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Research Article

The Influence of the Bi Rate, Inflation, and Gross Domestic Product on Bond Yields

Mahirun Mahirun*, Syifaul Fuadah, Arih Jannati

Universitas Pekalongan, Pekalongan, Indonesia

ORCID
Mahirun Mahirun: https://orcid.org/0000-0002-9193-5172

Abstract.
The objective of this study is to examine and analyze the impact of macroeconomic variables that we suspect affect bond yields including BI rate, inflation, gross domestic product. The population in our study is banking companies in the period 2017 - 2020, and the analytical tool used is multiple linear regression to test the effect of independent variables on the dependent variable. Analysis of the main test on 50 samples revealed that the BI rate and inflation exhibit a positive and statistically significant impact on bond yields, whereas the gross domestic product variable, while significant, exerts a negative influence.

Keywords: BI rate, inflation, gross domestic product, bond yield, banking

Corresponding Author: Mahirun Mahirun; email: Mahirun@yahoo.com

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1. INTRODUCTION

Bonds are debt instruments from issuers to obtain funds, with returns on the maturity date by paying coupons as specified [1]. One important factor that must be considered by investors before investing in bonds is the yield obtained from their investment. Factors that affect bond yields can be macroeconomic and microeconomic. Macroeconomic factors include inflation, economic growth, money supply, rupiah exchange rate, BI rate, stock index and gross domestic product. micro factors that can affect bond yields are company growth. Investors and issuers must always pay attention to fluctuations in bond prices and factors that affect changes in bond yields [2]. The interest rate factor affects the high and low bonds, this is because the relative increase in interest rates can reduce investor returns, because bond interest is fixed, the impact is that the amount of yield required by investors will also increase [3]. Sari & Abundanti [4] found that the BI rate has a positive effect on bond yields, while Rahman & Sam'ani [5] found that the BI rate has a negative effect on bond yields

Inflation can also affect bond yields, because inflation is a continuous increase in prices that can affect individuals, companies and governments [6]. Campbell & Ammer [7] revealed that the announcement of expected inflation is the factor that most affects the movement of bond yields in the long run. When inflation is expected to rise, investors will demand more compensation because bond prices will fall. When this happens, the yield that investors will get will increase. Nurfauziah & Setyarini [8] found that inflation has a positive effect on bond yields. While Listiawati & Paramita [9] stated that inflation has a negative effect on bond yields.

Changes in economic conditions with increasing Gross domestic product have a positive influence on the company's products, because the company's sales increase, the company's opportunity to earn profits will also increase [10]. So it can be concluded that the increase in gross domestic product will have a positive impact on companies and society, because they will invest their funds in bonds so that bond prices will increase, this increase in bond prices causes a decrease in bond yields, so that gross domestic products will have a negative effect on bond yields [11], Meanwhile, another study found that gross domestic product has a positive effect on bond yields [12].

The phenomenon shows that high interest rates in 2017, which amounted to 3.8%, resulted in a decrease in bond yields. Meanwhile, inflation that occurred in 2019 at 5.6% caused bond yields to increase by 1% from 2018, while the highest gross domestic product in 2018 was 5.17 with a high yield of 7.4%. In 2018, economic stability was maintained so that it did not have a negative impact on bond yields (Table 1).

Table 1: BI Rate, Inflation, Gross Domestic Product, and Bond Yields.

Variabel	Average Yearly			
	2017	2018	2019	2020
Bi Rate	3.80%	3.20%	3.00%	2.00%
Inflation	4.56%	5.10%	5.60%	4.25%
Gross Domestic Product	5.07	5.17	5.02	-2.07
Bond Yield	6.90%	7.40%	7.50%	7.00%

Source: www.bi.go.id, www.m.id.investing.com

This study aims to test and analyze the variables that are considered to affect bond yields, namely interest rates, inflation, and gross domestic product.

1.1. Theoretical Overview

1.1.1. Signaling Theory

Spence [13] introduced signal theory by suggesting that the information sent will be a signal, the sender of the information provides the accuracy of the information with the intention that it can be used by the recipient of the information. The received signal will be interpreted in accordance with the recipient's understanding and result in changes in behavior. Companies can provide positive signals to be captured by potential investors in the form of investment in the company concerned. Brigham & Houston [14] Information is an important issue issued by the company, and can affect investments made by external parties. Information, records or descriptions of past, present and future conditions regarding the sustainability of the company's life and the impacts that may arise.

1.1.2. Bonds

Bonds are long-term debt that will be paid back at maturity with fixed interest if any. The debt value of the bond is expressed in debt securities [15]. Bonds issued by the government of the Republic of Indonesia are government bonds, while bonds issued by companies, both companies in the form of State-Owned Enterprises (BUMN) or private business entities are corporate bonds or corporate bonds [16]. Corporate bonds or corporate bonds according to Gitman [17] "*A long - term debt instrument indicating that a corporation has borrowed a certain amount of money and promises to repay it in the future under clearly defined terms*" so corporate bonds are a long-term instrument indicating that the company has borrowed debt and promises to repay *it in* the future with clear benefits.

1.1.3. Bond yield

Bond yield or yield is a measure of the income that investors will receive from the purchase of government bonds which tend to be irregular [10]. Bond yield is the income earned by investors from bond yields and bond interest. Yield is the rate of investment retrieval as a percentage of the initial investment amount. yield bonds measure the rate of return based on the interest rate (coupon), not the difference in price increases

(capital gains). Bond yield is the interest rate that equates the present value of all interest receipts and the nominal value of the bond, with the bond price [18]. Shapiro [19] argues that if the bond were priced at par, it would yield exactly the coupon rate, but if interest rates have risen above the coupon rate, investors in the secondary market will not want to pay full price for yielding bonds.

1.2. Hypothesis development

1.2.1. Effect of BI Rate on Bond Yield

According to Mishkin [6] interest rates are the cost of borrowing or the price paid for borrowed funds (usually expressed as a percentage per year). Interest rates are also the most important factor in a country's economy. Ang [21] explains that the price behavior of a bond is strongly influenced by market interest rates. If interest rates rise, the market price of bonds will fall, and this causes the bond yield to increase. This statement is reinforced by previous research conducted by Sari & Abundanti [4], Yuliana [12] and Sundoro [22] which states that the bi rate has a positive effect on bond yield. Based on the description above, the following hypothesis can be formulated:

H1: BI rate has a positive effect on bond yields

1.2.2. Effect of Inflation on Bond Yield

Inflation is a general increase in prices and goods where these goods and services are the basic needs of society or a decrease in the selling power of a country's currency (Badan Pusat Statistik, 2012). Financial theory states that the inflation rate is reflected by the consumer price index which represents the high movement of the overall price of goods and services which will affect the stock market or capital market [23]. Meanwhile, according to [24] the movement of bond and stock returns is caused by interest rates, inflation, economic growth and dividend payments. According to Saputra & Prasetiono [25] that changes in the inflation rate are very fluctuating have an impact on investment securities because with increasing inflation it means that investing in securities such as bonds is felt to be increasingly risky, the high risk in investment will result in higher yields expected by investors. This statement is reinforced by previous research conducted by Nurfauziah & Setyarini [8], Rahman & Sam'ani [5], Akbari & Sentosa [26] which state

that inflation has a positive effect on bond yields. based on the description above, the following hypothesis can be formulated:

H2: Inflation has a positive effect on bond yields

1.2.3. Effect of Gross Domestic Product on Bond Yield

Gross domestic product growth is a good positive signal for investment, and vice versa [27]. Changes in economic conditions such as GDP have a positive influence on company products, with increasing company sales, the opportunity to earn profits will also seem to increase [10]. In research conducted by Saputra & Prasetiono [25] which states that gross domestic product has a negative effect on bond yields. so that the following hypothesis can be formulated:

H3: Gross domestic product has a negative effect on bond yields

2. METHODS

2.1. Data Type and Source

The type of data in this study is secondary data. The data source used comes from banking financial reports for the period 2017 to 2020. The data in this study is panel data, which is a type of data that is a combination of cross sectional data and time series data, so according to Gujarati [28], the analysis method is a combination of time series data analysis and cross sectional data analysis. Regression analysis is used to answer the objectives of this study with bond yields as the dependent variable.

2.2. Empirical Model and Variable Measurement

The focus of the research is on empirical testing of the integration of variables related to bond yield, including BI rate, Inflation, and Gross Domestic Product. The empirical study model is presented in Figure 1.

In Figure 1, an equation can be formed that shows the causal relationship between the BI rate variable, Inflation, Gross Domestic Product with the Bond Yield variable, as follows:

Bond Yields = β_1BI rate + β_2Inflation + β_3Gross Domestic Product + β_1

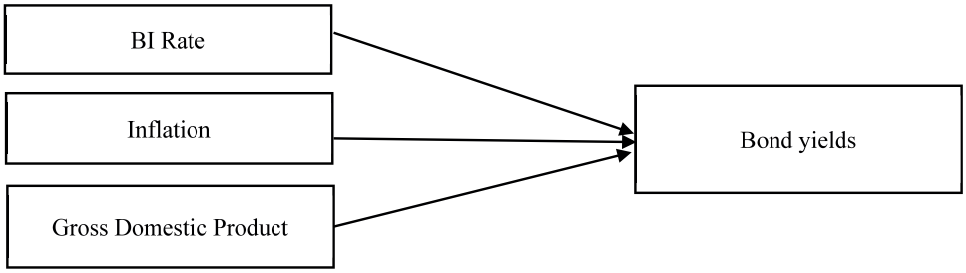

Figure 1: Empirical Research Model.

Bond yield is the return obtained by investors within a predetermined period of time when buying a bond, the reward received is based on interest or coupon. Yield is measured using a ratio scale whose results are in the form of a percentage (%). Bi rate is the value of an interest rate that is issued by Bank Indonesia. BI rate is measured using a ratio scale which results in a percentage. Inflation in this study takes data published by Bank Indonesia which is taken in December of each year, and is measured using a ratio scale which results in a percentage. Gross domestic product is the growth in the market value of all final goods and services produced in a country in a period with data published by the Badan Pusat Statistik, and a ratio scale with results in the form of a percentage.

3. RESULTS AND DISCUSSION

3.1. Descriptive Statistical Test Results

The descriptive statistical test results found that the average bond yield reached 2.46% with the highest bond yield value of 18.75% and the lowest of 0.08%, and the details are presented in table 2.

TABLE 2: Desctiptive statistics.

Value	BI Rate	Inflation	Gross Domestic Product	Bond Yield
Mean	4.89	1.02	4.35	2.46
Median	4.83	3.12	5.08	1.07
Std. Deviaton	0.53	0.64	1.33	3.51
Minimum	4.25	2.04	2.07	0.08
Maximum	5.63	3.81	5.17	18.75

Source: SPPS data processing results

3.2. Classical Assumption Test Result

The classical assumption test as a regression requirement results in a normality test which shows the results of normally distributed data (significance level 0.70 > 0.05), the results of the autocorrelation test show that there is no autocorrelation (durbin Watson value 1.802 > du (1.710) and < 4-du (2.289)), multicollinearity test results with the result that there are no symptoms of multicollinearity in all variables (VIF value < 10 and Tolerance value > 0.01), and it is also found that all variables do not experience heteroscedasticity disorders in the heteroscedasticity test because the data points look spread above and below the number 0 on the Y axis, do not collect in one particular field and do not resemble regular patterns.

3.3. Regression Test Result

The fit model test found that all data in the study can be used to predict the dependent variable, because the significance level is below 0.05. While the results of the influence of each variable on the bond yield variable using the regression test are shown in table 3.

TABLE 3: Regression Test Result.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.618	0.441		3.666	0.001
	BI Rate	0.103	0.120	0.152	2.861	0.022
	Inflation	0.176	0.112	0.296	2.574	0.040
	Gross Domestic Product	-0.110	0.108	-0.151	-2.025	0.039

Source: SPPS data processing results

The regression equation formed from the regression test results table is :

Bond yield = 0 . 1 5 2 (BI rate) + 0.296 (inflation) - 0.151 (Gross domestic product)

3.4. Effect of BI Rate on Bond Yield

The regression analysis results found that the BI rate has a positive and significant effect. This means that a higher BI rate will have an impact on increasing the value of bond

yields while a decrease in the value of the BI rate has an impact on decreasing the value of bond yields. Referring to the signalling theory, it is explained that the high value of the company's capabilities will encourage higher shareholder confidence in the company's performance. The higher the BI Rate value, it will provide an indication to shareholders that the value of bond yields has the potential to rise as *signaling* theory. Interest rates are often used by investors as a benchmark for the desired rate of return and as a comparison in determining the investment decision to be chosen. The reference interest rate in determining the amount of bond yield, refers to the development of interest rates issued by Bank Indonesia (BI). Therefore, if the interest rate increases, the amount of *yield* required by investors will also increase. If interest rates rise, the market price of bonds will fall, and this causes bond yields to increase. Vice versa, if market interest rates fall, bond market prices will rise and yields will fall. Our findings support research conducted by Sari & Abundanti [4], Ekak & Abundanti [1], Yuliana [12] and Sundoro [22].

3.5. Effect of Inflation on Bond Yield

The effect of inflation on bond yields is positive and significant, so that higher inflation will increase the value of bond yields while a decrease in inflation has an impact on reducing bond yields. Based on signaling theory, the higher the value of inflation can provide an indication for shareholders that the value of bond yields can increase in a sustainable period of time. Indications of an increase in the value of bond yields will encourage shareholders to set company financial rules and policies to adjust the value of inflation that occurs. Inflation is a situation where there is excessive demand for goods as a whole in the economy of a region. Inflation will cause prices to rise generally and continuously. Fluctuating inflation will have an impact on investments in various other securities including bonds and will increase investor risk. As a result, investors will expect higher yields on their investments. Therefore, the inflation rate has a positive effect on the bond yield desired by investors. The study results support the findings of Nurfauziah & Setyarini [8], Rahman & Sam'ani [5], and Akbari & Sentosa [26] .

3.6. Effect of Gross Domestic Product on Bond Yield

Our finding is that GDP has a negative and significant effect on bond yield . This means that the higher the value of GDP will have an impact on reducing the value of bond

yields while the lower the value of GDP has an impact on increasing the value of bond yields. In terms of classical economic theory by Adam Smith which explains that the economy will grow and develop if there is an increase in population which expands the market and encourages specialization. With a high level of GDP, it indicates that the ability and specialization of the population in producing various products is getting higher, thus encouraging a better economic level. This certainly reduces the potential risk of loss from the issuance of bonds applied by banks. So that with the higher GDP, the value of the bond yield applied will decrease in accordance with the level of risk that can occur. From the results of the research framework analysis which is the basis for determining the hypothesis, it is identified that GDP has a negative and significant effect on the value of bond yields. The results of this analysis are proven to strengthen the findings of the Saputra & Prasetiono [25].

4. CONCLUSIONS

Our research results found that the BI rate and inflation variables have a significant positive effect on bond yield. This indicates that investors will strongly consider the Bank Indonesia benchmark interest rate as a basis for making their investment. If BI rate are high, investors' expectations to get a return on their investment will increase because it is a strong signal [13]. Meanwhile, the results of studies on inflation indicate that an increase in inflation will increase the return on investment in bonds. Inflation is a situation where there is excessive demand for goods as a whole in the economy of a region. Inflation will cause prices to rise generally and continuously. Fluctuating inflation will have an impact on investments in various other securities including bonds and will increase investor risk so that the level of profit demanded by investors also increases. Another finding from our study is that gross national domestic product has a significant negative effect on bond yield. This can be interpreted that an increase in GDP as an indicator of economic growth causes a low level of risk in the investment sector, so that it can reduce the return requested by investors.

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