

DYNAMIC EFFECTS OF INTERACTION BETWEEN ECONOMIC GROWTH, INVESTMENT AND SAVINGS WITH INTERNATIONAL TRADE IN INDONESIA

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Abstract

Anticipation of economic uncertainty needs to be done to avoid the brink of crisis by maintaining the pace of economic growth, investment and savings climate as well as smooth international trade. This study aims to analyze and explore the dynamic relationship interaction between economic growth variables projected as Gross Domestic Product (GDP), investment, gross domestic savings and international trade of the Indonesian state with data in the period 1971-2020 obtained from the worldbank.org website. The research method uses the Vector Auto Regression (VAR) analysis model with the development of Impulse Response Function (IRF) and Variance Decomposition (VDC) analysis to explain the response of a variable to the shock of the variable itself and other variables. The results of the analysis revealed that the one-way relationship for the variables of investing, saving, and trading was influenced by the variable itself with a lag of one. In addition, the results of IRF analysis show that the variable response of economic growth, investment, savings and international trade is dominated by shocks to economic growth variables, and the results of VDC analysis show that economic growth variables most contribute to the variable response of economic growth itself, investment, savings and international trade. The results of this study can be used as a reference for the formulation of anticipatory policies by the government and Bank Indonesia in preventing the risk of economic crisis by maintaining macroeconomic variable stability so that the level of domestic market confidence is maintained in the outlook. Therefore, the policy stages that can be carried out are to control inflation, reduce the current account deficit, maintain fiscal balance and improve in managing foreign debt.

Keywords: Economic Growth, Investment, Savings, International Trade, Vector Auto Regression (VAR).

THE INTRODUCTION

Global uncertainty triggered by various issues such as the financial crisis, the Covid-19 pandemic to the Russia-Ukraine war which caused soaring commodity and energy prices had an impact on Indonesia's macroeconomic performance. Economic growth is a macroeconomic variable that is the main

and crucial highlight in assessing economic performance as well as the focus of a country's government policy (Makuria, 2015; Rahman et al., 2020; Sekine, 2022). This is because economic growth is one of the indicators in assessing and evaluating economic development conditions (Yuni, 2021). In addition, economic growth is also a benchmark for developing country governments in formulating policies to improve the status of developed countries (Tan & Tang, 2016). Existence Indonesia's economic growth as a country that is trying to improve its status to become a developed country is still very volatile and vulnerable to global crises as shown in Figure 1.

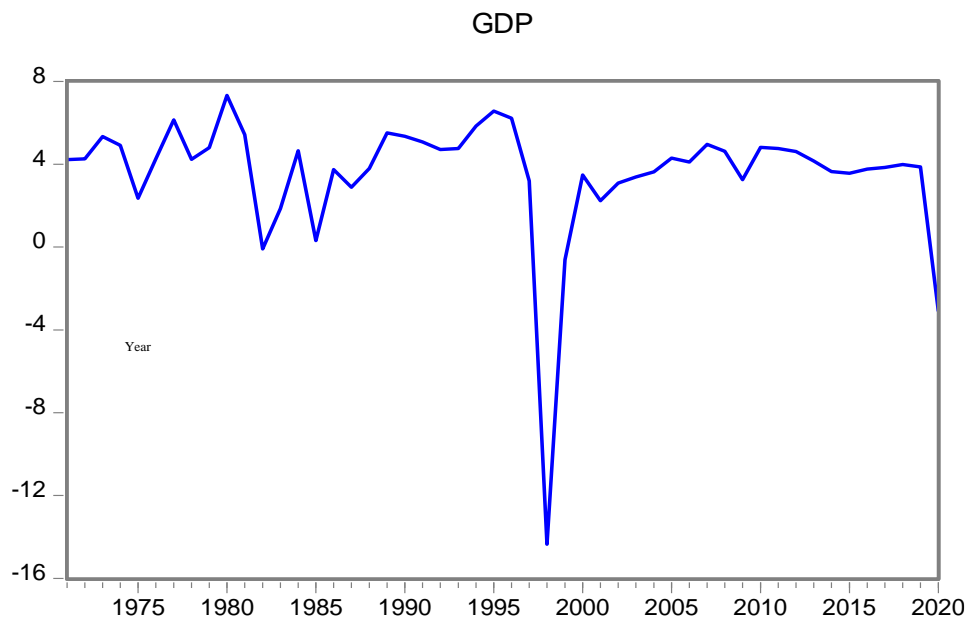


Figure 1. Economic Growth in 1975-2020 (Percent)

(Source : worldbank.org, 2020.)

The economic crisis has been in several periods, including the darkest occurred in 1997-1999 known as the monetary crisis that infected almost all countries in the world where economic growth was minus to above 15 percent. After that in 2008, the Indonesian economy was affected by the global financial crisis which had an effect in 2009 economic growth only touched 4.63 percent, down compared to the previous year of 6.01 percent. Then in 2020 the crisis due to Covid-19 caused Indonesia's economic growth to contract by 2.19 percent. In terms of movement, Indonesia's economic growth throughout the period 1975 to 2020 moved very fluctuating, which indicates the vulnerability of the

Indonesian economy by global factors.

In general, the performance of economic growth is caused by various influencing factors where these factors are also strongly influenced by the performance of economic growth, meaning that there is a causality relationship between these variables. One of them is investment which has an important role in supporting economic growth (Dankyi et al., 2022). Furthermore, stable economic growth reflects an automatic increase in people's income as well as increased demand in the market which encourages companies to expand through investment (Sukirno, 2000).

Investment comes from capital participation made by the government and private sector where the capital comes from domestic and foreign savings. From the domestic side, savings are influenced by economic growth which is a picture of people's income. Keynes's (1936) model revealed that increasing people's income has implications for increasing the availability of funds that are not used for consumption or has implications for increasing investment (Jhingan, 2016). However, there are various investment problems in Indonesia that are classic in nature, namely bureaucratic system problems that have not shown good performance such as permits, land disputes and regulatory uncertainty.

Furthermore, Solow's model (1970) explains, the savings rate plays an important role in the capital stock for investment which will produce a high output rate and it can happen the other way around which means there is a causality relationship between the savings rate and economic growth (Hasan & Fitra, 2013). The savings rate in Indonesia is currently still constrained by low income growth due to high levels of poverty and unemployment as well as lack of jobs due to the crisis caused by Covid-19. To overcome this, international economic openness, which can be described based on trade volume, has an important role in increasing investment and savings (Eslamloueyan & Jafari, 2010) . Furthermore, international trade will have an impact on sustainable



economic growth in the long run (Shahbaz, 2012). However, for Indonesia, the issue of international trade is still a major challenge that must be passed due to various problems faced today such as global uncertainty due to the lack of conducive political situations between countries in the world such as the Ukraine-Russia war which began at the beginning of 2022, still high dependence on imports, and the low quality of human resources.

So in general, based on the identification that has been explained, there is a flow of causality relationship between economic growth and the level of savings as a source of investment and international trade which is the determinant of economic growth. In addition, one of the investment levels is determined by the availability of funds sourced from the level of public savings, economic growth and gains from international trade. The availability of savings is also influenced by economic growth, thereby increasing the amount of funds that are not consumed by the public and also positively influenced by the growth of investment and international trade. In the end, the existence of Indonesia's international trade can be encouraged due to the stability of economic growth, a good investment climate and the availability of adequate savings as a source of funding.

So based on the identification of problems in this study, also variable analysis focuses on variables of economic growth, savings rates, investment and international trade. Some considerations focus on variables, including based on literature reviews that have been carried out, there is still controversy about the relationship between economic growth and investment, savings and international trade where there is insufficient empirical evidence about the specific nature of the relationship between these variables. In addition, these variables also have relationships that influence each other so it is important to analyze causally, and the response and proportion of changes in a variable to changes (shock) other variables.

The novelty in this study compared to previous studies lies in the selection of variables that have not previously been analyzed at once in causality analysis, analysis of the response of a variable to the shock of other variables in the long run and the proportion of changes in a variable as a result of the shock of the variable compared to shocks of other variables. Therefore, this study aims to analyze the causality relationship and dynamic effects between economic growth, investment, savings and trade in Indonesia with a more in-depth study than previous studies because this study involves a longer historical period (1971-2020) which aims to produce in-depth information related to shock and response variables in this study.

LITERATURE REVIEW

The interaction between economic growth and investment, savings and trade

The paradigm of economic growth according to Solow's theory focuses on changes in factors of production, including capital in the sense of savings-investment and labor. In addition, the Harrod-Domar model also states that savings and investment are sources of economic growth. The difference between the two models lies in the marginal rate of return where Solow's model assumes that the marginal rate of return is declining but the Harrod-Domar model assumes that the marginal rate of return is constant (Yustika, 2012). In addition, to support the existence of economic growth is maintained with additional investment and savings, opening the tap of interaction with the international world on the trade side is a positive thing for increasing income. Countries with open economies will benefit from trade in terms of technology knowledge transfer (Barro & Salai-i-Martin, 1995). In addition, international trade increases competition between domestic and international markets so that it will naturally explore the potential that will increase economies of scale as well as specialization and ultimately expand market size (Melitz & Ottaviano, 2008).



Causality Relationship between Investment and Economic Growth

Several empirical studies prove that investment has a causality relationship, including studies (Nupehewa et al., 2022 ; Tan & Tang, 2011; Tan & Tang, 2016; Fatiha & Masih, 2017) stated that investment, especially in foreign direct investment, affects economic growth through the transfer of technological knowledge from foreign countries so that production methods become more effective and efficient, especially in the manufacturing sector industry as well as the existence of manpower training, skill acquisition and better management patterns. Furthermore, economic growth can also affect the increase in investment through investor confidence in guaranteed future returns. (Tan & Tang, 2011; Tan & Tang, 2016; Fatiha & Masih, 2017). On the other hand, several studies confirm that there is no causality between investment and economic growth (Mehanna, 2011; Jangili, 2011; Bakari, 2018; Suhel, 2008; Saimul & Darmawan, 2020; Juliansyah et al., 2022)

Causality Relationship between Savings and Economic Growth

Savings and economic growth have a causal relationship where the savings rate describes the availability of capital that can be invested so that it will affect economic growth. Conversely, stable economic growth will have an impact on increasing income from international trade and foreign investment, so that economic growth will also increase domestic savings. This is also evidenced by several empirical studies (Saltz, 199; Andersson, 1999; AbuAl-Foul, 2010); Zhang et al., 2017). However, some empirical evidence suggests that there is no causality between the rate of savings and economic growth as expressed (Zangeneh, 2006; Tang, 2010; Makuria, 2015; Karahan, 2018); (Đidelija, 2021).

Causality Relationship between International Trade and Economic Growth

Previous studies revealed that international trade and economic growth have a causal impact where trade has an impact on increasing income derived from exports and imports that are carried out to present new technology so that the transfer of technological knowledge occurs which in the end the production process carried out can be more efficient. In addition, the economic growth rate will increase trade due to additional domestic income. The results were confirmed by several previous findings, including: (Ismail & Harjito, 2009; Shahbaz, 2012; Jiranyakul, 2014; Fatiha & Masih, 2017; Alam & Sumon, 2020; Abugamea, 2019); Gries & Redlin, 2020; Saimul & Darmawan, 2020). In contrast, other findings found no causality relationship between international trade and economic growth (Kalaitzi, 2018; Juliansyah et al., 2022).

Causality Relationship between Savings and Investment

Savings and investment have a causality relationship where the savings rate is a reflection of the availability of capital that can be invested, besides that the investment level will increase income in the future so that high income is a determinant of the amount of savings. This has been proven through several studies including: (Chakrabarti, 2006; Irandoust, 2019). Other results confirm the opposite result, there is no causality relationship between savings and investment (Jangili, 2011; Nguena, 2011; Otoo et al., 2020)

Causality Relationship between Savings and International Trade

Several empirical studies prove that saving and trading indirectly, especially through income and capital levels, have a causality relationship. The results of international trade have an impact on increasing income which further increases the availability of funds saved. The savings rate will determine the availability of capital used as an instrument to support trade. This result has



been proven through several studies among others (Liu, 2009; Gries & Redlin, 2020).

Causality Relationship between Investment and International Trade

Previous empirical studies have revealed that investment and international trade have a causality, albeit indirect, relationship with which the level of investment affects trade through increased revenue. This is based on the findings (Bajo-Rubio, 2001; Dritsaki et al., 2004; Akadiri et al., 2020; Rani & Kumar, 2019). However, case studies in Indonesia did not find a causality relationship between investment and international trade (Herdianto, 2021).

METHODOLOGY

Time series data analysis techniques with a Vector Auto Regression (VAR) approach were used in this study with the aim of producing empirical evidence of a picture of causality and dynamic relationships between the variables tested (Kurniawan, 2019). The variables in this study are economic growth projected as Gross Domestic Product (GDP) per capita, investment, gross domestic savings and international trade of the Indonesian state with data in the period 1971-2020 obtained from the <https://data.worldbank.org/> website. The variable GDP per capita is defined as the sum of gross value added by all resident producers in the economy plus product taxes (minus subsidies) that are not included in the assessment of output, divided by the population in one year. In addition, the Investment Variables in this study use foreign direct investment data which is the net inflow of investment in the reporting economy from foreign investors, and divided by GDP. Furthermore, gross savings are calculated as gross national income minus total consumption, plus net transfers. Lastly, International Trade is the amount of exports and imports of goods and services measured as a share of gross domestic product (data.worldbank.org: 2023).

Based on several variables that have been described, the VAR equation compiled in this study using lag 1 based on the results of optimum lag testing is as follows:

$$GDP_{it} = C_{11} + \alpha_1 GDP_{t-1} + \alpha_{12} Investment_{t-1} + \alpha_{13} Saving_{t-1} + \alpha_{14} Trade_{t-1} + e_{it} \quad (1)$$

$$Investment_{it} = C_{21} + \alpha_1 GDP_{t-1} + \alpha_{22} Investment_{t-1} + \alpha_{23} Saving_{t-1} + \alpha_{24} Trade_{t-1} + e_{it} \quad (2)$$

$$Saving_{it} = C_{31} + \alpha_1 GDP_{t-1} + \alpha_{32} Investment_{t-1} + \alpha_{33} Saving_{t-1} + \alpha_{34} Trade_{t-1} + e_{it} \quad (3)$$

$$Trade_{it} = C_{41} + \alpha_1 GDP_{t-1} + \alpha_{42} Investment_{t-1} + \alpha_{43} Saving_{t-1} + \alpha_{44} Trade_{t-1} + e_{it} \quad (4)$$

Where:

GDP_{it}	: Gross Domestic Product waktu t
$Investasi_{it}$: Time Investment t
$Saving_{it}$: Time Saving t
$Trade_{it}$: Time International t
$\alpha_{1,2,3,4}$: Constant
$\beta_{1,2,3,4}$: independent variabel Coefisient
e_{it}	: Error

There are several stages in using VAR analysis, namely first testing data stationarity as the main requirement before estimating using the VAR model where data stationarity can be seen if the data moves convergently in the area of mean values with small deviations and there are no positive or negative trends. Stationarity testing using the ADF test method and a reference probability level of five percent. If the ADF probability value is smaller than the value of 0.05, it can be concluded that the data used is stationary or does not contain unit roots. After that, determination of lag length needs to be done to produce residuals that are free from autocorrelation and heterokedasticity (Wardhono, 2019). Determination of optimal lag length using available information criteria according to Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Crition (AIC), Schwarz Information Crition (SC), and Hannan-Quin Crition (HQ) criteria. Furthermore, VAR stability tests are carried out so that the VAR model obtained can be assumed to be stable so that the results of Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) analysis are also considered valid. After that, the

Granger causality test can be carried out which is used to identify a two-way relationship or causality between two variables. The last stage is Impulse Response Function (IRF) analysis and Forecast Error Variance Decomposition (FEVD) analysis where IRF is an analysis used to identify the response of an endogenous variable to a particular shock and FEVD analysis to identify fluctuations in a variable by looking at changes in error variance influenced by other variables (Firdaus, 2019).

RESULT AND DISCUSSION

The general picture of Indonesia's economic growth, investment, savings and trade performance from 1971-2020 is very volatile as described in Figure 2. This picture proves that the Indonesian economy is very vulnerable to crisis risks influenced by various factors both domestic and global.

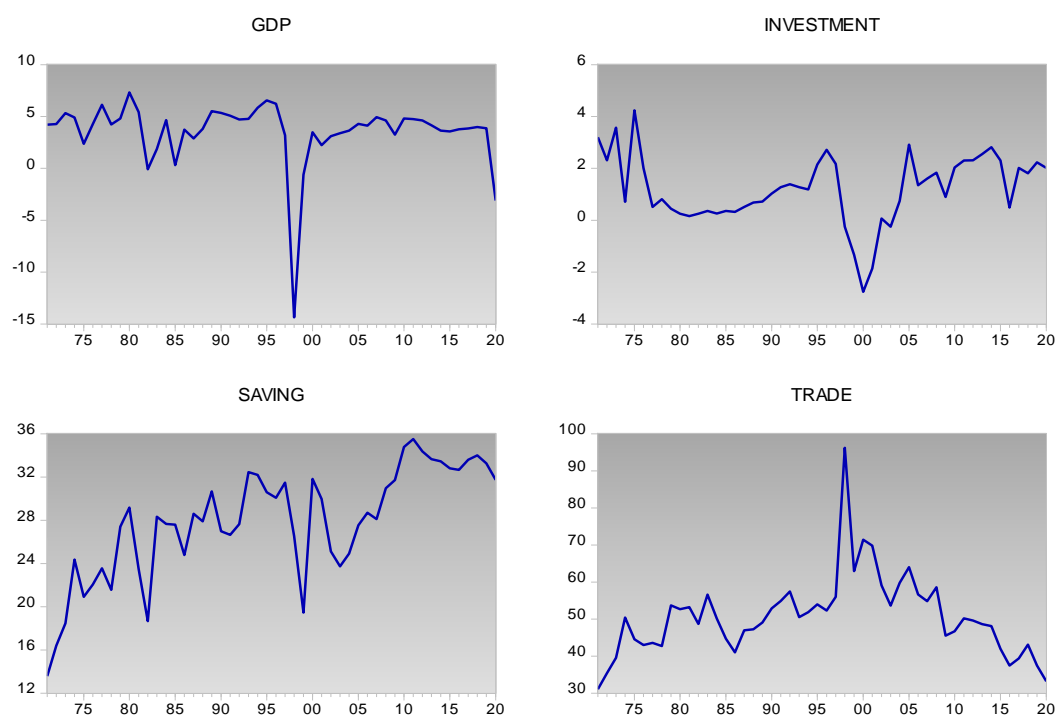


Figure 2. Development of Economic Growth, Investment, Savings and Trade 1975-2020 (percent)

(Source : worldbank.org, 2020.)

Domestically, the vulnerability of national economic resilience can be caused by various things including high disparities between regions, low quality of human resources due to poor education management, high unemployment and poverty rates due to limited employment, inflation that is still uncontrolled and dependence on domestic production on foreign countries trigger the hampering of the domestic economy if partner countries trade experiences a crisis or trade deregulation by partner countries. These domestic problems are ultimately integrated with the increasing dependence of the national economy on foreign countries so that economic uncertainty to the global crisis will greatly impact the domestic economy.

The estimation results obtained from the VAR model of variables of economic growth, investment, savings and international trade explain several things. First, Table 1 describes the results of stationary testing using the ADF test method and the reference probability level of five percent. If the ADF probability value is smaller than the value of 0.05, it can be concluded that the data used is stationary or does not contain unit roots. The results show that all variables are stationary at the first level (at-level) where all variables have an ADF probability value smaller than the value of 0.05.

Table 1. ADF Stationer Test Results (Augmenteed Dicky Fuller)

Variabel	Statistic ADF Value	Nilai Probability Value
GDP	-4.89	0.0002*
Investament	-3.47	0.0131*
Tabungan	-3.49	0.0123*
Perdagangan	-3.34	0.0182*

*Significance= $\alpha = 0,05$

Source: Data Analyzed

Second, the results of determining the optimal lag length using LR, FPE, AIC, SC, and HQ. The determination of optimal lag in this study based on the criteria of sequential modified LR statistical test (LR) obtained optimal lag at lag 1 as described in Table 2 below.

Table 2. Optimal Lag Test Results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-486.8978	NA	21848.80	21.34338	21.50239	21.40295
1	-433.4880	95.20867*	4310.514*	19.71687*	20.51193*	20.01471*
2	-418.3847	24.29676	4558.688	19.75585	21.18697	20.29196
3	-409.9205	12.14430	6602.737	20.08350	22.15066	20.85787
4	-391.3051	23.47157	6406.774	19.96979	22.67299	20.98242

Source: Data Analyzed

Third, based on the results of stability testing the estimation of the VAR equation system in Table 3 which has been formed through roots of characteristic polynomials to all variables multiplied by the number of lags, the VAR system produced in this study is stable because it shows that all roots have modulus values smaller than one. This means that the results of IRF and FEVD analysis that will be produced later can be said to be valid.

Table 3. Var Model Stability Test Results

Roots of Characteristic Polynomial	
Root	Modulus
0.951479	0.951479
0.625436	0.625436
0.555953	0.555953
0.239788 - 0.399195i	0.465677
0.239788 + 0.399195i	0.465677
-0.258583 - 0.179755i	0.314924
-0.258583 + 0.179755i	0.314924
-0.152933	0.152933

Source: Data Analyzed

Fourth, based on Table 4 which displays the results of the Granger Causality Test using the VAR Pairwise Granger Causality Test and using a real level of 10 percent, it shows that there is no relationship between variables of economic growth, investment, savings and trade that are two-way but only some relationships between variables that are one-way. From Granger's causality test in Table 4, a one-way relationship is shown in the effect of economic growth on investment at the level of 5 percent with a probability value of 0.0155 or below a significant value of 0.05. Furthermore, the other

one-way relationship is shown in the effect of trade on investment and the effect of trade on savings at the level of 10 percent with probability values of 0.0742 and 0.0749 or below the significant value of 0.10.

Table 4. Granger Causality Test Results

Pairwise Granger Causality Tests			
Lags: 1			
Null Hypothesis:	Obs	F-Statistic	Prob.
INVESTMENT does not Granger Cause GDP	49	0.09845	0.755
GDP does not Granger Cause INVESTMENT		6.32662	0.015*
SAVING does not Granger Cause GDP	49	0.84042	0.364
GDP does not Granger Cause SAVING		1.11817	0.295
TRADE does not Granger Cause GDP	49	0.04842	0.826
GDP does not Granger Cause TRADE		2.76102	0.103
SAVING does not Granger Cause INVESTMENT	49	1.80063	0.186
INVESTMENT does not Granger Cause SAVING		0.70309	0.406
TRADE does not Granger Cause INVESTMENT	49	3.33879	0.074**
INVESTMENT does not Granger Cause TRADE		0.18996	0.665
TRADE does not Granger Cause SAVING	49	3.32032	0.074**
SAVING does not Granger Cause TRADE		0.48266	0.490

Signifikan= $\alpha = 0,05^*$, $0,10^{**}$

Source: Data Analyzed

Next, analysis of Impulse Response Function (IRF) analysis which visually explains the response to a variable due to the shock of another variable. The results of the IRF analysis described based on Figure 1 with plots from IRF as many as 20 plots / year in the future explain visually the response of variables of economic growth, investment, savings and trade arising from the shock of the variables themselves and another variable mentioned. So the results of the IRF analysis in this study are as follows:



Response to Cholesky One S.D. (d.f. adjusted) Innovations

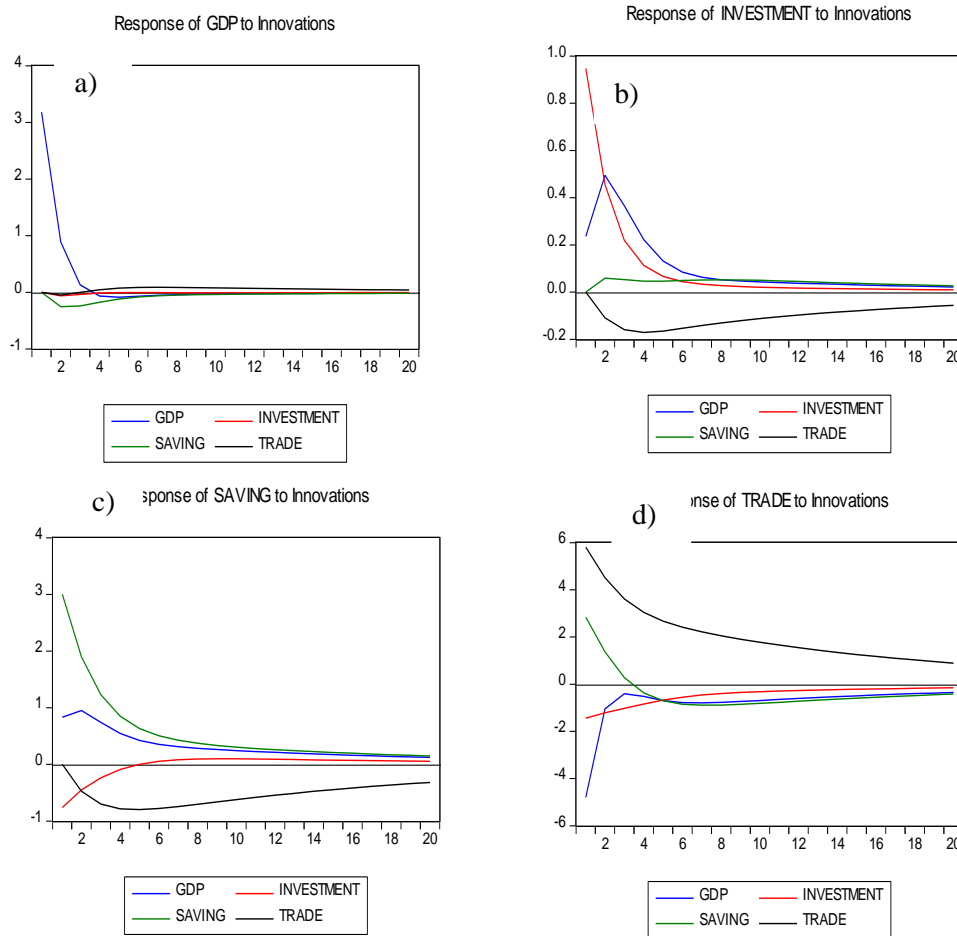


Figure 3. Results of Impulse Response Function (IRF)

(Source: Data Analyzed)

Figure 3 a) describes the variable response of economic growth due to shock variables of investment, savings and trade. The economic growth response due to the economic growth shock of the previous period tends to be stable in the long term which is seen from the next 4 years to 20 years in the future, the line of stable economic growth is close to the equilibrium line. While the savings shock gave a negative response to economic growth starting from period 2, but this did not last long because the economic growth response began to move positively after period 4 and then until period 20 the economic growth response of the savings shock was stable positive. Furthermore, investment and trade shocks are not too responded to by economic growth for at least the next 20 years assuming current economic conditions.

Furthermore, Figure 3 b) describes the response of investment variables due to shock variables of economic growth, savings and trade. Investment response due to investment shock in the previous period tends to be stable in the long term which is seen from 4 years to 20 years in the future, the investment line is stable near the balance line. Meanwhile, the shock of economic growth was responded by investment fluctuations which initially strengthened from the initial period to period 2, after which it decreased to period 6 and moved constantly positive above the balance line for the next 20 years. Investment response due to shock from savings tends to increase positively but with a small value and lasts for the next 2 periods only and then fluctuates stably until the next 20 periods. However, the trading shock was responded by investment in a negative manner which declined sharply even in the short period of 2 periods where the next period continued to move towards the balance line but remained in negative conditions.

Furthermore, Figure 3 c) describes the response of savings variables due to shock variables of economic growth, investment and trade. The savings response due to the previous savings shock period tends to be stable in the long term which is seen from 4 years to 20 years in the future the savings line is stable near the balance line. Meanwhile, the shock of economic growth was responded by fluctuations in savings which initially strengthened from the initial period to period 2, after which it decreased to period 6 and moved constantly positive above the balance line for the next 20 years. The savings response due to the shock of the investment was initially negative but over time strengthened towards positive crossing the balance line starting from period 5 and then fluctuating steadily to the next 20 periods. However, the trading shock was responded to by savings in a negative way which declined sharply even in the short period of 2 periods where the next period continued to move towards the balance line but remained in negative conditions.

Furthermore, Figure 3 d) describes the response of trade variables due to shock variables of economic growth, investment and savings. The trading response due to the previous period's trading shock tends to be stable in the long term which is seen from 4 years to 20 years ahead of the stable trading line near the balance line. While the shock of economic growth was responded by trade fluctuations negatively although in period 2 it increased sharply towards the equilibrium line but still until the next 20 periods the shock of economic growth was responded negatively by trade. The trading response due to the shock of savings was initially positive but over time weakened towards negative positions crossing the equilibrium line starting from period 3 and then fluctuating steadily to the next 20 periods negatively. However, the investment shock was responded to by trading continuing to stabilize negatively, which was up to 20 periods ahead.

Finally, in the analysis of Variance Decomposition (VD) which explains the magnitude of the response of one variable as the impact of shock from other variables. The results of the VD analysis described in Table 7 explain the response of variables of economic growth, investment, savings and trade arising from the shock of the variable itself and another variable with forecasting for the next 20 years. Then the results of the VD analysis in this study are as follows:

Table 7. Results of variance decomposition (VD) per five years for 20 years

Variance Decomposition of GDP

Period	S.E.	GDP	INVESTMENT	SAVING	TRADE
1	3.181496	100.0000	0.000000	0.000000	0.000000
5	3.335352	98.31518	0.051932	1.545231	0.087653
10	3.344911	97.86234	0.055211	1.693580	0.388873
15	3.349109	97.64460	0.059750	1.730750	0.564897
20	3.351229	97.53485	0.062267	1.748680	0.654205

Variance Decomposition of Investment

Period	S.E.	GDP	INVESTMENT	SAVING	TRADE
1	0.976316	5.826987	94.17301	0.000000	0.000000
5	1.331982	28.19944	65.92929	0.595361	5.275909
10	1.377603	27.30745	61.88265	1.238663	9.571239
15	1.398779	26.81252	60.08901	1.663116	11.43535
20	1.409375	26.57396	59.21996	1.875100	12.33098

Variance Decomposition of SAVING

Period	S.E.	GDP	INVESTMENT	SAVING	TRADE
1	3.205742	6.731972	5.634756	87.63327	0.000000
5	4.546529	12.70169	4.089794	73.72243	9.486086
10	4.939251	12.52197	3.620446	65.65853	18.19905
15	5.123683	12.40636	3.503411	62.16304	21.92718
20	5.214537	12.35394	3.453422	60.56426	23.62838

Variance Decomposition of TRADE

Period	S.E.	GDP	INVESTMENT	SAVING	TRADE
1	8.179101	34.41428	3.113362	12.03487	50.43749
5	11.17847	20.03694	4.613197	8.513303	66.83656
10	12.41531	18.09292	4.324467	9.295426	68.28719
15	13.00011	17.45930	4.131895	9.850400	68.55840
20	13.28619	17.17937	4.044022	10.10520	68.67141

Cholesky Ordering: GDP INVESTMENT SAVING TRADE

Source: Data Analyzed

First, based on Table 7 the response of economic growth over the next 20 years due to shocks from investment, savings and trade variables shows a small but increasing percentage with the proportion of savings being the variable most responded to by economic growth. That is, the availability of domestic savings is a very important factor where savings are a source of availability of funds that can be used as capital channeled to industries so as to increase productivity and job expansion which has an impact on economic growth.

Second, based on Table 7 investment responses over the next 20 years due to shocks from economic growth variables, savings and trade show an increasing percentage with the proportion of economic growth being the variable most responded to by investment where the increase in investment responses due to shocks from economic growth increased sharply in the first

five years but declined slowly over the next 15 years. Even so, the level of investment is largely determined by economic growth as the main factor in attracting investors both domestically and internationally to invest in Indonesia which will then open new jobs so as to reduce poverty rates and ultimately will have an impact on economic growth.

Third, based on Table 7 the response of savings over the next 20 years due to shocks from variable economic growth, investment and trade shows mixed percentages where the shock from economic growth increased sharply in the first five years but declined slowly over the next 15 years. Meanwhile, the amount of savings response due to investment shock has continued to decline for 20 years. In contrast, the size of the savings response resulting from the shock from trade has been increasing for 20 years. This indicates that the results of trading are the main factor that brings in unconsumed income aka savings.

Fourth, based on Table 7 trade responses over the next 20 years due to shocks from variable economic growth, investment and savings show mixed percentages where shocks from economic growth are the most responded to by trade levels but continue to decline slowly over the next 20 years. The shock trade response from investment and savings rates fluctuated over the next 20 years. This result shows that economic growth is the factor that most contributes to Indonesia's trade performance.

CONCLUSIONS

Anomaly in economic performance has an impact on uncertainty in Indonesia's economic condition where it is proven that historically the global economic phenomenon has greatly affected domestic economic performance such as economic growth, investment, savings and trade. This study uses a Vector Auto Regression (VAR) analysis model to analyze interactions and explore dynamic relationships between variables of economic growth,

investment, savings and trade. The findings begin with all assumptions that have been passed in using the VAR model where the variable is stationary at the level (at Level) with an optimal lag of one and the analyzed VAR model is stable expressed by the value of the modulus, so that the analysis of Impulse Response Function (IRF) and Variance Decomposition (VD) is valid. Granger's causality results show that there is no causality relationship between the analyzed variables where there is only a one-way relationship for investment, savings, and trading variables that are influenced by the variable itself with a lag of one. In addition, the results of the IRF analysis showed economic growth shocks to be the most responded by other variables, as well as the results of the VD analysis of economic growth that contributed the most to the responses of other variables. The results of the study can be a reference to formulate anticipatory policies in preventing the risk of economic crisis by maintaining the stability and conduciveness of the variables that have been analyzed. In addition, further research is expected to add or find other variables that are more relevant in the study of causality relationships. Cross-country studies are also interesting to do because the interrelationships between economies globally are increasingly dependent on each other.

REFERENCES

- AbuAl-Foul, B. (2010). The Causal Relation between Savings and Economic Growth: Some Evidence from MENA Countries. *Topics in Middle Eastern and African Economies*, 1–12.
- Abugamea, G. H. (2019). The Nexus Of Trade, Employment And Economic Growth: Empirical Evidence From Palestine. *Munich Personal RePEc Archive*, 97100. <https://mpra.ub.uni-muenchen.de/97100/>
- Akadiri, A. C., Gungor, H., Akadiri, S. S., & Bamidele-Sadiq, M. (2020). Is the causal relation between foreign direct investment, trade, and economic growth complement or substitute? The case of African countries. *Journal of Public Affairs*, 20(2). <https://doi.org/10.1002/pa.2023>
- Alam, K. J., & Sumon, K. K. (2020). CAUSAL RELATIONSHIP BETWEEN TRADE



OPENNESS AND ECONOMIC GROWTH: A PANEL DATA ANALYSIS OF ASIAN COUNTRIES. *International Journal of Economics and Financial Issues*, 10(1), 118–126. <https://doi.org/10.32479/ijefi.8657>

- Andersson, B. (1999). On the Causality Between Saving and Growth: Long- and Short-Run Dynamics and Country Heterogeneity. *Econstor*, 1–29.
- Bajo-Rubio, O. (2001). Foreign Direct Investment and Trade: A Causality Analysis. *Open Economies Review*, 12, 305–323.
- Bakari, S. (2018). Does Domestic Investment Produce Economic Growth in Canada: Empirical Analysis Based on Correlation, Cointegration and Causality. *International Academic Journal of Science and Engineering*, 05(01), 56–72. <https://doi.org/10.9756/IAJSE/V5I1/1810006>
- Barro, R. J., & Sala-i-Martin, X. (1995). *Economic growth*. McGraw-Hill.
- Chakrabarti, A. (2006). The saving–investment relationship revisited: New evidence from multivariate heterogeneous panel cointegration analyses. *Journal of Comparative Economics*, 34(2), 402–419. <https://doi.org/10.1016/j.jce.2006.02.001>
- Dankyi, A. B., Abban, O. J., Yusheng, K., & Coulibaly, T. P. (2022). Human capital, foreign direct investment, and economic growth: Evidence from ECOWAS in a decomposed income level panel. *Environmental Challenges*, 9, 100602. <https://doi.org/10.1016/j.envc.2022.100602>
- Đideliija, I. (2021). The Causal Link Between Savings and Economic Growth in Bosnia and Herzegovina. *South East European Journal of Economics and Business*, 16(2), 114–131. <https://doi.org/10.2478/jeb-2021-0018>
- Dritsaki, M., Dritsaki, C., & Adamopoulos, A. (2004). A Causal Relationship between Trade, Foreign Direct Investment and Economic Growth in Greece.
- Eslamloueyan, K., & Jafari, M. (2010). Capital mobility, openness, and saving–investment relationship in Asia. *Economic Modelling*, 27(5), 1246–1252. <https://doi.org/10.1016/j.econmod.2010.02.007>
- Fatiha, I., & Masih, M. (2017). Causal relationship between FDI, trade, economic growth and exchange rate: Malaysian evidence. *Munich Personal RePEc Archive*. Online at <https://mp.ra.ub.uni-muenchen.de/108485/>

- Firdaus, M. (2019). *Aplikasi Ekonometrika Untuk Data panel dan Time Series*. IPB Press.
- Gries, T., & Redlin, M. (2020). Trade and economic development: Global causality and development- and openness-related heterogeneity. *International Economics and Economic Policy*, 17(4), 923–944. <https://doi.org/10.1007/s10368-020-00467-1>
- Hasan, T. I. B., & Fitra, F. (2013). *Pengaruh Investasi Dalam Negeri Dan Jumlah Uang Beredar Terhadap Pdb Indonesia*. 3(1).
- Herdianto, M. M. (2021). *Bukti Dari Satu Dekade Terakhir*. 2.
- Irandoust, M. (2019). Saving and investment causality: Implications for financial integration in transition countries of Eastern Europe. *International Economics and Economic Policy*, 16(2), 397–416. <https://doi.org/10.1007/s10368-017-0390-6>
- Ismail, A. G., & Harjito, D. A. (2009). Exports and Economic Growth: The Causality Test for ASEAN Countries. *Economic Journal of Emerging Markets*, 8(2). <https://doi.org/10.20885/ejem.v8i2.629>
- Jangili, R. (2011). Causal Relationship between Saving, Investment and Economic Growth for India – What does the Relation Imply? *Munich Personal RePEc Archive*.
- Jhingan, M. L. (2016). *Ekonomi Pembangunan Dan Perencanaan*. Rajawali Pres.
- Jiranyakul, K. (2014). Temporal Causal Relationship between Stock Market Capitalization, Trade Openness and Real GDP: Evidence from Thailand. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2518354>
- Juliansyah, H., Ganesha, Y., Ichsan, I., Nailufar, F., & Terfiadi, S. Y. (2022). Effect Of Export Import And Investment On Economic Growth In Indonesia (Vecm Analysis Method). *Journal of Malikussaleh Public Economics*, 5(1), 16. <https://doi.org/10.29103/jmpe.v5i1.8153>
- Kalaitzi, A. S. (2018). The Causal Effects of Trade and Technology Transfer on Human Capital and Economic Growth in the United Arab Emirates. *Sustainability*, 10(5), 1535. <https://doi.org/10.3390/su10051535>
- Karahan, Ö. (2018). The Causal Relation Between Savings and Economic Growth in Turkey. In S. Roukanas, P. Polychronidou, & A. Karasavoglou (Eds.),

- The Political Economy of Development in Southeastern Europe* (pp. 127–139). Springer International Publishing. https://doi.org/10.1007/978-3-319-93452-5_8
- Kurniawan. (2019). *Analisis Data Menggunakan Stata Se 14 (Panduan Analisis, Langkah Lebih Cepat, Lebih Mudah Dan Lebih Praktis)*. Deepublish. <https://www.freepik.com//>
- Liu, X. (2009). Trade and Income Convergence: Sorting Out the Causality. *The Journal of International Trade & Economic Development*, 18(1), 1–34.
- Makuria, A. G. (2015). *Domestic savings and economic growth*.
- Mehanna, R.-A. (2011). The Temporal Causality Between Investment And Growth In Developing Economies. *Journal of Business & Economics Research (JBER)*, 1(3). <https://doi.org/10.19030/jber.v1i3.2989>
- Melitz, M. J., & Ottaviano, G. (2008). Market size, trade, and productivity. *Review of Economic Studies*, 75(1), 295–316.
- Nguena, C. L. (2011). Heterogeneity Of Saving-Investment Causality And Fiscal Coordination Implication: The Case Of An African Monetary Union. *Munich Personal RePEc Archive*, 49411, 1–20.
- Nupehewa, S., Liyanage, S., Polkotuwa, D., Thiyagarajah, M., Jayathilaka, R., & Lokeshwara, A. (2022). More than just investment: Causality analysis between foreign direct investment and economic growth. *PLOS ONE*, 17(11), e0276621. <https://doi.org/10.1371/journal.pone.0276621>
- Otoo, H., Appiah, S. T., Buabeng, A., & Apodei, M. (2020). Testing Causality and Cointegration of Savings and Investment In Ghana. *European Journal of Engineering Research and Science*, 5(2), 132–137. <https://doi.org/10.24018/ejers.2020.5.2.1734>
- Rahman, M. M., Saidi, K., & Mbarek, M. B. (2020). Economic growth in South Asia: The role of CO2 emissions, population density and trade openness. *Heliyon*, 6(5), e03903. <https://doi.org/10.1016/j.heliyon.2020.e03903>
- Rani, R., & Kumar, N. (2019). On the Causal Dynamics Between Economic Growth, Trade Openness and Gross Capital Formation: Evidence from BRICS Countries. *Global Business Review*, 20(3), 795–812. <https://doi.org/10.1177/0972150919837079>

- Saimul, S., & Darmawan, A. (2020). Understanding Causality Relation among FDI, Foreign Trade and Economic Growth. *Economics Development Analysis Journal*, 9(4), 414–426. <https://doi.org/10.15294/edaj.v9i4.39044>
- Saltz, I. S. (1999). An examination of the causal relationship between savings and growth in the third world. *Journal of Economics and Finance*, 23(1), 90–98. <https://doi.org/10.1007/BF02752690>
- Sekine, T. (2022). Looking from Gross Domestic Income: Alternative view of Japan's economy. *Japan and the World Economy*, 64, 101159. <https://doi.org/10.1016/j.japwor.2022.101159>
- Shahbaz, M. (2012). Does trade openness affect long run growth? Cointegration, causality and forecast error variance decomposition tests for Pakistan. *Economic Modelling*, 29(6), 2325–2339. <https://doi.org/10.1016/j.econmod.2012.07.015>
- Suhel. (2008). Analisis Model Vector Auto Regression (Var) Terhadap Hubungan Antara Pertumbuhan Ekonomi Dengan Penanaman Modal Asing (PMA) Di Indonesia. *Jurnal Ekonomi Pembangunan Journal of Economic & Development*, 6(2), 96–113.
- Sukirno, S. (2000). *Makro Ekonomi Modern*. PT. Raja Grafindo Persada.
- Tan, B. W., & Tang, C. F. (2011). The Dynamic Relationship Between Private Domestic Investment, The User Cost Of Capital, And Economic Growth In Malaysia. *Munich Personal RePEc Archive*.
- Tan, B. W., & Tang, C. F. (2016). *Examining the Causal Linkages among Domestic Investment, FDI, Trade, Interest Rate and Economic Growth in ASEAN-5 Countries*. 6(1).
- Tang, C. F. (2010). *Savings-Led Growth Theories: A Time Series Analysis For Malaysia Using The Bootstrapping And Time-Varying Causality Techniques*.
- Wardhono, A. (2019). *Analisis Data Time Series Dalam Model Makro Ekonomi*. CV Pustaka Abadi.
- Yuni, R. (2021). Dampak Perdagangan Internasional Terhadap Pertumbuhan Ekonomi Indonesia Pada Tahun 2009-2019. *NIAGAWAN*, 10(1), 62. <https://doi.org/10.24114/niaga.v10i1.19193>
- Yustika, E. (2012). *Ekonomi Kelembagaan* (1st ed.). Erlangga.



- Zangeneh, H. (2006). Dependency, Interdependency, And Economic Development: A Third World Catch 22? *Munich Personal RePEc Archive*, 26806, 1–6.
- Zhang, X., Hang, J., & Liu, X. (2017). Multi-scale causality between saving and growth: Evidence from China. *Applied Economics Letters*, 24(11), 790–794. <https://doi.org/10.1080/13504851.2016.1229403>