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## Determinants of Indonesia Government Bonds Yield Period 2019-2022

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### ABSTRACT

#### KEYWORDS

Macroeconomics,  
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This research seeks to examine how the yields of Indonesian government bonds are influenced by various factors, including the BI interest rate, inflation, foreign exchange reserves, IHSG, and exchange rates. The investigation utilizes monthly time series data spanning from 2019 to 2022, focusing on the benchmark series of 10-year SUN. Data analysis is carried out using Eviews 13, and the GARCH-M (1,1) analytical method is employed. The research findings reveal that the BI interest rate has a notably positive and significant effect on bond yields. In contrast, inflation does not exhibit a significant impact on bond yields. Foreign exchange reserves are found to have a considerable negative impact on bond yields. IHSG, on the other hand, does not demonstrate a significant influence on bond yields. Lastly, exchange rates are identified as having a meaningful positive impact on bond yields.

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### INTRODUCTION

In 1997, Indonesia experienced a serious monetary crisis, which became known as the Asian Monetary Crisis or Asian Financial Crisis. In situations of economic or monetary crisis, governments face pressure to obtain additional funds to run economic stimulus programs, close budget deficits, or address other financial problems through debt by issuing bonds or bonds. Historically, the country has started issuing Government Bonds (SUN) in 2002, with the legal basis and management regulated in Law Number 24 of 2002 concerning Government Bonds. The portion of debt in the form of SBN dominates the overall government debt compared to foreign and domestic loans, and there is an upward trend every year. In 2019, the SBN portion of total government debt was 84.2%, then continued to increase until 2022 of 88.53%.

The position of government debt to GDP has increased relatively. Starting in 2019 it was 29.80%, but 2 years later in 2021 it rose quite significantly to 41%. Although in 2022, the ratio of government debt to GDP was recorded to decrease slightly at the level of 39.57%.

On the other hand, the yield on rupiah-denominated government bonds with a tenor of 10 years (SBN 10y) was recorded at a relatively higher level compared to peer countries in the ASEAN region. Indonesia's average 10y SBN yield from 2019 to 2022 is 6.62%, higher than other countries such as Malaysia (3.40%), Thailand (1.78%), Philippines (4.76%), and Vietnam (3.63%).

Due to the substantial impact of the SBN portfolio size on annual government interest payments, the elevated yield exerts considerable pressure on government expenditure. Government bond yields are influenced by macroeconomic conditions such as benchmark interest rates, world oil prices, US interest rates, stock market indices, fiscal deficit, government debt and current account balance (Trinh et al., 2020). In other studies, Rahmatika (2019) states macroeconomic variables that affect government bond yields, namely the money supply, foreign exchange reserves, inflation, exchange rates, and world oil prices.

Considering various economic factors, Bank Indonesia tends to increase interest rates when it anticipates that future inflation will surpass the predefined target. Conversely, the central bank will decrease interest rates if it foresees that future inflation is likely to fall below the established target (Muktiyanto & Aulia, 2019).

Inflation poses a risk factor for investments in local currency bonds, as elevated inflation levels lead to an increase in the risk premium of bonds, subsequently raising their yields (Cepni & Guney, 2018). In research Aulia & Miyasto (2019) stated that inflation has a significant positive effect on government bond yields. The same thing was also expressed Kuzu (2020), Tjandrasa et al. (2020) and Agusty & Marsoem (2021). But different results were reported Sundoro (2018), Nguyen & Nguyen (2022) and Varirahartia & Marsoem (2022), It is stated that inflation has a significant negative effect on government bond yields. While according to Nia & Hamzah (2020), Trinh et al. (2020) and Sandinanto & Widhiastuti (2022) Inflation has an insignificant effect on government bond yields.

The considerable negative impact on government bond yields is observed with an increase in foreign exchange reserves. A rise in foreign exchange reserves indicates a reduced risk of default on government bonds in a country. Consequently, this diminishes the likelihood of default, leading to greater capital inflows from abroad. This, in turn, has the effect of increasing both purchases and prices of government bonds, ultimately resulting in a decrease in government bond yields (Rahmatika, 2019). But according to Sundoro (2018) and Nia & Hamzah (2020), changes in foreign exchange can positively affect government bonds. While Trinh et al. (2020) states that foreign exchange reserves have an effect but not significantly on government bond yields.

IHSG reflects the condition of stocks in the capital market. According to Sundoro (2018), stock market has a significant negative effect on government bond yields. When IHSG rises, the stock market is in good performance. Therefore, investors will prefer to invest in the stock market rather than in the bond market so that bond yields will also fall. But Trinh et al. (2020), Rosanti & Sihombing (2021) and Nguyen & Nguyen (2022) Reporting stock market indices has a significant positive effect on government bond yields. Meanwhile, according to research Agusty & Marsoem (2021) Stock market indices have no effect on government bond yields.

In other studies, Aulia & Miyasto (2019) states that exchange rate variables affect government bond yields positively and significantly. These results are different from the research conducted Ichsan et al. (2018), Kuzu (2020), and Tjandrasa et al. (2020) That said, the exchange rate has a significant negative effect on government bond yields. While according to Nguyen & Nguyen (2022) and Varirahartia & Marsoem (2022), the exchange rate has no effect on the yield of government bonds.

Based on the phenomena mentioned and the inconsistencies in the results of previous research encourage the author to further explore macroeconomic variables that determine government bond yields and provide recommendations on what can be done to mitigate the risk of high interest returns so that the burden on the State Budget can be maintained at a reasonable and controlled level.

Derived from the problem statement, the research aims to accomplish the following objectives: examine the impact of BI interest rates on yields of Indonesian government bonds, assess the influence of inflation on yields of Indonesian government bonds, analyze the effect of foreign exchange reserves on the yield of Indonesian government bonds, investigate the impact of IHSG on yields of Indonesian government bonds, and study the effect of exchange rates on yields of Indonesian government bonds.

## RESEARCH METHOD

The design in this study is a causal study that aims to test the hypothesis of the influence of several independent variables (X) on the dependent variable (Y). Data processing in this research uses the Eviews 13 application with systematic steps of descriptive analysis, selection of the Best Model Model Generalized Autoregressive Conditional Heteroscedasticity (GARCH) and GARCH in Mean (GARCH-M) model.

## RESULTS AND DISCUSSION

### GARCH Model Analysis Results

#### Best Model Selection

In this study the models used were GARCH (1.1) and GARCH-M (1.1). This model is a parsimony model that refers to a simple GARCH model with a relatively small number of parameters, but still able to provide accurate estimates with only two parameters (autoregression parameters and volatility parameters).

In choosing the best model between GARCH (1.1) and GARCH-M (1.1), look at the values of Akaike Info Criterion (AIC) and Schwarz Criterion (SC). The following are the AIC and SC values of both models:

**Table 1. AIC and SC values**

Variable	GARCH (1,1)		GARCH-M (1,1)	
	AIC	SC	AIC	SC
SUN10Y	-8.849860	-8.559711	<b>-8.936822</b>	<b>-8.620295</b>

Source: Results of data processing using Eviews 13 (2023)

Based on Table 1, the best model for the SUN10Y is GARCH-M (1,1) because it has a smaller AIC and SC compared to the GARCH model (1,1).

#### GARCH-M Model Results (1,1) on SUN10Y

In the 10-year tenor SUN uses the GARCH-M model (1.1), the results are shown in the following table:

**Table 2. GARCH-M (1,1) Results on SUN10Y**

Variable	Coefficient	Std. Error	z-Statistic	Prob.
@SQRT(GARCH)	-0.091311	0.178995	-0.510128	0.6100
C	-0.104370	0.076343	-1.367122	0.1716
BI7DRR	0.278009	0.038640	7.0132289	0.0000
INF	0.014100	0.022976	0.613684	0.5394
CD	-0.044177	0.009327	-4.736444	0.0000
IHSG	-0.008611	0.001365	-0.757721	0.4486
KURS	0.077442	0.008241	9.396882	0.0000

Source: Results of data processing using Eviews 13 (2023)

Based on Table 2 can be made the following equation:

$$\text{SUN10Y} = -0.104370 + 0.278009 \text{ BI7DRR} + 0.014100 \text{ INF} - 0.044177 \text{ CD} - 0.008611 \text{ IHSG} + 0.077442 \text{ KURS} - 0.091311 \sigma^2$$

From these equations it can be concluded that:

1. When BI7DRR, INF, CD, IHSG, and KURS are all set to 0, the yield of SUN10Y is recorded as -0.104370.

2. The coefficient value of 0.278009 for the BI7DRR variable suggests that a 1% increase in BI7DRR would result in a 0.278009% rise in the yield of SUN10Y, assuming other independent variables remain constant.
3. The coefficient value of the INF variable is 0.014100, indicating that if the INF variable increases by 1%, the yield of SUN10Y will increase by 0.014100%, assuming the other independent variables remain constant.
4. With a coefficient value of -0.044177, an increase of 1% in the CD variable would correspond to a decrease of 0.044177% in the yield of SUN10Y, assuming other independent variables remain constant.
5. The IHSG coefficient, with a value of -0.008611, implies that a 1% increase in the IHSG variable would result in a 0.008611% decrease in the yield of SUN10Y, assuming other independent variables remain constant.
6. The coefficient value of 0.077442 for the KURS rate variable suggests that a 1% increase in the KURS rate would lead to a 0.077442% increase in the yield of SUN10Y, assuming other independent variables remain constant.
7. A variance value of -0.091311 indicates that a 1% increase in variance tends to correspond to a 0.091311% decrease in the yield of SUN10Y.

**Table 3. Variance Equation GARCH-M (1,1) on SUN10Y**

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	2.77E-06	1.73E-06	1.601239	0.1093
RESID(-1)^2	1.045841	0.423660	2.468585	0.0136
GARCH(-1)	-0.063157	0.073398	-0.860465	0.3895

Source: Results of data processing using Eviews 13 (2023)

Based on Table 3, the conditional variance equation of the GARCH-M model (1,1) in SUN10Y is:

The equation shows that the fixed contribution to variance<sup>1</sup> in each period is 2.77. The ARCH coefficient is 1.045, meaning that if the residual value in the previous period is high, it will increase the variance in the current period by 1.045 times the residual value. For the GARCH coefficient of -0.063 indicates that if the variance in the previous period is high, it will reduce the variance in the current period by 0.063 times the previous variance value.

## Hypothesis Test

### Value of Coefficient of Determination (R<sup>2</sup>)

The R2 value signifies the degree to which the relationship can elucidate the association between the independent and dependent variables. The coefficient of determination for the 10-year tenor SUN, derived from the data processing results, is outlined below:

**Table 4. Value of Coefficient of Determination (R<sup>2</sup>)**

Variable	Model	R <sup>2</sup>
SUN10Y	GARCH-M (1,1)	0.815309

Source: Results of data processing using Eviews 13 (2023)

Table 4 reveals that the coefficient of determination (R2) is 0.8 (80%), indicating that the independent variable can account for 80% of the relationship with the dependent variable, while the remaining 20% is influenced by other factors.

## Simultaneous Significance (F-Statistical Test)

The F test is performed by comparing  $F_{\text{calculate}}$  with  $F_{\text{table}}$ , where the  $F_{\text{calculate}}$  for SUN10Y is as follows:

$$F_{\text{calculate}} = \frac{R^2 / (k-1)}{(1-R^2) / (n-k)}$$

$$F_{\text{calculate SUN10Y}} = \frac{0.815309 / (4-1)}{(1-0.815309) / (48-4)} = 51.74$$

With  $df1 = k-1 = 3$  and  $df2 = n-k = 44$ , and the degree of confidence  $\alpha = 5\%$ , the value of  $F_{\text{table}}$  is 2.82. By comparing the calculated F value with the tabulated F value, the rejection of  $H_0$  is justified as  $F_{\text{calculate}}$  exceeds  $F_{\text{table}}$ . This leads to the conclusion that the independent variables collectively (simultaneously) have a significant impact on the dependent variable.

**Partial Significance (t-Statistics)**

Examining the coefficient values allows for an understanding of the impact of each independent variable on the dependent variable. Meanwhile, the assessment of significance is conducted through a comparison between the probability value and the 5% significance level. The subsequent analysis delves into the individual effects of each independent variable on SUN10Y:

**Table 5. Significance of SUN10Y**

Variable	Effect	Significance	Hypothesis
BI7DRR	(+)	Sig.	Accepted
INF	(+)	No sig	Rejected
CD	(-)	Sig.	Accepted
IHSG	(-)	No sig.	Rejected
KURS	(+)	Sig.	Accepted

Source: Data processed (2023)

**The Impact of BI Interest Rate (BI7DRR) on the Yield of Indonesian Government Bonds**

According to the research findings, the BI interest rate (BI7DRR) demonstrates a notable positive influence. This implies that an increase in BI interest rates corresponds to an elevation in bond yields, while a decrease in BI interest rates results in a reduction in bond yields. This highlights the tangible effects of Bank Indonesia's monetary policy on the bond market during the specified period. Changes in BI interest rates, as part of monetary policy, have a ripple effect on overall market interest rates, encompassing those related to bonds with medium and extended durations.

These findings are consistent with the foundational principles of the Term Structure of Interest Rate theory, positing a positive correlation between short-term and long-term interest rates. A rise in short-term interest rates tends to impact an increase in long-term bond yields. The underlying rationale is that surging short-term interest rates may indicate market expectations of an imminent rise in future interest rates. To mitigate potential losses stemming from escalating interest rates, investors anticipate higher yields on long-term bonds.

The outcomes of this study align with prior research, including works by Adiwibowo & Sihombing (2019) and Qisthina et al. (2022), which affirm that interest rates have a significant positive effect on government bond yields.

**The Impact of Inflation on Yields of Indonesian Government Bonds**

The results indicated that fluctuations in inflation had no discernible effect on government bond yields. This implies that changes in the inflation rate do not significantly impact the return or yield provided by government bonds. The data on inflation reflects a stable

inflation rate, indicating effective control over inflation by Bank Indonesia. This stability plays a role in keeping government bond yields relatively steady. When market participants anticipate central banks implementing measures to control inflation, investors do not expect a substantial increase in bond yields. As a result, inflation does not play a role in influencing bond yields.

These findings corroborate the outcomes reported in the research conducted by Trinh et al (2020), Pratiwi & Mustafa (2021), Permanasari & Kurniasih (2021) and Qisthina et al. (2022), all of which assert that inflation does not influence government bond yields.

### **The Impact of Foreign Exchange Reserves on Yields of Indonesian Government Bonds**

The results revealed a significant adverse influence of foreign exchange reserves on the yield of Indonesian government bonds. Foreign exchange reserves are considered a critical indicator of a nation's economic health. This study suggests that the detrimental impact of foreign exchange reserves on bond yields indicates that the market views an increase in reserves as a favorable signal of the country's economic stability. The improved economic stability, in turn, reduces investment risks, leading to a positive impact on bond prices and a subsequent decrease in yields.

These study findings align with earlier research, including Rahmatika (2019) and Varirahartia & Marsoem (2022), which assert that foreign exchange reserves negatively affect government bond yields.

### **The Impact of the Composite Stock Price Index (IHSG) on Yields of Indonesian Government Bonds**

The results indicated that the yield of government bonds remained unaffected by IHSG. This study revealed that IHSG, reflecting stock market performance, is influenced by factors such as company performance and market sentiment. In contrast, bond yields are more responsive to factors associated with a nation's economic conditions, such as market interest rates and foreign exchange reserve levels. Due to these distinct driving forces, fluctuations in IHSG do not have any influence on bond yields. This aligns with the findings of Agusty & Marsoem (2021), which demonstrated that IHSG did not have a significant effect on government bond yields.

### **The Impact of Exchange Rate on Yields of Indonesian Government Bonds**

The findings of the study indicate a significant positive correlation between the exchange rate and government bond yields. An increase in the exchange rate, particularly the strengthening of the Rupiah in this context, may signal an appreciation in its value relative to other currencies, notably the Dollar. This strengthening of the Rupiah implies that the market perceives the currency as carrying a heightened risk of fluctuation. Consequently, investors may seek higher yields as a means of compensation for the exchange rate risk associated with the currency.

These study results align with the findings of Aulia & Miyasto (2019), Muktiyanto & Aulia (2019), and Agusty & Marsoem (2021), which assert that the exchange rate has a positive effect on government bond yields.

## **CONCLUSION**

The research outcomes suggest that the yield of Indonesian government bonds is significantly influenced by the BI interest rate (BI7DRR), demonstrating a notable positive correlation. Inflation, as indicated by the study, does not exert an impact on the yield of these bonds. On the contrary, foreign exchange reserves demonstrate a considerable negative impact

on the yield of Indonesian government bonds. IHSG, representing stock market performance, does not play a significant role in affecting government bond yields. Additionally, the study highlights that the Rupiah exchange rate positively and substantially influences the yield of Indonesian government bonds.

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