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A Study on Corporate Bond Valuation with reference to NSE & BSE

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ABSTRACT:

A bond is a long-term contract under which a borrower agrees to make payments of interest and principal on a specific date to the holders of bond. Generally investors have many choices while investing in bonds. However, bonds can mainly be classified into four types namely Treasury bonds, Corporate bonds, Municipal bonds and Foreign bonds. Treasury bonds, also called government bonds are issued by federal government The study focuses on present value approach, YTM, Current Yield and bond duration. The scope of the study in limited to three corporate bonds i.e., SBI, Rural Electrification corporation limited and L & T Finance limited. The value of a bond equals the present value of all future cash flows accruing to the investor. Cash flows for the conservative bond investor include periodic interest payments and principle returns. It is important to understand what causes changes in interest rates and how these changes in rates affect the price of the bonds. Differences in bond price volatility are mainly a function of differences in yield, coupon and term to maturity. The Macaulay duration measure incorporates coupon, maturity and yield in one measure. In turn modified duration which is directly related to Macaulay duration provides an estimate of the response of bond prices to changes in interest rates under certain assumption.

Keywords:

Bond, coupon rate, YTM, Duration, Present value of bond.

1. INTRODUCTION:

Bond is a debt security, in which the authorized issuer owes the holders a debt and, depending on the terms of the bond, is obliged to pay interest (the coupon) to use and/or to repay the principal at a later date, termed maturity. A bond is a formal contract to repay borrowed money with interest at fixed intervals (ex semi-annual, annual, sometimes monthly).Bonds provide the borrower with external funds to finance long-term investments, or, in the case of government bonds, to finance current expenditure.

Bonds and stocks are both securities, but the major difference between the two is that (capital) stockholders have an equity stake in the company (i.e., they are owners), whereas bondholders have a creditor stake in the company (i.e., they are lenders). Another difference is that bonds usually have a defined term, or maturity, after which the bond is redeemed, whereas stocks may be outstanding indefinitely. A bond is a long-term contract under which a borrower agrees to make payments of interest and principal on a specific date to the holders of bond. Generally investors have many choices while investing in bonds. However, bonds can mainly be classified into four types namely Treasury bonds, Corporate bonds, Municipal bonds and Foreign bonds. Treasury bonds, also called government bonds are issued by federal government. It is assumed that government bonds have not default risk but it is not free from interest rate risks. Corporate bonds as the name implies are issued by corporations. Unlike treasury bonds, corporate bonds are exposed to default risks. Municipal bonds are issued by state and local government and are also exposed to default risk. Foreign bonds are issued by foreign governments or foreign corporations. Foreign bonds are exposed to default risk and in addition the risk exists if the bonds are denominated in a currency other than that of investor's home currency. All these bonds are generally traded in a market which is called bond market. The main aim of this study to focus on Indian bond market and to determine the bond valuation using present value approach, YTM and bond duration.

2. NEED FOR THE STUDY:

A bond is a long-term contract under which a borrower agrees to make payments of interest and principal on a specific date to the holders of bond. Generally investors have many choices while investing in bonds. However, bonds can mainly be classified into four types namely Treasury bonds, Corporate bonds, Municipal bonds and Foreign bonds. Treasury bonds, also called government bonds are issued by federal government. It is assumed that government bonds have not default risk but it is not free from interest rate risks.

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Corporate bonds as the name implies are issued by corporations. Unlike treasury bonds, corporate bonds are exposed to default risks. Municipal bonds are issued by state and local government and are also exposed to default risk. Foreign bonds are issued by foreign governments or foreign corporations. Foreign bonds are exposed to default risk and in addition the risk exists if the bonds are denominated in a currency other than that of investor's home currency. All these bonds are generally traded in a market which is called bond market. Thus the need of this study is to find the valuations of corporate bond with are traded in NSE & BSE.

3. RESEARCH METHODOLOGY:

Objective of the study:

To study the present Indian corporate bond market, to evaluate the present value of bond using present value approach and to analyze the bond duration of selected bonds in the study.

Data Collection:

The data was collected from the NSE &BSE website. The bond features such as ISIN No, Descriptor, Issuer name, Issue Date, Coupon & Basis rate and redemption date had been collected.

Sample size:

Three corporate bonds has been taken for the study i.e., SBI, Rural Electrification corporation limited and L & T Finance limited and the sample size of four bond for the analysis.Two from SBI and one each from rest.

Scope of the study:

The scope of the study is limited to Indian corporate bond market only. The study focused on present value approach, YTM, Current Yield and bond duration. The scope of the study was limited to three corporate bonds i.e., SBI, Rural Electrification Corporation limited and L & T Finance limited.

Tools &Techniques:

Present Value approach, YTM, Current Yield and Duration.

4. LITERATURE REVIEW:

Peter Feldhutter (2009), proposed a model how corporate bond prices are affected by search frictions and occasional selling pressures.

A key prediction in the model is that in a distressed market with more sellers than buyers, the midprice paid by institutional investors is lower than that of retail investors. Using a structural estimation, the model is able to identify liquidity crises based on the relative prices of institutional and retail investors. He found that search costs have the highest impact on yields for bonds with short maturities according to the estimation.

Joost Driessen (2005) provided an empirical decomposition of the default, liquidity, and tax factors that is determine expected corporate bond returns. In particular, the risk premium associated with a default event is estimated. The intensity-based model is estimated using bond price data for 104 US firms and historical default rates. Significant risk premium on common intensity factors and important tax and liquidity effects are found. These components go a long way to wards explaining the level of expected corporate bond returns. Adding a positive default event risk premium helps to explain the remaining error, although this cannot be estimated with high statistical position.

Edith S. Hotchkiss (2002) stated a unique dataset based on daily and hourly high-yield bond transaction prices, we find the informational efficiency of corporate bond prices is similar to that of underlying stocks. We find that stocks do not lead bond in reflecting firm-specific information. We further examine price behavior around earnings news and find that information is quickly incorporated into both Bond and stock prices, even at short return horizons. We find that measures of market quality are no poorer for the bonds in our sample than for the underlying stocks.

Viral v. Acharya (2002) in his finding analyzed corporate bond valuation and default rules when interest rates and firm value are stochastic. It then uses the results to explain the dynamics of hedging. Bankruptcy rules are important determinants of corporate bond sensitivity to interest rates and firm value Although endogenous bankruptcy models can be calibrated to produce the same prices, they can have very different hedging implications. We show that empirical results on the relation between corporate spreads and Treasury rates provide evidence on duration, and we find that the endogenous model explains the empirical patterns patterns better than do typical exogenous models.In recent years, there has been a proliferation of interest rate option pricing models of growing complexity and sophistication in what has been described as an "arms race" (Lochoff, 1993).

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These models can be classified in several different ways.

•We can distinguish models with analytical (closed-form) solutions like the Black-Scholes model from models which require numerical methods for solution. Most realistic models require numerical solutions and are typically based on the binomial lattice. The binomial lattice is a very flexible tool which can be used for valuing American options and options with many exotic features. The lattice is also computationally quite efficient as compared to alternative numerical methods.

•We can also distinguish between single factor models and multi-factor models. Single factor models are based on the dynamics of just one factor (typically the short term interest rate), while multi-factor models involve several factors (for example, a short term rate and a long term rate). In India very little is known about the dynamics of long term interest rates, and Varma (1996) argues that, apart from the short term rate (call market rate), sufficient reliable data does not exist for other interest rates for estimation of the interest rate dynamics. This suggests the use of single factor models at this stage in India.

•Option pricing models can be classified according to the dynamics assumed for the short term interest rate. Most realistic models allow for mean reversion in some way, but they differ in the assumption made regarding variability of interest rates. For example, variability may be assumed to be independent of the level of interest rates, to be proportionate to the level, proportionate to the square-root of the level, and so forth. It has already been pointed out that Indian interest rate dynamics can be characterized by mean reversion and a level independent volatility (variability proportionate to the level of interest rates).

•Pricing models can also be classified according to whether they endogenously derive the term structure of interest rates or they allow the user to input a term structure. There are strong reasons for preferring models which allow the term structure to be endogenously specified as these models are guaranteed to provide correct pricing of straight bonds (i.e. bonds which do not have any embedded options). This point is forcefully argues in Dattatreya and Fabozzi (1989).

•Based on these considerations, the single factor model of Black-Derman-Toy (Black et al., 1994) stands out as a very attractive tool for pricing interest rate options in India.

This model is lattice based, incorporates mean reversion, assumes level independent volatility and is calibrated through an exogenously specified yield curve.

•The Black-Derman-Toy (BDT) model of option pricing is based on a binomial lattice of interest rates. The lattice approach breaks time into discrete periods (years, months, weeks, days or whatever). The larger the number of periods (the shorter, the time interval), the more accurate the valuation. The term "binomial" means that given the interest rate in any period, the interest rate in the next period can take only two values (usually called the up-state and the down-state). When we use short time intervals, this ceases to be restrictive because though there are only two possible values one period hence, a large number of values may be possible after a few periods. In a general lattice, there are two possible values one period hence and each of them can have two values two periods hence and so on. The number of values (states) explodes exponentially (2, 4, 8, 16, 32 and so on) and the lattice soon becomes unmanageable even with a powerful computer. Most practical lattice models (including the BDT lattice), therefore, "recombine". Recombination means that if the interest rate moves up in one period and moves down the next, the resulting value is the same as would result if it moved down first and then moved up. With recombination, there are only 3 possible values of the interest rate after 2 periods, 4 values after 3 periods and so on. Recombination allows lattices with a large number of time periods to be analysed on a computer. In any lattice, it is also possible to specify the probabilities of an up-move and a down-move at each node. In the Black-Derman-Toy model, both these probabilities are set equal to half throughout the lattice and we shall do likewise.

5. DATA ANALYSIS & INTERPRETATION:

Table 1:

Calculation of Present value of SBIBIIR Bond :

Sr No	ISIN	Descriptor	Issuer Name	Issue Date	Coupon & Basis	Redemption Date
1	INE062A08033	SBIBIIIR	State bank of India	16/03/2010	9.75% p.a. payable annually.	16/03/2021

Face value=10000/-, Issue price=10000/-
Current price : 10300/-

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scrip_cd	sc_name	Open Price	High Price	Low Price	Close Price
961701	SBIBIIIR	10301.1	10301.1	10222.3	10300

Assume : YTM = 10 %

Year	CFs	PV factor 10%	PV of bond
16-Mar-11	975	0.909090909	886.3636364
16-Mar-12	975	0.826446281	805.785124
16-Mar-13	975	0.751314801	732.5319309
16-Mar-14	975	0.683013455	665.938119
16-Mar-15	975	0.620921323	605.39829
16-Mar-16	975	0.56447393	550.3620818
16-Mar-17	975	0.513158118	500.3291653
16-Mar-18	975	0.46650738	454.8446957
16-Mar-19	975	0.424097618	413.4951779
16-Mar-20	975	0.385543289	375.9047072
16-Mar-21	975	0.350493899	341.731552
16-Mar-21	10000	0.350493899	3504.938995
		PV of Bond	9837.623475

Interpretation:

The Present Value of bond is Rs.9837.62, which is less than the current price of the bond, currently the bond is valued at Rs.10300 in the market. Since the PV of bond is less than the current price, the investor can buy/purchase the bond.

Table 2:

Calculation of Current yield, YTM of SBIBIIR Bond : Current price : 10300/-, Face value:10000/-, Issue price:10000/-

scrip_cd	sc_name	Open Price	High Price	Low Price	Close Price
961701	SBIBIIIR	10301.1	10301.1	10222.3	10300

Current Yield = Coupon / Market price * 100= 975/10300 * 100 = 9.46 %

Calculation of YTM

Sr. No	Descriptor	Issuer Name	Issue Date	Coupon & Basis	Redemption Date
1	SBIBIIIR	State bank of India	16/03/2010	9.75% p.a. payable annually.	16/03/2021

Assume : r1= 10 % r2= 8 %

Year	CFs	PV factor 10%	PV of bond	PV Factor	PV of bond
16-Mar-11	975	0.909090909	886.3636364	0.925926	902.7777778
16-Mar-12	975	0.826446281	805.785124	0.857339	835.9053498
16-Mar-13	975	0.751314801	732.5319309	0.793832	773.986435
16-Mar-14	975	0.683013455	665.938119	0.73503	716.6541065
16-Mar-15	975	0.620921323	605.39829	0.680583	663.5686171
16-Mar-16	975	0.56447393	550.3620818	0.63017	614.4153862
16-Mar-17	975	0.513158118	500.3291653	0.58349	568.9031354
16-Mar-18	975	0.46650738	454.8446957	0.540269	526.7621624
16-Mar-19	975	0.424097618	413.4951779	0.500249	487.742743
16-Mar-20	975	0.385543289	375.9047072	0.463193	451.6136509
16-Mar-21	975	0.350493899	341.731552	0.428883	418.1607879
16-Mar-21	10000	0.350493899	3504.938995	0.428883	4288.828593
		PV of Bond	9837.623475		11249.31875

YTM=r2+(r1-r2)*{(pv of bond at r2-current price)/(pv of bond at r2-pv of bond at r1)}

$$YTM = 8 + (10-8)x\frac{11250-10300}{11250-9838}\ 8 + (10-8)x\frac{11250-10300}{11250-9838} = 8 + 2x\frac{950}{1412}$$

$$8 + 2x\frac{950}{1412} = 9.34\ \%$$

Interpretation:

The current yield of the bond is 9.46 % , which is less than the coupon rate, which means the bond is trading at a premium to its face value. Thus the yield rate is the interest earned by the buyer on the bond purchased which is expressed as a percentage of the total investment. The Yield to Maturity is at 9.34%, which means at this rate the PV of the bond is equal to the PV of market price of the bond.

Table 3:

Calculation of Duration of SBIBIIR Bond:Face value:10000/-,Issue price:10000/-.

Sr. No	Descriptor	Issuer Name	Issue Date	Coupon & Basis	Redemption Date
1	SBIBIIIR	SBI	16/03/2010	9.75% p.a.	16/03/2021

Assume : YTM = 10 %

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Year	CFs	PV factor 10%	PV of bond	Weights (wi)	wi x n
1	975	0.909090909	886.3636364	0.090099366	0.090099
2	975	0.826446281	805.785124	0.081908514	0.163817
3	975	0.751314801	732.5319309	0.074462286	0.223387
4	975	0.683013455	665.938119	0.067692987	0.270772
5	975	0.620921323	605.39829	0.061539079	0.307695
6	975	0.56447393	550.3620818	0.055944617	0.335668
7	975	0.513158118	500.3291653	0.050858743	0.356011
8	975	0.46650738	454.8446957	0.046235221	0.369882
9	975	0.424097618	413.4951779	0.042032019	0.378288
10	975	0.385543289	375.9047072	0.038210926	0.382109
11	975	0.350493899	341.731552	0.034737206	0.382109
11	10000	0.350493899	3504.938995	0.356279035	3.919069
		PV of Bond	9837.623475	1.000	7.178907

Duration=wi*n ; (n=number of years) ; Duration = 7.17 Years

Interpretation:

Duration is a measure of a bond's sensitivity to interest rate changes. Technically, duration is the weighed average number of years the investor must hold a bond until the present value of the bond's cash flows equals the amount paid for the bond. Thus in this case it takes 7.17 years to recover the true cost of the bond.

Table 4:

Calculation of Present value of SBI Bond series 1 :

Sr. No	ISIN	Descriptor	Issuer name	Issue Date	Coupon & Basis	Redemption Date
2	INE062A08017	SBIBONDSI	SBI	04/11/2010	9.25% p.a.	4/11/2020

Face value: 10000/-,Issue price:10000/-.
Current price : 10100/-

scrip_cd	sc_name	Open Price	High Price	Low Price	Close Price
961692	SBIBONDSI	10100	10100	10100	10100

Assume : YTM = 10 %

Year	CFs	PV factor 10%	PV of bond
04/11/11	925	0.909090909	840.9090909
04/11/12	925	0.826446281	764.4628099
04/11/13	925	0.751314801	694.9661908
04/11/14	925	0.683013455	631.7874462
04/11/15	925	0.620921323	574.3522238
04/11/16	925	0.56447393	522.1383853
04/11/17	925	0.513158118	474.6712594
04/11/18	925	0.46650738	431.5193267
04/11/19	925	0.424097618	392.290297
04/11/20	925	0.385543289	356.6275427
04/11/20	10000	0.385543289	3855.432894
		PV of Bond	9539.157467

Interpretation:

The Present Value of bond is Rs.9539.15, which is less than the current price of the bond, currently the bond is valued at Rs.10100 in the market. Since the PV of bond is less than the current price, the investor can buy/purchase the bond.

Table 5:

Calculation of Current yield, YTM SBI Bond series1: Current price : 10100/-,Face value:10000/-,Issue price:10000/-.

scrip_cd	sc_name	Open Price	High Price	Low Price	Close Price
961692	SBIBONDSI	10100	10100	10100	10100

Current Yield = Coupon / Market price * 100
= 925/10100 * 100 = 9.15 %

Calculation of YTM

Sr. No	Descriptor	Issuer Name	Issue Date	Coupon & Basis	Redemption Date
2	SBIBONDSI	SBI	04/11/2010	9.25% p.a.	4/11/2020

Assume : r1= 10 % r2 = 7 %

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Year	CFs	PV factor 10%	PV of bond	PV Factor	PV of bond
04/11/11	925	0.909090909	840.9090909	0.934579439	864.4859813
04/11/12	925	0.826446281	764.4628099	0.873438728	807.9308237
04/11/13	925	0.751314801	694.9661908	0.816297877	755.0755361
04/11/14	925	0.683013455	631.7874462	0.762895212	705.6780711
04/11/15	925	0.620921323	574.3522238	0.712986179	659.512216
04/11/16	925	0.56447393	522.1383853	0.666342224	616.366557
04/11/17	925	0.513158118	474.6712594	0.622749742	576.0435112
04/11/18	925	0.46650738	431.5193267	0.582009105	538.3584217
04/11/19	925	0.424097618	392.290297	0.543933743	503.1387119
04/11/20	925	0.385543289	356.6275427	0.508349292	470.2230952
04/11/20	10000	0.385543289	3855.432894	0.508349292	5083.492921
		PV of Bond	9539.157467		11580.30585

YTM=r2+(r1-r2)*{(pv of bond at r2-current price)/pv of bond atr2-pvof bond at r1)}

$$= 7+(10-7)x\frac{11580-10100}{11580-9540} \quad 7+(10-7)x\frac{11580-10100}{11580-9540} = 7+3x\frac{1480}{2040}$$

$$7+3x\frac{1480}{2040} = 9.17\%$$

Interpretation:

The current yield of the bond is 9.15 % , which is less than the coupon rate, which means the bond is trading at a premium to its face value. Thus the yield rate is the interest earned by the buyer on the bond purchased which is expressed as a percentage of the total investment. The Yield to Maturity is at 9.17%, which means at this rate the PV of the bond is equal to the PV of market price of the bond.

Table 6:

Calculation of Duration of SBI Bond series 1: Face value: 10000/-, Issue price:10000/-.

Sr. No	Descriptor	Issuer Name	Issue Date	Coupon & Basis	Redemption Date
2	SBIBONDSI	SBI	04/11/2010	9.25% p.a.	4/11/2020

Assume YTM= 10%

Year	CFs	PV factor 10%	PV of bond	Weights (wi)	wi x n
1	925	0.909090909	840.9090908	0.088153392	0.088153392
2	925	0.826446281	764.4628099	0.080139448	0.160278895
3	925	0.751314801	694.9661909	0.072854043	0.21856213
4	925	0.683013455	631.7874459	0.066230948	0.264923794
5	925	0.620921323	574.3522238	0.060209953	0.301049766
6	925	0.56447393	522.1383853	0.054736321	0.328417926
7	925	0.513158118	474.6712592	0.049760292	0.348322043
8	925	0.46650738	431.5193265	0.045236629	0.361893032
9	925	0.424097618	392.2902967	0.041124208	0.370117873
10	925	0.385543289	356.6275423	0.037385644	0.373856437
10	10000	0.385543289	3855.43289	0.404169121	4.041691214
			PV of Bond	1	6.857266502

Duration =wi*n ; (n=number of years) ; Duration = 6.85 Year

Interpretation:

Duration is a measure of a bond's sensitivity to interest rate changes. Technically, duration is the weighed average number of years the investor must hold a bond until the present value of the bond's cash flows equals the amount paid for the bond. Thus in this case it takes 6.85 years to recover the true cost of the bond.

Table 7:

Calculation of present value of Rural Electrification Corportation Limited (REC) Bond:

Sr. No	ISIN	Descriptor	Issuer Name	Issue Date	Coupon & Basis	Redemption Date
3	INE020B07GG9	793REC22	REC Limited.	27/03/2012	7.93 % p.a.	27/03/2022

Current price : 1061.68/-,Face value:1000/-, Issue price:1000/-

scrip_cd	sc_name	Open Price	High Price	Low Price	Close Price
961743	793REC22	1061.65	1061.7	1061.65	1061.68

Assume : YTM = 10 %

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Year	CFs	PV factor 10%	PV of bond
27/03/2013	79.3	0.909090909	72.09090909
27/03/2014	79.3	0.826446281	65.53719008
27/03/2015	79.3	0.751314801	59.57926371
27/03/2016	79.3	0.683013455	54.16296701
27/03/2017	79.3	0.620921323	49.23906092
27/03/2018	79.3	0.56447393	44.76278265
27/03/2019	79.3	0.513158118	40.69343878
27/03/2020	79.3	0.46650738	36.99403525
27/03/2021	79.3	0.424097618	33.63094114
27/03/2022	79.3	0.385543289	30.57358285
27/03/2022	1000	0.385543289	385.5432894
		PV of Bond	872.8074609

Interpretation:

The Present Value of bond is Rs.872.87, which is less than the current price of the bond, currently the bond is valued at Rs.1061 in the market. Since the PV of bond is less than the current price, the investor can buy/purchase the bond.

Table 8:

Calculation of Current yield, YTM of REC Bond:Current price : 1061.68/-,Face value:1000/-, Issue price:1000/-.

scrip_cd	sc_name	Open Price	High Price	Low Price	Close Price
961743	793REC22	1061.65	1061.7	1061.65	1061.68

Current Yield = Coupon / Market price * 100
= 79.30/1061.68 * 100 = 7.46 %

Calculation of YTM :

Sr. No	Descriptor	Issuer Name	Issue Date	Coupon & Basis	Redemption Date
3	793REC22	REC Limited.	27/03/2012	7.93 % p.a. payable annually.	27/03/2022

Assume : r1= 10 % r2 = 7 %

Year	CFs	PV factor 10%	PV of bond	PV Factor	PV of bond
27/03/2013	79.3	0.909090909	72.09090909	0.934579439	74.11214953
27/03/2014	79.3	0.826446281	65.53719008	0.873438728	69.26369115
27/03/2015	79.3	0.751314801	59.57926371	0.816297877	64.73242164
27/03/2016	79.3	0.683013455	54.16296701	0.762895212	60.49759032
27/03/2017	79.3	0.620921323	49.23906092	0.712986179	56.53980403
27/03/2018	79.3	0.56447393	44.76278265	0.666342224	52.84093835
27/03/2019	79.3	0.513158118	40.69343878	0.622749742	49.38405453
27/03/2020	79.3	0.46650738	36.99403525	0.582009105	46.15332199
27/03/2021	79.3	0.424097618	33.63094114	0.543933743	43.13394579
27/03/2022	79.3	0.385543289	30.57358285	0.508349292	40.31209887
27/03/2022	1000	0.385543289	385.5432894	0.508349292	508.3492921
		PV of Bond	872.8074609		1065.319308

YTM=r2+(r1-r2)*{(pv of bond at r2-currentprice)/(pv of bond at r2- pv of bond at r1)}

$$YTM = 7 + (10-7)\,x\,\frac{1065-1061}{1065-873} \quad 7 + (10-7)\,x\,\frac{1065-1061}{1065-873} = 7 + 3\,x\,\frac{4}{192} \quad 7 + 3\,x\,\frac{4}{192}$$

= 7.06 %.

Interpretation:

The current yield of the bond is 7.46 % , which is less than the coupon rate, which means the bond is trading at a premium to its face value. Thus the yield rate is the interest earned by the buyer on the bond purchased which is expressed as a percentage of the total investment. The Yield to Maturity is at 7.06%, which means at this rate the PV of the bond is equal to the PV of market price of the bond.

Table 9:

Calculation of Duration of REC Bond: Face value:1000/-, Issue price:1000/-.

Sr. No	Descriptor	Issuer Name	Issue Date	Coupon & Basis	Redemption Date
3	793REC22	REC Limited.	27/03/2012	7.93 % p.a.	27/03/2022

Assume: YTM=10%

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Year	CFs	PV factor 10%	PV of bond	Weights (wi)	wi x n
1	79.3	0.909090909	72.09090908	0.082596578	0.082596578
2	79.3	0.826446281	65.53719008	0.075087798	0.150175596
3	79.3	0.751314801	59.57926372	0.068261634	0.204784903
4	79.3	0.683013455	54.16296698	0.062056031	0.248224125
5	79.3	0.620921323	49.23906091	0.056414574	0.282072869
6	79.3	0.56447393	44.76278265	0.051285976	0.307715857
7	79.3	0.513158118	40.69343876	0.046623615	0.326365303
8	79.3	0.46650738	36.99403523	0.042385104	0.339080834
9	79.3	0.424097618	33.63094111	0.038531913	0.346787217
10	79.3	0.385543289	30.57358282	0.035029012	0.350290118
10	1000	0.385543289	385.543289	0.441727765	4.417277653
		PV of Bond	872.8074603	1	7.055371052

Duration=wi*n; (n=number of years); Duration = 7.05 Years

Interpretation:

Duration is a measure of a bond's sensitivity to interest rate changes. Technically, duration is the weighed average number of years the investor must hold a bond until the present value of the bond's cash flows equals the amount paid for the bond. Thus in this case it takes 7.05 years to recover the true cost of the bond.

Table 10:

Calculation of Present value of L& T finance Bond series IV:

Sr. No	ISIN	Descriptor	Issuer Name	Issue Date	Coupon & Basis	Redemption Date
4	INE523E07459	LTFINNCDIV	L & T Finance	17/09/2009	10.24 % p.a	17/09/2019

Current price : 1071/-,Face value:1000/-,Issue price:1000/-.

scrip_cd	sc_name	Open Price	High Price	Low Price	Close Price
934784	LTFINNCDIV	1070	1071	1070	1071

Assume :		YTM = 12 %	
Year	CFs	PV Factor 12 %	PV of bond
17/09/2010	102.4	0.892857143	91.42857143
17/09/2011	102.4	0.797193878	81.63265306
17/09/2012	102.4	0.711780248	72.88629738
17/09/2013	102.4	0.635518078	65.07705123
17/09/2014	102.4	0.567426856	58.10451003
17/09/2015	102.4	0.506631121	51.87902681
17/09/2016	102.4	0.452349215	46.32055965
17/09/2017	102.4	0.403883228	41.35764255
17/09/2018	102.4	0.360610025	36.92646656
17/09/2019	102.4	0.321973237	32.97005943
17/09/2019	1000	0.321973237	321.9732366
		Pv of bond	900.5560747

Interpretation:

The Present Value of bond is Rs.900.55, which is less than the current price of the bond, currently the bond is valued at Rs.1071 in the market. Since the PV of bond is less than the current price, the investor can buy/purchase the bond.

Table 11:

Calculation of Current yield, YTM of L&T finance Bond series IV

Current price : 1071/-, Facevalue:1000/-, Issue date:1000/-.

scrip_cd	sc_name	Open Price	High Price	Low Price	Close Price
934784	LTFINNCDIV	1070	1071	1070	1071

Current Yield = Coupon / Market price * 100
= 102.40/1071 * 100 = 9.56 %

Sr. No	Descriptor	Issuer Name	Issue Date	Coupon & Basis	Redemption Date
4	LTFINNCDIV	L & T Finance	17/09/2009	10.24 % p.a	17/09/2019

Assume : r1= 12 % r2 = 8 %

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Year	CFs	PV Factor 12 %	PV of bond	PV factor 8 %	PV of bond
17/09/2010	102.4	0.892857143	91.42857143	0.925925926	94.81481481
17/09/2011	102.4	0.797193878	81.63265306	0.85733882	87.7914952
17/09/2012	102.4	0.711780248	72.88629738	0.793832241	81.28842148
17/09/2013	102.4	0.635518078	65.07705123	0.735029853	75.26705693
17/09/2014	102.4	0.567426856	58.10451003	0.680583197	69.69171938
17/09/2015	102.4	0.506631121	51.87902681	0.630169627	64.52936979
17/09/2016	102.4	0.452349215	46.32055965	0.583490395	59.74941647
17/09/2017	102.4	0.403883228	41.35764255	0.540268885	55.32353377
17/09/2018	102.4	0.360610025	36.92646656	0.500248967	51.22549423
17/09/2019	102.4	0.321973237	32.97005943	0.463193488	47.43101318
17/09/2019	1000	0.321973237	321.9732366	0.463193488	463.1934881
		Pv of bond	900.5560747	PV of Bond	1150.305823

YTM=r2+(r1-r2)*{(pv of bond at r2-currentprice)/pv of bond at r2-pv of bond at r1)}

$$= 8 + (12-8)\,x\,\frac{1150-1071}{1150-900}\;8 + (12-8)\,x\,\frac{1150-1071}{1150-900} = 8 + 4\,x\,\frac{79}{250}\;8 + 4\,x\,\frac{79}{250}$$

$= 9.26\,\%$

Interpretation:

The current yield of the bond is 9.56 % , which is less than the coupon rate, which means the bond is trading at a premium to its face value. Thus the yield rate is the interest earned by the buyer on the bond purchased which is expressed as a percentage of the total investment. The Yield to Maturity is at 9.26%, which means at this rate the PV of the bond is equal to the PV of market price of the bond.

Table 12:

Calculation of Duration of L& T finance Bond series IV - Face value:10000/-, Issue price:1000/-.

Sr. No	Descriptor	Issuer Name	Issue Date	Coupon & Basis	Redemption Date
4	LTFINNCDIV	L & T	17/09/2009	10.24 % p.a.	17/09/2019

Assume: YTM = 12 %

Year	CFs	PV factor 12%	PV of bond	Weights (wi)	wi x n
1	102.4	0.892857143	91.42857143	0.101524574	0.101524574
2	102.4	0.797193878	81.63265306	0.090646941	0.181293881
3	102.4	0.711780248	72.88629738	0.080934768	0.242804305
4	102.4	0.635518078	65.07705123	0.072263186	0.289052744
5	102.4	0.567426856	58.10451003	0.064520702	0.322603509
6	102.4	0.506631121	51.87902681	0.05760777	0.345646617
7	102.4	0.452349215	46.32055965	0.051435509	0.36004856
8	102.4	0.403883228	41.35764255	0.045924561	0.367396489
9	102.4	0.360610025	36.92646656	0.041004072	0.369036652
10	102.4	0.321973237	32.97005943	0.036610779	0.36610779
10	1000	0.321973237	321.9732366	0.357527139	3.575271387
		PV of Bond	900.5560747	1	6.520786509

Duration=wi*n; (n=number of years) ; Duration = 6.52 Years

Interpretation:

Duration is a measure of a bond's sensitivity to interest rate changes. Technically, duration is the weighed average number of years the investor must hold a bond until the present value of the bond's cash flows equals the amount paid for the bond. Thus in this case it takes 6.52 years to recover the true cost of the bond.

6. FINDINGS:

Bond	Face value(rs)	Present value(Rs.)	Current yield(%)	Coupon rate(%)	YTM(%)	Duration(Yrs)	Remarks
SBIBIIR	10000	9837.62	9.46	9.75	9.34	9.46	Under valued–buy
SBI Bond Series II	10000	9539.15	9.15	9.25	9.17	6.85	Under valued–Buy
REC Bond	1000	872.80	7.46	7.93	7.06	7.05	Under valued–Buy
L & T Finance Bond series IV	1000	900.55	9.56	10.24	9.26	6.52	Under valued–Buy

•From the above table we found that all the bond are under value, thus an investor can buy these bond, since PV of the bond is less the Face value and the market price of the bond.

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•When we compare current yield and coupon rate, the current yield is less than the coupon rate, which shows that the bond is trading at premium.

•Duration of these bond shows that the shorted period to recover the true value of the bond is L & T finance bond series IV followed by SBI Bond Series II.

7. SUGGESTIONS:

• The study suggests that the investor should be select the L&T financial bond because this bond is having less duration compare to other bonds.

•In this lowest interest rates are in REC bond. So the investors not interested to choose this bond.

•In this all corporate bonds L&T finance having highest interest rates so the price of the bond is also higher. So the select this bond for better returns.

•From seeing all values of bonds L&T finance having good values compare to others so it is the best choice for investors.

8. CONCLUSION:

The study concluded L&T financial corporate bond is the best among the all other bonds as per the calculations of data analysis. So the investors are interested to purchase these types of bonds. The Indian corporate bond market can be observed. In this corporate bond markets from the selected samples calculating the valuations, by using the coupon payments and current prices of the bonds. The coupon rates are observed for the different bonds. From the finding YTM we know that the present value of the bond is gain or loss, The durations of the bonds tell how much time to take complete the bonds.

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