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# ANALYSIS OF THE IMPACT OF DIGITALIZATION OF THE FINANCIAL SECTOR ON INFLATION IN INDONESIA USING THE VECTOR ERROR CORRECTION MODEL METHOD

**Edi SETIAWAN[1], Dery WIRANDHIKA[2], Dewi PURWANTI[3]**
[1]Sahid University Jakarta, Indonesia
[2]LLC Bumitama Gunajaya Agro, Indonesia
[3]Statistics Polytechnic STIS, Indonesia
Corresponding author: Edi Setiawan
E-mail: edi.bkkbn@gmail.com

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**Abstract:**
Digitalizing the financial sector through non-cash payment instruments brings many benefits to the Indonesian economy but also has consequences. This study aims to determine the effect of non-cash payment instruments, including electronic money and card payment instruments, on inflation in Indonesia using the Vector Error Correction Model (VECM) method. This study uses two types of analysis: descriptive and inferential. Descriptive analysis is used to provide an overview of the development of inflation, electronic money, and APMK in Indonesia, and it is presented in graphical form. Meanwhile, inferential analysis is used to determine the effect of shocks to one variable on another variable and the decomposition of the diversity of a variable due to shocks to another variable using the Vector Error Correction Model (VECM) time series analysis. The results of this study indicate that shocks to the value of electronic money transactions and card payment instruments have a positive effect on inflation, which is in line with the quantity theory of money. This paper concludes that the digitalization of the financial sector impacts inflation in Indonesia, so the government must prepare the right policies to balance the positive impacts on economic growth and the negative impacts on inflation.

**Keywords**: Inflation, Card Payment, Electronic Money, Vector Error Correction Model, VECM

## INTRODUCTION

Indonesia is one of the countries with the highest incomes in the world. According to data collected by katadata.com, Indonesia ranks 17th out of 20 countries with the highest incomes in the world in 2022. Indonesia's economic success is partly supported by advances in technology and information through digitalization in the financial sector. Digitalization in the financial sector offers ease of transactions and flexibility regarding time and place. These various advantages encourage people to be more consumptive, increasing Indonesia's gross domestic product (GDP).

Electronic money and card-based payment instruments (APMK) are examples of the results of digitalization in the financial sector. Unlike APMK, which has been used for a long time, electronic money has yet to be familiar to all Indonesian people. Based on data from Bank Indonesia, electronic money began to be used for transactions in Indonesia in 2009 but only received significant attention in 2019, along with the emergence of fintech companies in Indonesia. Electronic money became popular because of its advantages, such as cashless and fast transactions. It did not require authorization and promotions offered by merchants and electronic money issuing companies aimed at increasing public interest in electronic money.

Digitalizing the financial sector brings many benefits to the Indonesian economy, but the various conveniences offered by technological developments also have consequences behind them.

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Pramono et al. (2006) stated that the presence of non-cash payment instruments causes an increase in financial efficiency and productivity that can encourage actual sector activities, thereby increasing economic growth and public welfare. However, the quantity theory of money by Mankiw (2009) states that the money supply is proportional to the price level. This statement indicates that increased economic growth caused by increased financial productivity can cause increased inflation. So indirectly, the use of non-cash payment instruments is thought to be closely related to the inflation rate.

Bank Indonesia (2020) stated that inflation can cause a decrease in people's real income, uncertainty for economic actors in decision-making, and high domestic inflation rates that can put pressure on the rupiah exchange rate. Inflation is so crucial to the government that this indicator continues to be monitored and maintained through a series of programs, including the inflation targeting framework (ITF) run by Bank Indonesia and the formation of a regional inflation control team (TPID) led by the Ministry of Home Affairs.

The previous explanation raises the suspicion that the digitalization of the financial sector can impact inflation. However, this conclusion is still subjective, so further research using valid statistical analysis methods is needed. This study aims to determine the effect of shocks in the value of electronic money transactions and APMK on inflation in Indonesia. In addition, this study also looks at the decomposition of the diversity of the three research variables due to shocks to each other.

**Quantity Theory of Money.** Utari (2015) stated that the quantity theory of money is a theory that shows a direct relationship between the money supply or the amount of money in circulation and changes in the price level in the economy. This theory can be explained through the Fisher equation as follows:

$$M \times V = P \times Y$$

Where: M = money supply, V = velocity of money, P = price level, and Y = output growth rate. The equation above shows that the amount of money is directly proportional to the price level. Mankiw (2009) stated that the equation above can be more helpful in explaining the influence of money if the velocity of money is assumed to be constant. Meanwhile, Utari (2015) stated that when the economy is assumed to be full employment, the output growth rate will also be constant (Y = 0). So, the quantity theory of money concludes that money growth does not affect real output growth but affects price changes (inflation).

In reality, the velocity of money (V) cannot be constant and is closely related to non-cash payment instruments, namely electronic money and APMK, where, according to Ady (2016), Laurentia (2017) states that non-cash payment instruments have a fast mechanism and can increase the intensity of the velocity of money. The increase in the intensity of the velocity of money affects the amount in circulation, which will then increase the price level, commonly known as inflation.

**Relationship between inflation and electronic money. Hidayati** et al. (2006) stated that electronic money can be equated with cash or demand deposits. They can be calculated as part of the money supply (M1) because its float is very liquid. Meanwhile, the quantity theory of money by Mankiw (2009) states that the money supply is proportional to the price level, so the increase in the use of electronic money is thought to cause an increase in inflation through an increase in the amount of money in circulation M1.

In addition, the influence of electronic money on inflation is also related to the difference in the value of goods and the float of electronic money, which generally occurs due to discounts in

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transactions. Head of the Payment System Regulation Team, Directorate of Accounting and Payment Systems BI, Puji Atmoko in detik.com (2011), stated that electronic money can cause an increase in the inflation rate due to the difference in the value of goods purchased with the listed price. This is related to the Fisher equation, where Mankiw (2009) states that changes in the value of one variable in the Fisher equation must be followed by changes in other variables to maintain equality. The difference in the value of goods causes an increase in prices because no one bears the difference in the amount of money and prices in the quantity theory of money, resulting in increased inflation (Nahak et al., 2023).

**Relationship between inflation and card-based payment instruments (APMK). Not** much different from the influence of electronic money on inflation, APMK is also suspected of having the potential to increase inflation. This is related to the fact that APMK, as a non-cash payment instrument, is a substitute for cash. Syarifudin et al. (2009) stated that using APMK as a non-cash payment instrument can reduce the need for cash, but in M1 and M2, it is estimated that it will increase. Technology development has caused saving deposits to experience a shift in definition, where their use no longer requires a long time in transactions with the increasing development of APMK such as ATMs/Debit. The ease of transactions offered by APMK makes demand deposits and saving deposits, part of M2, already function like cash. People are increasingly fond of using APMK because the returns obtained will be higher if they transfer the cash they have to demand/save deposits without losing the function of cash in transactions (Angin et al., 2023).

**Previous research.** Research by Prayogi (2022) stated that simultaneously, the amount of money in circulation, GDP growth, and interest rates affect inflation in Indonesia. Research by Shabrina et al. (2017) stated that the increase in APMK transactions from 2005 to 2015 significantly affected inflation in Indonesia and negatively affected unemployment and Gross Domestic Product (GDP). Research by Rahmayuni (2019) stated that electronic money and e-commerce affect inflation, so regulations are needed to circulate money quickly. Research by Pranoto and Salsabila (2018) concluded that electronic money could shift the existence of credit cards as a non-cash payment instrument in Indonesia.

## METHODS

This study uses two types of analysis: descriptive and inferential. Descriptive analysis is used to provide an overview of the development of inflation, electronic money, and APMK in Indonesia, and it is presented in graphical form. Meanwhile, inferential analysis is used to determine the effect of shocks on one variable and the decomposition of the diversity of a variable due to shocks on another variable using Vector Error Correction Model (VECM) time series analysis. The model specifications produced by VECM in this study are as follows:

$$\Delta \text{lnihk}_t = a_{10} ECT_{t-1} + \sum_{i-1}^{p-1} a_{1i} \Delta \text{lnihk}_{t-i} + \sum_{i-1}^{p-1} a_{2i} \Delta \text{lnmoney}_{t-i} + \sum_{i-1}^{p-1} a_{3i} \Delta lnapmk_{t-i} + e_{1t}$$

$$\Delta \text{lnmoney}_t = a_{20} ECT_{t-1} + \sum_{i-1}^{p-1} a_{1i} \Delta \text{lnihk}_{t-i} + \sum_{i-1}^{p-1} a_{2i} \Delta \text{lnmoney}_{t-i} + \sum_{i-1}^{p-1} a_{3i} \Delta lnapmk_{t-i} + e_{2t}$$

$$\Delta \text{lnapmk}_t = a_{30} ECT_{t-1} + \sum_{i-1}^{p-1} a_{1i} \Delta \text{lnihk}_{t-i} + \sum_{i-1}^{p-1} a_{2i} \Delta \text{lnmoney}_{t-i} + \sum_{i-1}^{p-1} a_{3i} \Delta lnapmk_{t-i} + e_{3t}$$

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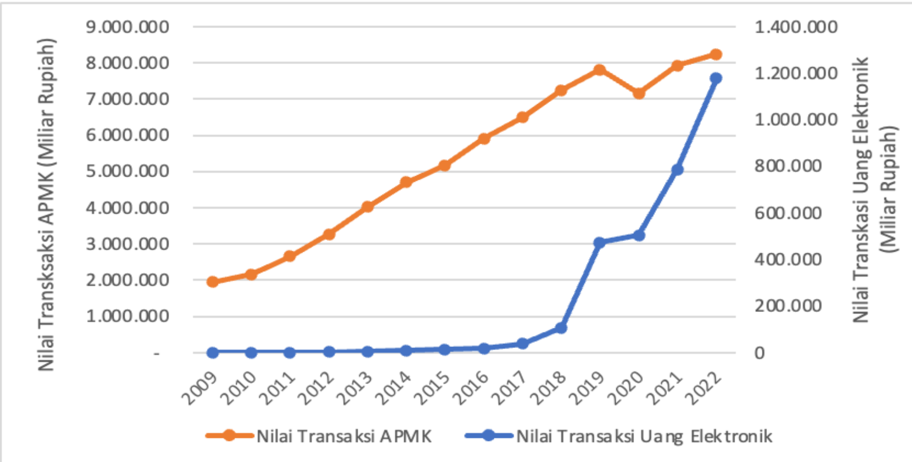
Description: ECT = speed of adjustment, link = ln(IHK), ln money = ln(electronic money transaction value), lnapmk = ln(APMK transaction value). The procedures and stages of inferential analysis carried out in this study are as follows:

1. Stationarity testing
2. Cointegration testing
3. Determination of optimal lag
4. VAR/VECM model stability testing
5. Classical assumption testing
6. Impulse Response Function (IRF)
7. Forecast Error Decomposition Variance (FEDV)

## RESULT AND DISCUSSION

**Descriptive Analysis.** Figure 1 shows the development of the transaction value of card-based payment instruments (APMK) and electronic money from 2009 to 2022. When viewed in terms of numbers, the transaction value of APMK far exceeds the transaction value of electronic money. The total transaction value of APMK from 2009-2022 was 74.72 thousand trillion rupiah, while the total transaction value of electronic money in the same period only reached 3.14 thousand trillion rupiah. The average transaction value per year was 5.34 thousand trillion rupiah and 224 trillion rupiah, respectively. This is reasonable, considering APMK has been around longer than electronic money as a non-cash payment instrument. In addition, the transaction value of APMK was contributed by two payment instruments: ATM/Debit and credit cards.




Source: Bank Indonesia (processed)

**Figure 1.** Value of APMK and Electronic Money Transactions in Indonesia 2009-2022.

The transaction value of APMK and electronic money experienced a slowdown or even a decline in 2020. This was due to the COVID-19 pandemic that hit the world then, forcing people to reduce consumption and resulting in reduced transactions. In contrast to the transaction value of APMK, which decreased by six percent due to the COVID-19 pandemic, the transaction value of electronic money continued to grow, although not significantly by six percent. This value is insignificant because, in the following years, it could grow to above 50 percent and even above 300 percent in the previous year. This is in line with research by Nugraha et al. (2022), which stated that

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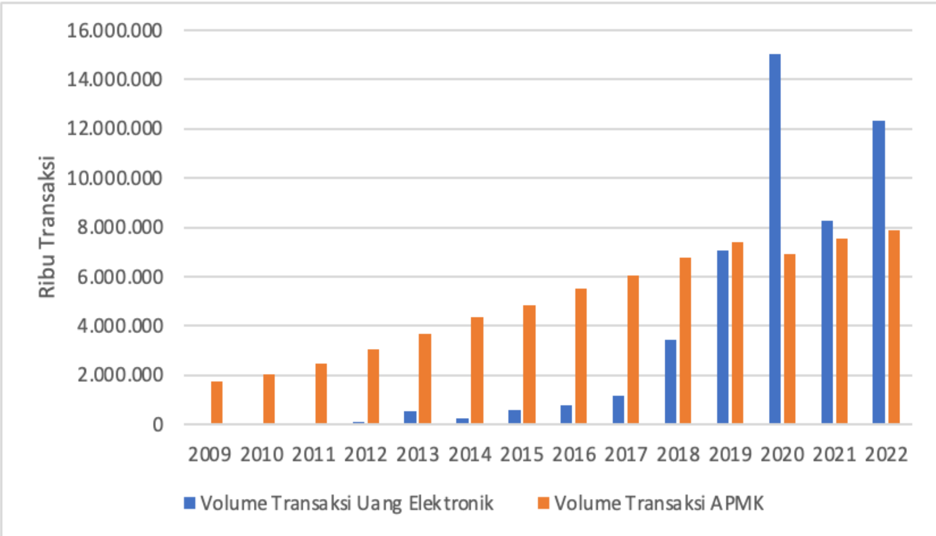
COVID-19 caused APMK transactions to decline while electronic money transactions continued to experience an insignificant increase. The decline in APMK transactions was because people had to have savings to use them, while research by Smeru (2021) found that 51.5 percent or more than half of the population, did not have savings to be on the safe side. Unlike APMK, electronic money is a stored value that is ready-to-use cash owned by a person directly. In addition, merchants and companies providing electronic money also play an essential role by providing discounts or cashback so that the public prefers electronic transactions.

Figure 2 shows the development of transaction volumes for card-based payment instruments (APMK) and electronic money from 2009 to 2022. When viewed in terms of numbers, the volume of APMK transactions is higher than that of electronic money transactions, where the total volume of APMK and electronic money transactions from 2009 to 2022 was 70.16 billion and 49.59 billion, respectively. The average volume of APMK and electronic money transactions per year from 2009 to 2022 was 5.01 billion and 3.54 billion, respectively. However, over time, the volume of electronic money transactions can outperform the volume of APMK transactions from 2020 to 2022.




Source: Bank Indonesia (processed)

**Figure 2.** Transaction Volume of APMK and Electronic Money in Indonesia 2009-2022

In contrast to the transaction value, which experienced a slowdown, the transaction volume scored the highest in 2020, even though the COVID-19 pandemic hit it. This picture shows the role of electronic money in supporting safe transactions (physically) in Indonesia, which the government has appealed to avoid contracting the COVID-19 virus. COVID-19 made people anxious and reduced consumption because of being on guard due to the difficulty of income at that time. However, the increasing understanding of the community in using electronic money, supported by the participation of merchants and companies providing electronic money through discounts or cashback, has increased the volume of electronic money transactions. In addition, the government's appeal to maintain physical contact also impacted the increasing volume of electronic money transactions; even several local governments have mandatory programs to use electronic money in several transactions, such as purchasing fuel to avoid fraud and limit purchase quotas. Compared to electronic money, using APMK as a non-cash payment instrument seems less flexible because its

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use requires authorization. In addition, the promos offered are also not as many and varied as those given by merchants to electronic money users. So, in terms of volume, electronic money transactions finally overtake APMK transactions, even though the authorization policy is actually to protect APMK users themselves.

Table 1 shows Indonesia's inflation target and actual inflation from 2009 to 2022. The green indicates actual inflation that is successfully below the government's target. In general, Indonesia's inflation can still be controlled, as evidenced by the large number of actual inflations below the target set by the government, except for actual inflation in 2010, 2013, 2014, and 2022.

**Table 1.** Indonesia's Inflation Target and Actual Inflation 2009-2022

| No. | Year | Target Inflation | Actual Inflation (%,Yoy) |
|---|---|---|---|
| 1 | 2009 | 4,5+1% | 2,78 |
| 2 | 2010 | 5+1% | 6,96 |
| 3 | 2011 | 5+1% | 3,79 |
| 4 | 2012 | 4,5+1% | 4,30 |
| 5 | 2013 | 4.5+1% | 8,38 |
| 6 | 2014 | 4.5+1% | 8,36 |
| 7 | 2015 | 4+1% | 3,35 |
| 8 | 2016 | 4±1% | 3,02 |
| 9 | 2017 | 4±1% | 3,61 |
| 10 | 2018 | 3,5±1% | 3,13 |
| 11 | 2019 | 3,5±1% | 2,72 |
| 12 | 2020 | 3±1% | 1,68 |
| 13 | 2021 | 3±1% | 1,87 |
| 14 | 2022 | 3±1% | 5,51 |

Source: Central Statistics Agency and Bank Indonesia (processed)

According to Bank Indonesia (2020), the causes of inflation consist of three things, namely pressure from the supply side caused by several factors such as exchange rate depreciation, foreign inflation, increasing commodity prices regulated by the government, and adverse supply shocks; pressure from the demand side and inflation expectations. In line with Bank Indonesia, BPS data divides inflation into three compositions, namely core inflation, government-regulated prices, and volatile prices. BPS data shows that Indonesia's inflation in 2010 was predominantly contributed by volatile price inflation of 17.74 percent, while inflation in 2013, 2014, and 2022 was contributed by government-regulated price inflation of 16.65 percent, 17.57 percent, and 13.34 percent, respectively.

The increase in inflation in 2022 is also in line with the increase in transactions using non-cash payment instruments, both APMK and electronic money; even the value and volume of electronic money transactions increased significantly in 2022 by almost 50 percent each. This data supports the assumption that digitalization of the financial sector through non-cash payment instruments impacts inflation in Indonesia.

**Inferential Analysis. Stationarity Testing.** Data stationarity testing is conducted to avoid spurious regression problems. Data stationarity testing in this study was conducted using the Augmented Dickey-Fuller (ADF) test. The variables tested for data stationarity are lnihk (CPI), lnmoney (electronic money transaction value), and lnapmk (number of APMK in circulation).

Table 2 shows that the three research variables are not stationary at the level because they have t-statistics values smaller than the t-table value and p-values greater than the five percent

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significance level. However, the three research variables are successfully stationary and do not have a deterministic trend at the first difference level, with t-statistics values more significant than the t-table value and p-values more minor than the five percent significance level.

**Table 2.** Data Stationarity Test Results

| No. | Variables | Level | | First Difference | |
|---|---|---|---|---|---|
| | | t-statistics | p-value | t-statistics | p-value |
| 1 | lnihk | -0,6191 | 0,9764 | -10,9475 | 0,0000 |
| 2 | lnmoney | -2,4153 | 0,3703 | -13,5765 | 0,0000 |
| 3 | lnapmk | -0,6946 | 0,9713 | -4,5023 | 0,0020 |

Cointegration Testing Cointegration testing is conducted to see if there is a cointegration relationship between individually non-stationary variables and a stationary linear combination. If there is cointegration between variables, then the analysis is continued using the Vector Error Correction Model (VECM). Table 3 shows that the λmax(r0) value is greater than the critical point, and the p-value is less than the five percent significance level. This indicates that there is cointegration between the three research variables. Therefore, the inferential analysis in this study is continued using the VECM analysis.

**Table 3.** Hasil Pengujian Kointegrasi

| No. | Hypothesized No. of CE(s) | Eigenvalue | Trace Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|---|
| 1 | None * | 0.209800 | 85.02513 | 29.79707 | 0.0000 |
| 2 | At most 1 * | 0.185123 | 45.93722 | 15.49471 | 0.0000 |
| 3 | At most 2 * | 0.069480 | 11.95400 | 3.841466 | 0.0005 |

**Determining** the optimum lag is very important in VAR/VECM analysis. A lag that is too short causes the model to be less able to explain the diversity of variables. However, a shorter lag will reduce the model's degree of freedom, resulting in less efficient parameter estimates.

Table 4 shows the optimum lag results based on the most considerable LR value, AIC, SIC, FPE, and the smallest HQ. The decision on the optimum lag to be used in the VAR/VECM analysis is the sixth lag because it was selected by three criteria at once (AIC, FPE, and HQ) and is not too long so that it does not use up the degree of freedom.

**Table 4.** Optimum Lag Test Results

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | 850.2711 | NA | 6.96e-09 | -1.026.995 | -1.021.348 | -1.024.703 |
| 1 | 905.2259 | 107.2452 | 3.99e-09 | -1.082.698 | -1.060.109 | -1.073.528 |
| 2 | 936.0383 | 59.01046 | 3.06e-09 | -1.109.137 | -10.69607* | -10.93091* |
| 3 | 944.0026 | 14.96328 | 3.10e-09 | -1.107.882 | -1.051.410 | -1.084.958 |
| 4 | 952.3881 | 15.44952 | 3.12e-09 | -1.107.137 | -1.033.724 | -1.077.336 |
| 5 | 962.7482 | 18.71111 | 3.08e-09 | -1.108.786 | -1.018.431 | -1.072.108 |
| 6 | 974.7027 | 21.15572* | 2.97e-09* | -11.12367* | -1.005.071 | -1.068.812 |
| 7 | 978.7760 | 7.060436 | 3.16e-09 | -1.106.395 | -9.821.573 | -1.055.963 |
| 8 | 979.7132 | 1.590466 | 3.49e-09 | -1.096.622 | -9.554.428 | -1.039.312 |

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**VAR/VECM Stability Testing.** VAR/VECM stability testing is essential because an unstable VAR/VECM model will produce an invalid Impulse Response Function (IRF) and Forecast Error Decomposition Variance (FEDV). Two methods, modulus and unit circle values, are used for stability testing.

Table 5 shows that all modulus values of the sixth lag are smaller than one, and Figure 3 shows no points outside the unit circle. So, it can be concluded that the VAR/VECM model with an optimum lag of six is stable and can be used in the following analysis process.

**Table 5.** Results of Modulus Values

| Root | Modulus |
|---|---|
| 0.426489 - 0.782517i | 0.891193 |
| 0.426489 + 0.782517i | 0.891193 |
| -0.747202 - 0.405891i | 0.850328 |
| -0.747202 + 0.405891i | 0.850328 |
| -0.074605 + 0.844182i | 0.847473 |
| -0.074605 - 0.844182i | 0.847473 |
| 0.812238 | 0.812238 |
| -0.364872 - 0.703033i | 0.792078 |
| -0.364872 + 0.703033i | 0.792078 |
| -0.155341 + 0.699542i | 0.716583 |
| -0.155341 - 0.699542i | 0.716583 |
| -0.635410 + 0.102809i | 0.643673 |
| -0.635410 - 0.102809i | 0.643673 |
| 0.453615 - 0.440778i | 0.632497 |
| 0.453615 + 0.440778i | 0.632497 |
| 0.528003 - 0.337297i | 0.626544 |
| 0.528003 + 0.337297i | 0.626544 |
| -0.254232 | 0.254232 |

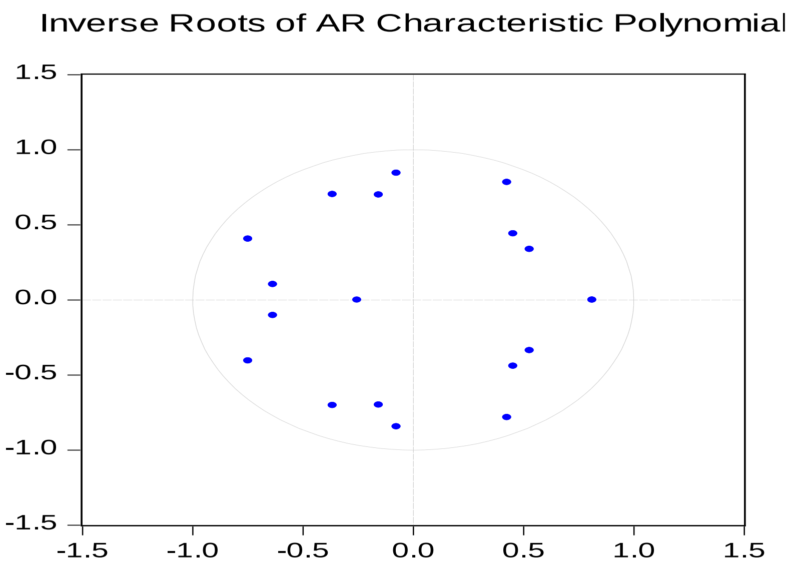


**Figure 3.** Sixth circle lag unit

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**Classical Assumption Testing. Non-autocorrelation.** Autocorrelation is a condition with a correlation between disturbances (error terms). Violating the non-autocorrelation assumption will cause the OLS estimator to remain linear, unbiased, consistent, and asymptotically customarily distributed but become inefficient. The autocorrelation test in this study uses the Lagrange Multiplier test (LM test).

Table 6 presents the results of the LM test, where the p-value shows a value greater than the five percent significance level. The LM test concludes that there is insufficient evidence to state a correlation between disturbances, so there is no autocorrelation in the formed VECM model.

**Table 6.** Results of the Non-autocorrelation Assumption Test

| Lag | LRE* stat | df | Prob. | Rao F-stat | df | Prob. |
|---|---|---|---|---|---|---|
| 1 | 2.616.707 | 9 | 0.9776 | 0.288912 | (9, 345.7) | 0.9776 |
| 2 | 7.232.240 | 9 | 0.6130 | 0.803823 | (9, 345.7) | 0.6130 |
| 3 | 1.037.993 | 9 | 0.3206 | 1.158.904 | (9, 345.7) | 0.3207 |
| 4 | 7.558.251 | 9 | 0.5792 | 0.840451 | (9, 345.7) | 0.5792 |
| 5 | 6.039.552 | 9 | 0.7360 | 0.670114 | (9, 345.7) | 0.7360 |
| 6 | 6.787.390 | 9 | 0.6592 | 0.753899 | (9, 345.7) | 0.6593 |

**Normality.** Gujarati (2004:108) states normality as a condition where the error term ui follows a normal distribution. Violating the normality assumption in classical regression will cause the estimator to be biased with non-minimum and non-constant variance. The normality test in this study uses the Jarque-Bera (JB) test statistic, which is compared to $\chi2(\alpha,2)$.

Table 7 shows that the p-value of the JB test results is smaller than the five percent significance level, which indicates that the error term does not follow a normal distribution. However, Gujarati (2004:109) states that if an independent random variable is significant in number (say above 100 observations) and is distributed identically, then with a few exceptions, the distribution of their numbers tends to a normal distribution. This is because the number of variables increases without limit. The data used in this study consisted of 176 observations, so the data is extensive, and the error term is considered to follow a normal distribution.

**Table 7.** Results of the Normality Assumption Test

| Component | Jarque-Bera | df | Prob. |
|---|---|---|---|
| 1 | 5.263.605 | 2 | 0.0000 |
| 2 | 2.723.170 | 2 | 0.0000 |
| 3 | 5.801.842 | 2 | 0.0550 |
| Joint | 3.255.332 | 6 | 0.0000 |

**Homoscedasticity.** Homoscedasticity is a condition where the disturbance term has a constant variance. The consequence obtained if the data does not have a constant variance is an inefficient estimation result that remains consistent and unbiased. Data homoscedasticity was tested in this study using the Breusch-Pagan-Godfrey test, which was compared with $\chi2(\alpha,m\text{-}1)$.

Table 8 presents the results of the Breusch-Pagan-Godfrey test, which shows that the p-value is more significant than the five percent significance level. The Breusch-Pagan-Godfrey test concludes that there is insufficient evidence to state that the variance of the disturbance term is not constant. Hence, the VECM model meets the assumption of homoscedasticity.

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**Table 8.** Results of the Homoscedasticity Assumption Test

| Chi-sq | df | Prob. |
|---|---|---|
| 2.287.724 | 228 | 0.4732 |

**Impulse Response Function (IRF).** Impulse Response Function (IRF) captures the impact of one standard deviation shock on another variable, even if the impact is negligible. Figure 4 shows the visualization of IRF for the inflation variable.

The leftmost image (response of d(link) to d(link)) shows the shock of inflation to itself, which, of course, causes an increase in inflation. The impact of the shock of inflation itself produces results that vary up and down but, on average, above 0.004 percent. The middle image (response of d(link) to d(money)) shows the shock of the electronic money transaction rate to inflation. As expected, the shock from the electronic money transaction rate causes an increase in inflation. The rightmost image (response of d(link) to d(lnapmk)) shows the shock of the APMK transaction rate to inflation. Like the shock given by the electronic money transaction rate, inflation is also affected by an increase due to the shock from the APMK transaction rate. The effect was not as significant as the shock to the electronic money transaction value rate, where the increase only lasted until the seventh month and then decreased until it reached equilibrium in the eighth month.

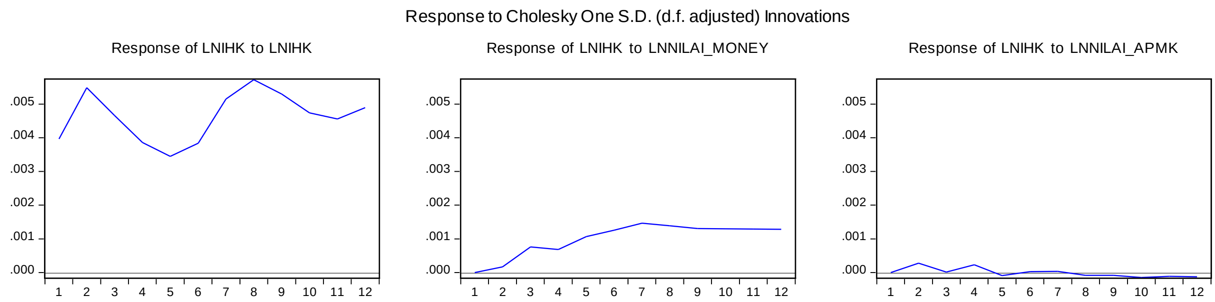


**Figure 4.** Visualization of IRF Inflation

**Forecast Error Decomposition Variance (FEDV).** FEDV is used to determine which variable shock has the most influence on the diversity of an endogenous variable. Table 9 presents a table of the decomposition of the diversity of the endogenous inflation variable.

The diversity of inflation is undoubtedly predominantly contributed by its shock, whereas in the first month, there was no contribution from the other two variables. The rate of electronic money and APMK transaction values only showed a role starting in the second month, where the rate of electronic money transaction values contributed 0.05 percent of the diversity. In comparison, the rate of APMK transaction values contributed 0.16 percent of the diversity. However, the diversity contributed by the rate of APMK transaction values did not increase consistently; in fact, the diversity by the rate of electronic money transaction values increased to contribute 5.12 percent of the diversity in month 12.

**Table 9.** Forecast Error Decomposition Variance (FEDV) of Inflation

| Period | S.E. | LNIHK | LNNILAI_MONEY | LNNILAI_APMK |
|---|---|---|---|---|
| 1 | 0,003970 | 100,0000 | 0,000000 | 0,000000 |
| 2 | 0,006781 | 99,77970 | 0,056809 | 0,163494 |
| 3 | 0,008266 | 99,00135 | 0,888448 | 0,110203 |

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| | | | | |
|---|---|---|---|---|
| 4 | 0,009152 | 98,57013 | 1,279356 | 0,150513 |
| 5 | 0,009840 | 97,57989 | 2,280468 | 0,139641 |
| 6 | 0,010639 | 96,53951 | 3,340498 | 0,119990 |
| 7 | 0,011912 | 95,72311 | 4,180603 | 0,096288 |
| 8 | 0,013293 | 95,47168 | 4,446562 | 0,081760 |
| 9 | 0,014372 | 95,30305 | 4,623581 | 0,073370 |
| 10 | 0,015191 | 95,05812 | 4,866025 | 0,075854 |
| 11 | 0,015914 | 94,83333 | 5,092478 | 0,074193 |
| 12 | 0,016699 | 94,71380 | 5,212902 | 0,073296 |

## CONCLUSION

This study shows that digitalizing the financial sector through non-cash payment instruments such as electronic money and APMK positively affects inflation. According to the previous theory, an increase in electronic money transactions can cause an increase in inflation through an increase in the amount of money in circulation M1. In addition, providing discounts or cashback in transactions using electronic money also affects inflation through the difference in the value of goods and the float of electronic money. The difference in the value of goods causes an increase in prices because no one bears the difference in the amount of money and the price in the quantity theory of money, increasing inflation. Meanwhile, APMK makes demand deposits and saving deposits, part of M2, already function like paper money. People are increasingly fond of using APMK because the returns obtained will be higher if they transfer the paper money they have to demand/save deposits without losing the function of paper money in transactions.

This study shows the need for government awareness of the negative impact of using non-cash payment instruments on inflation and its positive impact on economic growth. The government needs to regulate and create limits that can balance the impact of economic growth and inflation from using non-cash payment instruments. In addition, further research should focus on analyzing the use of non-cash payment instruments in urban areas, where the use of non-cash payment instruments is more massive and significantly influences the economy.

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