Determinant of Indonesian Government Bond Yields with 1, 5 and 10 Years Term

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Abstract:- This study intends to examine the effects of macroeconomic factors including the BI Rate, CDS, JCI, Inflation, Exchange Rate and FFR (Fed Fund Rate) on the yields of Indonesian Government Bonds for 1, 5 and 10 years during the period 2011 – 2020. Type of data used is data time series taken on a monthly basis, which is processed using the Eviews 12 application program. The analytical method used is VECM. The data analysis stage is through stationarity test, optimal lag test, VECM estimation test, Impulse Response Function (IRF) analysis, Forecast Error Variance Decomposition (FEVD) analysis. The result of this observation states that the Fed Funds Rate, CDS and JCI have a positive effect on the yields of Indonesian government bonds with maturities of 1, 5 and 10 years. The exchange rate and inflation have a negative effect on the yields of 1, 5 and 10 year government bonds. The BI Rate has a positive effect on yields on Indonesian government bonds with a period of 1 year, but has a negative effect on yields on Indonesian government bonds with a period of 5 and 10 years. The biggest contribution to the yields of Indonesian government bonds with a period of 1, 5 and 10 years is the yield of the bonds themselves, in addition CDS and JCI also have a significant contribution only to 1 year government bonds.

Keywords:- *Macroeconomics; Indonesian Government Bonds with 1, 5 and 10 Years; VECM; IRF; FEVD.*

I. INTRODUCTION

In recent years, the current developments in the bond market have shown significant developments as an alternative source of financing and as an investment option with more stable risk. Both the government and corporations continued to record an increase in bond issuance for funding needs. Judging from the bond trading activity in the secondary market, government bonds showed a trend of increasing daily transaction volume in the last 10 years more significantly than corporate bonds (see Figure 1).

For the government and investors, the development of the bond market is an important thing to know, especially regarding the movement of yields. Observations made by Hutahayan, Widiharih, Wilandari (2015), one of the methods used to determine the correlation between the yields obtained and the maturity of a bond at a certain time is through the yield curve.

Fig. 1: Indonesian Bonds Daily Transaction Volume
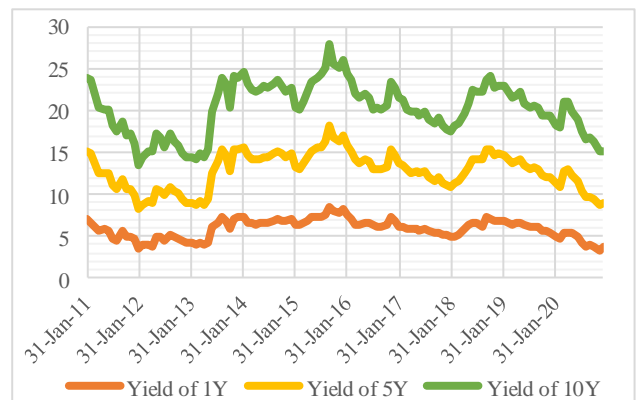
Source : Indonesia Bond Pricing Agency, Processed

Fig. 2: Yield Curve Government Bond

Figure 2 shows that the development of the movement of government bond yields in Indonesia during the 2011 to 2020 research period shows dynamic conditions. The movement of the yield curve during the observation period seemed to have been at the highest level but in certain periods it was at an inverted level. Previous research by Sihombing *et.al* (2014) found that the dynamic movement of government bonds is one of them influenced by macroeconomic fundamentals. The phenomenon that has occurred so far is that there is the correlation between the yield curve and macroeconomic factors such as interest rates, inflation, exchange rates, and others (Alfonso and Martins, 2012).

Based on research by Gadanecz, Miyajima, & Shu (2014) concluded that the exchange rate of developing countries against the US Dollar including the Rupiah

exchange rate had a significant effect on yields on government bonds in developing countries. When exchange rate risk increases, investors want higher bond yields. Muktiyanto & Aulia (2019) also concluded that the Rupiah exchange rate significantly affected the yield of 10-year tenor bonds. However, different results are shown by Kurniasih & Restika (2015) who find that the exchange rate has a significant negative effect on bond yields.

Research conducted by Naidu. A, Goyari & Kamaiah (2016) and Santosa (2021) explains that inflation has a negative effect on bond yields. However, Tjandrasa, Siagian, & Lie (2020) in their research prove that inflation has a positive effect on bond yields. As inflation continues to rise, the overall price rises, as a result, investing in valuable securities such as bonds poses risks. For this reason, investors expect compensation by asking for higher returns on their investments.

The results of observations made by Sundoro (2018) stated that tight monetary policy led to a decrease in the BI rate so that bond yields fell. Related to the effect of interest rates on bond yields also led to different results from research by Nia and Hamzah (2020) stating that the BI rate has a significant negative effect on bond yields. meanwhile Santosa (2021) stated that BI rate has a positive correlation to bond yields.

According to the results of research by Sihombing *et.al* (2014), FFR had a negative effect on bond yields. Where the impact of the increase in the FFR causes the yield curve to fall. Meanwhile the research by Yieand & Chen (2019) says that foreign interest rates (Fed Funds Rate) have a positive and significant effect on government bond yields.

The results of previous observations conducted by Adiwibowo & Sihombing (2019) concluded that CDS had a negative effect on government bond yields. Meanwhile, another study by Tjandrasa, Siagian, & Lie (2020) concluded that CDS had a positive effect on bond yields.

In addition to the research gap, the researchers also found another phenomenon that anomalies in the movement between government bond yields and several economic indicators in 2020. As is known, 2020 is the year of the global economic crisis due to the outbreak of the Coronavirus-19 outbreak in almost all countries (including Indonesia) which led to restrictions on economic activity or lockdown. The impact is like a domino effect, The Rupiah exchange rate against the USD weakened significantly, the JCI fell, and the Indonesian economy entered a recession zone or contracted for 3 consecutive quarters from the 2nd to the 4th quarter of 2020. This condition also led to massive panic among market players. In theory, as explained earlier, bond yields will increase when there is an increase in risk due to the emergence of negative issues in the market. But in fact in 2020, the emergence of the Covid-

19 virus that continues until 2021 only encourages a temporary increase in yields and precisely then the trend of yields in the state bond market recorded a decline until the end of 2020. Anomalous conditions like this also encourage researchers to develop research on what factors can affect the movement of Indonesian government bond yields.

II. LITERATURE REVIEW

A. Term Structure of Interest Rate Theory

This theory explains that the effect of the interest rate required is one of the factors that is of concern to the owner of capital in order to buy or sell bonds. Martelli, Priaulet, & Priaulet (2003), Term Structure of Interest Rate (TSIR) is an interest rate that is structured into several structures based on a certain maturity. The interest rate structure associated with the maturity period of the bond is plotted on a yield curve. In discussing the yield curve, there are 3 theories that explain the structure of the interest rate period (Miskhin, 2009) :

- Expectation theory
- The Liquidity Premium Theory
- Market Segmentation Theory

B. Asset Demand Theory

Mishkin (2009) stated that the factors that influence the demand for bonds which will ultimately affect bond prices and yields are:

- Wealth
- Expected returns
- Risk
- Liquidity

C. Bond Yield

Based on Zulfikar (2016), bond yields are the income or returns expected by investors when placing their funds into bond investments. If the market price of the bonds is the same as the nominal value of the bonds, then the amount of the yield will be the same as the coupon expressed as a percentage (Samsul, 2008). In this study, the measurement of the rate of return is calculated using the YTM issued by the IBPA. YTM is the rate of return in the form of the returns expected by investors when placing their funds in bonds until maturity. The formula for calculating Returns To Maturity is as follows:

$$YTM = \frac{C + \frac{F - P}{n}}{\frac{F + P}{2}} \times 100\%$$

Where :

YTM : Yield to Maturity
C   : Coupon
F   : Nominal Value (Face Value)
P   : Bond Market Price
n   : Period (time to maturity)

D. Macroeconomic factors that affect government bond yields

a) Rupiah Exchange Rate

According to Sadono Sukirno (2013) the exchange rate is a value that shows the currency of a country that is needed to get the price of another country's currency. When the exchange rate of the US dollar increases even higher, it will result in high interest rates as a result the rate of economic growth slows down.

b) Bank Indonesia Interest Rate (BI Rate)

Bank Indonesia interest rate/BI Rate is an interest rate with a period of one month which is announced by Bank Indonesia periodically. Since 19 August 2016 Bank Indonesia has replaced the BI Rate using the BI-7 Day Reverse Repo Rate (BI7DRR) to strengthen the monetary operational framework by implementing a new policy of reference interest rates. The BI 7-Day (Reverse) Repo Rate instrument is used as the new policy interest rate because it can quickly affect the money market, banking and real sector. The BI 7-Day (Reverse) Repo Rate instrument is a new reference that has a stronger correlation with money market interest rates, is transactional in nature or traded on the market, and moves financial markets, especially for repo users (www.bi.go.id).

c) Credit Default Swap (CDS)

According to the preliminary study of the IMF Report (2013), the definition of Credit Default Swap (CDS) is a contract between the seller and the buyer of CDS that pays a fee (fixed premium) for a certain period (maturity) and certain compensation in the event of a credit event. In other words, CDS is a protection against credit risk (credit event). CDS is also a tool used to enter into credit agreements that can be useful as a hedging instrument as well as speculation for profit.

d) Inflation

Based on the opinion of Boediono (1999), inflation is a continuous and comprehensive increase in prices. Increased inflation will have an effect on rising interest rates. When interest rates increase, bond prices fall and yields rise. The inflation rate affects how much real interest (real exchange rate) will be received from the coupon. According to Fisher (1930) the real interest rate (real exchange rate) received is the interest rate after deducting inflation.

e) Jakarta Stock Exchange Composite Index (JCI)

Sunariyah (2006) said the JCI is an indicator of the overall price movement of all stocks listed on the Indonesia Stock Exchange. The Composite Stock Price index will be presented daily based on the closing price of trading on the Indonesia Stock Exchange. The country's economic conditions will greatly affect the movement of the JCI. If the economic condition of a country is good, the JCI will increase (bullish) and vice versa if the economic condition of a country is deteriorating, the JCI will decrease (barrish).

f) The Federal Funds Rate (FFR)

The reference interest rate in the US or the Federal Funds Rate (FFR) issued by the American Central Bank named the Federal Reserve (The Fed). This FFR is a very important benchmark interest rate for financial market players, both in America and around the world. The Fed provides borrowing costs to banks when experiencing financial problems. Federal Reverse as the most influential central bank in the world, the increase in the US interest rate (FFR) is often used as a measure in investment decision making and a means to control economic growth.

E. Hypothesis

Referring to the description above, the hypothesis in this study is formulated as follows:

- H1 : The Rupiah Exchange Rate has a Negative Effect on Yields of 1, 5 and 10 Year Government Bonds
- H2 : The BI Rate has a Positive Effect on Yields of Government Bonds with a period of 1, 5 and 10 Years
- H3 : CDS has a positive effect on yields of 1, 5 and 10 year government bonds
- H4 : Inflation has a negative effect on yields of 1, 5 and 10 year government bonds
- H5 : JCI has a negative effect on yields of 1, 5 and 10 year government bonds
- H6 : FFR has a positive effect on yields of 1, 5 and 10 year government bonds
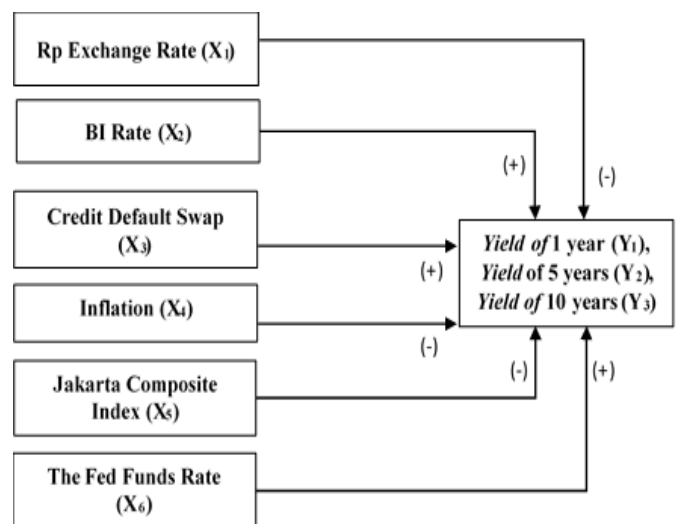
F. Conceptual Framework

Fig. 3: Conceptual Framework

III. RESEARCH METHOD

A. Types of research

This observation is a quantitative type using secondary data in the form of time series. Data is collected on a monthly basis through Bloomberg, Bank Indonesia, IBPA and the Central Statistics Agency (BPS). The research period was conducted from January 2011 to December 2020.

B. Population and sample

The object of this observation is a bond instrument issued by the Indonesian government. As a sample are Indonesian government bonds denominated in Rupiah with maturities of 1, 5 and 10 years.

C. Data Analysis Method

This observation will analyse the effects and contributions of the exchange rate, BI rate, CDS, JCI, Inflation and Fed Fund Rate on Indonesian government bond yields, the analysis method used is linear regression through the VAR or VECM data analysis method which is processed using the application eViews 12. VAR analysis approach is used if the data is stationary and there is no cointegration, while VECM is used if the data is found to be stationary and cointegration occurs. To determine the right model then The first steps are: data stationarity test, optimal lag test and cointegration test.

IV. RESULT AND DISCUSSION

A. Research Result

a) Stationary Test

The results of the stationary test for the six variables showed that all of the variables tested with probability were below 0,05 (for <5%) which means that all data variables were stationary or all data had passed the stationary test at the first difference stage.

Variable	Level		First Difference	
	P-Value	Description	P-Value	Description
Y1	0,3331	Not Stationary	0,0000	Stationary
Y2	0,2868	Not Stationary	0,0000	Stationary
Y3	0,1315	Not Stationary	0,0000	Stationary
BIR	0,6984	Not Stationary	0,0001	Stationary
CDS	0,1170	Not Stationary	0,0000	Stationary
FFR	0,6974	Not Stationary	0,0000	Stationary
JCI	0,2726	Not Stationary	0,0000	Stationary
INF	0,4583	Not Stationary	0,0000	Stationary
Exchange Rate	0,5176	Not Stationary	0,0000	Stationary

Table 1. Stationary test result

b) Optimal Lag Test

Followed by the stages of the VAR model to determine the optimal number of lags using criterion parameters based on Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC) and Hannan-Quinn Information Criterion (HQ). Determination of the optimal lag is done before starting the cointegration test stage.

VAR Lag Order Selection Criteria
Endogenous variables: D(Y1) D(BIR) D(CDS) D(FFR) D(IHSG) D(INF) D(KURS)
Exogenous variables: C
Date: 09/08/21   Time: 15:59
Sample: 2011M01 2020M12
Included observations: 116

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2132.116	NA	24548893*	36.88131	37.04748*	36.94877*
1	-2093.590	71.73786	29452744	37.06190	38.39122	37.60153
2	-2033.575	104.5087	24570173	36.87199*	39.36446	37.88379
3	-1987.312	74.97914*	26339178	36.91917	40.57480	38.40314

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Table 2: Optimal lag test results on yield of 1 year government bond

Seen from table 2, the results of determining the optimal lag length for 1 year *yields* are in the 2nd lag

VAR Lag Order Selection Criteria
Endogenous variables: D(Y2) D(BIR) D(CDS) D(FFR) D(IHSG) D(INF) D(KURS)
Exogenous variables: C
Date: 09/08/21   Time: 22:21
Sample: 2011M01 2020M12
Included observations: 116

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2112.802	NA	17595750*	36.54830*	36.71447*	36.61576*
1	-2072.535	74.97974	20486381	36.69888	38.02819	37.23850
2	-2017.451	95.92250	18606629	36.59398	39.08645	37.60578
3	-1972.151	73.41599*	20280734	36.65778	40.31341	38.14176

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

because they match the criteria of AIC, FPE, SC and HQ. The AIC criterion has the smallest value (as indicated by the asterisk (*) indication on the test instrument).

Table 3 Optimal lag test on yield of 5 years government bond

Based on table 3, the determination of the optimal internal lag for 5 year yields is based on the criteria, which is, lag 3. The most frequent lag is marked with an asterisk (*) at the end of each value, that is lag 0. However, because the model goodness test cannot be done at lag 0, then for the next estimation, lag 3 is used which has the smallest LR criteria and with an asterisk (*) at the end of the value.

VAR Lag Order Selection Criteria
Endogenous variables: D(Y3) D(BIR) D(CDS) D(FFR) D(IHSG) D(INF) D(KURS)
Exogenous variables: C
Date: 09/08/21   Time: 22:49
Sample: 2011M01 2020M12
Included observations: 116

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2115.104	NA	18308405*	36.58801*	36.75417*	36.65546*
1	-2075.342	74.04070	21502258	36.74727	38.07659	37.28690
2	-2020.825	94.93514	19721143	36.65215	39.14462	37.66395
3	-1974.941	74.36319*	21280011	36.70588	40.36151	38.18985

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Table 4: Optimal lag test on yield of 10 years
government bond

Based on table 4, the most optimal lag according to
the criteria of AIC, FPE, SC and HQ on the 10-year yield
is at lag 3 which has the smallest LR criteria and with an
asterisk (*) at the end of the value.

c) Cointegration Test
The cointegration test term in this observation uses
the Johanssen Cointegration test method. Cointegration
test aims to be able to show the long-term correlation of
variables in an observation. For stationary data that
occurs in the differentiation process but does not occur
cointegrated, an example that can be used is VAR with
differentiation data (VAR in difference). However, if
stationary data occurs in the differentiation process and is
cointegrated, the Vector Error Correction Model (VECM)
is used. Trace statistics are the criteria that underlie
cointegration testing. .an equation is cointegrated if the
trace statistic is greater than the critical value of 5%.
From the results of the cointegration test on all the
observed variables there is a cointegration correlation so
that it was developed into a VECM analysis.

d) VECM Estimation Results
If the research variables have been proven to have
a cointegration relationship, then proceed with the VECM
estimation model. The VECM estimation results to
identify the short-term and long-term correlation of the
effect of the dependent variable yield on government
bonds with a period of 1 year, 5 years and 10 years on the
independent variables, that are the BI Rate, CDS, Fed
Fund Rates, JCI, Inflation, and the Rupiah Exchange
Rate.

e) Impulse Response Function (IRF)
After all the tests have been met through the
VECM stage, the Impulse Response Function (IRF)
analysis is used to determine the response of an
endogenous variable to a certain shock (Firdaus, 2018).
The IRF test results on all research variables are as
follows:

Yield of 1 Year Government Bond
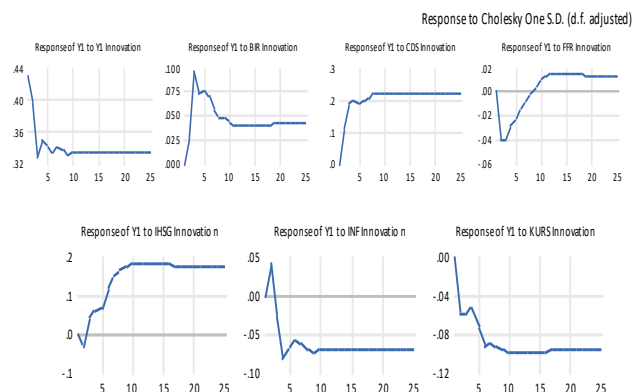
Yield of 5 Years Government Bond
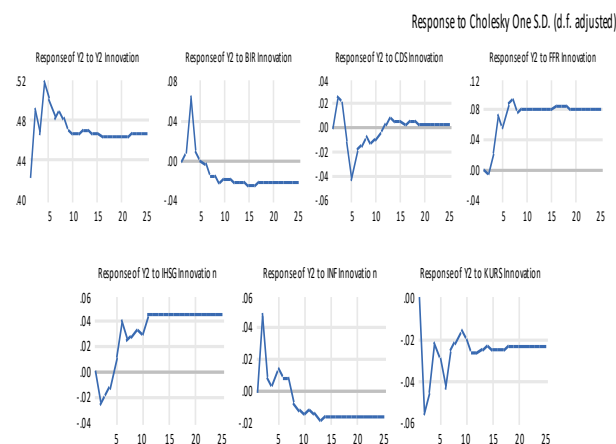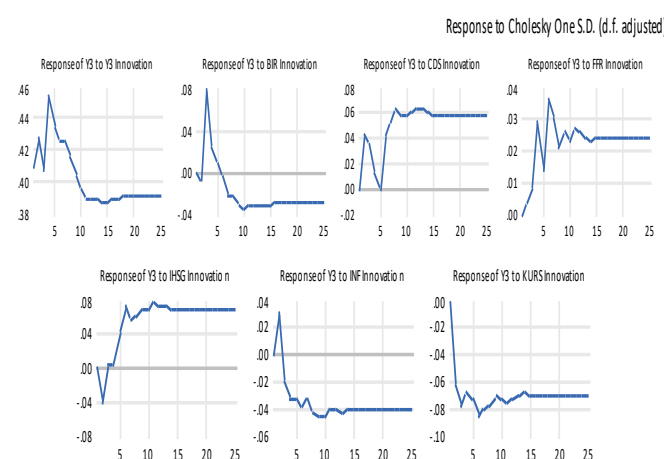

Yield of 10 Years Government Bond

Fig. 4: Responses to Government Bond Yields
with 1, 5 and 10 Year

• Government Bond Yields with 1, 5 and 10 years
If there is a shock of one standard deviation to the
bond yields with 1, 5 and 10 years term, the yields
themselves will respond positively at the beginning
to the end of the period.

• The Exchange rate
If there is a shock of one standard deviation to
exchange rate, then the bond yields with 1, 5 and 10

years term respond negatively from the beginning of the period to the end.

- BI rate

  If there is a shock of one standard deviation in the BI Rate, the bond yield with 1 year term will respond stably to the shock with a positive trend until the end of the projection period.Whereas if there is a shock of one standard deviation in the BI rate, the bond yield with 5 and 10 years term will respond negatively.

- Credit Default Swap

  A shock of one standard deviation on CDS will be responded positively to the bond yield with 1 and 10 years term from the beginning of the period to the end of the projection period. .Meanwhile, a shock of one standard deviation on CDS on the bond yield with 5 years term will be responded positively in the long term even though it had a negative reaction in the 4th to 11th periods and rose to positive in the 12th period by 0,002597 to end of projection periode.

- Inflation

  A shocks of one standard deviation to inflation will be responded negatively by the bond yield with 1 and 10 years term in the 3rd period until the end of the projection period. .As for the bond yield with 5 years term, a negative response in the 8th period will be -0,007870 until the end of the projection period.

- Jakarta Stock Exchange Composite Index (JCI)

  If there is a shock of one standard deviation to the JCI, the bond yield with 1, 5 and 10 years term will be responded positively in the long term.

- The Fed Funds Rate

  If there is a shock of one standard deviation to the FFR, the bond yield 1 years term will be responded positively starting in the 9th period of 0,004938. As for the bond yield with 5 and 10 years term, a stable positive response will be given in the long term from the beginning of the period.

f) Forecast Error Variance Decomposition (FEVD)

Furthermore, the FEVD test is carried out which is a series with the IRF test. The FEVD test aims to measure the magnitude of the effect contribution of each independent variable on the dependent variable. In this method can be reviewed the strengths and weaknesses of each variable affecting other variables over a long period of time.

PERIOD	YIELD	BIR	CDS	FFR	JCI	INF	Ex. Rate
Yield of 1 Year Government Bond							
1	100,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
10	66,5685	1,9264	18,6438	0,2701	7,3817	1,9840	3,2249
15	61,7335	1,5094	20,2699	0,2090	10,3542	2,1484	3,7746
20	59,7048	1,3271	21,0169	0,1797	11,5403	2,2183	4,0127

PERIOD	YIELD	BIR	CDS	FFR	JCI	INF	Ex. Rate
Yield of 5 Years Government Bond							
1	100,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
10	96,8563	0,2386	0,1762	1,8769	0,2795	0,1298	0,4423
15	96,4172	0,2352	0,1222	2,2166	0,4900	0,1249	0,3934
20	96,1545	0,2412	0,0942	2,4232	0,6013	0,1237	0,3615

PERIOD	YIELD	BIR	CDS	FFR	JCI	INF	Ex. Rate
Yield of 10 Years Government Bond							
1	100,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
10	93,5250	0,5237	0,9910	0,2650	1,2692	0,6497	2,6760
15	92,3175	0,5602	1,3647	0,2980	1,9085	0,7672	2,7836
20	91,8548	0,5490	1,5188	0,3079	2,1299	0,8177	2,8214

Table 5: FEVD Test Results

Based on the table data above, the biggest contribution that affects the yield of 1,5 and 10 year government bonds is the bond yield itself. In addition, the CDS variable has a contribution of 21,01% and the JCI has a contribution of 11,5% to the yield of 1-year government bond.

B. Discussion of Research Results

a) Effect of the Rupiah Exchange Rate on yields of 1, 5 and 10 year government bonds

Based on the results of the IRF test, the exchange rate has a negative effect on yields of 1, 5 and 10 year government bonds. This negative response means that the decline in the exchange rate (the strengthening of the Rupiah exchange rate) has led to a decrease in bond yields in all these periods. The occurrence of shocks in the exchange rate variable of one standard deviation caused the yield on government bonds to decline and continue to decline until the end of the period. If we look at the results of the analysis of variance decomposition, the exchange rate does not have a contributing effect on the movement of bond yields.

The negative effect of government bond yields on the rupiah exchange rate variable against the strengthening USD caused a decrease in government bond yields. This influence relationship is due to the ownership of Indonesian government bond yields are mostly owned by foreign investors so that foreigners will be very happy if the Rupiah experiences a strengthening, investors will invest their funds in the bond market of course, this causes bond prices to increase and government bond yields to decline. The results of this observation are consistent with the proposed hypothesis and are in line with the results of research conducted by Kurniasih & Restika (2015), Ichsan, Agusalim & Abdullah (2018) and Saenong et.al (2020).

b) The effect of the BI rate on yields of 1, 5 and 10 years government bonds

Based on the results of the IRF test, the BI rate shocks in the yield of government bonds with a period of 1 year were responded positively, which means that shocks to the BI rate will affect changes in yields which are statistically increasing or positive. Since 2016, Bank Indonesia has imposed the BI 7-Day (Reverse) Repo Rate shortened to BI Rate, so that this greatly affects the yield of 1 year bonds. These findings support the theory of interest rate structure, if interest rates increase, bond yields will also increase. The results of this study are in line with previous research conducted by Santosa (2020) which found that if the BI Rate increased, then in the short term the yield on government bonds would rise.

Meanwhile, from the results of the same test, the BI rate variable has a negative effect on government bonds with a period of 5 years and 10 years. Meanwhile, if viewed from the analysis of variance decomposition, the BI rate has no contribution to changes in yields. This finding means that the longer the investment period is related to the risk of changes in interest rates where an increase in the BI rate will reduce government bond yields. These observations are in line with the liquidity theory which states that investors will prefer short-term bonds because they have a small interest risk, as well as the results of observations made by Muktiyanto & Aulia (2019) stating that the BI rate has a significant negative effect on yields government bonds in the long term.

c) The effect of Credit Default Swap (CDS) on yields of 1, 5 and 10 year government bonds

Based on the results of the IRF test, 10 year CDS have a positive effect on yields of 1, 5 and 10 year government bonds. This positive response means that an increase in 10 year CDS will encourage an increase in yields on government bonds, both short-term and long-term. In addition, the results of the analysis of variance decomposition show that the 10 year tenor CDS variable has the largest contribution to the 1 year tenor government bond yields, with an effect of 21,02% in the 20th period. These observations are consistent with the hypothesis made by Muktiyanto & Aulia (2019), Ernawati, Surwanti & Pribadi (2020) and Tjandrasa, Siagian & Lie (2020) which state that the increase in default risk will increase the currency risk premium and default borne by investors, especially foreign investors. This is because especially foreign investors will ultimately be compensated for by *higher* government bond yields.

d) Effect of Inflation on yields of 1, 5 and 10 year government bonds

Based on the results of the IRF test, inflation has a negative effect on government bonds with maturities of 1, 5 and 10 years. This negative response could be interpreted that the downward push down yields bond in all these periods. One standard deviation shocks on inflation resulted government bond yields to decline and continue to decline until the end of the period. .When viewed from the results of the analysis of variance decomposition, it has no contribution effect on the movement of bond yields.

This finding is consistent with the initial hypothesis and is in line with previous research which said that when inflation rose, it indicated that people's purchasing power was increasing, causing the price of securities to rise. When bond prices rise, bond yields fall.This theory is supported by research conducted by Sundoro (2018), Nia & Hamzah (2020), Santosa (2020), Permanasari & Kurniasih (2021) which concluded that inflation has a negative effect on bond yields, meaning that when inflation rises, *yields* government bond will fall.

e) Effect of Jakarta Composite Index (JCI) on yields of 1, 5 and 10 year government bonds

Based on the results of the IRF test, the JCI shocks to yields of 1, 5 and 10 year government bonds responded positively. This positive response means that when the JCI experiences an increase, the yield on government bonds in all these periods will increase. Although in several studies conducted by Sundoro (2018) and Tjandrasa, Siagian, & Lie (2020) it is explained that there is a negative effect between the JCI and government bond yields, when the JCI rises, government bond yields will fall. However, in this research period, a positive relationship was produced between the JCI and yields on government bonds, this often happens because government bonds are seen as a safe asset or referred to as "*Bonds as a Safe haven*" during economic turmoil occurs. Therefore, investors will tend to secure their riskier assets such as stocks into lower-risk assets with fixed income, like investing in bonds.

This finding is supported by Baur and McDermott (2012) who found that in times of uncertainty, bonds are considered safe investments. .In addition, research from Gulko (2002) also suggests that stocks and bonds are positively correlated because of their exposure to general macroeconomic conditions such as inflation rates, interest rates, economic growth, etc. Meanwhile, from the analysis of variance decomposition, the JCI variable does not contribute to government bond yields.

f) The effect of Fed Funds Rate (FFR) on yields of 1, 5 and 10 year government bonds

Based on the results of the IRF test, FFR has a positive effect on yields of 1, 5 and 10 year government bonds. This positive response can be interpreted that the increase in FFR will encourage an increase in bond yields in all these time periods. While the results of the analysis of variance decomposition of the FFR variable do not contribute to bond yields.

The FFR is a very important benchmark interest rate for financial market participants, both in the United States and throughout the country. The increase in FFR during the study period was influenced by the impact of US government intervention as a global factor in depressed bond markets, which pushed up government bond yields throughout the study period. This finding is consistent with the initial hypothesis and in accordance with

previous research by Yieand & Chen (2019) which said that the FED rate had a positive effect on bond yields.

V. CONCLUSIONS AND SUGESTIONS

A. Conclusions
- The exchange rate has a negative effect on the yields of 1, 5 and 10 year government bonds.
- The BI rate has a positive effect on the yields of 1 year government bonds and has a negative effect on the yields of 5 and 10 years government bonds.
- CDS has a positive effect on yields of 1, 5 and 10 year government bonds.
- Inflation has a negative effect on yields of 1, 5 and 10 year government bonds.
- The JCI has a positive effect on yields of 1, 5 and 10 year government bonds.
- The Fed Funds Rate has a positive effect on yields of 1, 5 and 10 year government bonds.
- The biggest contribution to the yield of 1, 5 and 10 year government bonds is the yield of the bonds themselves, besides that CDS and JCI also have a significant contribution to 1 year government bonds.

B. Suggestion
- The government should pay more attention to many aspects in determining the coupon determination because high coupon bonds issued will increase yields and reduce bond prices. For example, when a new series of sovereign bonds is issued in the primary market, the government must pay attention to whether the timing of the issuance is in ideal market conditions.
- The government needs to maintain that investment risk or credit default swap (CDS) remains stable at a low level and the JCI movement trend does not decline. In the midst of uncertain global conditions, ways to keep risk levels low can be maximized from the domestic side, for example by maintaining socio-political economic stability and a conducive investment climate by issuing accommodative policies. Meanwhile, from an investor's perspective, in order to maximize profits, it is also necessary to pay attention to the trend of CDS movements before investing in bonds.
- For further research, it is necessary to conduct qualitative tests and also conduct research on corporate bonds with influencing factors related to company performance.

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