EMPIRICAL STUDY ON THE DETERMINANTS OF INDIAN CORPORATE BOND RETURNS

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ABSTRACT

This study explores various dimensions of the Indian capital market, encompassing the Indian corporate bond market. It's crucial to understand the determinants of corporate bond yield. Objective of the study is to examine the factors influencing corporate bond yield in the Indian bond market. The study adopted a time series analysis using a regression model. The yield curve's slope shows a negative correlation. Changes in the Treasury bill rate, the Index of Industrial Production, and currency rates influence positively to the corporate bond yield. The study did not find any relation with the changes in bank rates, industrial production growth, inflation, Nifty returns. The study adds significant understanding of the complicated relationships influencing corporate bond yield dynamics and has consequences for investors and financial experts.

Keywords: *Bond Returns; Bond Yield; Credit Spread; Equity Returns; Indian Corporate Bond Market.*

JEL Classification*: G10, G12, G18, G21*

INTRODUCTION

The Capital Market in India dominated by the equity market compared to developed bond market. When we look at the global perspective, we can see the fixed income market is much bigger than equity market. Indian bond market is well organized and regulated market where the Government bond market has better exposure than corporate bond market.

Indian Capital market has separate entities like bond market, commodity market, and currency market not integrated in one system. Indian Corporate Bond market is still underdeveloped; there are many impediments of the underdevelopment. In recent years understanding the bond returns is significant that is bond yield. Investor's attraction is the yield from the asset; in corporate bond Institutional investors are the major investor's, retail investor's participation is

very less unlike in equity market this is because of the credit risk, inflation, and interest rate, and credit ratings.

There are limited studies examined the determinants of bond yields but those are focused on government bond yield, there are very few studies which studied the determinants of corporate credit spread in Indian context Thakur, Kannadhasan, and Goyal (2018). Numerous studies have been conducted in global perspective and answered the question.

OBJECTIVES OF THE STUDY

- To examine the impact of equity market factors.
- To examine the impact of Macro-financial factors.

The objective of the study is to examine the determinants of Indian corporate bond yield which extends the study of Thakur et al., (2018), Section two Review of Literature and Hypotheses of the study, and the third section light upon the methodology. Empirical results and findings discussed in fourth section and the last section is conclusion.

REVIEW OF LITERATURE AND HYPOTHESES DEVELOPMENT

Understanding the determinants of bond yield is significant to understand the risk associated with the asset and to manage the risk in bond market. The bond return here implied the India local currency bond yield taken from the S&P Indian Corporate Bond Index. Factors determining bond yield are as follows:

3-Month Treasury Bill

Barry Eichengreen and Luengnaruemitchai (2004) they examined 41 countries panel data. Since before 1997-98 Crisis ASIA is having underdeveloped bond market and depend heavily on bank finance which raised concern about developing the securities market specially the bond market. They examined the multiple factors influencing the development of both the bond markets with different statistical analysis. Further they suggest there should be a standard yield curve provided by the government bond market for the development of corporate bond market.

Davies (2008) examined the key determinants of corporate credit spread using 85 years of AAA and BAA corporate bond yields where they used 3 months Treasury bill yield rate as proxy for risk free rate which definitely affect the corporate credit spread. Further they found that risk rate has positive signal to the credit spread.

Maalaoui Chun, Dionne, and François (2014) examined the factors determining the credit spread using two regimes to avoid hiding effects of determinant across spread. They used different regression models and found that the risk-free rate has significant positive relationship with the credit spread with different regime.

Pavlova, Hibbert, Barber, and Dandapani (2015) observed the contradictory results for above study where the level of treasury yield has negative effect on corporate bond credit spread. Azad, Chazi, Cooper, and Ahsan (2017) used 10-year treasury rate. Radier, majoni, Njanike, and Kwaramba (2016) used similar variable as proxy for level of yield. In this study we are using 91-days treasury bill yield rate as proxy for risk free rate. Based on the inputs the following hypotheses will be carried out in the study.

H_1 There is a negative relationship between corporate bond yield and T-bill yield.

Slope of yield curve

Helps in understanding the term structure of interest rate and in normal economic conditions the positive slope indicated the expectations of rising interest rate which inversely related to the yield from private debt instruments. Many studies have included this variable because the direct relationship with the corporate bond yields.

Houweling, Mentink, and Vorst (2005) used eight proxies for the bond liquidity where seven out of eight has significance as liquidity measure and the slope of yield curve can be tested as liquidity.

Georgoutsos and Kounitis (2016) focused on the relationship between corporate credit spread and the long-term treasury rates; they found the relationship between both. They established a relationship between long term BAA bonds and treasury rates but not with the short-term relationship and failed to implement yield curve as determinant of corporate credit spread.

Azad et al., (2017) Examined the determinants of Japanese corporate credit spread in three samples namely the global financial crisis where they considered pre-crisis period, crisis period, and post crisis period, they observed that the treasury slope (Used difference between 10 year and 2-year treasury rate) has time varying relationship with credit spread. In pre-crisis period it has statistically positive relation, in crisis period it doesn't have any effect but in post-crisis period it showed negative relationship. In this study we are using the monthly difference between 10-year government bond yield and 2-year government bonds yield. Based on the inputs the following hypotheses will be carried out in the study.

H_2 There is a negative relationship between corporate bond yield and Slope of yield Curve.

Equity Returns

Equity market and bond market inversely related to each other, in high returns equity market investors book profits by selling in short run then the amount will be transferred to the bond market which results in lowering the bond yield Sharma, Chhabra, and Saxena (2020)

Collin-Dufresne, Goldstein, and Martin (2001) highlighted the equity market return is less important than the slope of yield curve and level of yield on the credit spread which but at the same time the Landschoot (2008) shows a large percentage of the stock market is showing the change in credit spread.

Landschoot (2008) using panel data of US and EURO they observed the stock market return effect on the both the market yield spreads, they observed that stock market returns (they used S&P 500 as a proxy for stock market return) affect more on US yields than the EURO market.

Maalaoui Chun, Dionne, and François (2014) Examined the effect of different factors on credit spread where they highlighted that market factors are more suitable in explaining the credit spread that default and liquidity variables during 2001 recession.

Thakur, Kannadhasan, and Goyal (2018) investigated the factors determining the corporate credit spread, by using regression analysis they statistically proved that there is significant relationship between the recovery rate (used S&P BSE Sensex returns as a proxy) and corporate credit spread.

Zhou, Xiong, Liu, and Li (2019) studied the comparative analysis of credit spread and its determinants, they considered the macroeconomic factors as the macroeconomic variables have strong explanatory power of the corporate credit spread. Further they found negative significant relationship between China's CSI300 and American SPX500 with the corporate credit spread.

Sharma, Chhabra, and Saxena (2020) Examined the effect of Nifty index returns, Volatility index and exchange rate on Indian government bond yield where they noticed nifty has Negative significant relationship and VIX and exchange rate has positive statistically significant relationship. VIX implied for the risk from the equity investment and that shows investors tend to come from high-risk equities to bond market with their investment. In this

study we are using the Nifty returns and BSE Sensex returns as equity returns proxy. Based on the inputs the following hypotheses will be carried out in the study.

H_3 There is a negative relationship between corporate bond yield and Equity Returns.

Macroeconomic Variables

Macroeconomic factors like inflation, industrial production, the bank rate, and the exchange rate fall under the scope of the macroeconomic environment. Numerous studies, including those by Nair and Thenmozhi (2012) and Zhou, Xiong, Liu, and Li (2019), have highlighted the significant predictability of these macroeconomic variables in the corporate debt market.

Barry Eichengreen and Luengnaruemitchai (2004) They highlighted that there is no ASIA effect in the development of bond market rather it depends on the macroeconomic, financial policies which strength the bond market whether it's developed country or developing. Further they found stable inflation rate is favourable to the development of corporate bond market, Burger and Warnock (2006) examined 49 countries and their findings in line with the early studies that stable inflation rate has positive relation with the development of bond market which excited to include the inflation as explanatory variable for the study.

Nair and Thenmozhi (2012) examined the effect of macroeconomic factors on conditional volatility of bond market in both the markets; they found macroeconomic factors exhibit a strong relationship with the bond market volatility. Furthermore, they highlighted the interest rate variable is significant followed by the exchange rate, inflation, and money supply.

Bhattacharyay (2013) examined the 9 ASIAN countries with different statistical models, they found out where as interest rate variability has negative relationship in GLS model with heteroskedasticity. Exchange rate variability doesn't show any significant relationship due to the underdevelopment of corporate bond market in ASIAN countries.

Thakur, Kannadhasan, and Goyal (2018) Studied the internal and external factors determining the corporate credit spread where they considered the inflation and industrial production as macroeconomic variables through the statistical analysis, they found both the variables have significant relationship with the credit spread. Hence the in this study we are considering some macro-financial factors as follows and accordingly the hypotheses are formed:

H_4 There is a negative relationship between corporate bond yield and Inflation Rate (WPI).

H_5 There is a negative relationship between corporate bond yield and IIP.

H_6 There is a negative relationship between corporate bond yield and Exchange Rate.

H_7 There is a negative relationship between corporate bond yield and Bank Rate.

Given the limited number of studies in the corporate bond market, this research aims to explore the factors that determine corporate bond yield.

METHODOLOGY

The Study is based on secondary Monthly data collected from various data sources and compiled for 2013 to 2023 to the study. The study uses the econometric analysis, where the data checked with stationary test using Unit root Test then we check the correlation between variables and simple regression model using EViews 13.

Regression Model:

$Y = C + B_1X_1 + B_2X_2 + \ldots\ldots + B_7X_7 + e$

Where,

Y is corporate bond yield,

C is the Intercept,

$B_1, B_2, \ldots\ldots B_7$ are the coefficients for the independent variables $X_1, X_2, \ldots\ldots X_7$ respectively and

e is error term.

DATA ANALYSIS

This section summarises the analysed results. In Time Series Analysis the data is believed to be stationary before further statistical analysis, therefore the Data will be tested to check the data is stationary or non-stationary, if the data is non stationary it should be converted into stationary. There are statistical methods to check the data stationary, in this study we are using ADF Unit root test. Among all the variables Equity returns and Index of Industrial Production also the IIP Growth has stationary data other variables are converted into stationary with first difference.

We added one more variable and excluded BSE Sensex returns because this escalated the multicollinearity issue in the model because we adopted nifty returns as well as BSE Sensex returns which both variables had strong correlation in the study.

Table 1 Descriptive Statistics

	Mean	Std. Dev.	Min	Max
DYIELD	-0.02	0.17	-0.37	0.81
DCREDIT_SPREAD	0.00	0.14	-0.44	1.15
IIPG	4.00	14.68	-57.30	133.52
IIP	124.18	13.43	54.00	151.40
DT_BILL	-0.04	0.29	-1.53	0.65
DSLOPE_OF_YIELD_CURVE	0.00	0.24	-0.69	0.73
DINFLATION	-0.06	1.34	-4.63	4.76
DEXCHANGE_RATE	0.16	0.89	-2.13	2.86
DBANK_RATE	-0.03	0.20	-0.75	0.50
BSE_SENSEX_RETURNS	1.15	4.72	-23.10	14.40
NIFTY_RETURNS	1.17	4.76	-23.25	14.68

Source: Author's Calculation

Table 1 highlights the descriptive statistic of all the variables. According to the table it can infer that though the mean value of yield is negative it suggests that the government bonds are trade for less yield than corporate bonds. Nifty returns and BSE returns share a common standard deviation which tells high variability in the stock market. Inflation is not stable because it has the high standard deviation where earlier studies suggest to have stable inflation encourages the corporate bond market development. We can observer the negative bank rate, t-bill yield which suggest the monetary easing by the government.

Table 2 Correlation Matrix

Probability	IIPG	IIP	YIELD	T_BILL	SYC	Inflation	Exchange Rate	CC	Bank Rate	BSE Returns	Nifty Returns
IIPG	1										
IIP	0.308	1									
YIELD	0.079	0.362	1								
T_BILL	0.202	0.314	0.453	1							
SYC	-0.054	-0.178	-0.352	-0.382	1						
Inflation	0.284	0.054	0.083	0.062	0.039	1					
Exchange Rate	0.044	-0.051	0.182	0.107	0.086	-0.079	1				
CC	0.007	0.116	0.605	0.130	-0.278	-0.098	-0.006	1			
Bank Rate	0.132	0.307	0.340	0.530	-0.363	-0.054	0.115	0.044	1		
BSE Returns	-0.100	-0.139	-0.151	-0.072	0.045	0.033	-0.359	-0.089	0.052	1	
Nifty Returns	-0.090	-0.155	-0.173	-0.095	0.058	0.039	-0.367	-0.102	0.031	0.996	1

Source: Author's Calculation

Table 2 shows the correlation among the variables, here we can observe there is weak relationship between stock market returns and yield that is 0.08 with BSE returns and slightly stronger positive relationship with nifty of 0.12 suggesting a weak relationship. Among all the

variables the IIP overall index and T-bill is having moderate correlation and slope of yield curve is negative inverse relation with yield. As we can observe in the Table 2 there is strong correlation between the BSE returns and Nifty returns which raises the issue of multicollinearity, therefore BSE returns are excluded from the study.

Before going for the regression analysis, we checked and used diagnostic tests of Autocorrelation by using Serial Correlation LM test and found the p-value is greater than 0.05 which means there in no autocorrelation in the regression model. Next, we ran a coefficient diagnostic test through the VIF where we found the Centered VIF for BSE returns and Nifty returns are highest that means there is a Multicollinearity (Multicollinearity means the two independent variables having strong correlation in between and this leads to trigger an error in regression model) in the Regression Model, as in Table 2 we noticed the strong correlation between two independent variables and in Multicollinearity Test we found same and removed one of the variable that is BSE Returns.

Table 3 Regression Analysis

Dependent Variable: Corporate bond yield
Method: Least Squares
Sample (adjusted): 2013M09 2023M08
Included observations: 120 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 5.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
T_BILL	0.153608	0.043298	3.547680	0.0006
INFLATION	0.014629	0.010902	1.341822	0.1824
IIP	0.003353	0.000959	3.496803	0.0007
NIFTY_RETURNS	-0.001707	0.002300	-0.742394	0.4594
EXCHANGE_RATE	0.034468	0.012499	2.757598	0.0068
BANK_RATE	0.043643	0.074992	0.581967	0.5618
SLOPE_OF_YIELD_CURVE	-0.157358	0.064322	-2.446398	0.0160
IIPG	-0.001354	0.001190	-1.137791	0.2577
C	-0.422552	0.124679	-3.389130	0.0010

R-squared	0.343126	Mean dependent var	-0.016425
Adjusted R-squared	0.295784	S.D. dependent var	0.173593
S.E. of regression	0.145675	Akaike info criterion	-0.942843
Sum squared resid	2.355543	Schwarz criterion	-0.733781
Log likelihood	65.57059	Hannan-Quinn criter.	-0.857942
F-statistic	7.247785	Durbin-Watson stat	1.651142
Prob(F-statistic)	0.000000	Wald F-statistic	10.07974
Prob(Wald F-statistic)	0.000000		

Source: Author's Calculation

Table 3 reports the regression model where the corporate bonds yield as dependent and other variables are independent. The regression model is statistically significant. The regression analysis suggests that among all the variables treasury bill yields, exchange rate, IIP are having the significant positive relationship which means the increase in these variable values encourage the increase in corporate bond yield it consist us to reject the H1 H5 and H6 null hypotheses these results in line with Sharma, Chhabra, and Saxena (2020). We accept H2 null hypothesis because the results are showing a significant negative relationship which in line with Azad et al., (2017) for their post crisis scenario. Inflation, equity returns, IIP growth rate and bank rate are not significant therefore the H3, H4 and H7 rejected statistically these variables are not significant this is due to the sample period and the data frequency because earlier studies Thakur, Kannadhasan, and Goyal (2018) has proven the statistical significance of inflation and equity returns in credit spread.

CONCLUSION

The study explored the determinants of corporate bond yield through a regression analysis. Corporate bond market in India is underdeveloped this creates a liquidity crisis in the secondary market. Yields on bonds determined by the micro factors of the market and macro factors. In this study the variables are chosen by referring the literature and the model is test with goodness of fit. Out of nine variables four variables are statistically significant. The study used monthly data frequency from Aug 2013 to Aug 2023 the data availability is the issue. The study adds significant understanding of the relationships influencing corporate bond yield. The study suggests having stable inflation environment and the participation for all the stakeholders like retail investors, public issue of bonds need to be encouraged to strengthen the market and that leads to a liquid market for the development of corporate bond market. Future studies can make use of the results and try to incorporate the more reliable variables to the study.

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