

# Analysis of Interest Rate, Capital Structure and Information Risk on Yield to Maturity and Its Application on Company Value: A Case Study of Bond Companies Listed in The Indonesia Stock Exchange (IDX) from 2009 to 2013

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**Abstract.** This research aimed at identifying and analyzing the effect of interest rate, capital structure, and information risk on yield to maturity in increasing the value of bond companies in the IDX. Descriptive method with quantitative approach was used. The samples comprised bond companies listed on the IDX from 2009 to 2013. The samples were selected using purposive sampling with the following criteria: the bonds were traded in the IDX from 2009 to 2013, they had bond ratings from PT. Pefindo, and they did not have the option to sell and purchase. The data were analyzed using panel data analysis. The results showed that 1) interest rate affected yield to maturity, 2) capital structure affected yield to maturity, 3) information risk affected yield to maturity, and 4) yield to maturity affected company value.

## 1. Introduction

In a country's economy, capital market plays an important role due to its economic and financial functions. In terms of its economic function, capital market facilitates two converging parties, including one that has funds called investor and one that needs the funds. State that capital market allows the party with funds to invest and generate profit [1]. Moreover, company as the party in charge with the invested funds is expected to maintain the investment for the sake of keeping the investment and the availability of funds for company operation. In terms of its financial function, capital market allows for several possibilities, including providing compensation for investors based on the choices they make. Indonesia's capital market has various securities, such as stocks, bonds, and mutual funds, and investors are given the time to choose from these securities. The securities that are traded in the capital market are bonds, a message that is recognized as debt issued by the government or private companies to investors, in which this debt will be deposited at a predetermined period.

## 2. Literature review

### 2.1. The effect of interest rate on company value

According to Surya and Nasher the interest rate most likely to be used by investors as a reference and comparative measure in determining bonds and the optimal rate of return is the interest rate of Bank Indonesia Certificates (SBI, *Sertifikat Bank Indonesia*) [2]. This is because SBI is supported and given a full guarantee by the government, in this case Bank Indonesia, as a monetary master, which makes securities market participants view SBI as high-priced and risk-free certificates.

In addition, according to a research by Setyarini and Nurfauziah on the analysis of interest rate on yield to maturity, interest rate does not have an impact on yield to maturity [3].

*2.2. The effect of capital structure on yield to maturity*

Capital structure can be defined as a permanent financing that comprises long-term debt, preferred stock, and shareholder capital [4] .

*2.3. The effect of information risk on yield to maturity*

Information structure revealed by a company will affect the balance of their yield securities. Therefore, when investors take possession of securities, they demand compensation for the information risk that comes with the transaction. This is because the private information about the asset value of market participants will be disclosed to the public upon the transaction [5] .

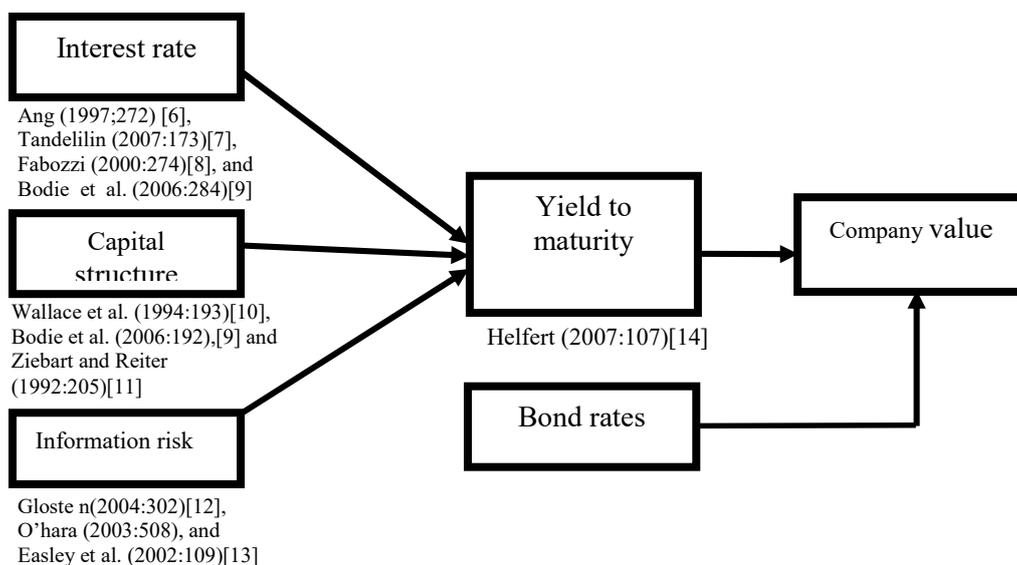
*2.4. The effect of yield to maturity and bond rate on company value*

Companies exist because it is inefficient and expensive for business persons to enter and make contract with workers and capital owners, land, and other resources needed for production and distribution processes. Business persons usually sign a big and long-term contract with workers to carry out different tasks for a certain compensation and allowance. This kind of contract is far more affordable compared to some specific contracts and also very profitable for business persons, workers, and other resources owners.

*2.5. Hypothesis*

1. Interest rate positively affects yield to maturity.
2. Capital structure positively affects yield to maturity.
3. Information risk negatively affects yield to maturity.
4. Yield to maturity and bond rate positively affects company value.

*2.6. Research model*



**3. Research method**

Descriptive method with quantitative approach was used in this research. The samples comprised bond companies listed in the Indonesian Stock Exchange (IDX) from 2009 to 2013, which

were selected using purposive sampling with the following criteria: the bonds were traded in the IDX from 2009 to 2013, they had bond ratings from PT. Pefindo, and they did not have the option to sell and purchase.

### 3.1 Variable size

In this research, the independent variables were interest rate (X1), capital structure (X2), and information risk (X3). Moreover, the other variables include yield to maturity (Y) as the intervening variable, company value (Z) as the dependent variable, and bond rate as the control variable.

## 4. Findings and discussion

### 4.1 Descriptive analysis

#### 4.1.1. Interest rate.

The results of the descriptive analysis of interest rate of the samples in the 2009-2013 period can be seen in the following criteria table :

Year	Interest rates	Criteria
2009	6.50%	Moderate
2010	6.50%	Moderate
2011	6.75%	Moderate
2012	5.75%	Low
2013	7.50%	Moderate
Mean	6.60%	<b>Moderate</b>

Source: [www.bi.go.id](http://www.bi.go.id)

**Table 1.**

Results of descriptive analysis of interest rates.

	BI rate
Mean	6.60
Median	6.50
Maximum	7.50
Minimum	5.75
Std. Dev.	0.63
Skewness	0.13
Kurtosis	2.38
Jarque-bera	0.09
Probability	0.95
Sum	33.00
Sum Sq. Dev.	1.57
Observations	5

Source: *EViews 7 calculations*

**Table 1.** Shows that the interest rate set by BI tend to fluctuate. For instance, the interest rate reached 6.50% in 2009 and 2010 and were significantly volatile from 2011 to 2013. This caused negative effect on the bond companies listed in the IDX in a way it was difficult for them to deposit their money to the bank because higher interest rate tends to make it difficult for the companies to attract depositors and buyers of bonds. According to the criteria table, it was revealed that the interest rate throughout the five-year period was varied, with a low value of 5.75% as per 2012 and a high value of 7.50% as per 2013. This means that the average interest rate for the five-year period was 6.60% and categorized as moderate.

#### 4.1.2. Capital structure (DER).

The results of the descriptive analysis of capital structure of the samples in the 2009-2013 period measured using debt to equity ratio (DER) can be seen in the following criteria table :

Criteria	Interval
Low	0.00% - 35.86%
Moderate	35.86% - 110.25%
High	110.25% - 184.64%
Very high	184.64% - 259.04%

Source: *processed data, 2015*

**Table 2.**

Results of descriptive analysis of capital structure (DER).

	DER
Mean	21.42
Median	2.820
Maximum	259.04
Minimum	-38.53
Std. Dev.	0.51
Skewness	2.981
Kurtosis	11.64
Jarque-Bera	734.21
Probability	0.00
Sum	35.18
Sum Sq. Dev.	41.19
Observations	160

Source: *EViews 7 calculations*

**Table 2.** Shows that the bond companies listed in the IDX during the five-year period had various capital structures with the lowest value of -38.53% in 2010 by PT Smartfren Telecom Tbk. and the highest value of 259.04% in 2013 by the State Electricity Company. According to the criteria table, the average capital structure for the five-year period was 21.42% and categorized low to moderate.

4.1.3. *Information risk.*

To measure information risk, a model was utilized [13]. This model was first implemented in a government bond market [15]. The measure of information risk–probability of informed trading (PIN)–can be used to measure the level of information risk of bond transactions just by using the frequency of buys and sales in a period of time.

Believe that, in bond market, private information usually comes from different interpretation of public information and the private access of “dealer” to the flow of consumer orders [15]. Therefore, the problem of unsymmetrical information is not only caused by its incompleteness, but also by the high heterogeneity of interpretation of market players about a certain public information.

**Table 3.** Results of descriptive analysis of Information risk.

Description	2009	2010	2011	2012	2013
Observation data					
Number of announcements	23	94	107	80	100
Number of bonds (sample)	9	23	24	24	25
Frequency of buys (b)	272	1349	1401	1615	1798
Frequency of sales (s)	121	1099	1254	1160	1344
Information risk (PIN)	2.51% (9.42%)	8.56% (19.77%)	10.03% (23.78%)	7.59% (22.36%)	10.01% (24.56%)

Source: Processed data from [www.idx.go.id](http://www.idx.go.id), 2013

**Table 3.** Shows that the information risk average based on the calculations using PIN ratio was 2.51% in 2009, 8.56% in 2010, 10.03% in 2011, 7.59% in 2012, and 10.01% in 2013. This shows that, in Indonesia’s bond market, not all new information about fundamental announcements were responded directly by investors. In contrast, when the information comes during trading process in the bond market, not only the sellers involved in the transactions were informed, but also the sellers that were not involved in the transactions .

4.1.4. *Company bond rating.*

Due to the fact that the ranks of the bonds under study were presented in letters and the financial ratios were presented in numbers, a conversion system was used. This system converted the symbols with the highest scale for the company with the highest rank and lower scale for companies with lower ranks with the same distance assumption between ranks.

**Table 4.** Presents the lowest and highest bond positions from 160 observations. The bond ranks presented in letters were converted to numbers that can be correlated with other variables.

**Table 4.** Description of company bond rating variable.

Bank rank	Conversion value
Lowest A-	10
Highest AAA	17
Average	13.75

According to Table 4, the lowest bond rank given by PT. Pefindo to the sample companies was A. The company ranked A- was PT. Semen Baturaja (Persero). The A- bond rank was converted to 10. The A- bond rank showed a quite safe parameter compared to other bonds in Indonesia.

4.1.5. *Yield to maturity.*

The results of the descriptive analysis of yield to maturity of the samples in the 2009-2013 period can be seen in the following criteria table :

Criteria	Interval
Low	0.24 - 1.11
Moderate	1.11 - 1.98
High	1.98 - 2.85
Very high	2.85 - 3.71

**Table 5.**  
Results of descriptive analysis  
of yield to maturity.

YTM		YTM	
Mean	94.8619	Kurtosis	2.885367
Median	25.01	Jarque-Bera	30.35195
Maximum	198.79	Probability	0.000000
Minimum	23.42	Sum	73.08670
Std. Dev.	37.35168	Sum Sq. Dev.	53.15997
Skewness	1.065323	Observations	160

Source: EViews 7 calculations

**Table 5** shows that the bond companies listed in the IDX during the five-year period had various yield to maturity with the lowest value of 23.42% in 2009 by PT Smartfren Telecom Tbk. and the highest value of 198.79% in 2013 by the State Electricity Company. According to the criteria table, the average yield to maturity for the five-year period was 94.86% and categorized moderate to high.

#### 4.1.6 Company value.

The results of the descriptive analysis of company value of the samples in the 2009-2013 period measured using Tobin's Q can be seen in the following criteria table :

Criteria	Interval
Low	0.24 - 1.11
Moderate	1.11 - 1.98
High	1.98 - 2.85
Very high	2.85 - 3.71

Source: processed data, 2015

**Table 6.**  
Results of descriptive analysis  
of company value.

Tobin's Q	
Mean	1.75
Median	1.32
Maximum	3.71
Minimum	0.24
Std. Dev.	1.96
Skewness	3.21
Kurtosis	32.12
Jarque-Bera	21064.08
Probability	0.00
Sum	132.32
Sum Sq. Dev.	541.08
Observations	160

Source: EViews 7 calculations

**Table 6.** Shows that the bond companies listed in the IDX during the five-year period had various company values with the lowest value of 0.24 in 2012 and 2013 by PT Smartfren Telecom Tbk. and the highest value of 3.71 in 2013 by PT Telekomunikasi Indonesia Tbk. and Pakuwon Jati Tbk. in 2019. According to the criteria table, the average company value measured using Tobin's Q for the five-year period was 1.75 and categorized moderate to high.

#### 4.2. Verification analysis

The panel data regression analysis equation using the PLS model is as follows:

$$PTB_{it} = \beta_0 + \beta_1 SB_{it} + \beta_2 SM_{it} + \beta_3 RI_{it} + u_{it}$$

$$NP_{it} = \beta_0 + \beta_1 PTB_{it} + u_{it}$$

After the regression calculation with pooled least square (PLS) approach was carried out, the following calculation results were obtained.

**Table 7.** Results of regression calculation with PLS approach of interest rate, capital structure, and information risk to yield to maturity.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.124512	0.012450	4.024123	0.0001
TSB	0.454123	0.014217	7.214512	0.0005
SM	0.250012	0.002110	5.215421	0.0003
RI	-0.214747	0.073636	5.095586	-0.0001

Table 7 Next.....

Next....

**Table 7.** Results of regression calculation with PLS approach of interest rate, capital structure, and information risk to yield to maturity.

Weighted Statistics			Unweighted Statistics				
R-squared	0.721213	Mean dependent var	0.912965	R-squared	0.493134	Mean dependent var	0.582796
Adjusted R-squared	0.624123	S.D. dependent var	0.981180	Adjusted R-squared	0.336841	S.D. dependent var	0.799560
S.E. of regression	0.708114	Sum squared resid	43.12264	S.E. of regression	0.742842	Sum squared resid	47.45604
F-statistic	15.10596	Durbin-Watson stat	2.155969	Durbin-Watson stat	1.857555		
Prob(F-statistic)	0.000000						

Source: EViews 7 calculations

Based on **Table 7**, the following panel data regression equation was developed:

$$PTBO_{it} = 5.124512i_{it} + 0.454123TSB_{it} + 0.250012SM_{it} + -0.214747RI_{it} + u_{it}$$

According to the above regression equation, the intercept was 5.124512 and it means that, if the independent variables scored zero (0), then the yield to maturity was 5.124512%. If each independent variable increase by 1%, then the projections are as follow:

- 1) 1% increase of interest rate will increase yield to maturity by 0.454123%.
- 2) 1% increase of capital structure will increase yield to maturity by 0.250012%.
- 3) 1% increase of information risk will decrease yield to maturity by 0.214747%.

**Table 8.** Results of regression calculation with PLS approach of yield to maturity and bond rank on company value.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.074560	0.010210	5.241563	0.0000
PTBO	0.458390	0.094480	8.169223	0.0006
PO	0.215123	0.014012	5.241530	0.0001

Weighted Statistics			
R-squared	0.803012	Mean dependent var	0.874521
Adjusted R-squared	0.771331	S.D. dependent var	0.789412
S.E. of regression	1.291606	Sum squared resid	40.14520
F-statistic	13.14210	Durbin-Watson stat	2.14520
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.614510	Mean dependent var	0.421521
Adjusted R-squared	0.541502	S.D. dependent var	0.251410
S.E. of regression	0.621014	Sum squared resid	45.45112
Durbin-Watson stat	1.351247		

Source: EViews 7 calculations

Based on **Table 8**, the following panel data regression equation was developed:

$$NP_{it} = 4,074560i_{it} + 0,458390 PTBO_{it} + 0,215123 PO_{it} + u_{it}$$

According to the above regression equation, the intercept was 4.074560 and it means that, if the yield to maturity and bond rank variables scored zero (0), then the yield to maturity was 4.074560%. If each variable increase by 1%, then the projections are as follow:

- 1) 1% increase of yield to maturity will increase company value by 0.458390%.
- 2) 1% increase of bond rank will increase company value by 0.215123%.

#### 4.3. Discussion

Based on the analysis, interest rate had the highest effect on yield to maturity. The positive direction of coefficient means that higher interest rate resulted in higher bond profit for investors. Therefore, it is ideal for investors to consider or monitor the movement of interest rate in the SBI. By doing this, investors will be able to know when the interest rate is increased, which means that it is the best time to buy bonds and is not the best time to realize capital gains. Investors will also be able to know when the interest rate is decreased, which means that it is the best time to sell bonds or realize capital gains. In addition, interest rate can also be used by investors as a benchmark to determine their expected profit.

These adjustments are reasonable from the vantage point of a risk-free concept where investors are willing to invest on riskier instruments under the condition that the investments have higher rate of return, because the investors tend to invest on risk-free instruments. In line with Horne and Wachowicz, when interest rate increase, rate of return is also expected to increase [16]. Adds that higher interest rate results in higher return of investments [7].

The results of this research showed similar results with a previous research conducted by Kadir [17], which revealed that interest rate significantly affected bond interest rate. Moreover, the DER that measured the capital structure had a positive impact on the bond rate interest. Therefore, company management as a bond issuer should monitor the fundamental factors of the company, especially the DER or how much debt the company owe in their capital structure that can support the operation of the company to generate bigger profit. Higher DER means that there is an indication that the bond issuer or company could not generate sufficient profit to pay their debts and bonds, or that they have a high risk of default. This means that investors will expect higher yield when they invest on the bonds owned by the said company. This is in line with Bodie who state that the leverage ratio that is too high shows excessive debt, and the company probably could not generate enough profit to pay their bond obligations [9]. Moreover, Indra also states that higher DER results in higher financial risk of a company [18]. In other words, higher debt results in higher risk of the debt not being paid off.

This research hypothesized that information risk negatively affects interest rate. The results of the research then proved that information risk affected interest rate negatively and significantly. If the selling price of bonds increase, the yield to maturity of the bonds possessed by market maker will decrease because the price and yield to maturity had a negative relationship. Therefore, it can be said that, when information risk reflected in the PIN is increased, then market maker will attempt to make profit by increasing the selling price of their bonds, hence decreasing the yield to maturity of the bonds. In other words, the relationship between yield to maturity and information risk is negative.

## 5. Conclusion

1. Interest rate positively and significantly affected yield of maturity. The results that showed positive direction of coefficient means that, if interest rate in SBI increases, the yield of maturity will also increase.
2. The DER that measured the capital structure positively affected yield of maturity. The results that showed positive direction of coefficient means that, if DER increases, the yield of maturity will also increase and vice versa.
3. Information risk negatively affected yield to maturity. An increase of information risk will increase the transaction information, and market makers will make profits by increasing the selling price of their bonds. Along with this increase on selling price, the yield to maturity of the bonds possessed by the market makers will decrease. Therefore, if the information risk measured by PIN increases, the yield to maturity will decrease.
4. Bond rank positively affected company value. The results that showed positive direction of coefficient means that, if bond rank increases, the company value will also increase.
5. Yield to maturity positively affected company value. The results that showed positive direction of coefficient means that, if yield to maturity increases, the company value will also increase and vice versa.

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