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COVID-19 and Monetary Policy Responses

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Abstract: The COVID-19 pandemic has profoundly impacted the world economy, especially Indonesia, causing substantial fluctuations in essential macroeconomic indices such as economic growth, inflation, and financial markets. In response, Bank Indonesia executed a series of monetary policy modifications, chiefly by augmenting the money supply to guarantee liquidity and stabilize the economy. The efficacy of monetary policy transmission during extraordinary crises is debatable due to structural changes and increased uncertainty. This study seeks to analyze the dynamic relationships between money supply, inflation, and economic growth in Indonesia from 2013 to 2024, specifically contrasting patterns before and during the pandemic. The study utilizes a quantitative methodology, specifically the Vector Autoregression (VAR) model and Granger causality tests, to ascertain the direction and magnitude of correlations among variables. The results aim to deliver empirical evidence about the effectiveness of monetary policy in alleviating economic disruptions during health emergencies, so providing significant policy recommendations for central banks encountering analogous issues in the future.

Keywords: Key Money Supply, Inflation, Exchange Rate, Gross Domestic Product at Constant Prices, Reference Interest Rate, Covid

1. Introduction

The COVID-19 pandemic has significantly affected Indonesia's economy, resulting in a decline in economic growth from 5.02% in 2019 to 2.97% in 2020, and an increase in the unemployment rate from 5.28% to 7.07% (Melati, 2023), attributable to interruptions in global supply networks and foreign investment. One of the key steps taken is to ensure that monetary and fiscal policies are aligned; this consistency is crucial for creating synergy in efforts to revive the economy. As a result, monetary and fiscal measures can support each other to minimize the negative impact of the pandemic (Sasongko, 2020). During the COVID-19 pandemic, unconventional monetary policies, such as Quantitative Easing (QE), had a predominantly beneficial global effect, primarily aimed at mitigating disaster risk in financial markets (Cortes et al., 2022). For economic recovery after the COVID-19 pandemic, the alignment of monetary and fiscal policies is crucial. To boost lending and investment, Bank Indonesia (BI) lowered the benchmark interest rate and provided additional liquidity. These steps are expected to minimize the negative impact of the pandemic as BI seeks to avoid fluctuations detrimental to the economy by keeping the rupiah exchange rate stable.

To mitigate the economic impact of the COVID-19 pandemic, Indonesia's central bank has implemented monetary policy, which is crucial during this crisis. To encourage lending and investment, Indonesia's central bank has lowered the benchmark interest rate and provided additional liquidity to ensure banks have sufficient funds to assist businesses. Additionally, to support economic recovery, BI is working to maintain the

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stability of the rupiah exchange rate and control inflation. These steps are expected to mitigate the negative effects of the pandemic and promote sustainable economic growth in Indonesia (Fitriani, 2023).

The COVID-19 epidemic considerably impaired the transmission of monetary policy to financial markets, despite accounting for other variables. Nevertheless, the gravity of the pandemic did not significantly impact the efficacy of this transmission (Wei & Han, 2021). The money supply (M2) in Indonesia, which exhibited a stable upward trend before the COVID-19 pandemic, reflecting positive economic growth. Meanwhile, the benchmark interest rate tended to be stable and relatively low to encourage investment. However, during the pandemic, the economic stimulus provided by the government and Bank Indonesia to support the depressed economy led to a significant surge in the money supply. Although these aggressive monetary policies aim to maintain liquidity in the market, they increase the risk of future inflation if economic growth does not keep pace with the increase in the money supply. The money supply negatively impacts inflation, as an increase in the amount of money can cause inflation to rise. Conversely, interest rates do not affect inflation. This finding highlights the importance of carefully setting interest rate policies (Ningsih & Kristiyanti, 2018).

The inflation conditions in Indonesia and their impact on constant price GDP before, during, and after the COVID-19 pandemic. Before the pandemic, stable inflation drove GDP growth, but during the pandemic, demand decreased, followed by economic contraction. Therefore, appropriate and responsive monetary policy is crucial for economic recovery. Inflation in Indonesia in 2020 was categorized as mild inflation (below 10% per year) and did not have a significant impact on the overall economy. However, inflation for food, beverages, and tobacco reached 3.63%, and inflation for healthcare reached 2.79% (Amalin & Panorama, 2021). Although inflation was mild overall, it was quite high for food and beverages as well as healthcare.

This good inflation control is supported by strong coordination between the Central Government, Regional Governments, and Bank Indonesia, although there was an increase in volatile food (VF) and administered prices (AP) inflation, especially for commodities like cayenne pepper and cooking oil. The easing of PPKM ahead of Christmas and New Year also drove inflation in the AP component, including air transport fares and cigaret prices. With the decline in COVID-19 cases allowing for the relaxation of mobility restrictions, economic activity is beginning to recover, and domestic demand is increasing. However, inflation projections for 2022 are expected to increase along with economic recovery, so the government is committed to monitoring imported inflation and global commodity price trends to maintain economic stability and public welfare (Limanseto, 2022).

Bank Indonesia (BI), as the monetary policy authority, is responsible for regulating the amount of money in circulation in society and maintaining the stability of the financial system, ultimately aiming to keep inflation stable. According to (Arnon, 2011), "One important gap in the early stages of monetary theory development was the incomplete treatment of intermediation, i.e., the transfer of funds from savers to investors." The most attention-grabbing monetary aspect is the exchange of domestic and international goods and services, with a focus on the role played by money and

banking in this process. The role of intermediation in monetary theory and policy is typically limited to interest rate issues. Over time, the increasing importance of intermediation in the economy has transformed this gap into a major reason for some weaknesses in monetary theory. Seeing this weakness, the process in monetary policy is not only at the time BI, as the monetary policy maker, sets the benchmark interest rate, but also how the impact of that interest rate setting is responded to by the banking sector, leading to fund transfers. Benassy-Quere et al., (2010) "One of the most striking aspects of the evolution of monetary policy is its increasing sophistication and the growing importance of communication with market participants and private agents. Under normal conditions, effectiveness is highly dependent on the central bank governor's ability to make credible announcements to the public and to guide the expectations of financial market participants regarding their future decisions. This implies that monetary policy also depends, sometimes to a certain extent, on the quality of central bank communication.

According to Arnon (2011), "One important gap in the early stages of monetary theory development was the incomplete treatment of intermediation, i.e., the transfer of funds from savers to investors." The internal and international exchange of goods and services is the most closely monitored monetary element, with an emphasis on the role played by money and banking in this process. The role of intermediation in monetary theory and policy is usually limited to interest rate issues. However, as intermediation becomes more important in the economy, this gap becomes a major reason for some weaknesses in monetary theory. Because of this weakness, the monetary policy process includes not only the actions of Bank Indonesia as the monetary policy maker in setting the benchmark interest rate, but also how the banking sector responds to the interest rate setting, resulting in the transfer of funds. One of the most prominent aspects of the evolution of monetary policy is its increasing sophistication and the growing importance of communication with market participants and private agents," (Benassy-Quere et al., 2010). In normal situations, effectiveness heavily relies on the central bank governor's ability to make credible public announcements (Ospina-Tejeiro & Romero, 2025) and guide financial market participants' expectations about their upcoming decisions. This shows that the quality of central bank communication also sometimes influences monetary policy.

Monetary policy plays an important role in the economic development of Indonesia. Macroeconomic variables such as inflation, money supply, exchange rates, and interest rates significantly impact the economy, both in the short and long term (Pasaribu et al., 2023). Central Bank transparency regarding macroeconomic projections includes the publication of inflation forecasts, GDP (Gross Domestic Product) growth, output gaps, and other related variables. The purpose of this transparency is to explain how monetary policy is used to achieve inflation targets and overall economic stability (Ospina-Tejeiro & Romero, 2025). One of the important tools for maintaining a country's economic stability, especially in developing countries like Indonesia, is monetary policy. Consumption, investment, and production activities in the economy are heavily influenced by macroeconomic components such as inflation, exchange rates, and interest rates. This happens in both the short and long term.

Often, the policy interest rates of small countries' central banks follow changes in interest rates in large countries. However, the inward-looking Taylor rule, which focuses on domestic variables such as inflation and the output gap and does not explicitly consider foreign interest rates, is still used by the central banks of small countries (Basu et al., 2025). Contractionary monetary policies, such as interest rate hikes, tighten corporate financing conditions, thereby increasing funding costs. This particularly burdens small businesses, which are more vulnerable to financial difficulties and are directly impacted in their ability to innovate (Majeed et al., 2025).

Domestic inflation is heavily influenced by changes in currency exchange rates and foreign interest rate policies. One of the main ways to connect international monetary policy with domestic economic conditions is thru import inflation. Taylor's rule, which aims to maintain price stability, encourages central banks to raise interest rates as a result of persistently rising import prices (Basu et al., 2025). To control inflation, an adaptive policy approach based on strengthening market confidence in the central bank's credibility is needed. Additionally, it is important to integrate fiscal policy coordination to curb the inflationary impact stemming from fiscal deficits and keep inflation expectations well-anchored. Stability of expectations and inflation control are needed thru clear communication and the use of dynamic prediction models (Phahlamohlaka & Buthelezi, 2025).

The importance of macroeconomic stabilization thru monetary policy to prevent the negative impact of the medium-run on productivity and GDP. The negative effect of contractionary monetary policy on innovation could potentially lead to medium-term economic "scarring" and exacerbate the trade-off faced by central banks between inflation control and economic growth (Majeed et al., 2025). Surprises in monetary policy contractions can lead to a decline in economic output (GDP), resulting in lower tax revenues and increased government spending. This suggests that tight monetary policy can worsen GDP conditions, which then puts pressure on fiscal policy (Afonso & Gomes-Pereira, 2025).

This study is significant due to the COVID-19 pandemic's unprecedented economic disruptions, which have tested the efficacy of conventional monetary policy transmission mechanisms. Although Bank Indonesia augmented the money supply to sustain liquidity and economic stability, the tangible effects of these actions on inflation and economic growth require empirical evaluation, especially regarding the alterations in macroeconomic dynamics before and during the pandemic. This study addresses a significant deficiency in the literature by examining the efficacy of monetary policy in a developing economy, specifically Indonesia, amid a global crisis, so establishing a scientific basis for more adaptive and effective policymaking in the future.

2. Materials and Methods

In this study, the vector autoregression (VAR) model was used as the data analysis model. This model was chosen because the Mundell-Fleming model is too complex, making it difficult to measure the influence between variables. According to Widarjono (2013), the VAR model is designed to minimize theoretical approaches so that economic

phenomena can be observed well. Therefore, VAR is a non-structural or atheoretical model. The advantages of the VAR model are as follows: 1. The model is simple and does not need to distinguish between endogenous and exogenous variables. 2. Using the VAR model to predict specific situations is better than using more complex simultaneous equation models because VAR can see long-term In addition to using the VAR model, this study also uses a regression model with dummy variables. A dummy variable is an indicator variable that represents a specific category or group within the data (e.g., gender, marital status, the presence of a feature). Its value is usually 0 or 1, indicating the absence or presence of a specific characteristic in the observation (Greene, 2018). The use of dummy variables in this study is to examine the condition of Indonesia's GDP during the COVID-19 pandemic and outside of it.

3. Results and Discussion

The results of the Granger causality test show that the main driver is the money supply (M2). Changes in M2 cause exchange rate movements (ER) and an increase/decrease in real output (GDPK). Changes in M2 can affect the exchange rate and bank credit before influencing inflation, as monetary policies that alter M2, such as open market operations, can impact the exchange rate and bank credit. NT - PDBK feedback loop: Real output (PDBK) and the exchange rate are mutually influenced, as demonstrated by the feedback between the foreign exchange market and the real sector. Policies focused on one variable will impact the other. It has not been proven that the benchmark interest rate (SB) is a causal factor; from 2013 to 2024, the SB appears to be reactive rather than a primary driver of changes in M2, NT, GDPK, or INFLS. There is no direct relationship between M2 and INFLS; although M2 affects NT and NT, there is no direct causality between M2 and INFLS. This means that the impact of M2 on inflation is transmitted indirectly thru the exchange rate channel.

Table 1 Results of Dummy Variable Regression Model Test

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	969015.116	122452.314		7.913	.000
	jumlah uang beredar	.180	.010	.883	17.468	.000
	nilai tukar	40.660	12.140	.164	3.349	.002
	dummy	-95442.846	23693.023	-.115	-4.028	.000

a. Dependent Variable: PDB harga konstan

3.1 Discussion

The study shown in Table 2 indicates that an increase in the money supply in Indonesia correlates with a rise in constant price GDP of 0.180 billion rupiah, but a depreciation of the exchange rate corresponds to an increase in constant price GDP of 50.66 billion rupiah. The analysis reveals that the augmentation of the money supply in Indonesia favorably influences the growth of Gross Domestic Product (GDP) at constant prices by 0.180 billion rupiah, demonstrating the impact of monetary stimulus on enhancing

aggregate demand and production capacity. The depreciation of the rupiah exchange rate results in an increase in constant price GDP of 50.66 billion rupiah, since currency devaluation boosts export competitiveness and strengthens the exchange rate.

The analysis indicates that, under COVID conditions, the constant price GDP declined by 95,442.846 billion rupiah compared to periods without COVID conditions. The data indicates that the Gross Domestic Product (GDP) at constant prices diminished significantly by 95,442.846 billion rupiah during the COVID-19 pandemic relative to the preceding and subsequent years. The Covid-19 pandemic impacted the Indonesian economy, seen by fluctuations in the exchange rate and the price of the Jakarta Composite Index (JCI). The effect was transient (Sebayang et al., 2021). This decline is attributable to various structural and operational factors, including diminished production activity, supply chain disruptions, reduced household consumption, closures of non-essential businesses, and mobility restrictions implemented to curb the virus's spread, reflecting a broader macroeconomic impact. Comprehending the reduction in GDP value under these stable conditions is crucial as it negates the impact of inflation. This offers a definitive representation of the genuine decrease in national economic activity, unaltered by price fluctuations. The reduction of around 95.4 trillion rupiah signifies that the actual output of goods and services either stagnated or had a substantial decline throughout the pandemic. This obstructs economic progress and complicates national economic recovery strategies. The current policies exert a direct beneficial effect, although they may also inadvertently result in adverse outcomes. A discernible effect currently observed is the reduction in economic growth in Indonesia (Yamali & Putri, 2020). The social restrictions and regional quarantines enacted during the epidemic disrupted the supply and demand for goods and services. This circumstance results in a deterioration of economic growth (Aeni, 2021).

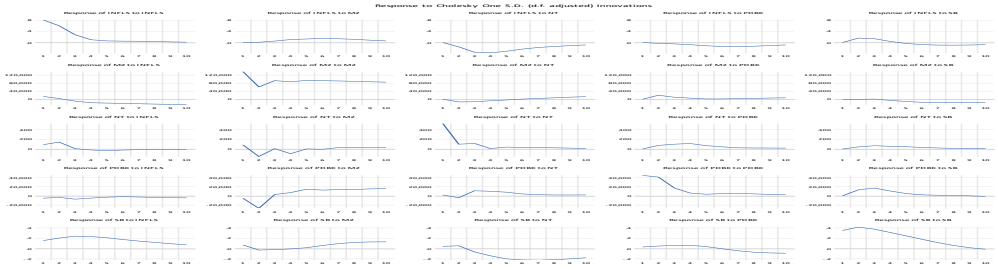

Figure 1. Impulse Response Function (IRF)

Figure 1 shows that the inflation response to its own shock is initially positive, subsequently diminishing toward zero, signifying a reversion to normalcy. The augmentation of the money supply initially mitigated inflation, but then escalated it until the sixth period, after which it declined, consistent with monetary theory. The appreciation of the exchange rate mitigated inflation until the fourth quarter through reduced import costs, after which the response became favorable. Economic growth (constant price GDP) exerted minimal impact on beginning inflation, presumably owing to stable conditions. The initial interest rate increase elevated inflation—reportedly linked to market expectations—but the impact became negative

beginning in period 5, signifying the efficacy of monetary policy in curbing medium-term inflation.

Escalating inflation resulted in a reduction of the money supply, especially during the 10th decade, indicating modifications in monetary policy. The money supply exhibits consistent expansion, notwithstanding the influence of shocks, and demonstrates a robust reaction to both internal and external disturbances. The appreciation of the currency rate first led to a reduction in the money supply, subsequently bolstering long-term growth. Economic development propels an expansion of the money supply, illustrating the reliance of monetary policy on prevailing conditions. The substantial rise in interest rates markedly diminished the availability of circulating money, consistent with the objective of regulating liquidity.

The exchange rate has a pronounced response to inflation shocks: initially appreciating, followed by significant depreciation from periods 4 to 10, aligning with the hypothesis that elevated inflation undermines the currency over the long term. The reaction to monetary supply disturbances is ambivalent—initially robust, subsequently diminishing before recovering. Variations in exchange rates diminished over time, signifying market stabilization. Economic expansion and increasing interest rates lead to exchange rate appreciation, in accordance with capital flow theory and investment appeal. Economic growth is impeded by elevated inflation, persisting in its downturn until the tenth period. An augmented money supply stimulates long-term growth following an initial contraction. An appreciation of the exchange rate enhances GDP, signifying the contribution of capital imports to economic growth. The GDP's response to the shock is initially substantial, however it remains positive, signifying economic resilience to external disruptions. Interest rate increases offer a temporary enhancement to GDP but impede medium- to long-term growth.

Policy interest rates steadily rose in reaction to inflation shocks, reaching their apex in the third quarter. The reaction to money supply shocks was varied: initially declining, followed by a significant increase in the sixth period. The valuation of the exchange currency alleviates the necessity for interest rate increases, but economic expansion necessitates such hikes, however they must eventually be reduced owing to long-term consequences. The initial response of interest rates to the shock is substantial, but diminishes over time, indicating policy inertia accompanied by incremental changes.

4. Discussion

The Granger Causality test outcomes disclose intriguing patterns in Indonesia's macroeconomic variables: The money supply (M2) affects the exchange rate (ER) and constant price GDP (GDPK), but does not directly impact inflation (INFLS). This indicates that monetary policy exerts a more significant influence through real output and the exchange rate rather than through inflation. Following Bank Indonesia's increase of M2, the currency rate initially depreciated, enhancing exports and economic activity, as demonstrated by the rise in constant-price GDP.

However, the impact of the money supply on inflation is not direct and is not visible in the short term. Developing countries and emerging markets with less experience in unconventional monetary policy tend to be more vulnerable to its side effects, such as financial volatility and exchange rate fluctuations, making the impact of its emissions greater (Abla Amoah et al., 2025). Developing countries unfamiliar with unconventional monetary policies, such as quantitative easing as implemented by the US, are more susceptible to economic disruptions like unstable financial markets and fluctuating currency values. The negative impact is greater, including increased carbon emissions in those countries, as they are less prepared to handle this disruption. In other words, they are more affected, especially environmentally, if they lack the experience and ability to manage unconventional monetary policy.

Additionally, there is a two-way relationship between constant price GDP and the exchange rate; export-import trade affects constant price GDP, while import demand and capital flows influence the exchange rate. This relationship shows that there is a constant interaction between the real sector and the external sector. This is something that needs to be considered when making policy.

Central banks must rely more on unconventional monetary policy tools to better adapt to the impact of the Covid-19 pandemic (Neaime & Gaysset, 2022). The COVID-19 pandemic has shown a negative impact on the economy, according to regression analysis with dummy variables. The Covid-19 pandemic intensified strain on global financial markets, prompting central banks in wealthy nations to adopt unconventional measures to alleviate its adverse effects (Yıldırım Karaman, 2022). During the pandemic, constant price GDP fell by approximately Rp95.4 trillion, or a decrease of 0.6-0.8% from the average monthly GDP. This impact may affect economic growth in both the short and long term. According to the coefficient of the M2 variable in the regression model, an increase in the money supply can boost constant-price GDP. This indicates that the role of monetary policy in driving real economic growth is greater. Additionally, the VAR model analysis indicates that other economic variables, including M2, the exchange rate, and inflation, are less influenced by the benchmark interest rate (SB). Compared to the increased risk posed by monetary tightening during expansion, monetary policy is more effective in reducing the risk of economic downturn during a recession. Monetary easing during a recession can reduce the risk of economic decline by about twice as much as the increase in risk posed by monetary tightening during an expansion (Barci, 2025). Expansionary monetary policy—increased M2 and liquidity easing—is more effective in protecting economic growth during recessions, while monetary tightening during expansions increases the risk of economic downturns. Therefore, for developing countries, it is necessary to balance monetary policy by adjusting to the economic cycle, prioritizing liquidity support during recessions, and avoiding excessive tightening.

This result shows that coordinating monetary and fiscal policies is crucial in addressing crises. The decline in GDP by Rp95.4 trillion during the pandemic shows that the Indonesian economy is vulnerable to external disruptions, especially in sectors dependent on domestic demand. Loose monetary policy and expansionary fiscal policy, known as increasing the money supply, drove economic recovery after the pandemic,

but this recovery was uneven, with manufacturing and service industries recovering faster than the primary sector.

5. Conclusions

A primary determinant of Indonesia's economic framework is the money supply, which directly impacts the exchange rate and GDP, although does not effect inflation. The reciprocal relationship between the exchange rate and GDP establishes a feedback loop between the real and external sectors, which is crucial to consider in the formulation of macroeconomic policies. The national economy was profoundly impacted by the COVID-19 pandemic, resulting in a real GDP contraction of Rp95.4 trillion. This illustrates the significance of exchange rate stabilization for sustaining economic growth and regulating inflation in both the short and long term. This occurrence demonstrates that fiscal and monetary policies must effectively collaborate during a crisis. Conversely, given previous inflation significantly influences current inflation, effective management of expectations and communication of policy are essential for mitigating long-term inflationary pressures. Consequently, owing to the always evolving dynamics of financial market structures, benchmark interest rates are more inclined to react to changes in economic conditions rather than proactively respond to them. This illustrates the ineffectiveness of the benchmark interest rate as a tool of monetary policy. This study is limited by the employment of an atheoretical VAR model, which identifies statistical correlations rather than genuine causation. The study does not explicitly incorporate significant external variables, like budgetary situations. The utilization of quarterly data constrains the capacity to effectively identify short-term reaction patterns. These constraints provide opportunities for future study to enhance the models and datasets employed.

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