

Navigating the Economic Landscape: VAR Analysis and Strengthening the Bank Lending Channel's Impact on Monetary Policy

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Abstract

In the last 12 years, the percentage of economic growth in Indonesia can be said to have had a downward trend, but the value did not drop drastically but slowly from 6.81% in 2010 to 5.01% and in that year there were several policies that were less effective so that the purpose of this study is to see how credit is developing nationally and also at the province, then to see what factors will affect credit, then to see how the effectiveness of monetary policy is on total credit, GDP, inflation, using the multiple OLS method and the VAR method to prove the purpose of the research. The results of the research on policy interest rate variables (BIRATE), Gross Domestic Product (GDP) and inflation (INF) have a significant effect on total credit at α 10%, and monetary policy when shocks to policy interest rates, the response from interest rates loans, Gross Domestic Product Inflation is effective when after 2 years the policy is implemented.

Keywords: Bank lending channel, effectiveness of monetary policy, VAR

JEL Classification: E52, E58

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1. INTRODUCTION

Monetary policy refers to the policies implemented by the bank's monetary authority to maintain and stabilize the economy. The execution of monetary policy involves the use of several monetary instruments that operate through a monetary policy transmission system. Monetary policy transmission is a conceptual framework that explains the impact of policy implementation on economic activity. Bernanke & Gertler (1995) stated that monetary policy transmission can be controlled through the credit channel mechanism, which consists of the balance sheet channel (BSC) and the bank loan channel (BLC). Current studies state that in

developing countries, the bank lending channel (BLC) is weak (Abuka et al., 2019), and as in Indonesia, studies on BLC are limited in a market context (Soedarmono et al., 2021). Besley et al. (2012) stated that credit lines, as bank lending channels, have an important meaning in an economy where the banking sector plays a dominant role. Therefore, banks have a role in their existence and governance so that they can understand how monetary policy should be implemented in the economy.

In the last 12 years, the percentage of economic growth in Indonesia can be said to have had a downward trend, but the value did not drop drastically, 6.81% (2010) to 5.01% (2022), and in that year there were several policies that were less effective. CEIC data (global economic data, indicators, charts, and forecasts) for Indonesia showed that the amount of bank credit distributed fluctuates, leading to unstable conditions. The highest credit growth occurred in 2011 at 24.64%, in line with an increase in GDP of 5.94% and an increase in inflation of 4.11%. The rapid increase in demand for credit was the result of increasing public needs. Furthermore, a drastic decline in credit occurred in 2020, -2.63% as a result of a decrease in real GDP of -2.17% and inflation, 1.57%. The emergence of the COVID-19 Pandemic exacerbated this condition. The COVID-19 pandemic has had an impact on the banking sector, a significant decline in credit growth (IMF, 2020). The decline in lending during the crisis and the slow growth in lending are often cited as one of the factors driving Indonesia's economic recovery. Base on CEIC data, also illustrates that developments between credit, credit interest rates, and inflation rates have different movements. During the COVID-19 pandemic (2019-2021), there was a decrease in credit rates, which is very drastic, even though we can see that interest rates have been reduced (fig.1). The central bank has taken various expansionary measures during the pandemic, such as gradually lowering the benchmark interest rate since the beginning of the COVID-19 pandemic until now, reached 3.5% to boost demand for credit (Bank Indonesia, 2021), In fact, monetary policy, by reducing interest rates, or what is called expansionary policy, it turns out that credit growth still tends to experience a decline.

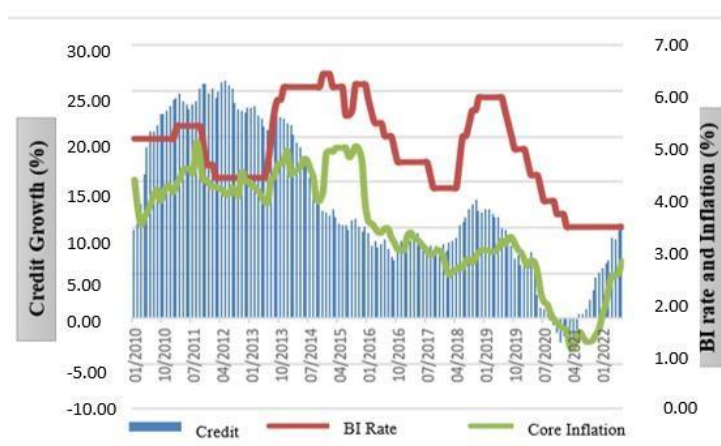


Figure 1. Policy Interest Rate Movements, Credit Growth and Inflation in Indonesia

Source: <https://www.ceicdata.com/id/country/indonesia>

The monetary policy of a country also affects its economy through the bank lending channel, which directly affects the availability of bank loans. Fungáčová et al. (2021) found in their study that the supply of bank lending is influenced by monetary policy due to the fact that bank lending and government bonds are not completely interchangeable as assets for banks. The effectiveness of the bank lending channel in implementing monetary policy relies heavily on the availability of loans and several factors that influence both consumer behavior and the corporate environment. The impact of a restrictive monetary policy is observed in the reduction of bank reserves and deposits. Banks will decrease lending, leading to a detrimental effect on output. Conversely, implementing an expansionary monetary policy will boost bank reserves and output (Apergis et al., 2012). Modugu & Dempere (2022) proved that transmission through the bank lending channel is contingent on whether the established monetary policy is contractionary or expansionary (e.g., interest rates or money supply), despite the fact that the latter remains ineffective at inducing credit contraction. Modugu & Dempere (2022) have asserted that the influence of monetary policy on the effectiveness of transmitting monetary policy, particularly in developing countries, is weak when it comes to the bank lending channel and the manipulation of interest rates. Due to impediments in financial institutions, markets, and bank concentration, this condition develops. Borio & Gambacorta (2017) included liquidity, capitalization, funding costs, bank risks, and income, and found that the effectiveness of short-term interest rate reductions in promoting the growth of financing from banks decreases when interest rates hit exceptionally low levels. This finding is valid even after considering aspects such as business and financial cycle conditions, as well as different bank-specific diversification.

A great deal of investigation to examine the influence and interplay between credit, monetary policy, and economic growth in relevant studies. It is imperative to consistently monitor the presence of credit to ascertain appropriate monetary policies (Besley et al., 2012; Gambacorta, 2003; Manaresi & Pierri, 2019). Khan (2015) observed in Pakistan, 1% rise in inflation leads to a decrease in lending by approximately 0.16%. Almalki & Batayneh (2015) provide evidence of a negative correlation between inflation and bank lending in Saudi Arabia, with a coefficient of -2.65. Zermeño et al. (2018) conducted an analysis of inflation and credit across 84 countries from 1980 to 2010. Employing a quantitative panel regression approach, it was found that the association between these two variables exhibited a non-linear pattern. Specifically, the relationship was found to be statistically significant for developing countries. Tinoco-Zermeño et al. (2022) stated the inflation rate exerts a detrimental influence on bank lends in Mexico. However, in the short term, the impact tends to be beneficial. In addition to the instruments, Iddrisu & Alagidede (2020) discovered that the implementation of interest rates and lending channels as a proportion of monetary policy limitations resulted in a reduction of banking sector credit by 0.22%. Modugu & Dempere (2022) conducting research in developing countries in Sub-Saharan stated the money supply has a significant impact on credit channels, whereas the monetary policy rate has a minimal effect on bank lending activities. The limited influence of the monetary policy rate on lending can be attributed to the inadequate degree of financial development, high bank concentration, institutional vulnerability, and various other structural characteristics that

tend to diminish the effectiveness of monetary policy transmission in developing nations. Bank's capital adequacy ratio and macroeconomic conditions, such as GDP growth rate, are key factors that impact bank lending.

Theoretically, the standard concept of the monetary policy transmission mechanism starts with monetary policy influencing the development of various interest rates in the financial sector, as a determination of interest rates, which become a reference for determining other interest rates, especially credit interest rates. Borio & Gambacorta (2017) state interest rates on credit have an impact on the demand for credit and an effect on inflation. Empirically, it is a bit contradictory to existing theory because even though credit interest rates have increased or decreased, demand for credit by the public continues to increase, so that it often puts pressure on rising prices (inflation) in certain sectors. Based on the background and facts presented, there are problems related to credit levels, inflation, and GDP related to the monetary policy mechanism. The bank landing channel problem is complex and must be solved immediately.

We use the vector autoregression (VAR) analysis technique to observe the shock of monetary policy. Abraham et al. (2023) found that VAR model can be used to measure the impact of interest rate changes on an interest rate variable over a long period of time, for example, up to twelve months using monthly data. This analysis technique is not the first to be used. Various studies related to monetary policy, in particular bank channel lending, have used this model. Aysan et al. (2018) employed a VAR panel model with quarterly data from Turkey and found that the responses of sharia banks to policy interest rate changes, in terms of savings and credit, were greater. They associated these differences in responses with the sharia bank's reaction moisture, while conventional banks were more prepared to accommodate policy rate changes. During the adjustment period, sharia bank deposits can withdraw their savings if the returns offered by alternative investments become more profitable. Study by Karlsson et al. (2023) proved that the vector autoregression (VAR) model has emerged as a crucial macroeconomic model utilized by policymakers and forecasters. In order to analyze a correlation between the GDPPC and the selected independent variables (Corruption Perception Index, Political Rights score, Civil Liberties score, Gender Inequality Index, Consumer Price Index, Population Density, and the percentage of people using the Internet), (Ganeriwalla & Mehta, 2021) also combined OLS and VAR. Matějů (2019) combined OLS with VAR to improve the identification of structural shocks through the application of restrictions (e.g., zero or sign restrictions). This is crucial for understanding the monetary transmission mechanism and how policy changes propagate through the economy.

This article highlights the importance of maintaining credit stability for Indonesia's economic growth, especially considering the trend of declining growth despite the volatile distribution of credit. The breakdown of the urgency of this research is as follows: 1) The historical correlation from Indonesian credit growth (Fig. 1) showed that 2010–2022, economic growth showed a downward trend (6.81% to 5.01%), coinciding with fluctuations in bank credit distribution. In 2011, the highest credit growth (24.64%) aligned with a rise in GDP (5.94%) and inflation (4.11%). This suggests credit availability fuels economic activity,

and then in 2020, a drastic credit decline (-2.63%) mirrored a drop in GDP (-2.17%) and inflation (1.57%). The COVID-19 pandemic exacerbated this, highlighting the impact of unstable credit on economic resilience. This condition's impact emphasizes the link between slow credit growth and Indonesia's sluggish economic recovery post-pandemic. Even though Bank Indonesia has made various efforts to stimulate credit demand through interest rate cuts (expansionary policy), credit growth remains stagnant despite the lowered interest rates. This scenario underscores the need for stable credit to ensure economic growth. Fluctuations create uncertainty and hinder business activity and investment. Therefore, maintaining stable credit is crucial for Indonesia's economic well-being. It fuels growth, strengthens resilience during crises, and facilitates a more predictable economic environment.

The purpose of this study is to carry out a descriptive analysis of the development of national and provincial credit in Indonesia, to estimate what factors influence loans in Indonesia in order to increase economic growth, to make estimates, and to analyze the results of the estimation on the effectiveness of landing channel banks in transmitting policies. monetary system in Indonesia.

2. RESEARCH METHOD

This study used a quantitative approach to estimate and analyze the relationship between the variables that have been determined to answer the problem. We used secondary data in this study, monthly data starting from the 2010–2022. The data used in this research comes from Bank Indonesia, the Financial Services Authority, Indonesian Statistics, and CEIC Data (Global Economic Data, Indicators, Charts, and Forecasts).

In this groundbreaking study, we will elucidate the intricate relationship between credit, interest rates, inflation, and economic growth using the powerful Ordinary Least Squares (OLS) analysis technique. Moreover, we will delve into the dynamic interplay of these variables, demonstrating how past values influence their current and future trajectories, employing the cutting-edge vector autoregression (VAR) analysis technique. This research promises to unlock invaluable insights into the forces driving economic dynamics, offering actionable intelligence for informed decision-making.

Both of these analysis techniques have their advantages. Ordinary Least Squares (OLS) is a method used in linear regression to find the relationship between the dependent variable and one or more independent variables by minimizing the sum of the squares of the residuals (the difference between the predicted values and the actual values). OLS is superior in estimating the causal effects of one variable on another. In this case, we can isolate the direct impact of credit availability on economic growth (Y) while controlling for the effects of interest rates (X_1) and inflation (X_2). The method is similar to the approach used in Ganeriwalla & Mehta (2021). Using OLS will help identify the direct causal effects of credit on growth, which is valuable for policymakers aiming to stimulate growth through credit expansion.

Meanwhile, VAR considers how the past values of all variables (credit, interest rates, inflation, and growth) can affect the current and future values of the variables. Lütkepohl (2005) mentions that VAR provides a comprehensive picture of how these variables interact.

The VAR model also shows the possibility of simultaneous effects and can be used to predict the future values of these variables to help policymakers anticipate potential economic trends.

The empirical model in this study is as follows:

$$Credit_t = \beta_0 + \beta_1 BIRate_t + \beta_2 GDP_t + \beta_3 IR_t + \beta_4 INF_t + \varepsilon_t$$

Where $Lend_t$: Total Credit; $BIRate_t$: interest rate in year t , GDP_t : GDP in year t , IR_t : credit interest rate in year t ; INF : inflation rate in year t , β_0 : constant, β_1 - β_4 : regression coefficients, t : time unit (2010-2022), ε_t : residuals.

We used VAR to find out how effective the bank's landing channel system is in transmitting monetary policy developments in Indonesia. Abraham et al. (2023) stated that this approach is widely preferred due to its capability of accepting endogenous inputs for all variables in the model. The model used to analyze the data as follow:

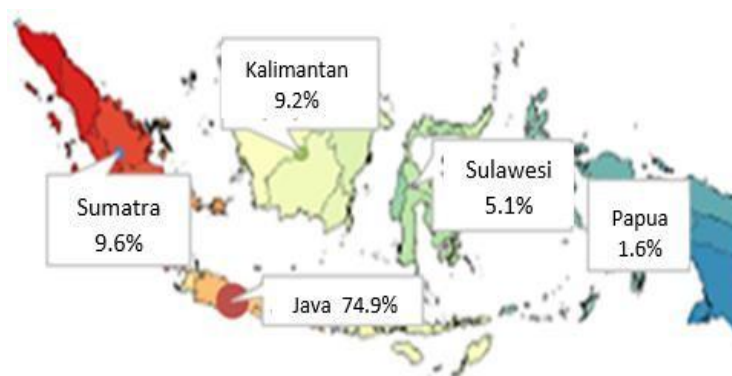
$$X_t = \beta_0 + \beta_n X_{t-n} + e_t$$

Where X_t is a vector element of $Credit_t$, $BIRate_t$, IR_t , INF_t , GDP_t , β_0 is a constant vector $n \times 1$, β_n is a coefficient of X_t , and n is the lag length.

3. RESULTS AND DISCUSSION

3.1 Results

Along with economic development in Indonesia, credit is also experiencing development on various islands in this country. We can show the development of credit in Indonesia by mapping the use of Indonesian credit as follows:



2010

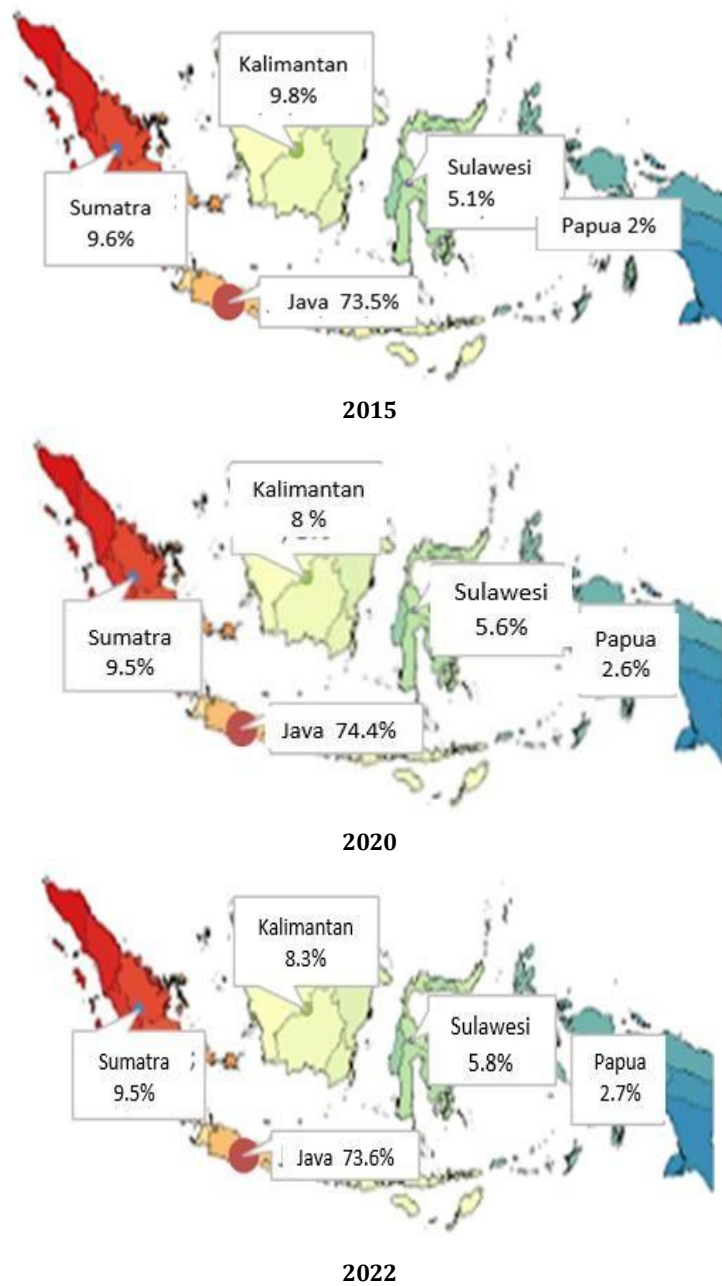


Figure 2. Credit Distribution in Indonesia (2010-2022)

Source: Bank Indonesia

Figure 2 shows from year to year, credit distribution in Java was always the highest. Several factors can explain why credit development in Java tends to be higher compared to other islands in Indonesia.

The first reason is that Java accounts for approximately 57% of Indonesia's total population at around 157 million people. Java is the most populated island in Indonesia, with a high concentration of residents in several major cities such as Jakarta, Bandung, Surabaya, and Yogyakarta. Coastal areas and metropolitan regions have a higher population density than rural areas within the island. The dense population distribution of Java Island presents challenges in managing the natural resources, infrastructure, and public services.

Not only that, Java is also the center of economic activities, with many large cities and rapidly developing industrial areas. Cities like Jakarta, Surabaya, and Bandung have become central to business, trade, and industry. The presence of various developing economic sectors in Java, including manufacturing, trade, services, and tourism, drives high credit demand.

Another reason is that Java has better financial accessibility compared to other islands in Indonesia. There are headquarters of major banks, bank branches, and financial institutions located on this island, making it easier for residents and businesses to access financial services, including credit.

Java also has more advanced infrastructures compared to other islands in Indonesia. Good road infrastructures, electricity networks, telecommunications, and transportation support economic growth and access to financial institutions. It provides an advantage for credit development in Java Island.

Java has a broader economic sector diversification than other islands in Indonesia. There are manufacturing, trade, and services, and agriculture as few important sectors. The presence of these sectors increases the demand for credit for working capital, investment, and business development. For several of the above factors, the distribution of credit in Java Island remains high.

As the center of Indonesia's government, Java has more progressive regulations and policies to support the development of finance and credit. A strong government and regulatory center can create a conducive business climate and protect the interests of lenders and borrowers.

Since the New Order when Soeharto served as the president of Indonesia for 32 years, money has been circulating mostly in Java, particularly the DKI Jakarta area or the Megapolitan city of Jabodetabek (Jakarta-Bogor-Depok-Tangerang-Bekasi), which accounts for 70%, and the remaining 30% circulates in other areas in Java and outside Java. This condition is followed by the transitional periods of B. J. Habibie, Abdurrahman Wahid, Megawati, Susilo Bambang Yudhoyono (more commonly known as SBY), and Jokowi.

Sumatra has also experienced significant developments in terms of banking and credit. Cities like Medan, Palembang, and Batam have become economic centers on this island. There are various financial institutions on the island of Sumatra that provide credit services for various needs, including corporate credit, consumer credit, and property credit.

The island of Kalimantan has great natural resource potential, such as mines and plantations. Credit on the island of Kalimantan is often related to financing the mining, plantation, and palm oil industries. Cities like Balikpapan and Samarinda have quite significant banking activities.

Sulawesi is also experiencing rapid economic development, especially in mining, fishing, and tourism. Credit on this island is usually related to financing for the mining, fishing, and plantation, as well as the tourism and hospitality sectors.

The development of credit in the island of Papua, which includes the Provinces of Papua and West Papua, has also seen an increase in line with the economic growth in the region. Although there is no up-to-date data, some factors have influenced the development of credit on the Island of Papua.

The financial infrastructure in Papua has gradually developed, involving the opening of bank branches and financial institutions in the region. This helps improve financial accessibility for residents and business actors, including credit services. Economic growth in Papua, particularly in the extractive exploration activities such as mining, oil, and natural gas, has driven demand for working capital and investment credit. Additionally, the agriculture, fisheries, and tourism sectors can also contribute to credit demand in this region. Micro, Small, and Medium Enterprises (MSMEs) play an important role in the economy of Papua Island. Government programs and financial institutions that support the development of MSMEs, such as providing low-interest loans or business capital assistance, can influence the development of credit at the local level. Lastly, Papua has a unique geographical condition, including areas that are difficult to reach and remote. This can affect financial accessibility and complicate the distribution of credit to remote areas. However, the government and financial institutions are striving to improve financial access through initiatives such as digital banking and microfinance institutions.

3.1.1 OLS Estimation Results

The results of our findings in the first stage found that inflation did not have a significant effect on total credit. However, the regression produced a high adjusted R^2 , 0.9715. The data shows multicollinearity (VIF) in GDP and the credit interest rate. Therefore, we carried out a test using the natural logarithm (LN), and the results are as follows:

Table 1. Estimation Results Total Credit

Variable	Coefficient	Std. Error	t-Statistic	VIF
<i>BIRATE</i>	0.0019	0.0019	9.8968***	4.7217
<i>LogGDP</i>	0.0906	0.0906	8.1863***	8.8874
<i>IR</i>	0.0059	0.0059	-1.1143***	18.3345
<i>INF</i>	0.0006	0.0006	0.7878	2.2124
<i>C</i>	0.1788	0.1788	3.3317***	NA
R-squared	0.9718			
Adjusted R-squared	0.9705			
F-statistic	7.9447			
Prob(F-statistic)	0.0000			

Source: data processing; note: * significant at 15%; *** significant at 1%

Table 1 shows that the centered VIF value of credit interest rates is greater than 10. The next step is to remove the variable Credit Interest Rate, and the results are as follows:

Table 2. Regression Estimation Result Total Credit

Variable	Coefficient	Std. Error	t-Statistic
<i>BIRATE</i>	0.0028	0.0019	1.4858*
<i>LogGDP</i>	1.6298	0.0665	2.4506***
<i>INF</i>	-0.0012	0.0009	-1.3955
<i>C</i>	-1,1823	0.1251	-9.4519***
R-squared	0.9315		
Adjusted R-squared	0.9292		
F-statistic	3.9919		
Prob(F-statistic)	0.0000		
Breusch-Pagan-Godfrey	0.7587		
Durbin-Watson stat	1.9916		
Breusch-Godfrey Serial Correlation LM test			
F-statistic	4.1216	Prob. F(2,86)	0.0000
Obs*R-squared	4.5026	Prob. Chi-Square(2)	0.0000

Source: data processing; note: * significant at 15%; *** significant at 1%

Table 2 shows that removing credit interest rate has resulted in the estimated model that is close to being BLUE, although not perfect. Therefore, the estimated model is as follows:

$$Credit_t = -1.1823 + 0.0028BIRate_t + 1.6298GDP_t - 0.001210Inf$$

The coefficient of R^2 shows the changes in the dependent variable is caused by changes in the independent variables. Based on the estimation model, the changes in Total Credit is 93.15% caused by the changes in BI rate, GDP, and inflation, while the remaining 6.85% changes are caused by other variables not included in the model. Next, the t -test results show that GDP has a significant effect to Total credit. The statistical F -test shows the probability value of 0.000000. Therefore, policy interest rate, GDP, and inflation have a simultaneous significant effect on Total Credit.

3.1.2 VAR Estimation Results

The first step of this inquiry entails evaluating the stationarity of each variable that will be used. The results of the data analysis suggest that the data shows stationarity when observed, the first difference level for all variables. The validation of the integration of all variables in this study with $I(1)$ can be achieved by combining the outcomes of both tests. The *lag* with the highest level, specifically lag 2, exhibits a combination of maximum and instability. Therefore, it can be inferred that the VAR model is currently experiencing

instability. There are several alternative solutions to be considered, which encompass the lag length on several criteria such as the likelihood ratio (LR), final prediction error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), and Hannan-Quinn Information Criterion (HQ). The lag period that demonstrated the highest effectiveness in this experiment is lag 2 for each network (Table 3).

Table 3. Optimum Lag Test Result

Selection Criteria	Lag Order
Likelihood Ratio (LR)	2
Final prediction error (FPE)	1
Akaike information criterion (AIC)	1
Schwarz information criterion (SC)	1
Hannan-Quinn information criterion (HQ)	1

Subsequently, the presence of co-integration among the variables was observed. The study used the *Johansen cointegration test* to conduct the co-integration analysis. This methodology applies two estimators, the trace test and the maximum *eigenvalue test*, to ascertain co-integration rankings. Co-integration refers to a state in which data exhibits statistical trace values or max-eigen statistics. Table 4, demonstrates there is no evidence of co-integration within the presented data. This means that the variables do not have a long-term, stable relationship with each other

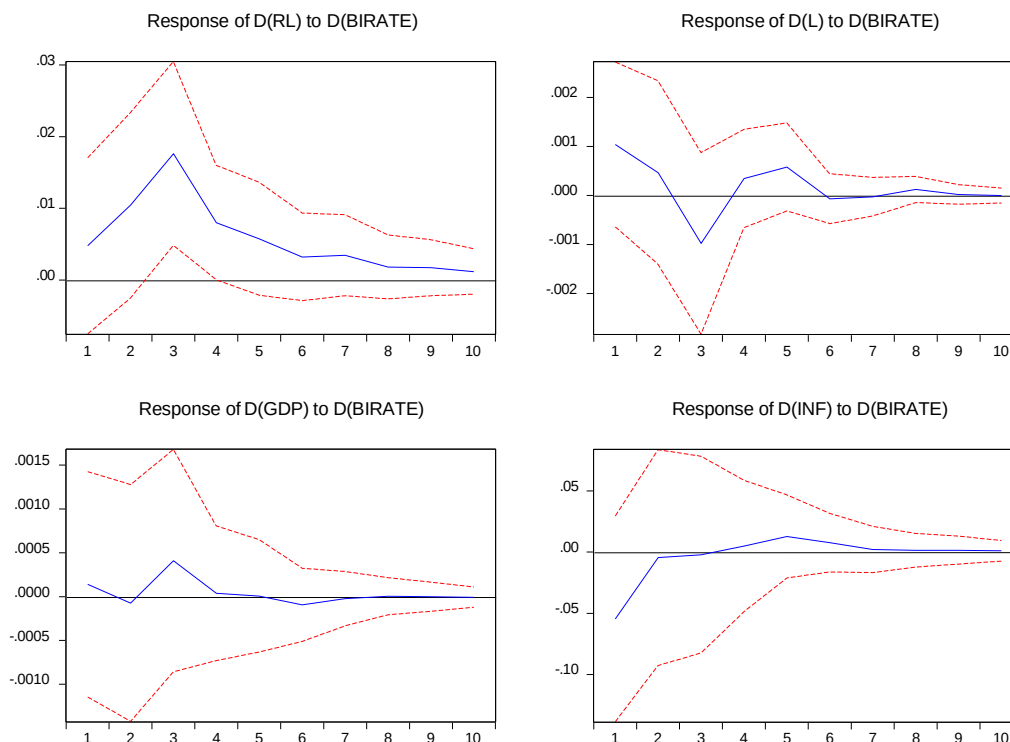
Table 4. Co-integration Test Results

Hypothesized of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.24116	65.59152	69.81889	0.1038
At most 1	0.17991	39.92681	47.85613	0.2251
At most 2	0.117884	21.48105	29.79707	0.3283
At most 3	0.056699	9.815857	15.49471	0.2952
At most 4 *	0.046081	4.387442	3.841466	0.0362

Source: data processed; Note: Johansen Cointegration Test, indicate no cointegration.

Impulse response functions (IRF) are used to examine the present and prospective reactions monetary policy shock. The VAR estimation will examine the impact of the central bank's monetary policy shock on the responses of various variables, focusing on the total credit. Presented below is a visual representation on phenomenon of shock.

Response to Cholesky One S.D. (d.f. adjusted) Innovations ± 2 S.E.



Graph 1. Shocks of Total Credit

Source: data processed

From Graph 1, we can interpret the response of the loan interest rate to shocks, the response of total credit to shocks from the policy interest rate, the response of GDP to shocks from the policy interest rate, and finally, the response of inflation to shocks from the policy interest rate.

3.2 Discussions

This study reveals that Java experienced the most significant variation in credit distribution between 2010 and 2022. The availability of financial managers has facilitated convenient access to loans for both businesses and people. Diana (2019) state the accessibility of getting funds in the form of business credit is determined by firm scale and the length of business operation, commonly referred to as the age of the business. The correlation between the size of a business and its potential to secure business capital from formal financial institutions is positive. The availability to financing from formal financial institutions for small-scale enterprises is about twice as significant compared to other micro-scale businesses. The island of Java is renowned for its extensive concentration of small enterprises, rendering it the primary hub for credit distribution in Indonesia.

In addressing the research problems, we used two analysis technique models (OLS and VAR) for different purposes. OLS is used to estimate the causal effect of one variable on

another. The findings of the OLS regression analysis indicate that the Total credit in Indonesia during the period of 2010-2022 is influenced by factors such as GDP, inflation, and the BI rate. However, it was observed that only GDP has a significant effect on the Total Credit, where a 1% increase in GDP is significantly associated with a 1.692% increase in total credit. However, it was observed that only GDP has a significant impact on Total Credit, where a 1% increase in GDP is significantly associated with a 1.692% increase in total credit. This suggests that a higher GDP value indicates potential for further Total Credit. This indicates increasing optimism towards the economy. The economic actors feel optimistic about the future, there is a tendency to be more daring in taking risks, including taking credit for various individual needs or developing businesses.

Another study that aligns with our research findings was also conducted by Shuja et al. (2024) in various developing countries such as Bangladesh, Cambodia, China, India, Indonesia, Kyrgyzstan, Malaysia, Nepal, Pakistan, Philippines, Russia, South Africa, Sri Lanka, Tajikistan, and Uzbekistan. The OLS and GMM results indicate that monetary tightening has a negative impact on bank loans, while economic growth (GDP) has a positive impact on credit (Shuja et al., 2024). This may be due to bank characteristics such as size and liquidity playing a crucial role in mitigating the negative effects of monetary policy (Özsüca, 2022; Shuja et al., 2024). However, banking concentration and state ownership can weaken the effectiveness of the bank lending channel (Nguyen et al., 2021). These findings have significant implications for policymakers in developing countries and highlight the importance of considering market structure and bank characteristics in the transmission of monetary policy.

Previous OLS analysis shows that a 1% increase in GDP is significantly associated with a 1.692% increase in total credit. To further understand the transmission mechanism and long-term impact of this relationship, as well as to consider the influence of other variables such as interest rates and inflation, a VAR model will be used to analyze the dynamics between GDP and total credit during the period 2010-2022. The variables can affect the current and future values of those variables (Ganeriwalla & Mehta, 2021). VAR provides a comprehensive picture of how these variables interact. This reveals a potential feedback loop, where growth can influence future credit demand or vice versa.

The results of the VAR show response of the loan interest rate to shocks, the response of total credit due to shocks from loan interest rates. Based on these results, we can conclude that the response of the loan interest rate to the policy interest rate shock indicates that when the central bank raises or lowers the policy interest rate, commercial banks tend to follow by adjusting their loan interest rates. Finally, from inflation's response to shocks from the policy interest rate, we can see how the loan interest rate responds to the policy interest rate shock. From these results, it can be concluded that the government's policy was to increase the policy interest rate, and the loan interest rate response was effective after two years of the policy being implemented. GDP's response due to a policy interest rate shock is slowly returning to normal. From these results, it can be concluded that the government's policy of increasing policy interest rates and the GDP response was effective after two years of the policy being implemented.

Recent studies have examined the impact of monetary policy on various economic factors using vector autoregression (VAR) and dynamic stochastic general equilibrium models. (DSGE). Wilhelmsson (2020) mentions that interest rates affect housing prices both directly and through bank loan channels, with the latter's importance increasing over time. Bublyk et al. (2024) in their VAR analysis show weak evidence regarding the effectiveness of the interest rate channel in controlling long-term inflation dynamics.

Building upon these findings, our analysis reveals that policy interest rate changes are effectively transmitted to loan interest rates, suggesting a strong connection between monetary policy and lending rates. While GDP initially experiences a slowdown following a policy interest rate hike, it eventually returns to normal levels. This indicates that monetary policy can influence economic growth, albeit with a lag. Overall, our findings align with the existing literature, demonstrating the significance of monetary policy in shaping economic outcomes. However, further research is needed to fully understand the complex interactions between monetary policy, interest rates, and economic variables in different contexts.

4. CONCLUSIONS

Java's substantial population, coupled with its role as an economic center, has led to a higher level of credit use compared to other islands. Additionally, its well-developed financial system and infrastructure facilitate easy access to credit.

Bank Indonesia implements monetary policy in Indonesia with the goal of achieving stability in the value of the Rupiah, maintaining stability in the payment system, and maintaining stability in the financial system to support sustainable economic growth. Therefore, we reviewed the monetary policy transmission mechanism through the bank lending channel by observing the COVID-19 pandemic. We observed how the bank lending channel system affected total credit in Indonesia during 2010–2022. We use the OLS technique and complement it by using VAR to see its effectiveness two years after the policy was implemented.

However, in order to conduct further analysis on credit within monetary policy, it would be beneficial to carry out a thorough credit analysis, especially by taking into account the fluctuations in credit variance. This is a crucial step in measuring and managing credit risk in the future. Further research in this field is essential to refine existing models and develop new methods that are more adaptive to monetary policy in Indonesia. By understanding the patterns of credit variance changes, financial institutions can formulate more accurate monetary policies through credit. In addition, the results of this research can also provide significant contributions to the development of better banking regulations, thereby protecting the interests of customers and maintaining the stability of the financial system. In addition, the VAR approach made it easier to capture all time variations for the coefficients, as well as the variance in shock the recommendations to policy maker we summarize the results below

First, policymakers could consider implementing more targeted monetary policy measures, such as stimulating credit growth in specific sectors or regions. Second, investing in infrastructure development, particularly in regions with high concentrations is crucial.

For further studies, we suggest to observe regional disparities in credit access and their implications for economic development. By implementing these recommendations, policymakers and stakeholders can contribute to a more inclusive and sustainable financial system in Indonesia, fostering economic growth and development

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