Response of Macroeconomic Indicators to External Shocks in Indonesia

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Abstract

As a developing country with a high level of economic openness, Indonesia is classified as vulnerable to global economic dynamics. This study aims to analyze the response to external shocks, namely the COVID-19 pandemic, the Fed's interest rate increase, and USD/IDR exchange rate fluctuations on Indonesia's macroeconomic indicators, namely Gross Domestic Product (GDP) and Consumer Price Index (CPI), as well as evaluate the government's fiscal policy in responding to these pressures during the 2013–2023 period. The research used secondary data for the quarter 2013:Q1 and 2023:Q4, with as many as 44 observations of each variable, using the Vector Error Correction Model (VECM) method. The results of the estimate show that the USD/IDR exchange rate and the Fed's interest rate have a significant long-term relationship with Indonesia's real GDP and CPI. Throughout the research period, the government responded through various fiscal policies such as fuel subsidy adjustments (2013–2014), strengthening infrastructure and tax reform (2015–2019), large stimulus through the PEN program during the pandemic (2020–2022), and returning to fiscal discipline in 2023 with a focus on social protection, human resource development, and industrial downstreaming. These findings underscore the importance of adaptive fiscal policies in mitigating the impact of external shocks on the domestic economy.

Keywords: External shocks, fiscal policy, VECM, Gross Domestic Product, Consumer Price Index, Fed interest rate, USD/IDR exchange rate

Introduction

Indonesia is a developing country with an open economy vulnerable to global change (Hashmi et al., 2021). Global economic policy uncertainty has a major impact on Indonesia's stock market and exports, as well as tightening competition in attracting investors, especially related to environmental, social, and governance issues (Ministry of Finance, 2024b). Indonesia strives to maintain its economic growth's stability, as instability can trigger systemic risks,

reduce investment, and weaken global competitiveness. One of the factors that affect Indonesia's economic growth is external conditions (Kala et al., 2018).

As reflected in the increasing trade flows, Indonesia is closely related to the United States. Countries with high exposure to the U.S. economy tend to be more sensitive to change, and countries with limited trade are also affected (Retnasih et al., 2016). Interest rate hikes in the US risk affecting Indonesia's exchange rate in the short term (A. S. Prasetyo & Susandika, 2021). In the past five years, Indonesia has faced external shocks that have had a major impact on various sectors, such as air transportation, remittance flows, as well as economic and energy crises, leading to a slow recovery and increased dependence on external debt (Gudmundsson et al., 2021). To maintain economic stability and resilience, local governments also encourage economic development tailored to the needs of the local community amid rapidly changing economic dynamics (Wahed, 2018).

As a country with an open economic system, Indonesia is vulnerable to the influence of global economic conditions, especially from the United States. Disruptions in the world economy, such as the Fed's interest rate hike, can trigger capital outflows, weaken exchange rates, increase import costs, and potentially increase inflation and reduce people's purchasing power (Mardiana et al., 2022).
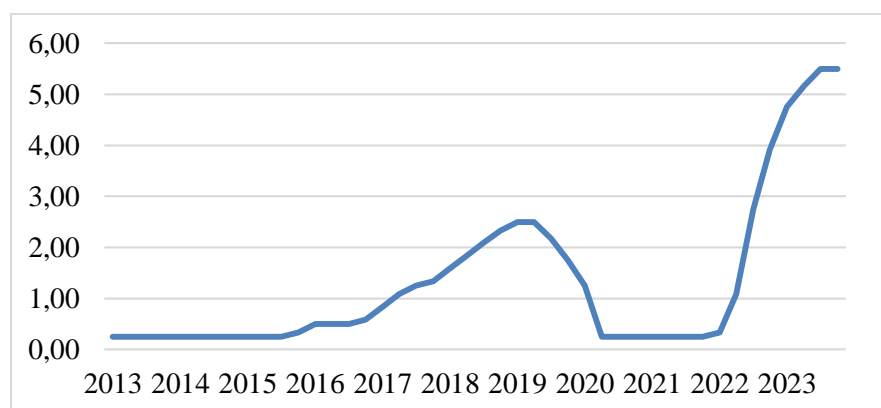

Figure 1. The Fed's Policy Interest Rate

Source: Bank Indonesia (2023b), data processed

Thorbecke (2023) stated that the Fed's interest rate hike in 2019–2023 was triggered by high inflation after the COVID-19 pandemic. Expansionary monetary policy, supply chain disruptions, and geopolitical conflicts exacerbated inflation, so in 2022, the Fed raised interest rates aggressively to control them. The capital and financial balance sheet deficit occurs as global market conditions deteriorate. The Fed's interest rate hike boosted capital outflows from developing countries, including Indonesia, which recorded USD8.13 billion in mid-October (Rezki et al., 2023).

Bank Indonesia responded to the Federal Fund Rate hike by raising the BI Rate to maintain exchange rate stability and attract capital inflows, although this risked slowing domestic economic growth (Budiarso & Pontoh, 2023). However, capital outflows remained high due to the bond sell-off, which also pressured the exchange rate. Indonesia-US trade is heavily influenced by exchange rates, which are also influenced by external factors (Rezki et

al., 2023). High capital outflows have caused the weakening of the value of developing countries' currencies, including Indonesia, against the US dollar (Rahayu, 2023).
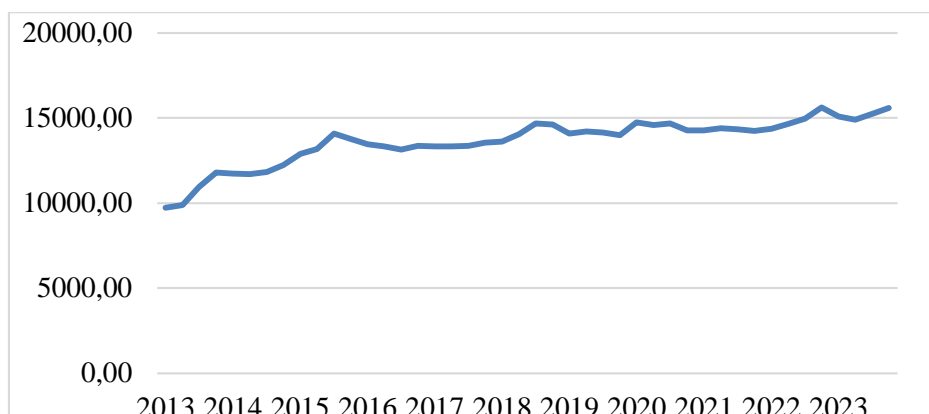

Figure 2. USD to IDR Exchange Rate

Source: Bank Indonesia (2023a)

As shown in Figure 2, the USD/IDR exchange rate experienced a sharp spike in early 2020, exceeding Rp16,000 per USD. According to Putri (2022), the high demand for USD has caused a weakening of developing countries' currencies, including the Rupiah. This condition suppresses the Consumer Price Index (CPI) through increased import prices, which can hinder economic growth, weaken purchasing power, and negatively impact people's welfare (Machmud, 2016).

Mardiana et al. (2022) explained that the strict monetary policy of the United States caused the USD/IDR exchange rate depreciation in 2019-2023. This tightening puts pressure on the Indonesian economy, such as the Fed's interest rate hike, which increases borrowing costs, reduces economic activity, and triggers capital outflows. However, this situation can be controlled if Bank Indonesia maintains rupiah stability through foreign exchange market interventions, spot transactions, DNDF, and SBN purchases in the secondary market (Rezki et al., 2023).

Global events such as the COVID-19 pandemic, trade wars, and fluctuations in commodity prices have worsened the Rupiah's position, impacting the Indonesian economy. The impact includes an increase in the price of imported goods, inflationary pressures, a slowdown in economic growth, and an increase in the external debt burden that worsens the current account balance, so that it becomes a major challenge in maintaining national economic stability (Lubis & Syarvina, 2023).

Indonesia's balance sheet is affected if imports exceed exports, causing a trade balance deficit and increased production costs. The company will then raise the price of goods to cover these costs, reducing people's purchasing power. As a result, Indonesia's GDP declined and economic growth slowed (Silaban et al., 2023). According to Didenko & Yefimenko (2023), economic stability is achieved when there is a balance between aggregate demand and supply and between production and consumption. One of the main indicators of economic stability is Gross Domestic Product (GDP). Keynesian theory posits that economic stability is reflected in

GDP being influenced by aggregate demand, where the inability to meet aggregate demand can lead to a decline in GDP and an increase in unemployment (Jahan et al., 2014).

CPI is a macroeconomic indicator that is influenced by global economic shocks. For example, during the financial crisis in the United States, Indonesia's CPI reached 132.72% with inflation of 11.06% (Retnasih et al., 2016). Pratiwi (2022) recorded a decrease in government consumption from 3.25% to 1.94% and a decline in CPI in 2020. The pandemic and the PSBB policy hampered production and distribution, creating a supply shock that suppressed the prices of goods and services, thereby increasing CPI and inflation (Pratama et al., 2021).

The demand shock due to a decline in people's purchasing power since April 2020 also affected the CPI. Economic uncertainty at that time made people hold back spending and reduce consumption, which impacted declining demand for goods and services and reduced investment by companies, worsening economic growth (Sinamo & Hanggraeni, 2022). These shocks make the CPI an important indicator that illustrates price volatility during the pandemic and shows how inflation is affected by supply and demand changes amid a crisis.

The post-COVID-19 pandemic is a concrete example of external shocks that greatly impact the Indonesian economy. Larionova (2023) stated that the pandemic has significantly affected Indonesia's macroeconomic indicators. The COVID-19 pandemic caused a recession in the Indonesian economy with a contraction of -2.07%, which lasted for three consecutive quarters from the second quarter to the end of 2020 (Antara & Sri Sumarniasih, 2022).

Amid external challenges, fiscal policy is an important tool the government applies to deal with the economic crisis. The crisis caused by the COVID-19 pandemic has different characteristics from the previous crisis, so the fiscal policies needed are also different (Prasasti & Ekananda, 2023). Keynesian theory explains that fiscal policy works through a multiplier effect, where increased government spending can have a greater impact on national output and drive economic growth greater than a single unit.

Previous research by Silaban et al. (2023); Putra (2022); Rahayu (2023); Prasetyo & Susandika (2021); and Ulfia & Saputra (2021) clarified that there is a significant influence of external variables in the form of the rupiah exchange rate on foreign exchange and global interest rates on Indonesia's macroeconomic indicators, especially GDP and CPI. The findings show that the depreciation of the rupiah exchange rate (the strengthening of the US dollar) tends to suppress economic growth, while the appreciation of the rupiah exchange rate (the weakening of the US dollar) can increase economic growth (Silaban et al., 2023). The rupiah exchange rate has a significant positive relationship to inflation in Indonesia, suggesting that exchange rate fluctuations can affect domestic price stability (Son, 2022). Global monetary policy, such as the rise in interest rates in the United States, also plays an important role in the Indonesian economy, where domestic interest rate policies often adjust to these global dynamics.

The COVID-19 pandemic has uniquely impacted the IDR/USD exchange rate, with positive effects observed in the short and long term. However, inflation and domestic interest rates do not directly affect the exchange rate Happy, 2023). These findings underscore the importance of understanding the complex relationship between global monetary policy and

domestic factors in responding to external shocks and emphasizing the important role of domestic fiscal policy in maintaining economic stability, although its effectiveness in the face of external shocks such as the pandemic and the Fed's rate hikes needs to be further examined. This study will analyze how countercyclical fiscal policies can maintain Indonesia's GDP and CPI stability amid global uncertainty.

The phenomenon of Covid-19 that has hit the world requires all countries to secure their country's economy, including Indonesia, which is also affected by Covid-19 and is securing its economy through policy mix instruments, especially fiscal policy. The importance of the government's role in fiscal policy during the Covid-19 period and post-Covid-19 Recovery Economics is the reason why the researcher conducted this study with the theme of the response of macroeconomic indicators to external shocks in Indonesia as a result of Covid-19 and the impact of the US Fed's policy with the determination of the benchmark interest rate level is considered too tight, so that it has an impact on the stability of macroeconomic indicators in developing countries, including Indonesia.

Literature Review

1. **Microeconomic Indicators**
   GDP and CPI are complementary macroeconomic indicators in analyzing the impact of global shocks on the domestic economy—GDP reflects changes in overall economic activity. At the same time, CPI shows its impact on price stability (Cheng & Fu, 2022). In this context, Keynesian theory asserts that fiscal policy through multiplier effects can increase government spending, which then boosts national output and economic growth significantly.

2. **External shock**
   Ministry of Finance (2024a) states that external shocks, such as global economic conditions, geopolitical situations, and climate change, significantly affect the country's economic performance and revenue. In this context, the classical theory explains that interest rates reflect a balance between investment demand and savings, where the Fed's interest rate hike has proven to have a positive and significant impact on the BI Rate in Indonesia (Ulfia & Saputra, 2021). In addition, the exchange rate as a financial variable affects the economy through the transmission of monetary policy, particularly in an open exchange rate system, where the appreciation or depreciation of a currency depends on the dynamics of demand and supply (Ihwanudin et al., 2022). The transmission mechanism of external shocks, such as changes in commodity prices and financial market volatility, is a challenge for developing countries due to economic openness and the influence of the financial cycle. Monetary policies of developed countries, especially the US, have a significant impact on developing economies through interest rate channels, capital flows, and exchange rate fluctuations (O. R. Ananda & Idris, 2024)

3. **Mundell-Fleming Model Theory**
   Analyzes the impact of monetary policy in the floating exchange rate system, assuming that the economy is affected by international interest rates. External shocks such as changes in

US monetary policy significantly impact interest rates, exchange rates, inflation, and output in developing countries such as Indonesia (A. S. Prasetyo & Susandika, 2021).

4. **Fiscal policy**

Zainal et al. (2022) describe fiscal policy as a government strategy to influence a country's economic performance through expenditure and taxation adjustments.

5. **Vector Error Correction Model (Vecm)**

The Vector Error Correction Model (VECM) is a development of Vector Autoregression (VAR), which is used when there is a long-term relationship or cointegration between the variables analyzed, in other words, this model is adapted to handle non-stationary data with cointegration relationships (Basuki & Prawoto, 2018, p. 2).

6. **Fiscal and Monetary Interaction**

Reed (2022) explains that fiscal and monetary policies can affect and shift the aggregate demand curve in the short term.
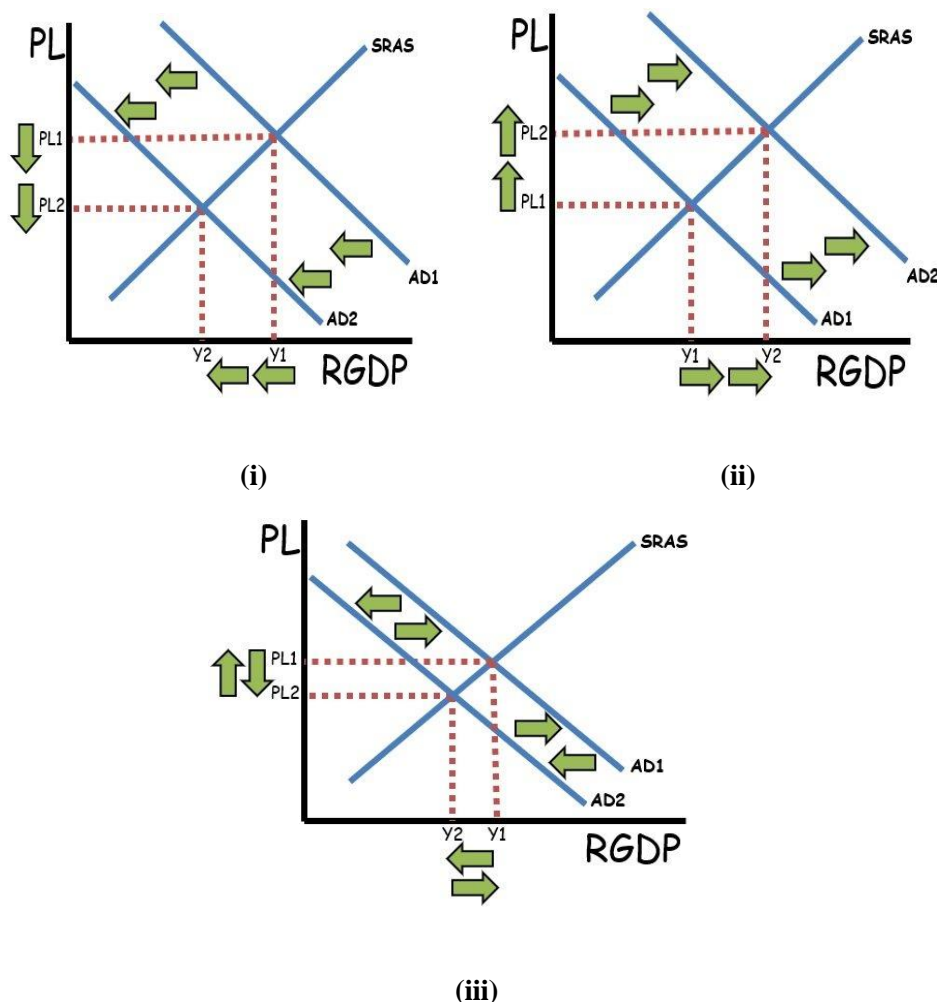

(i)   **(ii)**

(iii)

Figure 3. Demand and Supply Levels

Source: Reed (2022)

Research Method

1. Research location

This research was conducted in Indonesia and the United States with a period of 2013-2023.

2. Data sources and data types

This study uses secondary data for the quarter of 2013:Q1 - 2023:Q4. The variables used from the United States and become external shocks are quarterly data for the Fed's interest rate variables, and USD/IDR exchange rates, while quarterly data from Indonesia is taken from GDP and CPI variables. Thus, there were a total of 44 samples for each variable in that period. The data used in this study were obtained from various official sources, namely the Indonesian Economic and Financial Statistics (SEKI) of Bank Indonesia, the Central Statistics Agency (BPS), and the Federal Reserve Bank of St. Louis (FRED). Exchange rate data and Fed interest rates are obtained from Bank Indonesia's Economic and Financial Statistics (SEKI), Consumer Price Index (CPI) data is obtained from the Central Statistics Agency, and GDP data is obtained from the Federal Reserve Bank of St. Louis (FRED).

3. Data analysis

The analysis method used is the VECM method, one of the econometric approaches that can identify short-term dynamics of its long-term equilibrium due to permanent shocks.

Data Transformation: Performed if necessary to equalize variable scales and address outliers.

Stationariness Test (ADF-test): Tests the stationarity of a variable with Augmented Dickey-Fuller to stationary data.

Determination of Optimal Lag: Determine the optimal lag using the Akaike Information Criterion (AIC).

Model Stability Test: Ensures the model is stable if all characteristic roots are within the unit circle.

Johansen Cointegration Test: Testing the long-term relationships between variables as a condition for implementing VECM.

Granger Causality Test: Identifies the direction of causal relationships between variables.

IRF and VD analysis: IRF traces a variable's response to shock; VD measures the contribution of variables in explaining dependent variability.

Result

1. Data Stationarity Testing

Table 1. ADF Test Results: *Level & First Difference – Trend and Intercept*

Variable	Level		First Difference	
	ADF test scores	**Probability**	**ADF test scores**	**Probability**
GDP	-0.149492	0.9371	-6.369275	0.0000
FFR	-2.272233	0.1854	-4.899549	0.0003
CPI	-2.286334	0.1808	-6.353842	0.0000
EXC	-2.931875	0.0499	-5.380736	0.0001

Source: E-views Processing Results

Based on Table 1, the results of the ADF test show that all variables in this study, namely Gross Domestic Product (GDP), Consumer Price Index (CPI), USD/IDR (EXC) exchange rate, and Fed interest rate (FFR) are not stationary at the level. However, after the *first difference*, the result showed that all variables became stationary. Thus, it can be concluded that the four variables are integrated in the first order (I(1)).

2. Determination of Optimal Lag Length

Table 2. Optimal *Lag Length* Test Results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1105.745	NA	1.47e+19	55.48725	55.65614	55.54832
1	-1070.752	61.23773	5.72e+18	54.53760	55.38204*	54.84292*
2	-1052.400	28.44541*	5.22e+18*	54.42001*	55.94000	54.96959
3	-1048.823	4.828678	1.04e+19	55.04117	57.23671	55.83501

Source: E-views Processing Results

The lag with the lowest AIC value is the most optimal so that it will be used in the next test. From the lag 1 to lag 3 test, it can be concluded that the most optimal lag is at lag 2 because it has the lowest AIC value. The results of the optimal lag test are summarized in the table above.

3. Model Stability Testing

Table 4. Model Stability Test Results

Root	Modulus
0.580297 - 0.329994i	0.667563
0.580297 + 0.329994i	0.667563
-0.005784 - 0.622790i	0.622816
-0.005784 + 0.622790i	0.622816
0.242364 - 0.567852i	0.617411
0.242364 + 0.567852i	0.617411
-0.493737	0.493737
0.059017	0.059017

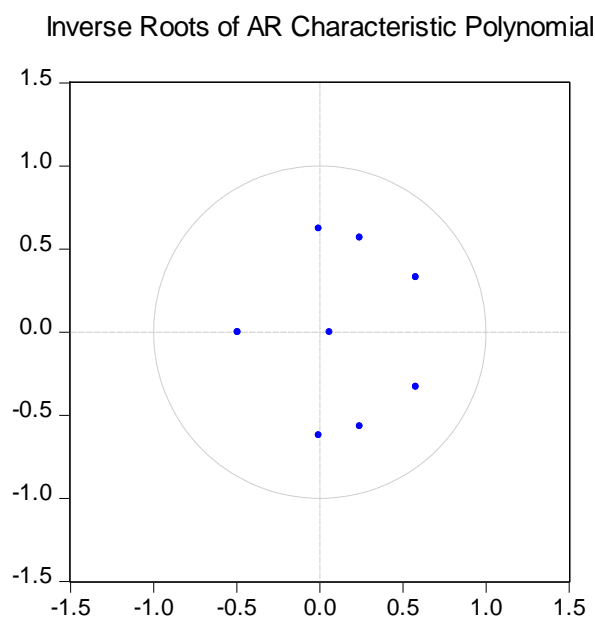Inverse Roots of AR Characteristic Polynomial

Figure 5 Model Stability Test Results Drawings

Source: E-views Processing Results

From the results obtained, it can be concluded that the VECM model formed has been stable because it has a characteristic root <1 and is in a *unit circle* so that it is valid enough to be used in the IRF and VAD analysis process and shows that the VECM model used in this study meets the stability assumption.

4. Cointegration Test Results

Table 3. Johansen Cointegration Test Results

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistics	0.05 Critical Value	Prob.**
None *	0.511522	67.56100	47.85613	0.0003
At most 1 *	0.370174	38.90261	29.79707	0.0034
At most 2*	0.281418	20.41011	15.49471	0.0084
At most 3 *	0.164544	7.191117	3.841466	0.0073

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: E-views Processing Results

Based on the output shown in Table 4.4. it is known that the *trace statistic value of none* is greater than the critical value of 5% where 67.56100 > 47.85613 then accept H_0 and declare that there is cointegration. The results *of the Johansen Cointegration* Test show that there are 4 cointegrated equations. From these results, it can be concluded that there is a long-term and short-term relationship between variables. Thus, this study will use the *Vector Error Correction Model* (VECM) estimation model because it meets the criteria, namely that there are integrated equations.

5. Granger's Causality Test

Table 4. Granger *Causality Test Results*

Null Hypothesis (H_0)	Probability	Test Results
FFR *does not Granger Cause* EXC	0.3225	Not enough evidence to reject H_0
EXC *does not Granger Cause* FFR	0.3147	
IHK *does not Granger Cause* EXC	0.3230	Not enough evidence to reject H_0
EXC *does not Granger Cause* IHK	0.7426	
PDB *does not Granger Cause* EXC	0.0033	Subtract H0
EXC *does not Granger Cause* PDB	0.1871	Not enough evidence to reject H_0
IHK *does not Granger Cause* FFR	0.0391	Subtract H0
FFR *does not Granger Cause* CPI	0.6170	Not enough evidence to reject H_0
PDB *does not Granger Cause* FFR	0.0051	Subtract H0
FFR *does not Granger Cause* PDB	0.2284	Not enough evidence to reject H_0
PDB *does not Granger Cause* CPI	0.7016	Not enough evidence to reject H_0
IHK *does not Granger Cause* PDB	3.E-05	Subtract H0

Source: E-views Processing Results

Granger's causality test (2013Q1–2023Q4, lag 2) shows that the CPI significantly affects the FFR (F = 3.543; p = 0.0391), meaning that inflation drives interest rate hikes. In addition, the CPI strongly affects GDP (F = 14.136; p = 0.00003), confirming that price stability is important to support economic growth through a conducive investment climate and increased economic activity.

GDP significantly affects EXC (F = 6.686; p = 0.0033) and FFR (F = 6.107; p = 0.0051). Economic growth drives exchange rate appreciation and interest rate hikes, reflecting the monetary response to control overheating and maintain economic stability.

Some of the relationships were insignificant, namely FFR ↔ EXC (p > 0.31), CPI ↔ EXC (p > 0.32 and p > 0.74), and FFR → CPI (p = 0.6170). This suggests that external factors or intermediate variables influence fluctuations in interest rates and exchange rates more, while the impact of FFR on inflation can be delayed due to price rigidity.

6. VECM Model Estimation

Table 5. VECM Estimation Results

Variable	Coefficient	t-Statistics	Information
Long-term			
D(EXC(-1))	1.000000		
D(FFR(-1))	-15.50329	-0.07164	Insignificant
D(IHK(-1))	0.836954	4.40347	Significant
D(PDB(-1))	-0.015648	-3.33950	Significant
C	365.4096		
Short-term			
D(EXC(-1),2)	-0.268576	-1.54799	Insignificant
D(EXC(-2),2)	-0.221269	-1.16465	Insignificant
D(FFR(-1),2)	531.4928	1.99508	Insignificant
D(FFR(-2),2)	-570.7564	-2.05934	Significant

Variable	Coefficient	t-Statistics	Information
D(CPI(-1),2)	0.303119	2.49658	Significant
D(CPI(-2),2)	0.182458	2.03030	Significant
D(GDP(-1),2)	-0.006708	-2.86293	Significant
D(PDB(-2),2)	0.001851	0.99874	Insignificant
C	-11.77527	-0.19709	
CointEq1	-0.325615	-1.76072	

Source: E-views Processing Results

The results of the VECM estimate show that in the long term, the CPI has a significant positive effect on the EXC (inflation encourages exchange rate depreciation), while GDP has a significant negative effect on the EXC (economic growth strengthens the exchange rate). In the short term, FFR (lag-2) has a significant negative effect on the EXC (the increase in FFR weakens the rupiah), the CPI (lag-1) has a significant positive effect (inflation drives rupiah depreciation), and GDP (lag-1) has a significant negative effect (economic growth strengthens the rupiah), consistent with the long-term relationship.

The error correction term coefficient (CointEq1) is negative (as expected), indicating the existence of an adjustment mechanism towards long-term equilibrium. However, because it is not yet significant at the level of 5%, the adjustment process is slow even though the system remains stable in the long term.

Overall, these results confirm that domestic macroeconomic indicators, especially inflation and GDP, play an important role in determining the movement of the rupiah exchange rate against the US dollar in the short and long term. Meanwhile, the influence of global interest rates (The Fed) is more short-term and temporary on Indonesia's exchange rate system.
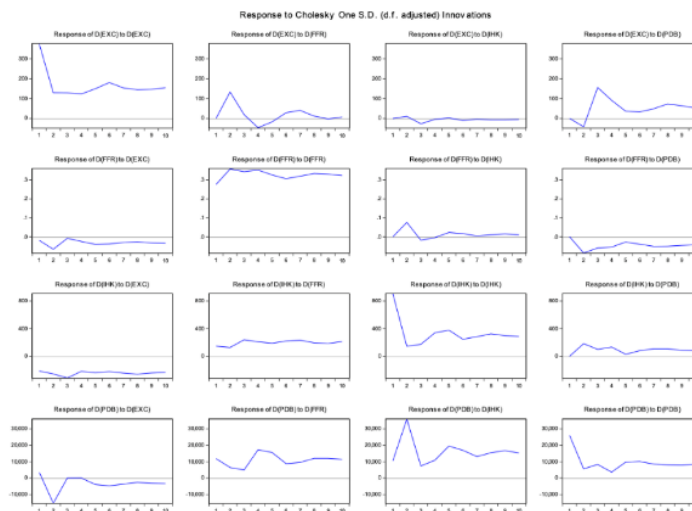
7. **Impulse Response Function (IRF)**

Figure 6. Impulse *Response Function Test Results*

Source: E-views Processing Results

Based on the IRF results, the exchange rate (EXC) significantly impacts GDP, with the exchange rate shock initially causing a contraction in GDP, but turning positive and stable over time. This suggests that weakening exchange rates may reduce short-term economic growth, but boost exports and improve output in the following period.

Shocks from GDP to other variables, such as inflation and exchange rates, suggest that economic growth affects price and exchange rate dynamics, although the impact diminishes after a few quarters. This reflects the existence of feedback mechanisms in economic systems that affect each other.

Generally, the response between variables fluctuates, especially in the first 4–6 quarters, and then converges near equilibrium values. These results are in line with the study Jian et al. (2019) and Rahman & Barman (2018) which shows that the IRF in the VECM model describes a gradual transition of shock towards Long-term equilibrium.
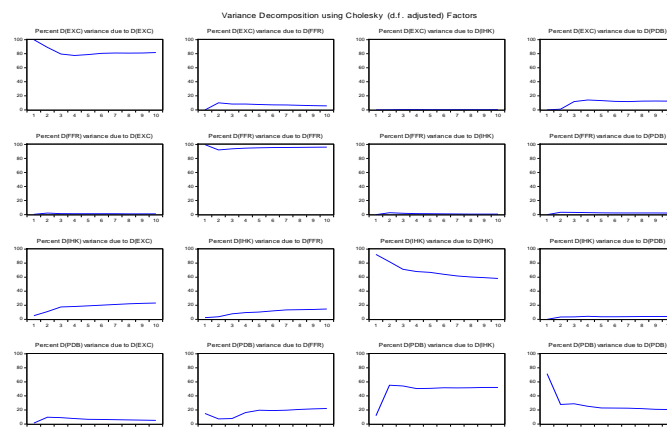
8. **Variance Decomposition**

Figure 7. Variance Decomposition Test Results
Source: E-views Processing Results

The results of the VD analysis show that the variation in the exchange rate (D(EXC)) is largely explained by shocks of itself, with a contribution of more than 80% over 10 quarters. Interest rates (D(FFR)) and inflation (D(CPI)) had small contributions, less than 10% each, while economic growth (D(GDP)) increased slightly at the end of the period, reaching around 10%. The variation in the benchmark interest rate (D(FFR)) is almost entirely explained by shocks of its own, with a contribution of around 98–99%, while the influence of other variables such as D(EXC), D(CPI), and D(GDP) is very small (less than 2%). Inflation (D(CPI)) was initially dominated by a shock from itself (around 70%), but its contribution declined to 50–60% over time, with D(FFR) and D(GDP) starting to contribute increasingly, although still below 30%. Meanwhile, the variation in economic growth (D(GDP)) was initially explained by a shock of around 60%, then decreased to below 50%. The second largest contribution came from the CPI, which increased to around 40% in the second quarter and was stable there. The influence of D(EXC) and D(FFR) is still quite small, below 10–15%.

Discussion
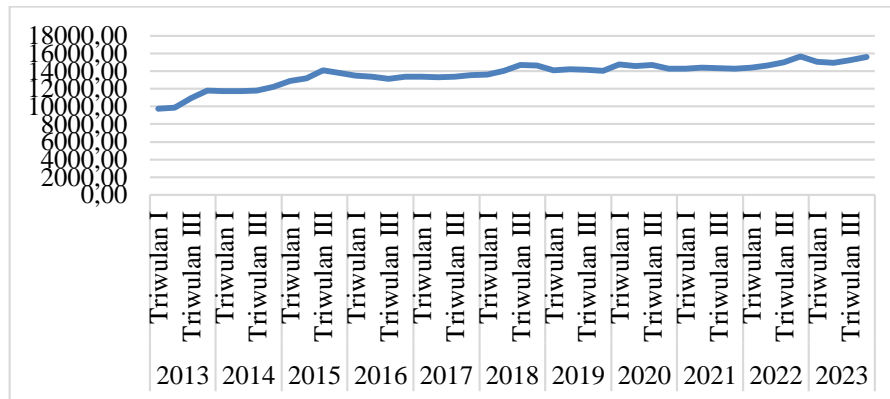
Exchange Rate Development

Figure 8. Rupiah to Dollar Exchange Rate

Source: Bank Indonesia (2023a)

The rupiah exchange rate is influenced by global sentiment and domestic policy. During the 2013 taper tantrum, the rupiah depreciated sharply due to capital outflows, prompting BI to raise interest rates and implement macro policies. The rupiah briefly strengthened in 2014–2018, then weakened to Rp16,000/USD during the 2020 pandemic before recovering slowly. In 2022, the rupiah weakened again to close to Rp16,500 due to the Fed's interest rate hike and global inflationary pressures (Suroyo & Sulaiman, 2024). From the end of 2022 to 2023, the rupiah has been stable in the range of Rp15,200–15,600/USD despite being pressured by the increase in US interest rates. To maintain stability, BI raised the benchmark interest rate by 25 bps to 5.75% in April 2023 to reduce inflation, attract foreign capital flows, and contain the weakening of the rupiah. The decision is not only aimed at containing pressure on inflation, but also a defensive step to strengthen the attractiveness of domestic assets, maintain foreign capital flows, and stabilize the rupiah exchange rate so that it does not weaken further against the US dollar(Suroyo & Sulaiman, 2024).
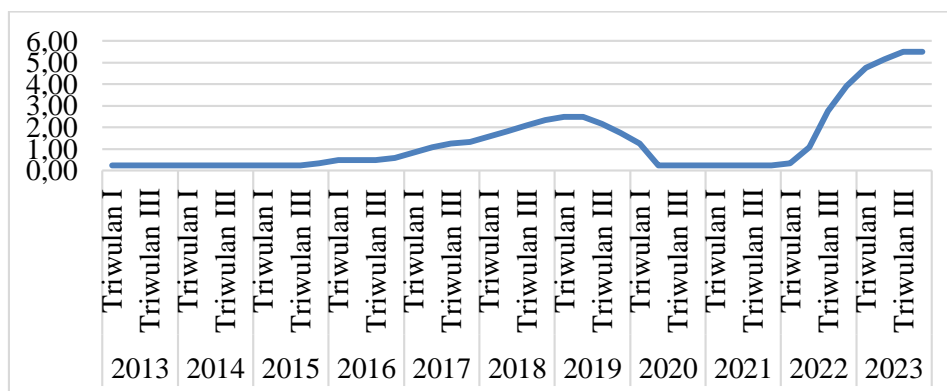
Federal *Funds Rate (Federal Funds Rate)*

Figure 9. U.S. Federal *Funds Rate*

Source: Bank Indonesia (2023b), data processed

Since 2013, the Federal Funds Rate (FFR) has varied significantly. During 2013–2015, the US benchmark interest rate was maintained at a very low level of 0.00–0.25% as an effort to recover from the 2008 crisis through monetary easing and quantitative easing. FFR then rose gradually until it reached 2.4% by the end of 2018. The Federal Reserve implemented this ultra-low interest rate policy as part of the 2008 post-global financial crisis economic recovery strategy, which aimed to boost growth through monetary easing and quantitative easing (QE) programs (Basri, 2017). In May 2013, Fed Chairman Ben Bernanke's statement about the QE reduction plan triggered a taper tantrum, leading to the flow of funds from developing countries to the US. This phenomenon triggered exchange rate volatility, a surge in bond yields, and current account balance pressure in emerging markets. Although interest rates have not yet risen, expectations of policy changes have caused significant global volatility (Harikrishnan et al., 2023). In 2020, the Fed drastically lowered the FFR due to the COVID-19 pandemic, from 1.50–1.75% to 0.00–0.25% to maintain liquidity and support the economy. Interest rates remain close to zero until the end of 2020, encouraging capital inflows to developing countries and strengthening the rupiah. However, starting in March 2022, the Fed aggressively raised interest rates to dampen inflation, so the FFR jumped from 0.1% to 5.33% by the end of 2023. This increase pushed capital outflows out of emerging markets and weakened their currencies, including the rupiah.

Economic Growth Development

Over the past decade, Indonesia's economy has been relatively stable with consistent annual GDP growth. In 2012–2013, growth reached around 5.6% driven by domestic demand, household consumption, and investment. However, in 2015–2019, growth slowed to an average of 5% per year due to declining commodity prices and the economic slowdown of trading partners such as China (Jayasuriya, 2021).
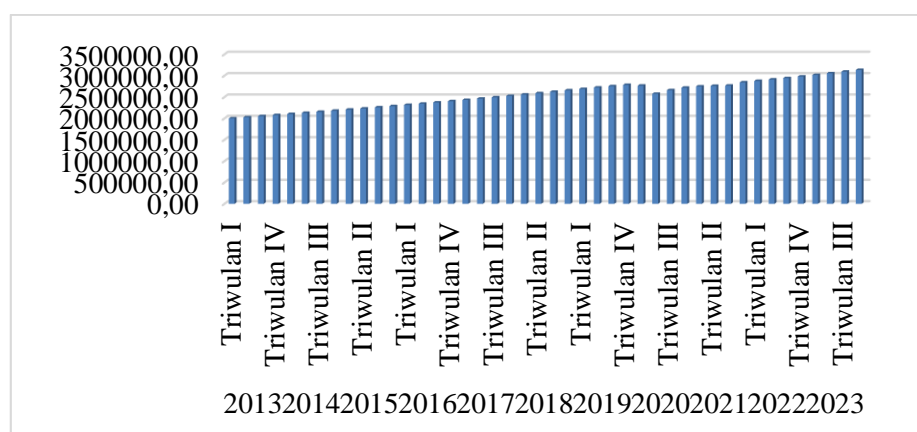

Figure 10. Indonesia's Gross Domestic Product

Source: Central Statistics Agency (2024)

Indonesia's growth momentum was significantly disrupted due to the COVID-19 pandemic in early 2020. The PSBB policy and partial lockdown halted much economic activity while weakening global demand, which pressured exports and manufacturing. As a result, Indonesia's economy contracted by -2.07% in 2020, the deepest contraction since the 1998 crisis (Khairi & Haryanti, 2024). Indonesia's economic recovery began to be seen in 2021 with

a growth of 3.69%, driven by the easing of restrictions, vaccinations, and increased mobility. The recovery strengthened in 2022 with a growth of 5.31%, supported by household consumption, increased investment, and a surge in exports due to high global commodity prices (Khairi & Haryanti, 2024).

Consumer Price Index Development

Inflation is an important macroeconomic indicator that reflects price stability and people's purchasing power. In Indonesia, controlling inflation is the main mandate of Bank Indonesia (BI) with an annual target of 3±1%. Inflation stability indicates the success of monetary policy and provides an important signal for businesses and households in economic decision-making. Therefore, the dynamics of Indonesia's inflation in the last decade, especially related to the COVID-19 pandemic crisis and post-pandemic commodity price volatility, need to be considered.
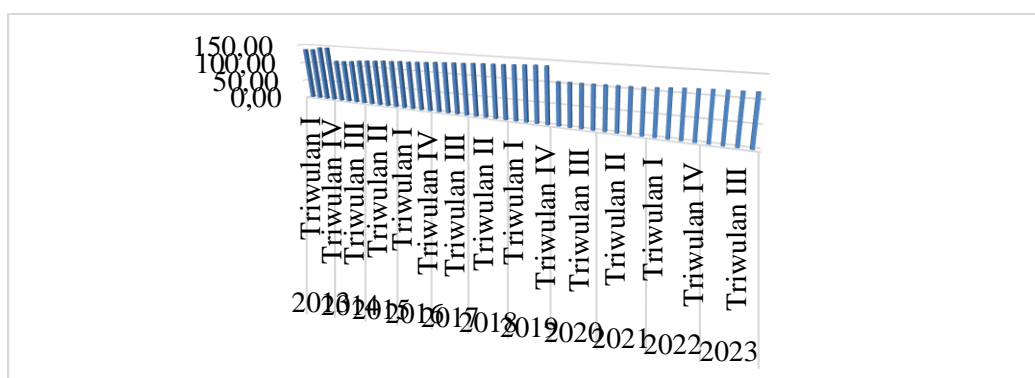

Figure 11. Indonesian Consumer Price Index

Source: Federal Reserve Bank of St. Louis (2025)

Indonesia's inflation is relatively under control, within BI's target range of 3-4% per year. This reflects BI's success in maintaining price stability through interest rate policy, monetary operations, and coordination with the government, especially in controlling food and energy prices, which are often the main triggers of inflation (International Monetary Fund, 2023). During the COVID-19 pandemic in 2020–2021, Indonesia's inflation fell sharply to the range of 1–2%, the lowest in a decade. This decline was due to weakening aggregate demand due to mobility restrictions, declining production and consumption activities, and global economic uncertainty. Research Asmadina et al. (2021) also shows the significant negative influence of the pandemic on Indonesia's inflation through demand and supply channels. The inflation trend chart shows that in 2020 and early 2021, Indonesia's inflation remained below the lower limit of BI's target, even close to 1%. However, since the beginning of 2022, inflation has risen sharply due to a surge in world commodity prices, such as energy and food, triggered by geopolitical tensions and supply chain disruptions. Inflation reached nearly 6% in mid-2022, exacerbated by domestic policies, such as the lifting of fuel subsidies in September 2022, that caused gasoline prices to rise by around 30%, triggering the biggest spike in inflation in the past seven years (Ilman & Hapsari, 2023). Although inflation briefly surpassed, inflationary pressures began to ease in late 2022 and early 2023, in line with global price stabilization and the government's and Bank Indonesia's policy response. In mid-2023, inflation was recorded

below 4%, lower than the global average of around 9% in 2022. This shows the success of price administration policies, the coordination of the Central and Regional Inflation Control Teams, and Indonesia's economic structure, which is more isolated from global dynamics. Overall, Indonesia's inflation during 2013-2019 was stable in the range of 3-4%. Inflation dropped dramatically in 2020–2021 due to the pandemic, with an average of close to 1%, before rising again in 2022 and falling again to 3–4% in 2023. This dynamic reflects Indonesia's ability to control inflation despite global shocks, thanks to its fast and coordinated policies.

Fiscal Policy Effectiveness

The 2013-2023 period is challenging for the Indonesian economy, especially due to external shocks such as the 2013 Taper Tantrum. The tapering announcement by the Fed triggered a depreciation of the rupiah and a surge in interest rates. Indonesia responded with strict fiscal policies, including cutting energy subsidies, increasing fuel prices by 30-44%, and providing additional cash transfers for the poor (Jayasuriya, 2021). Bank Indonesia also raised interest rates to maintain stability. Despite the economic downturn in 2014-2015, growth remained stable in the range of 5%, and inflation and balance sheets improved. Indonesia's fiscal response tends to be procyclical, tightening spending to deal with external pressures, allowing for economic stabilization in a relatively short period (Basri (2017). The 2018-2023 period was challenging for Indonesia, starting with US-China trade tensions that reduced the demand for Indonesia's export commodities such as coal and CPO. The COVID-19 pandemic (2020–2022) caused an economic contraction of -2.07% in 2020, with a decline in household consumption and state revenue. The government responded with expansive fiscal policies, including the National Economic Recovery Program (PEN) (Prasetyo et al., 2024). Then, the Russia-Ukraine war (2022–2023) triggered a surge in energy and food prices, worsening Indonesia's inflation by reaching 5.51% in September 2022. On the other hand, US interest rates are being raised aggressively by the Federal Reserve, while countries around the world are implementing massive fiscal stimulus to deal with the impact of the pandemic and global inflation (Rezki et al., 2023).

Fiscal policy is a strategy used by governments to regulate taxes and expenditures to address economic problems and achieve economic stability (Ananda et al., 2024). Oktafia et al. (2020) state that fiscal policy is the main tool used to manage the economy toward macroeconomic goals. The success of fiscal policy depends heavily on considering political, economic, and social factors (Hidoyatovna & Kizi, 2024). This study aims to analyze the effectiveness of Indonesia's fiscal policy in dealing with external shocks between 2019-2023. The Indonesian government responded to external shocks through expansionary fiscal policies focusing on sectoral stabilization and social protection. During the pandemic, the government launched the National Economic Recovery (PEN) program to deal with the impact of the pandemic and maintain economic stability, with a budget of Rp695.2 trillion that includes allocations for health, social protection, and MSME support. Although the PEN program contributes to economic recovery, its effectiveness is limited by high state budget deficits, budget inefficiencies, and challenges to the accuracy of social assistance targets and business stimulus (Halimatussadiah et al., 2020). The total PEN budget directed to economic recovery and related sectors reached Rp1,645 trillion (Sarwono et al., 2023). This policy succeeded in

mitigating the decline in household consumption, as reflected in the growth of the household consumption sector of 3.55% (yoy) in the fourth quarter of 2021, better than the previous quarter, which was only 1.03% (BPS, 2022)

Post-pandemic, the Indonesian government focuses on energy subsidy reform to reduce fiscal pressures and support economic growth. (Talattov et al., 2023) In 2022, fuel and electricity subsidies reached Rp502 trillion due to the surge in global crude oil prices, which exacerbated the budget deficit of up to 5.78% of GDP, exceeding the limit set by the 3% Law, which was then temporarily revoked through Perppu No. 1/2020. On the other hand, infrastructure stimulus such as the acceleration of National Strategic Projects (PSN) with a total value of Rp5,481.4 trillion, is expected to increase long-term productivity (Harmen, 2023). In addition, good fiscal policy management also has a positive impact, as can be seen from the increase in Indonesia's credit rating (Rezki et al., 2023). Indonesia's fiscal policy is effective in responding to external shocks, but it faces major challenges, especially during economic contractions, such as during the pandemic. Limited tax base and social restrictions narrow the government's fiscal space (Ministry of Finance of the Republic of Indonesia, 2023). Nonetheless, tax revenues remain important as a primary source of financing and an instrument to support countercyclical fiscal policies. The success of fiscal policy is highly dependent on the flexibility of state revenues and the government's ability to reallocate and target fiscal stimulus during crises (Rezki et al., 2023).

Indonesia's fiscal policy has maintained macroeconomic stability during the pandemic through the PEN Program, which reduces the socioeconomic impact and contains extreme poverty rates. Countercyclical policies also supported the rebound of economic growth to 5.31% in 2022, while inflation and financial volatility were under control. However, increased energy subsidy spending risks creating long-term fiscal dependency, especially with significant global commodity price imbalances and government debt. Research suggests sustainable fiscal policy reforms, including restructuring energy subsidies and efficiency of public spending, so as not to burden the economy in the long run Indrawati et al., 2024). Indonesia's main challenge in maintaining fiscal sustainability is the increase in government debt, reaching 41.6% of GDP in 2023 (Annisa & Riofita, 2024). The effectiveness of fiscal policy is not only seen from the size of the stimulus, but also from the accuracy of its targets and efficiency. Targeted policy design, especially in the face of rising energy prices, must not strain the budget and reduce adaptation incentives in the private sector OECD, 2022). Structural reforms, such as the diversion of non-productive subsidies to priority sectors, such as education and health, are important. Fiscal and monetary policy coordination is also crucial, with Bank Indonesia easing monetary policy in 2020 and responding to the Fed's monetary tightening policy in 2022. As a result, Indonesia's inflation in 2022 is estimated to reach 5.7%, exceeding the set inflation target (Bappenas, 2022).

The effectiveness of Indonesia's fiscal policy is evident in several key programs. The state-funded mass vaccination program has succeeded in reducing COVID-19 cases by up to 95% in six months, with an allocation of IDR 73 trillion for vaccines and health facilities, which increased the complete vaccination ratio to 75% in 2022. This supports the recovery of formal sector labor productivity. In addition, the provision of fiscal incentives in the form of interest

subsidies for MSME loans (IDR 115 trillion in 2020–2021) succeeded in preventing the bankruptcy of 6.2 million micro business actors, as well as encouraging the contribution of MSMEs to GDP to increase from 61% (2020) to 64% (2023). The market operation policy of IDR 25 trillion in 2022 also suppressed food inflation from 6.2% in June 2022 to 4.8% in December 2022 (BPS, 2023). National Food Agency of the Republic of Indonesia (2023, p. 12) Strategic food price control programs such as the Cheap Food Bazaar (BPM) and the Cheap Food Movement (GPM) also help stabilize food prices. In addition, the 2023 State Budget also supports infrastructure development that supports green economic transformation with budget allocations for various priority sectors and bureaucratic reform (Ministry of Finance, 2023, p. 17).

According to McKinsey (2022, p. 25), the transition to a global net-zero economy could create around 200 million new jobs through 2050. However, it risks eliminating another 185 million jobs, resulting in a significant workforce shift. Clean energy and green infrastructure investment is expected to lower carbon emissions and drive long-term economic growth. Indonesia's fiscal policy during 2013–2023 plays an important role in responding to external shocks. Government spending instruments, subsidies, and fiscal stimulus were adjusted to dampen economic turmoil, with GDP growing back to 5%, poverty rates depressed, and inflation under control. However, long-term effectiveness also depends on further structural reforms, such as increasing the tax base and allocating spending to productive sectors (Indrawati et al., 2024).

Conclusion

Based on the results and discussions, the following conclusions were obtained: the VECM Estimate results show that the exchange rate (USD/IDR) and the Fed interest rate (FFR) have a long-term and significant relationship with real GDP and CPI in Indonesia. The response to the shock in the FFR caused a significant decline in GDP in the 1st to 5th quarters and suppressed the inflation rate (CPI) slowly and gradually. Meanwhile, *the shock* in the exchange rate (USD/IDR) has a depressive effect on the economy, where the value of GDP falls significantly, especially in the 3-5 quarters after the *shock*. Inflation increases due to exchange rate depreciation with a positive response to exchange rate shocks after 2-3 quarters. During the 2013-2023 period, the Indonesian government carried out various fiscal policies to respond to external pressures such as in 2013-2014 fuel subsidy adjustments were given to keep the fiscal healthy in the face of taper tantrums, in 2015-2019 infrastructure spending was strengthened and tax reforms were carried out to support long-term growth, 2020-2022 during the pandemic massive fiscal spending was implemented through the National Economic Recovery (PEN) program and deficit fiscal expansion temporarily to exceed the limit of 3% of GDP. Until 2023, fiscal discipline with a deficit below 3% will be carried out again, focusing on social protection, human resource development, and industrial downstreaming.

Indonesia's domestic economic stability is vulnerable to global shocks, so anticipatory and adaptive fiscal policies, such as optimizing responsive spending instruments, are needed. In addition, the exchange rate and inflation responses to external shocks are also quite

significant, requiring more integrated coordination between fiscal and monetary policies so that they do not conflict.

Declaration of conflicting interest

The authors declare that there is no conflict of interest in this work.

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