list}}$$

Rebalancing

The index automatically adjusts or rebalances for changes in the composition of the index portfolio so that the changes do not represent a capital gain or loss to the index.

10.1.5 Returns on Individual Bonds

Total return (TR)

It is the absolute return that a bond offers and it includes both coupons and capital gains / (losses). The total return index for an individual bond is calculated each market day by increasing the previous market day's index value by the percentage change in bond's gross

price (GP). The gross price of a bond is its net price plus accrued interest. The gross price must be adjusted for loss of accrued interest on coupon payment day by adding the coupon value (C) to the gross price.

$$TR_{i,t} = TR_{i,t-1} * \{(GP_{i,t} + C_{i,t}.)/ GP_{i,t-1}$$

Principal Return (PR)

It is simply the current net price divided by the net price on the base date.

$$PR_{i,t} = NP_{i,t} /NP_{i,o}$$

Interest Return

The total return divided by principal return index.

$$IR_{i,t} -TR_{i,t} /PR_{i,t}$$

10.1.6 Market Indices

For a portfolio of bonds the total return is calculated by multiplying the previous day's index value by the ratio of the narket capitalisation of the bond list on a day to its market capitalisation on the previous day. Each bond has an individual weight which is multiplied by the price to calculate its market capitalisation. These weights are called market caps (MC). Thus, Total Return (TR) of the index is,

$$TR_t = TR_{t-1} * \Sigma \text{ for all bonds i belonging to bond list I } \{MC_{i,t} * TR_{i,t} * TR_{i,t-1}\}$$

where market cap is,

$$MC_{i,t} = Q_{i,t} * GP_{i,t}$$

The bond index must be fully invested that is coupons, changes in the bond list and changes in principal amounts must be accounted for on a daily basis. The bond list could change when bonds enter or leave the index. Principal amounts could change owing to redemption or additional issue of further bonds. The equivalent formula for the entire index would then reduce to $TR_t =$

$$\frac{\Sigma \text{ for all bonds i belonging to bond list 1 } \{Q_{i,t} * GP_{i,t}\}}{\Sigma \text{ for all bonds i belonging to bond list 1 on base date } \{Q_{i,0} * GP_{i,0}\} * \text{Adjustment factor}}$$

10.1.7 Adjustment Factor

The adjustment factor can be decomposed into three contributing factors:

1. The partial impact of a change in the composition of the bond list between two dates keeping amount outstanding (weights) constant at today's values (Adjustment Factor1)

2. The partial impact of a change in the amounts outstanding between the two dates keeping the yesterday's bond list intact (Adjustment Factor2).

3.   The impact of coupons paid leaving both bond list and weights constant at yesterday's value (Adjustment Factor3).

$$\text{Adjustment Factor 1} = \frac{\text{(Today list \& Todays weights)}}{\text{(Yesterdays list \& Todays weights}}$$

$$\text{Adjustment Factor 2} = \frac{\text{(Yesterdays list \& Todays weights)}}{\text{(Yesterdays list \& Yesterdays weights}}$$

$$\text{Adjustment Factor 3} = \frac{\text{(Yesterdays list \& Yesterdays weights)}}{\text{(Yesterdays list \& Yesterdays weights \& Todays coupon}}$$

The product of the adjustment factors from base to date is the adjustment factor in the denominator of the equation. Therefore the disaggregation explains how rebalancing at the beginning of the month and coupon reinvestment properly chain-link an index.

10.1.8 Index Statistics

The duration, yield, remaining maturity and average coupon of the bond index are approximated by using the following relationships.

Duration

The duration of the index can be approximated by weighting the individual duration of the bonds by their market capitalisation.

Duration of the bond index = Σ for all bonds i belonging to bond list I {MCi * Di}

Remaining maturity

The residual time to maturity of the index is simply the market cap weighted years to maturity of each bond in the bond list.

Remaining maturity bond index = Σ for all bonds i belonging to bond list I {MCi * Years to Maturity$_i$}

Yield

The index yield can be approximated by weighting each bond's yield by its duration. Rigorously, all the cash flows of the component bonds need to be discounted to arrive at the accurate yield to maturity. The duration calculated using the yield calculated thus would be the exact duration of the index. For most practical purposes the following approximation is adequate:

Yield bond index = Σ for all bonds i belonging to bond list I {(MC$_i$ * D$_i$ /D$_{bond\_index}$) * Y$_i$ }

Average coupon

The average coupon is arrived at by calculating the duration weighted coupon rates of the bonds

$$\text{Average coupon bond index} = \frac{\Sigma \text{ for all bonds i belonging to bond list 1}}{\{(MC_i * D_i / D \text{ bond\_index}) * C_i\}}$$

10.1.9 Calibration Issues

Rules for bond inclusion

Bonds may enter or leave an index for a variety of reasons, such as, capital changes and changes in liquidity.

Capital changes

- mandatory redemptions

- optional redemptions: call, put, conversion, extension

- issue price related: partly paid to fully paid

- Re-issue of existing bonds

- Change in outstanding amount due to OMO by RBI

Changes in Liquidity

A bond may be deemed illiquid if there is no market lot trade for three consecutive trading days. A bond can enter the index when:

- a partly paid bond becomes fully paid, and

- trading volumes satisfy the above conditions of liquidity.

10.1.10   Principal Return Index and Total Return Index

The PRI tracks the price movements of bonds and is a mirror image of the movement of market yields. The TRI tracks the returns available in the bond market. In a falling interest rate scenario, the index gains on account of interest accrual and capital gains, losing on reinvestment income, whereas during rising interest rate periods, the interest accrual and reinvestment income is offset by capital losses. Therefore the TRI typically has a positive slope except during periods when the drop in market prices is higher than the interest accrual. Figure 10.1 tracks the l-Bex Total Return Index. Figure 10.2 tracks the l-Bex Principal Return Index.

While there exists an array of indices for the equity market, a well-constructed and widely accepted bond index is conspicuous by its absence. There are a few additional difficulties in construction and maintenance of debt indices. First, on account of the fixed maturity of bonds vis-a-vis the perpetuity of equity, the universe of bonds changes frequently (new issues come in while existing issues are redeemed). Secondly, while market prices for the constituents of an equity index are normally available on all trading days over a long period of time, market prices of constituent bonds in a bond index, irrespective of the selection criteria used, may not be available daily. This is on account of the fact that the liquidity of a security varies over its lifetime and, in addition, can witness significant fluctuations over a short period of time. However, market participants need an index to compare their performance with as well as the performance of different classes of assets. A widely tracked benchmark in this context is the

ICICI Securities' (Isec) bond index (i-BEX), which measures the performance of the

Figure 10.1: PrincipalReturnIndex

Figure 10.2: TotalReturnIndex
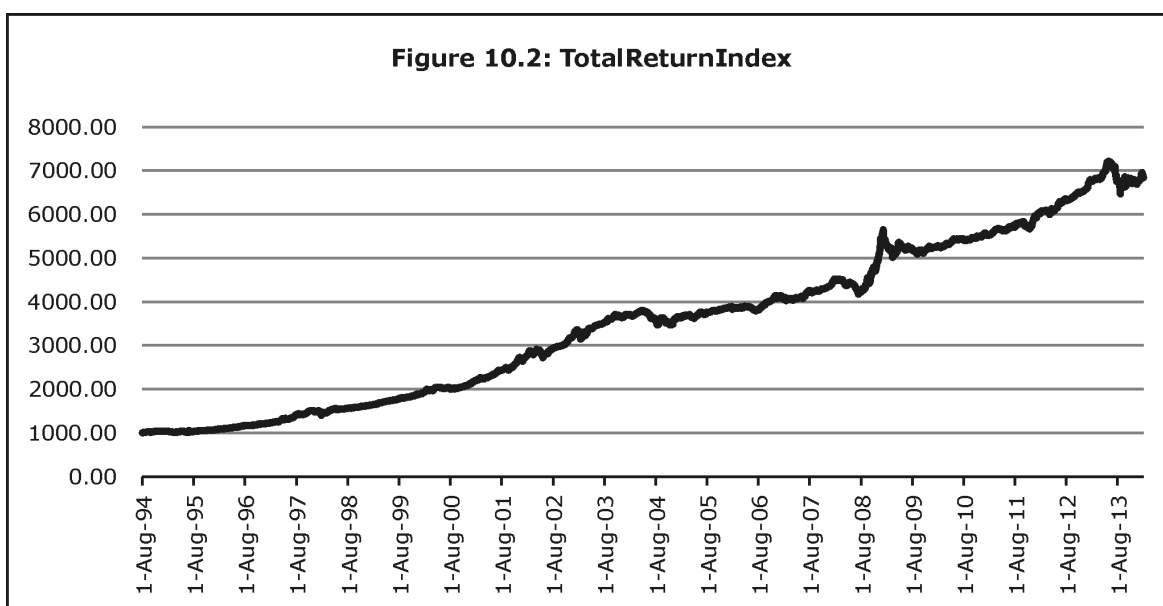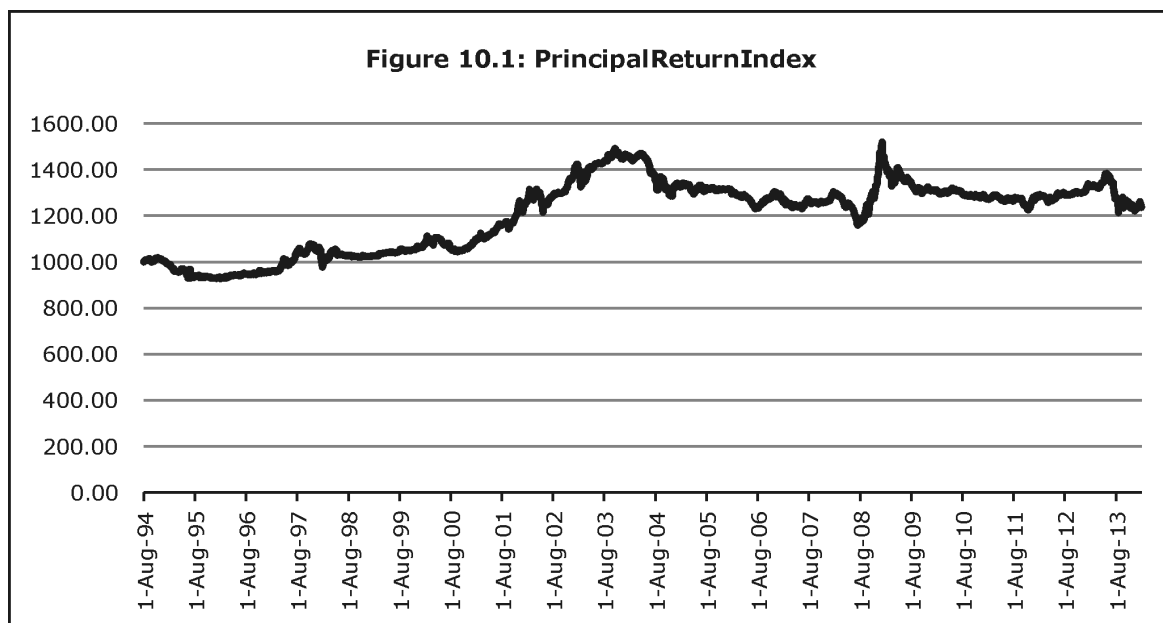
bond markets by tracking returns on government securities NSE's GSec Index and NSE's T-Bills Index. These have emerged as the benchmark of choice across all classes of market participants - banks, financial institutions, primary dealers, provident funds, insurance companies, mutual funds and foreign institutional investors. It has two variants, namely, a Principal Return Index (PRI) and Total Return Index (TRI). The PRI tracks the price movements of bonds or capital gains/losses since the base date. It is the movement of prices quoted in the market and could be seen as the mirror image of yield movements.

During 2007-08, the PRI of i-BEX and TRI Index increased by 4.10% and 12.72% respectively. The TRI tracks the total returns available in the bond market. It captures both interest accruals

and capital gains/losses. In a declining interest rate scenario, the index gains on account of interest accrual and capital gains, while losing on reinvestment income. As against this, during rising interest rate periods, the interest accrual and reinvestment income is offset by capital losses. Therefore, the TRI typically has a positive slope except during periods when the drop in market prices is higher than the interest accrual.

The NSE-government Securities Index prices components off the NSE benchmark ZCYC, so that the movements reflect returns to an investor on account of change in interest rates. The index provides a benchmark for portfolio management by various investment managers and gilt funds.

10.2 THE FIMMDA NSE MIBID-MIBOR[7]

10.2.1 Introduction to Polled Benchmarks

The debt markets in India do not have an organizational form that supports a transparent form of trading where, prices and rates are observable by all participants. The debt markets are distributed dealer markets in which, trades are struck between dealers over telephones, after negotiations. Since such trades are not centrally reported, last traded prices are also not observed in such markets.

One of the methodologies used to obtain market information in such distributed dealer markets is the conduct of a poll amongst dealers, and create an order book that comprises the prices at which these dealers are willing to trade as principals. The design of the poll can be tuned to achieve the objective of estimating the market rates at the instant of sampling. There are two variations to the objective of such polling: one kind of poll occurs either at the beginning of the market or during market hours, when participants in the poll provide their estimate of the market rates at the time of the poll; an alternate methodology is the polling of the last traded prices from dealers soon after the close of the market.

The polling technique, which uses a sample of dealers, can have two variations: dealers can be asked to quote rates at which they would trade as principals; alternatively dealers could provide their estimate of the market rate, at the time of polling. The results of the poll are impacted by the choice of these alternate polling objectives.

From the results of the poll, by putting together the rates of the sample of dealers, estimates of liquidity in the market as a whole is estimated. The estimation techniques have to account for biases created by extending the results obtained from the sample, for the market as a whole. The manner in which the mean of the sample is estimated has important implications for the reliability of the estimate, because the range of poll results could carry elements of noise, manipulation and idiosyncratic variation, which would impact the sample mean.

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[7] The methodologies described in this chapter were developed by Dr. Ajay Shah. For a complete discussion, refer to, "Improved Methods for Obtaining Information from Distributed Dealer Markets," by Ajay Shah, IGIDR, September 1998.

The NSE MIBOR is a polled benchmark, whose polling and sample mean estimation techniques explicitly account for the above issues in creating a market benchmark for debt markets.

10.2.2 Polling Methodology

The polling methodology involves the following:

a. A randomly chosen sub-set of respondents from a population of 29 participants, consisting of dealers and principal investors (banks, institutions and primary dealers) in the debt markets is chosen on every polling day.

b. At an appointed time, they are asked to report their perception of the bid and ask rates in the market, for a range of tenors, on a fixed trade value of Rs. 100 million. Currently, quotes are polled and processed daily by the NSE at 0940 hours for overnight rate and at 1130 hours for the 14 day, 1 month and 3 month rates.

c. Participants in the poll are free to provide both bid and ask, or either one of the rates.

d. The sampled information from poll participants is kept confidential. This is to avoid possible cartels and manipulation in the poll process.

e. Monitoring of quotes to assess quality of poll participant rates is also done. This is to ensure that participants, who provided noisy estimates, are identified, and less frequently polled.

10.2.3 Methodology to Determine Average Rates

After the range of rates is obtained from the poll, an appropriate methodology that identifies the benchmark bid and asks is applied to the data. Many exchanges use a simple trimmed mean, where the outliers are trimmed, and the average rates are obtained from the mean of the trimmed sample. There is a well known trade-off between statistical efficiency and vulnerability to manipulation, in methodologies that use a simple trimmed mean.

The NSE MIBOR uses a more sophisticated methodology for obtaining the sample mean, such that the extent of trimming is optimized to reduce the vulnerability of data to manipulation, while simultaneously obtaining unbiased estimates of the sample mean. A statistical bootstrapping technique is used to arrive at an adaptive trimmed mean, which determines the mean, after a series of computer intensive iterations that successively trim sample data of noise, and locate the mean and the standard deviation. The overnight rates are disseminated daily to the market at 0955 hours and the 14 day, 1 month and 3 month rates at 11.50 hours.

From the data obtained, NSE disseminates the average bid rate (MIBID) and the average offer rates (MIBOR) and the standard deviation of sample quotes from these means. This data provides a benchmark of market rates, which is used for a variety of pricing, trading and valuation applications. Since the data is captured and processed by an independent agency, which has no direct trading interest in the markets, the NSE benchmarks are widely used by market participants.

NSE has been computing and disseminating the NSE Mumbai Inter-bank Bid Rate (MIBID) and NSE Mumbai Inter-bank Offer Rate (MIBOR) for the overnight money market from June 15, 1998, the 14-day MIBID/MIBOR from November 10, 1998 and the 1 month and 3 month MIBID/MIBOR from December 1, 1998. Further, the exchange introduced a 3 Day FIMMDA-NSE Ml BID-MIBOR on all Fridays with effect from June 6, 2008.

The NSE MIBID/MIBOR is used as a benchmark rate for majority of deals struck for interest rate swaps, forward rate agreements, floating rate debentures and term deposits. Bankers, issuers and investors are using the NSE MIBID/MIBOR extensively. Banks have been active in devising tailor-made products to suit the customer needs and have also linked term deposit rates to the overnight MIBID/MIBOR. Issuers use these to price instruments on the basis of daily interest rate movement and hedge against adversities. These provide a comfort zone against any unexpected volatile market movements having an impact on the financial commitments of the issuer in respect of its debt. The transparency resulting from dissemination of MIBID/MIBOR has helped the issuers to obtain finer rates by issuing bonds linked to MIBOR. A number of organisations are benchmarking interest rate swaps to MIBID/MIBOR.

The Reuters also conducts a poll of sample dealers and publishes the benchmark rates every day. Some floating rate products use the Reuters MIBOR as benchmarks. The procedure varies from the NSE model in two important ways:

a.   The polling techniques asks for the dealer's rates at which they are willing to trade as principals, rather than the dealers view of the market rates, as is the case with the NSE MIBOR.

b.   The technique used for determining the average rates is the simple trimmed mean that trims a given percentage of outliers, and obtains the average rates from the remaining values.

Figure 10.3: Historical NSE-MIBID/MIBOR overnight rates
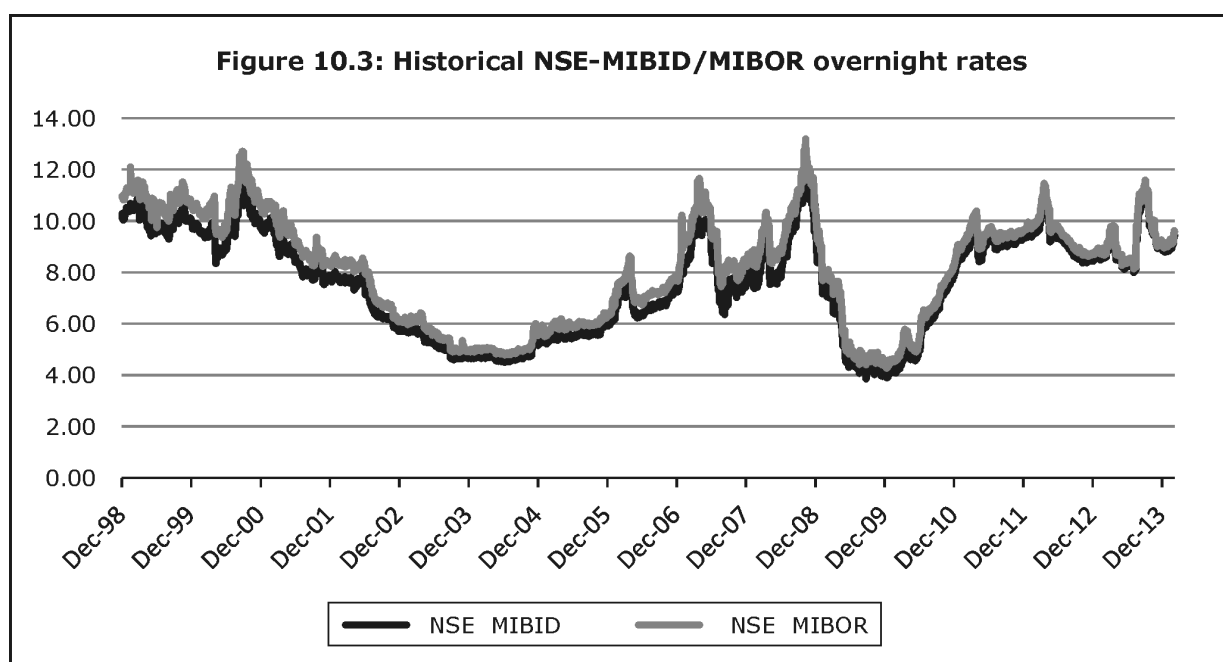
Model Questions

1.   **What does re-balancing of a bond index mean?**

   a. Changing the weightages in the index so that the market capitalisation of bonds is kept constant

   b. Adjusting the index for changes in the composition of the index portfolio to ensure that artificial capital gains or losses are not included in the index.

   c. Adjusting the composition of the index, whenever coupons are paid, such that the index is not impacted by changes in accrued interest.

   d. Changing the composition of the index when yield alters, such that duration of the index is kept constant.

Answer: b

2.   **What is the information gathered from market participants in the poll to determine NSE MIBOR?**

   a. The rate at which they would be able to lend and borrow in the markets.

   b. The rate at which they are willing to lend and borrow amongst one another.

   c. Their view of the market rates for lending and borrowing.

   d. Their view of the lending and borrowing rates of specific market participants.

Answer: c

CHAPTER 11: TRADING MECHANISM IN THE NSE-WDM

Secondary market activity in the NSE's Wholesale Debt Market (WDM) segment happens through the NEAT (National Exchange for Automated Trading) system, which is a fully automated screen based trading system. The WDM segment is meant primarily for banks, institutional and corporate participants and intermediaries to enter into high value transactions in debt securities issued by the central and state governments, public sector units, financial institutions and corporate bodies. Both short-term instruments like treasury bills and commercial papers, and long-term instruments such as bonds and debentures, are available for trading in the WDM segment of the NSE.

11.1 DESCRIPTION OF THE NSE - WDM

The trades on the WDM segment can be executed in the Continuous or Negotiated market. In the continuous market, orders entered by the trading members are matched by the trading system. For each order entering the trading system, the system scans for a probable match in the order books. On finding a match, a trade takes place. In case the order does not find a suitable counter order in the order books, it is stored in the order books as a passive order. This could later match with any future order entering the order book and result into a trade. This future order, which results in matching of an existing order, is called the active order. In the negotiated market, deals are negotiated outside the exchange between the two counter parties and are reported on the trading system for approval.

The WDM trading system recognizes three types of users - Trader, Privileged and Inquiry. Trading Members can have all the three user types whereas Participants are allowed privileged and inquiry users only. The user-id of a trader gives access for entering orders or trades on the trading system. The privileged user has the exclusive right to set up counter party exposure limits. The Inquiry user can only view the market information and set up the market watch screen but cannot enter orders or trade or set up exposure limits. The WDM supports two kinds of trades: Repo trades (RE), which are reversed after a specific term, allowed only in specified securities and Non-Repo (NR) trades, which are for outright sales and purchase, allowed in all securities. Trading in debt as outright trades or as 'repo' transactions can be for varying days of settlement and repo periods. For every security it is necessary to specify the number of settlement days (whether for same day settlement or T+1 etc. depending on what is permitted by the Exchange), the trade type (whether Repo or Non Repo), and in the event of a Repo trade, the Repo term. Order matching is carried out only between securities which carry the same conditions with respect to settlement days, trade type and repo period, if any.

The security itself is represented by three fields -

- Security Type (e.g. GS for Government Securities),

- Security (e.g. CG2010 - Central Government maturing in 2010) and

- Issue (e.g. 6.25%).

All order matching is on the basis of descriptors. All enquiries also require the selection of valid descriptors. There are 6 fields, which together form an entity, which is called 'Security Descriptor' in the system:

Security Type	Security	Issue	Settlement days	Trade Type	Repo Term
GS	CG2015	7.61%	1	Non Repo	
TB	364D	110604	1	Repo	7

All trade matching is essentially on the basis of descriptor, its price (for non-repos)/ rate (for repos) volume and order conditions and types. All volumes, in order entry screens and display screens, are in Rs. lakh unless informed to the trading members otherwise. All prices are in Rupees. Repo rates are in percentages. A maximum of two decimal places are allowed for values and four decimal places for prices. The Exchange sets the multiples (incremental value) in which orders can be entered for different securities. The Exchange announces from time to time the minimum order size and increments thereof for various securities traded on the Exchange.

11.2 ORDER TYPES AND CONDITIONS

The trading system provides tremendous flexibility to the users in terms of the type of orders that can be placed on the system. Several time-related, price-related or volume-related conditions can easily be placed on an order. The trading system also provides complete on-line market information through various inquiry facilities. Detailed information on the total order depth in a security, the best buys and sells available in the market, the quantity traded in that security, the high, the low and last traded prices are available through the various market screens at all points of time.

Order Types

The most frequently used order type is the Day order with settlement dates varying from T+0 to T+2. The trading system also provides complete on-line market information through various inquiry facilities. Detailed information on the total order depth in a security, the best buys and sells available in the market, the quantity traded in that security, the high, the low and last traded prices are available through the various market screens at all points of time

Order Matching Rules for continuous market

Orders lying unmatched are called 'passive' orders. Fresh orders which enter the system and are scanning for a suitable match are called 'active' orders. Orders are matched as per price-

time priority. The best buy order is the one with the highest buy price and the best sell order is the one with the lowest sell price. Order matching is done automatically by the system. The trade price is based on passive order price. In case of repo trades, the best buy order is one with lowest buy rate and the best sell order is one with the highest sell rate. The trade rate is based on passive order rate. However, trade price for repo trades is the active order price.

11.3 MARKET PHASES AND STARTING UP

Pre-Open Market Phase

The pre-open period commences from 9.00 hrs this period allows the trading member/ Participant to:

- set up counter party exposure limits

- set up Market Watch (the security descriptor)

- make inquiries

Market Timing

The Market remains open from 9:00 a.m. to 5:00 p.m. on Monday to Friday. At the start of the trading session, a message is displayed indicating that trading would begin. The following activities are allowed at this stage:

- Order Activity

- Inquiries

- Trade Activity

- Negotiated Trade Activity

When the market closes, trading in all securities ends and none of the above functions except requesting trade cancellations are allowed.

Post-Closing Period (Also called as SURCON)

At this stage, the period of SURveillance and CONtrol (SURCON) commences. In this stage, a Trading member has only inquiry access. However, a Trading member can request a trade cancellation till 3.00 pm for same day trades and 5.15 p.m. for other day trades He can also modify report requests. After this period, the trading system processes the data to make it available for the next day. A Trading member/Participant must remain logged on to the system till 5.50 p.m. as reports are generated at his workstation. The member loses connection to the trading system at 5.50 p.m. and does not have access till 6.15 p.m. A trading member gets access to the inquiry screens from 6.45 p.m. to 7.00 p.m. The user can also set/ modify the CP exposures set by him vis-a-vis other Trading members or Participants during 6.15 p.m. to 7.00 p.m., to prepare for trading on the next day.

11.4 TRADING MECHANISM

Counter-party Limits

A Trading member/ Participant are required to set CP limits on other Trading members/ Participants only on the first occasion. These limits are stored by the system and used for validation of all transactions as per the definition. (See the CP exposure screen given in Figure 11.1). The limit available is reduced by trade consideration, each time a valid trade is executed by the Trading member/ Participant against the particular Participant/ Trading member. The limit becomes available only after the settlement of the trade i.e. all SD trades reduce limit available during the day for trading and become available for the next trading day. Where trades are executed for other day settlement (say, T+2) the limit becomes available only for trading on T+3rd day. The limits are overwritten only when the Trading member/ Participant modifies the previously set limits. However CP exposure limit can not be reduce below the outstanding current asset limits already taken. When a Trading member/ Participant are added to the system his default limit on others and others on him is zero. Hence the new Trading member/ Participant will not be able to transact unless others set limit on him or he sets a limit on others.

All trades executed by trading members for their Participants (entities registered with NSE as Participants) are not counted in the particular Trading member's counterparty exposure and are reckoned only in the Participant's counterparty exposure. Though all client trades which are done by the Trading member on his own account are settled by the client directly, the exposure limit available of the Trading member is reduced. In case of Repo trades the CP limit is reduced by trade value and becomes available only after the forward leg is executed.

Participants can set limits for buy or sell or both. Limits with respect to assets and call, and the counter- party code are entered in the screen. Counterparty exposure limits can be set by all Participants before market opening, during market hours and after market closes on any day. However CP exposure limit can not be reduce below the current day's exposure already taken.

Exchange notifies from time to time for which markets the CP limits are applicable. If there is any such change, then "Current Limit' is displayed according to new change. If a trade is cancelled then system restores CP limits i.e. current limit for that counter party is decreased by trade value and same is available for future trades with that counter party. If the limit originally set by a Trading member/ Participant is Rs. 150 lakh against a counterparty on any day and the used up limit on the next trading day is Rs. 120 lakh, the Trading member/ Participant can modify his previously set limit to any new value. If the new limit is lower say Rs. 100 lakh, the system will register the new limit but continue to show the current value or the used up limit as Rs. 120 lakh till the time these trades are settled. The new limit is applicable for all future trades until it is modified.

Figure 11.1: NEAT Counter-party exposure screen

11.5 ORDER ENTRY

Order entry mechanism enables the Trading Member to place orders in the market. The system accepts orders from all Trading Members and provides equal access to all users. The order entry screen is shown in Figure 11.2.

Figure 11.2: Order Entry Screen on the NEAT

11.5.1 Order Entry in Continuous Market

The order entry screen is activated in the following manner:

On pressing the buy or sell key, the system automatically picks up information from market inquiry screens and fills in the following fields:

- Security type

- Security

- Issue

- Settlement Period

- Trade type

- Repo term (in the case of a repo)

The user is required to fill in the order value and price (and repo rate in the case of a repo). The maximum number of decimal places for the value is 2 and for the price and repo rate is 4. If the user wants to place an outright BUY order and there are SELL orders available, then the best sell price and the value available at that price appear by default (Same figures as appear in the market watch for that security descriptor).

In case of repo trades the user is not required to enter the price, as the system provides the default price. The default price is based either on traded price in that security on the trading system or on traded price in that security outside the Exchange.

For example, in the case of Dated Government Securities if there is no traded price available on the system, the default price is based on the traded price reported in RBI's SGL press release. If there is no such default price, the seller's price is considered as the price for repo trade and the consideration is calculated accordingly.

The order value should be equal to or greater than minimum order size and in multiples of the increments. The Exchange notifies the members of the minimum order size and the increments thereof for various securities that are traded on the Exchange.

11.5.2 Order Entry in Negotiated Trades Market

In case of order entry in Negotiated trades market or Negotiated trade entries as they are referred to, the procedure is same as in the case of continuous market, for initiating the screen and auto fill-up of fields. Additionally, the user is required to fill in the Counter Participant ID (the Participant responsible for settlement with whom the trade is negotiated) in the case of a negotiated trade entry. The Participant and counter Participant could also be Trading members.

In the case of a negotiated trade entry, the system does not allow the user to add attributes such as GTC, GTD, IOC, MF, AON, DV and OS. In case of repo trades default price is displayed for both buyer and seller.

Both of them are allowed to change this price. However the trade takes place only if both enter same price.

All negotiated trades require Exchange approval and one of the options that the Exchange could exercise in this regard is to throw the security descriptor open for participation period. As a result, if the negotiated trade entry is made when there is not sufficient time before market close for participation period and order matching at the end of the participation period, it is cancelled automatically by the system.

Participation period time	1 minute
Participation period match time	1 minute
Market close time	5.45 p.m.

A negotiated trade entry made in last two minute of market close could result in a negotiated trade and hence, the trade entry is cancelled as soon as it is entered as there is not enough time for participation period. The counter negotiated trade entry is automatically removed from the system at the end of the day.

Order Number

When an order is entered by the user, the system registers the order and confirms to the user by displaying an Order Confirmation number. This number has the date of the order built in as the first 8 digits. Each order number is unique. This order number is used for all subsequent amendments and cancellations, if any. This is true in case of orders entered in the continuous as well as the negotiated trades market.

Order Confirmation Slip

For every order accepted by the trading system, an order confirmation slip is generated with the order number and all details of the given order at the user's local printer.

11.6 ORDER VALIDATION

Continuous Market

The Trading system checks and validates the details when an order is entered. The following checks are made:

- Orders can be entered only within the trading hours for the market i.e. it should not be during pre-open period or after market close.
- The security type, security and issues are valid values and together should form an acceptable combination.
- Trading in this security type, security and issue should be allowed at that time.
- The Trading member entering the order should not be under suspension by the Exchange.
- In case of an order entered by a Trading member on behalf of a Participant, the

Trading member as well as the Participant should not be under suspension.

- Order value should be in multiples of the increment and at least equal to the minimum order value for the security type or issue.

- The specified settlement period should be available for trading for the security type.

- The settlement days entered for that order is a permitted settlement period. The 'settlement days' is counted as per the working days. e.g. - If 15th July is holiday, then all orders for T+1 settlement entered on 14th July are accepted. T+ 1 trades done on 14th are settled on 16th and T+2 trades done on 14th are settled on 17th. In case of Repo transactions ready leg settlement is counted as per working days but forward leg settlement is counted as per calendar days. The maximum number of days permitted for settling a trade is notified to the members by the Exchange from time to time. Currently repo upto 14 days are allowed.

- The specified trade type should be available for trading for the security type.

- The Trading member/Participant should be permitted to trade in the security type for that settlement period (Same/ Next/ Two) for the trade type (Repo/ Non-Repo) for the Continuous Market Type

- The Trading member/Participant should be allowed to buy (lend)/ sell (borrow) in that security type.

- For an order, the order value should not exceed the issue value.

- The member is allowed to enter orders on behalf of only those Participants who are registered with the Exchange for non-participant; member has to put their own broker code.

- Extra validation checks for order attributes or conditions are performed before an order is confirmed by the system irrespective of whether they are buy or sell orders.

After the necessary checks and validation are completed, the system generates a unique order number; time stamps it and sends an order confirmation to the member with order confirmation slip to be printed at his end.

Negotiated Trades Market

For a trade entry in the negotiated trades market, similar checks as in the case of an order entered in the continuous market are made with a few variations.

Following is a list of checks for entries in the negotiated trades market:

- Negotiated trade entries can be entered only within the trading hours for the market i.e. it should not be during pre-open period or after market close.

- The security type, security and issues are valid values and together should form an acceptable combination.

- Trading in this security type, security and issue should be allowed at that time.

- The Trading member entering the negotiated trade entry should not be under suspension by the Exchange.

- In case of a negotiated trade entry by a Trading member on behalf of a Participant, the Trading member as well as the Participant/counter Participant should not be under suspension.

- Trade value should be in multiples of the increment and at least equal to the minimum order value for the security type or issue.

- The specified settlement period should be available for trading for the security type.

- The settlement days entered for that order is a permitted settlement period. The 'settlement days' is counted as per the working days. In case of Repo transactions ready leg settlement is counted as per working days but forward leg settlement is counted as per calendar days. The maximum number of days permitted for settling a trade will be notified to the members by the Exchange from time to time.

- The specified trade type should be available for trading for the security type.

- The Trading member/Participant should be permitted to trade in the security type for that settlement period (Same / Next / Two) for the trade type (repo / Non-repo) for the Negotiated trades market type.

- The Trading member/Participant should be allowed to buy (lend)/ sell (borrow) in the security type.

- The trade value should not exceed the issue size.

- The member is allowed to enter orders only on behalf of those Participants/ Counter Participants who are registered with the Exchange. for non- participant, member has to put their own broker code.

After the necessary checks and validation are completed, the system generates a unique trade entry (negotiated order) number, time stamps it and sends a trade entry (negotiated order) confirmation to the member with a confirmation slip to be printed at his end.

It is not possible to modify an outstanding negotiated trade entry. Currently, in case a trading member cancels a negotiated order before neat approval of the trade by the Exchange, the counter broker does not get any message to this effect. Now if a trading member cancels his side of a Negotiated Trade order, the counter party member receives a message "Negotiated trade alert cancelled as the counter broker has cancelled its order" in the message window at his trader workstation. The details of the order such as the security descriptor, volume and price are also displayed after the above message. The user can cancel his negotiated orders through single order cancellation. The order can also be cancelled by invoking the Outstanding Order screen and double clicking on the relevant order.

11.7 ORDER MATCHING

Continuous Market

Order Matching is the process of matching the buy and sell orders on the basis of certain matching algorithms. As a result of matching process, a trade is generated. If an order placed is not matched immediately, the system stores the order in the order book according to price-time priority. The orders are matched on the basis of price-time priority. The best buy order matches with best sell order. An order may match partially with another order resulting in multiple trades. The best buy order is the one with the highest price and the best sell order is the one with the lowest price. In case of repo transaction, the best buy order is the one with lowest repo rate and the best sell order is the one with highest repo rate. The priority followed in matching orders is:

• Best price

• Within price, time priority

Counter-party Exposure Limits

The process of order matching considers the CP exposure limit set by the Trading members/ Participants on other Trading members or Participants.

These limits apply for order matching in market types as notified by Exchange. Whenever there is potential order match available the system checks the counter party exposure limit available vis-a-vis the potential counter party before approving the match. If the resulting trade is not crossing the counter party exposure limit then the system concludes the trade provided other parameters are met.

When a member transacts with another member or Participant on whom he has set a limit, the balance limit available gets reduced by an amount equal to the trade consideration as shown in the message window. During trading hours, if a potential trade results in the current CP limit crossing the warning limit set by the Exchange then the system concludes the trade and a message appears on the workstation of the participant on whose behalf the order entered stating that the warning limit has been exceeded. After the warning CP limit has been crossed, if the member continues to enter orders and if a potential trade results in crossing of CP limit set by the member, then the system allows the trade provided it is less than or equal to the cut off limit set by the Exchange. A message appears on the workstation of the participant on whose behalf the order was entered stating that CP limit has been exceeded with the respective Trading member/Participant who has entered the counter order.

After crossing the warning limit, if the member continues to enter orders and if resulting trade is exceeding the cut off limit set by the Exchange, then the system does not allow the trade. It skips the passive order and go to the next best passive order. If it does not find a suitable match in the books so that the current value of CP limit is within the cut off limit, then such an

order remains in the respective book. Such orders may find matches with orders from another Trading member/ Participant with whom CP exposure is not exhausted.

Freeze

The Exchange sets lower and upper limits to the trading price for all the issues in the market. In case a match results in the price falling outside the trading range, the trade results in a freeze in the security descriptor. For a frozen security descriptor, order entry is restricted by the system till the time the freeze is resolved by the Exchange. The Trading members involved in the trade get a message that the match has resulted in a freeze. All other users of the system are informed that a freeze has taken place in the security descriptor. In case of freeze the Exchange has following options:

1.   Cancel the buy order and approve the sell order

2.   Cancel the sell order and approve the buy order

3.   Approve both the orders which result in trade depending on the turnover limit and counter party exposure limit.

4.   Cancel both the orders

5.   Start participation period

The system checks for a price freeze only during a trade i.e. only when there is a potential match. If an order is entered at a price outside the set range, it is allowed to be written to the book. There is no validation for price freeze at order entry level.

Participation Period

With respect to a freeze, the Exchange can start a participation period for the security descriptor. The system informs all the users that the freeze has been resolved and the participation period is open for order entry. The orders causing the freeze are retained in the books and are allowed to participate in this process.

During the participation period, there is no continuous matching in that particular security descriptor by the system. The orders entered by the members are written directly to the Board lot book. Orders entered are by default fully disclosed and 'DAY' orders. Orders with other price, time and volume conditions are however not accepted during the participation period. The participation period continues for a duration specified by the Exchange. After the participation period, orders are matched by the system as per the normal matching algorithm i.e. best buy order with the best sell order. For this matching process, all the orders in the Book are considered. This includes orders present in the book before the occurrence of the freeze as well as orders entered during the participation period.

Negotiated Trades Market

All negotiated trade entries are stored in a separate book in the system. A negotiated trade entry can match only with another counter negotiated trade entry. All negotiated trade

matching is one-to-one and there can be no partial matches. When a negotiated trade entry is made, the system checks for the following details:

For the given security descriptor, the Counter Participant ID of the negotiated trade entry should match the Participant ID of the counter negotiated trade entry. The trade value, price and repo rate in case of a repo trade should match exactly with that of the counter trade entry.

If no match is found for the negotiated trade entry, it is written to the negotiated trade entry book.

The Exchange has the options of approving the negotiated trade, canceling the trade in which case both the negotiated trade entries would be cancelled or start a participation period.

With respect to a negotiated trade, the Exchange can start a participation period. The negotiated trade entries involved are written to the Board lot book as normal orders retaining their original time stamp. The participation period process and matching remains the same as explained in the case of freezes.

11.8 TRADE MANAGEMENT

A Trade is a transaction that takes place when two orders match each other. Whenever a trade takes place, the system sends trade confirmation messages to each of the Trading members involved. The system also broadcasts the trade confirmation to all Trading members in the market through the Ticker screen. A trade confirmation slip also gets printed at each of the member's workstation with the same unique trade number.

There are some conditions that could prevent a possible match from taking place. These conditions are as follows:

1)   Suspension is in effect for the ST/ S/ I involved.

2)   Suspension is in effect for any of the Participants involved.

3)   Suspension is in effect for any of the Trading member involved.

4)   Turnover limit for one of the members involved in the trade is exceeded due to the trade.

5)   CP limit set by the trading member / participant on the counter party is exceeded due to the trade.

The above is true for trades in both continuous and negotiated trades markets.

Negotiated Trade Entry Screen

Currently the user has to enter order details in the negotiated buy and negotiated sell order screens. A new facility 'Negotiated Trade Entry Screen' is provided wherein a user can enter both the buy and sell negotiated trade order details in a single screen, in case a trading member represents both buyer as well as seller in a negotiated trade.

Alternatively, the user can first highlight the desired security descriptor with the highlight bar on market watch screen. On invoking the negotiated trade entry screen the security details gets defaulted on to the screen. The user is required to enter the desired Sell Participants code in the Counter Participant code field (CP Field) and the Buy Participants code in the field which by default displays the trading members' code. After entering all the required details in the respective fields the user can commit the trade and confirm the trade.

On confirming the negotiated trade details a message "Negotiated trade needs approval: …….. (Order details of the trade)……. "Is displayed in the message window screen. The system generates a buy and sell order confirmation slips separately with distinct order numbers.

The Exchange then receives an alert to this effect. In case the Exchange approves the negotiated trade then a message "Negotiated Trade: …… (Order details of Buy and Sell).… Approved by Control" is displayed in the message window screen and the trading member receives separate buy and sell trade confirmation slips. In case the Exchange rejects the negotiated trade alert then a message "Order ……. (Order details of Buy and Sell) Negotiated Trade not approved - order cancelled" is displayed in the message window screen and the trading member receives separate buy and sell order cancellation slips.

11.9 REPORTS

The following reports are available to the user at the end of every trade day:

1.   Open Orders Today: This report details the orders that are available for trading the next trading day.

2.   Orders Placed Today: This report details all the orders placed by the member on a given trading day.

3.   Cancelled Orders Today: This report details the orders cancelled by the member on a trading day.

4.   Trades Done Today: This report details all trades executed by the member on a trading day.

5.   Activity Log Report: This report details all the activities carried out by the member on a trading day.

11.10 SETTLEMENT

Trades on WDM segment are settled gross, on a trade for trade basis, i.e., each transaction is settled individually and no netting of transactions is allowed. The Exchange monitors settlement of these trades on day to day basis, wherein participants confirm all trades and settlement thereof and also provide complete settlement details to the Exchange through an on-line, interactive data communication system and faxes. Each trade has a unique settlement date specified upfront at the time of order entry and is used as matching parameter. It allows settlement period T+I for Government Securities &. Treasury Bills and for Non-government

Securities ranging from same day (T+0) to a maximum of two days (T+2).

All Government securities trades settled through Clearing Corporation of India Ltd. It facilitates settlement on Delivery versus Payment (DVP-II) basis which provides for settlement of securities on gross basis and settlement of funds on net basis simultaneously. For other securities, funds are settled through exchange of physical instruments such as, pay-orders or cheques, for value on the settlement day in exchange for Securities (Either physical certificates or through Demat).

11.11 RATES OF BROKERAGE

NSE has specified the maximum rates of brokerage chargeable by trading members in relation to trades done in securities available on the WDM segment of the Exchange, as given below:

Order Value upto Rs.10 million	Brokerage
Govt. Of India Securities and T-Bills	
Order Value upto Rs.10 million	25 ps. per Rs.100
More than 10 million upto 50 million	15 ps. per Rs.100
More than 50 million upto 100 million	10 ps per Rs.100
More than 100 million	5 ps per Rs.100
State Govt. Securities & Institutional Bonds	
Order Value upto Rs.2.5 million	50 ps. per Rs.100
More than 2.5 million upto 5 million	30 ps. per Rs.100
More than 5 million upto 10 million	25 ps per Rs.100
More than 10 million upto 50 million	15 ps per Rs.100
More than 50 million upto 100 million	10 ps per Rs.100
More than 100 million	5 ps per Rs.100
PSU & Floating Rate Bonds	
Order Value upto Rs.10 million	50 ps. per Rs.100
More than 10 million upto 50 million	25 ps. per Rs.100
More than 50 million upto 100 million	15 ps per Rs.100
More than 100 million	10 ps per Rs.100
Commercial paper and Debentures	1% of the order value

Model Questions

1. **Which of the following statements about negotiated trade entry is false?**

    a. If a trading member represents both the buyer and the seller, negotiated trade orders can be entered in a single screen.

    b. Trading members can invoke the security descriptor, and fill up the code and transaction details of the selling participants, and confirm the trade.

    c. All negotiated trades require approval of the exchange, only after which trading members receive confirmation slips.

    d. Negotiated trade entries can be made outside of set counter-party limits, and sent for approval within the end of the trading day.

Answer: d

2. **A trading member on the WDM segment of NSE sets up a counter party limit of Rs. 400 lakh against a counter party and utilise Rs. 280 lakh on a given day which is outstanding in current asset limit. The next day, he modifies the CP limit to Rs. 150 lakh. Which of the following will hold good?**

    a. The CP limits cannot be modified to al level lower than amounts in current asset limit.

    b. The counter party has to be notified about the reduction in the CP limit.

    c. The new CP limit will result in the counterparty canceling or reversing that amount of transaction that exceed the new CP limit.

    d. The earlier transaction will remain in the system as utilized CP limit until those trades are settled; the new CP limit will apply for fresh trades.

Answer: a

3. **Repo trades on the NEAT are matched in terms of**

    a. Rates, volume and other order conditions.

    b. Price, volume and other order conditions.

    c. Price-time priority.

    d. Rates-time priority.

Answer: a

CHAPTER 12: REGULATORY AND PROCEDURAL ASPECTS

The debt markets in India are regulated by two agencies: RBI and SEBI. In a notification issued by the Government on March 2, 2000, the areas of responsibility between RBI and SEBI have been clearly delineated. In terms of this notification, the contracts for sale and purchase of government securities, gold related securities, money market securities and securities derived from these securities and ready forward contracts in debt securities shall be regulated by the RBI. Such contracts if executed on stock exchanges shall however be regulated by SEBI, in a manner that is consistent with the guidelines issued by the RBI. However, regulation of money market mutual funds, which pre-dominantly invest in money markets, is done by the SEBI, which is the regulatory authority for the mutual fund industry SEBI is the regulating agency for the stock markets and the member-brokers of the stock exchanges, and therefore regulates the listing and trading mechanism of debt instruments. Regulation of corporate debt issuance is also under the purview of SEBI.

The issuance of debt instruments by the government is regulated by the Government Securities Act 2006. The issuance of corporate securities is regulated by the SEBI Guidelines for Disclosure and Investor protection.

The Fixed Income Money Market & Derivatives Association of India (FIMMDA), formed in 1998, is the Self Regulatory Organisation for debt markets. Its objective is to enable market development by involving market participants in the creation of good market practices, uniform market conventions and high levels of integrity in the debt markets. FIMMDA has brought out the Handbook of Market Practices, aimed at creating high standards of conduct and professionalism amongst principals and intermediaries in the market place.

This chapter is divided into three sections, focusing on regulation and market practices. Section 1 discusses the salient provisions of the Government Securities Act, which governs the issuance of government securities. Section 2 is an extract from the SEBI Regulations for issuance of debt instruments by the corporate sector. Section 3 is an extract from the FIMMDA Handbook of market practices.

12.1 GOVERNMENT SECURITIES ACT, 2006

With a view to consolidating and amending the law relating to the Government Securities and its management by the Reserve Bank of India, the Parliament had enacted the Government Securities Act, 2006. The Act received the presidential assent on August 30, 2006.

The Government Securities Act also provides that RBI may make regulations to carry out the purposes of the Act. Government Securities Regulations, 2007 have been made by the Reserve Bank of India to carry out the purposes of the Government Securities Act, 2006.

The Government Securities Act, 2006 and Government Securities Regulations, 2007 have come into force with effect from December 1, 2007. The Government Securities Act applies to Government securities created and issued by the Central and the State Government.

The new Act and Regulations would facilitate widening and deepening of the Government Securities market and its more effective regulation by the Reserve Bank in various ways such as:

i. Stripping or reconstitution of Government securities

ii. Legal recognition of beneficial ownership of the investors in Government Securities through the Constituents Subsidiary General Ledger (CSGL).

iii. Statutory backing for the Reserve Bank's power to debar Subsidiary General Ledger (SGL) account holders from trading, either temporarily or permanently, for misuse of SGL account facility;

iv. Facility of pledge or hypothecation or lien of Government securities for availing of loan;

v. Extension of nomination facility to hold the securities or receive the amount thereof in the event of death of the holder;

vi. Recognition of title to Government security of the deceased holder on the basis of documents other than succession certificate such as will executed by the deceased holder, registered deed of family settlement, gift deed, deed of partition, etc., as prescribed by the Reserve Bank of India.

vii. Recognition of mother as the guardian of the minor for the purpose of holding Government Securities;

viii. Statutory powers to the Reserve Bank to call for information, cause inspection and issue directions in relation to Government securities.

Every Regulation made by the Reserve Bank of India are to be approved by the Parliament.

GOVERNMENT SECURITIES ACT 2006

'Government security' means a security created and issued by the Government for the purpose of raising a public loan or for any other purpose as may be notified by the Government in the Official Gazette.

A Government security may be issued in the form of a-

i. a Government promissory note,

ii. a bearer bond payable to bearer,

iii. a stock or

iv. a bond held in a bond ledger account.

A stock means a Government security (i) registered in the books of the RBI for which a stock

certificate is issued; or (ii) held at the credit of the holder in the subsidiary general ledger account including the constituent's subsidiary general ledger account maintained in the books of the RBI, and transferable by registration in the books of the RBI.

A transfer of a government security shall be valid only if it purports to convey the full title to the security. The transfer of the Government securities shall be made in such form and in such manner as may be prescribed.

GOVERNMENT SECURITIES REGULATIONS 2007

Government Securities Regulations, 2007 have been made by the Reserve Bank of India to carry out the purposes of the Government Securities Act.

The Government Securities Regulations, 2007 provides for transfer of Government securities held in different forms. Government security held in the form of *Government Promissory Notes* is transferable by endorsement and delivery. A *bearer bond* is transferable by delivery and the person in possession of the bond shall be deemed to be the holder of the bond. Government securities held in the form of *Stock Certificate* , Subsidiary General Ledger account including a constituent Subsidiary General Ledger Account) &. Bond Ledger Account are transferable, before maturity, by execution of forms - III, IV & V respectively appended to the Government Securities Regulations. Government securities held in subsidiary general ledger account including a constituents' subsidiary general ledger account or bond ledger account, shall also be transferable by execution of a deed in an electronic form under digital signature.

A person unable to write, execute or endorse a document, may apply to the Executive Magistrate to execute the document or make endorsement on his behalf after producing sufficient documentary evidence about his identity and satisfying the Executive Magistrate that he has understood the implications of such execution or endorsement.

12.2 SEBI ISSUE OF CAPITAL AND DISCLOSURE REQUIREMENTS (ICDR) REGULATIONS 2009[1]

The issue of capital in India is governed by the SEBI (Issue of Capital and Disclosure Requirements) Regulation, 2009[2] . ICDR regulations are applicable for public issue; rights

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[1] Only some provisions pertaining to ICDR Regulations 2009 are discussed here. For greater details, it is recommended that original regulation may be referred to. The regulations are updated as of December 31, 2010.

[2] The ICDR Regulations 2009 have been made primarily by conversion of the SEBI (Disclosure and Investor Protection) Guidelines, 2000 (rescinded). ICDR were notified on August 26, 2009. While incorporating the provisions of the rescinded Guidelines into the ICDR Regulations, certain changes have been made by removing the redundant provisions, modifying certain provisions on account of changes necessitated due to market design and bringing more clarity to the provisions of the rescinded Guidelines (sourced from SEBI circular (SEBI/CFD/ DILyICDRR/1/2009/03/09 dated September 3,2009)

issue[3], preferential issue; an issue of bonus shares by a listed issuer; qualified institutions placement by a listed issuer and issue of Indian Depository Receipts.

General conditions for public issues and rights issues

An issuer cannot make a public issue or rights issue of equity shares and convertible securities[4] under the following conditions:

a. If the issuer, any of its promoters, promoter group or directors or persons in control of the issuer are debarred from accessing the capital market by SEBI or

b. If any of the promoters, director or person in control of the issuer was or also is a promoter, director or person in control of any other company which is debarred from accessing the capital market under the order or directions made by SEBI.

c. If the issuer of convertible debt instruments is in the list of willful defaulters published by the RBI or it is in default of payment of interest or repayment of principal amount in respect of debt instruments issued by it to the public, if any, for a period of more than 6 months.

d. Unless an application is made to one or more recognised stock exchanges for listing of equity shares and convertible securities on such stock exchanges and has chosen one of them as a designated stock exchange. However, in case of an initial public offer, the issuer should make an application for listing of the equity shares and convertible securities in at least one recognised stock exchange having nationwide trading terminals.

e. Unless it has entered into an agreement with a depository for dematerialisation of equity shares and convertible securities already issued or proposed to be issued.

f. Unless all existing partly paid-up equity shares of the issuer have either been fully paid up or forfeited.

g. Unless firm arrangements of finance through verifiable means towards 75% of the stated means of finance, excluding the amount to be raised through the proposed public issue or rights issue or through existing identifiable internal accruals, have been made.

Appointment of Merchant banker and other intermediaries

The issuer should appoint one or more merchant bankers, at least one of whom should be a lead merchant banker. The issuer should also appoint other intermediaries, in consultation with the lead merchant banker, to carry out the obligations relating to the issue. The issuer

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3 Where the aggregate value of specified securities offered is Rs. 50 lakh or more;

4 Convertible security means a security which is convertible into or exchangeable with equity share at a later date with or without the option of the holder of the security and includes convertible debt instrument and convertible preference shares.

should in consultation with the lead merchant banker, appoint only those intermediaries which are registered with SEBI. Where the issue is managed by more than one merchant banker, the rights, obligations and responsibilities, relating *inter alia* to disclosures, allotment, refund and underwriting obligations, if any, of each merchant banker should be predetermined and disclosed in the offer document.

Conditions for Initial Public Offer

1) An issuer may make an initial public offer (an offer of equity shares and convertible debentures by an unlisted issuer to the public for subscription and includes an offer for sale of specified securities to the public by an existing holder of such securities in an unlisted issuer) if:

   a. The issuer has net tangible assets of at least Rs.3 crores in each of the preceding 3 years (of 12 months each) of which not more than 50% are held in monetary assets. If more than 50% of the net tangible assets are held in monetary assets, then the issuer has to make firm commitment to utilize such excess monetary assets in its business or project.

   b. The issuer has a track of distributable profits in at least 3 out of the immediately preceding 5 years.

   c. The issuer company have a net worth of at least Rs.1 crores in each of the preceding 3 full years (of 12 months each).

   d. The aggregate of the proposed issue and all previous issues made in the same financial year in terms of issue size does not exceed 5 times its pre-issue net worth as per the audited balance sheet of the preceding financial year.

   e. In case of change of name by the issuer company within last one year, at least 50% of the revenue for the preceding one year should have been earned by the company from the activity indicated by the new name.

2) Any issuer not satisfying any of the conditions stipulated above may make an initial public offer if:

   a. The issue is made through the book building process and the issuer undertakes to allot at least 50% of the net offer to public to qualified institutional buyers and to refund full subscription monies if it fails to make allotment to the qualified institutional buyers OR At least 15% of the cost of project is contributed by scheduled commercial banks or public financial institutions, of which not less than 10% would come from the appraisers and the issuer undertakes to allot at least 10% of the net offer to public to qualified institutional buyers and to refund full subscription monies if it fails to make the allotment to the qualified institutional buyers.

   b. The minimum post-issue face value capital of the issuer should be Rs.10 crore; OR the issuer undertakes to provide compulsory market making for at least 2 years from the date of listing of the equity shares and convertible securities subject to

the conditions that a) the Market makers undertake to offer buy and sell quotes for a minimum depth of 300 equity shares and convertible securities and ensure that the bid-ask spread for their quotes should not at any time exceed 10%. b) the inventory of the market makers, as on the date of allotment of the equity shares and convertible securities should be at least 5% of the proposed issue.

3) An issuer may make an initial public offer of convertible debt instruments without making a prior public issue of its equity shares and listing.

4) An issuer cannot make an allotment pursuant to a public issue if the number of prospective allottee is less than one thousand.

5) No issuer can make an initial public offer if there are any outstanding convertible securities or any other right which would entitle any person any option to receive equity shares after the initial public offer. However, this is not applicable to:

- a public issue made during the currency of convertible debt instruments which were issued through an earlier initial public offer, if the conversion price of such convertible debt instruments was determined and disclosed in the prospectus of the earlier issue of convertible debt instruments;

- Outstanding options granted to employees pursuant to an employee stock option scheme framed in accordance with the relevant Guidance Note or Accounting Standards, if any, issued by the Institute of Chartered Accountants of India in this regard.

- Fully paid-up outstanding securities which are required to be converted on or before the date of filing of the red herring prospectus (in case of book built issues) or the prospectus (in case of fixed price issues), as the case may be.

Conditions for further public offer

An issuer may make a further public offer (an offer of equity shares and convertible securities) if it satisfies the following conditions:

a) the aggregate of the proposed issue and all previous issues made in the same financial year in terms of issue size does not exceed 5 times its pre-issue net worth as per the audited balance sheet of the preceding financial year;

b) if it has changed its name within the last one year, at least 50% of the revenue for the preceding one full year has been earned by it from the activity indicated by the new name.

If the issuer does not satisfy the above conditions, it may make a further public offer if it satisfies the following conditions:

i. the issue is made through the book building process and the issuer undertakes to allot at least 50% of the net offer to public to qualified institutional buyers and to refund full subscription monies if it fails to make allotment to the qualified institutional

buyers; or at least 15% of the cost of the project is contributed

ii. by scheduled commercial banks or public financial institutions, of which not less than 10% should come from the appraisers and the issuer undertakes to allot at least 10% of the net offer to public to qualified institutional buyers and to refund full subscription monies if it fails to make the allotment to the qualified institutional buyers;

iii. the minimum post-issue face value capital of the issuer is Rs.10 crore; or the issuer undertakes to provide market-making for at least 2 years from the date of listing of the specified securities, subject to the two conditions that a) the market makers offer buy and sell quotes for a minimum depth of three hundred specified securities and ensure that the bid-ask spread for their quotes does not, at any time, exceed 10%;

iv. the inventory of the market makers, as on the date of allotment of the specified securities, should be at least 5% of the proposed issue.

Pricing in Public Issues

The issuer determines the price of the equity shares and convertible securities in consultation with the lead merchant banker or through the book building process. In case of debt instruments, the issuer determines the coupon rate and conversion price of the convertible debt instruments in consultation with the lead merchant banker or through the book building process.

Differential Pricing

An issuer may offer equity shares and convertible securities at different prices; subject to the following condition;

a) the retail individual investors/shareholders or employees entitled for reservation making an application for equity shares and convertible securities of value not more than Rs.2 lakh, may be offered equity shares and convertible securities at a price lower than the price at which net offer is made to other categories of applicants provided that such difference is not more than 10% of the price at which equity shares and convertible securities are offered to other categories of applicants;

b) in case of a book built issue, the price of the equity shares and convertible securities offered to an anchor investor cannot be lower than the price offered to other applicants;

c) in case of a composite issue, the price of the equity shares and convertible securities offered in the public issue may be different from the price offered in rights issue and justification for such price difference should be given in the offer document.

d) in case the issuer opts for the alternate method of book building, the issuer may offer specified securities to its employees at a price lower than the floor price. However, the difference between the floor price and the price at which equity shares and convertible securities are offered to employees should not be more than 10% of the floor price.

Promoters' Contribution

The promoters' minimum contribution varies from case to case. The promoters of the issuer are required to contribute in the public issue as follows:

In case of an **initial public offer,** the minimum contribution should not be less than 20% of the post issue capital;

In case of **further public offer,** it should be either to the extent of 20 % of the proposed issue size or to the extent of 20% of the post-issue capital;

In case of a **composite issue,** either to the extent of 20% of the proposed issue size or to the extent of 20% of the post-issue capital excluding the rights issue component.

Lock-in of specified securities held by promoters.

In a public issue, the equity shares and convertible debentures held by promoters are locked-in for the period stipulated below:

a)   minimum promoters' contribution is locked-in for a period of 3 years from the date of commencement of commercial production or date of allotment in the public issue, whichever is later;

b)   promoters' holding in excess of minimum promoters' contribution is locked-in for a period of 1 year:

However, excess promoters' contribution in a further public offer is not subject to lock in.

Book Building

Book Building means a process undertaken to elicit demand and to assess the price for determination of the quantum or value of specified securities or Indian Depository Receipts, as the case may be in accordance with the SEBIICDR Regulations 2009.

In an issue made through the book building process, the allocation in the net offer to public category is made as follows

i.   Not less than 35% to retail individual investors.

ii.   Not less than 15% to non institutional investors i.e. investors other than retail individual investors and qualified institutional buyers.

iii.   Not more than 50% to Qualified Institutional Buyers; 5 % of which would be allocated to mutual funds.

However, if the issue is made through the book building process and the issuer undertakes to allot at least 50% of the net offer to public to qualified institutional buyers and to refund full subscription monies if it fails to make allotment to the qualified institutional buyers then in that case at least 50% of the net offer to public should be allotted to qualified institutional buyers.

In an issue made through the book building process, the issuer may allocate upto 30% of

the portion available for allocation to qualified institutional buyers to an anchor investor in accordance with the conditions laid down in ICDR Regulations 2009.

In an issue made other than through the book building process, allocation in the net offer to public category will be made as follows:

a)   minimum 50% to retail individual investors; and

b)   remaining to individual applicants other than retail individual investors and other investors including corporate bodies or institutions, irrespective of the number of equity shares and convertible securities applied for;

c)   the unsubscribed portion in either of the categories specified above (point a and b) may be allocated to applicants in the other category.

If the retail individual investor category is entitled to more than 50% on proportionate basis, the retail individual investors will be allocated that higher percentage.

Indian Depository Receipts

A foreign company can access Indian securities market for raising funds through issue of Indian Depository Receipts (IDRs).

An IDR is an instrument denominated in Indian Rupees in the form of a depository receipt created by a Domestic Depository (custodian of securities registered with the Securities and Exchange Board of India) against the underlying equity of issuing company to enable foreign companies to raise funds from the Indian securities markets.

An issuing company making an issue of IDR is required to satisfy the following:

a)   it should be listed in its home country.

b)   it should not be prohibited to issue securities by any regulatory body.

c)   it should have a track record of compliance with securities market regulations in its home country.

Conditions for issue of IDR

An issue of IDR is subject to the following conditions:

a)   issue size should not be less than Rs.50 crore

b)   procedure to be followed by each class of applicant for applying should be mentioned in the prospectus;

c)   minimum application amount should be Rs.20,000;

d)   at least 50%. of the IDR issued should be allotted to qualified institutional buyers on proportionate basis.

e)   the balance 50% may be allocated among the categories of non-institutional investors and retail individual investors including employees at the discretion of the issuer and the manner of allocation has to be disclosed in the prospectus. Allotment to investors within a category will be on proportionate basis.

f)　　Further, atleast 30% of the IDRs issued will be allocated to retail individual investors and in case of under-subscription in retail individual investor category, spill over to other categories to the extent of under-subscription may be permitted.

g)　　At any given time, there will be only one denomination of IDR of the issuing company.

12.3 SEBI (ISSUE AND LISTING OF DEBT SECURITIES) REGULATIONS, 2008

Issue Requirements for Public Issues

General Conditions

1.　　No issuer should make any public issue of debt securities if as on the date of filing of draft offer document and final offer document as provided in these regulations, the issuer or the person in control of the issuer, or its promoter, has been restrained or prohibited or debarred by the Board from accessing the securities market or dealing in securities and such direction or order is in force.

2.　　The following conditions have to be satisfied by an issuer for making any public issue of debt securities as on the date of filing of draft offer document and final offer document.

    i.　If the issuer has made an application to more than one recognized stock exchange, the issuer is required to choose one of them as the designated stock exchange. Further, where any of such stock exchanges have nationwide trading terminals, the issuer should choose one of them as designated stock exchange. For any subsequent public issue, the issuer may choose a different stock exchange subject to the requirements of this regulation.

    ii.　The issuer has to obtain in-principle approval for listing of its debt securities on the recognized stock exchanges where the application for listing has been made.

    iii.　Credit rating has been obtained from at least one credit rating agency registered with SEBI and is disclosed in the offer document. If the credit ratings have been obtained from more than one credit rating agency, then all ratings including the unaccepted ratings have to be disclosed in the offer document.

    iv.　It has to enter into an arrangement with a depository registered with SEBI for dematerialization of debt securities that are proposed to be issued to the public in accordance with the Depositories Act 1996 and regulations made thereunder.

3.　　The issuer should appoint one or more merchant bankers registered with SEBI at least one of whom should be a lead merchant banker.

4.　　The issuer should appoint one or more debenture trustees in accordance with the provisions of section 117 B of the Companies Act, 1956 and SEBI (Debenture Trustee) Regulations, 1993.

5. The issuer should not issue debt securities for providing loan to or acquisition of shares of any person who is part of the same group or who is under the same management.

Filing of Draft Offer Document

No issuer should make a public issue of debt securities unless a draft of offer document has been filed with the designated stock exchange through the lead merchant banker. The draft offer document filed with the stock exchange has to be made public by posting the same on the website of designated stock exchange for seeking public comments for a period of seven working days from the date of filing the draft offer document with such exchange. The draft offer document may also be displayed on the website of the issuer, merchant bankers. The lead merchant bankers should ensure that the draft offer document clearly specifies the names and contact particulars of the compliance officer of the lead merchant banker and the issuer including the postal and email address, telephone and fax numbers. The lead merchant banker should also ensure that all comments received on the draft offer document are suitably addressed prior to the filing of the offer document with the Registrar of Companies. A copy of the draft and final offer document should be forwarded to SEBI for its records, simultaneously with filing of these documents with the designated stock exchanges. The lead merchant bankers should prior to filing of the offer document with the Registrar of Companies, furnish to SEBI a due diligence certificate as per the format provided in Schedule II of SEBI (Issue and Listing of Debt Securities) Regulations, 2008.

Electronic Issuance

An issuer proposing to issue debt securities to the public through the on-line system of the designated stock exchange should comply with the relevant applicable requirements as may be specified by SEBI.

Price Discovery through Book Building

The issuer may determine the price of debt securities in consultation with the lead merchant banker and the issue may be at fixed price or the price may be determined through the book building process in accordance with the procedure as may be specified by SEBI.

Minimum Subscription

The issuer may decide the amount of minimum subscription which it seeks to raise by issue of debt securities and disclose the same in the offer document. In the event of non-receipt of minimum subscription all application moneys received in the public issue shall be refunded forthwith to the applicants.

LISTING OF DEBT SECURITIES

An issuer desirous of making an offer of debt securities to the public has to make an application for listing to one or more recognized stock exchanges in terms of sub-section (1) of section

73 of the Companies Act, 1956 (1 of 1956). The issuer has to comply with the conditions of listing of such debt securities as specified in the Listing Agreement with the Stock exchanges where such debt securities are sought to be listed.

Conditions for listing of debt securities issued on private placement basis:

An issuer may list its debt securities issued on private placement basis on a recognized stock exchange subject to the following conditions:

i.   The issuer has issued such debt securities in compliance with the provisions of the Companies Act, 1956 rules prescribed thereunder and other applicable   laws.

ii.   Credit rating has been obtained in respect of such debt securities from at least one credit rating agency registered with SEBI.

iii.   The debt securities proposed to be listed are in dematerialized form.

iv.   The disclosures as prescribed under Regulation 21 of the Issue and Listing of Debt Securities Regulations, 2008 have to be made.

Further, the issuer has to comply with the conditions of listing of such debt securities as specified in the Listing Agreement with the stock exchange where such debt securities are sought to be listed.

Conditions of Continuous Listing and Trading of Debt securities:

Continuous Listing Conditions

i.   All the issuers making public issues of debt securities or seeking listing of debt securities issued on private placement basis should comply with the conditions of listing specified in the respective agreement for debt securities.

ii.   Every rating obtained by an issuer should be periodically reviewed by the registered credit rating agency and any revision in the rating shall be promptly disclosed by the issuer to the stock exchange where the debt securities are listed.

iii.   Any change in rating should be promptly disseminated to investors and prospective investor in such manner as the stock exchange where such securities are listed may determine from time to time.

iv.   The issuer, the respective debenture trustees and stock exchanges should disseminate all information and reports on debt securities including compliance reports filed by the issuers and the debenture trustees regarding the debt securities to the investors and the general public by placing them on their websites.

v.   Debenture trustee should disclose the information to the investors and the general public by issuing a press release in any of the following events :(a) default by issuer to pay interest on debt securities or redemption amount; (b) failure to create a charge on the assets; revision of rating assigned to the debt securities.

Trading of debt securities

i.   The debt securities issued to the public or on a private placement basis, which are listed in recognized stock exchanges, shall be traded and such trades shall be cleared and settled in recognized stock exchanges subject to conditions specified by SEBI.

ii.   In case of trades of debt securities which have been made over the counter, such trades shall be reported on a recognized stock exchange having a nation wide trading terminal or such other platform as may be specified by the Board.

SEBI may specify conditions for reporting of trades on the recognized stock exchange or other platform.

12.4 MARKET PRACTICES AND PROCEDURES

12.4.1 Dealing Principles & Procedures[8]

Scope

Deals done in the Indian market should be conducted on the basis of these provisions of FIMMDA handbook.

In respect of deals done with overseas counterparties, the counterparty should be made aware of the conventions, followed in India, in advance, to avoid any possible confusion.

Preliminary Negotiation of terms

Dealers should clearly state at the outset, prior to a transaction being executed, any qualifying conditions to which the deal will be subject to. Where a firm quote has been indicated on the NDS, qualifying conditions cannot be specified after the conclusion of the deal.

Typical examples of qualifications include where a price is quoted subject to the necessary credit approval, limits available for the counterparty, inability to conclude a transaction because offices of the member in other centres are not open. This should be made known to the broker and the potential counterparty at an early stage and before names are exchanged by the broker.

Firmness of Quotation

Dealers, whether acting as principals, agent or broker, have a duty to make absolutely clear whether the prices they are quoting are firm or merely indicative. Prices quoted by brokers should be taken as indicative unless otherwise qualified.

In respect of deals on the NDS, the dealer would put the quote as a "firm" quote or "indicative" quote on the NDS. In case the dealer is willing to do the deal only with a certain set of counterparties, he should put the quote as "firm" only for preferred counterparties.

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[8]   This section has been extracted from The Handbook of Market Practices, Fixed Income Money Market and Derivatives Association of India, 2003.

In respect of other deals, a dealer quoting a firm price or rate either through a broker or directly to a potential counterparty is committed to deal at that price or rate in a marketable amount provided, the counterparty name is acceptable. Generally, prices are assumed to be firm as long as the counterparty or the broker is on line. Members should clearly and immediately indicate when the prices are withdrawn.

In volatile markets, or when some news is expected, dealers quoting a firm price or rate should indicate the length of time for which their quote is firm. The price or the rate is usually for the marketable amount. If the quote is not for a marketable quantity, the dealer / broker should qualify the same while submitting the quote.

A significant part of the volume transacted by brokers relies on mandates given by dealers acting on behalf of principals. The risk that the principal runs is that such an offer could get hit after an adverse market move has taken place.

The broker is expected to use the mandate in order to "advertise" the principal's interest to the entities that the broker expects will have an interest in the price. Generally, the broker is free to show the price to entities he deems fit, but members have the right to expect that if a smaller set is defined, the broker will adhere to such a smaller set.

Mandates shall not be for a period of more than 15 minutes unless otherwise specified. Brokers are expected to check with the principal from time to time to ensure that the mandate is still current.

The broker shall reveal the name of the entity offering the mandate when the counterparty is firm to deal at the mandate price. The broker will then call the member who offered the mandate and confirm the deal. In the absence of any significant market movement, the member who has offered the mandate is expected to adhere to it. In case the price is not adhered to, it is the responsibility of the member who had offered the mandate to explain why the mandate is no longer valid. It is required of the member that the mandate price be withdrawn before the broker reveals the counterparty name. The only exception to this is when the counterparty name is not acceptable.

The principal should call the broker if he wishes to withdraw the mandate before its expiry. The quote cannot be withdrawn after the broker has concluded the deal.

Delivery of the securities/funds

The dealers should agree upon the delivery conditions before concluding the deal.

Delivery of the securities/funds is on a Delivery-versus-Payment (DVP) basis in respect of Government Securities and T-Bills. In respect of other securities, which are in demat form, since there is no DVP mechanism, the dealers should agree upon the priority of settlement of the securities and funds.

Banks and primary dealers are currently not allowed to invest in securities, which are not in demat form. However, where physical securities are to be delivered, the dealers should agree before conclusion of the deal as to whether the settlement will be DvP or otherwise (in which case the priority of settlement needs to be agreed upon).

Concluding a Deal

Dealers should regard themselves as bound to honour a deal once the price, name acceptability, credit approval and any other key commercial terms have been agreed. Oral agreements/ contracts are considered binding on all the parties concerned. In respect of deals done on the NDS, the deal would be considered as final as soon as any counterparty responds to a "firm" quote.

Where quoted prices are qualified as being indicative or subject to negotiation of commercial terms, members should normally treat themselves as bound to honor the deal at the point when the terms have been agreed without qualification.

Oral agreements are considered binding; the subsequent confirmation is evidence of the deal but should not override terms agreed orally.

Making a transaction subject to documentation is not a good practice. In order to minimise the likelihood of disputes arising once documentation is prepared, dealers should make every effort to clarify all material points quickly during the oral negotiation of terms, and should include these in the confirmation.

Where brokers are involved, members have the right to expect that the broker will make them aware immediately on conclusion of the deal. As a general rule a deal should be regarded as having been 'done' where the dealer positively acknowledges the broker's confirmation. It is expected that a broker shall not assume that a deal is done without oral confirmation from the dealer.

Passing of names by brokers

It is a good practice for dealers not to seek the names of the counterparty before transacting and for brokers not to divulge the names before concluding the deal. Dealers and brokers should at all times treat the details of transactions as absolutely confidential between the parties involved.

To save time and avoid confusion, dealers should, wherever practical, give brokers prior indication of counterparties with whom, for whatsoever reason, they would be unwilling to do business. In all their transactions, brokers should aim to achieve a mutual and immediate exchange of names.

In the repo markets, it is accepted that members may vary the price (second leg) depending on the counterparty. Hence it is acceptable for the member to know the name of the counterparty in advance.

In the case of instruments like Certificate of Deposits and Commercial Papers, where the seller may not be the same entity as the issuer, the broker shall first disclose the issuer's name to the potential buyer. The name of the buyer shall be disclosed only after the buyer has accepted the seller's name. The seller has the right to refuse to transact with the buyer.

Reporting of deals on the NDS

The dealers should enter the deals, concluded on the NDS or to be reported on the NDS, within a period of 15 minutes of the conclusion of the deal.

Deals in Government Securities and T-Bills may be conducted either on the NDS or otherwise. However, all the deals in Government Securities and Treasury Bills have to be reported on the NDS. Since the settlement of the deals amongst members will be through CCIL, it would have to be entered in the NDS. The dealer of the selling counterparty of the securities has to enter the deal into NDS and the dealer of the buying counterparty have to approve the deal. The back office of both the counterparties have to then approve the deal.

It would be a good practice to conclude the approval of the deals within a period of 30 minutes from the time of conclusion of the deal. In any case the process should be completed before the time of closure of the NDS.

Oral Confirmations

No oral confirmation is essential in respect of deals, entered in the NDS. In respect of other deals an oral confirmation of the deals by the back office is a good practice.

Lack of response should not be construed as confirmation.

Written Confirmations

A written confirmation of each deal must be sent out at the earliest and a confirmation should be received from the counterparty

The confirmation provides a necessary final safeguard against dealing errors. Confirmations should be dispatched and checked promptly, even when oral deal confirmations have been undertaken.

A confirmation of each deal must be sent out at the earliest. This is particularly essential if dealing for same day settlement. All participants of the wholesale markets should have in place the capability to dispatch confirmations so that they are received and can be checked within a few hours from the time of striking the deal. Where the products involved are more complex, and so require more details to be included on the confirmation, this may not be possible; nevertheless it is in the interest of all concerned that such deals are confirmed as quickly as possible and in no case later than the next working day of the date of the deal. It is recommended that principals should inquire about confirmations not received within the expected time.

All confirmations should include the trade date, value date, the name of the counterparty and all other details of the deal, including, wherever appropriate, the commission charged by the broker.

All confirmations should state "The settlement of the deals in Fixed Income, Money Market and Rupee Derivatives are subject to FIMMDA's market conventions irrespective of the counterparty being a member of FIMMDA".

It is an accepted practice for principals to confirm directly all the details of transactions arranged through a broker; who independently sends a contract/transaction confirmation to both counterparties.

It is vital that principals upon receipt of confirmations immediately check the confirmations carefully so that discrepancies are quickly revealed and corrected. As a general rule, confirmations should not be issued by or sent to and checked by dealers. Confirmation is a back- office function.

Settlement of Differences

If all the procedures outlined above are adhered to, the incidence and size of differences should be reduced. Errors may occur, and they should be identified and corrected promptly. Failure to observe these principles could leave those responsible bearing the cost of any differences, which arise. Where difference in payment arises because of errors in the payment of funds, firms should not attempt undue enrichment by retaining the funds. In case funds are retained then compensation terms should be negotiated between the counterparties. The same principle is applicable in case of delivery of securities.

Rounding off

All interest receivable/payable should be rounded off to the higher rupee if the paise component is equal to or higher than 50 paise and should be ignored if the paise component is less than 50 paise.

The rounding off of paise should also be obne in respect of broken period interest receivable/ payable.

Bank Holidays / Market Disruption

The list of holidays will be displayed by FIMMDA on its website. If due to unforeseen events, a particular date for which transactions have been entered into is subsequently declared as a holiday, and then while settling such claims, the principle of no undue enrichment should be followed.

Dealing Standards & Conventions

Call money / Notice money & Term money

Call Money is essentially a money market instrument wherein funds are borrowed/lent for a tenure ranging from overnight to 14 days and are at call or notice. The borrower or lender must convey his intention to repay / recall with at least 24 hours notice. However, monies can also be borrowed / lent with a specified maturity date i.e. repaid / recalled on the maturity. Money lent for a fixed tenor for more than 14 days is called Term Money

- Interest to be calculated on a daily / 365 -day year basis.
- Interest to be payable on maturity and rounded-off to the nearest rupee.
- In case of Maturity of Term Money falling on a holiday the repayment will be made on the next working day at the contracted rate.

The receiver of funds will collect the cheque and give the receipt. The same procedure should be followed on the reversal of the deal.

In case of an unscheduled holiday

Roll over of call deals may happen if there is a strike, natural calamity, etc. The strike could involve either or both the counter-parties. In case of disruption of work, due to which funds cannot be delivered or cannot be received, the deals are necessarily rolled over. It is recommended that the rate be fixed as the previous working day's FIMMDA NSE Overnight MIBOR.

Bills rediscounting scheme

- Interest to be calculated on a daily / 365-day year basis

- Interest to be calculated on a Front-end basis and rounded off to the nearest rupee.

- Amount payable to the borrower should be the principal amount less the interest.

- On maturity the borrower should repay the Principal Amount.

Example:

Transaction Amount : Rs. 10,00,00,000/- (Rupees Ten crore)

No. of days : 45 days

Rate of Interest : 10.25% p.a.

$$\text{Interest} = \frac{\text{Transaction Amount} * \text{No. of days} * \text{Rate of Interest}}{365 * 100}$$

$$\text{i. e.} = \frac{10,00,00,000 * 45 * 10.25}{365 * 100}$$

<div style="margin-left:3em">

=   Rs. 12,63,698.63013

=   Rs. 12,63,699/- (rounded off)

</div>

Amount payable   =   Transaction Amount – Interest

=   (10,00,00,000 - 12,63,699)

=   Rs. 9,87,36,301/-

Amount to be repaid =   Rs. 10,00,00,000/- on maturity

In case of an unscheduled holiday

In case the maturity date of the transaction is a holiday, then the amount should be repaid the previous working day.

Government Securities

- Interest to be calculated on a 30 month/360 day year basis

- 30th and 31st to be construed as the same day. *T* a deal is done on the 30th or 31st day of the month then interest should be calculated for 29 days for that month. (European 30/360).

- Interest payable in a Repo transaction to be calculated on a daily/365 day year basis.

- Repo reversal price to be calculated up to a maximum of eight decimal places and the reversal amount should be adjusted accordingly.

- Prices in the secondary market to be quoted up to a maximum of four decimal places and in multiples of Rs. 0.0025

- e.g. Rs. 100.4350 or Rs. 101.2125 but not Rs. 102.3745 or Rs. 103.5018

- Deal confirmation must exchange between the buyer and the seller. Usually, the seller will deliver the SGL to the buyer. Delivery date and the time of the deal should be mentioned on the deal slip.

The NSE requires that deals done through a NSE broker be reported by him to the exchange within 20 minutes of the deal taking place. The list of authorised signatories of the member should be made available in case the counter-party requests

In case of an unscheduled holiday

In case of disruption of work, due to which the SGL cannot be delivered or received, the SGL should be delivered the next day. As the bank buying the security gets the benefit of funds for the holiday, the buyer bank should pay at FIMMDA NSE Overnight MIBOR for the funds.

Zero Coupon Bonds

- Prices are to be quoted up to a maximum of four decimal places.

- In the secondary market, quotes should be in terms of price and not yield. Deal confirmation must be exchanged between the buyer and the seller. Seller will deliver the SGL to the buyer. Delivery date and the time of the deal should be mentioned on the deal slip. The NSE requires that deals done through a NSE broker be reported by him to the exchange within 20 minutes of the deal taking place.

In case of an unscheduled holiday

In case of disruption of work, it may not be possible for the Buying bank to lodge the SGL or for the selling bank to deliver the SGL to the buying bank. Since the Rupee value of the SGL (Price + no. of days for which coupon has to be paid to the selling bank, or in the case of a T-bill or Zero, the price as calculated from the yield) is calculated for the day of the holiday, the buying Bank would have the advantage of funds for one day (or if the next working day is more than one day away, for the corresponding number of days).

Hence it is necessary that the selling Bank be compensated for the day(s) for which the SGL has not been lodged. The fair rate for compensation, just as in money deals, would the FIMMDA NSE Overnight MIBOR for the previous working day. The Base rupee amount is the SGL amount.

Example

Purchase of Rs. 5 crore of 11.40, 29 Sept. 2000 on @ Rs. 100.85 for delivery on Sept. 8th. 159 Days have elapsed since the previous coupon. The total consideration to be delivered by the Buyer to the seller is: Rs. 5, 04, 25,000 + Rs. 25, 17,500 = Rs. 5, 29, 42,500.

If due to disruption, the SGL cannot be lodged by the buyer, the buyer will lodge the SGL on the 9th of September. The Buyer will compensate the seller at the O/N NSE MIBOR for the day, say 10.15%. Hence a total compensation paid by the buyer to the seller would be Rs. 14,867.41

Certificate of Deposits / Commercial Paper / Treasury Bills

• Interest to be calculated on actual number of days / 365 day year basis.

• Interest to be calculated on a rear ended basis

• Price to be calculated up to a maximum of four decimal places.

In case yield is given then:

$$\text{Price} = \frac{100}{1 + (\text{Yield}(\%) * (\text{No. of days to maturity}) / 365}$$

In case price is given then:

$$\text{Yield} = \frac{(100 - \text{Price}) * 365}{\text{Price} * \text{No. of Days to maturity}}$$

In the secondary market, quotes should be in terms of yield to maturity and not price. The Price should be quoted up to 4 decimal places.

Example:

In case a bank wishes to sell a CP/CD/T-Bills say maturing on April 29, 1999 at a YTM of 9.5% and let us assume that the price at that YTM works out to be Rs. 98.75. Then the bank should quote that it wants to sell the instrument maturing on April 29, 1999 at a YTM of 9.5 % p.a. and not that it wants to sell it at Rs. 98.75.

Delivery

Delivery would generally be on a DvP basis with the seller sending the documents to the buyer. However, the practice of "delivery upon clearance of buyer's check" is also prevalent, and is considered acceptable.

In the case of Primary issuance, the stamped certificate should be delivered within 10 days of receipt of monies by the issuer.

Corporate Bonds / Debentures

- Interest to be calculated on actual number of days and 365 day year basis

- Prices to be quoted upto a maximum of four decimal places.

Deal confirmation must be exchanged between the buyer and the seller. Seller will deliver the bonds/debentures to the buyer. Delivery date and the time of the deal should be mentioned on the deal slip.

The NSE requires that NSE brokers report deals done by them within 20 minutes of the deal taking place. When the deal is done after NSE hours, it needs to be reported on the next working day.

Model Questions

1. **The day count convention for corporate bonds is**

   a. 30/360 US NASD

   b. Actual/365

   c. Actual/360

   d. 30/360 European

Answer: b

2. **A 364-day CP, maturing on 28ᵗʰ June 2014, is trading on 17ᵗʰ July 2013, at a price of Rs. 93.3375. What is the Yield inherent in this price?**

Answer: Yield $= \dfrac{(100\ 93.3375) * 365}{93.3375 * 346}$

   $= 7.5300\%$ (Number of days between 17/07/2013 and 28/06/2014 is 346 days)

3. **A 90 day CP is issued on July 2, 2013, when the price of a t-bill of same tenor is Rs. 97.5675. If the CP was issued at a price of Rs. 97.45028, what is the spread at which it has been issued?**

Answer:

   The implicit yield for treasury bills and CPs can be found using the formula Yield = ((100-price)*365)/(Price * no of days to maturity)

   The yield implicit in the price of the T-bill is = ((100- 97.5675)*365))/(97.5675*90)

   $= 10.1111\%$

   The yield implicit in the price of the CP is = ((100- 97.45028)*365))/(97.45028*90)

   $= 10.6111\%$

   The spread at which the CP has been issued is = 10.6111 - 10.1111

   $= 50$ basis points.

4. **Compute the Rupee value of an SGL transaction, with the following data:**

   Coupon Rate: 11.68%

   Maturity date: August 6, 2014

   Settlement Date: July 11, 2013

   Price: Rs. 105.4025

   Transaction amount: Rs. 50000000

Answer:

   Value of the transaction = number of securities * trade price

   = (50000000/100) * 105.4025

   = Rs. 5,27,01,250

Accrued Interest for the period since the last coupon is

= days since the last coupon/360 * coupon rate * face value

= (155/360) * 0.1168 * 50000000

= Rs. 25,14,444

Settlement amount = Value of transaction + Accrued Interest

= Rs. 5,27,01,250 + 25,14,444

= Rs. 5,52,15,694 (Number of days since the last coupon date can be computed using the *coupdaybs* function in Excel. Specify Settlement date; maturity date; frequency = 2; and basis = 4)

5. **The details of a transaction in G-Secs is as under: Coupon Rate: 10.50%**

Maturity Date: May 21, 2017

Settlement Date: July 29, 2013

Price: Rs. 111.9125

Transaction Amount: Rs. 63500000

The buyer is unable to lodge the SGL on the settlement date. The transaction is settled 1 day later. If the NSE overnight MIBOR on the previous day was 8.25%, what is the amount for which this SGL will settle?

Answer:

Value of the transaction is = number of securities * trade price

= (63500000/100) * 111.9125

= Rs. 7,10,64,438 Accrued Interest for the period since the last coupon

= days since the last coupon/360*coupon rate*face value

= (68/360) * 0.1050 * 63500000

= Rs. 12,59,417

Settlement amount = Rs. 7,10,64,438 + 12,59,417

= Rs. 7,23,23,855

(Number of days since the last coupon date can be computed using the *coupdaybs* function in Excel. Specify Settlement date; maturity date; frequency = 2; and basis = 4)

The amount of interest to be paid for 1 day delay in settlement will be the overnight MIBOR applied to the settlement amount, on actual/365 day basis.

Interest to be paid = 7,23,23,855 * 0.0825*1/365

= Rs. 16, 347.17

Therefore settlement amount with interest will be = Rs. 7,23,40,201

CHAPTER 13   VALUATION OF BONDS

13.1 BOND VALUATION: FIRST PRINCIPLES

The value of a financial instrument is well understood as the present value of the expected future cash flows from the instrument. In case of a plain vanilla bond, which we will first see, before understanding the variations, the cash flows are pre-defined. The cash flows expected from a bond, which в not expected to default are primarily made up of (i) coupon payments and (ii) redemption of principal.

The actual dates on which these cash flows are expected are also known in advance, in the case of a simple non-callable bond. Therefore, valuation of a bond involves discounting these cash flows to the present point in time, by an appropriate discount rate. The key issue in bond valuation is this rate. We shall begin with a simple assumption that the rate we would use is the "required rate" on the bond, representing a rate that we understand is available on a comparable bond (comparable in terms of tenor and risk). For example, consider a Central Government bond with 11.75% coupon, maturing on April 16, 2006 (Table 13.1). The cash flows from this bond are the semi-annual coupon and the redemption proceeds receivable on maturity. In order to value the bond, we need the tenor for which we have to value the bond and the "required rate" for this tenor. Let us assume for simplicity, that we are valuing the bond on its issue date and the "required rate" or the 8-year rate in the market is 12%. Since government bonds pay coupons semi-annually, this bond would pay (11.75/2) = Rs. 5.875, every six months as coupon. In order to value this bond, we need to list these cash flows and discount them at the required rate of 6% (semi-annual rate for the comparable 12% rate)[9].

Therefore, the value of the bond can be stated in general terms as:

$$P_0 = \frac{C_1}{1+r} + \frac{C_2}{(1+r)^2} + \frac{C_3}{(1+e)^3} + \ldots\ldots\ldots \frac{C_n}{(1+r)^n} \ldots\ldots\ldots (3.1)$$

where P_0 is the value of the bond

Ci, c_2... c_n are cash flows expected from the bond, over Vʝ' periods

ᴵr' is the required rate at which we shall discount the cash flows.

It is important to see that the value of the bond depends crucially on the required rate. Higher the rate at which we discount the cash flows, lower the value of the bond. In other words, the required rate and the value are inversely related. This is an important principle in bond analytics and we shall return to this principle in some detail later in the workbook.

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[9]   In the bond markets, the annual rates are simply divided by two to arrive at the semi-annual rates. Effective semi-annual rates can vary, if we considered the impact of re-investing the six monthly coupon until the end of the year.

Since the required rate is the rate at which we are discounting the cash flows, given the same level of cash flows (same coupons), higher the rate at which cash flows are discounted, lower the present value of the bond. It is also important that we use an appropriate rate in the discounting process. We shall examine this issue also in some detail in later parts of the workbook.

Table 13.1: Value of a 11.75% bond with 8 years to redemption at par

Semi-annual period	Cash flow (Rs.)	Present value after discounting @ 6% (Rs.)
1	5.875	5.542
2	5.875	5.229
3	5.875	4.933
4	5.875	4.654
5	5.875	4.390
6	5.875	4.142
7	5.875	3.907
8	5.875	3.686
9	5.875	3.477
10	5.875	3.281
11	5.875	3.095
12	5.875	2.920
13	5.875	2.754
14	5.875	2.599
15	5.875	2.451
16	105.875	41.677
Value of the bond		98.737

13.2 TIME PATH OF A BOND

Consider a 12.5% Central Government bond maturing on March 23, 2004, selling at a required yield of 9.7% on February 5, 2001 for Rs. 106.89. If the required yield does not change, there would still be a change in its value and as this bond moves towards maturity, the value will converge to the redemption value of Rs. 100.

Let us put forth the generalisations that we know from the bond value equation, all of which arise from the inverse relationship between required yield and the value of the bond:

a)   If the required yield on a bond is equal to its coupon, the bond will sell at par.

b)   The price of a bond will be higher than the redemption value, if the required yield is lower than the coupon rate. This is because coupons earned at a higher rate are being discounted at a lower rate. We may also understand the premium in the price of the bond, as arising from higher demand for a bond with coupons that are higher than the prevalent market rates. Such a bond which sells at a price higher than the redemption value is called a premium bond.

c)   The price of a bond will be lower than the redemption value, if the required yield is higher than the coupon rate. This is because coupons earned at a lower rate are being discounted at a higher rate. These bonds sell at a discount because buyers have the option of seeking higher rate bonds when required rates go up, rather than buy into a lower coupon bond. Such a bond is called a discount bond.

We illustrate the time path of this bond at this required rate and few others assumed required rates in Table 13.2. We have illustrated in Table 13.2, that the value of a bond whether premium or discount, would tend to redemption value as it nears maturity. The dates have been chosen randomly and the required yields have been chosen to illustrate the time path of both discount and premium bonds.

Therefore, value of a bond will change over time, even if required rates do not change. This is an important property of bond values.

Table 13.2: Time path of 7.40% 2012 Bond

Date	Required rate (%)			
	5	5.5	6	7
29-Jan-04	116.0689	112.4667	109.0019	102.4616
14-Sep-04	115.0706	111.7081	108.4657	102.3226
21-Nov-04	114.7716	111.4819	108.3073	102.286
6-Jun-05	113.8681	110.7912	107.8153	102.1523
21-NOV-05	113.0896	110.1962	107.3925	102.0423
6-Jun-06	112.1406	109.4671	106.8707	101.8992
29-Jan-07	110.9715	108.566	106.2235	101.7196
21-Nov-07	109.4659	107.4058	105.3924	101.5014
29-Jan-08	109.0975	107.1182	105.1823	101.4362
21-NOV-08	107.5153	105.8928	104.3001	101.2017
21-NOV-09	105.466	104.2955	103.1413	100.8807
14-Sep-10	103.7168	102.9245	102.1403	100.5957
21-Nov-10	103.3129	102.6091	101.9119	100.5369
03-May-12	**100**	**100**	**100**	**100**

13.3 VALUING A BOND AT ANY POINT ON THE TIME SCALE

In the simple example where we applied the principles of discounting, we discounted the cash flows of the bond, on the date of issue of the bond. If we valued the bond, say on the first coupon date, we would consider all the cash flows from that time point until maturity of the bond. Such valuation is a simple exercise because; we need to discount cash flows for a time period that culminates into a cash flow date. The valuation exercise can consider rounded semi annual periods (the *n* in the equation).

In reality, we need to be able to value a bond on any date from the date of its issue (this date is called the valuation date, or settlement date for the bond). We should be able to discount

the expected cash flows to the valuation date, exactly measuring the fractional period of time on the time scale. Therefore the '*n*' in the bond equation should be equal to the actual distance, which is seldom a round number. Computing this distance for the purpose of valuing a bond depends on the day count convention in the bond markets.

In order to value a bond accurately we need to know the actual dates on which coupons will be paid, the number of days between two coupon periods and the distance of the actual valuation date from the previous and the next coupon. All of this depends on the market convention used, for counting the days on the time line, which is also called the day count convention. There are 5 popular day count conventions:

a. 30/360: This convention considers each month, including February, as having 30 days and the year as consisting of 360 days. There are 2 variations to this convention: US NASD convention and the European 30/360 convention. The 30/360 convention is used in the treasury bond markets in many countries. Indian treasury markets use the European 30/360 day count convention.

b. Actual/360: This convention counts the actual number of days in a month, but uses 360 as the number of days in the year.

c. Actual/actual: This convention uses the actual number of days in the month and the actual number of days in the year, 366, for a leap year.

d. Actual/365: This convention uses the actual number of days in a month and 365 days as the days in the year.

For example consider the period January 2, 2013 to June 30, 2013. The number of days in this period and the period in terms of years can vary depending on the day count convention, as can be seen in Table 13.3.

Table 13.3: Days in the period Jan 2 - June 30, 2013

Day count convention	Number of days in the period	Number of days in the year	Number of days as a year fraction
30/360	178	360	0.494444
Actual/actual	179	365	0.490411
Actual/360	179	360	0.497222
Actual/365	179	365	0.490411

If we have to value a bond on any date other than the coupon date, we have to use the appropriate day count convention to measure the 'n' in the bond valuation equation. In the general form, we did not care about the actual date of maturity of the bond, since we measured time periods as rounded half-years. For real-life bond valuation, we have to know the settlement date, as well as the actual date of maturity, so that, using the appropriate day count convention, we can discount the cash flows for the actual time distance that is involved.

Box 13.1: Coupons and Coupon days

In order to find the expected future cash flows from a bond, the dates on which these cash flows are expected and the distances from the settlement dates, we can use the coupon functions in Excel. The following are the coupon functions that are commonly used:

a) **Coupnum:** number of coupons payable between the settlement date and the maturity date.

b) **Coupdays:** number of days in the coupon period, containing the settlement date

c) **Coupdaybs:** number of days from beginning of the coupon period to the settlement date

d) **Coupdaysnc:** number of days from the settlement date to the next coupon date

In all these cases, we need to specify the settlement date, maturity date, frequency of coupon payments per annum and the day count convention (also called basis). We can use the yearfrac function to convert the number of days into fractional years.

(See Box 1.1)

Table 13.4 provides the data using the coupon functions of Excel, for an illustrative sample of 4 treasury bonds, using the 30/360 day count convention.

Table 13.4: Coupon days for settlement date February 5, 2001

Name of the Security	Maturity Date	No. of coupons until maturity	No. of days in the coupon period	No. of days from previous coupon to settlement	No. of days from settlement to next coupon
CG 12.5% 2004	23-Mar-04	7	180	132	48
CG 11.7% 2006	10-Apr-06	11	180	115	65
CG 11.5% 2008	23-May-08	15	180	72	108
CG 11.3 % 2010	28-Jul-10	19	180	7	173

In order to value a bond, on a settlement date that is not a coupon date, we have to re-cast the bond valuation equation 13.1, as follows:

$$P_0 = \frac{C_1}{(1+r)^{(dnc/dicp)}} + \frac{C_2}{(1+r)^{[1+(dnc/dicp)]}} \cdots\cdots\cdots \frac{C_n}{(1+r)^{[(n-1)+(dnc/dicp)]}} \cdots\cdots (13.2)$$

Where $c_1\, c_2 .. c_3$, are expected cash flows from the bond. Given the redemption value, coupon rate and frequency of coupons, we can compute these cash flows.

dnc is the number of days to the next coupon

dicp is the days in the coupon period

Since the first cash flow Ci, is only *dnc/dicp* periods away from the settlement date, we discount it only for that period. For the subsequent cash flows, we can generalise the period for which discounting is to be done, as *[(n-1) + dnc/dicp]*. We can use the "price" function in

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Excel, in order to use equation 13.2 in actual valuation of a bond. Alternatively, we can use the coupon functions to find out the values in equation 13.2 and value the bond using the PV function.

The value of the same bond, by merely varying the day count convention (change the basis in Excel to 1, 2 and 3) can vary to Rs. 99.0136, Rs. 99.0143 and 99.0134 respectively.

Using Excel, readers can check the impact of changes in the day count convention and the frequency of coupon payments on the value of the bond. Are there any generalisations here?

Box 13.2: Price function

The price function in Excel will compute the price of a bond, given the following:

Settlement: the date on which the bond is sought to be valued

Maturity: the date on which the bond matures

Rate: the rate at which coupon is paid

Yld: the required rate for valuation

Redemption: the redemption value of the bond

Frequency: number of coupons per year

Basis: day count convention to be used.

On providing these inputs, Excel computes the cash flows from the coupon rate and redemption values, the time as the distance between settlement date and each of the cash flows, given the day count convention specified in the basis and discounts the cash flows to the settlement date, using the specified required rate. Both settlement and maturity will have to be formatted as date fields. Yield and coupon have to be provided as rates. The numbers 0-4 are used for the various day count conventions. Use the function as = price(settlement, maturity, rate, yld, redemption, frequency, basis)

For example, in order to value the 11.75% 2006 bond, maturing on April 16, 2014, on February 5, 2013, using the day count convention of 30/360 and the required yield of 12%, we shall state

= Price(05/02/2013,16/04/2014,0.1175,0.12,100,2,4)

= Rs. 99.6877

13.4 ACCRUED INTEREST

The discounting of expected future cash flows to the present provides a valuation for the bond, which denotes the price at which a bond can be bought or sold, provided buyer and seller agree on the price based on such value (whether they will do so depends on their view of the required rate among other things). We will proceed on the assumption that the required yield represents the "market" and that there would be buyers and sellers at this "fair value." If a transaction takes place at the value determined by the bond equation, the buyer pays for all the future cash flows occurring after the date of settlement, discounted until the settlement date, in return for receiving all those cash flows.

However, if the settlement occurs at a date, which is not a coupon date, as can mostly be the case, the transaction takes place on a date that falls between two coupon dates. This would mean that the seller has held the bond for a period beginning from the previous coupon, to the settlement date and is eligible to receive a part of the next coupon, in proportion to his holding period. The seller on the other hand, holds the bond only for the period beginning the settlement date, but receives the next coupon entirely, having bought the bond.

Therefore in the bond markets, interest on a bond is not accounted on the coupon date, but is accrued on an everyday basis. On every transaction in the markets, the buyer has to pay the seller, a part of the coupon he would receive later, to compensate the seller for holding the bond for the fraction of the coupon period. This cash flow that is paid to the seller is called accrued interest ands computed as follows:

$$AI = c \left[\frac{dflc}{dicp} \right] \quad \text{...(13.3)}$$

Where *dflc* represents days from the last coupon and *dicp* represents the days in the coupon period and is the coupon payment. We know that both these values depend on the day count convention and can be found with the help of the coupon functions in Excel.

Let us consider the bonds in Table 13.5. We can compute the accrued interest for these bonds using the data for coupons (provided in column 1), given the settlement date of February 5, 2001. The accrued interest is the amount of coupons that are due to the seller, having held the bond from the previous coupon date until the settlement date.

If the price of the bond includes accrued interest, it is called as the *dirty price* or *full price* of the bond. Price that excludes accrued interest is called *clean price.* In most markets the convention is to quote the clean price, though the buyers always pay the seller the clean price and the accrued interest that is the dirty price. It is important to remember that the *price function in Excel provides the clean price of the bond.*

Table 13.5: Accrued Interest on Settlement Date February 5, 2001

Security	Semi-annual Coupon (Rs.)	Maturity	Days since Last coupon/Days In the Coupon period	Accrued Interest (Rs.)
CG 12.5 %2004	6.25	23-Mar-04	0.7333	4.5833
CG 11.68% 2006	5.84	10-Apr-06	0.6389	3.7311
CG 11.5% 2008	5.75	23-May-08	0.4000	2.3000
CG 11.3% 2010	5.65	28-Jul-10	0.0389	0.2197
CG 11.03 % 2012	5.52	18-Jul-12	0.0944	0.5209

13.5 YIELD

The returns to an investor in bond are made up of three components: coupon, interest from

re-investment of coupons and capital gains/loss from selling or redeeming the bond. When we are able to compare the cash inflows from these sources with the investment (cash outflows) of the investor, we can compute yield to the investor. Depending on the manner in which we treat the time value of cash flows and re-investment of coupons, we are able to get various interpretations of the yield on an investment in bonds.

13.5.1 Current Yield

One of the earlier measures on yield on a bond, current yield was a very popular measure of bond returns in the Indian markets, until the early 1990s.

Current yield is measured as:

Current Yield = Annual coupon receipts/ Market price of the bond

This measure of yield does not consider the time value of money, or the complete series of expected future cash flows. It instead compares the coupon, as pre-specified, with the market price at a point in time, to arrive at a measure of yield. Since it compares a pre-specified coupon with the current market price, it is called as current yield.

For example, if a 12.5% bond sells in the market for Rs. 104.50, current yield will be computed as

= (12.5/104.5) * 100

= 11.96%

Current yield is no longer used as a standard yield measure, because it fails to capture the future cash flows, re-investment income and capital gains/losses on investment return. Current yield is considered a very simplistic and erroneous measure of yield.

13.5.2 Yield to Maturity (YTM)

In the previous section on bond valuation, we used equation 13.1 to show that the value of a bond is the discounted present value of the expected future cash flows of the bond. We solved the equation to determine a value, given an assumed required rate. If we instead solve the equation for the required rate, given the price of the bond, we would get a yield measure, which is knows as the YTM or yield to maturity of a bond. That is, given a pre-specified set of cash flows and a price, the YTM of a bond is that rate which equates the discounted value of the future cash flows to the present price of the bond. It is the internal rate of return of the valuation equation. For example, if we find that an 11.99% 2022 bond is being issued at a price of Rs. 108, (for the sake of simplicity we will begin with the valuation on a cash flow date), we can state that,

$$108 = \frac{5.995}{(1+r)} + \frac{5.995}{(1+r)^2} \dots\dots\dots + \frac{105.995}{(1+r)^{18}}$$

This equation only states the well known bond valuation principle that the value of a bond will

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have to be equal to the discounted value of the expected future cash flows, which are the 18 semi-annual coupons of Rs. 5.995 each and the redemption of the principal of Rs. 100, at the end of the 9th year.

That value of r which solves this equation is the YTM of the bond. We can find the value of r in the above equation using the IRR function in Excel[10].   The value of r that solves the above equation can be found to be 5.29%, which is the semi-annual rate. The YTM of the bond is 10.58%.

However, as we have already noted in the section on valuation, we should be able to compute price and yield for a bond, at any given point of time. We therefore have to be able to compute the yield by plotting the cash flows accurately on the time line (using the appropriate day count convention) and calculate YTM, given the price at any point on the time line. We have to adopt a procedure very similar to the one we used for bond valuation[11]   and we can use the yield function in Excel to compute the YTM for a bond.

Yield to maturity represents the yield on the bond, provided the bond is held to maturity and the intermittent coupons are re-invested at the same YTM rate. In other words, when we compute YTM as the rate that discounts *all the cash flows* from the bond, at the same YTM rate, what we are assuming in effect is that each of these cash flows can be re-invested at the YTM rate for the period until maturity.

Let us illustrate this limitation of YTM with an example.

Suppose an investor buys the 11.75% 2018 bond at Rs. 107.75. The YTM of the bond on this date is 9.6824%. Consider the information about the cash flows of the 11.75% 2018 bond in Table 13.6. However, the actual yield on the bond depends on the rates at which the coupons can be re-invested. The YTM of 9.6824% is also the actual return on the bond, at maturity, only if all coupons can be re-invested at 9.6824%.

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[10]   IRR can be computed by listing the cashflows in a single column, with initial outflow stated as a negative number, say b2: b20 and using formula =IRR (b2:b20).

[11]   Readers who have skipped the earlier discussion are referred to section 13.3 on valuation of bonds.

Box 13.3: Using the Yield Function

The yield function in Excel will compute the yield of a bond, given the following:

Settlement: the date on which the yield is sought to be computed

Maturity: the date on which the bond matures

Rate: the rate at which coupon is paid

Price: the market price of the bond

Redemption: the redemption value of the bond

Frequency: number of coupons per year

Basis: Day count convention to be used (represented by numbers 0-4) On providing these inputs, Excel computes the cash flows from the coupon rate and redemption values, the time as the distance between settlement date and each of the cash flows, given the day count convention specified in the basis and find by trial and error, the rate that equates the future the cash flows to the price on the settlement date.

Use the function as = yield (settlement, maturity, rate, price, redemption, frequency, basis) For example, in order to value the 11.75% 2018 bond, maturing on April 16, 2013, on February 2, 2018, using the day count convention of 30/360, at price of Rs. 107.75, we shall state the following:

= yield(16/04/2013,02/02/2018,0.1175,107.75,100,2,4)

Excel will return a yield of 9.6824%, which is the YTM of the bond.

13.5.3 Yield to Maturity of a Zero Coupon Bond

In the case of a zero coupon bond, since there are no intermittent cash flows in the form of coupon payments, the YTM is the rate that equates the present value of the maturity or redemption value of the bond to the current market price, over the distance in time equal to the settlement and maturity dates. For example, if a zero coupon bond sells at Rs. 93.76 on February 5, 2001 and matures on January 1, 2002, its YTM is computed as:

$$93.76 = \frac{100}{(1 + ytm)^{(330/365)}}$$

$$= 7.39\%$$

In the case of zero coupon bond, interest is accrued on an everyday basis until maturity, at this discounting rate.

Table 13.6: Why YTM is not earned even if a Bond is held to Maturity

Days to maturity	Cash flow date	Cash flow	Future value if re-invested at YTM of 10.02%	Case-I		Case-II	
				Assumed re-investment rates	Reinvestment returns	Assumed re-investment rates	Reinvestment returns
1800	16-Apr-01	5.875	9.5789	10.25	9.6843	9.25	9.2334
1620	16-Oct-01	5.875	9.1219	10	9.1141	9	8.7308
1440	16-Apr-02	5.875	8.6867	9.75	8.5977	8.75	8.2752
1260	16-Oct-02	5.875	8.2722	9.5	8.1299	8.5	7.8621
1080	16-Apr-03	5.875	7.8776	9.25	7.7059	8.25	7.4875
900	16-Oct-03	5.875	7.5017	9	7.3213	8	7.1478
720	16-Apr-04	5.875	7.1438	8.75	6.9726	7.75	6.8399
540	16-Oct-04	5.875	6.803	8.5	6.6563	7.5	6.561
360	16-Apr-05	5.875	6.4784	8.25	6.3697	7.25	6.3087
180	16-Oct-05	5.875	6.1693	8	6.11	7	6.0806
0	16-Apr-06	105.875	105.875	7.75	105.875	6.75	105.875
Alternate Values		**164.625**	**183.5085**		**182.5368**		**180.4022**

Assumes compounding will be done semi-annually.

13.5.4 Using the Zero-Coupon Yield for Bond Valuation

If interest rates are a function of time to maturity, then valuation of a bond, using the same YTM rate, can lead to erroneous results, as we saw in the pervious section. In other words, the YTM of a zero coupon bond is a "pure" interest rate for the tenor of the bond. In all the other cases, if we used YTM rate for valuation, we have assumed that a single rate, equivalent to the YTM, exists for all the time periods for which coupons have to be invested. Therefore, the appropriate rates for various tenors will have to be used to value cash flows for that tenor. We call such a valuation as the zero coupon yield based valuation. In the next chapter, we shall discuss the methodology used for estimating the zero coupon yield curve (ZCYC). In this section, we shall see how the valuation of a bond changes if we use the ZCYC for valuation. The equation we use will be

$$PV = \frac{C}{(1+r_1)} + \frac{C}{(1+r_2)^2} + \ldots\ldots + \frac{C+R}{(1+r_m)^m} \ldots\ldots \quad\ldots\ldots \quad\ldots\ldots (13.4)$$

Consider the 12.5% 2013 bond, whose cash flows are in Table 13.7. The valuation in Table 13.7 uses a different rate for each of the cash flows. In the next chapter on yield, we shall see how the appropriate ZCYC rate is estimated. The NSE estimates the ZCYC from market prices and enables the computation of appropriate discount rates, used in the table.

Table 13.7: Using the ZCYC for valuation of bonds

Coupon dates	Cash flows (Rs.)	Distance in years from settlement date	Appropriate ZCYC rate	Present value of the cash flow (Rs.) Semi-Annual Compounding
23-Mar-10	6.25	0.13611	9.6148	6.17062
23-Sep-10	6.25	0.64722	9.5108	5.88522
23-Mar-11	6.25	1.15	9.4519	5.62024
23-Sep-11	6.25	1.66111	9.4272	5.36322
23-Mar-12	6.25	2.16389	9.4302	5.12017
23-Sep-12	6.25	2.675	9.4548	4.88154
23-Mar-13	106.25	3.18056	9.4956	79.10151
Value of the bond				**112.14252**

13.5.5 Bond Equivalent Yield

In all the examples which we have seen so far, we have determined the semiannual coupon from the annual coupon, by simply dividing the annual coupon by 2. We have computed the semi-annual yield for the purpose of determining the price, by similarly dividing the annual yield by 2. If cash flows are compounded multiple times during a year, the effective rates are not the annual rate divided by the number of compounding periods. This is because; intermittent cash flows can be re-deployed, at prevailing rates, to arrive at an effective annual rate.

For example, if annual yield is 11.75%, the semi-annual yield is simply taken as 11.75/2, which is 5.875%. However, if the six monthly coupon is reinvested at 5.875%, the effective annual yield will be higher than 11.75%, at 12.095%. In other words, semi-annual yields should be annualized, by incorporating the effect of the re-investment, as follows:

Effective Annual yield = $(1+ \text{Periodic interest rate})^k - 1$

where k is the number of payments in a year. This formula can be used to compute effective yields for any number of compounding periods in a year. In the above example,

Effective annual yield = $\{(1+0.05875)^2\} - 1$

$$= 12.095\%$$

Though it is well known that semi-annual yields are therefore not half the annual yields, in most bond markets, the convention is to simply divide the annual yield by 2, to get the semi-annual yield. The semi-annual yield thus simplistically computed is called the Bond Equivalent Yield (BEY).

Given the formula above, bond equivalent yield is = (1+effective yield) $^{1/k}$ - 1

Using the numbers from the same example, BEY = $(1 + .12095)^{1/2}$ -1 = 5.875%

In the yield calculations for most fixed income securities, unless otherwise stated, it is the bond-equivalent-yield that is used.

13.6 WEIGHTED YIELD

When bonds are traded at different prices during a day, the yield for the day is usually reported as the weighted yields, the weights being the market value of the trades (price time's quantities traded). For example, assume that the trades in CG11.3% 2010 are as in Table 13.8. The weighted yield is computed using market values for each trade as the weightage.

Table 13.8: Weighted Yield

Quantity	Price (Rs.)	Market value (Rs.)	YTM (%)	YTM as Proportion of market value
10,000	105	10,52,300	10	1.49
2,500	105	2,63,625	10	0.37
4,000	105	4,21,880	10	0.60
6,500	106	6,85,750	10	0.97
9,000	106	9,50,670	10	1.34
8,500	106	8,98,535	10	1.26
12,000	106	12,69,600	10	1.78
6,000	106	6,35,700	10	0.89
5,500	106	5,83,000	10	0.82
3,500	106	3,71,700	10	0.52
2,000	106	2,12,500	10	0.30
	Total Value	**73,45,260**	**Weighted Yield**	**10.34**

13.7 YTM OF A PORTFOLIO

YTM of a portfolio is not computed as the average or weighted average of the YTMs of the bonds in the portfolio. We are able to compute weighted yields only when the cash flows of the bonds under question are the same, as was the case in weighted yields. In a portfolio of bonds, each bond would have a different cash flow composition and therefore, using a weighted yield would provide erroneous results. We therefore find the YTM of the portfolio as that rate which equates the expected cash flows of the bonds in the portfolio, with the market value of the portfolio.

Consider for example, a portfolio of bonds as in Table 13.9.

Table 13.9: YTM of a portfolio : Sample Bonds

Bond	Maturity Date	Number of Bonds	Price as on Feb 5, 2001 (Rs.)	Market Value (Rs.)
CG 11.75% 2001	25/08/01	20000	101.1	2022000
CG 11.68% 2002	6/08/02	25000	102.915	2572875
CG 12.5% 2004	23/03/04	32000	107.48	3439360
			Total	**803**

Box 13.4: XIRR Function

The XIRR function computes the IRR (equivalent to YTM in our case) for a series of cash flows, occurring at different points in time, when we provide the dates and the cash flows. The function requires {values, dates, and guess}. The values have to be in a column, with the *initial cash outflow shown as a negative number.*

Year	Cash Flows
05/02/2012	-500000
05/05/2012	25814
05/08/2012	15874
05/11/2012	12698
05/02/2013	32564
05/05/2013	25418
05/08/2013	45128

In the above example, the market value on February 05, Rs. 500000 is to be shown as a negative value. The dates on which the cash inflows occur are shown in a corresponding column.

When we use the function as, for instance,

= XIRR (C2:C7, B2:B7) we get the result 0.65406, which is 65.406%. We have to remember however, that the XIRR function supports only the actual/365 day count convention. We use this function as an approximation, because finding the YTM is an iterative trial and error process, which can be complex otherwise.

The cash flows from these bonds accrue on different dates, as these bonds have different dates to maturity. Table 13.10 shows the dates and the cash flows for these bonds and given the quantity of bonds held, the total cash flows from this portfolio, on the given dates. The yield to maturity of this portfolio is that rate which equates this series of cash flows in column 3 of table 13.9, to the market value on table 13.8, as on February 5, 2001. We can find the YTM by using the XIRR function in Excel.

Table 13.10: Portfolio Cash Flows

Date	Cash flow per bond	Total cash flows
25-Feb-01	5.875	117500
25-Aug-01	105.875	2117500
6-Feb-01	5.84	146000
6-Aug-01	5.84	146000
6-Feb-02	5.84	146000
6-Aug-02	105.84	2646000
23-Mar-01	6.25	200000
23-Sep-01	6.25	200000
23-Mar-02	6.25	200000
23-Sep-02	6.25	200000
23-Mar-03	6.25	200000
23-Sep-03	6.25	200000
23-Mar-04	106.25	3400000
	YTM	**13.1586%**

13.8 REALISED YIELD

The actual yield realised by the investor in a bond, over a given holding period, is called realised yield. Realised yield represents the horizon return to the investor, from all the three components of bond return, namely, coupon, return from re-investment of coupon and capital gain/loss from selling the bond at the end of the holding period. The realised yield to the investor is the rate which equates cash flows from all these three sources, to the initial cash outflow. Realised yield is also called total return from a bond. Depending upon the reinvestment rates available to the investor and the yields which prevail at the end of the holding period, the investor's realized yield from holding a bond can vary. For example, consider the 12.5% 2004 bond. The realized yield on a 1-year horizon based on a set of assumptions about re-investment rates and YTM at the end of the holding period, are as follows:

|	
Purchase price of the bond on 23 March 2001	Rs. 107.42 (YTM 9.6%)
Coupons received: 2 Semi-annual	Rs. 12.50
Reinvestment of 1st coupon for 1 year @ 7.5%	Rs. 6.7188
Reinvestment of 2nd coupon for 6 months @ 7%	Rs. 6.4688
Sale of bond at the end of 1 year @ 7.8% yield	Rs. 108.55
Coupon income from the bond for 1 year	Rs. 12.5
Income from coupon re-investment	Re. 0.6876
Capital gain on sale	Rs. 1.13
Total cash flows from the bond	Rs. 14.3176
Total return for 1 year holding period	**14.3176/107.42 = 13.3286%**

The total return to the investor is attributable to all the three sources of income and depends on the re-investment rate and the sale price. An increase in interest rates will enhance the reinvestment income of the investor, while reducing the capital gains; a decrease in interest rates will generate capital gains, while reducing the re-investment income of the investor. The investment horizon will also impact the percentage composition of each of these components to the total return of the investor. Holding the bond over a longer time will enhance coupon component of the return and reinvestment, if rates are increasing. However, the capital gains will drop, due to a fall in yield, as well as due to the time path effect, leading to the bond tending to redemption value, as it nears maturity. Realised yield or total return therefore provides the investor the tool to analyse impact of interest rates and holding period, on the actual returns earned from a bond.

13.9 YIELD-PRICE RELATIONSHIPS OF BONDS

The basic bond valuation equation shows that the yield and price are inversely related. This relationship is however, not uniform for all bonds, nor is it symmetrical for increases and decreases in yield, by the same quantum.

Consider Figure 13.1 which plots the price-yield relationship for a set of bonds:

Figure 13.1 Price – Yield Relationship of Bonds
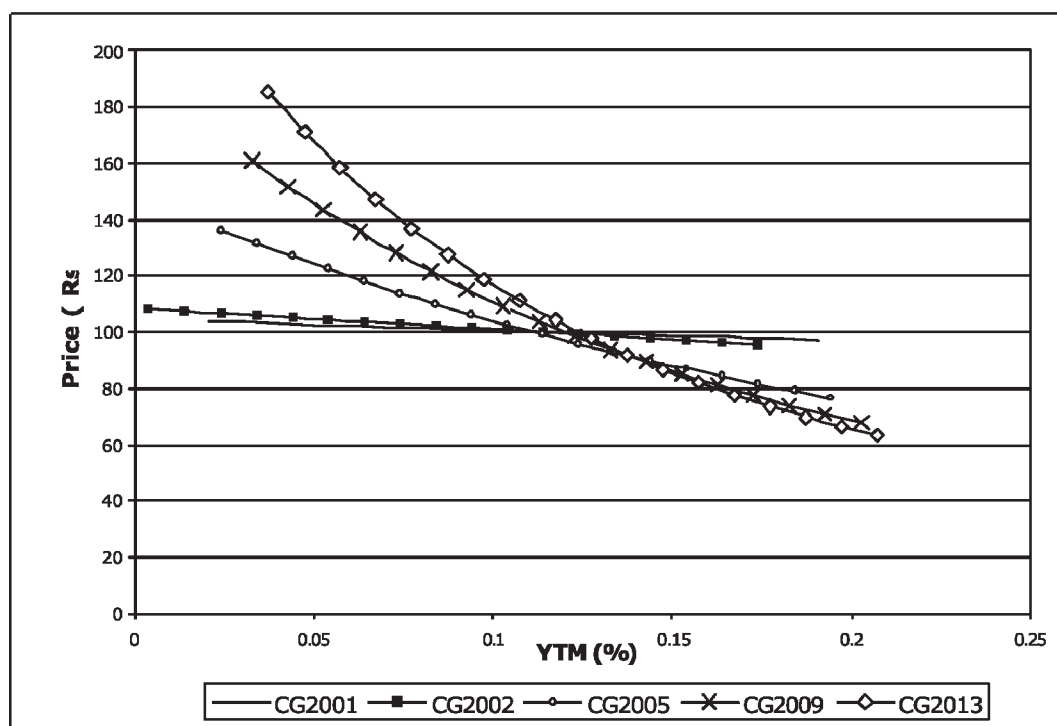
13.9.1 Price - Yield Relationship: Some Principles

a.   Price-yield relationship between bonds is not a straight line, but is convex. This means that price changes for yield changes are not symmetrical, for increase and decrease in yield.

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b.	The sensitivity of price to changes in yield in not uniform across bonds Therefore for a same change in yield, depending on the kind of bond one holds, the changes in price will be different.

c.	Higher the term to maturity of the bond, greater the price sensitivity We notice in Figure 13.1, that CG2013 has the steepest slope, while 2001 and 2002 are virtually flat. Price sensitivities are higher for longer tenor bonds, while in the short-term bond, one can expect relative price stability for a wide range of changes in yield.

d.	Lower the coupon, higher the price sensitivity. Other things remaining the same, bonds with higher coupon exhibit lower price sensitivity than bonds with lower coupons.

In the bond markets therefore, we are interested in two key questions: What is the yield at which reinvestment and valuation happens and how the change in this yield impacts the value of the bonds held. These are the questions we address in the next two chapters.

Model Questions

1. **A GOI security with coupon of 11.68%, maturing on 07/07/2014, is to be settled on 10/11/2013. What are the number of days from the previous coupon date?**

    a) 132
    b) 145
    c) 129
    d) 123

Answer: d.

We use the ***coupdaybs*** function in Excel and specify the following:

Settlement date: 10/11/2013

Maturity Date: 07/07/2014

Frequency: 2

Basis: 4

The answer is: 123 days

2. **What is the accrued interest on a 11.68% GOI security, maturing on 6-Aug-2002, trading on l-Jun-2001 at a YTM of 7.7395%?**

    a) Rs. 3.6901
    b) Rs. 3.7311
    c) Rs. 3.7105
    d) Rs. 3.7520

Answer: b

Accrued interest is computed as

Coupon payment * (number of days from previous coupon/days in the coupon period)

We use the ***coupbs*** and ***coupdays*** functions to ascertain days from previous

coupon and days in the coupon period.

The amount of coupon is Rs. 11.68/2.

Therefore, the accrued interest is

= 5.84 * (115/180)

= Rs. 3.7311

3. **A 10.5% GOI security maturing on 02/05/2015, is being priced in the market on 08/10/2013 at Rs. 102.50. The YTM of the bond is**

a) 7.3728%

b) 7.3814%

c) 8.3562%

d) 8.7487%

Answer: d

We use the *Yield* function in Excel, specifying settlement (08/10/2013) and maturity dates (02/05/2015), coupon (0.105), price of the security (102.50), redemption (100) frequency (2), basis (4).

The answer obtained is **8.7487%**

4. **The following is the description of bonds held in a portfolio. What is the portfolio yield, using the weighted yield method?**

Coupon (% pa)	Maturity Date	Market Price	No: of Bond
10.25	07/07/2014	101.5	5500
11.5	10/09/2014	104.75	2480
10.75	08/12/2014	110.8	3640
12.75	02/06/2015	103.25	2800
12.5	09/11/2015	102.4	6300
9.75	02/07/2016	108.5	4250

Answer:

The yield of each of the bonds can be computed using the "yield" function (see solved example 3 above). The market value of each bond can be computed as the product of number of bonds and market price as on July 11, 2001.

Market Value = Market Price x No: of Bond

Coupon (% pa)	Maturity Date	Market Price	No: of Bond	Market Value
10.25	07/07/2014	101.5	5500	558250
11.5	10/09/2014	104.75	2480	259780
10.75	08/12/2014	110.8	3640	403312
12.75	02/06/2015	103.25	2800	289100
12.5	09/11/2015	102.4	6300	645120
9.75	02/07/2016	108.5	4250	461125

The yield of the portfolio can be found by weighting each bond's yield by the market value of the bond in the portfolio. This is done as:

Portfolio Yeild

=\{(10.25*558250)+(11.5*259780)+(10.75*403312)+(12.75*289100)+(12.5*645120)+

(9.75*461125)\}/(558250+259780+403312+289100+645120+461125)

= 11.1939%

We can do the same in Excel, using the formula

= sumproduct (yield array, market value array)/sum(market value array)

The answer in both cases is 11.1939%, which is the portfolio yield.

5. **On April 12, 2001, a dealer purchases a 11.68% GOI bond maturing on 6-Aug-2002 for Rs. 104.34. He holds the bond for 1 year, and sells it on April 11, 2002, for Rs. 100.90. If the coupons received during the holding period are re-invested at 8.2405% (1st coupon) and 6.7525%(2nd coupon), what is the realised yield on the investment?**

Answer:

The components of realized yield are:

Coupon income, re-investment of coupons and capital gains/losses.

Coupon income:

The number of coupons between the acquisition date and date of sale of the bond can be found with the *coupnum* function. In this case there are two coupons. Therefore the coupon received is: Rs. 11.68

Re-investment Income:

We can find the first coupon date, by using the "coupncd" function in Excel.

The first coupon is due on August 6, 2001. Since the bond will be sold on April 11, 2002, the number of days for which the coupon will be re-invested will be 248 days. The interest rate applicable to this coupon, as given in the question, is 8.2405%. Therefore the re-investment income can be computed as:

= (11.68/2) * (248/365)* 0.082405

= 0.3270

Similarly, the second coupon is due on 6th Feb 2002. It will be reinvested for 65 days, at 6.7525%. The reinvestment income will be

= (11.68/2) * (64/365)* 0.067525

= 0. 0691

Capital gain/loss:

Rs. 100.90 - 104.34

= -3.44

The total rupee return from holding the bond for a year is

= 11.68 + 0.3270+ 0.0691 - 3.44

= 8.6361

The released yield therefore is:

= (8.6361/104.34)*100

= 8.2769%

CHAPTER 14: YIELD CURVE AND TERM STRUCTURE OF INTEREST RATES

Interest rates are pure prices of time, and are the discounting factors used in the valuation equation for bonds. It is crucial that we are able to derive these discount factors from the "market" such that the valuations we do are current and accurate. The process of determining the discount factors, (which we know as the yields or interest rates) will have to therefore draw from the current market prices of bonds. The broad picture of the debt market can be discerned in terms of a functional relationship between two variables: time and interest rates. The focus of this chapter is the understanding of this relationship between time and interest rates. This relationship not only provides tools for valuation of bonds, but also enables identification of arbitrage opportunities in the market and assessment market expectations of future interest rates.

14.1 YIELD CURVE: A SIMPLE APPROACH

The simplest approach to observing the interest rates in the market is to draw the yield curve from the YTM of traded bonds. The YTMs of traded bonds is used as an approximation of the interest rate for the given term to maturity of the bond. When we obtain a plot of these relationships between YTMs and term to maturity of a set of traded bonds, we can identify the functional relationship between time and yield, by fitting a curve through the plot of points. Alternatively, we can use these YTMs to estimate yields for any tenor, by methods of interpolation.

14.1.1 Yield Curve from a Sample of Traded Bonds

Consider for example, bonds traded on March 29, 2001 (Table 14.1). From the observed market prices in column 5, we can compute the YTM of these bonds, using the "yield" function in Excel. The term to maturity of the bonds is the distance in time between the maturity date of the bonds (column 3) and the settlement date (March 29, 2001). The term to maturity is shown in column 4. We can see that bonds with varying terms to maturity have traded at different yields, and the general tendency is for yields to increase as the term increases.

In order to be able to model this relationship into a function, that can be used for valuing bonds, we need to estimate the relationship as an equation, so that given values of tenor (x), we can estimate values of yield (y).

This can be done by plotting the term to maturity and the yield to maturity, and fitting a 3rd degree polynomial to describe the functional relationship. A third degree polynomial is specified as follows:

$$y_{it} = a_{it} + b_{1it} x + b_{2it} x^2 + b_{3it} x^3 e_{it} \ ....(14.1)$$

where bi, b_2 and b_3 are estimated co-efficients, given values of term to maturity (x) and yield to maturity (y).

Table 14.1: Sample Bonds for Yield Curve

Name	Coupon	Maturity Date	Term To Maturity (yrs)	Price (Rs.)	YTM(%)
CG2001	11.75	25/08/2001	0.41	101.00	9.09%
CG2002	11.15	09/01/2002	0.78	102.75	7.41%
CG2003	11.10	07/04/2003	2.02	103.52	9.15%
CG2004	12.50	23/03/2004	2.98	108.31	9.25%
CG2005	11.19	12/08/2005	4.37	106.19	9.42%
CG2006	11.68	10/04/2006	5.03	107.58	9.74%
CG2007	11.90	28/05/2007	6.16	109.31	9.84%
CG2008	11.40	31/08/2008	7.42	107.60	9.92%
CG2009	11.99	07/04/2009	8.02	109.18	10.28%
CG2010	11.30	28/07/2010	9.33	106.60	10.18%
CG 2011	12.32	29/01/2011	9.83	110.97	10.40%
CG2013	12.40	20/08/2013	12.39	111.20	10.74%

Fig 14.1: Yield Curve as on March 29, 2001

$$y = 9E\text{-}06x^3 - 0.0003x^2 + 0.0041x + 0.0817$$
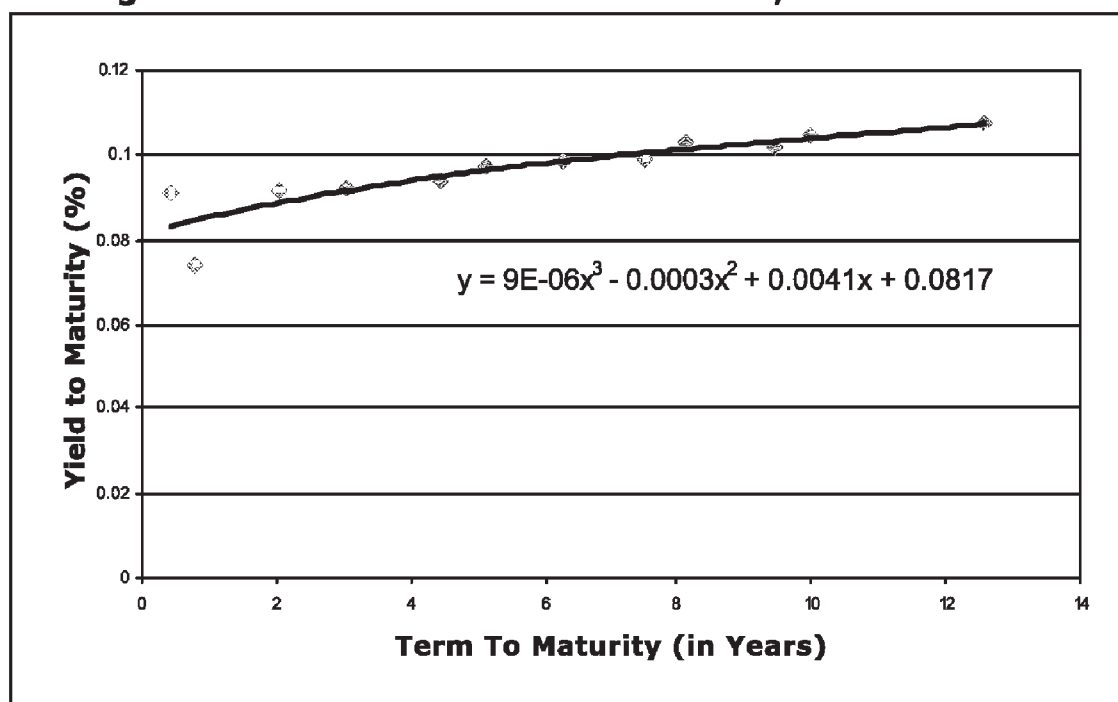
The equation in Fig 14.1 provides the generalised relationship between term to maturity and yield to maturity. By fitting into the equation, the term to maturity of any given bond, (by substituting the value of x), the corresponding YTM can be estimated. The given bond can be valued by fitting into its cash flow features, the YTM thus derived, so that value of the bond

can be computed. For example, we can use the equation in the yield curve above to value the 12.5% 2004 bond on March 29, 2001. The bond has 3.03 years to maturity on that date, therefore we plug into the yield curve equation, this value in the place of x, as follows:

Y= ((-0.000009*(3.03)^3)-(0.0003*(3.03)^2)+(0.0041*3.03)+0.0817)

We obtain the value 0.09112 as the Y value. Since we know the cash flows of this bond, we can use the "Price" function to estimate the value of this bond, plugging in 0.09112 as the value for yield. The resulting price of the bond is Rs. 108.6754. (The last traded price of this bond on that date was Rs. 108.31). We can thus use the yield curve to mark a portfolio to market, or value a given bond, which may not be traded.

Box 14.1: Using Excel to draw the Yield Curve

The following are the steps to drawing the yield curve using Excel:

1. Compute yield and term to maturity for a set of bonds, using the yield function, and finding the difference in years, between settlement date and maturity date of the bond, ((maturity date - settlement date)/360)).
2. Draw an XY graph (XY scatter) of these points, using term for x values and Yield for Y values.
3. Choose Chart/Add trend line/type: Choose polynomial, and order 3.
4. Choose Chart/Add trend line/options: display equation on the chart.
5. Excel plots the graph and estimates the 3rd degree polynomial, displaying the equation of the yield curve.

14.1.2 Limitations of the Simple Yield Curve

The yield curve which we have drawn from the market prices above, is a summary of the YTMs for various traded bonds, on a given date. They, however, may not truly represent the yields or interest rates for various tenors. The YTM of a bond represents a single rate, at which all the cash flows of a bond are discounted. This actually translates into a valuation proposition where, cash flows accruing at varying points in time are all discounted at the same rate, i.e. the YTM of the bond. In reality, such a discounting process represents a scenario where cash flows accruing at any point in the life of the bond, can be deployed at a single rate. This would then translate into a situation where interest rates for all tenors for a given bond are equal, and hence a flat yield curve.

What we see when we plot the YTMs of traded bonds is a tendency for YTMs of bonds with varying tenors to be different. This means that rates for varying tenors are not uniform, but different. If this were true, we can not use the same YTM for valuing all the cash flows of a bond. The "true" interest rates, which are implicit in the prices of traded bonds, are therefore not observed. The YTM is a simplification, with an erroneous assumption on the re-investment of intermittent coupons. If we know that different rates exist across tenors, the valuation equation will have to be recast as follows:

$$P_0 = \frac{C_1}{1+r_1} + \frac{C_2}{(1+r_2)^2} + \dots \frac{C_n}{(1+r_n)^n} \quad \dots\dots\dots\dots(14.2)$$

Where r_1 r_2 .... r_n represent the rates for the respective tenors. These rates are "pure" spot rates, in that there are no assumptions on reinvestment of coupons. In other words they are rates that would be implicit in a bond that has a single cash flow at the end of the term, i.e. a zero coupon bond. These rates are also called as the zero coupon rates, and the yield curve that is drawn from these rates is called the zero coupon yield curve (ZCYC). We can thus look upon every coupon paying bond, as a bundle of zero coupon bonds, with each cash flow accruing at the end of a term r_1, r_2, r_3 ... r_n, being valued as if they were zero coupon bonds of that tenor. The estimation problem therefore is one of identifying these unique rates, and modeling their relationship with one another, which in turn is the basis for the valuation of the bond.

The actual modeling of the true rates across tenor, and their relationship across term is called the "modeling of the term structure of interest rates," which attempts the estimation of the theoretical spot rates, from a set of market prices of bonds, based on a theoretical framework that explains the relationship between the rates across various tenors. There are a number of methods to do this, and we shall discuss one of them in a subsequent section in this chapter.

14.2 BOOTSTRAPPING

The error caused by the reinvestment assumption in the yield curve derived from the YTMs of traded bonds can be eliminated, if we are able to observe the rates of bonds without intermittent coupons, i.e. zero coupon bonds. However, in most markets, zero coupon bonds across varying tenors do not exist, and even if they do, are not as actively traded as the coupon paying bonds. However, in most markets, treasury bills which are discounted securities, with no intermittent coupons, exist at the short end of the market. Therefore, we could bootstrap from the zero coupon treasuries, and derive the r_1, r_2 ... r_n of the coupon paying bonds.

For example, if a Treasury bill with 6 months to maturity, is traded in the market at Rs.96.5 and matures to the par value of Rs.100, the 6 month zero coupon rate can be computed by solving the equation:

$$96.5 = \frac{100}{(1+r_{0.5})^{0.5}}$$

The 6 month rate that solves this equation is 7.492%. We can now look for a coupon paying bond with 1 year to maturity, whose valuation equation, in zero coupon terms can be stated as

$$p_0 = \frac{C_1}{(1+r_{0.5})^{0.5}} + \frac{C_2}{(1+r_1)^1} \quad \dots\dots\dots(14.3)$$

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In this equation, we know the periodic coupons as well as the market price. From the earlier equation, we can substitute the value of 15.5. Then the only unknown in this equation would be ri, for which we can solve. The process of thus discovering the zero rates from prices of coupon bonds, by substituting zero rates estimated for shorter durations is called bootstrapping. The yield curve is then drawn from the plot of these derived zero rates, in the similar manner as we drew the par yield curve.

Bootstrapping is a very popular method with bond market dealers, for estimating the term structure from market prices. Some of the practical considerations in estimating the zero curve in this manner are the following:

1.   The choice of bonds for varying maturities has to reflect market activity. Depending on the bonds chosen for estimating the rates, the derived zero rates can vary. It is, however, possible to obtain a plot of all implied zero rates for all traded bonds, and adopt the curve fitting procedure, to overcome this problem.

2.   It may not be possible to obtain zero rates for the first cash flow of a bond; if a zero coupon Treasury bill with matching maturity is not found. For example, there could be a bond, with the first coupon 42 days away. We, therefore, need the r_1 for 42 days, in order to value this bond. A treasury bill with exactly 42 days to maturity may not be traded in the market. Dealers mostly use a linear interpolation to sort this problem. Traded treasury bills for available maturities are picked up. Assume for instance we have the rates for 2 bills, one with 40 days to maturity, and another with 52 days to maturity. The zero rate for the 42-day bond is computed by linearly interpolating between these two rates.

Example of linear interpolation:

If the rate for the 40-day bond is 6.542%, and the rate for the 52-day bond is 6.675%, the rate for the 42-day bond can be found as

= 6.542 + [(6.675-6.542)] x [(42-40)/(52-40)]

= 6.56416%

3.   The bootstrapping technique is sensitive to the liquidity and depth in the market. In a market with few trades, and limited liquidity, bootstrapping is only an approximation of the true term structure, due to simple assumptions (like linear interpolation) made for linking up rates for one tenor and the rates for another. It is not uncommon for some to use more sophisticated non-linear interpolations.

14.3 ALTERNATE METHODOLOGIES TO ESTIMATE THE YIELD CURVE

In the estimation of the yield curve from a set of observed market prices, the following are important considerations:

a.   The spot rates and the yield curve that is estimated should have a close fit with market prices. That is, the prices estimated by the model and the prices actually prevalent in the market should have a close fit.

b.   The model must apply equally well to bonds which are not part of the sample used for estimation. That is, if a very close fit is sought to be achieved, it may come at the cost of the model not being able to value out-of-sample bonds. The model would have incorporated "noise" in the estimation.

c.   The estimated yield curve should be smooth, such that the spot and forward rates derived from them do not show excessive volatility.

d.   A number of mathematical techniques are used to generate a fitted yield curve from a set of observed interest rate points. They involve optimality criteria consistent with the assumptions regarding the term structure of interest rates.

14.3.1 NSE -ZCYC (Nelson Seigel Model)

In the Indian markets, term structure estimation has been done, and is disseminated every day by the National Stock Exchange. The Zero Coupon Yield Curve (ZCYC) published by the NSE, uses the Nelson-Seigel methodology.[12] The Nelson-Siegel formulation specifies a parsimonious representation of the forward rate function given by

$$f(m,b) = \beta_0 + \beta_1 * \exp(-m/\tau) + \beta_2 [(m/\tau) * \exp(-m/\tau)]............(14.4)$$

where 'm' denotes maturity and b=[$\beta O, \beta 1, \beta 2 and \tau$] are parameters to be estimated.

Since the model is based on the expectations hypothesis, it develops the term structure from the no-arbitrage relationship between spot and forward rates. The forward rate function can be mathematically manipulated (integrated) to obtain the relevant spot rate function, the term structure:

$$r(m,b) = \beta_0 + (\beta_1 + \beta_2) * [1 - \exp(-m/\tau)]/(m/\tau) - \beta_2 * \exp(-m/\tau).......(14.5)$$

In the spot rate function, the limiting value of r(m,b) as maturity gets large is β0 which therefore depicts the long term component (which is a non-zero constant). The limiting value as maturity tends to zero is β0 + β1, which therefore gives the implied short-term rate of interest.

With the above specification of the spot rate function, the PV relation can now be specified using the discount function given by

$$d(m,b) = \exp\left(-\frac{r(m,b)*m}{100}\right)........................(14.6)$$

The present value arrived at is the estimated/model price (p_est) for each bond. It is common to observe secondary market prices (pmkt) that deviate from this value. For the purpose of empirical estimation of the unknown parameters in term structure equation above, we

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12   The paper (Gangadhar Darbha, et al, 2000) that describes the methodology can be downloaded from www.nse.co.in 'products' zcyc. The following section is extracted from this paper.

postulate that the observed market price of a bond deviates from its underlying valuation by an error term ei, which gives us the estimable relation:

$pmkt_i = p\_est_i + e_i$ (14.7)

This equation is estimated by minimising the sum of squared price errors. The steps followed in the estimation procedure are as follows:

i.   A vector of starting parameters ($\beta O, \beta 1, \beta 2 and \tau$) is selected,

ii.   The discount factor function is determined using these starting parameters,

iii.   This is used to determine the present value of the bond cash flows and thereby to determine a vector of starting 'model' bond prices,

iv.   Numerical optimization procedures are used to estimate a set of parameters (under a given set of constraints viz. non-negativity of long run and short run interest rates) that minimise the sum of squared price errors,

v.   The estimated set of parameters are used to determine the spot rate function and therefrom the 'model' prices (this is the first set of results we compute for each day),

vi.   These 'model' prices are used to compute associated 'model' YTMs for each bond (this is the second set of results).

Plots of the estimated term structure for any particular day can be obtained by following the procedure below:

(I)   Create a series of maturity values; for instance 1 to 25 years, with step lengths of (say) 0.5 years

(II)   For each maturity, use the estimated parameters for the required day to derive corresponding spot rates

(III)   With maturity values on the X-axis, plot the spot rates against the maturity values,

(IV)   Spot rate associated with any desired maturity (eg. 8.2 years) can be similarly derived by substituting the estimated parameters and m=8.2 in the term structure equation.

14.4 THEORIES OF THE TERM STRUCTURE OF INTEREST RATES

The term structure represents the different rates of market interest rates for different periods of time. The shape of the curve therefore contains crucial information on the functional relationship between price and time. The normally observed shapes of the yield curve are the following:

a.   upward sloping

b.   downward sloping

c.   humped

d.   inverted

The most commonly known theories that attempt an interpretation of the shape of the yield curve are:

- The pure expectation hypothesis
- The liquidity preference hypothesis
- The preferred habitat hypothesis

14.4.1 Pure Expectation Hypothesis

This interpretation explains the yield curve as a function of a series of expected forward rates. Pioneered by Irving Fisher in 1896, this is the oldest theory of the term structure, and is the easiest to quantify and apply. The traditional form of the pure expectations theory implies that the expected average annual return on a long term bond is the geometric mean of the expected short term rates. For example, the one year spot rate can be thought of as the product of the six-month spot and the six month rate six months from now (six month forward). A risk neutral investor would therefore be indifferent between the one year spot rate, and a one year position formed by a combination of a six month spot and a six month forward. Therefore shape of the yield curve is driven by the expectations about the interest rates. Based on the expectations hypothesis, we can calculate a series of short term rates, which over any given period will, in aggregate, reproduce the market rates expressed in the yield curve.

14.4.2 Liquidity Preference Hypothesis

This hypothesis is a modification of the expectation hypothesis, incorporating risk. Other things remaining the same, investors would prefer short term bonds to long term bonds, because pricing of short term bonds is made easier by the lower price risk of these bonds and the shorter term to maturity. Therefore short term instruments will enjoy a higher liquidity than long term instruments. If investors prefer short term rates to long term rates, interest rates at the lower end of the yield curve would be lower, and the yield curve would slope upwards. The liquidity preference hypothesis posits that the long term rates are not only composed of expected short term rates, but also contain a liquidity premium. The liquidity premium is the additional yield demanded by investors to extend the maturity of instruments, over longer periods of time. Therefore liquidity premium can be expected to increase with time to maturity.

14.4.3 Preferred Habitat Hypothesis

Preferred habitat hypothesis recognizes that the market is segmented and that expectations of investors are not uniform across various tenors. This hypothesis posits that distinct categories of investors exist, and that each of these categories prefers to invest at certain segments of the yield curve. For example, corporates with short term surplus funds, would prefer to deploy the same in short term instruments, and may be unwilling to take price risks associated with investing in long term instruments. On the other hand, pension and insurance companies would prefer to invest in long term bonds, to match the liability profile of their portfolios. Since the portfolios and the asset requirements of investors vary, they would prefer some

tenors over the other, and therefore focus on segments of the yield curve. The preferred habitat theory therefore posits that depending on demand and supply at varying tenors of the yield curve, investors will have to be receive (pay) premiums (discounts) to shift away from a preferred habitat. The shape of the yield curve therefore is a function of demand and supply, and does not have any formal relationship to interest rate expectations.

We can summarise the interpretation of the alternate shapes of the yield curve under these three hypotheses, as follows:

Term structure hypotheses	Shape of the yield curve			
	Flat	Upward Slopping	Downward Slopping	Humped
Expectations Hypothesis	Short term interest rates are not expected to change	Short term interest rates are expected to increase	Short term rates are expected to decrease	Short term rates are expected to intially increase and then decrease
Liquidity Premium Hypothesis	There is no liquidity premIA on long term rates over short term.	Liquidity premia are positive with increase in term	Liquidity premia are negative with increase in term	Liquidity premia are positive upto a certain term after which they turn negative
Preferred Habitat Hypothesis	Demand and Supply are matched at all maturities	Excess of supply over demand in shorter maturities	Excess of supply over deman in longer maturities	Excess of supply over demand in the intermediate term

The term structure of interest rates becomes very important in a market in which forwards and derivatives trade, as the valuation and trading of these instruments is not possible without a dependable model of term structure. The NSE-ZCYC is an important development in this context. In the Indian markets, pending the development of the forward and derivative markets in interest rate products, and limited liquidity in the spot markets, yield curve estimations are yet to gain importance. However, the increasing focus on valuation and marking to market of portfolios has created the need for the market yield curve, for banks, PDs, institutions and mutual funds. The RBI used to publish the yield curves for valuation of bank portfolios. After the RBI discontinued this practice nearly 2 years ago, the FIMMDA has created a standard yield curve, based on polled yields at the end of every trading day, to enable valuation of portfolios on the basis of a standard yield curve. This has enabled standard industry practice on valuation. SEBI has mandated a standard valuation model for bonds in mutual fund portfolios, from December 1, 2000, based on a duration-based valuation model developed by CRISIL.

Model Questions

1.   **The NSE ZCYC estimates for July 11, 2001 are as follows:**

        Beta 0 = 11.4652

        Beta 1 = -2.2510

        Beta 2 = -10.7202

        Tau = 1.4197

What is the spot rate for a term to maturity of 3.5 years?

Answer:

We use the ZCYC valuation equation (14.5)

$$r(m,b)\beta_0 + (\beta_1 + \beta_2)*[1-\exp(-m/\tau)]/(m/\tau) - \beta_2 * \exp(-m/\tau)$$

We can take the values provided by NSE to an Excel Spreadsheet, and key in the formula above, substituting 3.5 for *m* in the equation, and substituting the NSE estimates for $\beta_0,$ β_1 *and* β_2 *and Tau*. We then get

= 11.4652 + ((-2.2510-10.7202)*(1-exp(-3.5/1.4197))/(3.5/1.4197)-(-

10.7202*exp(-3.5/1.4197))

= **7.56185%**

2.   **If there are 2 bonds trading in the market as follows, on July 11, 2001 as detailed below:**

        i.   **11.98% 2004 (Maturity 8-Sep-2004): Rs. 111.8**

        ii. **11.19% 2005 (Maturity 12 Aug 2005): Rs. 111.83**

What is the linearly interpolated rate for 3.5 years, using the above data?

Answer:

Using the **Yield** function, we can find out the YTM of the above bonds as 7.6917% and 7.7524% respectively. Using the **yearfrac** function, we can find the term to maturity of these bonds as 3.1583 years and 4.0861 years respectively. To find the YTM for a 3.5 year bond, we can do a linear interpolation, as follows:

= 7.6917 + (7.7524-7.6917)*((3.5-3.1583)/(4.0861-3.1583))

= **7.7141%**

3.   **If the yield curve is upward sloping, which of the following is false?**

        a.   The market expects short term interest rates to increase.

        b.   The liquidity premium is increasing with increase in tenor.

        c.   There is an excess of demand over supply in shorter maturities.

d. The interest rates are positively related to term, along the yield curve.

Answer: c

4. **The NSE-ZCYC estimate of the spot rate for the term 7.2876 years is 9.1648%. What is the discounted value of a cash flow of Rs. 100, receivable at the end of that term?**

Answer:

We can use the ZCYC estimates to arrive at the discounted value of any cash flow, by using the formula:

$$d(m,b) = exp\left\{-\frac{r(m,b)*m}{100}\right\}$$

Therefore the discount factor to be applied to the cash flow of Rs. 100, receivable at the end of 7.2876 years is (Excel recognises the term exp in the formula)

= exp ((- 9.1684 * 7.2876)/100)

= 0.512787

Therefore, the discounted value of Rs. 100 will be

= 100*0.5128

= Rs. 51.2787

5. **The following term structure of interest rates is given to you:**

Tenor (in years)	Yield (% p.a.)
0.30	7.0257
0.35	7.0487
0.40	7.0847
0.45	7.1589
0.50	7.1905
0.55	7.2025
0.60	7.2368
0.65	7.2604
0.70	7.2928
0.75	7.3138
0.80	7.3388
0.85	7.3704
0.90	7.3939
0.95	7.4181
1.00	7.4379

On 15th June 2001, you are required to value a bond with a coupon of 11.04%, maturing on 10-Apr-2002. The face value of the bond is Rs. 100. Given the yield

curve information in the table above, what is the value of the bond? (Use linear interpolation to find discounting rates for each of the component cash flows).

Answer:

We have to first find the cash flows of the bond up to the date of maturity, and the distance in years of each of the cash flows to the settlement date. We use the coupncd function and find that there are 115 days to the first coupon and 295 days to the next coupon, which translate into 0.319444 years and 0.819444 years respectively.

The discount rate for these two tenors can be found with by interpolation from the term structure information that is given in the table above. The rate for the tenor of 0.319444 years can be found by linear interpolation between the tenors 0.3 and 0.35 years, as follows:

= 7.0257+ (7.0487-7.0257)*(0.31944 - 0.3)/(0.35-0.3)

= 7.0346%

Similarly the rate for the tenor of 0.819444 can be found by interpolation between the tenors 0.8 and 0.85 years, as follows:

= 7.3388 + (7.3704 -7.3388)*(0.81944 - 0.8)/(0.85-0.8)

= 7.3511%

We can now value the bond by discounting the cash flows using these rates, as follows:

$$\frac{5.52}{(1.070346)^{0.31944}} + \frac{105.52}{(1.073511)^{0.81944}}$$

Rs. 104.9627

This is the value of the bond, computed by discounting each cash flow by the interpolated yield from the term structure of interest rates.

CHAPTER 15   DURATION

Duration, as the name suggests is, in a simple framework, a measure of time, though its applications in understanding the price-yield relationship are more intense. We shall begin with the simple definition, and later illustrate the alternate applications, including modified duration and PV01.

15.1 INTRODUCTION AND DEFINITION

In the case of bonds with a fixed term to maturity, the tenor of the bond is a simple measure of the time until the bond's maturity. However, if the bond is coupon paying, the investor receives some cash flows prior to the maturity of the bond. Therefore it may be useful to understand what the 'average' maturity of a bond, with intermittent cash flows is. In this case we would find out what the contribution of each of these cash flows is, to the tenor of the bond. If we can compute the weighted average maturity of the bond, using the cash flows as weights, we would have a better estimate of the tenor of the bond. Since the coupons accrue at various points in time, it would be appropriate to use the present value of the cash flows as weights, so that they are comparable. Therefore we can arrive at an alternate measure of the tenor of a bond, accounting for all the intermittent cash flows, by finding out the weighted average maturity of the bond, the present value of cash flows being the weightage used. This technical measure of the tenor of a bond is called duration of the bond.

Lets us attempt an intuitive understanding of duration, with the help of an example. Suppose one had two options:

- Buy bond A selling at Rs. 100.25 with 1 year to maturity. The redemption value of the bond is Rs. 110.275.

- Buy bond B, also selling at Rs. 100.25, and 1 year to maturity. However, the bond pays Rs. 50.5 at the end of 6 months, and Rs. 57.5 at the end of 1 year, on maturity.

Both these bonds have the same tenor of 1 year, and are priced at the same yield 10%. Would one therefore be indifferent between the two options? Why not?

Intuitively, we seem to prefer option (b) to option (a), because we receive some cash flows earlier, in the second case. In other words, though the two options are for 1 year's tenor, we intuitively understand that the second option places some funds earlier than a year with us, and therefore must have an average maturity of less than 1 year. If we are able to compute what percentage of funds, in present value terms is available to us, in the case of bond B, we can understand what the average maturity of bond B is. We attempt doing that in Table 15.1.

The 2 cash flows accruing at the end of 6 months and 1 year have different present values. At a discounting rate of 5% (bond equivalent yield of 10% for half year), the cash flows' present values are Rs.48.1 and Rs. 52.15 respectively.

This present value cash flow stream actually means that 48% of the bond's cash flows accrue at the end of 6 months, and 52% of cash flows accrue at the end of 1 year. (Note that the sum of the cash flows is the current value of the bond, i.e. Rs. 100.25; and the sum of the weights of the cash flows adds up to 1). If we apply these weights to the period associated with the cash flow, we know that the weighted maturity of the bond is 1.52 half years, or 0.76 years.

This is why we seem to prefer bond B, whose average maturity is actually less than a year. The duration of this bond is 0.76 years. In the case of bond A, all the cash flows accrue at the end of the year. Therefore, the duration of the bond is also 1 year.

In any bond with intermittent cash flows accruing prior to maturity, the average maturity will be lesser, and duration is a measure of this average maturity of a bond.

Table 15.1: Weighted Present Values and Duration

Period	Cash flow (Rs.)	Present value of cash flow (Rs.)	Weight of the present value	Weighted tenor of the bond (Year)
1	50.5	48.10	0.48	0.48
2	57.5	52.15	0.52	1.04
Total		**100.25**	**1.000**	**1.52**
Duration				**1.52/2=0.76 yrs**

15.2 CALCULATING DURATION OF A COUPON PAYING BOND

Fredrick Macaulay, in 1938, first propounded the idea of duration, and we call his measure as Macaulay's duration. Macaulay duration in years

$$= \sum_{i=1}^{n} \frac{t \times pvcf_t}{k \times pvtcf} \dots\dots\dots\dots(15.1)$$

Where k = number of payments per year (in the case of semiannual coupon paying bonds, *k = 2)*

n = number of periods until maturity (years to maturity x *k)*

t = period in which cash flow is expected to be received (£ = 1, 2, ...n)

$pvcf_t$ = present value of the cash flow in period t discounted at the yield to maturity

pvtcf = Total present value of the cash flows of the bond, discounted at the bonds yield to maturity (this would actually be the price of the bond).

The above equation can also be stated as

$(1 \times PVCF_1 + 2 \times PVCF_2 + 3 \times PVCF_3 \dots + n \times PVCF_n)/ (k \times PVTCF)$ (15.2)

Let us consider an example. See Table 15.2. Column 1 lists the period in which the cash flows accrue. Column 2 is the list of cash flows, which in this case are the coupons for all the

periods, except the last one, when the coupon and redemption amount are due. Column 3 is the present value of each of the cash flows, discounted for the appropriate period, at the YTM rate of 9%.(4.5% on a semi-annual basis). For example, Rs. 5.26 is the discounted value of Rs. 5.5 receivable in six months, discounted at the rate of 4.5%.

The sum of the present values is Rs. 107.91 which is the value of the bond at a YTM of 9%. Column 4 provides the weighted value of the present values, by computing the product of the present values and the period in column 1. Duration of the bond is the sum of these weighted values divided by the sum of the present value of the cash flows. 8.039 is the duration in half-years. Therefore duration in years is 8.039/2, which is 4.02 years.

Table 15.2: Duration of a 5 year 11% bond, at a YTM of 9%

Period	Cash flows (Rs.)	Present Value of Cash Flows (Rs.)	Weighted Present Value [a]	Weighted Cash Flows [b]	Duration [c]
1	5.5	5.26	5.263	0.049	0.049
2	5.5	5.04	10.073	0.047	0.093
3	5.5	4.82	14.459	0.045	0.134
4	5.5	4.61	18.448	0.043	0.171
5	5.5	4.41	22.067	0.041	0.204
6	5.5	4.22	25.341	0.039	0.235
7	5.5	4.04	28.291	0.037	0.262
8	5.5	3.87	30.94	0.036	0.287
9	5.5	3.7	33.309	0.034	0.309
10	105.5	67.93	679.344	0.63	6.295
Total		**107.91**	**867.535**	**1**	**8.04**
Duration = 8.04/2= 4.02 yrs					

(a) Present Value in column (3) time period in column (1).

(b) Present Value in column (3) as fraction of Total Present value.

(c) Weighted Cash flows in column (5) times period in column (1).

We can arrive at the same result by finding out the weight of each of the discounted cash flows to the total, and applying this weight to the periods in which cash flows accrue. In column 5 we find the proportion of cash flows accruing in each of the periods, to the total cash flows. Duration is the sum product of these weights, multiplied by the period in column 1, and summed up. We arrive at the same value of 4.02 years. We also notice what proportion of the cash flows of the bond accrue in each of the periods, in column 5. Only 63% of the bonds cash flows accrue in 5 years.

15.3 COMPUTING DURATION ON DATES OTHER THAN COUPON DATES

In the example above, we had computed duration, discounting the cash flows for whole periods, as we had assumed that the calculations are made at the beginning of the cash flow stream. In reality, we should be able to compute duration on any day when a bond is outstanding. In order to do this, the fractional periods representing the distance of each of the cash flow from the date of maturity will have to be calculated, and the discounting of cash flows done for these fractional periods. As in the case of yield and price calculations, the day count convention in the market should be known, apart from the settlement and the maturity dates. We could then use the Excel function "Duration."

Box 15.1: Function "Duration"

In order to use Excel to compute the duration of a bond on any given settlement date, we provide the following values:

Settlement date: the date on which we want to compute the duration, in date format format

Maturity date: the date on which the bond would redeem, in date format

Coupon: Coupon of the bond, as a rate

Yield: YTM of the bond, as a rate

Frequency: Frequency of payment of coupons per year, 2 for semi annual bonds

Basis: Day count convention in the market. 4 for European 30/360 convention.

Excel will return the duration of the bond in years.

Table 15.3 Duration of Select t G-Secs or March 29, 2001

Name	Coupon (%)	Maturity Date	Term to Maturity (Yrs.)	Price (Rs.)	Yield to Maturity	Duration (yrs)
CG2001	11.75	25-Auq-01	0.41	101.00	0.09	0.41
CG2002	11.15	9-Jan-02	0.78	102.75	0.07	0.75
CG2003	11.10	7-Apr-03	2.02	103.52	0.09	1.78
CG2004	12.50	23-Mar-04	2.98	108.31	0.09	2.59
CG2005	11.19	12-Auq-05	4.37	106.19	0.09	3.55
CG2006	11.68	10-Apr-06	5.03	107.58	0.10	3.79
CG2007	11.90	28-May-07	6.16	109.31	0.10	4.46
CG2008	11.40	31-Auq-08	7.42	107.60	0.10	5.24
CG2009	11.99	7-Apr-09	8.02	109.18	0.10	5.22
CG2010	11.30	28-Jul-10	9.33	106.60	0.10	6.01
CG2011	12.32	29-Jan-11	9.83	110.97	0.10	6.05
CG2013	12.40	20-Auq-13	12.39	111.00	0.11	6.85

Notice that the duration of the 2013 12.40 security is only 6.85 years, while its term to maturity is 12.58 years.

The basic relationship between coupon, term to maturity and the yield and duration can be intuitively understood, by viewing duration as the fulcrum that balances the present value of cash flows of a bond. If we view the present values of the cash flows from a bond, as weights placed on a scale, duration represents the fulcrum which would balance these weights on the time scale. We have diagrammatically represented this in Figure 15.3. which presents the cash flows of a 11%, 5-year bond, semi annual coupons, selling at YTM of 11%. The duration of this bond is 4.02 years. If we can imagine that there is a fulcrum at 4.02 on the graph, we could begin to see how the fulcrum would behave for changes in the factors influencing duration. An increase in the term would mean more number of bars on the chart. The fulcrum would move to the right. Higher the term, greater is the duration. If the coupon rates were higher, the size of each of the bars would be higher. The fulcrum would then move left. Duration and coupon are inversely related. Higher the coupon, lower the duration. If the yield at which we discount the cash flow increases, the size of the bars would decrease. The fulcrum would move to the left. Yield and duration are inversely related.

Figure 15.3: Present value of Cash Flows on the Time Scale
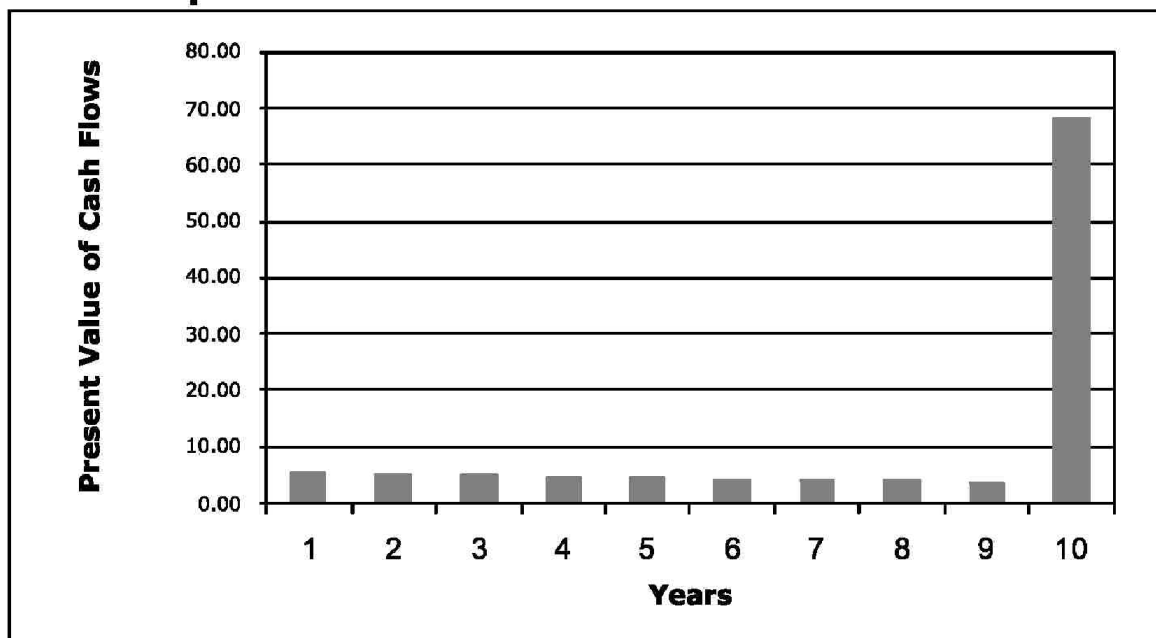
Apart from these factors, duration is also impacted by the structure of the bond. A bond with sinking fund provisions would have a lower duration, as a higher percentage of the cash flows of the bond would accrue before maturity. Similarly, callable bonds have shorter duration than otherwise comparable non-callable bonds. Call options reduce the outstanding maturity period of a bond. Estimating the duration of a callable bond is, however, complicated by the need to estimate the probability that the option will be exercised.

15.4 MODIFIED DURATION

Though intuitively we have known duration as the weighted average term to maturity of a

bond, an alternate explanation which looks at duration as the approximation of the slope of the price-yield relationship, is significant, and has important applications. We have known that a bond's realized yield is impacted by coupon, term to maturity and yield. Duration is a single measure approximation of the impact of all of these three factors, on the price of a bond, for a given change in yield. Therefore, duration is an important measure of sensitivity of a bond to changes in underlying yield, and hence the interest rate risk of a bond.

The price of a bond is the present value of the cash flows associated with the bond, and can be represented as

$$P = \sum_{t=1}^{n} \frac{C_t}{(1+r)^t} = \frac{C_1}{(1+r)} + \frac{C_2}{(1+r)^2} \dots \dots \frac{C_n}{(1+r)^n} \dots\dots(15.3)$$

In order to understand how price changes for a small change in yield, we can take the first derivative of the above equation with respect to r, to get the following equation:

$$\frac{dP}{dr} = \frac{-1}{(1+r)} \left[\frac{C_1}{(1+r)^1} + \frac{2C_2}{(1+r)^2} \dots\dots + \frac{nC_n}{(1+r)^n} \right] \dots\dots(15.4)$$

This equation computes the absolute change in the price of a bond for a given change in yield. In order to convert the same into a percentage change in price for a percentage change in yield, we divide both sides of equation by the bond price, as follows:

$$\frac{dP}{dr} \cdot \frac{1}{P} = \frac{-1}{(1+r)} \left[\frac{C_1}{(1+r)^1} + \frac{2C_2}{(1+r)^2} \dots\dots + \frac{nC_n}{(1+r)^n} \right] \cdot \frac{1}{P} \dots\dots(15.5)$$

The term on the right hand side of the above equation can be rewritten as

$$= \frac{- Duration}{1+r} \dots\dots(15.6)$$

This formula represents the percentage change in price of a bond, for small changes in yield. This measure is known as the *modified duration* of a bond. We can state this relationship in a generalized form as % change in price of a bond = Modified duration * % change in yield

For example, for a bond with a modified duration of 7.5, a 50 basis point change in yield will result in a 7.5 * 50/100 = 3.75% change in price, in the opposite direction (notice the minus sign in the equation, signifying that the change in price is in the opposite direction of the change in yield - yield and price are inversely related). If the yield is semi-annual, we use half the yield in the equation.

Modified duration is the slope of the line in the price-yield function, and for small changes in the yield of a bond, modified duration indicates the percentage change in price that can be expected. Modified duration is, therefore, a direct measure of the interest rate sensitivity of a bond. Higher the modified duration of a bond, greater the percentage change in price for a given change in yield.

Box 15. 4: Modified Duration Function

In order to use Excel to compute the modified duration of a bond on any given settlement date, we use the function *Mduration* provide the following values:

Settlement date: the date on which we want to compute the modified duration, in date format

Maturity date: the date on which the bond would redeem, in date format

Coupon: Coupon of the bond, as a rate

Yield: YTM of the bond, as a rate

Frequency: Frequency of payment of coupons per year, 2 for semi annual bonds

Basis: Day count convention in the market. 4 for European 30/360 convention.

Excel will return the modified duration of the bond in years

It has to be remembered that modified duration will provide close approximation of the actual change in prices, for small changes in yield. For large changes in yield, however, the first order derivative, which is modified duration, is inadequate.

Notice that modified duration is lower than duration of the same set of bonds, computed in the beginning of this chapter. Tables 15.4 and 15.5 illustrate the application of modified duration to measuring the interest rate sensitivity of bonds.

Table 15.4: Modified Duration of a Set of Bonds

Name	Coupon (%)	Maturity Date	Term to Maturity (Yrs.)	Price (Rs.)	Yield to Maturity	Modified Duration (Yrs)
CG2001	11.75	25-Aug-01	0.41	101.00	0.09	0.39
CG2002	11.15	9-Jan-02	0.79	102.75	0.07	0.73
CG2003	11.10	7-Apr-03	2.05	103.52	0.09	1.70
CG2004	12.50	23-Mar-04	3.03	108.31	0.09	2.48
CG2005	11.19	12-Aug-05	4.44	106.19	0.09	3.39
CG2006	11.68	10-Apr-06	5.11	107.58	0.10	3.62
CG2007	11.90	28-May-07	6.25	109.31	0.10	4.25
CG2008	11.40	31-Aug-08	7.53	107.60	0.10	4.99
CG2009	11.99	7-Apr-09	8.14	109.18	0.10	4.96
CG2010	11.30	28-Jul-10	9.47	106.60	0.10	5.72
CG 2011	12.32	29-Jan-11	9.98	110.97	0.10	5.75
CG2013	12.40	20-Aug-13	12.58	111.20	0.11	6.50

The modified duration of these bonds will provide inputs for understanding the interest rate sensitivity of the bonds. We change the yield of these bonds by 10bps (as for large change in yield modified duration is inadequate, we have considered 10 bps change instead of 50 bps, so that answer will come correct), and re-compute the value of the bonds, in Table 15.5.

Table 15.5 : Interest Rate Sensitivity of a Set of Bonds-Using Modified Duration

Old price of the bond (Rs.)	Modified Duration (Yrs)	New yield (+10 bp) (%)	New Price (Rs.)	Actual % change in price	% Change in Price computed with mduration
101	0.388	0.09192	100.960	0.0395	0.0388
102.75	0.725	0.07513	102.674	0.0742	0.0725
103.515	1.701	0.09251	103.335	0.1786	0.1701
108.31	2.479	0.09347	108.041	0.2480	0.2479
106.19	3.394	0.09522	105.825	0.3433	0.3394
107.58	3.618	0.09836	107.172	0.3793	0.3618
109.31	4.248	0.09943	108.830	0.4391	0.4248
107.6	4.991	0.10024	107.060	0.5020	0.4991
109.18	4.962	0.10381	108.612	0.5204	0.4962
106.6	5.715	0.10282	105.982	0.5795	0.5715
110.97	5.752	0.10599	110.322	0.5835	0.5752
111.2	6.500	0.10840	110.472	0.6547	0.6494

We can use the same set of bonds to illustrate how modified duration helps estimate changes in the price of bonds for a given change in yield. We have used the same set of bonds in the Table 15.3, but changed the yield by 10 basis points (column 3 in the table 15.4). The new price for the now changed yield is computed and posted in column 4. The actual percentage change in price, for a 10 bp change in yield is in column 5. The percentage change in price, computed with modified duration (Mduration * basis point change in yield/100) is in the last column. Notice that the numbers in the last 2 columns are fairly comparable.

15.5 RUPEE DURATION

Modified duration provides a measure of percentage change in price, for a percentage change in yield. However two bonds with the same measure of modified duration will change in value, in rupee terms, in much different manner, depending on the price at which they are trading. Consider Table 15.5. The rupee change in value of the bond is different across the bonds, and is a function of both modified duration and the price.

Therefore rupee price change can be calculated as:

Modified duration * yield change (in basis points) * rupee price of the bond. We can standardize the expected price change in rupee terms, for a 100 basis point change in yield as

Modified duration * 0.01(100 basis points) * rupee price of the bond.

This value is called the dollar (rupee) duration of a bond, and is comparable across bonds selling at various prices. Table 15.6 shows the rupee duration of a set of bonds. Rupee duration

represents the change in price for a 100 basis point change in yield. (From the data on the bonds that is available, calculate actual change in price for a 100bp change in yield, and compare the same with value in the last column in the table 15.6).

Table 15.6: Rupee Duration Bonds

Name	Coupon	Price (Rs.)	Mduration (Yrs)	Rupee Duration
CG2001	11.75	101.00	0.39	0.39
CG2002	11.15	102.75	0.73	0.74
CG2003	11.10	103.52	1.70	1.76
CG2004	12.50	108.31	2.48	2.68
CG2005	11.19	106.19	3.39	3.60
CG2006	11.68	107.58	3.62	3.89
CG2007	11.90	109.31	4.25	4.64
CG2008	11.40	107.60	4.99	5.37
CG2009	11.99	109.18	4.96	5.42
CG2010	11.30	106.60	5.72	6.09
CG 2011	12.32	110.97	5.75	6.38
CG2013	12.40	111.20	6.50	7.23

Price Value of a Basis Point (PVOI)

Another important variation to the rupee duration, which is used extensively in practice, is the price value of a basis point (known commonly as PVBP or PV01). The PVO1 of a bond is the rupee value of change in price of a bond, for a 1 basis point change in yield. PVOI is calculated as

Modified duration * Price of the bond*0.01/100.

PVOI is also = Rupee Duration of a bond/100.

PVOI of a bond is a number that can be applied for any anticipated change in yield, to ascertain the change in price value. In table 15.6, the last column has to be divided by 100, to obtain the PVOI of each of the bonds. In practice, PV01 is extensively used in ascertaining the price sensitivity of a portfolio. PV01 of a portfolio is the portfolios modified duration times the market value of the portfolio, multiplied by the value 0.0001.

PV01 is a useful number in buying hedge products for a portfolio. The payoff from a hedge has to match the PV01 of the portfolio, to enable effective hedging.

15.6 PORTFOLIO DURATION

The duration of a portfolio of bonds can be computed in two ways:

(a)   Map the cash flows of the bond into various term buckets, when they are due, and using yield of the portfolio, discount the total cash flows of the portfolio. Compute duration with the usual formula, treating the aggregate cash flows as if they were a single bond.

(b)   Compute the weighted duration of a portfolio, using the market value of the bond as the weightage.

Though (a) is conceptually sound, it is a computationally intensive procedure. Therefore in practice (b) is a more commonly used approach to determine the duration of a portfolio.

Consider the set of bonds we have been using in this chapter. Table 15.7 shows the duration of a portfolio that holds one each of all the bonds. (The weightages can be changed for any quantity holding in each of the bond. What we require for computation is the market value of the portfolio's exposure to a given bond, as a proportion of the total market value of the portfolio).

$$Dur_p = \sum_{i=1}^{N} (D_i \, x W_i)........(15.7)$$

Duration of a portfolio is the sum product of duration of each security in the portfolio (D_i) times the proportion of the security to total portfolio value (as a decimal)(W_i).

Table 15.7: Duration of a Portfolio of Bonds

Name	Coupon	Price (Rs.)	Duration (Yrs)	Weights	Weighted Duration
CG2001	11.75	101.00	0.41	0.08	0.03
CG2002	11.15	102.75	0.75	0.08	0.06
CG2003	11.10	103.52	1.78	0.08	0.14
CG2004	12.50	108.31	2.59	0.08	0.22
CG2005	11.19	106.19	3.55	0.08	0.29
CG2006	11.68	107.58	3.79	0.08	0.32
CG2007	11.90	109.31	4.46	0.09	0.38
CG2008	11.40	107.60	5.24	0.08	0.44
CG2009	11.99	109.18	5.22	0.09	0.44
CG2010	11.30	106.60	6.01	0.08	0.50
CG 2011	12.32	110.97	6.05	0.09	0.52
CG2013	12.40	111.20	6.85	0.09	0.59
Portfolio value		1284.205	Portfolio Duration		3.942

In the table 15.7, the proportional weight of each bond is computed as the price of the bond divided by the value of the portfolio (in this case the sum of the prices of all the bonds, as we assume that we hold one bond each). For example, the value 0.079 = 101/1284.205. The last column applies these proportions to the duration of each bond. The duration of the portfolio is the sum of the last column, which is the weighted duration of all the bonds in the portfolio.

We can compute modified duration also in a similar manner, using market values of the bonds as weights. We can then estimate the interest rate sensitivity of the portfolio. The modified duration of this portfolio of bonds can be computed, using the mduration function, and using the value weights as in the case of portfolio duration.

Table 15.8 shows the modified duration of this portfolio, which is 3.754. We have also taken

from our earlier illustration of price sensitivity, the new prices of bonds, when interest rates increase by 10 basis points. We see that the value of the portfolio has fallen to Rs. 1259.906 due to this change in etes. In percentage terms, this change is 0.383%. Given the portfolio's modified duration of 3.754, we can expect for a 10 basis point change in yield, a price change of 3.754 * 0.1 = 0.375%

Modified duration of the portfolio thus provides a close approximation of this change in price.

Table 15.8: Modified Duration of a Portfolio

Name	Coupon	Price (Rs.)	Modified Duration	Weight	Mduration	Weighted New Price[a]
CG2001	11.750	101.000	0.388	0.079	0.031	100.960
CG2002	11.150	102.750	0.725	0.080	0.058	102.674
CG2003	11.100	103.520	1.701	0.081	0.137	103.335
CG2004	12.500	108.310	2.479	0.084	0.209	108.041
CG2005	11.190	106.190	3.394	0.083	0.281	105.825
CG2006	11.680	107.580	3.618	0.084	0.303	107.172
CG2007	11.900	109.310	4.248	0.085	0.362	108.830
CG2008	11.400	107.600	4.991	0.084	0.418	107.060
CG2009	11.990	109.180	4.962	0.085	0.422	108.612
CG2010	11.300	106.600	5.715	0.083	0.474	105.982
CG 2011	12.320	110.970	5.752	0.086	0.497	110.323
CG2013	12.400	111.200	6.500	0.087	0.563	110.472
Total		**1284.205**	**Portfolio Duration Modified**		**3.754**	**1279.2861**

[a]Price assuming 10 basis point increase in yield.

15.7 LIMITATIONS OF DURATION

Duration is not a static property of a bond. Duration of a bond changes over time, and with changes in market yields. Any strategy based on duration values of a bond will, therefore, require dynamic tuning. Computing duration involves the discounting of cash flows of a bond. It is common to use the YTM of the bond, as the rate at which cash flows are discounted. Therefore, the limitations of YTM extend to the computation of duration.

We use duration based on the view that equal changes in interest rates occur across various terms. In other words, when we measure "change in yield" and use duration to estimate "change in price", we assume that the given change in yield occurs across the tenor spectrum. This actually translates into an assumption of parallel shifts in the yield curve, which is not a very realistic assumption to make.

Duration is the first derivative of the price-yield function. The results obtained by using duration to measure price change are only an approximation of the actual price yield relationship, which is not linear, but convex.

Model Questions

1. **The duration of a coupon paying bond ʙ always lower than its term to maturity, because:**

    a) Since duration is the measure of average maturity, it has to be lower than the tenor.

    b) Duration measures the weighted maturity, and therefore cannot be compared to tenor of a bond.

    c) As long as some cash flows are received prior to maturity, the weightage of the terminal cash flow cannot be 1.

    Answer: c

2. **On July 11, 2001, the following is the market value of the bonds in your portfolio. (Assume equal holdings in all the bonds). What is the duration of the portfolio?**

Coupon (%)	Maturity date	Price on 11-Jul-2001 (Rs.)
11.68	6-Aug-2002	104.34
11.00	23-May-2003	105.74
12.50	23-Mar-2004	111.63
11.98	8-Sep-2004	111.8
11.19	12-Aug-2005	111.83
11.68	10-Apr-2006	114.4
11.90	28-May-2007	116.6

Answer:

We can use the Yield function to find the YTM and the Duration Function to compute duration, as follows:

Coupon (%)	Maturity date	Market Price on 11-Jul-2001 (Rs.)	YTM (%)	Duration (Yrs)
11.68	6-Aug-2002	104.34	7.3728%	0.990695
11.00	23-May-2003	105.74	7.6309%	1.720562
12.50	23-Mar-2004	111.63	7.6399%	2.318881
11.98	8-Sep-2004	111.8	7.6917%	2.653983
11.19	12-Aug-2005	111.83	7.7524%	3.297774
11.68	10-Apr-2006	114.4	7.9700%	3.753991
11.90	28-May-2007	116.6	8.2733%	4.463083
Portfolio Value: 776.34				
Portfolio Duration: 2.781662				

The portfolio duration is the weighted duration of the bonds, using the market values as weights. It is computed as

Sum product (market price, duration)/sum (market price)

= **2.7816**

3.   **Using the same data as in Question *2,* if the expectation is that yield would increase by 50 basis points, what would be the expected change in the value of the portfolio?**

Answer: We can use the ***mduration*** function in Excel, and compute the modified duration of all the bonds, and find the portfolio modified duration, using a similar method as in Answer 2. We would arrive at a number **2.6763** as the portfolio's modified duration.

A 50bp increase in yield will reduce the value of the portfolio by

2.6763*.50 = 1.3381%

In rupee terms that would be Rs. 776.34 * 1.3381%

= Rs. 10.3888

The portfolio price will reduced by Rs. 10.3888/-

CHAPTER 16: FIXED INCOME DERIVATIVES

16.1 WHAT ARE FIXED-INCOME DERIVATIVES?

Fixed income derivatives are securities that derive their value from some bond price, interest rate or an underlying bond market variable. In terms of volumes globally, they account for a major proportion of derivatives markets. They are important because they enable banks to separate funding/liquidity decisions from interest-rate sensitivity decisions.

16.1.1 Forward Rate Agreements

Spot Rates and Forward Rates

We already have discussed "Spot" or "Zero-Coupon" interest rates. A spot interest rate is the interest rate on an investment starting today and ending after some (say 'n') years. This is a "pure" interest rate i.e. it is assumed that there are no coupon payments between today and n years. This is also the yield on a zero coupon bond of the corresponding maturity. In the absence of zero coupon bonds, the spot rates can be estimated from the yields on coupon bearing bonds by a process called "bootstrapping" A forward rate is the interest rate contracted today on an investment that will be initiated after some time (n years). In other words, they are rates implied by current spot rates for periods in the future. Consider the following example:

Time	Spot Rate (annualized)
1 year	6%
2 year	7%
3 year	8%

This means that Rs. 100 invested today will give Rs. 106 at the end of one year.

Rs. 100 invested today will give Rs. $(100*(1+7/100)^2)$ that is Rs. 114.49 at the end of two years and Rs $(100*(1+8/100)^3)$ that is Rs. 125.97 at the end of three years.

The question we must ask is as follows:

*What would be the amount I would receive on Rs. 100 invested after one year at the end of two years?*

Notice that the payoff from the above investment would come at the end of two years from today.

We can re-create the above investments using present interest rates. For the sake of simplicity, we assume that bid-ask spreads are negligible.

1.   Borrow today in an amount that will give Rs. 100 after one year. This amount is Rs. 100/(1.06) that is Rs. 94.34.

2.   Invest the same amount for a period of two years. At the end of two years, the payoff will be Rs. 94.34*(1.07) 2 that is Rs.108.

At the end of one year, Rs. 100 will have to be paid out for the first borrowing. At the end of two years Rs. 108 will flow in. In terms of cash flows, this is what it looks like:

Rs. 94.34		Rs. 100		
↑		↑		
0 Year		**1 Year**		**2 Years**
↑				↑
Rs. 94.34				Rs. 108
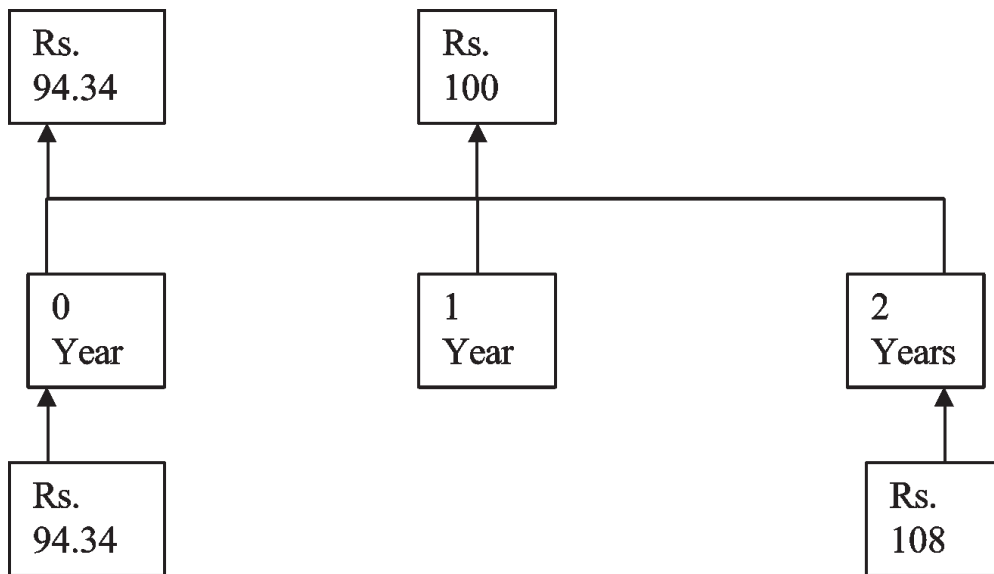
Notice that at Year 0, there is an outflow and inflow of Rs. 94.34 and hence the net flow is zero. In other words, the above series of flows is the same as:

	Rs. 100	
	↑	
0 Year	**1 Year**	**2 Years**
		↑
		Rs. 108
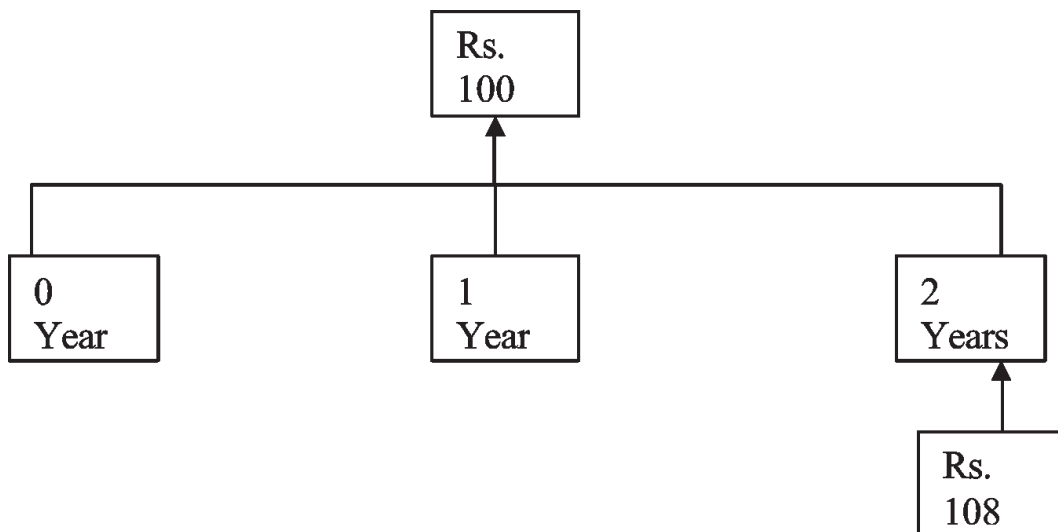
In effect we have created an investment where we will lend Rs. 100 after one year and will get back Rs. 108 after two years. This means that the interest rate from one year to two years forward is 8%.

In the above example, the 8% interest rate is called the forward rate of interest. In most circumstances, the forward rate of interest is the expected spot rate for the corresponding period.

Why is the forward rate also the expected spot rate?

If the market had expected the spot rate (from 1 to 2 years) to be less than the forward rate indicated today, they would have heavily started doing the above transactions to lock in the greater forward rate. This would have meant additional demand for borrowing one-year money and lending two-year money. This would have pushed the one-year spot rate up and the two-year spot rate down till the implied forward rate was in line with market expectations.

We can similarly construct the 2-3 year forward rate and the 1-3 year forward rate.

The rates would be as follows:

Year	Spot rates
0-1	6%
0-2	7%
0-3	8%

Year	Forward Rates
1-2	8%
2-3	10%

A point to be noted about forward rates is that they can never be negative. This applies some restrictions on the term structure of the spot rates. For instance, the following term structure cannot be possible

Year	Spot rates
0-1	6%
0-2	7%
0-3	4%

This is because computation shows that the 2-3 year forward rate is -1.7%. If the forward rate were negative, one can borrow three-year money and invest it for two years and sit on cash from year 2 to year 3 to make a risk free profit.

Formula for computation of the Forward Rate:

If we have the n-year spot rate as Rp and the m-year spot rate as Rm where

m>n

And we want to compute the forward rate F_{mn} from year n to year m, then:

$(1+ Rn)^n * (1+ F_{mn} r^n = (1+ R™)^m$

Using the above formula, F_{mn} can be computed.

16.2 MECHANICS OF FORWARD RATE AGREEMENTS

Forward Rate Agreements (FRA's) are over the counter derivative contracts that allow counter-parties to lock into a specified interest rate for a future date. The buyer of an FRA locks in a borrowing rate while the seller locks into a lending rate.

Typically these contracts are structured in such a way that the difference between the market rate and the "locked-in" rate is settled.

Consider the following example:

A and B enter into a forward rate agreement of one year, starting one year from today, for a notional amount of Rs. 100. Party A is the buyer i.e. it has locked into a borrowing rate. The spot interest rates in the market are the same as the ones mentioned in the earlier example.

Pricing

The first question to ask is: *What is the most likely rate at which the Forward Rate Agreement will be contracted?*

The answer is obvious: It should be the forward rate implied by today's interest rates from year 1 to year 2. We have earlier calculated this at 8%. If the contracted FRA rate is different, then one of the parties will carry out the two transactions mentioned in the earlier example and benefit from it. This party will have earned a "risk-free" profit. It is unlikely that the other party will allow that to happen.

In practice, it is slightly different because of bid- ask spreads between lending and borrowing rates.

Suppose one year has passed by. Now the one year spot interest rate is 7%. The question now is: *Who has benefited from the FRA and by how much?* The scenario now is as follows:

1.   Party A had locked into a borrowing starting today and ending one year from now at 8%.

2.   Today's rate is actually 7%.

This means that party A will lose out 1% at the end of next year. In a typical FRA with netted out cash interest payments, the amount that A would lose will be discounted at the prevailing rate (7%) and settled. The FRA is then closed out. It is easy to work out that the party that is long a FRA (Borrower) receives a payment when the rates go up and the party that has sold an FRA (Lender) receives payment when the rates go down.

The advantage of netting is that the notional amounts and interest rates need not be actually exchanged. This causes significant reduction is credit risk. However, one will also find FRA's that are in the nature of actual lending. In India, there is some amount of forward lending activity between banks and corporates.

16.3 INTEREST RATE FUTURES

Futures are standardized Forward contracts that are traded on exchanges. The counterpart in this case will be the exchange itself. These are contracts on either the level of interest rate of specified tenors, or on the price of bonds of particular maturity. An example of the former are the Euro-Dollar futures contracts traded on LIFFE. An example of the latter are the T-Bond futures traded on CBOT. In India, interest rate futures have been introduced recently (June 24, 2003) on NSEIL

There are several important differences between Futures and Forward contracts:

1.   Futures are standardized and available only for certain tenors and dates and only on certain interest rate benchmarks. In that sense, their usage is restrictive.

2.   Futures are tradable on the exchange. Hence they are highly liquid instruments.

3.   Futures are marked to market daily and the Profit and Loss on the contract is paid out, between the participant and the exchange.

Uses of FRAs and Futures

As with any derivatives contracts, FRA's and futures have three main uses.

1.   Hedging

2.   Speculation

3.   Arbitrage

Hedging:

FRA's and Futures can be used to remove uncertainty about future interest rates and hence reduce the uncertainty of future earnings.

For instance, suppose the Financial Manager of a company knows that there is going to be a large inflow of cash one year down the line, which will have to be invested. He is also uncertain about interest rates one year down the line and wants to remove this uncertainty. A very good way to do this is to sell a forward rate agreement starting one year hence. This way, he can lock into a forward rate today itself and remove the uncertainty.

Speculation:

Suppose a speculator feels that interest rates are going to fall drastically in the future, to a greater extent than that implied by the forward rates. He can enter into a forward rate agreement and receive a locked in rate. He stands to benefit if the rates indeed fall. However, if the rates rise, he stands to lose. In this case, the speculator has taken a view that the rates will fall. It is in this sense that Forwards and Futures are just like wagers on the future levels of interest rates.

Salient Points

1. A forward rate is the interest rate on an investment to be made at some point in the future.

2. A Forward Rate Agreement is an over the counter Forward contract between two parties for a specified interest rate at some point in the future.

3. Interest Rate Futures are standardized forward contracts on interest rates that are traded on an exchange.

4. Forward Rate Agreements and Interest Rate Futures contracts can be used for hedging and speculation.

16.4 INTEREST RATE SWAPS

What are interest rate swaps (IRS)?

An IRS can be defined as an exchange between two parties of interest rate obligations (payments of interest) or receipts (investment income) in the same currency on an agreed amount of notional principal for an agreed period of time.

The most common type of interest rate swaps are the "plain vanilla" IRS. Currently, these are the only kind of swaps that are allowed by the RBI in India. Dealing in "Exotics' or advanced interest rate swaps have not been permitted by the RBI.

In a plain vanilla swap, one party agrees to pay to the other party cash flows equal to the interest at a predetermined fixed rate on a notional principal for a number of years. In exchange, the party receiving the fixed rate agrees to pay the other party cash flows equal to interest at a floating rate on the same notional principal for the same period of time. Moreover, only the difference in the interest payments is paid/received; the principal is used only to calculate the interest amounts and is never exchanged.

An example will help understand this better:

Consider a swap agreement between two parties, A and B. The swap was initiated on July 1, 2001. Here, A agrees to pay the 3-month FIMMDA NSE-MIBOR rate on a notional principal of Rs. 100 million, while B pays a fixed 12.15% rate on the same principal, for tenure of 1 year.

We assume that payments are to be exchanged every three months and the 12.15% interest rate is to be compounded quarterly. This swap can be depicted diagrammatically as shown below:
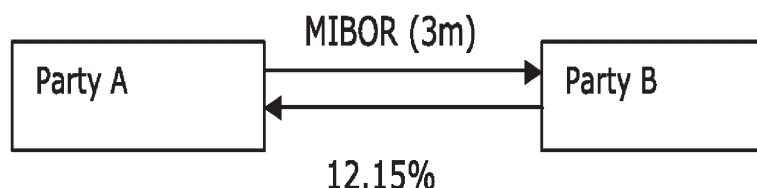
An interest rate swap is entered to transform the nature of an existing liability or an asset. A swap can be used to transform a floating rate loan into a fixed rate loan, or vice versa. To understand this, consider that in the above example;

A had borrowed a 3 yr, 1 crore loan at 12%. This means that following the swap, it will:

(a)   Pay 12% to the lender,

(b)   Receive 12.15% from B

(c)   Pay 3 month MIBOR

Thus, A's 12% fixed loan is transformed into a floating rate loan of MIBOR -0.15%. Similarly, if B had borrowed at MIBOR + 1.50%, it can transform this loan to a fixed rate loan @ 13.65% (12.15 + 1.50). Following figure summarizes this transaction.
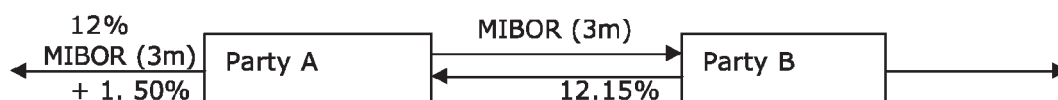
An IRS can also be used to transform assets.

Example

A fixed-rate earning bond can be transformed into variable rate earning asset and vice versa. In the above example, it could be that A had a bond earning MIBOR+0.5% and B a bond earning 12.5% interest compounded quarterly. The swap would then result in A receiving a fixed income of 12.65% and B receiving a variable income of MIBOR+0.35%. This can be shown diagrammatically as follows:
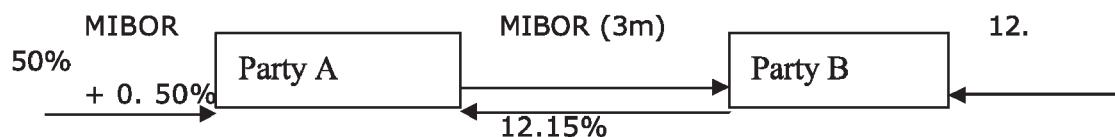
Sometimes, a bank or financial intermediary is involved in the swap. It charges a commission for this. The two parties often do not even know who the other party is. For them, the intermediary is the counter-party. For example, if a financial institution charging 20 basis points were acting as intermediary, the swap would look as follows:

Swap as a Combination of Bonds

A swap can be interpreted as a combination of bonds in such a way that they receive fixed leg is short on a floating rate bond and long on a fixed rate bond and vice versa for the receive floating leg.

This has significant implication on the pricing and valuation of plain vanilla interest rate swaps because a swap can be valued as a combination of the two:

An example will make this very clear. Consider the swap for a notional of Rs 100.

Party A pays 3 month MIBOR and receives 12.15% for a period of two years. This is equivalent to A having a short position in a 3 month MIBOR linked bond and a long position in a 2 year 12.15% bond with quarterly payments. 12.15% is also the going swap rate at the time of inception of the swap. Assume that 1-month has passed since the inception of the bond. Hence there are two months left for the interest payments to be exchanged. Let us also assume that the swap has a look ahead configuration i.e. the MIBOR to be paid after two months has already been set.

1.   The 12.15% fixed rate bond can be valued according to conventional methods i.e. by discounting each cash flow from the bond by the discounting rate for the relevant period.

2.   The MIBOR linked bond will reset to par. This is because on the next reset date, the coupon that will be fixed (MIBOR) will also be equal to the discounting rate for the relevant period. Hence we have the par value + MIBOR to be discounted for a period of two months (time to reset).

The value of the swap is simply the difference between the above two.

A swap as a string of FRAs or futures

A swap can also be interpreted as a strip of FRAs or futures contracts. Consider that every time the floating index is reset an interest rate payment goes from one counterparty to the other in just the same way that compensation is payable/received under an FRA. In a similar way, as interest rate changes so the value of a futures position changes.

Consider a long futures long position and a short FRA position - remember these denote the same obligation. Each position gains if interest rates fall and loses if interest rates rise. The risk/return profile is that of a swap-floating rate payer.

Similarly, for a swap fixed rate payer the position is the same as that for a short futures position and a long FRA position. Each will lose if interest rates fall and gain if interest rates rise.

Pricing an IRS

In order to determine the fixed rate or the swap rate to be paid or received for the desired interest rate swap, the present value of the floating rate payments must equate the present value of fixed rates. The truth of this statement will become clear if we reflect on the fact that the net present value of any fixed rate or floating rate loan must be zero when that loan is granted, provided, of course, that the loan has been priced according to prevailing market terms. However, we have already seen that a fixed to floating interest rate swap is nothing

more than the combination of a fixed rate loan and a floating rate loan without the initial borrowing and subsequent repayment of a principal amount. Hence, in order to arrive at an initial fixed rate, we find that rate for the floating leg that gives a zero present value for the entire swap. The market maker then adds some spread so that the present value to the market maker is slightly positive.

Why do firms enter into interest rate swaps?

Swaps for a comparative advantage

Comparative advantages between two firms arise out of differences in credit rating, market preferences and exposure.

Example: **Say, Firm A with high credit rating can borrow at a fixed rate of 12% and at a floating rate of MIBOR + 20 bps. Another firm B with a lower credit rating can borrow at a fixed rate of 14 % and a floating rate of MIBOR + 150 bps.**

Before the Swap

Party	Fixed rate loan	Floating rate loan
A	12 %	MIBOR + 0.20%
B	14 %	MIBOR + 1.50%

Firm A has an absolute advantage over firm B in both fixed and floating rates. Firm B pays 200 bps more than firm A in the fixed rate borrowing and only 120 bps more than A in the floating rate borrowing. So, firm B has a comparative advantage in borrowing floating rate funds.

Now, Firm A wishes to borrow at floating rates and becomes the floating rate payer in the swap arrangement. However, A actually borrows fixed rate funds in the cash market. It is the interest rate obligations on this fixed rate funds, which are swapped. At the same time, B wishes to borrow at a fixed rate, and thus will actually borrow from the market at the floating rate.

Then, both the parties will exchange their underlying interest rate exposures with each other to gain from the swap. The calculation of the gain from the swap is shown below:

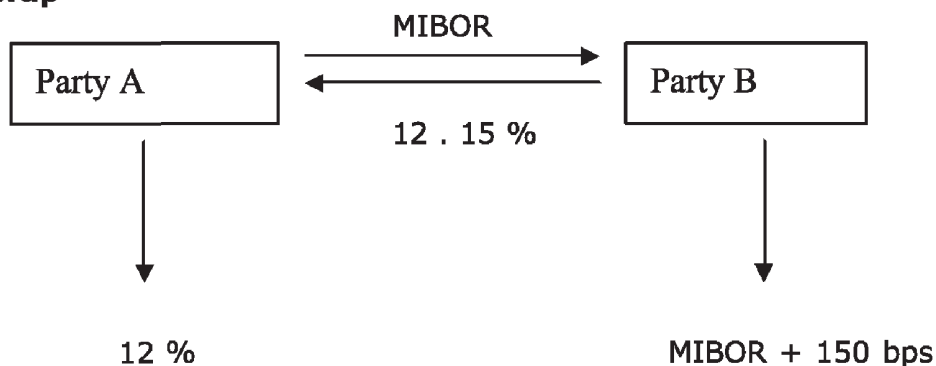The gain to firm A, because it borrows in the fixed rate segment is:

14% - 12% = 200 bps.

And, the loss because firm B borrows in the floating rate segment is:

(MIBOR + 20 bps) - (MIBOR + 150 bps) = 130 bps.

Thus, the net gain in the swap = 200 - 130 = 70 bps. The firms can divide this gain equally. Firm B can pay fixed at 12.15% to firm A and receive a floating rate of MIBOR as illustrated below:

After the Swap

Effective cost for firm A = 12% + (MIBOR - 12.15%)

= MIBOR - 15 bps

This results into a net gain of ((MIBOR + 20) - (MIBOR - 15)) i.e., a gain of 35 bps.

Effective cost for firm B = (MIBOR + 150) + (12.15% - MIBOR)

= 13.65%

This results into a gain of (14% - 13.65%) i.e., a gain of 35 bps.

Thus, both the parties gain from entering into a swap agreement.

As we have seen, firms can use IRS to transform assets and liabilities. But then, why don't firms take the desired form of loan or asset (fixed or floating) in the first place?

Ricardo's comparative advantage theory explains this behavior to some extent. Continuing with the same example, let us assume that A's credit rating is better than B's, and A and B can raise loans for fixed and floating rates as given below:

Before the Swap		
Firm	**Fixed rate loan rate**	**Floating rate loan rate**
A	12%	MIBOR + 0.20%
B	14%	MIBOR + 1.50%

Here, we see that though firm A can borrow cheaply compared to firm B in both the markets, the difference in rates available is not the same. Firm B has a comparative advantage in the floating rate market because it pays only 1.30% higher here, compared to the 2% difference in the fixed rate market. So, firm B will borrow at a floating rate, and firm A at fixed rate. After the swap deal, the cost of the floating rate loan to firm A will be MIBOR-0.15%, a clean gain of 35 basis points. Similarly, firm B also gains 35 basis points, because the cost of its loan will be 13.35% only, after the swap. Thus, both parties gain from the swap, as shown below:

Firm	Fixed rate loan rate	Floating rate loan rate	Gain
A		Mibor- 0.15 %	35 bps
B	13.65%		35 bps

In a perfect market, however, the spread between fixed and floating rates offered should vanish due to IRS. This is not seen in reality, and spreads continue to persist. So, the credit ratings of the firms are not the only criteria by which lenders judge firms, and the comparative advantage theory continues to hold.

Swaps for Reducing the Cost of Borrowing

With the introduction of rupee derivatives, the Indian corporates can attempt to reduce their cost of borrowing and thereby add value. A typical Indian case would be a corporate with a high fixed rate obligation.

MIPL, an AAA rated corporate, 3 years back had raised 4-year funds at a fixed rate of 18.5%. Assume a 364-day T-bill is yielding 10.25%, as the interest rates have come down. The 3-month MIBOR is quoting at 10%.

Fixed to floating 1 year swaps are trading at 50 bps over the 364-day T- bill vs. 6-month MIBOR.

The treasurer is of the view that the average MIBOR shall remain below 18.5% for the next one year. The firm can thus benefit by entering into an interest rate fixed for floating swap, whereby b makes floating payments at MIBOR and receives fixed payments at 50 bps over a 364-day treasury yield i.e. 10.25 + 0.50 = 10.75 %.
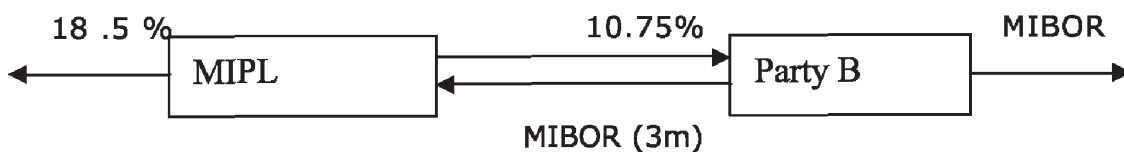
The effective cost for MIPL   = 18.50 + MIBOR - 10.75

= 7.75 + MIBOR

At the present 3m MIBOR is 10%, the effective cost is = 10 + 7.75 = 17.75%

The gain for the firm is (18.5 - 17.75) = 0.75 %

The risks involved for the firm are:

- Default/credit risk of party B: Since the counterparty is a bank, this risk is much lower than would arise in the normal case of lending to corporates. This risk involves losses to the extent of the interest rate differential between fixed and floating rate payments.

- The firm is faced with the risk that the MIBOR goes beyond 10.75%. Any rise beyond

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10.75% will raise the cost of funds for the firm. Therefore it is very essential that the firm hold a well-suggested view that MIBOR shall remain below 10.75%. This will require continuous monitoring.

How does the bank benefit out of this transaction?

The bank either goes for another swap to offset this obligation and in the process earn a spread. The bank may also use this swap as an opportunity to hedge its own floating liability. The bank may also leave this position uncovered if it is of the view that MIBOR shall rise beyond 10.75%.

Taking advantage of future views / speculation

If a bank holds a view that interest rate is likely to increase and in such a case the return on fixed rate assets will not increase, it will prefer to swap it with a floating rate interest. It may also swap floating rate liabilities with a fixed rate.

Other reasons for using IRS are speculation on future interest rate movements, management of asset-liability mismatch, altering debt structure, off-balance sheet gains, and interest risk management. It has been observed that FRAs are more popular for hedging against interest risks, while IRS are more popular for speculation and transforming nature of assets and liabilities.

16.5 GUIDELINES ON EXCHANGE TRADED INTEREST RATE DERIVATIVES

RBI issued detailed guidelines for Banks and Institutions allowing them to participate in the exchange traded interest rate derivatives (IRD) market in India to enable better risk management. Scheduled Commercial Banks excluding RRBs & LABs, Primary Dealers and specified Financial Institutions are allowed to deal in IRDs. To start with Banks and FIs are allowed to transact for the limited purpose of hedging the risk in their underlying investment portfolio while Primary Dealers are allowed to take trading positions as well as hedging the risk in the underlying investment portfolio.

The norms that will be applicable for transacting IRDs on the F&O segment of the stock exchanges are as follows:

i. ***Stock exchange regulation:*** SCBs and AIFIs can seek membership of the F&O segment of the stock exchanges for the limited purpose of undertaking proprietary transactions for hedging interest rate risk. SCBs and AIFIs desirous of taking trading membership on the F&O segment of the stock exchanges should satisfy the membership criteria and also comply with the regulatory norms laid down by SEBI and the respective stock exchanges (BSE/NSE). Those not seeking membership of Stock Exchanges, can transact IRDs through approved F&O members of the exchanges.

ii.   ***Settlement:***

    a) As trading members of the F&O segment, SCBs and AIFIs should settle their derivative trades directly with the clearing corporation/clearing house.

    b) Regulated entities participating through approved F&O members shall settle proprietary trades as a participant clearing member or through approved professional / custodial clearing members.

    c) Broker / trading members of stock exchanges cannot be used for settlement of IRD transactions.

iii. ***Eligible underlying securities:*** For the present, only the interest rate risk inherent in the government securities classified under the Available for Sale and Held for Trading categories will be allowed to be hedged. For this purpose, the portion of the Available for Sale and Held for Trading portfolio intended to be hedged must be identified and carved out for monitoring purposes.

iv.   ***Hedge criteria:*** Interest Rate Derivative transactions undertaken on the exchanges shall be deemed as hedge transactions, if and only if,

    a) The hedge is clearly identified with the underlying government securities in the Available for Sale and Held for trading categories.

    b) The effectiveness of the hedge can be reliably measured

    c) The hedge is assessed on an ongoing basis and is "highly effective" throughout the period.

v.   ***Hedge Effectiveness:*** The hedge will be deemed to be "highly effective" if at inception and throughout the life of the hedge, changes in the marked to market value of the hedged items with reference to the marked to market value at the time of the hedging are "almost fully offset" by the changes in the marked to market value of the hedging instrument and the actual results are within a range of 80% to 125%. If changes in the marked to market values are outside the 80% -125% range, then the hedge would not be deemed to be highly effective.

At present, the investments held in the (a) AFS category are to be marked to market at quarterly or more frequent intervals (b) HFT category are to be marked to market at monthly or more frequent intervals. The hedged portion of the AFS/ HFT portfolio should be notionally marked to market, at least at monthly intervals, for evaluating the efficacy of the hedge transaction.

vi.   ***Accounting:*** The Accounting Standards Board of the Institute of Chartered Accountants of India (ICAI) is in the process of developing a comprehensive Accounting Standard covering various types of financial instruments including accounting for trading and hedging. However, as the formulation of the Standard is likely to take some time, the Institute has brought out a Guidance Note on Accounting for Equity Index Futures as an interim measure. Till ICAI comes out with a comprehensive Accounting Standard,

SCBs and AIFIs may follow the above guidance note *mutatis mutandis* for accounting of interest rate futures also. However, since SCBs and AIFIs are being permitted to hedge their underlying portfolio which is subject to periodical mark to market, the following norms will apply

a) If the hedge is "highly effective", the gain or loss on the hedging instruments and hedged portfolio may be set off and net loss, if any, should be provided for and net gains if any, ignored for the purpose of Profit & Loss Account.

b) If the hedge is not found to be "highly effective" no set off will be allowed and the underlying securities will be marked to market as per the norms applicable to their respective investment category.

c) Trading position in futures is not allowed. However, a hedge may be temporarily rendered as not "highly effective". Under such circumstances, the relevant futures position will be deemed as a trading position. All deemed trading positions should be marked to market as a portfolio on a daily basis and losses should be provided for and gains, if any, should be ignored for the purpose of Profit & Loss Account. SCBs and AIFIs should strive to restore their hedge effectiveness at the earliest.

d) Any gains realized from closing out / settlement of futures contracts can not be taken to Profit & Loss account but carried forward as "Other Liability" and utilized for meeting depreciation provisions on the investment portfolio.

vii. **Capital adequacy:** The net notional principal amount in respect of futures position with same underlying and settlement dates should be multiplied by the conversion factor given below to arrive at the credit equivalent:

Original Maturity	Conversion Factor
Less than one year	0.5 per cent
One year and less than two years	1.0 per cent
For each additional year	1.0 per cent

The credit equivalent thus obtained shall be multiplied by the applicable risk weight of 100%.

viii. **ALM classification:** Interest rate futures are treated as a combination of a long and short position in a notional government security. The maturity of a future will be the period until delivery or exercise of the contract, as also the life of the underlying instrument. For example, a short position in interest rate future for Rs. 50 crore [delivery date after 6 months, life of the notional underlying government security 3½ years] is to be reported as a risk sensitive asset under the 3 to 6 month bucket and a risk sensitive liability in four years i.e. under the 3 to 5 year bucket.

ix. **Use of brokers:** The existing norm of 5% of total transactions during a year as the aggregate upper contract limit for each of the approved brokers should be observed by SCBs and AIFIs who participate through approved F & O members of the exchanges.

x. **_Disclosures:_** The regulated entities undertaking interest rate derivatives on exchanges may disclose as a part of the notes on accounts to balance sheets the following details:

Sr. No.	Particulars	Amount
1	Notional principal amount of exchange traded interest rate derivatives undertaken during the year (instrument-wise) a) b) c)	
2	Notional principal amount of exchange traded interest rate derivatives outstanding as on 31st March _____ (instrument-wise) a) b) c)	
3	Notional principal amount of exchange traded interest rate derivatives outstanding and not "highly effective" (instrument-wise) a) b) c)	
4	Mark-to-market value of exchange traded interest rate derivatives outstanding and not "highly effective" (instrument-wise) a) b) c)	

xi. **Reporting:** Banks and Specified AIFIs should submit a monthly statement to DBS or DBS (FID) respectively as per the prescribed format.

Model Questions

1.   **An interest rate swap transforms the nature of** _____ .

   a) an existing liability only

   b) an existing asset only

   c) an notional liability or an asset

   d) an existing liability or an asset

Answer: d

2.   **A swap can be interpreted as a strip of** _____ .

   a) fixed rate agreements only

   b) future contracts only

   c) fixed rate agreements or future contracts

   d) None of the above

Answer: c

3.   **Forward rates cannot be** _____ .

   a) positive

   b) negative

   c) zero

   d) higher than spot rate

Answer: b

Glossary of Debt Market Terms[13]

Accrued Interest

If a coupon bearing security is traded between two coupon dates, the buyer has to compensate the seller by paying him that part of the interest which is due to him for the period for which he has held the security after the immediately preceding coupon date. The calculation of accrued interest is done according to the day-count convention of the security or market (See Day Count).

Ask Price

In Financial Markets, market makers quote both bid (buy) price and ask (offer) price. This indicates that the market maker, not knowing the intention of the price taker is quoting him rates for both buying as well as for selling. The bid price is generally lower than the sell price, as dictated by normal profit motive (Sometimes a dealer would quote the same bid and ask, in which case the price is called a "choice-price"). The difference between the bid and the ask price is normally called the "bid-ask spread". The spread depends on many factors like liquidity in the instrument quoted, the bias of the dealer, his eagerness or otherwise to trade, market volatility etc. A small difference is considered to be a very fine price as the dealer is keeping very little by way of his profits. As example: A dealer quoting 12.50% 2004 night quote 105.15/20. This implies that the dealer is willing to buy the paper at 105.15 while he is willing to sell it at 105.20. In actual practice the price may be given as 15/20. It is understood that market participants are aware of the big figure. It should be kept in mind that while quoting interest rate rates, the bid is in fact higher than the offer. For example a USD 3x6 FRA can be quoted as 5.75/70, implying that the dealer is willing to buy the FRA at a yield of 5.75% while he will sell the same FRA at an yield of 5.70%.

Asset Backed Security

Any security that offers to the investor an asset as the collateral is called Asset Backed Security. The rate of return required by the investor for such types of bonds is generally less compared to bonds that offer no collateral.

Auction

The process of issuing a security through a price-discovery mechanism through asking for bids. This is the process followed by the RBI for all types of issues of debt market paper by it.

Balance Tenor

The un-expired life of the security

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[13] This glossary has been downloaded and modified from www.debtonnet.com. the first internet based debt market portal in India.

Bank Rate

Bank Rate is a direct instrument of credit control. It is that interest rate or discount rate at which banks, financial institutions and other approved entities in the interbank market can get financial accommodation from the central bank of the country. By hiking the bank rate the central bank makes credit expensive and by lowering the same central bank make credit cheaper

Basis Point

One hundredth of a percentage (i.e. 0.01). As interest rates are generally sensitive in the second place after the decimal point, the measure has large importance for the debt market.

Benchmark Rate

Benchmark rates are rates or the prices of instruments that are traded in the market on which are used for pricing of other instruments. These rates or prices are used as benchmark for floating rate instruments. Typically a benchmark rate should satisfy the following criteria

1.   The rate should be available readily and should either be directly observable in the market or made available by a credible agency

2.   The benchmark should be liquid so that counter-hedging strategies are readily available

3.   The rate should be unique and leave no scope for ambiguity

The benchmark should be representative of the market. Internationally the most popular benchmarks are the LIBOR and the US Treasury. In India, given the paucity of rates that satisfy the above criterion, not many benchmarks exist, save the MIBOR announced by either the NSE or Reuters.

Bid Price

See Ask Price

Bond

A bond is a promise in which the Issuer agrees to pay a certain rate of interest, usually as a percentage of the bond's face value to the Investor at specific periodicity over the life of the bond. Sometimes interest is also paid in the form of issuing the instrument at a discount to face value and subsequently redeeming it at par. Some bonds do not pay a fixed rate of interest but pay interest that is a mark-up on some benchmark rate.

Bootstrapping

Bootstrapping is an iterative process of generating a Zero Coupon Yield Curve from the observed prices/yields of coupon bearing securities. The process starts from observing the yield for the shortest-term money market discount instrument (i.e. one that carries no coupon). This yield is used to discount the coupon payment falling on the same maturity for a coupon-bearing

bond of the next higher maturity. The resulting equation is solved to give the zero yield (also called spot yield) for the higher maturity period. This process is continued for all securities across the time series. If represented algebraically, the process would lead to an nth degree polynomial that is generally solved using numerical methods. The most popular one being the Newton-Raphson technique.

Call Money

Borrowing or lending for one day upto 14 days, in the interbank market is known as call money. Entry into this segment of the market is restricted to notified participants which include scheduled commercial banks, primary dealers, development financial institutions and mutual funds

Call Option

See Option

Callable Bond

A Bond which has a Call covenant in its terms of issue, i.e. one in which the Issuer reserves the right to buy-back the issue is called a Callable Bond.

Clean Price

A Clean Price of a bond or security is the discounted value of all its future cash flows (using a suitable discount rate, which can be the YTM or the relevant spot rate). However, if the bond is traded between two coupon dates, the buyer of the bond will have to compensate the seller for that part of the period between coupons for which the seller was owning the bond (See Accrued Interest). The price arrived at after adjusting the Clean Price for this factor is called the Dirty Price.

Collateralised Bond

Any fixed income instrument which has collateral as a back up to the issue is called a Collateralised Bond. In India, related terminology is secured bonds or unsecured bonds.

Commercial Paper (CP)

A Commercial Paper is a short term unsecured promissory note issued by the raiser of debt to the investor. In India Corporates, Primary Dealers (PD) and All India Financial Institutions (FI) can issue these notes. For a corporate to be eligible it must have a tangible net worth of Rs 4 crore or more and have a sanctioned working capital limit sanctioned by a bank/FI. It is generally companies with very good rating which are active in the CP market, though RBI permits a minimum credit rating of Crisil-P2. The tenure of CPs can be anything between 15 days to one year, though the most popular duration is 90 days. These instruments are offered at a discount to the face value and the rate of interest depends on the quantum raised, the tenure and the general level of rates besides the credit rating of the proposed issue. While most of the issuing entities have established working capital limits with banks, they still

prefer to use the CP route for flexibility in interest rates. The credit ratings for CP are issued by leading rating agencies. Recently the quantum raised by the issuer through the CP has been excluded from the ambit of bank finance, but banks continue to prefer earmarking either their own limits for the corporate or the consortium limits while subscribing to the commercial paper.

Constituent SGL A/c

SGL account holders can have two SGL accounts with RBI - SGL account no.l and SGL account no.2 . SGL account no. 1 is the account for the own holdings of the bank or the PD who has the direct account. SGL account no.2 is for their constituents .Those who are not eligible for direct SGL account with RBI , say , for example , a Provident Fund Trust , who is not eligible for an SGL account can hold securities in demat form by opening a constituent SGL account with a Bank, PD .Through the SGL account no.2 of the party who has direct account with RBI the facility will be made available to the PF

Convertible Bond

A bond that is partially or fully convertible into equity within a specified period of time from the date of issue is known as a convertible bond. In such cases, the bond does not pay the holder that part of the maturity value that is earmarked for conversion to equity.

Convexity

See in conjunction with Duration, PVBP and Immunization. Convexity is another measure of bond risk. The measure of Duration assumes a linear relationship between changes in price and duration. However, the relationship between change in price and change in yield is not linear and hence the estimated price change obtained by duration will give only an approximate value. The error is insignificant when the change in yield is small but does not hold true for larger changes in yield, as the actual price-yield relationship is convex. Convexity is the measure of the curvature of the price-yield relationship. It is also the rate of change of duration with a change in yield. A high convexity is often a desired characteristic as for a given change in yield, positive or negative, a bond's percentage rise in price is greater than the percentage price loss.

While modified duration is used to predict the bond's % change in price small change in yields, modified duration and convexity together are used to calculate a bond's % change in price for a large change in yield, as per this relationship.

Coupon

The rate of interest paid on a security, generally a fixed percentage of the face value, is called the coupon. The origin of the term dates back to the time when bonds had coupons attached to them, which the investor had to detach and present to the issuer to receive the money.

Credit Rating

Credit Rating is an exercise conducted by a rating organisation to explore the credit worthiness of the issuer with respect to the instrument being issued or a general ability to pay back debt over specified periods of time. The rating is given as an alphanumeric code that represents a graded structure or creditworthiness. Typically the highest credit rating is that of AAA and the lowest being D (for default). Within the same alphabet class, the rating agency may apply '+' (plus) or '-' (minus) signs as suffixes to reflect comparative standing within the rating category.

CRR

This is the acronym for Cash Reserve Ratio. That part of their assets which banks in India are required to hold as Cash in balances with the Reserve Bank of India is called the Cash Reserve Ratio.

Current Yield

Current Yield on a bond is defined as the coupon rate divided by the price of the bond. This is a very inadequate measure of yield, as it does not take into account the effect of future cash flows and the application of discounting factors on them.

Day Count

The market uses quite a few conventions for calculation of the number of days that has elapsed between two dates. It is interesting to note that these conventions were designed prior to the emergence of sophisticated calculating devices and the main objective was to reduce the math in complicated formulae. The conventions are still in place even though calculating functions are readily available even in hand-held devices. The ultimate aim of any convention is to calculate (days in a month)/(days in a year).

The conventions used are as below:

We take the example of a bond with Face Value 100, coupon 12.50%, last coupon paid on 15th June, 2000 and traded for value 5th October, 2000.

A/360

In this method, the actual number of days elapsed between the two dates is divided by 360, i.e. the year is assumed to have 360 days. Using this method, accrued interest is 3.8888

A/365

In this method, the actual number of days elapsed between the two dates is divided by 365, i.e. the year is assumed to have 365 days. Using this method, accrued interest is 3.8356

A/A

In this method, the actual number of days elapsed between the two dates is divided by the actual days in the year. If the year is a leap year AND the 29th of February is included between

the two dates, then 366 is used in the denominator, else 365 is used. Using this method, accrued interest is 3.8356

30/360

U.S. (NASD) method. If the starting date is the 31st of a month, it becomes equal to the 30th of the same month. If the ending date is the 31st of a month and the starting date is earlier than the 30th of a month, the ending date becomes equal to the 1st of the next month; otherwise the ending date becomes equal to the 30th of the same month.

30/360 European

European method. Starting dates and ending dates that occur on the 31st of a month become equal to the 30th of the same month.

In Indian bond markets the 30/360 European convention is used. RBI while calculating yield in the SGL Transactions for T-Bills uses 364 as basis. This is probably because 364 is the longest tenure bill issued by it.

Derivatives

A Derivative is any instrument that derives its value from the price movement of an underlying asset. The most popular derivatives include Options, Futures and Swaps. Given the steep progress made by computing devices and the increased importance of quantitative techniques to the financial markets, the structure of derivatives have become severely complicated. It is not uncommon to find a combination of several options on a swap which pay-out depending on the occurrence of some event. The main input for pricing is volatility in the price of the underlying asset, which has given rise to the curious situation where the asset volatility is more heavily traded than the derivative itself. The application of derivative pricing has found its way in valuation of any contingent claim, floating rate notes, corporate valuation and project finance.

Dirty Price

Dirty Price of a security is its Clean Price plus Accrued Interest. Also see Clean Price, Accrued Interest.

Discount

The quantum by which a security is issued or is traded below its par value is called Discount. Also see Discount Basis.

Discount Basis

Securities that do not carry a coupon are generally issued at a discount to their face value. Examples of such securities are T-Bills and Commercial Papers (CP).

Discriminatory Price Auction

See French Auction

Duration

Duration is a measure of a bonds' price risk. It is weighted average of all the cash-flows associated with a bond, weighed by the proportion of value due to the jth payment in the cash-flow stream, with sum of all j's equalling one. Duration measures the sensitivity of a bond's price to a change in yield.

Dutch auction

This is the process of auction in which after receiving all the bids a particular yield is determined as the cut-off rate. All bids received at yields higher than the cut-off rate (i.e. at higher prices) are rejected. All bids received at yields below the cut-off rate are given allotment at the cut-off rate. The process is identical to that of the French Auction, except for the fact that there is no concept of allotment at a premium. The Liquidity adjustment Facility (LAF) of RBI is an example of such auction. Also see French Auction, Winner's Curse.

Floating Rate Note

A Floating Rate Note is an instrument that does not pay a fixed rate of interest on its face value. The interest paid on such instruments is dependent upon the value of a benchmark rate. The benchmark rate is mutually agreed upon by the issuer and the investor and has to satisfy some criteria (See Benchmark Rates). The interest paid is typically a mark-up on the benchmark so agreed. An example would be a AAA rated corporate issuer who issues a Note that pays 30 bps above the U.S. Treasury. In India a very common instrument of late has been an issue that pays a specified markup above the MIBOR.

French Auction

This is a process of auction in which after all the bids are received, a particular yield is decided as the cut-off rate. All bids that have been received at yields higher than the cut-off rate (i.e. at lower prices) are rejected. All bids that have been received at below the cut-off rate (i.e. at higher prices) are given full allotment but at a premium from the price at the cut-off yield

Gilts

Another name for government securities. The term reflects the superior quality of the papers issued by the government. The papers issued by the Bank of England used to have gilt-edged borders and the term gilts originated from there

Gross Price

See Dirty Price

Junk Bond

Any bond which has a credit rating below Baa/BBB. These are bonds that are below investment grade and carry very attractive rates of return, commensurate with the high credit risk.

LAF

This is a facility by which the RBI adjusts the daily liquidity in the domestic markets (India) either by injecting funds or by withdrawing them out. This method was made effective on the 5th June 2000 and is open for Banks and Primary Dealers. This method has replaced the traditional method of refinance based on fixed rates.

LIBOR

Stands for London Interbank Offered rate. This is a very popular bench mark and is issued for US Dollar, GB Pound, Euro, Swiss Franc, Canadian Dollar and the Japanese Yen. The maturity covers overnight to 12 months. The methodology, very briefly - the British Bankers Association (BBA) at 1100 hrs GMT asks 16 banks to contribute the LIBOR for each maturity and for each currency. The BBA weeds out the best four and the worst four, calculates the average of the remaining eight and the value is published as LIBOR. The figures are put up in Reuters on page LIBO and SWAP. The same is available on TeleRate page 3170.

Macaulay Duration

See Duration

Mark To Market

Mark to Market or MTM is a very popular reporting and performance measurement tools for any investment. In this technique the price at which the investment was made is compared with the price which the asset can realised if liquidated in the market at that moment. The difference is either the MTM gain or MTM loss depending upon the current worth vis-a-vis the original price. Liabilities can also be made subject to the same analysis as assets. Periodicity of MTM depends on the liquidity of the market in which the asset is a class. For example currency and bond investments are MTM-ed online while other investments like real estate may be MTM-ed at higher intervals.

MIBOR

Stands for Mumbai InterBank Offered Rate, it is closely modeled on the LIBOR. Currently there are two calculating agents for the benchmark -Reuters and the National Stock Exchange (NSE). The FIMMDA NSE MIBOR benchmark is the more popular of the two, reflected by the larger number of deals that are transacted using this benchmark.

Modified Duration

This is a slight variation to the concept of Duration. Modified Duration can be defined as the approximate percentage change in price for a 1% change in yield. Mathematically it is represented as Mod. Duration = Duration / (1+y/n), where n=number of coupon payments in the year and y=yield to maturity.

Multiple Price Auction

See French Auction

Net Price

See Clean Price

Non Convertible Debenture (NCD)

A Non Convertible debenture, as against a convertible debenture, is not convertible, either in part or the whole, into equity on its maturity.

Notice Money

Money borrowed or lent in the interbank market for a period beyond one day and upto 14 days.

Open Market Operations

One of the major instruments of monetary policy by which the central bank of a country manipulates short-term liquidity and thereby the interest rates to desired levels. Generally open market operations involve purchase and sale of treasury bills in the open market or conducting repos.

Options

Options are of two types: Call Option and Put Option.

Call Option gives the buyer the right but not obligation to buy a given quantity of the underlying asset, at a given price on or before a given future date.

Put Option gives the buyer the right but not the obligation to sell a given quantity of the underlying asset, at a given price on or before a given future date.

PLR

This is the acronym for Prime Lending Rate. This is the rate at which a bank in India lends to its prime customer. The bank usually follows an internal credit rating system and charges a spread over the PLR for non-prime customers.

Price Value of a Basis Point

See PVBP

Primary Dealer (PD)

A Primary Dealer in the securities market is an entity licensed by the RBI to carry on the business of securities and act as market maker in securities. In turn the Primary Dealer will enjoy certain privileges from the RBI like refinance from RBI at concessional rates, access to the interbank call money market etc. The PD has to give an annual undertaking to the RBI on his level of participation in the primary issues of government securities. To qualify for Primary Dealership the applicant company should have a networth of Rs.50.00 crore and a few years of experience in the securities market.

PVBP

Also called the Price Value of a Basis Point or Dollar Value of 01. This is one way of quantifying the sensitivity of a bond to changes in the interest rates. If the current price of the bond is P(0) and the price after a one basis point rise in rates is P(l) then PVBP is -[P(1)-P(0)]. This can be estimated with the help of the modified duration of a bond, as (Price of the bond * modified duration* .0001)

Repo

Repo or Repurchase Agreements are short-term money market instruments. Repo is nothing but collateralized borrowing and lending. In a repurchase agreement securities are sold in a temporary sale with a promise to buy back the securities at a future date at specified price. In reverse repos securities are purchased in a temporary purchase with a promise to sell it back after a specified number of days at a pre-specified price. When one is doing a repo, it is reverse repo for the other party

Reverse Repo

See Repo

Risk Free Rate

An interest rate given out by an investment that has a zero probability of default. Theoretically this rate can never exist in practice but sovereign debt is used as the nearest proxy.

SGL

Subsidiary General Ledger Account is the demat facility for government securities offered by the Reserve Bank of India. In the case of SGL facility the securities remain in the computers of RBI by credit to the SGL account of the owner. RBI offers SGL facility only to banks and primary dealers.

SLR

This is the acronym for Statutory Liquidity Ratio. That part of their Net Demand and Time liabilities (NDTL) that a bank is required by law to be kept invested in approved securities is known as SLR. The approved securities are typically sovereign issues. The maintenance of SLR ensures a minimum liquidity in the bank's assets.

Spread

Spread is the difference between two rates of interests. It is often generalised to imply the difference between either price or yield. Spreads can be between two risk classes or can be between tenors in the same risk class. For example 130 bps between AAA and GOI means a 1.30% spread between a AAA issue and that made by the Government of India. 5 paisa spread between bid and ask means that in the two way price quoted the difference between the buy and sell price is 5 paisa 60 bps spread between 3 month T Bill over 10 Year means

that the difference between the yield in the 3 month Treasury Bill and that on a 10 Year paper of the same risk class is 60 basis points.

STRIPS

STRIPS is the acronym for Separate Trading of Registered Interest and Principal of Securities. The STRIPS program lets investors hold and trade the individual interest and principal components of eligible Treasury notes and bonds as separate securities. When a Treasury fixed-principal or inflation-indexed note or bond is stripped, each interest payment and the principal payment becomes a separate zero-coupon security. Each component has its own identifying number and can be held or traded separately. For example, a Treasury note with 10 years remaining to maturity consists of a single principal payment at maturity and 20 interest payments, one every six months for 10 years. When this note is converted to STRIPS form, each of the 20 interest payments and the principal payment becomes a separate security. STRIPS are also called zero-coupon securities because the only time an investor receives a payment during the life of a STRIP is when it matures.

A financial institution, government securities broker, or government securities dealer can convert an eligible Treasury security into interest and principal components through the commercial book-entry system. Generally, an eligible security can be stripped at any time from its issue date until its call or maturity date. Securities are assigned a standard identification code known as a CUSIP number. CUSIP is the acronym for Committee on Uniform Security Identification Procedures. Just as a fully constituted security has it a unique CUSIP number, each STRIPS component has a unique CUSIP number. All interest STRIPS that are payable on the same day, even when stripped from different securities, have the same generic CUSIP numbers. However, the principal STRIPS from each note or bond have a unique CUSIP number.

STRIPS components can be reassembled or "reconstituted" into a fully constituted security in the commercial book-entry system. To reconstitute a security, a financial institution or government securities broker or dealer must obtain the appropriate principal component and all unmatured interest components for the security being reconstituted. The principal and interest components must be in the appropriate minimum or multiple amounts for a security to be reconstituted. The flexibility to strip and reconstitute securities allows investors to take advantage of various holding and trading strategies under changing financial market conditions that may tend to favour trading and holding STRIPS or fully constituted Treasury securities.

Term Money

Money borrowed and lent for a period beyond 14 days is known as term money

Treasury Bills

Treasury Bills are short-term obligations of the Treasury/Government. They are instruments issued at a discount to the face value and form an integral part of the money market. In India treasury bills are issued for two maturities 91 days and 364 days.

Uniform Price Auction

See Dutch auction

WDM Segment

The National Stock Exchange of India has three trading segments, one is the Capital Markets Segment, Future &. Option Segment and the other is the Wholesale Debt Market Segment. The Capital Markets Segment is meant for equities trading whereas all the trades in debt instruments are put through the WDM Segment. The WDM represents a formal screen-based trading and reporting mechanism for secondary market trades in debt instruments. The F&O segment is meant for trading in equity and interest rate derivatives.

Winners Curse

In a French auction, every successful bidder is one whose bid is equal or higher than the cut-off price. Therefore, successful bidders have to pay a premium on the cut-off price, on being successful in the auction. This is called the winners curse in treasury auctions. **Yield Curve**

The relationship between time and yield on a homogenous risk class of securities is called the Yield Curve. The relationship represents the time value of money - showing that people would demand a positive rate of return on the money they are willing to part today for a payback into the future. It also shows that a Rupee payable in the future is worth less today because of the relationship between time and money. A yield curve can be positive, neutral or flat. A positive yield curve, which is most natural, is when the slope of the curve is positive, i.e. the yield at the longer end is higher than that at the shorter end of the time axis. This results as people demand higher compensation for parting their money for a longer time into the future. A neutral yield curve is that which has a zero slope, i.e. is flat across time. This occurs when people are willing to accept more or less the same returns across maturities. The negative yield curve (also called an inverted yield curve) is one of which the slope is negative, i.e. the long term yield is lower than the short term yield. It is not often that this happens and has important economic ramifications when it does. It generally represents an impending downturn in the economy, where people are anticipating lower interest rates in the future.

Yield Pick-Up

Yield pick up or yield give up refers to the yield gained or lost at the time of initiation of a trade primarily in bonds and debentures. Suppose one sold 12.50 % GOI 2004 at a yield of 10.00 per cent and moved into 11.83 % GOI 2014 at a yield of 11.25 per cent the yield pick up is to the tune of 125 basis points. If one did exactly the reverse of this the yield give up is to the extent of 125 bps. These concepts are ordinarily used in bond swap evaluation.

Yield To Maturity

Yield to Maturity (YTM) is that rate of discount that equates the discounted value of all future cash flows of a security with its current price. In a way, it is another way of stating the price

of a security as other things remaining constant the price is a direct function of the YTM. The deficiency of YTM is that it assumes that all intermediate and final cash flow of the security is reinvested at the YTM, which ignores the shape of the yield curve. This makes YTM applicable as a measure for an individual security and to different bonds in the same risk class. The YTM, given its instrument-specific nature does not provide unique mapping from maturity to interest rate space. It is used primarily for its simplicity of nature and ease of calculation. More sophisticated traders would use the Zero Coupon Yield Curve (ZCYC) for valuation. See Zero Coupon Yield Curve.

Zero Coupon Bond

A Zero Coupon Bond (ZCB) is one that pays no periodic interest (does not carry a coupon). These bonds are typically issued at a discount and redeemed at face value. The discount rate, appropriated over the life of the bond is the effective interest paid by the issuer to the investor. In India, the spectrum of ZCB is virtually non-existent beyond one year. Upto one year, the Treasury Bills issued are proxies for ZCB. Also see Zero Coupon Yield Curve.

Zero Coupon Yield Curve

The Zero Coupon Yield Curve (also called the Spot Curve) is a relationship between maturity and interest rates. It differs from a normal yield curve by the fact that it is not the YTM of coupon bearing securities, which gets plotted. Represented against time are the yields on zero coupon instruments across maturities. The benefit of having zero coupon yields (or spot yields) is that the deficiencies of the YTM approach (See Yield to Maturity) are removed. However, zero coupon bonds are generally not available across the entire spectrum of time and hence statistical estimation processes are used. The NSE computes the ZCYC for treasury bonds using the Nelson-Seigel procedure, and disseminates this information on an everyday basis. The zero coupon yield curve is useful in valuation of even coupon bearing securities and can be extended to other risk classes as well after adjusting for the spreads. It is also an important input for robust measures of Value at Risk (VaR).

Guideline for using Excel:

To calculate yield to maturity (YTM) or term to maturity of bonds, duration, modified duration etc. 'insert function[7] (fx) of Microsoft Excel can be used effectively.

1.　　　Enable **Microsoft Excel** application in the PC as follows:

- Log into Excel and go to 'Tools'
- Select 'Add-ins'
- Choose (put tick marks on) 'Analysis ToolPak' and 'Analysis ToolPak-VBA'
- Click on OK.
- Re-login into Excel.

2.　　　Insert the parameters relevant to a function in Excel sheet cells:

For example, to calculate YTM, **'YIELD' function** of Excel may be used. Insert relevant parameters like Settlement date, Maturity date, **Coupon, Price,** Redemption, Frequency and Basis in separate cells in an Excel sheet as shown in a sample screen-1 below:
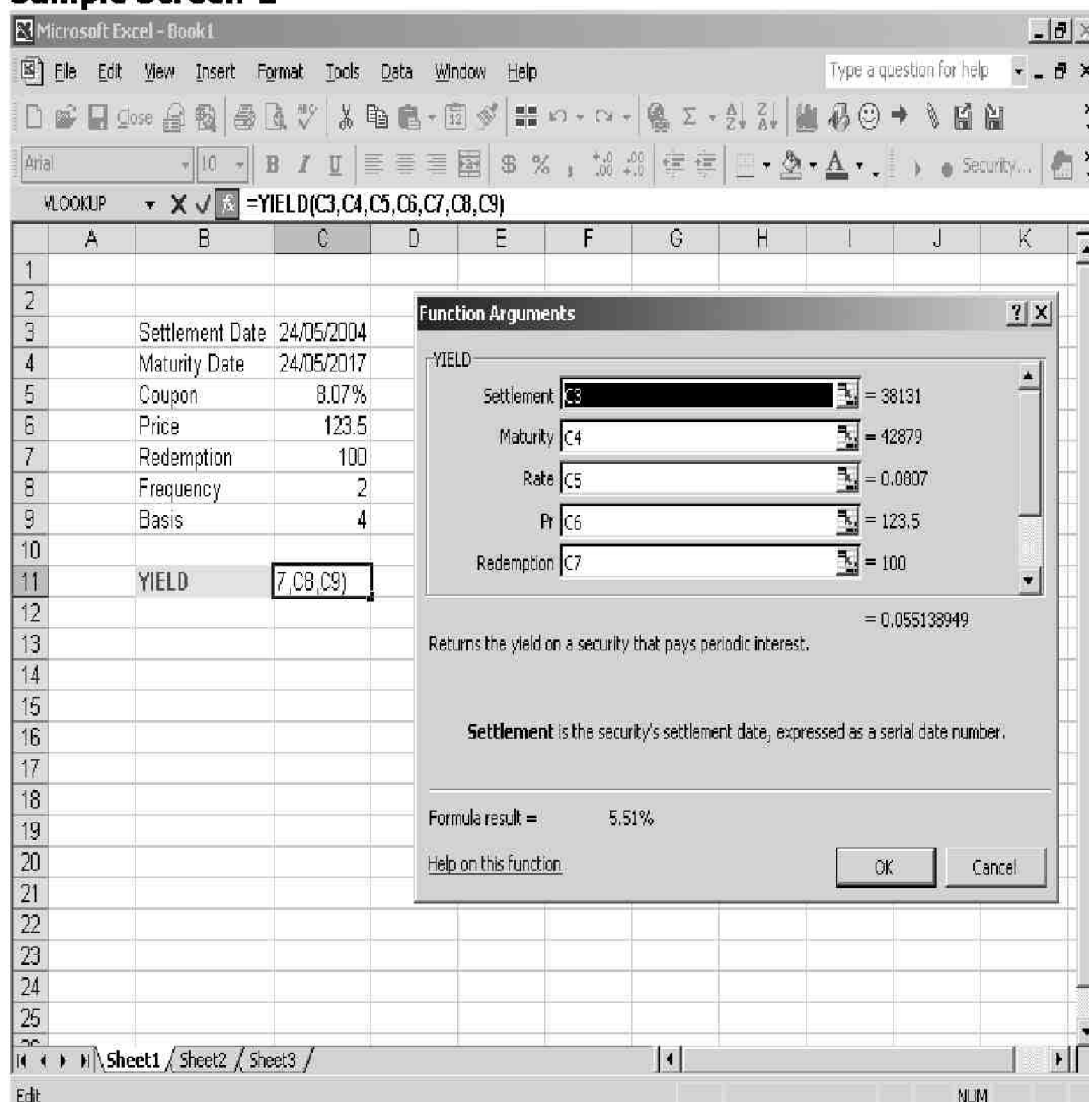

Sample screen-1
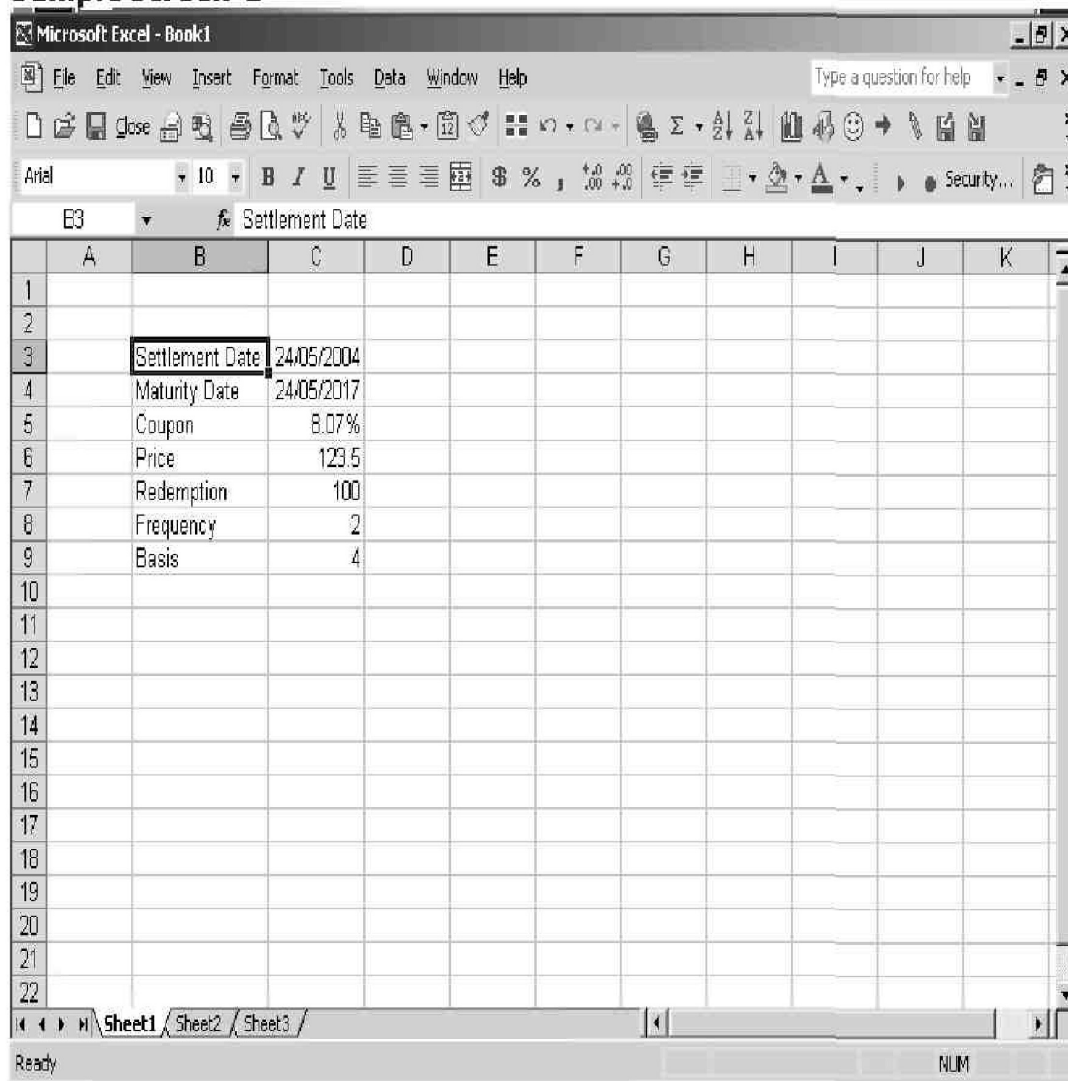
3. Choose a new cell for output and either click on fx key or go to 'Insert' and select 'Function'. A pop up window of 'Insert Function' would appear.

4. Select desired function 'YIELD' from the list by either typing it out in the window 'search for a function' or by choosing 'AN' from the pull out menu of 'Or select a category' window of 'Insert Function' and click on 'OK'. A 'Function Arguments' window for 'YIELD' would be displayed as shown in sample screen-2.

Sample Screen-2

In the 'Function Arguments' window, bring the cursor in the first field 'Settlement' pick up the input parameter from relevant cell in the Excel sheet already created (in the above sample screen cell C3). Same procedure may be followed for the other parameters and click on 'OK'. Calculated output, here 'yield', would appear as 'Formula result'.

Writing Formulae in Open Office and Excel

The Formula syntax is different in MS Excel and Open Office Calc.

An example is given below:

Formula in Open Office CalcPMT(0.1025/12;60;380000;0;0)

Formula in MS ExcelPMT(10.25%/12,60,380000,0,0)

Open Office Calc uses semi-colon ";" to separate arguments while MS Excel uses comma ","
to separate arguments.

So a formula created in MS Excel will not work in Open Office Calc unless this syntax is
changed.