Print ISSN: 2288-4637 / Online ISSN 2288-4645
doi:10.13106/jafeb.2020.vol7.no11.127

Do Real Interest Rate, Gross Domestic Savings and Net Exports Matter in Economic Growth? Evidence from Indonesia*

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Received: August 01, 2020 Revised: September 20, 2020 Accepted: October 05, 2020

Abstract

This study aims to measure the effects of real interest rate (RIR), gross domestic savings (GDS), and net exports (EN) shocks on Indonesia's economic growth (EG). The focus on Indonesia is unique due to the abundant resources available in the nation, but they are unsuccessful in boosting economic growth. This study applied a quantitative method to comprehensively analyze the correlation between variables by employing Vector Autoregression Model (VAR) combined with Vector Error Correction Model (VECM). Various procedures are preformed: Augmented Dickey–Fuller test (ADF), Optimum Lag Test, Johansen Cointegration Test, Granger Causality Test, as well as Impulse Response Function (IRF) and Error Variance Decomposition Analysis (FEVD). The data were collected from the World Bank and the Asian Development Bank from 1986 to 2017. The findings of the study indicated that economic growth responded positively to real interest rate shocks, which implies that when the real interest rate experiences a shock (increase), the economy will be inclined to growth. While, economic growth responded negatively to gross domestic savings and net export shocks. Policymakers are expected to consider several matters, particularly the economic conditions at the time of formulating policy, so that the prediction effectiveness of a policy can be appropriately assessed.

Keywords: Economic Growth, Net Exports, Economic Education, Gross Domestic Savings, Real Interest Rate

JEL Classification Code: B22, C22, E43, F41

1. Introduction

Economic growth (EG) is a delicate phenomenon and plays a critical role in a nation (Najarzadeh et al., 2012; Dinh, 2019), which also illustrates the increase in a country's economic productivity (Daňová & Vozárová, 2020). However, some experts conclude that any nation's financial development reflects its capacity to extend the generation of products and administrations. For instance, Asbiantari et al. (2018) mentioned that economic growth from year to year is presented through Gross Domestic Product (GDP) at constant prices according to the regular business field. The simplest definition of economic growth can be stated as the increase in the GDP of that country (Saymeh & Orabi, 2013). A country's government activities, aside from high growth rates, considers the speed of economic development to bring up the standard of living and well-being of society; where standards are raised, life is not just only improving the income, but also increasing the demand for goods and services in the community, which is good in terms of quality and quantity (Indriyani, 2016).

Increased economic development will also be accompanied by economic growth in a country. s and investment

***Acknowledgements:**
The highest appreciation provides to Institut Agama Islam Negeri Tulungagung, Ahmad Dahlan University Yogyakarta and Universitas Negeri Malang for facilitating the completion of this research.

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have been described as very important in enhancing the level of growth, especially in developing economies (Abusomwan & Ezebuihe, 2017). Private investment funds play an essential part in financing improvement and maintaining development. The decline in savings will be reflected in economic growth and development (Hussein et al., 2017). Economic growth in a country is indeed inseparable from the role of investment, while there is an investment shock in a country; it will have a significant effect on the country's national income (Sari & Baskara, 2018). In the centrally-planned economies, money played only a limited role as a medium of exchange (Caporale et al., 2014). According to Indriyani (2016), interest rates can be seen as a mechanism for allocating resources and the economy. Interest rates can affect the balance between public savings and investment in the real sector, further affecting the number of jobs and the unemployment rate, further implications can affect people's income (Parakkasi, 2016).

An essential part of the development literature emphasizes a robust causal connection running from the growth of trade to the growth of income, suggesting that trade is the engine of growth (El-Sakka & Al-Mutairi, 2000). Exports of goods and services are seen as an engine of economic and social development, including exports that require companies to innovate and improve to maintain market share (Bakari & Mabrouki, 2017). On the other hand, exports increase a nation's foreign exchange reserves, which allow the central bank to defend the domestic currency and stabilize its value, while lowering the cost of exports to foreign countries (Indriyani, 2016).

The study makes two primary contributions. First, this study presents an insight into the existing literature on macroeconomic factors and economic growth by bringing in net exports, which is largely missing in the prior studies. Second, studies of economic growth have investigated various countries such as Thailand, Laos, Philippines, Ethiopia, Uganda, Iran, among others. However, there is little scholarly attention to macroeconomic and economic growth in the context of Indonesia. The existing work includes Sujianto (2020) who is concerned with the balance of payment and economic growth. Other studies (Kim & Yoo, 2016) focused on the impact of coal consumption and economic growth. Lastly, Nursini (2017) investigated the relationship between trade openness and economic growth in Indonesia. The focused study on Indonesia is unique in that the abundant resources available in the nation unsuccessfully boost economic growth.

2. Literature Review

Gross Domestic Product (GDP) is fast becoming a key instrument in a nation. Economic growth is the primary indicator to describe the progress of a country over a certain period (Sunde, 2017; Černohorsk & Kula, 2017). Economic growth is calculated from the percentage increase in GDP at constant prices in one year against the previous year (Mankiw & Reis, 2018). Among the approaches in measuring GDP, the expenditure approach is commonly used by scholars, which involves the export and import variables. Both exports and imports are essential variables in determining the economic growth of a country. Exports can increase GDP, while imports can reduce GDP (Bakari & Mabrouki, 2018). The GDP can later be compared to see the high and low economic growth of a country. On the other hand, essential exports and imports cannot be separated from the exchange rate. A country can be encouraged to export more with the country's lower exchange rates, and vice versa. The fundamental rationale is because the income from the domestic currency triggers a lower exchange rate. In comparison, transfers that apply to interests are the opposite.

There is a growing body of literature that recognizes macroeconomic variables and economic growth in several countries and shows various results. For instance, Najarzadeh et al. (2012) examined relations between economic growth and real interest rate (RIR) in selected Islamic countries. The results reveal no significant causal relationship between real interest rate (RIR) and economic growth. Additionally, Masih and AbdulKarim (2014) investigated the causal chain among output, money, prices, exchange rate, and inflation in the context of the Nigerian economy following the global economic crisis that hit many countries. From the VECM analysis, it suggests that output, interest rate, and prices are the leading variables, while exchange rate and money appear to have borne the brunt of the short-run adjustments. Indeed, Ajlouni (2018) stated that the real interest rate (RIR) plays a crucial role in maintaining inflation and price stability so that the stability of Jordan's economic growth can be realized. Whereas in Australia, Hsing (2017) showed that in the short term the real interest rate (RIR) boosts GDP which lead to economic growth.

H1: *The shocks of the real interest rate have a positive impact on economic growth in Indonesia*

Furthermore, Urbanovský (2017) remarked that the change in real gross domestic product could change the interest rate. Indeed, Misztal (2011) confirmed the existence of a one-way causal relationship between gross domestic savings and GDP in the case of developed countries as well as in developing and transition countries. Sothan (2014) examined the direction of causality between domestic savings and economic growth in Cambodia. The study found that domestic savings do not Granger cause economic growth. The result goes contrary to the conventional wisdom that causality runs from savings to economic growth. Najarzadeh et al. (2014) showed that there is a long-run

causal relationship between savings and economic growth, and between savings and non-oil economic growth, and that these relations are two-way in Iran.

H2: *The shocks of the gross domestic savings have a positive impact on economic growth in Indonesia*

Elias and Worku (2015) showed that economic growth accelerates gross domestic savings in the case of Ethiopia and Uganda. In addition, Tsen (2007) showed that exports, consumption, and investment are essential to economic growth, the rise in exports might further enable cost reductions, which might result in further productivity gains. Sujianto (2020) examined the causality of national income, consumption, investment, government spending, and exports. The results showed that there is a one-way relationship where economic growth encourages net exports in Indonesia, Malaysia, the Philippines, and Thailand. Raj and Chand (2017) found that there is a strong positive relationship between exports and economic growth. Furthermore, a prior study by Hye et al. (2016) found that export value was the key to the success of China's economy both in the short and long term in the 1975-2009 period.

H3: *The shocks of net exports have a positive impact on economic growth in Indonesia*

These four macroeconomic indicators are essential in a country's economy. A nation's wealth is generally characterized by a robust exchange rates, managed net exports, and gross domestic savings. Interestingly, these variables turned out to have a relationship that is still a question mark, particularly in Indonesia. Therefore, this present study aims at providing a comprehensive analysis of these crucial variables. Furthermore, this study covers a relatively long period from 1986 to 2017.

3. Research Methods and Materials

This study applied a quantitative method to comprehensively understand the correlation between variables by using Vector Autoregression Model (VAR). A major advantage of the method is that the VAR modeling can treat all variables as endogenous and understand the relationship between variables with Granger causality. The VAR can also be analyzed from the effect of a shock of one variable to other variables through Impulse Response. It can also be seen how the variance of a variable is explained by itself and other variables through Variance Decomposition. Furthermore, when the data used stationary at first differencing level, the VAR model will be combined with the Vector Error Correction Model (VECM). The research approach used causality research, in addition to measuring the strength of the relationship between two or more variables; it also shows the direction of the relationship between independent variables and the dependent variable (questioning causality). The data are taken from official sources, World Bank and Asian Development Bank, from the period 1986 to 2017. Data were normalized or aligned by using the natural logarithm (ln). The variables used in this study are three independent variable and one dependent variable. The dependent variable is the economic growth, while the independent variable are real inerest rate, gross domestic savings, and net exports. This study follows VAR models equation from Pantas (2017) with modification for the different variables.

$$\ln EGt = \alpha 0+\alpha 1 LnRIRt + \alpha 2 LnGDSt + \alpha 3 lnENt + \varepsilon t \quad (1)$$

$$\Delta \ln EGt = \alpha 0+ \alpha 1 \Delta LnRIRt + \alpha 2 \Delta LnGDSt + \alpha 3 \Delta lnENt + \alpha 4 \Delta LnEGt+\alpha 5 LnRIRt-1+ \alpha 6 LnGDSt-1 + \alpha 7 LnRIRt-1 + \varepsilon t \quad (2)$$

4. Results and Discussion

4.1. Stationarity Test Data

ADF test at level first difference based on Table 1 shows that all data are stationary at 5% significance level. This means that the data used in this study are integrated into order one I (1). Sims (1980) rejects the use of variables difference because it will waste valuable information (long-term) associated with the unidirectional movement of data. Therefore, to analyze the long-term information will use the data levels so that the VAR model will be combined with the Vector Error Correction Model (VECM) (Ascarya et al., 2008).

Table 1: Stationarity ADF Test Results

Variable	Value ADF		Critical Values Mackinnon 5%	
	Level	1ST DIF	Level	1ST DIF
Ln_EG	-0.392562	-6.006072	-2.960411	-2.963972
Ln_RIR	-5.526065	-9.927370	-2.960411	-2.963972
Ln_GDS	-0.953248	-7.162869	-2.960411	-2.963972
Ln_EN	-2.546998	-7.169290	-2.960411	-2.963972

4.2. Optimum Lag Test

The determination of optimal lag significant in the VAR approach for the lag of the endogenous variables in the equation system will be used as exogenous. The optimum lag test is useful to eliminate the problem of autocorrelation in the VAR system. Therefore, with the use of lag is expected to appear optimal autocorrelation problem. Based on Akaike Information Criterion (AIC) criteria, the smallest value is shown on the lag one, as indicated with an asterisk (*). Thus, in the next process for estimating equation models, VAR will use lag 1 with the LR (119.2850), FPE (0.265988), AIC (10.01465), and SC (10.94878).

4.3. Johansen Cointegration Test

Table 2 provides information about the cointegration testing results. According to Table 2, it can be seen that there is at least one rank cointegration at the 5% significance level, which means there are at least one cointegration equation models capable of explaining the overall economic growth.

4.4. VECM Estimation

Table 3 shows that the results are estimates VECM short-term error correction value of the short-term to long-term to the coefficient of Error Correction Term worth 0.186004 with velocity value in the adjustment to the long-term trend of 18.6 with one lag. Further, the error correction is statistically significant because of the value of t-statistic (2.37245) > T-table (1.96). In the short-term analysis, there is no variables that significantly affect economic growth. In the long run, all variables used in this study have a significant effect. Explanations for each variable to economic growth is as follows:

- Real interest rate (RIR) has a positive and significant impact on economic growth 3.45896. This means that if the real interest rate rose by one unit, the economic growth will rise by 3.45896 units.
- Gross domestic savings have a negative and significant impact on economic growth 20.4051. This means that if the gross domestic savings rose by one unit, then the economic growth will rise by 20.4051 unit.

Table 2: Result of Johansen Cointegration Test

Hypothesized No. of CE (s)	Eigenvalue	Trace statistics	0.05 critical Value	Prob. **
none *	0.724230	61.41636	47.85613	0.0016
At most 1	0.384486	24.05895	29.79707	0.1979
At most 2	0.286714	9.985331	15.49471	0.2819
At most 3	0.006428	0.187021	3.841466	0.6654

Note: * indicates cointegration at the 5% significance level.

Table 3: VECM test result

Short-term		
Variable	**Coefficient**	**T-Statistics**
CointEq1	0.186	2.372*
D (EG (-1))	-0.334	-2.224*
D (LN_RIR (-1))	0.041	0.440
D (LN_GDS (-1))	-0.060	-0.577
D (LN_EN (-1))	-0.109	-0.587
Long-term		
LN_RIR (-1)	-0.495	-3.458*
LN_GDS (-1)	-0.702	-20.405*
LN_EN (-1)	1.102	7.182*

Note: * indicates significant variables at 5%.

- Net exports have a negative and significant effect on economic growth 7.18222. This implies that if net exports rose by one unit, the economic growth will fall by 7.18222 unit.

4.5. Granger Causality Test

Granger causality test results show that there is no relationship either one-way or two-way exogenous variables, namely, real interest rate, gross domestic savings, and net exports with Indonesia's economic growth in the period 1986 to 2017, especially in Indonesia (see Table 4).

4.6. Analysis of Impulse Response Function (IRF)

IRF is used to see the contemporary influence of a dependent variable when getting shocks or innovation of the independent variable of one standard deviation. The IRF results are susceptible to sequencing. The following figure shows the results of the impulse response of economic growth due to shocks real interest rate, gross domestic savings, and net exports in the long term.

Summary results of the analysis of IRF's EG models:

- Shocks RIR: 0.17879 positive and permanent, stable began a period of 23
- Shocks GDS: 0.10751 negative and permanent, stable began a period of 31
- Shocks EN 0.32591 negative and permanent, stable began a period of 27

4.7. Forecasting Error Variance Decomposition Analysis (FEVD)

After analyzing the behavior of shocks through the impulse response, then the next step is to predict the contribution of each study variable to shocks or changes in certain variables to see the model through the Forecast Error Variance Decomposition (FEVD).

Figure 2 shows that variables influence dominant behavior shocks net exports in the first place, and gross domestic savings in second, while the variable real interest rate contributed less significantly to changes in the value of economic growth, amounting to 0.49 percent.

Table 4: Granger causality test

Null Hypothesis:	Prob.	F-Statistic
LN_RIR does not Granger Cause LN_EG	0.2429	1.49854
LN_EG does not Granger Cause LN_RIR	0.8981	0.10795
LN_GDS does not Granger Cause LN_EG	0.2446	1.49064
LN_EG does not Granger Cause LN_GDS	0.3693	1.03706
LN_EN does not Granger Cause LN_EG	0.2153	1.63409
LN_EG does not Granger Cause LN_EN	0.2873	1.31148

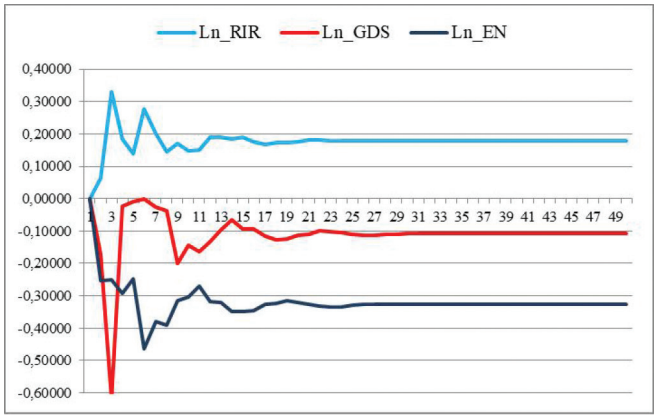

Figure 1: Test results graph Impulse Response Function (IRF)

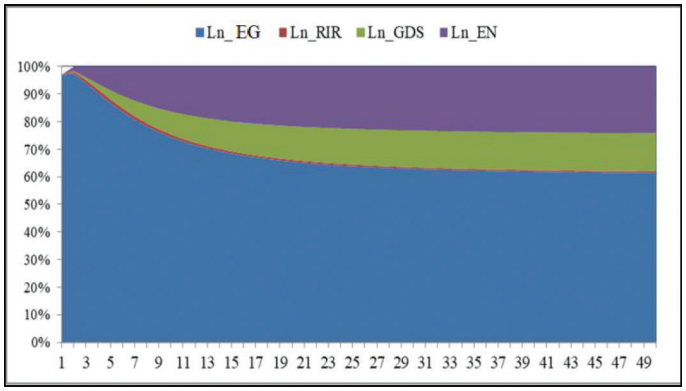

Figure 2: FEVD Graph

4.8. Discussion

The results of the analysis of the effect of variable real interest rate shocks, gross domestic product, and net exports on economic growth (EG) are reflected in the pattern of the Impulse Response Function (IRF). Furthermore, each variable's shaking contribution is reflected in the Forecast Error Variance Decomposition (FEVD) output. From the previous analysis, it can be known that shocks of real interest rate have a positive response on the economic growth and began to stabilize in the period from the 23rd until the end of the observation period. The findings support studies by Ajlouni (2018); Hsing (2017) showing that, in relation to the relationship between real interest rate and economic growth, the case in Indonesia is the same as Jordan and Australia in a certain time period. However, these results are not consistent with the hypothesis formulated and did not support findings by Masih and AbdulKarim (2014), which revealed that the exchange rate negatively affects economic growth.

Shocks of gross domestic savings responded negatively to economic growth and began to stabilize in the period from the 31st until the end of the observation period. In other words, when the economic growth experienced shocks (increase), then it is assumed it will undercut direct investment and trading activities, which will reduce economic growth. These results are not consistent with the hypothesis formulated and did not support findings by Elias and Worku (2015); Misztal (2011); Najarzadeh et al. (2012) which revealed that savings have a significant positive effect on economic growth.

The strategic effort to increase economic growth as a result of the gross domestic savings is by carrying out the "Yuk Investasi" investment movement as Rosmida and Wahyuni's (2017) study that the number of investors and financial inclusion and literacy increase with this campaign. Financial inclusion and literacy are useful to provide understanding to the community, as well as an economic education (investment) program early on for students in Indonesia (Ariyani, 2018).

Shocks of net exports responded negatively to economic growth and began to stabilize in the period from the 27th until the end of the observation period. In other words, when net exports experienced shocks (increase), then it is assumed they will reduce economic growth. These results are not consistent with the hypothesis formulated and did not support findings by Raj and Chand, (2017); Tsen (2007) who revealed that net exports have a significant positive effect on economic growth.

The findings indicate that there is no relationship, either one-way or two-way, of real interest rate variables with economic growth. This study supports a prior study by Karahan and Yilgör (2017) who remarked that in Turkey in 2002-2016, the real interest rate variable has an indirect relationship to economic growth through inflation. Indeed, Wuhan and Khurshid (2015) revealed that in 2003-2012 investment in Jiangsu Province, China, was influenced by the real interest rate, and indirectly the real interest rate is driving economic growth. However, this result contradicts some previous studies, such as Saymeh and Orabi, (2013) who showed that in Jordan in the 2000-2010 period, the real interest rate promoted economic growth. Additionally, Bashir et al. (2017) noted that the monetary policy is needed to boost economic growth, namely, real interest rate. The underlying rationale is that Indonesia's macroeconomic conditions are different from Pakistan.

In acquaintance with gross domestic savings, this study supports the findings by Rasmidatta (2011); Sothan (2014) that, in Cambodia in the 1989-2012 period, there was no two-way relationship between gross domestic savings and economic growth. Likewise, in Thailand, gross domestic savings does not encourage economic growth. This study is different from the findings by Khan and Sarker (2016);

Najarzadeh et al. (2014) that, as an essential factor in the economy, gross domestic savings encourages economic growth in Bangladesh; it is in Iran that in the 1972-2010 period there was a two-way relationship between gross domestic savings and economic growth. As for net exports, the results of this study contradict the research by Abbas (2012); Ahmad (2002); Ghartey (1993); Nushiwat (2008); Silaghi (2009) that there is a causal relationship between net exports and economic growth.

5. Conclusions

Real interest rate shocks responded positively to economic growth from the beginning of the period under investigation until the end and began to stabilize in the 23rd period with a value of 0.17879. In other words, when the real interest rate experiences a shock (increase), it will increase economic growth. Gross domestic savings shocks responded negatively to economic growth from the beginning of the period to the end of the period and began to stabilize in the 31st period with a value of -0.10751. It implies that when gross domestic savings experience a shock (increase), it will decrease the value of economic growth. Net exports shocks responded negatively to economic growth from the beginning of the period until the end of the period and began to stabilize in the 27th period with a value of -0.32591. It means that when net exports experience a shock (increase), they will decrease the value of economic growth. Policymakers are expected to consider several things, especially the economic conditions at the time of issuing policy, so that effective prediction of the implementation of a policy can be appropriately assessed. The variables studied also should be added, especially other macroeconomics variables, so the results obtained can be more thorough.

This study has limitations. Firstly, related to the variable macroeconomic indicators chosen to project very limited economic growth, namely, real interest rate, gross domestic savings and net exports. Secondly, on the aspect of findings, specifically the response of gross domestic savings to economic growth and the response of net exports to economic growth, where the results of the study showed significant negative responses. It is recommended that future research should add macroeconomic indicators such as consumption, investment, government spending, and imports, because these variables also contribute to economic growth. Future research should require a longer observation, especially to prove that gross domestic savings and net exports really have a significant negative impact on economic growth, and a comparative study with other countries that have the same characteristics as Indonesia is needed as well.

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