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ANALYSIS OF THE IMPACT OF MONEY SUPPLY, FOREIGN DEBT, INTEREST RATES, AND BANK CREDIT ON INFLATION IN INDONESIA (2022–2024)

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ABSTRACT

This study aims to examine the impact of the money supply, foreign debt, interest rates, and bank credit on inflation in Indonesia during the period 2022–2024. Inflation is a crucial indicator in maintaining macroeconomic stability because its dynamics are influenced by both monetary and external factors. A quantitative approach using the causal associative method is applied in this study. Secondary data in the form of monthly time series were used, comprising a total of 36 observations sourced from the Badan Pusat Statistik and Bank Indonesia. The Ordinary Least Squares (OLS) multiple linear regression analysis method was used, accompanied by the HAC Newey West standard error correction to address heteroscedasticity and autocorrelation. The research results indicate that, partially, the money supply has a positive effect, though not statistically significant, on inflation. Meanwhile, foreign debt exhibits a significant negative effect on inflation, indicating that an increase in external debt during the study period is associated with a decline in inflation through financing support and macroeconomic stability. Interest rates and bank credit each have a positive but statistically insignificant effect on inflation. Simultaneously, all four independent variables were found to have a significant effect on inflation. These findings suggest that Indonesia's inflation during the 2022–2024 period was influenced by a combination of monetary and financial factors acting in concert.

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INTRODUCTION

Inflation is one of the key indicators in macroeconomics that reflects a general and sustained increase in the prices of goods and services over a specific period. Inflation stability is a critical concern for every country as it is directly linked to household purchasing power, financial system stability, investment levels, and national economic growth (Mankiw, 2019). Consequently, inflation control is a top priority in both monetary and fiscal policies, whether in developed or developing nations, including Indonesia.

In recent years, inflation dynamics in Indonesia have shown quite volatile trends. According to Bank Indonesia data, Indonesia's inflation rate in September 2022 reached 5.95% (year-on-year/YoY), marking one of the highest inflation rates since the COVID-19 pandemic. This situation was influenced by rising fuel prices, global food and energy price pressures, the weakening of the rupiah exchange rate, and disruptions in international supply chains due to global economic uncertainty (Bank Indonesia, 2022). However, from the second half of 2023 through 2024, inflation began to show a downward trend and remained relatively under control in line with Bank Indonesia's targets. This stability reflects the government's efforts to control inflation through various monetary and fiscal policies implemented.

According to a publication by the Badan Pusat Statistik (BPS), the 2022–2024 period marked a critical phase in the nation's post-pandemic economic recovery. During this time, the government and monetary authorities implemented various policies to maintain economic stability while fostering growth. One of the policies implemented was monetary easing through increased liquidity and adjustments to the benchmark interest rate to support the recovery of economic activity. The impact of this policy is evident in the increase in the money supply in Indonesia. Based on Bank Indonesia's monetary aggregate data, the money supply (M2) has increased gradually during the economic recovery period.

An increase in the money supply is fundamentally closely linked to inflation. The quantity theory of money explains that faster growth in the money supply compared to the growth of goods and services output can lead to general price increases. This situation indicates that monetary expansion policies aimed at accelerating economic recovery have the potential to create inflationary pressure if not balanced by effective control (Tamara et al., 2024).

In addition to the money supply, another factor of concern is foreign debt. During the economic recovery period, the Indonesian government increased financing through foreign debt to support pandemic response efforts, national development, and maintain fiscal stability. Data indicates that Indonesia's foreign debt position has increased year-over-year during the 2022–2024 period. This rise in foreign debt may impact domestic economic conditions, particularly through increased liquidity and pressure on the rupiah exchange rate, which could ultimately influence inflation (Pratomo & Fadjar, 2024).

On the other hand, Bank Indonesia has also adjusted its interest rate policy to mitigate inflationary pressures arising from global volatility. Saraswati & Wahyudi (2018) note that the increase in the benchmark interest rate was implemented as a monetary tightening measure to maintain price stability and control public inflation expectations. Interest rate policy plays a crucial role in the monetary transmission mechanism as it influences bank deposit and loan interest rates. When interest rates rise, borrowing costs increase, leading to a decline in credit demand. Conversely, a decrease in interest rates can boost credit demand and economic activity, which may potentially drive up inflation.

Within this mechanism, the banking sector plays a strategic role as an intermediary institution that channels funds to the public through bank credit. Increased credit disbursement can stimulate consumption and investment, thereby accelerating economic growth. However, an increase in credit that is not matched by production capacity can also put upward pressure on

the prices of goods and services (Warjiyo & Juhro, 2022). From this perspective, the banking sector is a key variable in explaining inflation dynamics in Indonesia.
Previous studies have examined the relationship between the money supply, foreign debt, interest rates, and bank credit on inflation. However, the results of these studies still show differing findings, and few have specifically addressed Indonesia's economic conditions during the post-pandemic recovery period of 2022–2024. Yet, this period possesses distinct economic characteristics compared to previous periods, as it is influenced by the transition from a crisis phase toward national economic stabilization.

Given these conditions, an empirical study is needed to explain how the money supply, external debt, interest rates, and bank credit affect inflation in Indonesia during the 2022–2024 period. This study is expected to provide a more comprehensive understanding of the factors influencing inflation and serve as a basis for formulating more effective and sustainable economic policies.

RESEARCH METHODOLOGY

This study falls under the category of quantitative research, with the objective of testing the hypotheses regarding the established variables. This study utilizes a dataset of Indonesian macroeconomic data in the form of monthly time series covering the period from January 2022 to December 2024, resulting in 36 data points. All data were obtained from the official repositories of the Badan Pusat Statistik (BPS) and Bank Indonesia, and are classified as secondary data. The data processing and econometric analysis in this study were conducted using the EViews application. The regression equation used in this study is formulated as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

Notes:

Y	= Inflation
α	= Constant
$\beta_1, \beta_2, \beta_3, \beta_4$	= Regression coefficients
X_1	= Money Supply
X_2	= Foreign debt
X_3	= Interest Rate
X_4	= Bank Credit
e	= Error term

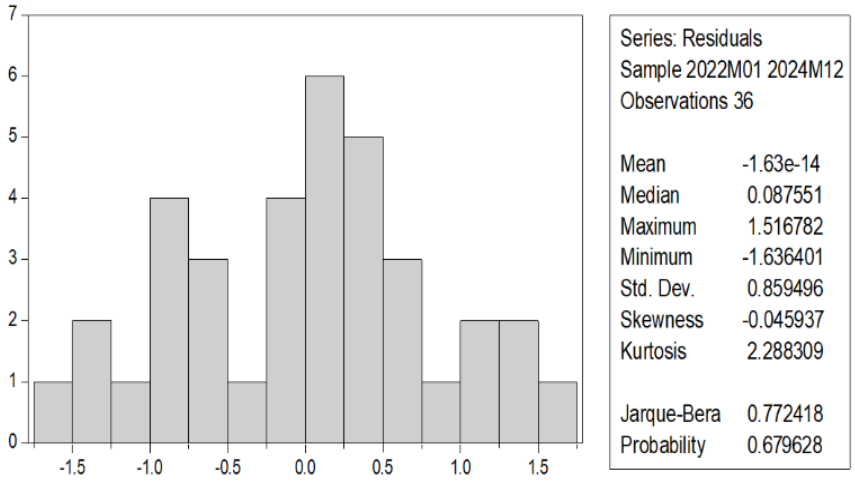
Next, to ensure that the regression model met the necessary assumptions, a series of classical assumption tests were conducted. Once all assumption tests were satisfied, hypothesis testing was performed using the coefficient of determination (R^2), the simultaneous significance test (F-test), and the partial significance test (t-test) to assess the model's ability to explain the dependent variable.

RESULTS AND DISCUSSION

Tests of Classical Assumptions

Normality Test (Jarque Bera)

The normality test was conducted using the Jarque Bera Normality Test, in which the model is considered to satisfy the normality assumption if the Jarque–Bera probability value is > 0.05, with the following results:



Source: Data processed using Eviews 10

Figure 1. Jarque Bera histogram

Based on Figure 1 above, the Jarque Bera statistic is 0,679628, which is greater than 0,05. Therefore, the residuals in the regression model are considered to be normally distributed and thus satisfy the assumption of normality.

Multicollinearity Test

The multicollinearity test in this study was conducted by examining the Variance Inflation Factor (VIF) values, with the following results:

Table 1. Multicollinearity Test Results

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	11441.18	493831.5	NA
LNJUB	125.4979	1377810	15.80301
LNULN	104.8083	754269.5	2.753117
BIRATE	0.205242	258.6575	9.292819
KREDIT	0.018923	86.98704	2.444648

Source: Data processed using Eviews 10

Based on the VIF test results, the LNJUB variable has a Centered VIF value of 15.80301, which exceeds the general threshold of 10, indicating a fairly strong presence of multicollinearity. This suggests a high degree of correlation between LNJUB and the other independent variables, particularly with BIRATE, as shown in the correlation matrix. Methodologically, multicollinearity does not cause regression coefficient estimates to be biased, but it can increase the variance of those coefficients, thereby increasing the standard error. Consequently, the t-statistic becomes smaller and may cause variables that are actually influential to appear statistically insignificant. To support the analysis, a correlation matrix among the independent variables is presented in Table 2. The correlation matrix is used to identify pairs of independent variables that have the strongest relationship.

Table 2. Correlation Matrix of Independent

Variable	LNJUB	LNULN	BIRATE	KREDIT
LNJUB	1.000	0.432245	0.883639	0.622992
LNULN	0.432245	1.000	0.131716	0.028303
BIRATE	0.883639	0.131716	1.000	0.48797
KREDIT	0.622992	0.028303	0.48797	1.000

Source: Data processed using Eviews 10

Based on Table 2, the pair of variables with the highest correlation is LNJUB and BIRATE, with a correlation coefficient of 0.8836, indicating a very strong relationship. The high correlation between these two variables is one of the reasons for the high VIF value for LNJUB. Nevertheless, the LNJUB variable was retained because it has a strong theoretical foundation in explaining inflation, particularly within the monetary theory framework, which states that the money supply is the primary determinant of inflation. Additionally, this study focuses more on testing causal relationships based on theory (Theory Driven Model) rather than on predictive purposes.

Therefore, the presence of multicollinearity in this study is accepted on the grounds that the model remains capable of providing unbiased estimates. Although there are indications of fairly strong multicollinearity in the LNJUB variable (Centered VIF > 10), this variable will still be retained in the model using a theory driven approach. However, the presence of multicollinearity can partially affect the accuracy of the estimates; thus, the interpretation of the t-test results is conducted with caution, placing greater emphasis on the direction of the relationship (sign) and the results of the simultaneous tests.

Heteroscedasticity Test

In this study, the test for heteroscedasticity focused on the use of the White Heteroscedasticity Test. The model was deemed to exhibit heteroscedasticity if the Chi-Square probability value (Obs*R-squared) was < 0.05. The results are as follows:

Table 3. Heteroscedasticity Test Results

Heteroskedasticity Test: White	Value
F-statistic	2.877060

Prob. F (11,24)	0.0147
Obs*R-squared	20.47374
Prob. Chi-Square(11)	0.0393
Scaled explained SS	9.779249
Prob. Chi-Square(11)	0.5503

Source: Data processed using Eviews 10

Based on Table 3, the results of the White Heteroskedasticity Test show that the Chi-Square Probability (Obs*R-squared) value is 0.0393, which is less than 0.05. This indicates that heteroskedasticity is present in the regression model, meaning that the assumption of homoskedasticity is not met. Consequently, the OLS standard error may be inconsistent, and the significance test for the regression coefficients needs to be adjusted.

Autocorrelation Test

The autocorrelation test was conducted to determine whether there is autocorrelation among residuals across periods in the time series data model. The results of the study are as follows:

Table 4. Autocorrelation Test Results

Breusch-Godfrey Serial Correlation LM Test	Value
F-statistic	32.51196
Prob. F(4,27)	0.0000
Obs*R-squared	29.81080
Prob. Chi-Square(4)	0.0000

Source: Data processed using Eviews 10

The results of the autocorrelation test using the Breusch-Godfrey test indicate that the Chi-Square Probability (Obs*R-squared) value is 0.0000, which is less than 0.05. This indicates that there is autocorrelation in the model residuals, meaning that the assumption of no autocorrelation is not met. Based on the results of the classical assumption tests; multicollinearity, heteroscedasticity, and autocorrelation were found to violate the assumptions. To address these issues in the model, the Heteroscedasticity and Autocorrelation Consistent (HAC) correction using the Newey West approach was applied. The Newey West HAC method does not alter the regression coefficients estimated using Ordinary Least Squares (OLS), but adjusts the covariance matrix to produce robust standard errors that account for the simultaneous presence of heteroscedasticity and autocorrelation. Consequently, the resulting t-statistics and significance tests are reliable and can serve as a basis for drawing research conclusions.

Results of Multiple Linear Regression Analysis (OLS)

Multiple linear regression analysis was used to test the relationships among money supply (LNJUB), foreign debt (LNULN), interest rate (BIRATE) and bank credit (KREDIT) on the inflation (INF). The results of the study are as follows:

Table 5. Multiple Linear Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	102.5921	106.9634	0.959132	0.3449
LNJUB	13.34661	11.20258	1.191386	0.2425
LNULN	-24.32699	10.23759	-2.376241	0.0239
BIRATE	0.205230	0.453036	0.453011	0.6537
KREDIT	0.096470	0.137561	0.701284	0.4884

R-squared	0.579778	Mean dependent var	3.398333
Adjusted R-squared	0.525556	S.D. dependent var	1.325882
S.E. of regression	0.913266	Akaike info criterion	2.784667
Sum squared resid	25.85569	Schwarz criterion	3.004600
Log likelihood	-45.12400	Hannan-Quinn criter.	2.861429
F-statistic	10.69265	Durbin-Watson stat	0.261308
Prob(F-statistic)	0.000015		

Source: Data processed using Eviews 10

Based on the findings of the analysis in Table 5, the OLS results show that the LNULN variable has a negative and significant coefficient at the 5% significance level, while LNJUB, BIRATE, and KREDIT are not significant in their partial effects because their p-values are > 0.05. The R-squared value of approximately 0.5798 indicates that roughly 57.98% of the variation in inflation can be explained by the combination of LNJUB, LNULN, BIRATE, and KREDIT in the model. However, given the presence of heteroscedasticity and autocorrelation, these OLS results serve only as a preliminary basis before standard error corrections are applied.

Additionally, the OLS regression output shows a Durbin Watson (DW) value of 0.261308, which is below 2. A Durbin–Watson value closer to 0 indicates the presence of very strong positive autocorrelation in the model's residuals, consistent with the Breusch–Godfrey test results showing a Prob. Chi-Square (Obs*R-squared) value of 0.0000 (< 0.05). Thus, it can be concluded that the assumption of no autocorrelation is not met in the initial OLS model, making the use of the Newey West HAC standard error correction essential to ensure that the t-tests and F-tests used in the analysis are not distorted by autocorrelation issues.

Furthermore, from an economic perspective, the presence of autocorrelation in this model indicates that inflation exhibits persistence, where inflation rates from previous periods influence current period inflation. This reflects that price adjustments in the economy do not occur immediately but rather gradually (with a lag), whether due to monetary policy, economic agents' expectations, or external factors such as global commodity prices.

Estimation Results with Standard Error: HAC (Newey West)

After adjusting for heteroskedasticity and autocorrelation using the Newey West HAC standard error, the regression coefficients remained the same as those obtained from the OLS estimates; however, the standard errors, t-statistics, and p-values were adjusted to make the results more robust to heteroskedasticity and autocorrelation. The results of the regression estimates using the HAC standard error are shown in Table 6.

Table 6. Results with Standard Error: HAC (Newey West)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	102.5921	190.8840	0.537458	0.5948
LNJUB	13.34661	15.14031	0.881528	0.3848
LNULN	-24.32699	9.161235	-2.655427	0.0124
BIRATE	0.205230	0.575109	0.356855	0.7236
KREDIT	0.096470	0.162056	0.595284	0.5560
R-squared	0.579778	Mean dependent var		3.398333
Adjusted R-squared	0.525556	S.D. dependent var		1.325882
S.E. of regression	0.913266	Akaike info criterion		2.784667
Sum squared resid	25.85569	Schwarz criterion		3.004600
Log likelihood	-45.12400	Hannan-Quinn criter.		2.861429
F-statistic	10.69265	Durbin-Watson stat		0.261308
Prob(F-statistic)	0.000015	Wald F-statistic		6.781221
Prob(Wald F-statistic)	0.000483			

Source: Data processed using Eviews 10

Based on Table 6, the LNULN variable continues to indicate a significant negative effect on inflation, with a coefficient of approximately -24.32699 and a p-value of 0.0124, which is less than 0.05. This suggests that an increase in foreign debt is associated with a decrease in inflation during the 2022–2024 period, after accounting for the HAC correction. Meanwhile, the variables LNJUB, BIRATE, and KREDIT have p-values above 0.05 and are therefore not statistically significant on their own. Simultaneous testing using the Wald F-statistic yielded a value of 6.781221 with a probability of 0.000483 (< 0.05). This result confirms that the four variables LNJUB, LNULN, BIRATE, and KREDIT collectively exert a significant influence on Indonesia's inflation dynamics during the observation period. Therefore, the regression results used in drawing the conclusions of this study are the estimates with the Newey West HAC standard error, as they provide more robust estimates against violations of heteroscedasticity and autocorrelation.

DISCUSSION

The Effect of Money Supply (LNJUB) on Inflation

The natural logarithm of the money supply (LNJUB) has a positive coefficient of 13.34661, indicating that a 1% increase in the money supply has the potential to raise inflation by 0.1334 units (ceteris paribus). However, this coefficient does not reach the threshold of statistical significance ($p > 0.05$), so the empirical evidence to confirm a causal relationship between the money supply and inflation remains inconclusive during the observation period. These results suggest that during the study period, an increase in the money supply was not strongly followed by an increase in inflation. Research by Muhson (2015) aligns with these findings, stating that the relationship between the money supply and inflation is not always significant, whereas Ningsih & Kristiyanti (2018) and Kurnia (2017) found a significant effect. Economically, this may occur because the increase in liquidity during the study period was offset by liquidity absorption, improvements on the supply side, and post pandemic normalization.

The Effect of Foreign debt (LNULN) on Inflation

The foreign debt (LNULN) coefficient is negative at -24.32699, meaning that a 1% increase in foreign debt reduces inflation by 0.2432 units (ceteris paribus). This result is significant at the 5% level, indicating that foreign debt influences inflation during the study period. This finding aligns with Todaro (2006) and supports the results of Rangkuty (2019) that foreign debt can contribute to macroeconomic stability if managed productively. Economically, additional external financing during the study period is believed to have helped maintain foreign exchange reserves, stabilize the exchange rate, and support production capacity.

The Effect of the Interest Rate (BIRATE) on Inflation

Estimation results using the HAC standard error indicate that the coefficient for the interest rate (BIRATE) is positive at approximately 0.20523 but is not statistically significant for inflation; thus, changes in the BI-7 Day Reverse Repo Rate during 2022–2024 are not yet considered to have a strong impact on inflation in the model used. These results are consistent with Ningsih & Kristiyanti (2018), but differ from Beureukat (2022), who found an effect of interest rates on prices. Economically, the response of inflation to interest rates appears to be constrained by policy lags, commodity price shocks, and supply-side recovery.

The Effect of Bank Credit (KREDIT) on Inflation

The coefficient for bank credit (KREDIT) is positive at approximately 0.09647 but is not statistically significant for inflation, although theoretically, an increase in consumer credit and working capital loans could boost aggregate demand and prices. Empirically, this finding differs from the research by Firmansyah (2019) and Warjiyo & Juhro (2022) but can be explained because credit disbursement during the recovery period was directed more toward productive sectors and conducted with a principle of prudence. Thus, the impact of credit on price increases is relatively limited.

The Simultaneous Effects of Money Supply (LNJUB), Foreign debt (LNULN), Interest Rate (BIRATE), Bank Credit (KREDIT) on Inflation

A simultaneous test using the Wald F-statistic indicates that LNJUB, LNULN, BIRATE, and KREDIT collectively have a significant effect on inflation at the 5% confidence level. These results confirm that Indonesia's inflation during the 2022–2024 period is influenced by a combination of monetary factors, not just a single variable. Economically, this finding highlights the need for coordinated policies regarding liquidity, interest rates, foreign debt, and bank credit to maintain price stability.

CONCLUSIONS

Based on secondary data comprising a total of 36 observations from the Badan Pusat Statistik and Bank Indonesia, the research findings indicate that, when considered individually, the money supply has a positive but statistically insignificant effect on inflation. Meanwhile, foreign debt exhibits a significant negative effect on inflation, suggesting that an increase in foreign debt during the study period is associated with a decline in inflation through financing

support and macroeconomic stability. Interest rate and bank credit each have a positive but statistically insignificant effect on inflation. Simultaneously, all four independent variables were found to have a significant effect on inflation.

It is recommended that the government and monetary authorities continue to strengthen policy coordination in maintaining inflation stability through the management of the money supply, interest rate regulation, and oversight of bank credit growth. The government also needs to ensure that the use of foreign debt is directed toward productive sectors capable of enhancing national economic capacity so as not to create fiscal risks in the future. In addition, the banking sector is expected to continue applying the principle of prudence in lending so that economic growth can proceed in a balanced manner without triggering excessive inflationary pressure. For future research, it is recommended to extend the observation period, expand the number of variables such as exchange rates and international commodity prices, and use more dynamic analytical models so that the relationship between monetary variables and inflation can be analyzed in greater depth.

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