

MONETARY POLICY MANAGES TO STABILISE THE INDONESIAN ECONOMY: ANALYSING USING THE ARDL AND NARDL APPROACHES

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Abstract

Throughout its history, Indonesia, a developing country and a member of the Association of Southeast Asian Nations, has encountered numerous economic issues. After the hyperinflation crisis between 1997 and late 1998, the Indonesian economy has been growing slowly. However, strong monetary policy fundamentals, such as interest rate increases and money value stabilization, can be useful tools for combating hyperinflation and regaining economic stability. Therefore, this study focuses on the impact of monetary policies on inflation in Indonesia, examining the components of interest rate, lending interest rate, and total reserves as independent variables. The observation was conducted for a period of 37 years from 1986 to 2022, and the analyses are conducted using the autoregressive distributed lag and nonlinear autoregressive distributed lag approaches. The results show that during Indonesia's 1997 hyperinflation crisis, money creation was lowered. The Central Bank of Indonesia realized that most people could not afford to pay off their debts; hence, it limited the amount of loans it issued to the private sector. Raising interest rates substantially affected the value of money and the amount of market liquidity. This study also indicates that the Central Bank of Indonesia is mature enough to understand the economic crisis and make the right decision, as per classical monetary theory.

Keywords: Domestic credit, Inflation, Interest rate, Monetary policy, Reserves.

INTRODUCTION

Indonesia is a Southeast Asian country that has the potential to develop and grow rapidly. In terms of its rich natural resources, large labor force, and low valued currency, Indonesia bears many similarities to China, which is strongly dominating the world economic market currently (Garnaut, 2015; Ing et al., 2018; Sriyanto, 2018; Sharma et al., 2021).

However, the Indonesian economy has grown at a slow pace after a critical financial crisis that occurred between 1997 and late 1998 (Resosudarmo et al., 2021; Gupta, 2021; Hill, 2021). A few factors caused hyperinflation in the past. According to Andersson et al. (2021) and Reinhart et al. (2016), Indonesia has a large external debt denominated in US dollars, which has led to the depreciation of the Indonesian rupiah.

Many private companies in Indonesia that borrow money from external investors are heavily affected as the rupiah falls in value, causing these companies to experience difficulties in continuing operations (Simandjuntak, 1999; Gu et al., 2021).

Moreover, political instability and a lack of confidence in the government's ability to overcome the economic situation further exacerbated the crisis, leading to the resignation of President Suharto in May 1998 (Samson and Warganegara, 2021; Szczepaniak et al., 2022).

Even after experiencing an economic crisis, Indonesia has shown maturity in managing its monetary policy as it wisely organizes appropriate measures despite inflation (Soedarmono et al., 2023). According to Tobal and Menna (2020), the key to achieving economic stability depends on a country's fiscal and monetary policies. Fiscal policies are vital for making deliberate changes to public finances to achieve particular macroeconomic objectives (Hajawiyah et al., 2021).

According to Roziqin et al. (2021), fiscal policies are determined from the perspective of an efficient taxation system and the structuring of the government's budget, which reflects the spending factor of the Indonesian government.

Government spending is a powerful tool that allows policymakers to boost economic activities through investments in infrastructure, such as hospitals (healthcare), schools and universities (education), public transportation, and other vital areas (Nursini, 2017; Masduki et al., 2022). Meanwhile, taxes act as a lever to affect economic behavior because adjustments to tax rates directly affect disposable income and consumption trends (Setyowati et al., 2023).

Meanwhile, for monetary policies, which are controlled by central banks, controlling the money supply and interest rates is the primary focus. According to Bianchi and Bigio (2022), monetary policies aim to generate full employment, stable exchange rates, and stability in prices and financial systems through targeted actions. Kaplan et al. (2018) demonstrated that one of the central bank's major tools in the monetary system is interest rates, which allow them to control the money supply in the market.

The Central Bank of Indonesia has the power to control reserve requirements and monitor the minimum percentage of deposits banks must retain in reserve (Prabheesh et al., 2021). Moreover, Indonesian central banks modify policy rates to affect borrowing costs, investments, and the spending behavior of private companies and citizens (Soedarmono et al., 2023).

Therefore, Indonesia is at risk of facing an economic crisis if these two policies are not managed properly, and the economy may experience hyperinflation or deflation (Obstfeld and Rogoff, 2021; Grinin and Korotay, 2018). The capacity to issue credit, such as loans, purchases of nonequity assets, and trade credits, is an indicator that the country's economy is healthy (Priyadi et al., 2021; Wu et al., 2022).

However, a large amount of money supply can negatively affect the economy. Easy credit may increase the money in the market; an uncontrollable money supply may increase the risk of hyperinflation. Thus, central banks frequently set specific inflation targets and ensure that the economy is at a steady level (Eleftheriou and Kouretas, 2023).

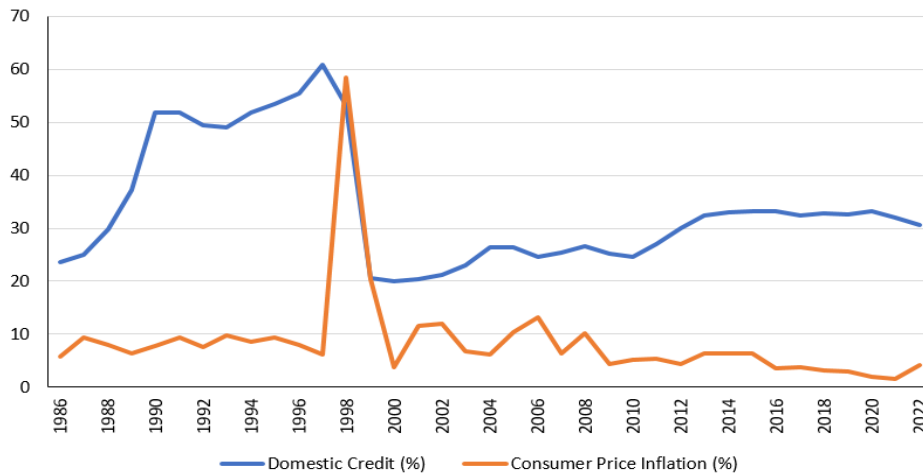


Figure 1: Domestic credit and the inflation of consumer

Source: World Bank

Figure 1 provides a comparison of domestic credit and inflation of consumer prices from World Bank data from 1986 to 2022. The domestic credit increase in a decade from 1986 to 1996 was not affected by inflation. However, the drastic shock from the inflation rate that occurred in 1997, which was from 6.22% to 58.45% in 1998, caused domestic credit to fall at an extraordinary rate. This case shows that inflation has a negative impact on domestic credit. The decrease in the consumer price inflation rate started in late 1998 and reached 3.69% in 2000, giving the impression that Indonesia has managed to control and stabilize the country’s economy until now. The data also show that domestic loans that decreased sharply from 1997 began to stabilize in 1999 and increased at a slow rate every year.

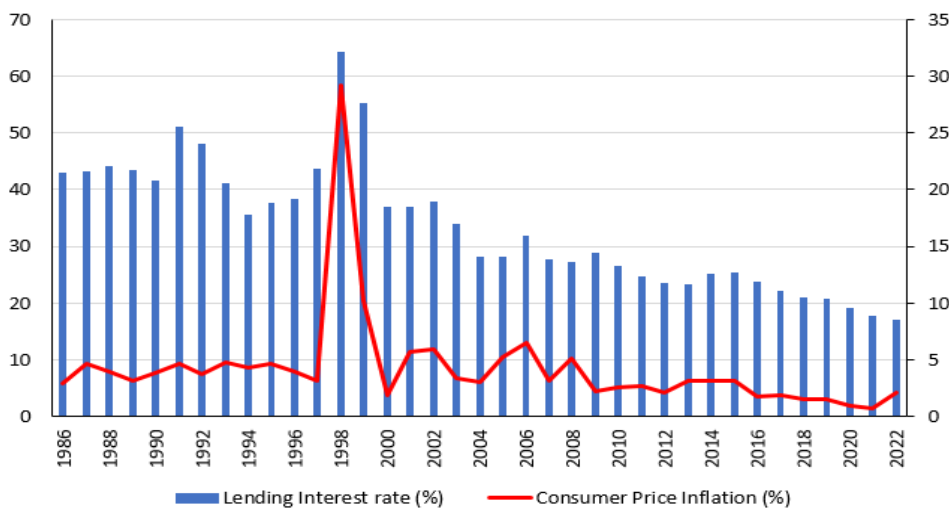


Figure 2: Inflation of consumer price and the lending interest rate

Source: World Bank Data

Closely relevant to Figure 1, Figure 2 compares the inflation of consumer prices and the lending interest rate (LIR) of Indonesia from 1986 to 2022. The LIR was more than 20% in 1986, increased a few times in 1992, and peaked in 1998. Moreover, the data indicate that the highest LIR in Indonesia's history occurred in the same year as the highest inflation occurred. After inflation managed to be controlled, the percentage of LIR decreased slowly. Therefore, the objective of this study examines the Indonesian method of solving the economic crisis using monetary tools such as the LIR and total reserves (TRES) from 1986 to 2022 using the autoregressive distributed lag (ARDL) and nonlinear autoregressive distributed lag (NARDL) approaches.

LITERATURE REVIEW

Inflation is a component that can disrupt the economy. Some studies focused on the impact of inflation, such as Garcimartín et al. (2022), who pointed out that inflation can disproportionately impact lower-income groups, as they spend a large portion of their income on essential goods, which tend to experience high rates of price increases (Jaravel, 2021). However, despite the negative impact of inflation, some scholars have found that inflation has a positive effect as well. Neville et al. (2021) and Cieslak and Pflueger (2023) have highlighted how inflation can influence business strategies, including pricing, wage setting, and investment. High-inflation environments pose significant challenges for businesses in terms of planning and maintaining profitability (Afrouzi, 2023).

In most cases, the impact of inflation does not benefit the country's welfare. Duca-Radu et al. (2021) analyzed how inflation expectations influence consumer spending, saving decisions, and overall consumer buying power. During the coronavirus disease 2019 (COVID-19) pandemic, some countries faced high inflation owing to the lockdown (Jaravel and O'Connell, 2020). Moreover, most people had to reduce their spending due to the inflation in the market (Jorda and Nechio, 2023). Ha et al. (2023) explored how moderate inflation can stimulate economic activity, whereas high inflation often leads to economic instability. Their findings emphasize the dual-edged nature of inflation, where its impacts are heavily contingent on the rate and stability of inflationary growth.

A nation may be at risk of hyperinflation if inflation is not closely controlled. Several studies have demonstrated how the inflation in Indonesia was caused by foreign sanctions, political unrest, and excessive government spending. One of the worst hyperinflations of the 21st century occurred in Zimbabwe (Josephson and Shively, 2021), which was caused by economic policy failures, political instability, and land reforms (Miller and Ndhlela, 2020; Kauma and Swart, 2022). Another hyperinflation crisis occurred in the Weimar Republic, particularly in the early 1920s, in Germany (Galofré-Vilà, 2023). Significantly, a severe period of hyperinflation, particularly in Serbia, occurred due to the collapse of Yugoslavia in the 1990s (Uvalić et al., 2020).

Many researchers have conducted studies involving monetary policies in the past; some of them were related to inflation. Belke et al. (2017) examined the effectiveness of tools such as interest rate adjustments and quantitative easing in controlling inflation. Their findings indicate a complex relationship between monetary policy decisions and inflation rates, highlighting the

challenges faced by central banks in achieving inflation targets. Siregar et al. (2023) and Ocran et al. (2022) delved into the influence of changes in interest rates or money supply on inflation through various mechanism, including consumer spending, investment, and currency values. These mechanisms are crucial for understanding the lagged and often complex effects of monetary policies (Matousek et al., 2019). Garriga and Rodriguez (2020) explored how global economic integration affects central banks' ability to control inflation. Further, Aftab and Phylaktis (2022) highlighted issues such as imported inflation and the influence of global financial markets.

Sims et al. (2021) and Vásconez et al. (2023) examined the structural “dynamic stochastic general equilibrium” model to understand the principal tools of monetary policies in unconventional systems. Shesadri and Harendra (2023) focused on the “Keynesian business cycle” theory with banks in India and clarified the impact of interest rates on policy interest rate shock. Several studies have examined the function of monetary policies in controlling inflation. This study focuses on the impact of monetary policies on inflation in Indonesia, filling a crucial gap in monetary policy studies, and examines interest rate, LIR, and TRES as independent variables.

DATA AND METHODOLOGY

This study aims to determine the nexus between monetary sector credit to the private sector and gross domestic product (GDP), inflation consumer price, LIR, and TRES minus gold. The original Equation (1) is given as follows:

$$CRE_t = f(GDP_t, INFCP_t, LIR_t, TRES_t) \quad (1)$$

Equation (1) can also be rewritten as follows:

$$CRE_t = \beta_0 + \beta_1 GDP_t + \beta_2 INFCP_t + \beta_3 LIR_t + \beta_4 TRES_t + \varepsilon_t \quad (2)$$

The variables in Equation (2) are:

CRE_t : Monetary sector credit to private sector (% GDP)

GDP_t : Gross Domestic Product (constant 2015 US Dollar)

$INFCP_t$: Inflation, consumer prices (annual %)

LIR_t : Lending interest rate (%)

$TRES_t$: Total reserves minus gold (current US\$)

This study used data (37 observations) from 1986 to 2022 taken from the World Bank database for analysis. Strongly related to monetary policies, this study used monetary tools such as the monetary sector credit to private sector (CRE) as a proxy for money supply, LIR , and $TRES$. CRE and LIR are significant factors in determining the effects of monetary policies. Asratie (2021) used monetary sector credit, LIR , and inflation to determine economic growth in Ethiopia. A similar variable was used to examine the connection between Kenya's monetary policy and LIR (Alper et al., 2020). Moreover, GDP is an important variable that links the

effects of the country's economic income. Some studies have included GDP as a vital component in identifying the economy's growth (Goshit et al., 2022; Ongan and Gocer, 2021).

TRES, not including gold, is used because the monetary system is highly concerned with liquid reserves. Considering that this study uses inflation as a variable, the value of gold is likely not affected by inflation. Thus, TRES are suitable when not including gold. According to Sui et al. (2021) and Erb et al. (2020), during the inflation period, the price of gold is more stable compared with the value of money. Finally, inflation of consumer prices (*INFCP*) is an important variable in this study that reflects the economic crisis that occurred in Indonesia in 1997 (Hill, 2021; Resosudarmo et al., 2021; Gupta, 2021). According to Dowling and Yap (2008) and Pritadrajati et al. (2021); the hyperinflation in Indonesia led to high unemployment, decreasing of foreign investment and depreciation of the Indonesian currency.

This study employed the ARDL and NARDL models, also known as the bounds testing cointegration technique, which were developed by Pesaran et al. (2001). The objective is to examine how monetary policy tools such as interest rates and TRES influence the monetary sector to give loans to private sectors. This approach has been frequently used in previous studies to calculate the correlation between monetary policies and several global economic crises, as demonstrated by Tarawalie and Kargbo (2020), Ongan and Gocer (2021), Goshit et al. (2022), Noureen et al. (2022), and Bhowmik et al. (2022).

According to Nkoro and Uko (2016) and Mohamad et al. (2023), the ARDL model offers an effective framework for assessing and projecting long-run linkages based on real-time series data. The ARDL model is a highly useful approach because the method offers further adaptability for significant integration. According to Pesaran et al. (2001), the method does not aim for all variables to be integrated in the same order, that is, (1). The method is highly flexible as regards finding the integration of significant value either in the first or levels of different orders (Mohamad et al., 2024).

The ARDL short-run model (Equation 3) and the long-run model (Equation 4) were used in this study. All variables in Equation (2) are conducted using the natural logarithmic form to obtain great results. Equation (3) depicts the ARDL short-term model as follows:

$$\Delta LCRE_t = \beta_0 + \beta_1 \Delta LGDP_{t-1} + \beta_2 \Delta LINFCP_{t-1} + \beta_3 \Delta LLIR_{t-1} + \beta_4 \Delta LTRES_{t-1} + \varepsilon_t \quad (3)$$

The long-run model is derived from Equation (4) by assuming that the difference variables are zero. Normalizing the equation, the following model is obtained:

$$LCRE_t = \beta_0 + \beta_1 LGDP_{t-1} + \beta_2 LINFCP_{t-1} + \beta_3 LLIR_{t-1} + \beta_4 LTRES_{t-1} + \varepsilon_t \quad (4)$$

This study uses the NARDL approach established by Shin et al. (2014) to examine the asymmetric effect of inflation, interest rates, and TRES not including gold on lending credit to the private sector. NARDL has the advantage of comparing the selected variable (total reserve, inflation, and LIR) to determine their positive and negative effects on lending credit to the private sector. This study excludes GDP from the comparison of positive and negative values due to the ARDL in both values, as shown in Table 4.

$$LINFCP_t = LINFCP_0 + \Delta LINFCP^+_t + \Delta LINFCP^-_t \quad (5)$$

$$LLIR_t = LLIR_0 + \Delta LLIR^+_t + \Delta LLIR^-_t \quad (6)$$

$$LTRES_t = LTRES_0 + \Delta LTRES^+_t + \Delta LTRES^-_t \quad (7)$$

Where *LINFCP*, *LLIR*, and *LTRES* represent the random initial value and $LINFCP^+_t + LINFCP^-_t + LLIR^+_t + LLIR^-_t + LTRES^+_t + LTRES^-_t$, represent partial sum processes that, when positive and negative changes are added, are described as follows:

$$\begin{aligned} LINFCP^\pm_t &= \sum_{x=1}^t \Delta LINFCP^+_x = \sum_{x=1}^t \max(\Delta LINFCP^+_x, 0), \sum_{x=1}^t \Delta LINFCP^-_x \\ &= \sum_{x=1}^t \min(\Delta LINFCP^-_x, 0) + \varepsilon_t \quad (8) \end{aligned}$$

$$\begin{aligned} LLIR^\pm_t &= \sum_{x=1}^t \Delta LLIR^+_x = \sum_{x=1}^t \max(\Delta LLIR^+_x, 0), \sum_{x=1}^t \Delta LLIR^-_x \\ &= \sum_{x=1}^t \min(\Delta LLIR^-_x, 0) + \varepsilon_t \quad (9) \end{aligned}$$

$$\begin{aligned} LTRES^\pm_t &= \sum_{x=1}^t \Delta \ln LTRES^+_x = \sum_{x=1}^t \max(\Delta LTRES^+_x, 0), \sum_{x=1}^t \Delta LTRES^-_x \\ &= \sum_{x=1}^t \min(\Delta LTRES^-_x, 0) + \varepsilon_t \quad (10) \end{aligned}$$

Equations (9)–(10) are used to validate the positive and negative shocks of the variables. The asymmetric ARDL approach in this study is explained below:

$$\begin{aligned} LCRE_t &= \beta_0 + \beta_1 LGDP_{t-1} + \beta_2 LINFCP^+_{t-1} + \beta_3 LINFCP^-_{t-1} + \beta_4 LLIR^+_{t-1} + \\ &\beta_5 LLIR^-_{t-1} + \beta_6 LTRES^+_{t-1} + \beta_7 LTRES^-_{t-1} + \varepsilon_t \quad (11) \end{aligned}$$

MAIN FINDINGS

The study uses the monetary sector credit to the private sector as the dependent variable proxy as LCRE. The independent variables are the GDP proxy as LGDP, inflation (consumer prices) proxy as LINFCP, LIR proxy as LLIR, and TRES proxy as LTRES. Table 1 shows five variables and the number of observations in 37 years. All the mean and median for all variables are positive, and all the descriptive statistics show that it is normally distributed. The value of skewness also indicates the same, and the skewness value between -1 and 1 is generally almost symmetrical. Beyond this range, skewness values represent progressively lopsided distributions (Orcan, 2020).

Table 1: Statistical descriptive

Statistic	LCRE	LGDP	LINFCP	LLIR	LTRES
Mean	3.4742	26.9506	1.8960	2.7643	24.2585
Median	3.4679	26.8778	1.8583	2.7713	24.2773
Maximum	4.1084	27.7464	4.0682	3.4705	25.6671
Minimum	2.9911	26.0744	0.4448	2.1424	22.1223
Std. Dev.	0.3246	0.4948	0.6397	0.3336	1.1147
Skewness	0.4797	0.0074	0.6375	0.0269	-0.3342
Kurtosis	2.0977	1.8983	5.5259	2.1418	1.8571
Jarque-Bera	2.6738	1.8714	12.3425	1.1398	2.7026
Observations	37	37	37	37	37

Figure 3 shows all variables studied in this research. Indonesia's TRES demonstrate a steadily increasing pattern. Similar to the TRES, GDP also shows an increase in income from 1986 to 2022; however, during Indonesia's hyperinflation crisis between 1997 and 1998 (Soedarmono et al., 2023), and the discovery of COVID-19 pandemic in late 2019 (Neaime and Gaysset, 2022), the graph shows a downward trend. The other variables, such as monetary sector credit, lending interest, and inflation rate, were also affected in the same years. In particular, the monetary sector credit shapely dropped after the hyperinflation occurred in the Indonesian economy.

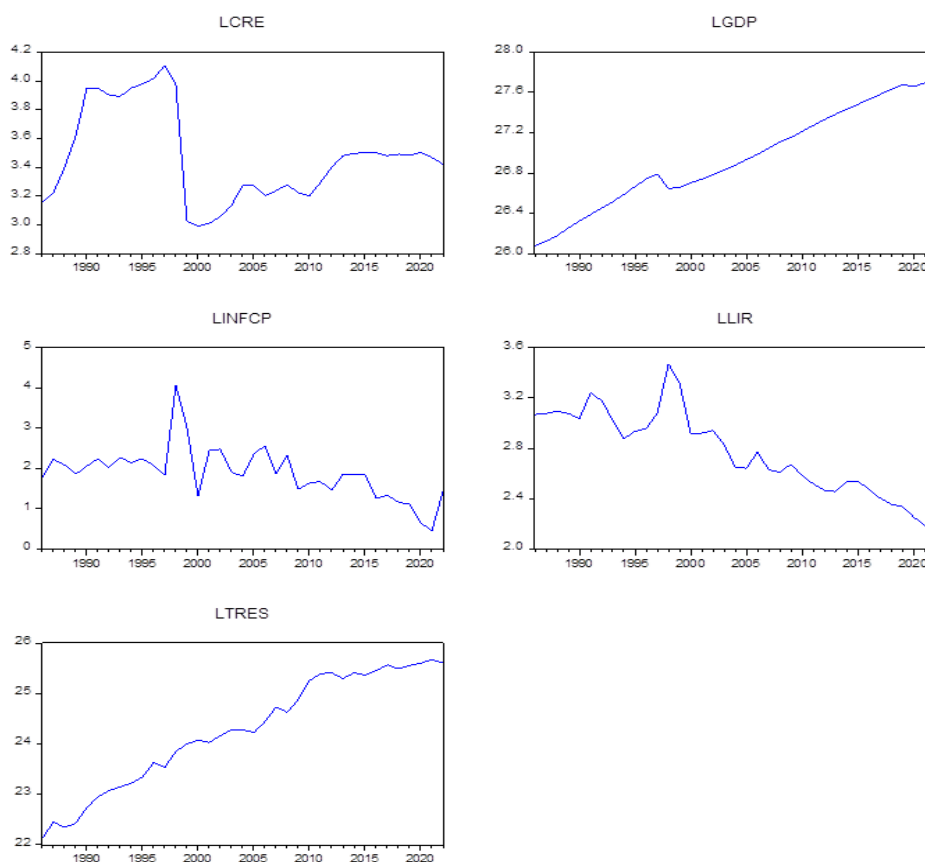


Figure 3: Trend variable's

Table 2 demonstrates the unit root test of Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) for all five variables in this study. The results of ADF and PP have similar conditions for evaluating the significance of the unit roots tests, with inflation being significant at both levels and the first difference for both tests. The others are not significant at the level except for inflation. However, after running the unit root test at the first difference, all the variables are stationary at 1% for ADF and PP. Therefore, this result clarifies that all the variables are suitable for the ARDL and NARDL approaches.

Table 2: Unit root tests

Test Variable	Augmented Dickey–Fuller		Phillips–Perron	
	Level	First dif.	Level	First dif.
LCRE	-2.7287	-4.4330***	-2.2844	-4.3677***
LGDP	-2.5668	-4.3595***	-2.0807	-4.3379***
LINFCP	-3.9837***	-8.6294***	-4.6258***	-14.5707***
LLIR	-2.9974	-3.7199***	-2.5767	-6.5575***
LTRES	-1.5856	-6.4755***	-1.3645	-6.5013***

The bound test is an important step to identify whether the model is suitable for long-run cointegration. Table 3 identifies that the F-statistic (25.86) is higher than the value of the upper bound test at 10%, 5%, 2.5%, and 1%. Thus, this study clarifies that the model has long-run cointegration.

Table 3: Bound test

F-value	Significant level (%)	Lower bound	Upper bound
25.86	10	2.2	3.09***
	5	2.56	3.49***
	2.5	2.88	3.87***
	1	3.29	4.37***

The ARDL short-run and long-run are demonstrated in Table 4 for model (1, 2, 1, 0, 0), using maximum lag 2. The long-run model does not have any significant results for the variables. However, the ARDL short-run model has four significant variables. The GDP and monetary sector credit to the private sector had positive outcomes, at 4.1837 and 0.8532, respectively. This finding is similar to that of Qamruzzaman (2021) and Ali et al. (2021), that is, GDP positively affects monetary credit. The second lag of GDP has a negative result of -3.5067, similar to the inflation of consumer price at -0.0477.

Table 4: ARDL short-run and long-run

Variable	ARDL short-run	Variable	ARDL long-run
LCRE(-1)	0.8532***	LGDP	-1.16733
LGDP	-0.8483	LINFCP	-0.8497
LGDP(-1)	4.1837***	LLIR	-1.3313
LGDP(-2)	-3.5067***	LTRES	-0.32501
LINFCP	-0.0755**	C	47.3397
LINFCP(-1)	-0.0492		
LLIR	-0.1954		
LTRES	-0.0477		
C	6.9472		

This finding clarifies the role of GDP, where positive and negative results still gain the positive result for monetary sector credit. This finding indicates that the positive impact of GDP is more likely to be bigger than the negative results in the second lag. GDP indicates whether or not Indonesia's economy is doing well. Thus, the Central Bank of Indonesia has effectively provided loan credit to the private sector to enhance Indonesia's economic growth. The monetary sector credit is positive because inflation is negative. The inflation contradicts the reaction to credit creation. That is, as the inflation increases, the government of Indonesia must reduce the amount of money supply in the Indonesian market. Similar results were obtained by Bernanke (2020) and Khakbaz et al. (2023). The findings for the ARDL models, in the short and long terms, do not provide compelling results regarding whether monetary tools such as interest rate and TRES can stabilize the economy. Thus, this study conducts further analysis using the NARDL approach, as shown in Table 5.

Table 5: NARDL results

Variable	NARDL short-run	Variable	NARDL long-run
LCRE(-1)	0.8119***	LGDP	-2.6824
LCRE(-2)	-0.2926**	LINFCP_POS	-0.6281**
LGDP	-0.7738	LINFCP_NEG	0.3057**
LGDP(-1)	2.1747**	LLIR_POS	0.2420
LGDP(-2)	-2.6903***	LLIR_NEG	-2.1809*
LINFCP_POS	-0.1906***	LTRES_POS	0.9806**
LINFCP_POS(-1)	-0.1664**	LTRES_NEG	-3.0171**
LINFCP_POS(-2)	0.0551	C	73.5459
LINFCP_NEG	0.1469**		
LLIR_POS	0.1164		
LLIR_NEG	-1.0714***		
LLIR_NEG(-1)	0.4650		
LLIR_NEG(-2)	-0.4419**		
LTRES_POS	0.4013**		
LTRES_POS(-1)	-0.1395		
LTRES_POS(-2)	0.2096*		
LTRES_NEG	-1.4503**		
C	35.3534**		

The continuation of the ARDL method in Tables 4 and 5 illustrates the NARDL short and long-run outcomes at models (2, 2, 2, 0, 0, 2, 2, 0) and with maximum lag 2. The asymmetric effect of adding positive and negative values to the selected variables provides an interesting result and demonstrates that the interest rate and TRES are effective tools for controlling inflation. In the asymmetric ARDL short run, monetary sector credit is significant at lags 1 and 2 at 0.8119 and -0.2926, respectively. Similar to monetary sector credit, GDP also has positive and negative results for lags 1 and 2, respectively. Thus, there is a symmetry in GDP and credit recreation in the short-run relationship (Ali et al., 2021). This result was similar to that of Ali et al. (2021), who found that the GDP has a positive impact on domestic credit. Meanwhile, Qamruzzaman (2021) found that monetary policy affects real GDP effectively. The negative sign reflects the downward trajectory of Indonesia's GDP in 1997, as depicted in Figure 3. This

decline correlates with the hyperinflation crisis during that period, as evidenced by Resosudarmo et al. (2021), Gupta (2021), and Hill (2021).

The NARDL short-run shows that the inflation rate with the positive sign gained negative results, which were -0.1906 and -0.1664 . Therefore, an increase in inflation reduces money creation because the Central Bank of Indonesia will reduce monetary money credit to the private sector (Suhendra and Anwar, 2021). The opposite sign of inflation is also significant and has a positive value (0.1469). Thus, when the inflation rate significantly reduces, the Central Bank of Indonesia will promote lending to the private sector to boost the economy (Suhendra and Anwar, 2021; Catalán et al., 2020). The finding for the NARDL long-run was relatively similar. That is, as the inflation rate increased, the monetary sector credit will be negatively impacted (-0.6281). Meanwhile, the value is positive (0.3057) when the inflation rate was negative. Similar to this study, Turna and Özcan (2021) studied the relationship among exchange rate, interest rate, and inflation. The study supports the monetary policy that as inflation increases, the interest rate will increase to ensure the stability of the economy (Turna and Özcan, 2021; Khakbaz et al., 2023).

For monetary tools such as the LIR, the study was unable to gain a significant positive sign for NARDL short-run and long-run. However, this study showed that when the LIR was negative, the monetary credit to the private sector was also negative (-1.0714 and -0.4419). This finding is similar for the NARDL long-run, that is, adding the negative sign to the lending rate results in -2.1809 . These results in terms of the monetary policy and lending rate are similar to those of Naiborhet (2020) and Catalán et al. (2020). TRES also follow the monetary theory, that is, a positive value sign results in positive figures of 0.4013 and 0.2096 for the NARDL short-run and 0.9806 in the long-run. When the negative sign is added to TRES, the value gains are negative for the short-run (-1.4503) and the long-run (-3.0171). These results prove that the Central Bank of Indonesia strongly implements monetary policies to stabilize inflation in the Indonesian economy (Nugraha et al., 2023; Mukhlis et al., 2020).

Table 6: Residual diagnostic test

Diagnostic test	F-value	Status
Normality test (Jarque–Bera)	0.3132	Normal distributed
Breusch–Pagan–Godfrey test	0.5685	No heteroskedasticity problem
Harvey test	0.8778	No heteroskedasticity problem
Glejser test	0.6880	No heteroskedasticity problem
Breusch–Godfrey Serial Correlation LM	0.2954	No series correlation problem

The models included in this research are generally stable, and the CUSUM and CUSUMQ tests may be used to identify all variables to assess parameter stability (Pesaran et al., 2001). Table 6 presents the results of the Jarque–Bera normality test (0.3132), which is stable and normally distributed. No heteroskedasticity issues exist as shown by the Breusch–Pagan–Godfrey (0.5685), Harvey (0.8778), and Glejser tests (0.6880). The study also conducted serial correlation of LM, and no sign of a correlation problem were observed. In Figure 4a and b, CUSUM and CUSUM of square fall inside the red line, further supporting the stability of the model.

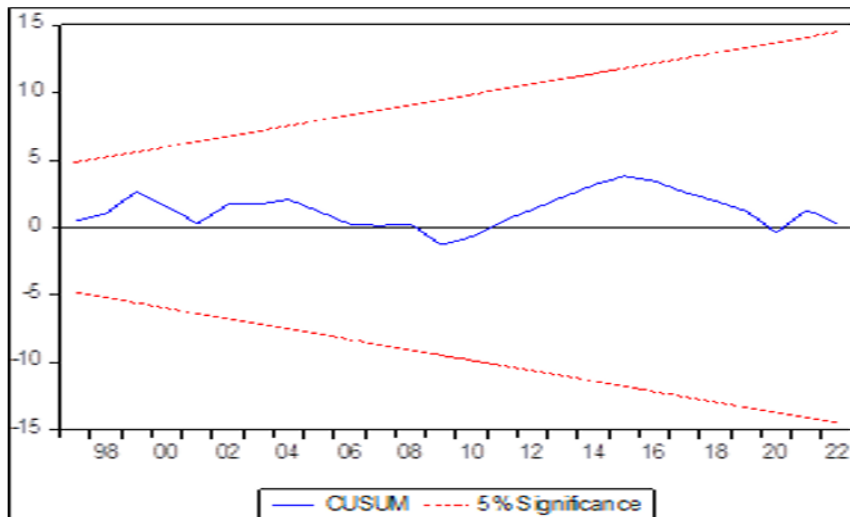


Figure 4a: CUSUM test

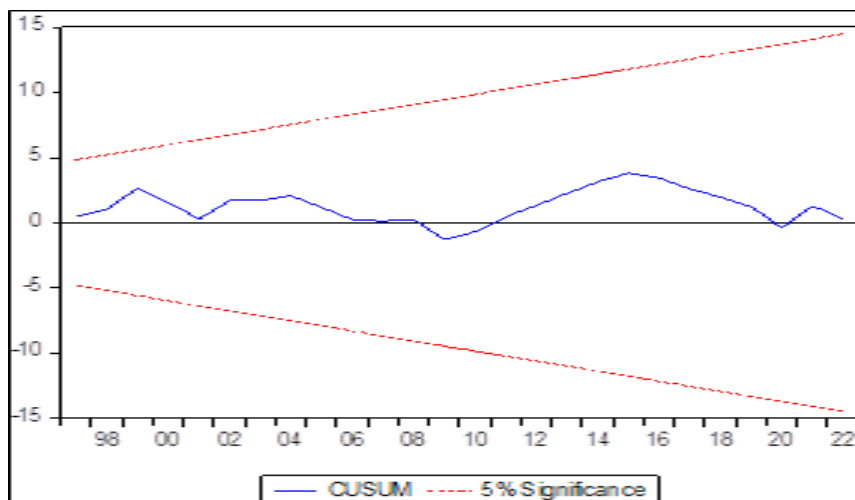


Figure 4b: CUSUM square test

CONCLUSION

This study clarifies the monetary theory that has been used to stabilize and control the Indonesian economy. The ability to give credit at a domestic level to the private sector is regarded as a positive effort to strengthen and develop the Indonesian economy. Banks that promote low interest rates to the private sector can enable commercial companies to run successfully. However, bank management in Indonesia must be careful when giving credit loans to avoid creating the risk of financial problems that can negatively affect the Indonesian

economy. Furthermore, the findings in this study reveal that the hyperinflation in Indonesia in 1997 diminished money creation. As the Central Bank of Indonesia is realize, the value of money during that time was reduced dramatically, and most people could not afford to pay back their debts. Thus, the bank limited its lending to the private sector. Increasing the interest rate is significant in reducing liquidity in the market and enhancing the value of money. Thus, the decision followed the classical monetary theory, helping the Central Bank of Indonesia to effectively stabilize the economy. Notably, our empirical findings only cover the money supply within Indonesia. Future research can add to these findings by adding external money supply variables, such as broad money and exchange rates that are closely related to broad money supply, into the models.

Acknowledgement

The financial support from UNIVERSITI MALAYSIA SARAWAK (GL/F01/UNS-FINTECH/02/2021(1)) is greatly acknowledged.

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