

STRUCTURAL ANALYSIS OF MACROECONOMIC VARIABLES IN INDONESIA: A VAR APPROACH

Arya Widyatmoko¹, Maya Nur Cholida^{2*}, Mahrus Lutfi Adi Kurniawan³, Nurul Azizah Az Zakiyyah⁴, Suripto⁵

¹Development Economic, Universitas Ahmad Dahlan, Indonesia

²Development Economic, Universitas Ahmad Dahlan, Indonesia

³Development Economic, Universitas Ahmad Dahlan, Indonesia

⁴Development Economic, Universitas Ahmad Dahlan, Indonesia

⁵Development Economic, Universitas Ahmad Dahlan, Indonesia

*Email corresponding author: maya2100010057@webmail.uad.ac.id

Abstract

This study analyzes how the structural relationship between macroeconomic variables such as inflation, interest rates, exchange rates, investment, and exports on economic growth in Indonesia using the Vector Auto Regression (VAR) model approach. With quarterly time series data from the period 2011 to 2023 and data sourced from the Central Bureau of Statistics and Bank Indonesia, this study evaluates short and long term relationships using stationary tests, impulse response function (IRF) and variance decomposition (VDC). The results show that most variables have a significant contribution to economic growth. Interest rate and investment variables are the most dominant factors in the long run. The VAR approach also proves the stability in predicting the response of the economy to external shocks. This study highlights the importance of sustainable monetary and investment policies to support economic growth as well as the need for stability of other economic variables such as inflation and exchange rates. This study provides insight into the macroeconomic dynamics in Indonesia and serves as a reference for more effective policy making.

Keywords: Economic growth; exchange rate; export; inflation; interest rate; investment

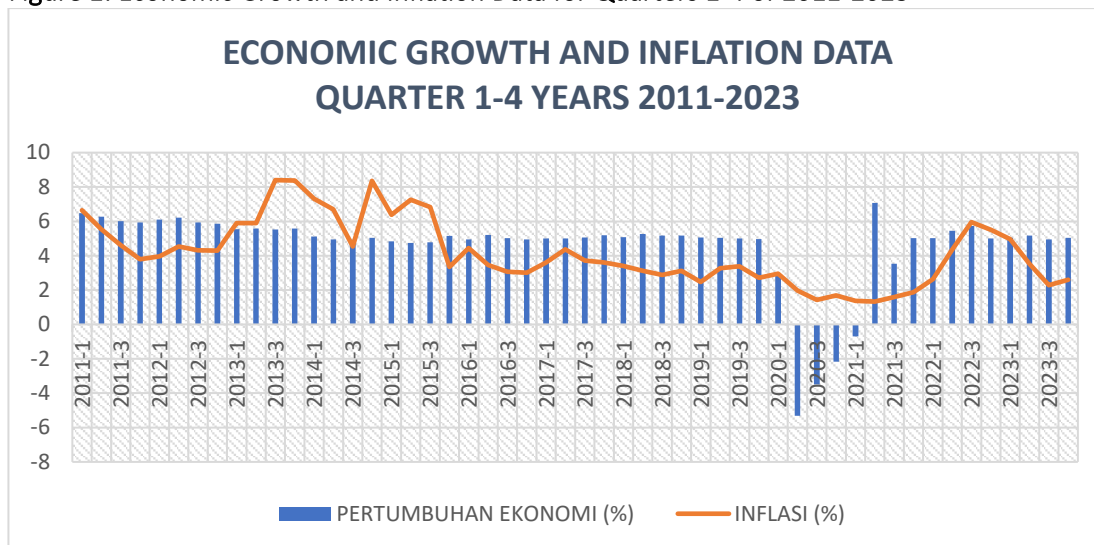
INTRODUCTION

According to (Azzahro & Prakoso, 2022) One of the benchmarks used to assess the economic success of a country is economic growth. Economic growth measures the sustainable impact of economic development seen from one period to the next. Stable economic growth is highly desired by developing countries such as Indonesia, stable economic growth is not obtained naturally but is also supported by the stability of macroeconomic variable conditions. According to (Ridho Kismawadi & Hamid, 2021) A number of previous studies explain that economic and non-economic factors are factors that affect economic growth. Economic growth that is recovering after the pandemic is something that needs to be considered because it can improve people's welfare.

The economic progress of a country is reflected in its economic growth rate. The process of economic growth occurs when a country experiences an increase in income and production of goods and services (Mu'arif & Soebagyo, 2023). Every year, economic growth also fluctuates. Macroeconomic issues including rising interest rates, monetary policy, and imports are also to blame (Apriliani, 2022). The development of a country's economy over time accompanied by an increase in the country's economy is known as economic growth. Other indicators of economic growth include an increase in national income, an increase in per capita income, an increase in the employment-to-unemployment ratio, and a decrease in poverty. If the economic activity of a country's population directly results in an increase in the production of goods and services, the country's economy is

considered to be growing. Thus, the need for further research as economic indicators and their influencing factors will be crucial for macroeconomic management to support economic growth and stability (Kunthi et al., 2023).

Figure 1: Economic Growth and Inflation Data for Quarters 1-4 of 2011-2023



Based on the graph in Figure 1, it is explained that the economic growth and inflation variables for the period 2011-2023 fluctuate every year. In achieving economic stability, it is necessary to maintain the inflation rate. According to (Kartika & Pasaribu, 2013) Achieving sustainable economic growth requires maintaining price balance and continues to be a key tenet of macroeconomic policy in most countries around the world. Among other things, the focus on price stability in the implementation of monetary policy aims to boost domestic currency trade and promote economic growth. According to (Satria, 2012) The impact of inflation on economic growth is also demonstrated theoretically and empirically in the endogenous growth model, which is a more recent theory of economic growth. However, in this case, shifts in the inflation rate have a long-run effect on economic expansion.

According to (Nairizi, 2023) states Inflation has both short-term and long-term effects on economic growth. In general, rising inflation adversely affects production cost activity. The need for policies that can keep the inflation rate low in order to have a significant impact on economic activity. According to (Sari et al., 2023) states that A sustained rise in the average price of products is known as inflation. This does not mean that the prices of various goods rise by the same amount, but that there is an increase over a period of time and not all at once. The severity of inflation is classified as low inflation of less than 10 percent per year, moderate between 10 and 30 percent, severe between 30 and 100 percent per year), and hyperinflation of more than 100 percent per year.

Investment plays a role in a country's economic growth. By increasing the stock of capital goods, investment will enable increased production. This shows how investment drives economic growth (Amalia, 2013). In general, Foreign Direct Investment (FDI) is more beneficial and less detrimental to a country's economy. This is because FDI is considered an important component as it can provide the additional foreign capital needed to support economic transformation and growth in developing countries (Maharani & Setyowati, 2024). According to (Suyanto, 2007) explains that investment plays a significant role in driving a country's economic growth. The effect of investment on the economy is discussed in Harrod Domar's theory in two main aspects. First, there is a positive correlation between investment and state income. Second, investment is able to increase the production capacity of the economy through increased capital.

With its far-reaching impact, interest rates are one of the most closely watched macroeconomic factors. Interest rates have a major influence on economic conditions and have a

direct impact on people's lives. Interest rates also impact the choices that people and investors make about saving, investing and buying. Economic growth is driven by interest rates, lower interest rates encourage more investment, which can spur economic expansion (Hazmi, 2018). According to (Kurniawati et al., 2021) explained that interest rates are one of the factors that have a significant impact on Indonesia's economic development and growth, both for the general public and businesses. Entrepreneurs will be more likely to invest when interest rates are low, and vice versa.

The most sensitive indicator that may give rise to various attitudes in society is the exchange rate, which is a reflection of economic growth. A stable exchange rate that is not affected by market conditions will promote a stable business environment that benefits investors and influences the success of economic expansion. Increases and decreases in the exchange rate also contribute to the rate of economic growth (Restiasanti & Yuliana, 2022). One of the most vulnerable economic factors to shocks in the economy and non-economy is the exchange rate; exchange rate policy aims to keep exports competitive while reducing imports, By keeping the exchange rate stable, it leads to an increase in economic growth rates (Sekar Lunggayu Kartika, 2019).

According to previous research, one of the significant factors for long-term economic growth is exports (Arfiani, 2019). According to (Wibowo, 2023) "Exports are one of the driving factors of a country's economic growth". For countries with low per capita income, exports are very important for economic growth. Exports from developing countries have the ability to boost economic growth and productivity. Increased domestic production that is exported or traded abroad can increase foreign exchange and benefit the country.

This study aims to develop the relationship between macroeconomic variables and Indonesia's economic growth based on explanations from previous studies. This study analyzes how macroeconomic factors affect economic growth in the long run and short run, and vice versa. By utilizing time series data and VAR approach, this study complements the literature by analyzing issues related to short-run and long-run shocks to macroeconomic variables and economic growth, and vice versa. This study also examines the structural relationship between macroeconomic variables and economic growth and uses a VAR model, which has higher empirical accuracy in macroeconomic models. Therefore, based on several points of view of previous research and current problems described above, the theme taken in this study is about "Structural Analysis of Macroeconomic Variables on Economic Growth in Indonesia: A VAR Approach".

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Gross Domestic Product (GDP) is a leading indicator that reflects the condition of a country's economy. Inflation has a complex relationship with GDP, where moderate inflation can boost economic growth, while too high inflation can hinder it (Mankiw, 2019). Interest rates also play an important role in economic growth, where high interest rates can reduce investment and consumption, while low interest rates tend to increase economic growth (Mazaya & Arti, 2025). In addition, a stable exchange rate can support exports and economic growth, while sharp fluctuations can create uncertainty for economic actors (Krugman et al., 2020). Investment, both domestic and foreign, is a major factor in driving GDP growth as it can increase production capacity and job creation (Apriliansah, 2024). Exports are also an important factor in economic growth, as increased exports can increase national income and strengthen a country's economic stability (Hanifah, 2022).

The relationship between GDP and inflation is often negative, especially when uncontrolled inflation reduces people's purchasing power and increases production costs. High interest rates tend to reduce economic growth as they discourage investment, while lower interest rates can stimulate economic activity through increased consumption and investment (Ginting, 2013). A weakening exchange rate can boost exports as the price of domestic goods becomes more competitive in the international market, but on the other hand it can increase the cost of imports and cause inflation. Investment has a positive correlation with GDP, as increased investment will expand production capacity and create new employment opportunities (Todaro & Smith, 2020). Increased exports also contribute to economic growth as they expand the market for domestic products and increase

foreign exchange earnings (Amanda Putri et al., 2024). Therefore, an understanding of the interaction between these variables is crucial in designing effective economic policies.

Based on the literature review above, the hypotheses that can be formulated in this study are as follows. First, inflation is expected to have a negative relationship with GDP, where rising inflation tends to suppress economic growth. Second, high interest rates are thought to negatively affect GDP by reducing investment and consumption levels. Third, exchange rates are predicted to have a significant relationship with GDP, either positively or negatively, depending on export and import conditions. Fourth, investment is expected to be positively related to GDP as increased investment will boost economic growth through increased production capacity. Fifth, exports are expected to contribute positively to economic growth by increasing national output and foreign exchange earnings. Testing this hypothesis will provide a clearer picture of the main factors that influence a country's economic growth.

RESEARCH METHODS

This study uses a VAR model developed by performing impulse response and forecasting error variance decomposition, which is applied to determine shocks from one variable to another. This study examines the short-term and long-term relationship between macroeconomic factors and Indonesia's economic growth using a quantitative approach and the Vector Auto Regression (VAR) econometric model. The data used are sourced from the Central Bureau of Statistics (BPS) and Bank Indonesia (BI)). Economic growth indicated by real GDP is the dependent variable of this study, while inflation, interest rates, exchange rates, investment, and exports are the independent factors. The data used is quarterly time series data from 2011 to 2023. To determine the long-run relationship, an analytical approach is conducted in several stages, including stationarity tests using Augmented Dickey-Fuller (ADF) and Philips Perron (PP). Variance Decomposition (VDC) measures the variance contribution of each variable to shifts in economic growth, while Impulse Response Function (IRF) analysis assesses the reaction of the dependent variable to shocks in the independent variable. The software used to process the data is EViews.

$$y_t = A_0 D_t + A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_k y_{t-k} + \varepsilon_t$$

Description:

y_t : Vector of endogenous variables at time t.

A_0 : Coefficient matrix for the deterministic component (D_t).

D_t : Vector of deterministic components such as constants, time trend or seasonal dummies.

$A_1, A_2, \dots, A_k$: 1st to k lag coefficient matrix.

$y_{t-1}, y_{t-2}, \dots, y_{t-k}$: Lag of the endogenous variable up to the k lag.

K : Number of lags in the model (VAR).

In determining the lag length in the var model using the following formula:

$$y_t y_t = (y_{1t} y_{2t} y_{3t} \dots y_{nt})^T D_t A_0 A_i y_t \varepsilon_t \varepsilon_t = (\varepsilon_{t1} \varepsilon_{t2} \varepsilon_{t3} \dots \varepsilon_{tn})^T.$$

All variables have the same opportunity to be the dependent variable so that they will produce different residual values. The VAR model uses partimonius data and lags in the model to reduce autocorrelation of the components of the residual value equation and produce an appropriate degree of freedom value.

In the VAR model, the stationary test is a crucial stage because it helps in determining and developing the var model, there are 2 stationary tests, namely ADF (augmented dickey fuller) and PP (Philips-perron) which aim to eliminate heteroscedasticity problems in the data. Here is the form of the stationary test equation:

$$\Delta y_t = \alpha_0 + b_t + \delta y_{t-1} + \sum_{j=1}^k \gamma_j \Delta y_t + \varepsilon_t$$

If the constant is a trend factor, the ADF Test can determine the presence of unit roots. It determines whether the data has a unit root, or whether the data is non-stationary and requires further differencing to become stationary. If the data has a unit root, long-term projections will be inaccurate, as both methods assume stationary data. If the data is not stationary, differencing will be used to make it stationary for valid and accurate analysis results.

RESULTS AND DISCUSSION

The description statistical test provides an overview of the characteristics of the data being analyzed. In the statistical test includes mean (average), median (middle value), maximum maximum value), minimum (minimum value), standard deviation, skewness value (slope), Kurtosis (tapering) all of these data aim to be easy to understand information for further analysis.

Table 1. Variable Descriptions

	Economic growth	Inflation	Exchange Rate	Investment	Interest Rate	Export
Mean	4.6175	4.167885	13115.58	5122.865	5.572115	14597.33
Median	5.055	3.665	13720.5	5120	5.75	13307.61
Maximum	7.08	8.4	16448	8197	7.75	25103.97
Minimum	-5.32	1.33	8640	2539	3.5	10382.7
Std. Dev.	2.334193	1.896743	2134.237	1286.622	1.318548	3912.181
Skewness	-3.007253	0.618391	-0.8452	0.25578	0.010264	1.368626
Kurtosis	11.50565	2.60925	2.542276	2.965173	1.949919	3.661383
Jarque-Bera	235.1275	3.645018	6.645092	0.56963	2.390033	17.18161
Probability	0	0.16162	0.036061	0.752154	0.302699	0.000186
Sum	240.11	216.73	682010	266389	289.75	759061.4
Sum Sq. Dev.	277.8714	183.4793	2.32E+08	84425228	88.66707	7.81E+08
bservations	52	52	52	52	52	52

Source: Eviews processing results

Table 1 shows that all variables have a significant mean value compared to the standard deviation value, which means that all variable data indicates high variability. Exports reached the highest value at 25103.97 and the lowest value at 10382.70. The highest export figure occurred in 2022 quarter 1, this is because 2022 is the beginning of economic recovery after the co-19 pandemic which previously paralyzed the economy in 2020-2021 so that in 2022 global demand increases in an effort to accelerate economic stability and economic growth. And the lowest export figures occurred in 2016 quarter 1, this cannot be separated from the decline in global commodity prices which fell because Indonesia exports more raw materials such as palm oil, mining products, etc. so that Indonesia is greatly affected by this. All data has a rightward slant based on a positive skewness value, except economic growth and exchange rates which have negative values. The kurtosis value on the variables used has a positive value and the highest on the economic growth variable and the lowest value on the interest rate variable.

Table 2. Augmented Dickey-Fuller and Phillips-Perron Stationary Test (ADF) Results

Variabel	ADF		PP	
	Trend	No trend	trend	No trend
		Level		
Economic growth	-2.972623	-2.912042*	-3.126330	-3.027071**
Inflation	-2.764901	-2.376313	-2.960676	-2.481192
Exchange Rate	-2.644314	-1.958922	-2.431880	-2.057904
Investment	-7.085309***	-6.683133***	-7.085309***	-6.668106***
Interest Rate	-2.312327	-2.155521	-1.776083	-1.776455
Export	-1.950425	-0.884472	-1.923751	-0.841326
		1 st difference		
Economic growth	-7.605277***	-7.669983***	-7.600636***	-7.664361***
Inflation	-5.052095***	-5.126107***	-8.319157***	-8.408114***
Exchange Rate	-10.29703***	-10.18636***	-14.83958***	-10.86269***
Investment	-7.806629***	-7.894473***	-28.64091***	-29.07886***
Interest Rate	-4.162330***	-4.147123***	-4.133984***	-4.114467***
Export	-8.429841***	-8.322398***	-8.400219***	-8.322398***

Source: Eviews processing results

Based on table 3 above, it can be explained that the results show the unit root test. This study uses the unit root test with the Augmented Dickey Fuller (ADF) and Pjilips Perron (PP) approaches to test the existence of nonstationary stochastic in time series data. The use of PP is also to eliminate heteroscedasticity problems in the data. The unit root test uses “Trend and Intersept” as the unit root test with “Trend” and by using “Intersept” as the unit root test with “no trend”. Based on the stationarity test results using Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP), the investment variable proved to be stationary at the level (I(0)) with a significance of 0.01%, while other variables such as GDP, inflation, exchange rates, interest rates, and exports were not stationary at the level, but became stationary at the 1st difference (I(1)) with a significance of 0.01%. This indicates that most variables require transformation to 1st difference for further analysis, while investment has met the stationarity requirement without differentiation.

Table 3. VAR Test Results Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-225.1556	NA	0.000614	9.631484	9.865384	9.719875
1	-39.3268	317.4576	1.21E-06	3.388617	5.025918*	4.007355*
2	-3.429977	52.34954	1.30E-06	3.392916	6.433617	4.542001
3	34.14588	45.40415	1.48E-06	3.327255	7.771358	5.006688
4	90.35368	53.86582*	9.54e-07*	2.485263*	8.332766	4.695043

Source: Eviews processing results

Based on Table 3, the lag order selection criteria test results show that lag 4 is selected by 3 methods, lag 1 is selected by 2 methods out of 5 methods tested. Thus, considering that too small a lag can cause the model to be less able to explain the relationship between variables, this study uses lag 4, because specifically lag 4 is selected by 3 methods, namely LR test statistic, FPE Final Prediction Error and Akaike information criterion.

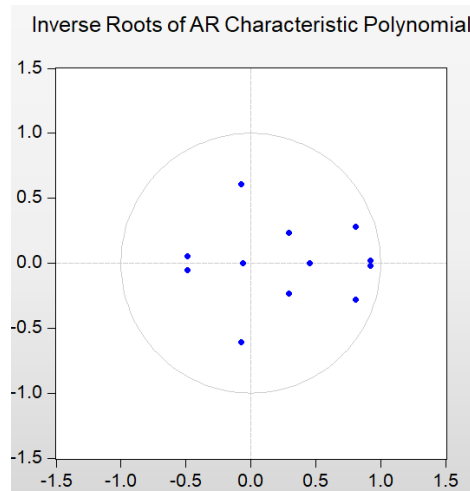


Figure 2. Inverse roots of AR characteristic polynomials

VAR stability occurs if the roots are inside the circle. Figure 1 shows that the root value of the inverse characteristic root of the AR polynomial is located inside the circle, which means that the VAR system is stable. Based on the VAR stability test, it can be concluded that the VAR estimation is accepted and can be used for impulse response function (IRF) and Forecast error varive decomposition (FEVD) analysis because it is stable and has an optimal lag and structural IRF estimation of VAR results does not produce biased estimates.

Table 4. LM test correlation test results VAR

Null hypothesis: No serial correlation at lag h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	39.84819	36	0.3028	1.129439	(36, 55.5)	0.3361
2	27.30822	36	0.8509	0.705138	(36, 55.5)	0.8664
3	50.82784	36	0.0517	1.566283	(36, 55.5)	0.0651
4	33.92856	36	0.5675	0.919984	(36, 55.5)	0.5993

Source: Eviews processing results

Based on Figure 5, it can be explained that the results of the serial correlation test using the LM Test on the VAR model. The results show that all probability values (Prob.) for each lag are above the 5% significance level (0.05), thus, H_0 fails to be rejected for all lags tested, indicating that the residuals of the VAR model do not have time problems.

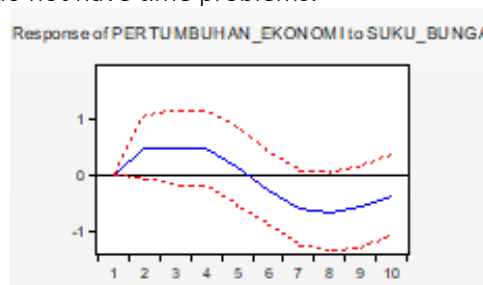


Figure 3. impulse response results

Response of economic growth to interest rate shocks

Based on Figure 3 when there is an interest rate shock, economic growth will respond positively from period 1 to 5 and negatively in the next period to period 10, meaning that interest rate volatility will increase economic growth, When the monetary authority establishes an expansionary monetary policy which lowers interest rates, the purchasing power of the community

increases or people prefer to consume rather than save, so that purchasing power increases, when purchasing power increases production increases consumption increases so that economic growth also increases. However, over time this will be responded to by the monetary authorities with monetary policy to increase interest rates so that inflation does not occur so that interest rates need to be increased, when interest rates rise, people will tend to return to saving and eventually consumption falls, production falls and the economy also falls. This is in line with research (Winarto et al., 2021) The response of the economic growth variable to the interest rate shock (SB) at the beginning of the period is positive, but in periods three to ten shows a negative response as indicated by the IRF line which is below the horizontal line.

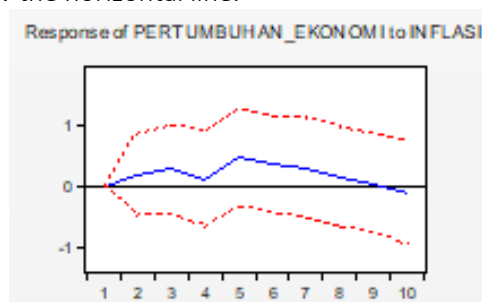


Figure 4. impulse response results

Response of economic growth to inflation shocks

Based on Figure 4 shows that economic growth responds to inflation shocks. From the beginning of period 1, it responds positively indicating that an increase in inflation in the short term can boost economic growth which leads to increased consumption and economic activity due to higher price expectations, but over time, it subsides and returns to near the horizontal line indicating that the impact of inflation is temporary. This condition is relevant to the economic problems in Indonesia because high inflation is often triggered by a surge in the prices of goods and services that can temporarily boost domestic consumption, but risks hampering people's purchasing power and long-term investment. because high inflation causes economic uncertainty, slows growth and causes social inequality. Therefore, Bank Indonesia's monetary authority policy and fiscal policy must be balanced in keeping the inflation rate under control and ensuring price stability aimed at supporting economic growth amid global and domestic challenges. This is in line with research (Quddus, 2022) that a high inflation rate will reduce people's purchasing power, which in turn will disrupt the economic cycle. the element to be considered is the inflation rate that is able to maintain people's purchasing power and optimal economic stability.

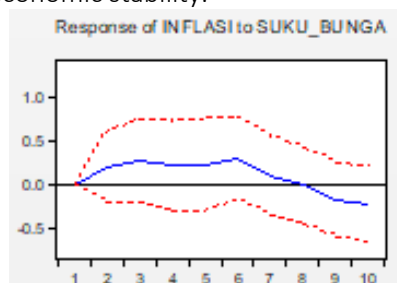


Figure 5. impulse response results

Inflation response to interest rate shocks

Based on Figure 5, it shows that inflation responds to interest rate fluctuations positively from the beginning of period 1 to period 7, meaning that an increase in interest rates is effective in controlling the inflation rate in the medium and long term. This is in accordance with the policy of the monetary authority of the central bank which uses interest rates as an instrument of monetary policy to control inflation and suppress consumption and investment. And in the 7th-10th period

gives a negative response which means that the policy is effective in reducing inflation. This is very important because high inflation causes a decline in investment, creates economic uncertainty and reduces people's purchasing power, therefore it is important for the central bank to formulate the right monetary policy to maintain economic stability in Indonesia. This is in line with research (Nofiatin, 2013) That interest rate shocks reduce inflation but the effect will still take time. To curb inflation and attract investors to invest in the capital market, Bank Indonesia will raise the SBI rate when inflation is high.

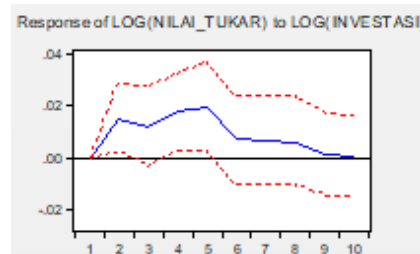


Figure 6. impulse response results

Response of exchange rate to investment shocks

Based on Figure 6 shows the response of the exchange rate to investment, the exchange rate strongly influences the existence of investment so that since the initial period, investment shocks provide a positive response, and the exchange rate appreciates, meaning that the existence of both direct and portfolio investment shocks tends to increase the demand for a country's exchange rate so that it strengthens or appreciates. However, in the 6th period, the response decreased, indicating that although investment has a positive impact in the short term, there are factors that can affect exchange rate movements in the long term such as political uncertainty, global market economy and monetary policies of other countries. Therefore, the need for policies that support the investment climate to remain conducive is balanced with macroeconomic policies to maintain the stability of the rupiah exchange rate on an ongoing basis. As explained in the research (Syafilla & Astuti, 2023) The currency exchange rate variable responds positively to Indonesian portfolio investment. As this increases the variability of future income flows, the exchange rate may impact the choice of where to invest.

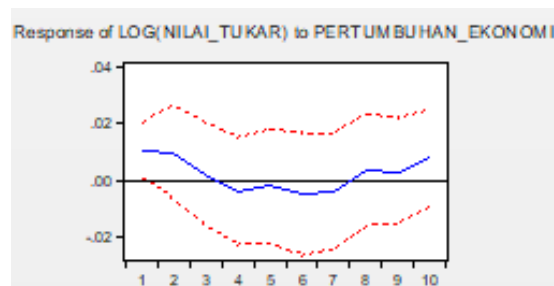


Figure 7. impulse response results

Response of exchange rate to economic growth shocks

Based on Figure 7, the exchange rate response to economic growth shocks shows a positive shock to economic growth in periods 1 to 2, this is likely due to an increase in investment and exports that cause economic growth, but starting in periods 3-7 responds negatively indicating that the exchange rate is slightly weakened or depreciated due to several factors such as global monetary policy, commodity prices, and domestic stability. In the 8-10th period, it responded positively or strengthened again, which means that economic growth plays an important role in strengthening the short-term exchange rate, and exchange rate stability in the long term and requires policies that can overcome various macroeconomic problems. This is in line with research (Asmara et al., 2024)

The rupiah exchange rate is also significantly influenced by economic growth, because a stable exchange rate means that the economy will grow and be accompanied by high export value results.

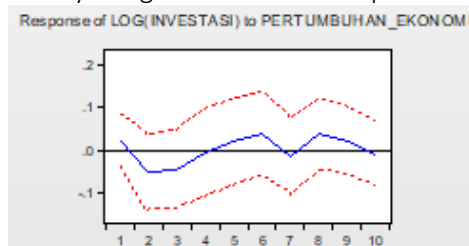


Figure 8. impulse response results

Response of investment to economic growth shocks

Based on Figure 8, it explains that the investment response to economic growth at the beginning of the period is positive, after a positive shock to economic growth, investment responds negatively, it could be due to the economic uncertainty of the global market, after the period 3-6 investment responds positively to economic growth, it shows that sustainable economic growth can encourage increased investment. Then fluctuations occur in the next period, period 7-10, meaning that this can occur between economic growth and investment because government policies, the influence of interest rates and the influence of investors play a role in driving the economy. Therefore, the government needs to maintain macroeconomic stability and create a sustainable investment climate so that economic growth can encourage investment, which ultimately strengthens the Indonesian economy. as explained by previous research (Bimantoro & S, 2016) The short-term correlation between direct investment and Indonesia's economic growth suggests that the benefits of direct investment, such as maintaining macroeconomic stability, are only temporary and some economic factors can affect macroeconomic stability.

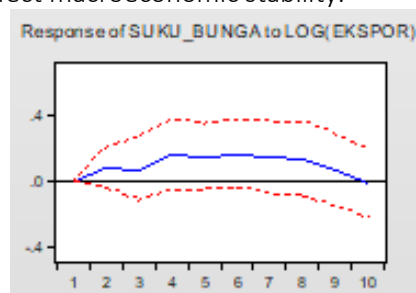


Figure 9. impulse response results

Response of interest rate to export shocks

Figure 9 explains the response of interest rates to export shocks. Changes in interest rates have an impact on a country's exports because initially an increase in interest rates has a positive effect because it attracts foreign investment and strengthens the rupiah exchange rate. So that export products become more competitive in the global market, but in the medium term the positive response begins to decline due to the increase in production costs due to high interest rates and create a slowdown in the domestic economy. These conditions require central bank monetary policy, on the one hand an increase in interest rates that is too high causes an inhibition of economic growth and exports and on the other hand an increase in interest rates is needed to control inflation. Therefore, monetary policy must be balanced by considering global and domestic economic conditions. This is in line with research (Anggraeni & Prakoso, 2022) Exports are affected by interest rates in the short term as market participants will respond by increasing the value of exports and production levels.

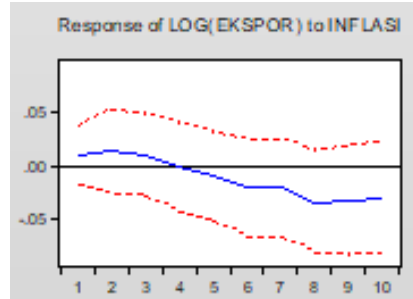


Figure 10. impulse response results

Response of exports to inflation shocks

Based on Figure 10, it explains that exports respond positively to inflation in the short term but in the long term respond negatively. In periods 1-3 respond positively meaning that the increase in inflation increases exports in the short term, because the price of goods becomes expensive but does not last long, because in the long term in the next period 4-10 responds negatively meaning that the increase in inflation in the long term will damage domestic products in the global market. This happens because the increase in inflation makes production costs become expensive as a result domestic products become less attractive to consumers abroad and eventually exports decline. Steps that can be taken by the central bank as a monetary authority is to raise interest rates so as to control inflation and keep domestic products in the global market but the policy must also consider the impact on economic growth. This is in line with research (Maisarah, 2024) that exports are strongly influenced by inflation. This means that exports will decline when inflation increases. After some time, the correlation between exports and inflation stabilizes. This shows that in the long run the relationship between exports and inflation becomes more predictable.

Variance Decomposition

The VAR approach uses variance decomposition to break down one endogenous variable into other endogenous variables. This process shows how much of the movement in the series is due to shocks to that variable alone compared to shocks to other variables. Measuring the composition or contribution of the influence of the independent variable on the dependent variable is another objective of variance decomposition.

Table 5. Variance Decomposition Result

Variance Period	Decomposition SE.	GDP	Inflation	Exchange Rate	Investment	Interest Rate	Export
1	1.633878	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	1.961180	83.36202	0.952955	3.371631	1.247280	6.025292	5.040824
3	2.126273	76.41666	2.676001	3.243964	2.537741	10.51019	4.615445
4	2.295005	67.46626	2.512493	3.976168	8.144897	13.62525	4.274932
5	2.420179	60.67648	6.107142	5.337972	9.821121	12.64794	5.409349
6	2.566409	54.19779	7.485994	6.653482	14.64820	12.13064	4.883897
7	2.668125	50.69882	8.177451	6.168092	14.38813	16.02668	4.540827
8	2.773757	47.79329	7.903878	5.968837	13.39921	20.34747	4.587308
9	2.864606	46.69107	7.433081	5.943516	12.56374	23.06077	4.307817
10	2.913765	46.16577	7.338650	6.048377	12.43225	23.82580	4.189141

Based on the VDC results table and the appendix, it explains that in the first period economic growth is strongly influenced by the economic growth shock itself by 100 percent. Meanwhile, in the first period the variables of inflation, exchange rates, investment, interest rates, exports have not yet had an influence on economic growth. This shows that in the short term, economic growth is independent or explained by shocks or internal factors of economic growth itself. However, over

time, the contribution of other variables such as interest rates, investment, exchange rates, inflation, and exports began to increase. Interest rate becomes the most dominant factor in the long run, explaining up to 23.8% of the variance in economic growth in the 10th period, followed by investment which contributes 12.4%. The exchange rate and inflation have smaller contributions, around 6% and 7% respectively in the 10th period, while exports remain relatively stable with a contribution of around 4-5%. These results suggest that to boost economic growth in the long run, policies that focus on managing interest rates and increasing investment are crucial, while variables such as inflation, exchange rates, and exports have a smaller but still relevant role.

CONCLUSION

By using quarterly data from 2011-2023 and applying the VAR model, this study analyzes the structural relationship between macroeconomic variables such as inflation, interest rates, exchange rates, investment, exports to economic growth in Indonesia. This study concludes that the macroeconomic variables both in the short and long term. In the long run interest rates and investment dominate the influence on economic growth, while inflation, exchange rates, exports have a smaller but relevant contribution. The results of the impulse response function (IRF) analysis show that each macroeconomic variable responds to shocks with different patterns, indicating the need for appropriate policies to maintain macroeconomic stability. For example, a balanced monetary policy is needed to maintain inflation and purchasing power, while fiscal policy should support increased investment and exports to boost economic growth. Thus ensuring inclusive growth amid global and domestic challenges.

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