

A Primer on Bonds



Bonds are the financial instruments issued for raising capital by borrowings. This article serves as a quick reference to this debt instrument describing its various features and types, accounting and tax treatments and other technical concepts involved with the Bonds. It also provides an insight into the position of bond market in India by using various data and statistics. Read on...

Definition:

Bonds are fixed income debt instruments, where an investor loans a certain amount of money to another entity, which in turn repays the loan over a period of time (coupon payments). This repayment is done in regular periods, followed by a balloon payment at the maturity of the said agreement. Bonds are unsecured and the value is solely backed by

the credit worthiness of the issuer (also called a 'debtor').

Features of Bonds:

Most bonds can be characterised by the following parameters:

- Issuer:** This is the entity liable for the money borrowed against the bond. Significant proportions of all bonds that are outstanding, in India, are either issued by the government or corporates.
- Face Value/ Par Value/ Principal:** It is the value on which the issuer pays interest. The balloon payment at the time to maturity of a bond, called the redemption value, is usually equal to the face value. However, it is also quite



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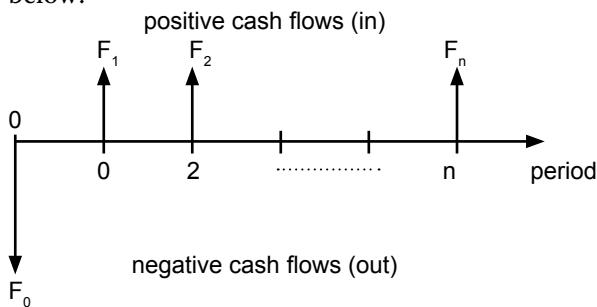
common to have a redemption value different from the par.

- c) **Maturity Date:** This is the day on which the redemption value is paid to the investor, essentially terminating the debt agreement. Time to maturity (TTM)/ tenor is the time by which the bond will mature; equal to the life of the bond on the day of issue.
- d) **Coupon Yield:** It is the interest payment made to the investor by the issuer at regular intervals of time. The amount is usually specified as an annualised percentage of the nominal value.
- e) **Frequency of Coupons:** Interest payments by the issuer can happen at different frequencies. Most government securities in India make coupon payments semi-annually, whereas the corporate bonds are annual.

These parameters only serve as a starting point. There also exist highly structured products like callable puttable bonds, which have features like optionality embedded in them.

Pricing:

A bond is priced using the present value concept, which is based on the theory of time value of money. An illustration using generalised variables is given below:



In the above cash flow diagram, F_0 , the price of the bond as of 'today', is to be estimated. F_1 to F_n are the cash flows, i.e. coupon payments and the end bullet payment.

Price of the bond is calculated as:

$$F_0 = \frac{F_1}{(1+r_1)} + \frac{F_2}{(1+r_2)^2} + \dots + \frac{F_n}{(1+r_n)^n}$$

Where r_1, r_2 etc. denote the interest rates for the respective time periods. These values can be obtained from the term structure of interest rates – a mapping between interest rates and time period of payment. The cash flows from the bond need not be equal, as is the case with a floating rate bond. For example,

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there are innovative products like inflation linked bonds that make payments by adding a premium to inflation indicators.

Types of Bonds:

A few basic types of bonds are explained below:

- a) **Fixed Rate Bonds:** A bond whose coupon is always fixed percentage of the redemption value. Zero coupon bonds are a special case of fixed rate bonds – these are always sold at a discount.
- b) **Floating Rate Bonds:** These bonds have the coupon rate indexed to an economic parameter. For example, a bond might have its coupon payment set to a two percent premium over the inflation.
- c) **Callable Bonds:** These bonds can be ‘called’ back by the issuer before its maturity.
- d) **Convertible Bonds:** Convertible bonds can be converted to equity at some points of time agreed upon by the parties involved. The optionality involved raises the price.

Bonds are also classified on the basis of maturity sometimes. *Bills* are securities with maturity less than a year, *notes* – between a year and 10 years and *bonds* – over 10 years.

Accounting Procedures:

As an instrument that has regular cash flows, bond is recorded in the books a bit differently from other assets. All steps are from the perspective of an issuer:

- The total amount received as proceeds from the sale are recorded on the assets side under cash and equivalents.
- Against this, a liability account called Bonds Payable is credited with an amount equal to the face value of the bond.
- If the bond has been issued at a premium (discount), then an additional account for the same is created on the liabilities (contra-liability) side.
- This discount on the bond/ premium has to

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be amortised over the life time of the bond, such that just before the bond is redeemed, the value in the discount/ premium accounts is zero – interest rate method or the straight line amortisation method can be followed for this process.

- Every time a payment is made to the investor, two changes are made:
 - An interest expense is recognised, and the cash account is debited.
 - The discount/premium account is amortised using the appropriate method.

Technical Concepts:

Yield and Price

Yield to maturity (YTM), current yield (broker's yield) and the coupon yield are three different yields that are used to evaluate a bond. Consider the following equation:

$$\frac{F_1}{(1+y)} + \frac{F_2}{(1+y)^2} + \dots + \frac{F_n}{(1+y)^n} = \frac{F_1}{(1+r_1)} + \frac{F_2}{(1+r_2)^2} + \dots + \frac{F_n}{(1+r_n)^n}$$

The value of y for which the above equation is satisfied is called the **yield to maturity (YTM)**, or simply the yield of the bond. YTM is arguably the most watched parameter of a bond, and when observed at an aggregate level for a few benchmark bonds, serves as an indicator to market trends.

Current yield is simply defined as the coupon payment through the time period divided by the price at the beginning of the investment period.

The yield to maturity is the average return obtained on the position. YTM of the bond is inversely related to the price, as indicated by the equation. When the yields are rising, it is wiser to either short a bond or wait for the economy to pick up again.

Yields of bonds majorly depend on two factors – the interest rates in the country (as set by the central bank) and the amount of risk associated with the issuer. The difference between the risk-free rate and the bond yield is called the credit spread/ premium. Factors such as capital flows, inflation and the exchange rate also affect the supply and demand in the market.

Duration

Macauley's duration gives the value of time period at which reinvestment risk cancels out price risk of a bond. Duration depends on coupon yield, maturity, redemption value and the yield to maturity.

It can be calculated as follows:

$$Duration = \frac{\sum \frac{tc}{(1+y)^t} + \frac{mR}{(1+y)^m}}{P}$$

Where t is the time period, c is the coupon rate, m is the time to maturity, y is the yield to maturity, R is the redemption value and P is the market price of the bond.

The formula above only gives the duration of a single bond. Portfolio duration is a more useful parameter to watch and can be calculated as a weighted average of all durations.

There are other measures of the same quantity – modified duration, effective duration, *etc.*, less pertinent.

PVBP

PVBP or the present value of a basis point is the amount by which the overall investment decreases in value when the yields move up by 1 basis point or 0.01 percentage points. As explained above, price of a bond goes down when the yield climbs.

PVBP can also be calculated at a portfolio level, by simply aggregating the PVBPs of each element in the portfolio. It is also referred to as DV01.

Factors Affecting Yields:

Consider the equation to calculate YTM again:

$$\frac{F_1}{(1+y)} + \frac{F_2}{(1+y)^2} + \dots + \frac{F_n}{(1+y)^n} = \frac{F_1}{(1+r_1)} + \frac{F_2}{(1+r_2)^2} + \dots + \frac{F_n}{(1+r_n)^n}$$

It is evident from the equation that YTM is dependent on the parameters like coupon yield, time to maturity and face value of the bond. But more importantly, macroeconomic indicators have a huge effect on the interest rates, and hence on YTM.

Indicators of the nation-wide economy like GDP growth, balance of trade, output gap, unemployment data, inflation data (headline and core), industry activity indicators, *etc.* play a role in shifting the yield curves of benchmark bonds and hence the bond market in general.

Expectations on the inflation number are considered the prime driver of interest rates in an economy. The governor of RBI has indicated that the bank's monetary policy will primarily target inflation. At a fundamental level, this means that

“Bond market in India is dominated by government securities. It can be seen that about 88% of the bonds that are traded are in some form guaranteed by the government. Corporate bond secondary market is not very active in India.”

for the interest rates to be lower; there has to be a decrease in inflation. A drop in headline inflation and/or core inflation will give enough leeway for the bank to cut rates. Similarly, given the inflation target ($4\pm 2\%$), a rising inflation number will force the bank to raise rates.

An important point to note is that it is the expected level of inflation, not realised, that plays a role in determining the yield curve.

Let's see how an economic indicator can affect rates in a country. Consider the unemployment data. An increase in the number of jobless claims indicates a slowing down economy (Phillip's Curve) and hence an expectation of a lower inflation number. This will be interpreted by the market as falling yields, causing an increase in the price of bonds.

Wage data is seen as an important indicator of inflation. This is because wages remain rather consistent over time, and hence a change in wages indicates a more lasting shift in inflation. There are other factors, such as the average wealth of

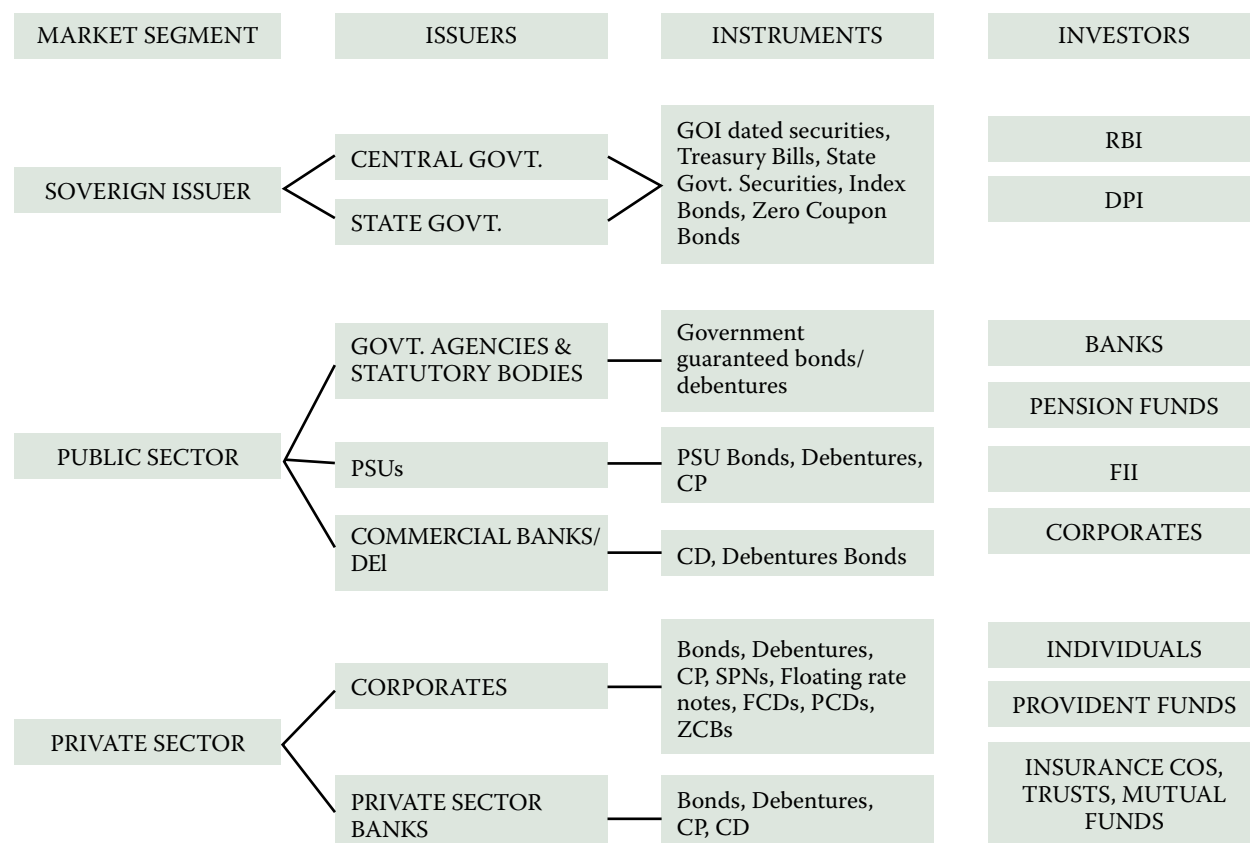
people, debt to GDP ratio, which play a relatively small role in determining the interest rates of the economy.

Bottom line is that one has to look at many economic factors to arrive at an estimate of *expected inflation*, which in turn determines the rates of the economy.

In case of corporates, issuer quality also affects the yields. Lower the rating, higher is the premium that is paid. An expectation on the credit rating of a firm can be arrived at, by following its balance sheets.

Bond Market in India:

Bonds are issued as a part of the debt capital markets and are also traded very actively in the secondary markets. The bond market in India is primarily regulated by the Securities Exchange Board of India (SEBI) and the Reserve Bank of India (RBI). Another organisation which is influential in promoting the bond markets is the Fixed Income Money Market and Derivatives Association (FIMMDA).



Source: SEBI, Working Paper No. 9, Corporate Debt Market in India: Key Issues and Some Policy Recommendations, July 2004

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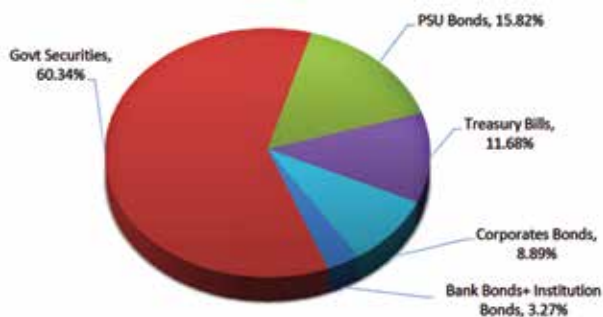
Bond market in India is dominated by government securities. Data from NSE indicates the following compositions of outstanding bonds:

Type of Security	No. of Securities as on 30 Oct, 2015	Issue Size* (₹ in millions)				Increase/Decrease in Last one Year %
		As on 30 Oct, 2015	As on 30 Sep, 2015	As on 31 Aug, 2015	As on 31 Oct, 2014	
Govt. Bonds	115	27045753	27035753	27590093	29042492	(6.88)
State Govt. Bonds	1811	13824230	13628137	13469235	11596505	19.21
Treasury Bills	51	3895962	4124852	3870714	3771324	3.30
State Enterprise Bonds	1136	4896686	4829347	4736507	3994810	22.58
Financial Institutions/ Bank Bonds	821	3832243	3862055	3906375	3739598	2.48
Corporate Debt	2924	4097366	3960027	3901668	3285606	24.71
Supra Institutional Bonds	10	3300	3300	3300	3300	0.00
Local Bodies	17	29750	29750	29750	29840	(0.30)
Mutual Fund	6	7502	7502	7502	7502	0.00
Preference share	1	1500	1500	1500	0	0.00
Total	6892	57634292	57482223.3	57516644.2	55470977	3.90

*rounded off the nearest million.

**Debt oriented Mutual Funds not included in the above data.

The following pie chart indicates the activity in these securities. It can be seen that about 88% of the bonds that are traded are in some form guaranteed by the government. Corporate bond secondary market is not very active in India.



Supply:

Two major types of issuers are looked at below:

Government Bonds

The Government of India (GOI) issues several types of bonds.

T-Bills are money market instruments, currently issued in three tenors – 91 days, 182 days and 364 days. These are zero coupon bonds and are always issued at a discount. The GOI also issues longer term bonds which can be any of these: fixed rate bonds, floating rate bonds, zero coupon bonds, capital indexed bonds and bonds with optionality.

Primarily, there are three channels for issue of new government securities and trading in India:

- Over the Counter (OTC)
- Negotiated Dealing System (NDS)
- Negotiated Dealing System – Order Matching (NDS-OM)

Both NDS and NDS-OM are available only to

select members like commercial banks, primary dealers, etc. and is maintained by the Clearing Corporation of India Limited (CCIL). CCIL also acts as the counter party to all transaction involving government securities.

Government bonds are also used to regulate the liquidity in the market through market interventions by the RBI. The central bank can purchase or sell government securities to this end.

Corporate Bonds

Corporate Bonds are issued by large corporates as an alternative to loans from banks. These bonds are usually listed on the exchanges NSE and BSE; accessible to retail investors. Issuance of corporate bonds to the public is done by investment banks.

Corporate debt market in India is evaluated as underdeveloped by several studies. The share of corporate bonds in India as compared to the government securities is low.

Security Type	No. of Securities	Mkt Capitalisation (₹ Mn.)	% of Total
Govt. Securities	115	27321563.14	46.98
PSU Bonds	1136	4952838.14	8.52
State Loans	1811	14015345.65	24.10
Treasury Bills	51	3817508.50	6.57
Local Bodies	17	29855.16	0.05
Fin. Inst.	240	1060581.76	1.82
Bank Bonds	581	2801079.08	4.82
Corporate Bonds	2924	4141250.91	7.12
Supranational Bonds	10	3386.26	0.01
Mutual funds	6	7502.00	0.01
Preference share	1	1500.00	0.00
Total	6892	58152410.60	100.00

Source: NSE

Demand:

The demand for government securities stems from different sources. One main source is the regulatory requirement—banks, provident funds, etc. are bound

to hold a certain amount of reserves in the form of government securities, called the statutory liquidity ratio (SLR).

Government securities are also used as an instrument to manipulate the liquidity in the market by the RBI. RBI also allows a tool called the LAF – Liquidity Adjustment Facility, which can be used by banks to borrow money at a premium (MSF) over the repo, to account for their own firm level liquidity needs. Also, all repo transactions by RBI are done using government securities.

Bonds are also seen as relatively less risky investments as compared to equity, derivatives and other complex structured products. The demand for corporate bonds is mainly in the institutional investors and FII space nowadays. Mutual funds, provident funds, insurance companies, *etc.* are the main sources of demand for the corporate bonds, as diversification allows them to go for higher returns at a cost of minimal marginal addition to risk taken.

Risks:

There are primarily two kinds of risk an investor faces with a bond on the portfolio:

- Default/ Migration Risk
- Interest Rate Risk

Default Risk

Default risk / migration risk is the uncertainty in bond prices and the yields due to a change in the issuer's rating. One special case in this scenario is the issuer defaulting. This risk is also referred to as the credit risk.

This risk can be quantified using the ratings published by well reputed global rating agencies like Fitch Ratings, Moody's and Standard & Poor's. Ratings range from AAA to D, where AAA indicates the safest investment there is, D indicates default. All securities that are awarded a rating of BBB or above are adjudged 'investment grade'. All other bonds are said to have a 'speculative' or 'junk' status.

Interest Rate Risk

Interest rate risk has two components – price risk and reinvestment risks.

Price risk is the variance in price of the bond due to a change in the interest rates. For example, if the interest rates move up, the prices of bonds begin to fall, reducing the value of investment. Lower the interest rates, higher the value of the investment.

Reinvestment risk is the variance in the returns that can be obtained by reinvesting the interest payments and/ or the proceeds from sale. In this case, as the interest rates move up, the reinvestment opportunity will have more value. Higher the interest rates, better the value for the investor from this perspective.

From the above two arguments, it can be observed that reinvestment risk and price risk move against each other, which leads to a simple conclusion. There must be a strategy that makes it possible for an investor to nullify the interest rate risk on the portfolio. The strategy is to set the investment horizon to the duration of the bond portfolio. At duration, reinvestment risk equals the price risk. But one important thing to note is that it is necessary to keep investing the payments from the bond issuer at the bank interest rates.

Taxation:

The coupon payments made by the issuer is counted under regular income and will be taxed accordingly. If the bond is sold and capital gains are made, then depending on the holding period, the government levies short-term or long-term capital gains tax. Some bonds also give tax saving benefits. There are bonds issued by the government of India which are income tax exempt. There are no corporate bonds which serve the purpose of tax savings, except for those bonds issued by companies in the infrastructure space.

Conclusion:

Bond market in India is under-developed compared to many other developing nations like Korea and Japan. In India, most of the demand is for the government bonds and corporates are finding it tough to raise money through bond issues. Bank loans still dominate corporate debt and will continue to do so in the near future – growth in the corporate bond market in India has been sluggish.

From an investor's perspective, a bond is one of the safest instruments to invest in. Some of these also serve the purpose of tax savings. A fairly liquid secondary market makes transacting in bonds also relatively easy. All these factors make bonds an easy and comfortable investment for risk-averse investors. ■

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