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THE INTERACTION OF GLOBAL AND DOMESTIC ECONOMIC VARIABLES ON INFLATION IN INDONESIA

Fariq Parizal[a]*, Evi Rosarina Nababan[b], Ignatia Bintang Filia Dei Susilo[c]
[a, b, c]Universitas Siliwangi, Kota Tasikmalaya, Jawa Barat, Indonesia
*fariq.p.ind@gmail.com

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ABSTRACT

This study investigates the dynamic interplay between global oil prices, the rupiah exchange rate, interest rates, and inflation in Indonesia using the Autoregressive Distributed Lag (ARDL) method on time series data from 1986 to 2023. The analysis identifies a long-term cointegrating relationship among these variables. However, oil prices and interest rates were found to have statistically insignificant long-term effects on inflation, likely due to government interventions such as fuel subsidies and active monetary policies. In the short term, exchange rate depreciation significantly influences inflation, while interest rate hikes exhibit a deflationary effect. The error correction model suggests that approximately 17% of inflationary disequilibria are corrected each year. These findings emphasize the need for adaptive policy strategies that account for Indonesia’s external vulnerabilities while reinforcing domestic resilience through diversification and inflation targeting mechanisms.

Keywords: inflation, oil prices, exchange rate, interest rate, ARDL

ABSTRAK

Studi ini menginvestigasi interaksi dinamis antara harga minyak global, nilai tukar rupiah, suku bunga, dan inflasi di Indonesia dengan menggunakan metode Autoregressive Distributed Lag (ARDL) pada data runtun waktu dari tahun 1986 hingga 2023. Analisis ini mengidentifikasi adanya hubungan kointegrasi jangka panjang di antara variabel-variabel tersebut. Namun, harga minyak dan suku bunga ditemukan memiliki pengaruh jangka panjang yang tidak signifikan secara statistik terhadap inflasi, kemungkinan besar disebabkan oleh intervensi pemerintah seperti subsidi bahan bakar dan kebijakan moneter yang aktif. Dalam jangka pendek, depresiasi nilai tukar secara signifikan mempengaruhi inflasi, sementara kenaikan suku bunga menunjukkan efek deflasi. Model koreksi kesalahan menunjukkan bahwa sekitar 17% dari disekuilibrasi inflasi dikoreksi setiap tahunnya. Temuan ini menekankan perlunya strategi kebijakan adaptif yang memperhitungkan kerentanan eksternal Indonesia sekaligus memperkuat ketahanan domestik melalui diversifikasi dan mekanisme penargetan inflasi.

Kata Kunci*: inflasi, harga minyak, nilai tukar, suku bunga, ARDL*

I. INTRODUCTION

Inflation remains a persistent challenge for many developing economies, including Indonesia, due to its complex and multi-dimensional nature. As a macroeconomic indicator, high inflation not only erodes public purchasing power but also undermines investment, destabilizes markets, and diminishes economic growth potential. Indonesia's inflation patterns are shaped by both domestic dynamics and international factors, especially in light of its integration into global trade and financial systems. The inflation-poverty nexus is also critical, where inflation and unemployment significantly influenced poverty levels in Indonesia (Murjani, 2019). Such findings underscore the importance of inflation targeting not only for stability but also for social equity.

The focus of this research is on three key variables global oil prices, the rupiah exchange rate, and interest rates as these have consistently emerged as pivotal macroeconomic instruments affecting inflation, particularly in small open economies like Indonesia. The rationale for choosing these variables lies in their theoretical and empirical relevance: (a) Global oil prices are a major external shock factor for energy-importing countries, directly influencing production and transportation costs (Blanchard & Gali, 2007), and thus cost-push inflation. (b) The exchange rate, especially against the U.S. dollar, plays a critical role due to Indonesia's dependence on imported goods and raw materials. Depreciation amplifies import costs and triggers imported inflation, in line with the Purchasing Power Parity (PPP) theory (Cassel, 1921). (c) Interest rates serve as a primary tool of monetary policy used by Bank Indonesia to regulate liquidity and aggregate demand, in accordance with the Taylor Rule (Taylor, 1993).

While variables like money supply, fiscal spending, and wages are undeniably important, this study narrows its focus to these three variables due to their direct linkage with inflation pass-through mechanisms and their prominence in both policy discourse and prior empirical studies in emerging economies. Numerous studies across emerging and resource-rich economies have applied ARDL and NARDL models to investigate inflation dynamics. For instance, Osman et al. (2019) explored inflation drivers in Saudi Arabia and found long-run effects from oil prices and money supply. Similarly, Amjad et al. (2021) used NARDL in Pakistan to show asymmetries in the inflationary impact of fuel prices. Studies by Coban & Yussıf (2019) in Ghana and Davari & Kamalian (2018) in Iran confirmed the role of macro variables like oil, FDI, and exchange rates in both short- and long-term inflation behavior.

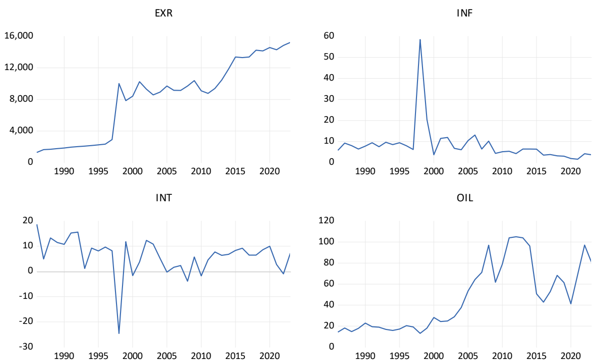

Figure 1. Trends in the Rupiah Exchange Rate, Inflation, Interest Rates, and Global Oil Prices in Indonesia (1986–2023)

Source: World Bank, 2024

World crude oil prices demonstrated significant fluctuations throughout the period 1986–2023, ranging from \$14,35 in 1986 to a peak of \$105,01 in 2012. The volatility of global oil prices carries important implications for the economy, particularly for developing nations such as Indonesia. Oil price shocks can disrupt macroeconomic stability through cascading effects on inflation, exchange rates, and international trade performance.

Inflation in Indonesia over the period exhibited a dynamic pattern, with the lowest rate of 1,20% recorded in 1993 and peaking at 58,45% in 1998. Various economic events have influenced inflation in Indonesia. During 1997–1998, the Asian financial crisis precipitated a sharp decline in the rupiah exchange rate, thereby triggering an extreme surge in inflation. The global financial crisis of 2008 also contributed to a downturn in the global economy, which subsequently affected oil prices and Indonesia’s exports. In the period 2014–2016, the collapse in global oil prices suppressed inflation while concurrently reducing Indonesia's export revenues. During the COVID19 pandemic (2020–2021), inflation declined as a result of weakened economic demand, but it surged again in 2022–2023 due to the Russia-Ukraine crisis, which led to a spike in global oil prices. Overall, inflation fluctuations were significantly driven by external factors, such as volatility in global commodity prices, as well as internal factors, notably the monetary policies implemented by Bank Indonesia.

The rupiah exchange rate against the United States dollar exhibited a persistent depreciation trend, starting at 1.282,56 rupiah/USD in 1986 and reaching 15.236.88 rupiah/USD in 2023. Fundamental factors such as the trade balance, interest rates, and global political conditions significantly influenced the dynamics of the exchange rate.

Indonesia's interest rates underwent a complex transformation, ranging from -3,85% to 11,50% over the study period. The movement in interest rates not only reflects monetary policy but also represents efforts to stabilize the economy and respond to external shocks.

Global oil prices have an impact on stock market indices and inflation, particularly in energy-importing countries (Ningsih & Waspada, 2018). Fluctuations in oil prices are driven by both fundamental and non-fundamental factors, such as geopolitical events and exchange rate movements (Bhar & Malliaris, 2011). Additionally, rising oil prices affect the cost of staple commodities and inflation, and if left unchecked, such instability can trigger an economic crisis (Pratama & Hutajulu, 2022).

Exchange rates play a crucial role in inflation, as depreciation raises import prices and inflation, whereas appreciation helps to temper inflation (Fadilla & Aravik, 2018). Moreover, exchange rates influence stock price indices, reflecting inflationary conditions (Situngkir & Batu, 2020), and exert a significant overall impact on inflation (Handika et al., 2021). The integration of global finance has rendered the rupiah susceptible to external factors, such as fluctuations in oil prices and international interest rate policies (Nurhasanah & Soekapdjo, 2019).

Interest rates exhibit a close relationship with both inflation and exchange rates; an increase in rates driven by inflation can exacerbate the depreciation of the rupiah through capital outflows (Asmara & Suarjaya, 2018). Interest rates also affect the yield on time deposits, which in turn influences inflation levels (Sudirman & Fitrianti, 2022). The property sector is impacted by the interrelated dynamics of interest rates, exchange rates, and inflation (Hasanah et al., 2021). Uncontrolled monetary policy can undermine economic stability through its effects on inflation and interest rates (Godrikus, 2020). Consequently, maintaining a balance in inflation in both the short and long term becomes a crucial factor for sustainable economic growth (Azizah, 2023).

Over the decades, various studies have explored the determinants of inflation in Indonesia, analyzing both internal and external contributors such as oil prices, exchange rates, interest rates, money supply, fiscal policy, and wages. However, much of the existing literature either (a) focuses on short-term determinants without exploring long-run dynamics, (b) employs older or fragmented time series data that do not capture structural breaks (e.g., the Asian Financial Crisis or COVID19), or (c) fails to simultaneously consider the combined influence of global and domestic variables in a unified framework. This study fills that gap by providing a comprehensive long- and short-run analysis of inflation determinants using a robust time series approach over an extended period (1986–2023). This not only incorporates critical global shocks but also captures Indonesia's structural policy shifts.

Several ARDL-based studies on inflation in Indonesia (Farichah, 2022; Mufida et al., 2023; Setiartiti & Hapsari, 2019) have also highlighted the significance of macroeconomic policy variables such as interest rates, exchange rates, and trade. However, results often vary depending on time span and model specifications. This paper employs the Autoregressive Distributed Lag (ARDL) approach, which is especially suitable given the mixed stationarity levels of the data and the need to examine both short- and long-term relationships. By doing so, this study aims to contribute new insights into the dynamic interactions between global and domestic economic variables and their effect on inflation in Indonesia, offering empirically grounded recommendations for more adaptive and resilient macroeconomic policies.

II. METHODS

This study employs a quantitative approach using secondary time series data spanning from 1986 to 2023, sourced from the World Bank Development Indicators (WDI) and the World Bank Commodity Price Data. The selection of this period is strategic, as it captures multiple structural economic events (e.g., the 1997–1998 Asian financial crisis, the 2008 global crisis, and the 2020–2022 COVID19 pandemic and oil price shocks), thereby offering a comprehensive basis for examining long-run and short-run inflation dynamics.

The selection of variables is guided by both theoretical frameworks and empirical precedence. Inflation (INF), the dependent variable, is measured as the annual percentage change in the consumer price index. It reflects the general price level and is central to macroeconomic stability (Mankiw, 2019). According to Fisher's quantity theory of money (1911), inflation is closely related to the money supply in the economy. In this study, inflation is measured as an annual percentage

Global oil prices (OIL), expressed in USD per barrel, are included due to their critical role in cost-push inflation particularly in energy-importing economies like Indonesia. This aligns with Supply Shock Theory (Blanchard & Gali, 2007).

Rupiah exchange rate (EXR) reflects the value of the rupiah relative to the United States dollar. According to Cassel's Purchasing Power Parity (PPP) theory (1920), exchange rates tend to adjust to differences in price levels between countries. Furthermore, the Mundell-Fleming model in 1963 suggests that exchange rates fluctuate as a result of monetary and fiscal policies.

Interest rate (INT), representing the policy rate or short-term lending rate, is central to monetary policy's role in influencing inflation and aggregate demand, as captured in the IS-LM model (Hicks, 1937) and the Taylor Rule (Taylor, 1993). According to Hicks' IS-LM model (1937), interest rates influence investment and consumption within an economy. Furthermore, interest rates are linked to the Taylor Rule, which explains how central banks adjust interest rates to maintain price stability and foster economic growth (Taylor, 1993). While other variables such as money supply or fiscal expenditures also affect inflation, this study intentionally focuses on these three macroeconomic levers to explore external price shocks and domestic policy responses, which are highly relevant in the Indonesian context.

This study adopts the Autoregressive Distributed Lag (ARDL) method, introduced by (Pesaran et al., 2001). This method is well-suited for: analyzing both short-term dynamics and long-term equilibrium relationships, handling variables with different orders of integration, i.e., I(0) or I(1), which is common in macroeconomic data, also estimating small-sample time series data efficiently and flexibly. The ARDL approach is widely adopted in inflation modeling due to its flexibility with mixed-order integration and small sample efficiency. Similar studies in developing economies, such as Iran (Pahlavani & Rahimi, 2009) and Mexico (Tinoco-Zermeño et al., 2014), have demonstrated its effectiveness in capturing both short-run volatility and long-term trends.

The econometric equation model to be estimated is as follows:

$$INF_t = \beta_0 + \beta_1 OIL_t + \beta_{2ss} EXR_t + \beta_3 INT_t + \varepsilon_t$$

(Equation 1)

Notation:

INF	=	Inflation (%)
OIL	=	Global Crude Oil Price (average, USD per barrel)
EXR	=	Rupiah Exchange Rate (Rupiah/USD)
INT	=	Interest Rate (%)
ε	=	Error term

Based on Equation (1), the ARDL equation can be formulated in the following model:

$$\Delta INF_t = \propto_0 + \sum_{i=1}^{n} \propto_{1i} \Delta INF_{t-1} + \sum_{i=1}^{n} \propto_{2i} \Delta OIL_{t-1} + \sum_{i=1}^{n} \propto_{3i} \Delta EXR_{t-1} + \sum_{i=1}^{n} \propto_{4i} \Delta INT_{t-1} + \theta_1 INF_{t-1} + \theta_2 OIL_{t-1} + \theta_3 EXR_{t-1} + \theta_4 INT_{t-1} + \varepsilon_t$$

(Equation 2)

Notation:

Δ	=	Lagged difference
$\propto_{1i} - \propto_{4i}$	=	Short-term dynamic relationship model
$\theta_1 - \theta_4$	=	Long-term dynamic relationship model

After confirming stationarity, the ARDL bounds test is applied to assess cointegration. If a long-run relationship is confirmed, an Error Correction Model (ECM) is derived to quantify short-term adjustments toward long-run equilibrium. The error correction model (ECM) based on Equation (2) can be formulated as follows:

$$\Delta INF_t = \propto_0 + \sum_{i=1}^{n} \propto_{1i} \Delta INF_{t-1} + \sum_{i=1}^{n} \propto_{2i} \Delta OIL_{t-1} + \sum_{i=1}^{n} \propto_{3i} \Delta EXR_{t-1} + \sum_{i=1}^{n} \propto_{4i} \Delta INT_{t-1} + \vartheta ECT_{t-1} + \mu_t$$

(Equation 3)

Notation:

ϑECT_{t-1}	=	Error correction term representing the residual adjustment from the previous period

Data analysis is conducted using EViews 12. First, stationarity testing is performed through the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test to ensure the stability of the time series data, following the recommendations of (Porter & Gujarati, 2008). Stationarity testing is a fundamental step to ensure the validity of time series analysis, as emphasized by (Hyndman & Athanasopoulos, 2018) in their book, which explains that non-stationary data can lead to misleading spurious regression results. The stationarity tests, including the ADF test and PP test, are applied to confirm the stability of the time series data.

Second, the cointegration test is conducted using bounds testing to examine the existence of a long-term relationship by comparing the F-statistic against critical values developed by (Pesaran et al., 2001). The cointegration test plays a crucial role in identifying long-run equilibrium relationships among economic variables. Pesaran et al., (2001) emphasize that bounds testing is a fundamental method for testing cointegration in the Autoregressive Distributed Lag (ARDL) model, particularly for variables with different integration characteristics.

Third, the optimal lag length is determined using the Akaike Information Criterion (AIC) (Lütkepohl, 2005). This process helps identify the most appropriate number of lags for each variable in the model. Selecting the optimal lag length is a critical procedure that determines the quality of the econometric model, as emphasized by Akaike (1998) in the Information Criterion theory. Proper lag length selection enables researchers to capture the dynamic relationships among variables while avoiding overfitting and underfitting in the econometric model.

Fourth, the classical assumption tests are conducted, including normality, autocorrelation, and heteroscedasticity tests. Classical assumption testing is a fundamental procedure in econometrics to ensure that the regression model meets the criteria of the Best Linear Unbiased Estimator (BLUE), as stated by Greene (2018) in *Econometric Analysis*. The tests for normality, autocorrelation, and heteroscedasticity aim to identify potential biases and validate the credibility of the econometric model.

The Jarque-Bera normality test evaluates the distribution of residuals to ensure that the data follow a normal distribution. The autocorrelation test, conducted using the Lagrange Multiplier (LM) test, identifies potential correlations among error terms across different periods. The heteroscedasticity test, performed using the Autoregressive Conditional Heteroskedasticity (ARCH) test, detects non-constant error variances.

Fifth, the estimation of the ARDL model will yield short-term and long-term coefficients, including the analysis of the Error Correction Term (ECT) (Nkoro & Uko, 2016). Analyzing both short-term and long-term relationships is a fundamental process for understanding the complexity of economic variable interactions. The Autoregressive Distributed Lag (ARDL) method allows researchers to explore intricate economic transmission mechanisms through the simultaneous estimation of short-term and long-term components.

Sixth, the model parameter stability test is a critical procedure in econometrics to detect potential structural changes in time series models (Brown et al., 1975). CUSUM and CUSUMSQ tests are fundamental diagnostic tools for evaluating the consistency of econometric models, helping researchers identify potential structural shifts that may affect the validity of the estimates.

III. RESULTS AND DISCUSSION

A. Stationarity Test

The following table presents the results of the stationarity test for each variable:

Table 1. Stationarity Test

Variable	Test for unit root in	Prob.	Decision
INF	*Level*	0,0005	Stationary
OIL	*Level*	0,5305	Non-Stationary
	1st difference	0,0000	Stationary
EXR	*Level*	0,7900	Non-Stationary
	1st difference	0,0000	Stationary
INT	*Level*	0,0000	Stationary

Source: Processed Data, 2024

Based on the stationarity test results, it can be concluded that not all variables are stationary at the level form. The Inflation (INF) and Interest Rate (INT) variables are stationary at the level with probabilities of

0,0005 and 0,0000, respectively, indicating that these variables are stable and do not contain a unit root from the outset. Meanwhile, the Oil Price (OIL) and Exchange Rate (EXR) variables are not stationary at the level, with probabilities of 0,5305 and 0,7900. However, both variables become stationary after first differencing, with probabilities of 0,0000, demonstrating that once differenced, they meet the stationarity requirement. This condition indicates that the dataset used in the model is suitable for further analysis using the ARDL method, as it satisfies the stationarity prerequisite with a combination of variables that are stationary at the level and first difference.

B. Cointegration Test (*Bound Test*)

The following table presents the results of the cointegration (Bound Test) analysis:

Tabel 2. Cointegration Test

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	11,16843	10%	2,37	3,2
		5%	2,79	3,67
		2,5%	3,15	4,08
		1%	3,65	4,66

Source: Processed Data Results, EViews 12, 2024

Based on the cointegration test results (Bound Test), the F-statistic is found to be 11,16843, which has significant implications for determining the long-term relationship among the variables. At various significance levels—10%, 5%, 2,5%, and 1%—the F-statistic consistently exceeds the critical bounds for both I(0) and I(1). This strongly indicates the presence of cointegration or a long-term equilibrium relationship among the variables in the model.

C. Determination of Optimal Lag

The figure below presents the results of the optimal lag selection for the ARDL model.

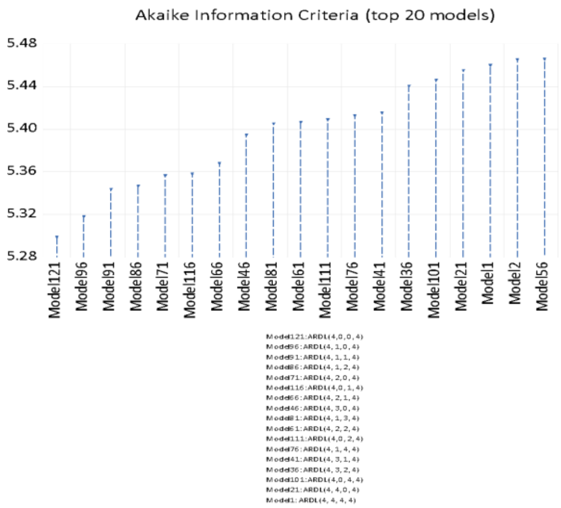

Figure 2. Criteria Graph

Source: Processed Data, 2024

Based on the optimal lag selection results using the Akaike Information Criterion (AIC), the ARDL(4, 0, 0, 4) model emerges as the most optimal specification. The selection of the optimal lag was conducted by evaluating various lag combinations for each variable in the ARDL model while considering the AIC criterion, which aims to minimize prediction errors and avoid overfitting. The ARDL(4, 0, 0, 4) model indicates that a four-period lag provides the best explanatory power in capturing the dynamic relationships among the variables. This implies that historical information from the past four periods contributes most significantly to identifying patterns and the interdependencies between the examined variables.

D. Classical Assumption Tests

1. Normality Test

The results of the Jarque-Bera normality test are presented in the table below:

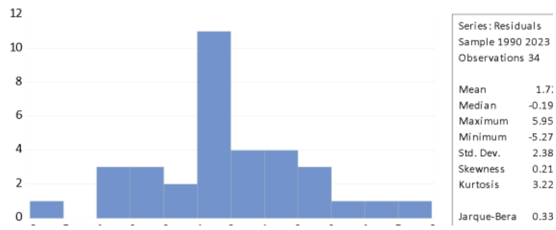

Figure 3. Normality Test

Source: Processed Data, 2024

Based on the output above, the Jarque-Bera probability value is 0,336134, with a significance level of 0,845297, which is greater than 0,05. According to the decision-making principle in the Jarque-Bera normality test, it can be concluded that the tested data follow a normal distribution.

2. Autocorrelation Test

The results of the LM Test are presented in the table below:

Table 3. Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0,211773	Prob, F(2,20)	0,8109
Obs*R-squared	0,705096	Prob, Chi-Square(2)	0,7029

Source: Processed Data, 2024

Based on the table above, the results of the LM Test show a Prob. Chi-Square(2) value of 0,7029, which is greater than 0,05. Therefore, it can be concluded that the model is free from autocorrelation issues.

3. Heteroskedasticity Test

The results of the heteroskedasticity test are presented in the table below:

Table 4. Heteroskedasticity Test

Heteroskedasticity Test: ARCH			
F-statistic	0,246321	Prob, F(1,31)	0,6232
Obs*R-squared	0,260145	Prob, Chi-Square(1)	0,6100

Source: Processed Data, 2024

Based on the table above, the Prob. Chi-Square(1) value is 0,6100, which is greater than 0,05 (or 5%). Therefore, it can be concluded that there is no heteroskedasticity issue in the model.

E. Long-Term and Short-Term Model Analysis Results

The following table below presents the estimation results from the model, highlighting both long-term and short-term relationships between the independent variables and the dependent variable.

Table 5. Long-Term and Short-Term Model Analysis

Variable	Coefficient	t-Statistic	Prob.
Long-run results			
ΔOIL	0,189110	0,678990	0,5042
ΔEXP	0,026140	1,489704	0,1505
INT	0,663304	0,531376	0,6005
C	-9,343984	-0,588366	0,5623
Long-run results			
INF(-1)	-0,172668	-1,526939	0,1410
ΔOIL	0,032653	0,730924	0,4725
ΔEXP	0,004513	5,939801	**0,0000**
INT(-1)	0,114532	0,656815	0,5181
ΔINF(-1)	-0,174009	-1,147098	0,2637
ΔINF(-2)	-0,534190	-5,153854	**0,0000**
ΔINF(-3)	-0,369349	-3,315127	**0,0031**
ΔINT	-0,553129	-3,788174	**0,0010**
ΔINT(-1)	-0,421429	-2,209773	**0,0378**
ΔINT(-2)	-0,391545	-2,547633	**0,0183**
ΔINT(-3)	-0,311075	-3,042817	**0,0060**
CointEq(-1)	-0,172668	-8,123748	0,0000
C	-1,613411	-0,868818	0,3943
R^2		0,938486	
Adjusted R^2		0,907728	
F-statistic		30,51268	
Prob(F-statistic)		0,000000	

Source: Processed Data, 2024

The independent variables exhibit different relationship characteristics. The Oil Price (OIL) variable has a coefficient of 0,189110 with a probability of 0,5042, indicating a positive but statistically insignificant effect on the dependent variable. The Export (EXP) variable shows a coefficient of 0,026140 with a probability of 0,1505, suggesting a weak positive relationship that is also not statistically significant. The Interest Rate (INT) variable has a coefficient of 0,663304 with a probability of 0,6005, implying a positive direction but no significant long-term impact. The constant term (C) is -9,343984 with a probability of 0,5623, reflecting an insignificant model intercept. Although these variables do not show individual statistical significance, they still provide valuable insights into the dynamics of long-term relationships.

In the short-term model analysis, several variables exhibit significant effects. The

Export variable (ΔEXP) shows a significantly positive impact with a probability of 0,0000, indicating a strong and consistent short-term relationship. The Inflation variable at the first to third lags (ΔINF(-1), ΔINF(-2), ΔINF(-3)) demonstrates a significant negative influence, with probabilities of 0,2637, 0,0000, and 0,0031, respectively, highlighting the complex dynamics of inflation over different periods. The Interest Rate variable (ΔINT) and its lags also exhibit a significant negative effect, with ΔINT having a probability of 0,0010 and its first to third lags (ΔINT(-1), ΔINT(-2), ΔINT(-3)) showing significance at different confidence levels. The Error Correction Term (CointEq(-1)) has a coefficient of -0,172668 with a probability of 0,0000, indicating a rapid and significant error correction mechanism, where approximately 17,27% of the disequilibrium is adjusted in each period.

The adjusted coefficient of determination (Adjusted R-squared) of 0,907728 indicates that the model explains 90,77% of the variation in the dependent variable. This can be categorized as very strong, as it is close to one, demonstrating the independent variables' comprehensive ability to explain changes in the dependent variable. The probability of the F-statistic is 0,000000, which is less than 0,05 (or 5%), signifying that the model is statistically significant overall. This implies that the independent variables collectively have a substantial and significant impact on the dependent variable, making the model suitable for estimation and prediction.

F. Stability Test

The following figures present the results of the stability tests conducted using CUSUM and CUSUM of Squares, which assess the structural stability of the model over the study period.

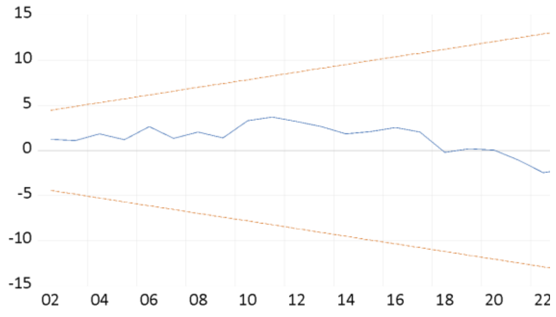

Figure 4. CUSUM Stability Test
Source: Processed Data, 2024

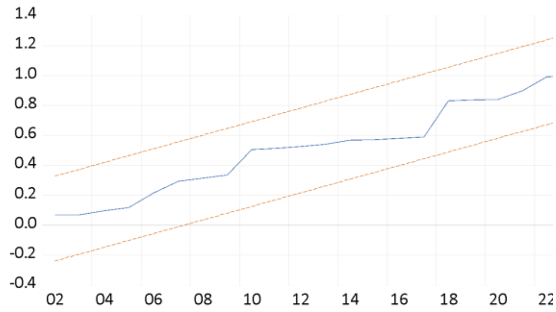

Figure 5. CUSUM of Squares Stability Test
Source: Processed Data, 2024

Based on the stability tests using CUSUM and CUSUM of Squares, it can be interpreted that the model exhibits stable parameters throughout the study period. In the CUSUM graph, the test statistic line remains within the 5% critical boundaries, indicating the absence of significant structural changes in the model. Similarly, the CUSUM of Squares graph remains within the 5% critical limits, suggesting that the model's residual variance remains constant and does not exhibit heteroskedasticity over time. These tests provide empirical evidence that the ARDL model employed is reliable and structurally stable, meaning that the model's estimated parameters can be trusted to explain the relationships between variables without significant shifts or structural disturbances during the study period.

G. Discussion

Indonesia's economy, which is primarily dependent on natural resources, is significantly influenced by fluctuations in global oil prices, exchange rates, inflation, and interest rate policies. According to the Mundell-Fleming model, in an open economy like Indonesia's, which is highly reliant on natural resources, shifts in global oil prices can substantially affect the trade balance. These effects, in turn, influence exchange rate movements and inflation levels, ultimately determining the extent to which interest rate policies can stimulate economic growth.

Although economic theory suggests that oil price hikes should induce cost-push inflation (Blanchard & Gali, 2007), the ARDL results reveal that in Indonesia’s context, this relationship is not statistically significant over the long term. This anomaly can be largely attributed to extensive government intervention through fuel subsidies, which act as a buffer against imported inflation (IEA, 2022). In 2025, the government allocated 19,41 million kiloliters (KL) of subsidized fuel—comprising 0,52 million KL of kerosene and 18,89 million KL of diesel—with a total subsidy budget amounting to Rp 26,7 trillion. Future studies could further explore this channel by including a subsidy-adjusted oil price index.

In this study, oil prices were not a significant inflation determinant, consistent with findings by Rostin et al. (2019) and Putri et al. (2024) in Indonesia, also Davari & Kamalian (2018) in Iran. However, other studies such as Lacheheb & Sirag (2019) and (Li & Guo (2022) found that oil price increases had a significant inflationary effect in Algeria and BRICS countries, respectively—often in asymmetric patterns. This suggests that oil-inflation dynamics may vary by subsidy regimes and trade dependencies.

The Rupiah exchange rate against the US dollar exhibits a weak positive relationship with inflation, though this relationship is statistically insignificant. According to Purchasing Power Parity theory, as proposed by Cassel (1921), exchange rates should fluctuate in accordance with differences in price levels between countries. Typically, a depreciation of the rupiah tends to increase import costs, including those of energy products such as oil, which can subsequently exacerbate inflationary pressures. Previous research by Sari (2024) also indicated that exchange rates significantly influence domestic prices, particularly in strategic commodity markets.

Then, interest rates exhibit a positive yet statistically insignificant relationship with inflation in the long term. Based on the IS-LM framework and the Taylor Rule, interest rates should influence inflation through monetary policy mechanisms. Increases in interest rates generally tend to reduce aggregate demand, thereby potentially easing inflationary pressures. However, research by Khoirunissa et al. (2024) indicates that interest rates have a more pronounced effect in the short term than in the long term. In Indonesia, macroprudential policies implemented by Bank Indonesia, such as credit control and open market operations, contribute to a more complex relationship between interest rates and inflation, which does not consistently manifest as statistically significant over the long run.

The lack of long-term statistical significance for oil prices and interest rates may be explained by several institutional and structural factors: First, policy insulation mechanisms such as administered fuel prices dilute the pass-through of international prices to domestic inflation (OECD, 2021). Second, Indonesia’s monetary policy regime has shifted significantly over the study period, from exchange-rate targeting to inflation targeting post-2005 (Bank Indonesia, 2022), introducing non-linear effects that may not be well captured in a linear ARDL model. Third, global supply chain integration and digitalization may have reduced the elasticity of inflation to traditional macroeconomic variables (Forbes et al., 2021).

The short-term model reveals a strong and significant adjustment mechanism, as indicated by the error correction coefficient (-0.172). This suggests that the Indonesian economy is responsive to inflation shocks and adjusts relatively quickly—a dynamic that may reflect the effectiveness of Bank Indonesia's short-term policy instruments, including the 7-day reverse repo rate and liquidity tightening operations. This finding is consistent with the study conducted by Alaskar & AlAli (2024), which posited that inflation often undergoes a short-term correction effect in response to economic policies. Additionally, Kuncoro (2020) revealed that the pattern of inflation correction can occur as a result of price adjustments and responsive monetary policies implemented in the short term.

The impact of global oil prices on inflation in the short term appears to be relatively insignificant. Although rising oil prices have the potential to drive inflation by increasing production and transportation costs, their short-term effect is comparatively limited. This phenomenon may be attributed to price stabilization mechanisms or fuel subsidy policies implemented by the government. As posited by Pan et al. (2024), countries that implement energy subsidies tend to experience a slower transmission of oil price effects on inflation compared to those without such subsidies. Given Indonesia's reliance on imported energy, reforms should prioritize a gradual transition to renewable resources, similar to policy recommendations made for Pakistan by Amjad et al. (2021). Reducing subsidy burdens while maintaining affordability for low-income groups is essential for price stability and fiscal resilience.

The rupiah exchange rate against the US dollar has a positive and significant effect on inflation. In other words, a depreciation of the rupiah tends to trigger an increase in inflation in the short term. When the rupiah weakens, the prices of imported goods become more expensive, which ultimately drives up domestic prices. This finding aligns with the research by Amjad et al. (2021), which indicates that currency depreciation often leads to imported inflation, especially in countries that are heavily dependent on imported goods and raw materials. Furthermore, the study by Astika et al. (2017) also demonstrates that rupiah depreciation has a notably inflationary impact in the short term, primarily through the rise in prices of imported consumer goods and energy.

Interest rates play a crucial role in controlling inflation in the short term. A significant increase in interest rates can effectively restrain inflation, with the effects of such monetary tightening evident in preceding periods and demonstrating strong statistical significance. These findings are consistent with monetarist theory, which posits that high interest rate policies can curb inflation by reducing aggregate demand and slowing credit growth. The study by Nisaâ (2022) found that high short-term interest rate policies can help mitigate inflation volatility driven by external factors, such as fluctuations in exchange rates and changes in oil prices.

IV. CONCLUSION

The findings confirm the existence of a long-run cointegrating relationship among the variables, suggesting that Indonesia's inflation dynamics are structurally linked to both domestic and external macroeconomic conditions.

However, in the long-run analysis, none of the three variables—oil prices, exchange rates, or interest rates—were found to have statistically significant effects on inflation.

This result may be attributed to the buffering effects of government interventions, such as fuel subsidies, managed exchange rate regimes, and inflation-targeting monetary policies, which may have weakened the direct pass-through of global shocks to consumer prices over time.

In contrast, the short-run model reveals several significant relationships. Exchange rate depreciation is shown to have a positive and statistically significant effect on inflation, underscoring Indonesia's vulnerability to imported inflation. Interest rate adjustments by Bank Indonesia demonstrate a strong and significant negative influence on inflation, highlighting the short-term effectiveness of monetary policy as a demand-side control mechanism. Meanwhile, oil prices, despite their volatility, exhibit no statistically significant short-term effect on inflation—again reinforcing the role of energy price controls and subsidies in moderating their transmission to domestic prices.

These findings suggest that Indonesia's inflationary trends are more sensitive to short-term monetary interventions and exchange rate fluctuations, rather than external commodity prices in isolation. Policymakers must therefore strike a balance between short-term stabilization tools and long-term structural reforms to safeguard economic resilience.

V. RECOMMENDATIONS

Based on the findings of this study, several key policy recommendations can be proposed to enhance Indonesia's ability to manage inflation effectively in both the short and long term. First, the significant short-run impact of the exchange rate on inflation highlights the urgent need for stronger exchange rate management. Bank Indonesia should maintain sufficient foreign exchange reserves and, when necessary, conduct strategic interventions in the currency market to stabilize the rupiah. In addition, the government should promote export diversification and reduce the economy's reliance on imported goods, particularly energy and food products, to minimize vulnerability to imported inflation.

Second, the effectiveness of interest rate adjustments in curbing inflation in the short term suggests that monetary policy remains a critical tool. Bank Indonesia should continue to use the 7-day reverse repo rate as its primary instrument to manage inflation expectations and control liquidity. However, it is equally important to ensure policy transparency and consistent communication with financial markets and the public to build trust and improve the transmission of policy signals.

Third, although global oil prices were not found to significantly affect inflation in this study, the result is likely due to Indonesia's extensive energy subsidy programs. These subsidies, while effective in softening short-term shocks, come with significant fiscal costs and may distort market behavior. Therefore, a gradual reform of energy subsidies is recommended, moving toward more targeted subsidies for vulnerable groups and increased investment in alternative and renewable energy sources to support long-term energy security and fiscal sustainability.

Fourth, to improve inflation management, it is essential to modernize the forecasting framework used by policymakers. Traditional linear models may no longer fully capture the complexities of inflation dynamics, especially in a highly integrated global economy. Incorporating nonlinear models such as the Nonlinear ARDL (NARDL) or threshold regressions and hybrid forecasting tools that integrate macroeconomic indicators with market sentiment data could enhance the predictive accuracy of inflation models and inform more responsive policymaking.

Fifth, in the long run, structural reforms are necessary to reduce supply-side bottlenecks and build inflation resilience. This includes strengthening domestic supply chains, increasing the productivity of key sectors such as agriculture and manufacturing, and reducing logistical inefficiencies. A more robust domestic supply base would help cushion the impact of global price shocks and reduce the economy's reliance on imported goods.

Finally, effective inflation management requires better coordination between monetary and fiscal authorities. Monetary policy alone cannot shoulder the responsibility of price stability, especially in a resource-constrained or shock-prone environment. Therefore, a coherent policy mix where fiscal measures such as subsidies, social assistance, and tax incentives are aligned with monetary goals—should be institutionalized. Such a framework will ensure that short-term inflation control does not come at the expense of long-term economic stability and inclusive growth.

VI. REFERENCES

Akaike, H. (1998). Information theory and an extension of the maximum likelihood principle. In *Selected papers of hirotugu akaike* (pp. 199–213). Springer. https://doi.org/10.1007/978-1-4612-1694-0_15

Alaskar, I., & AlAli, M. S. (2024). Macroeconomic Forces Shaping Kuwait's Stock Market: A Time Series Analysis of an Oil-Dependent Economy. *Pakistan Journal of Life and Social Sciences*, *22*, 9145–9156.

Amjad, M. A., Asghar, N., & ur Rehman, H. (2021). Investigating the role of energy prices in enhancing inflation in Pakistan: Fresh insight from asymmetric ARDL model. *Review of Applied Management and Social Sciences*, *4*(4), 811–822. https://doi.org/10.47067/ramss.v4i4.185

Asmara, I. P. W. P., & Suarjaya, A. A. G. (2018). *Pengaruh Variabel Makro Ekonomi terhadap Indek Harga Saham Gabungan*. *7*(3), 1397–1425. https://doi.org/10.24843/EJMUNUD.2018.v7.i03.p010

Astika, M. G., Sumarsono, H., & Sumanto, A. (2017). The Relationship Analysis of World Oil Price, Interest Rate, Exchange Rate and Inflation In Indonesia In The Period of 1986–2015. *Jurnal Ekonomi Dan Studi Pembangunan*, *9*, 1. https://doi.org/10.17977/um002v9i12017p012

Azizah, P. (2023). Pengaruh Pembiayaan Syariah dan Suku Bunga terhadap Inflasi di Indonesia (Pendekatan Error Correction Model). *Jurnal Ilmiah Ekonomi Islam*, *9*(2), 2602–2609. https://doi.org/10.29040/jiei.v9i2.8069

Bank Indonesia. (2022). *Inflation*. Bank Indonesia. https://www.bi.go.id/en/fungsi-utama/moneter/inflasi/Default.aspx

Bhar, R., & Malliaris, A. G. (2011). Oil prices and the impact of the financial crisis of 2007–2009. *Energy Economics*, *33*(6), 1049–1054. https://doi.org/10.1016/j.eneco.2011.01.016

Blanchard, O. J., & Gali, J. (2007). *The Macroeconomic Effects of Oil Shocks: Why are the 2000s so different from the 1970s?* National bureau of economic research Cambridge, Mass., USA. https://doi.org/10.3386/w13368

Brown, R. L., Durbin, J., & Evans, J. M. (1975). Techniques for testing the constancy of regression relationships over time. *Journal of the Royal Statistical Society Series B: Statistical Methodology*, *37*(2), 149–163. https://doi.org/10.1111/j.2517-6161.1975.tb01532.x

Cassel, G. (1921). *Theoretische Sozialökonomie*. C. F. Winter.

Coban, O., & Yussıf, A. (2019). Relationships Between Economic Growth, Foreign Direct Investment and Inflation: ARDL Models Approach for the Case of Ghana. *Eurasian Research Journal*, *1*(2), 7–23.

Davari, H., & Kamalian, A. (2018). Oil Price and Inflation in Iran: Non-Linear ARDL Approach. *International Journal of Energy Economics and Policy*, *8*(3), 295–300.

Fadilla, F., & Aravik, H. (2018). Pandangan Islam dan Pengaruh Kurs, BI Rate terhadap Inflasi. *Jurnal Ecoment Global*, *3*(2), 95–108. https://doi.org/10.35908/jeg.v3i2.478

Farichah, S. A. (2022). Analisis Inflasi di Indonesia: Pendekatan Autoregressive Distributed Lag (ARDL). *Jurnal Cakrawala Ilmiah*, *1*(10), 2467–2484. https://doi.org/10.53625/jcijurnalcakrawalailmiah.v1i10.2577

Forbes, K., Gagnon, J., & Collins, C. G. (2021). *Low inflation bends the Phillips curve around the world*. National Bureau of Economic Research. https://doi.org/10.3386/w29323

Godrikus, D. (2020). Analisis Kemampuan BI7dRR, Fed Rate dan Inflasi Terhadap Indeks Harga Saham Gabungan. *Management and Sustainable Development Journal*, *2*(2), 1–17. https://doi.org/10.46229/msdj.v2i2.172

Greene, W. H. (2018). *Econometric Analysis*. Pearson.

Handika, H., Damajanti, A., & Rosyati, R. (2021). Faktor Penentu Fluktuasi Pergerakan Indeks Harga Saham Gabungan (IHSG) Di Bursa Efek Indonesia (BEI). *Solusi: Jurnal Ilmiah Bidang Ilmu Ekonomi*, *19*(3), 153. https://doi.org/10.26623/slsi.v19i3.3503

Hasanah, L. U., Haryadi, H., & Emilia, E. (2021). Studi Variabel Makroekonomi dan Pengaruhnya terhadap Indeks Harga Saham Sektor Properti dan Real Estate di Bursa Efek Indonesia. *Jurnal Ekonomi Aktual*, *1*(2), 85–98. https://doi.org/10.53867/jea.v1i2.21

Hicks, J. R. (1937). *Mr. Keynes and the "Classics"; A Suggested Interpretation* (Vol. 5, Issue 2).

Hyndman, R. J., & Athanasopoulos, G. (2018). *Forecasting: principles and practice*. OTexts.

IEA. (2022). *Oil Market Report*. https://www.iea.org/reports/oil-market-report-december-2022

Khoirunissa, H. A., Wijaya, A. R., Isnaini, B., & Ferawati, K. (2024). Analisis Faktor-Faktor Penyebab Inflasi di Indonesia Menggunakan Regresi Ridge, LASSO, dan Elastic-Net. *Indonesian Journal of Applied Statistics*, *7*(2), 121–130. https://doi.org/10.13057/ijas.v7i2.96921

Kuncoro, H. (2020). Interest rate policy and exchange rates volatility lessons from Indonesia. *Journal of Central Banking Theory and Practice*, *9*(2), 19–42. https://doi.org/10.2478/jcbtp-2020-0012

Lacheheb, M., & Sirag, A. (2019). Oil price and inflation in Algeria: A nonlinear ARDL approach. *The Quarterly Review of Economics and Finance*, *73*, 217–222. https://doi.org/10.1016/j.qref.2018.12.003

Li, Y., & Guo, J. (2022). The asymmetric impacts of oil price and shocks on inflation in BRICS: a multiple threshold nonlinear ARDL model. *Applied Economics*, *54*(12), 1377–1395. https://doi.org/10.1080/00036846.2021.1976386

Lütkepohl, H. (2005). *New Introduction to Multiple Time Series Analysis*. Springer Science & Business Media.

Mankiw, N. G. (2019). *Macroeconomics*. Worth Publishers.

Mufida, L. L. A., Putri, S. S., Lasmana, T. A., Lubis, F. R. A., & Sukarniati, L. (2023). Analisis Inflasi di Indonesia (1986-2021) dengan Model ARDL. *PROSENAMA*, *3*, 150–161.

Murjani, A. (2019). Short-run and long-run impact of inflation, unemployment, and economic growth towards poverty in Indonesia: ARDL approach. *Jurnal Dinamika Ekonomi Pembangunan*, *2*(1), 15–29. https://doi.org/10.14710/jdep.2.1.15-29

Ningsih, M. M., & Waspada, I. (2018). Pengaruh BI Rate dan Inflasi terhadap Indeks Harga Saham Gabungan. *Jurnal Manajerial*, *3*(5), 239–245. https://doi.org/10.17509/manajerial.v17i2.11664

Nisaâ, M. (2022). The Application of Error Correction Model (ECM) in Assessing the Impact of Exchange, Interest, and Inflation Rates on the Gross Domestic Product of Indonesia. *Muslim Business and Economic Review*, *1*(1), 109–130. https://doi.org/10.56529/mber.v1i1.31

Nkoro, E., & Uko, A. K. (2016). Autoregressive Distributed Lag (ARDL) Cointegration Technique: Application and Interpretation. *Journal of Statistical and Econometric Methods*, *5*(4), 63–91.

Nurhasanah, A. I., & Soekapdjo, S. (2019). Determinasi Volatilitas Kurs Rupiah Terhadap Dolar Amerika. *Jurnal Akuntansi, Ekonomi Dan Manajemen Bisnis*, *7*(1), 1–8. https://doi.org/10.30871/jaemb.v7i1.1145

OECD. (2021). *OECD Economic Surveys INDONESIA*. https://www.oecd.org/en/publications/oecd

-economic-surveys-indonesia-2021_fd7e6249-en.html

Osman, A. M., Ahmed, A. O., Eltahir, M. N., Mohamed, A. S., Shidwan, O. S., & Ghada, M. (2019). Investigating the causes of inflation in Saudi Arabia: an application of autoregressive distributed lag (ARDL) model. *International Journal of Applied Engineering Research*, *14*(21), 3980–3986.

Pahlavani, M., & Rahimi, M. (2009). Sources of Inflation in Iran: An Application of the ARDL Approach. *International Journal of Applied Econometrics and Quantitative Studies*, *6*(1), 61–76.

Pan, C., Huang, Y., & Lee, C.-C. (2024). The dynamic effects of oil supply shock on China: Evidence from the TVP-Proxy-VAR approach. *Socio-Economic Planning Sciences*, *95*, 102026. https://doi.org/10.1016/j.seps.2024.102026

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, *16*(3), 289–326. https://doi.org/10.1002/jae.616

Porter, D. C., & Gujarati, D. N. (2008). *Basic Econometrics*. McGraw-Hill Education.

Pratama, N. K., & Hutajulu, D. M. (2022). Pengaruh Harga Bahan Kebutuhan Pokok Terhadap Inflasi di Kota Sorong. *Jurnal Wira Ekonomi Mikroskil*, *12*(1), 9–20. https://doi.org/10.55601/jwem.v12i1.821

Putri, D. I., Arintoko, A., Kadarwati, N., & Firdauzi, I. (2024). Determinants of Inflation in Indonesia: Do Changes in World Oil Prices Matter? *Journal of Economics Research and Social Sciences*, *8*(2), 222–231. https://doi.org/10.18196/jerss.v8i2.22626

Rostin, R., Adam, P., Nur, M., Saenong, Z., Suriadi, L. O., & Baso, J. N. (2019). The effect of crude oil prices on inflation, interest rates and economic growth in Indonesia. *International Journal of Energy Economics and Policy*, *9*(5), 14–19. https://doi.org/10.32479/ijeep.7829

Sari, D. M. (2024). Analysis of Exports, Inflation, Exchange Rates, Interest Rates on Foreign Exchange Reserves: ARDL Approach. *Journal of Economics, Finance And Management Studies*, *07*(06). https://doi.org/10.47191/jefms/v7-i6-18

Setiartiti, L., & Hapsari, Y. (2019). The determinants of inflation rate in Indonesia. *Jurnal Ekonomi & Studi Pembangunan*, *20*(1), 112–123. https://doi.org/10.18196/jesp.20.1.5016

Situngkir, T. L., & Batu, R. L. (2020). Pengaruh Inflasi dan nilai tukar terhadap indeks harga saham LQ45. *Jurnal Sentralisasi*, *9*(1), 36–44. https://doi.org/10.33506/sl.v9i1.708

Sudirman, S., & Fitrianti, F. (2022). Pengaruh Inflasi dan Tingkat Suku Bunga Terhadap Tingkat Bagi Hasil Deposito Mudharabah Pada Bank Umum Syariah di Indonesia. *Al-Mashrafiyah: Jurnal Ekonomi, Keuangan, Dan Perbankan Syariah*, *6*(2), 37–50.

Taylor, J. B. (1993). *Discretion versus policy rules in practice, 'Carnegie-Rochester Conference Series on Public Policy', No. 39*. North-Holland. https://doi.org/10.1016/0167-2231(93)90009-l

Tinoco-Zermeño, M. Á., Venegas-Martínez, F., & Torres-Preciado, V. H. (2014). Growth, bank credit, and inflation in Mexico: evidence from an ARDL-bounds testing approach. *Latin American Economic Review*, *23*, 1–22. https://doi.org/10.1007/s40503-014-0008-0