

## ***The Effect Of Electronic Money And Bi-Rate On Inflation In Indonesia***

### **Pengaruh Uang Elektronik, Bi-Rate Terhadap Inflasi Di Indonesia**

Sinta Yulyanti<sup>1</sup>, Rafli Ismail<sup>2</sup>

Universitas Islam Riau<sup>1,2</sup>

[sintayulyanti@eco.uir.ac.id](mailto:sintayulyanti@eco.uir.ac.id)<sup>1</sup>, [rafliismail@student.uir.ac.id](mailto:rafliismail@student.uir.ac.id)<sup>2</sup>

*\*Corresponding Author*

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#### **ABSTRACT**

*This study aims to analyze the effect of electronic money and the BI-Rate on inflation in Indonesia. The background of this research is the increasing use of electronic money in economic transactions by society, as well as the role of the BI-Rate as a monetary policy instrument used by Bank Indonesia to control inflation. This study employs a quantitative method with an Error Correction Model (ECM) approach to examine the long-term and short-term relationships among the variables. The data used in this research are secondary annual data from 2009 to 2023, obtained from Bank Indonesia and the Central Statistics Agency. The results indicate that, partially, electronic money affects inflation but not significantly, while the BI-Rate has a positive and significant effect on inflation. Simultaneously, both variables significantly influence inflation in Indonesia. These findings imply that although electronic money facilitates transactions, its impact on inflation control remains limited, whereas the BI-Rate continues to serve as the main instrument in controlling national inflation.*

**Keywords:** *Electronic Money, BI-Rate, Inflation*

#### **ABSTRAK**

Penelitian ini bertujuan untuk menganalisis pengaruh uang elektronik dan BI-Rate terhadap inflasi di Indonesia. Latar belakang penelitian ini adalah meningkatnya penggunaan uang elektronik dalam transaksi ekonomi oleh masyarakat, serta peran BI-Rate sebagai alat kebijakan moneter yang digunakan oleh Bank Indonesia untuk mengendalikan inflasi. Penelitian ini menggunakan metode kuantitatif dengan pendekatan Model Koreksi Kesalahan (ECM) untuk menganalisis hubungan jangka panjang dan jangka pendek antara variabel-variabel tersebut. Data yang digunakan dalam penelitian ini adalah data tahunan sekunder dari tahun 2009 hingga 2023, yang diperoleh dari Bank Indonesia dan Badan Pusat Statistik. Hasil penelitian menunjukkan bahwa, secara parsial, uang elektronik mempengaruhi inflasi namun tidak signifikan, sementara BI-Rate memiliki pengaruh positif dan signifikan terhadap inflasi. Secara bersamaan, kedua variabel tersebut secara signifikan mempengaruhi inflasi di Indonesia. Temuan ini menunjukkan bahwa meskipun uang elektronik memudahkan transaksi, dampaknya terhadap pengendalian inflasi tetap terbatas, sedangkan BI-Rate tetap menjadi alat utama dalam mengendalikan inflasi nasional.

**Kata kunci:** Uang Elektronik, BI-Rate, Inflasi

#### **1. Introduction**

The development of information technology has driven a major transformation in the payment system in Indonesia. Bank Indonesia, as the payment system authority, has recorded a rapid growth in the use of electronic money (e-money) since the issuance of Bank Indonesia Regulation No.11/12/PBI/2009. Electronic money has become an alternative means of payment that is efficient, secure, and practical, particularly with the increasing use of smartphones in daily life. Along with this trend, the emergence of a cashless society has also transformed people's economic behavior, which potentially influences the money supply and the inflation rate.

Inflation is one of the key indicators in assessing a country's economic stability. Bank Indonesia employs the BI-Rate as its main monetary policy instrument to control inflation. Changes in the BI-Rate are believed to influence consumption and savings behavior, in line with classical and Keynesian economic theories. On the other hand, the growing use of e-money is

also assumed to have an impact on inflation, as it accelerates the circulation of money in the economy.

Several previous studies have shown that the relationship between the BI-Rate and inflation is significant (Zunaitin, 2015), while the effect of e-money on inflation is positive but not significant (Ady, 2016). However, simultaneously, both variables have been proven to affect inflation in Indonesia. For instance, Eliyan Zunaitin's research indicates that the BI-Rate has a positive and significant effect on inflation in Indonesia. The findings suggest that monetary policy through the BI-Rate implemented by Bank Indonesia is effective in controlling inflation and aligns with the targeted inflation rate. According to classical economic views, a higher interest rate encourages households to reduce consumption levels. Classical theory explains that interest rates are a function of savings; the higher the interest rate, the greater the incentive to save. Increased savings consequently reduce consumption, which eventually leads to a decline in inflation (Nopirin, 2007; Mankiw, 2007).

As public awareness grows regarding the importance of efficiency and sustainability in economic activities, there is a shift toward minimizing the use of cash and transitioning to digital transactions. The use of e-money not only provides convenience but also supports efficiency in financial management for both financial institutions and the public. This transition can be seen as part of the broader move toward a more sustainable and environmentally friendly digital economy.

From the perspective of Green Theory, the use of e-money contributes to reducing the consumption of natural resources such as paper and metal, which are required for the production of physical money. The processes of printing, distributing, and managing cash physically consume energy and generate carbon emissions. Therefore, the transition to digital payment systems, such as e-money, can be viewed as a small yet significant step in supporting environmentally conscious economic development. Accordingly, financial and monetary policies should not only be examined from an economic perspective but also from their ecological impact.

Furthermore, the increasing adoption of e-money also has implications for inflation control. The acceleration of money circulation through electronic platforms may affect the money supply and the dynamics of public demand for goods and services. Hence, it is crucial to analyze how the interaction between the BI-Rate as a monetary instrument and e-money as a payment system innovation affects inflation within the macroeconomic framework, while also considering economic sustainability in line with the principles of the Green Economy.

## 2. Research Methodology

This study employs a quantitative approach using secondary time series data obtained from the official websites of Bank Indonesia and the Central Statistics Agency (BPS). The main objective of this research is to analyze the effect of electronic money transactions and the BI-Rate on inflation in Indonesia.

The variables used in this study consist of inflation as the dependent variable (%), while electronic money (Rp) and the BI-Rate (%) serve as the independent variables. The data analysis technique applied is the Error Correction Model (ECM), which is used to examine both short-term and long-term relationships among the variables. Data processing and analysis were carried out using EViews software.

In applying the ECM method, the following steps are conducted:

### 1. Stationarity Test (Unit Root Test).

The unit root test is a statistical technique used to examine whether a time series is stationary or non-stationary. A series is considered stationary if its statistical properties do not

vary over time. In this study, the stationarity test is carried out using the Augmented Dickey-Fuller (ADF) test. The general form of the ADF equation is expressed as follows:

$$\Delta Y_t = \gamma Y_{t-1} + \sum_{i=2}^p \beta_i \Delta Y_{t-i+1} + e_t \dots \dots \dots (1)$$

$$\Delta Y_t = \alpha_0 + \gamma Y_{t-1} + \sum_{i=2}^p \beta_i \Delta Y_{t-i+1} + e_t \dots \dots \dots (2)$$

$$\Delta Y_t = \alpha_0 + \alpha_1 T + \gamma Y_{t-1} + \sum_{i=2}^p \beta_i \Delta Y_{t-i+1} + e_t \dots \dots \dots (3)$$

## 2. Degree of Integration Test

The degree of integration test is a statistical technique used to determine the level of differencing required to make a time series stationary. This test identifies whether a variable becomes stationary after being differenced at a certain order, such as first differencing (I(1)) or second differencing (I(2)). In this study, the degree of integration test is carried out using the Dickey-Fuller (DF) test.

$$\Delta y_t = b_1 \Delta x_t - \lambda (y_{t-1} - \beta_0 - \beta_1 x_{t-1}) + e_t, \text{ dimana } e_t; 0 < \lambda < 1$$

## 3. Cointegration Test

The cointegration test is used as an initial indication of whether the model possesses a long-term relationship (cointegration relation). This test is carried out by generating residuals obtained through regressing the independent variables on the dependent variable using the Ordinary Least Squares (OLS) method (Dwi Widiarsih & Reza Romanda). Cointegration testing is a continuation of the stationarity test.

The most commonly applied cointegration tests include the Engle-Granger (EG) test, the Augmented Engle-Granger (AEG) test, and the Cointegrating Regression Durbin-Watson (CRDW) test. Importantly, the variables used must be integrated at the same order.

$$Y_t = \beta_0 + \beta_1 LNUE_t + \beta_2 LNJOB_t + e_t (3.1)$$

From the regression equation above, the residual error term is saved. The next step is to construct an autoregressive model of the residuals based on the following equations:

$$\Delta e_t = \beta_1 e_{t-1} \dots \dots \dots (3.2)$$

$$\Delta e_t = \beta_1 e_{t-1} + \sum_{i=2}^m a_i \Delta e_{t-i+1} \dots \dots \dots (3.3)$$

Hypotheses:

- $H_0$ : There is no cointegration
- $H_a$ : There is cointegration

Based on the OLS regression results in equation (3.1), the calculated CDR value is obtained and then compared with the critical value of CDR from the table. Meanwhile, from equations (3.2) and (3.3), the calculated EG and AEG values are obtained, which are subsequently compared with the critical values of DF and ADF from the table.

## 1. Error Correction Model (ECM)

The Error Correction Model is used to examine the short-run relationship between the dependent and independent variables. The ECM is a technique that corrects short-run disequilibrium toward long-run equilibrium (Sargan, Engle, and Granger). The long-run equation model can be formulated as follows:

$$Y_t = \beta_0 + \beta_1 \ln UE_t + \beta_2 \ln BIRate_t + e_t \dots \dots \dots$$

Dimana:

$Y_t$  : Inflation (%)

$\beta_0$  : Constant

$\beta_1 \beta_2$  : Coefficients

$X_{1t}$  : Electronic Money (in billion Rupiah)

$X_{2t}$  : BI-Rate (%)

$e_t$  : Error term / Residual

For the short-run regression equation of the ECM model, it can be expressed as follows:

$$\Delta Y_t = \beta_0 + \beta_1 \Delta UE_t + \beta_2 \Delta BI - Rate_t + \beta_3 ECT(-1)$$

Dimana:

$\Delta$  : Change (difference operator)

$\beta_1 \dots \beta_3$  : Coefficients

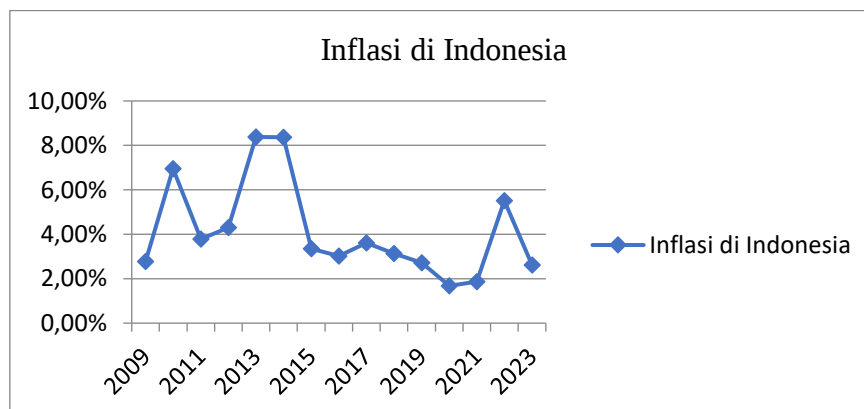
$e_t$  : Residual

ECT : *Error Correction Term*

### 3. Results and Discussion

Indonesia is the largest archipelagic country in the world, located in the tropical region of Southeast Asia, with a land area of 1.9 million km<sup>2</sup> and more than 17,000 islands. This geographical position makes Indonesia both strategically important and vulnerable to global dynamics, in terms of trade as well as finance. Currently, Indonesia consists of 38 provinces with a large population that is unevenly distributed, thereby supporting the potential utilization of digital financial technologies.

One of the financial innovations that has grown rapidly is electronic money (e-money). Since its introduction in 2009, the value of e-money transactions has increased significantly, from IDR 76.7 billion in 2008 to IDR 47.2 trillion in 2019. E-money offers various benefits such as transaction efficiency, reduction in cash usage, and enhancement of financial inclusion.



On the other hand, inflation in Indonesia has shown considerable fluctuations. For example, in 2009 inflation reached 8.38% due to the global crisis, while in 2020 it declined to 1.68% as a result of the COVID-19 pandemic. Both excessive and excessively low inflation may hinder economic growth, thus its control becomes the primary focus of monetary policy. The main instrument used by Bank Indonesia to maintain price stability is the policy interest rate, namely the BI-Rate (and since 2016, the BI 7-Day Reverse Repo Rate). During the period 2008–2023, the highest BI-Rate was recorded at 9.25% in 2008, while the lowest was 3.5% in 2021. This instrument serves to control inflation, influence market liquidity, and strengthen the effectiveness of monetary policy transmission.

This study aims to analyze the effect of electronic money and the BI-Rate on inflation in Indonesia. The analysis was conducted using time series data from 2008 to 2023 with the Error Correction Model (ECM) method. Prior to ECM estimation, a stationarity test was performed on each variable. The results indicated that all variables were stationary at the first difference level, which allowed the model to proceed to the cointegration test.

The Engle-Granger cointegration test revealed a long-term relationship among inflation, electronic money, and the BI-Rate. ECM estimation showed that in the short run, changes in

electronic money had a negative and significant effect on inflation, while the BI-Rate had a positive but insignificant effect. In the long run, electronic money continued to have a negative and significant effect on inflation, indicating that higher electronic money transactions could help suppress inflationary pressures. Meanwhile, the BI-Rate in the long run showed a significant negative effect on inflation, consistent with monetary theory that interest rates can be used to reduce inflation.

The error correction term (ECM coefficient) was also significant and negative, which means that the model is able to return to long-run equilibrium after experiencing short-run disequilibrium. This indicates that the model used satisfies the cointegration criteria. The findings suggest that electronic money has a significant role in reducing inflation, both in the short and long run. This is consistent with the theory that the digitalization of payment systems can enhance transaction efficiency, reduce the costs of distributing physical money, and accelerate money circulation in the economy. These findings also align with the Green Theory perspective, which argues that environmentally friendly technologies such as e-money can positively contribute to economic sustainability through waste reduction and energy efficiency.

As a monetary policy instrument, the BI-Rate shows an insignificant short-run effect but a significant long-run effect on inflation. This suggests that changes in interest rates take time to influence household consumption, investment, and production decisions. Under stable economic conditions, adjustments to the BI-Rate can serve as an effective tool in controlling aggregate demand. These findings indicate that traditional monetary instruments such as the BI-Rate remain relevant, but their effectiveness can be enhanced when combined with digital financial strategies, such as the promotion of e-money. Therefore, Bank Indonesia and the government need to strengthen digital infrastructure, expand financial literacy, and ensure financial inclusion to encourage the adoption of electronic money across all regions of Indonesia.

## A. Analysis Results

### a. Stationarity Test of Data.

The stationarity test is a very important initial step in time series data analysis. This test aims to determine whether the data used is stationary or not, as non-stationarity can result in biased and invalid model estimations. One of the common methods used to test stationarity is the Augmented Dickey-Fuller (ADF) test.

Based on the ADF test results, it is known that the variables Inflation (Inf) and BI-Rate are not stationary at the level (intercept), as indicated by probability values  $> 0.05$  and ADF t-statistics  $<$  critical values at the 1%, 5%, and 10% significance levels. Meanwhile, the Electronic Money (UE) variable shows stationary characteristics at the level, as evidenced by a probability value of 0.0001 (smaller than 0.05) and an ADF t-statistic of -6.635999, which is smaller than the critical values at all three significance levels.

**Table 3.1 Results of Data Stationarity Test**

| Var     | Prob   | ADF t-statistik | Nilai kritis MacKinnon |           |           | Ket             |
|---------|--------|-----------------|------------------------|-----------|-----------|-----------------|
|         |        |                 | 1%                     | 5%        | 10%       |                 |
| Inf     | 0.7479 | -0.909097       | -4.121990              | -3.144920 | -2.713751 | Tidak Stasioner |
| UE      | 0.0001 | -6.635999       | -4.004425              | -3.098896 | -2.690439 | Stasioner       |
| BI-Rate | 0.3265 | -1.890710       | -4.004425              | -3.098896 | -2.690439 | Tidak Stasioner |

*Source: Processed data using EViews 10*

### b. Test of Degree of Integration

The test of the degree of integration is conducted to determine at which level a data series becomes stationary. This test is a continuation of the unit root test if the data are not stationary at the level. A time series is considered stationary at a certain degree of integration if the ADF t-statistic value is smaller than the critical value at a given significance level (1%, 5%, or 10%) and the probability value is  $< 0.05$ . If the data are not stationary at the level, further testing must be conducted at the first degree or first difference.

The results of the ADF test at the first difference show that all variables previously non-stationary at the level — namely Inflation, Electronic Money, and BI-Rate — have become stationary at the first difference. This is evidenced by probability values  $< 0.05$  and ADF t-statistics smaller than the MacKinnon critical values at all three significance levels.

**Table 3.2. Degree of Integration Test (1st Difference)**

| Var     | Prob   | ADF t-statistik | Nilai kritis MacKinnon |           |           | Ket       |
|---------|--------|-----------------|------------------------|-----------|-----------|-----------|
|         |        |                 | 1%                     | 5%        | 10%       |           |
| Inf     | 0.0060 | -4.437333       | -4.121990              | -3.144920 | -2.713751 | Stasioner |
| UE      | 0.0001 | -6.643740       | -4.004425              | -3.098896 | -2.690439 | Stasioner |
| BI-Rate | 0.0140 | -3.917267       | -4.121990              | -3.144920 | -2.713751 | Stasioner |

Source: Processed data using EViews 10

Thus, all the variables used in this study are stationary at the first difference level. This fulfills one of the prerequisites for conducting further testing, namely the cointegration test, in order to determine whether there is a long-term relationship among the variables in the model.

#### c. Cointegration Test

The cointegration test is the next stage after the stationarity test and the degree of integration test. According to Gujarati (2012: 456), the cointegration test can be defined as a test of the existence of a long-term relationship among the variables in the model. This test can only be conducted if all variables are stationary at the same degree of integration, generally at the first difference level.

The test was carried out using the value of the Error Correction Term (ECT), which reflects the long-term relationship among the variables. If the probability value of the ECT  $< 0.05$ , it can be concluded that there is cointegration or a long-term relationship.

**Table 3.3. Cointegration Test Results**

| VARIABEL | PROB   | KET             |
|----------|--------|-----------------|
| ECT      | 0.0032 | Ada kointegrasi |

Source: EViews 10, processed data

It is known that the probability value of ECT is 0.0032, which is smaller than the significance level of 0.05 (5%). This indicates that there is a cointegration relationship between Electronic Money and the BI-Rate on Inflation. In other words, there is a long-term relationship among these three variables in the model used, thus allowing for the continuation to the Error Correction Model (ECM) analysis stage to capture short-term dynamics and adjustments toward long-term equilibrium.

#### d. Error Correction Model (ECM)

After conducting the cointegration test and finding the existence of a long-term relationship among the variables studied, the next step is to perform an Error Correction Model (ECM) analysis. This model is used to determine the long-term influence of the independent variables on the dependent variable, as well as to capture the short-term adjustment process toward long-term equilibrium.

**Table 3.4. Long-Term Estimation Test Results**

| Variabel           | Koefisien | t-statistik | Probabilitas | Keputusan        |
|--------------------|-----------|-------------|--------------|------------------|
| UE                 | -0.513578 | -1.908067   | 0.0806       | Tidak Signifikan |
| BI-Rate            | 1.182022  | 3.868613    | 0.0022       | Signifikan       |
| C                  | -2.108413 | -1.173570   | 0.2633       | Tidak Signifikan |
| R-square           | 0.591901  |             |              |                  |
| Adjust R-square    | 0.523884  |             |              |                  |
| F-statistic        | 8.702303  |             |              |                  |
| Prob (F-statistic) | 0.004620  |             |              |                  |

Source: EViews 10, processed data

It was found that the Electronic Money (EM) variable had a coefficient of -0.513578 with a t-statistic of -1.908067 and a probability value of 0.0806. Since this probability is greater than the 0.05 significance level, the EM variable is statistically insignificant in influencing inflation in the long run. Nevertheless, the negative relationship indicates that an increase in the use of electronic money tends to reduce the inflation rate, although its effect is not statistically strong.

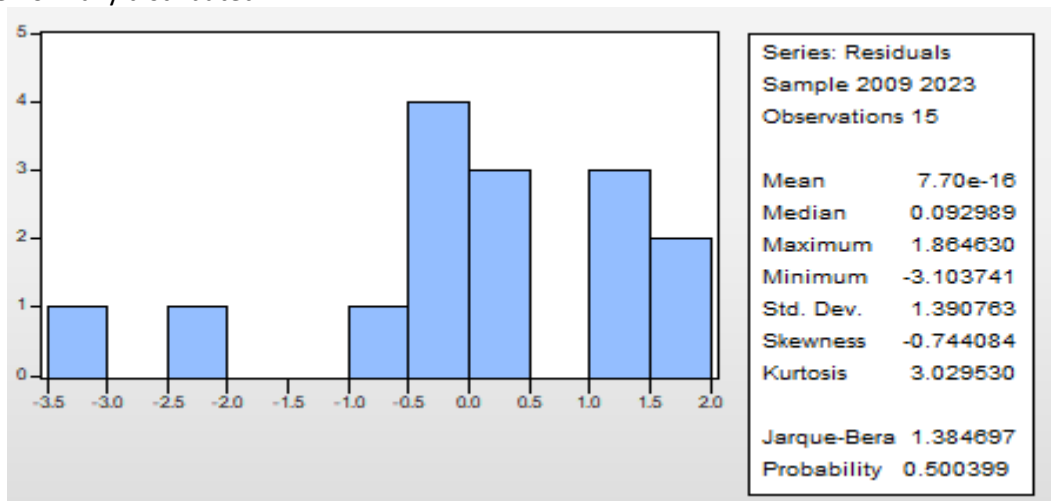
Meanwhile, the BI-Rate variable had a coefficient of 1.182022 with a t-statistic of 3.868613 and a probability value of 0.0022. Since this probability is smaller than 0.05, it shows that the BI-Rate has a positive and significant effect on inflation in the long run. This means that an increase in Bank Indonesia's policy interest rate tends to cause an increase in the inflation rate.

The coefficient of determination (R-squared) of 0.591901 indicates that the model is able to explain about 59.19% of the variation in the inflation variable, while the remaining portion is explained by other factors outside the model. The F-statistic value of 8.702303 with a probability of 0.004620 indicates that the overall regression model is significant.

## B. Classical Assumption Test

### a. Normality Test in the Long Run.

The normality test aims to examine whether the residuals in the regression model are normally distributed. Residual normality is important to ensure that the regression model estimates are valid, particularly in significance testing. In this study, the normality of residuals was tested using the Jarque-Bera test, in which the null hypothesis ( $H_0$ ) states that the residuals are normally distributed.



It can be seen that the Jarque-Bera statistic value is 1.384697 with a probability value of 0.500399. Since the probability value is greater than the commonly used significance level, such as 0.05 (5%), the null hypothesis ( $H_0$ ), which states that the residuals are normally distributed, cannot be rejected. This means that the results of this test indicate that the residuals in the model meet the normality assumption.

b. Multicollinearity Test.

According to Ghazali (2018), the multicollinearity test is a process of examining the existence of correlations among independent variables in the regression model.

- If the VIF value  $< 10$ , then it is stated that there is no multicollinearity.
- If the VIF value  $> 10$ , then it is stated that multicollinearity occurs.

**Table 3.5. Multicollinearity Test Results**

| Variabel | Coefficient<br>Variance | Uncentered<br>VIF | Centered<br>VIF |
|----------|-------------------------|-------------------|-----------------|
| UE       | 0.072448                | 1.561127          | 1.008398        |
| BI-Rate  | 0.093356                | 21.52541          | 1.008398        |
| C        | 3.227700                | 21.45513          | NA              |

Source: EViews 10, processed data

Based on the results of the Variance Inflation Factors (VIF) analysis, the Centered VIF values for the independent variables UE and BI-Rate are both 1.008398, which are far below the commonly used threshold of 10. This indicates that there is no significant multicollinearity problem among the independent variables in the regression model. Therefore, this regression model can be considered stable and valid for further analysis without the risk of significant distortion due to strong linear relationships among the variables.

c. Heteroscedasticity Test

The heteroscedasticity test is conducted to determine whether there is homogeneity of variance (constant variance) or heterogeneity of variance (non-constant variance) in the regression. To detect the presence of heteroscedasticity symptoms, the White test is used. The decision can be made by examining the Chi-Square probability value:

- If the Chi-Square probability value  $> \alpha$  (5%), it means there is no heteroscedasticity.
- If the Chi-Square probability value  $< \alpha$  (5%), it means heteroscedasticity is present.

**Table 3.6. Heteroscedasticity Test Results**

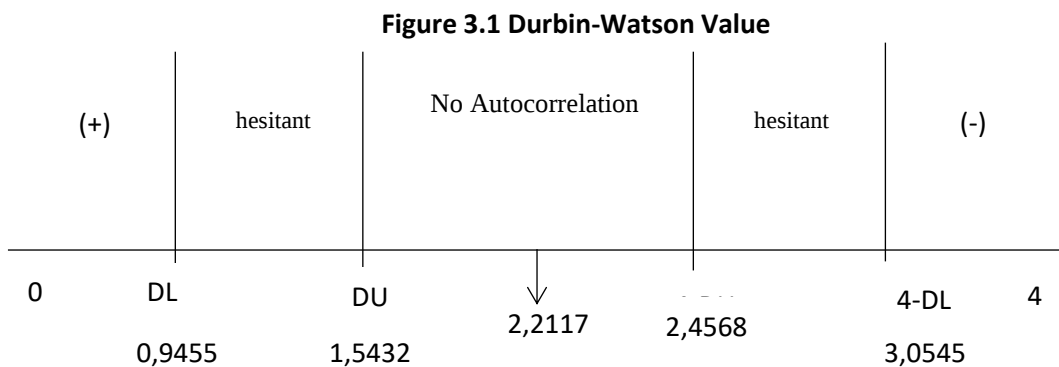
| Heteroskedasticity Test: White |          |                     |        |
|--------------------------------|----------|---------------------|--------|
| F-statistic                    | 1.769491 | Prob. F(5,9)        | 0.2152 |
| Obs*R-squared                  | 7.435897 | Prob. Chi-Square(5) | 0.1902 |
| Scaled explained SS            | 4.829239 | Prob. Chi-Square(5) | 0.4371 |

Source: EViews 10, processed data

Based on the results of the White heteroskedasticity test, it can be seen that the probability value of Chi-Squared (5) is 0.1902, which is greater than 5%. Therefore, the model is free from heteroskedasticity.

d. Autocorrelation Test

The autocorrelation test is used to examine whether, in a multiple linear regression model, there is correlation between one observation and another. This test essentially assesses whether the outcome in a certain year is influenced by the outcome in the previous or subsequent year. The autocorrelation test can be conducted using the Durbin-Watson test. For further clarification, see the figure below.



From the figure above, it can be concluded that the DW value is 2.2117. When compared with the DW curve, this value falls between DU and 4-DU, which indicates that there is no autocorrelation.

### C. Hypothesis Testing

#### a. Coefficient of Determination

The coefficient of determination shows that the regression model has a fairly good ability to explain the relationship between the independent variables and inflation. With 59.19% of the variation in inflation explained by the model, the remaining 40.81% is influenced by other factors not included in the model.

#### b. F-Test (Simultaneous Test).

The F-test or simultaneous test is used to examine whether the independent variables in the regression model jointly have a significant effect on the dependent variable. Based on the analysis results, the F-statistic value is 8.702303, with a probability value of 0.004620. Since the probability value is smaller than the commonly used significance level of 0.05 (5%), the null hypothesis ( $H_0$ ), which states that all regression coefficients (except the constant) are equal to zero, is rejected. Thus, the F-test results indicate that the independent variables, namely electronic money (UE) and the BI Rate, simultaneously have a significant effect on inflation in Indonesia.

#### c. (Probability Test).

Based on the analysis results, the coefficient of the electronic money variable is -0.513578, but with a probability value of 0.0806, which is much larger than the significance level of 0.05 (5%). This indicates that, partially, electronic money does not have a significant effect on inflation during the analysis period. Meanwhile, the coefficient of the BI Rate variable is 1.182022, with a probability value of 0.0022, which is smaller than the significance level of 0.05 (5%). This shows that, partially, the BI Rate has a significant effect on inflation. In conclusion, among the two independent variables analyzed, only the BI Rate has a significant partial effect on inflation, while electronic money does not contribute significantly in explaining inflation in Indonesia.

#### a). Short-Run ECM Test

**Table 3.7. Short-Run ECM Test Results**

| Variabel           | Koefisien | t-statistik | Probabilitas | Keputusan  |
|--------------------|-----------|-------------|--------------|------------|
| D(UE) <sub>t</sub> | -0.869525 | -4.177352   | 0.0019       | Signifikan |

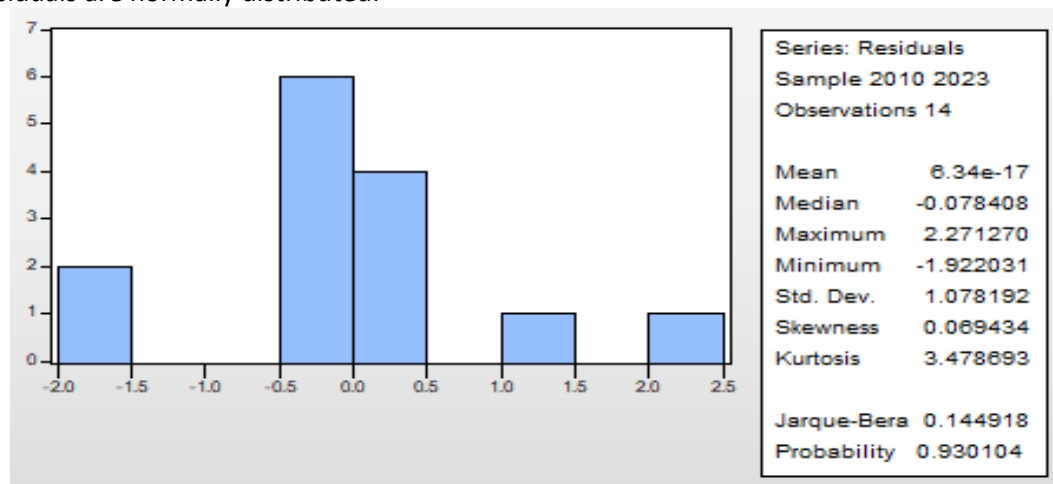
|                      |           |           |        |                     |
|----------------------|-----------|-----------|--------|---------------------|
| D(BI-Rate)           | 1.914017  | 5.887351  | 0.0002 | Signifikan          |
| E\$ct(-1)            | -1.625212 | -5.075927 | 0.0005 | Signifikan          |
| C                    | -0.026298 | -0.076506 | 0.9405 | Tidak<br>Signifikan |
| R-square\$d          | 0.837778  |           |        |                     |
| Adjust R-square\$d   | 0.789111  |           |        |                     |
| F-statistic          | 17.21459  |           |        |                     |
| Pro\$b (F-statistic) | 0.000283  |           |        |                     |

Based on the test results, the electronic money variable shows a coefficient of -0.869525 with a t-statistic of -4.177352 and a probability value of 0.0019. Since the probability is smaller than 0.05, it indicates that the relationship between electronic money and inflation in the short run is significant. The coefficient for the BI-Rate variable is 1.914017 with a probability value of 0.0002, which is highly significant. This suggests that changes in the BI-Rate have a positive and significant effect on inflation, meaning that every increase in the BI-Rate tends to raise the inflation rate. The coefficient of the Error Correction Term (ECT) is -1.625212 with a probability of 0.0005, which is below the 0.05 significance level, indicating that there is a significant short-run relationship between inflation and the variables in the model. Overall, electronic money, BI-Rate, and the Error Correction Term have significant effects on inflation.

#### D. Classical Assumption Test

##### a. Normality Test (Long Run)

The normality test aims to examine whether the residuals in the regression model are normally distributed. Residual normality is important to ensure that the regression model estimations are valid, particularly for significance testing. In this study, the normality of the residuals was tested using the Jarque-Bera test, where the null hypothesis ( $H_0$ ) states that the residuals are normally distributed.



It can be seen that the Jarque-Bera value is 0.144918 with a probability of 0.930104. Since the probability is greater than the commonly used significance level, such as 0.05 (5%), the null hypothesis stating that the residuals are normally distributed cannot be rejected. This means that the residuals in this model meet the normality assumption.

##### b. Multicollinearity Test

According to Ghazali (2018), the multicollinearity test is a procedure used to identify the existence of correlations among independent variables in a regression model. The purpose of

this test is to determine whether there is a high or perfect correlation among the independent variables in the model.

- If the VIF value is less than 10, it can be concluded that multicollinearity does not occur.
- If the VIF value is greater than 10, it indicates the presence of multicollinearity.

**Table 3.8. Multicollinearity Test**

| Variabel   | Coefficient<br>ssVariance | Uncentered<br>VIF | Centered<br>VIF |
|------------|---------------------------|-------------------|-----------------|
| D(UE)      | 0.043327                  | 1.098474          | 1.033101        |
| D(BI-Rate) | 0.105694                  | 1.486191          | 1.484942        |
| D(ECT)     | 0.102516                  | 1.474283          | 1.448380        |
| C          | 0.118157                  | 1.094590          | NA              |

Source: Eviews 10, processed data

The multicollinearity test using the Variance Inflation Factor (VIF) shows that all independent variables in the model have Centered VIF values lower than 10. These values, such as 1.033101 for D(UE), 1.484942 for D(BI-Rate), and 1.448380 for ECT (-1), indicate that there is no significant multicollinearity problem in the model.

#### c. Heteroskedasticity Test

**Table 3.9. Heteroskedasticity Test (White)**

| Heteroskedasticity Test: White |          |                     |        |
|--------------------------------|----------|---------------------|--------|
| F-statistic                    | 2.345528 | Prob. F(9,4)        | 0.2136 |
| Obs*R-squared                  | 11.76979 | Prob. Chi-Square(9) | 0.2266 |
| Scaled explained SS            | 7.442269 | Prob. Chi-Square(9) | 0.5912 |

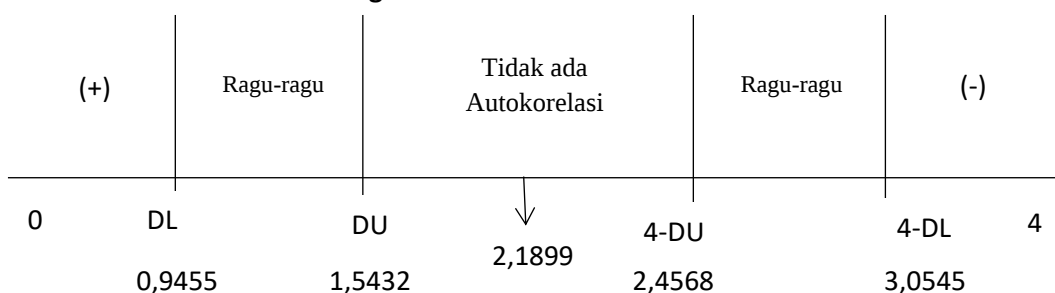
Source: Eviews 10, processed data

Based on the results of the White heteroskedasticity test, it can be seen that the Chi-Square (9) probability value is 0.2266, which is greater than 5%. This indicates that the model is free from heteroskedasticity problems.

#### d. Autocorrelation Test

The autocorrelation test is used to examine whether there is a correlation between one observation and another in a multiple linear regression model. This test can be conducted using the Durbin-Watson (DW) statistic. For more details, the result can be seen in the figure above.

**Figure 3.2. Durbin-Watson Test Value**



From the figure above, it can be concluded that the DW value is 2.1899. Referring to the DW curve, this value lies between DU and 4-DU, which falls under the criteria indicating that there is no autocorrelation in the model.

## E. Hypothesis Testing

### a. Coefficient of Determination

The coefficient of determination in this model is represented by the R-squared value of 0.837778, which indicates that approximately 83.77% of the variation in the dependent variable, namely D(Inflation), can be explained by the independent variables in the model, namely D(Electronic Money), D(BI-Rate), and ECT(-1). This result demonstrates that the model has a very good explanatory power in capturing the relationship among these variables.

### b. F-Test (Simultaneous Test)

The F-test aims to examine whether all independent variables in the model jointly have a significant influence on the dependent variable. Based on the regression results, the F-statistic is 17.21459 with a probability (Prob. F-statistic) of 0.000283. Since this probability is smaller than the commonly used significance level of 0.05 (5%), the null hypothesis, which states that all independent variable coefficients are equal to zero, can be rejected. Thus, it can be concluded that, simultaneously, the independent variables significantly affect the dependent variable.

### c. T-Test (Partial Test)

The T-test aims to examine the partial influence of each independent variable on the dependent variable. The analysis shows that the variable D(Electronic Money) has a probability value of 0.0019, which is smaller than the 5% significance level (0.05), indicating that electronic money significantly affects inflation in Indonesia. Meanwhile, the variable D(BI-Rate) has a probability value of 0.0002, also smaller than 0.05, showing that this variable significantly influences inflation in Indonesia. Furthermore, the variable ECT(-1) has a probability value of 0.0005, which is far smaller than 0.05, indicating a highly significant effect on the dependent variable. Overall, Electronic Money, BI-Rate, and ECT(-1) all exert a significant influence at the specified significance level.

## 4. Conclusion

This study concludes that electronic money and BI-Rate play an important role in influencing inflation in Indonesia. The estimation results of the Error Correction Model (ECM) indicate that, in the short run, electronic money has a negative and significant effect on inflation, while BI-Rate has a positive but insignificant effect. In the long run, electronic money continues to have a negative and significant effect, while BI-Rate demonstrates a negative and significant effect on inflation. These findings emphasize that the digitalization of the payment system can support price stability while highlighting the relevance of BI-Rate as a monetary policy instrument.

This research contributes theoretically to the development of literature on the relationship between financial digitalization, monetary policy, and inflation. Practically, the findings may serve as recommendations for Bank Indonesia and the government to strengthen digital infrastructure, expand financial literacy and inclusion, and optimize the combination of traditional monetary instruments with digital financial innovations to maintain national economic stability.

Although this study provides strong empirical evidence, certain limitations remain, particularly concerning the observation period and the variables employed. Therefore, future research is expected to broaden the scope of data and include other relevant variables to produce a more comprehensive analysis that can better support monetary policy and macroeconomic stability in Indonesia.

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