

Research Article

## Analysis of Payment System Digitalization in Achieving Rupiah Stability and Financial System Stability in Indonesia

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**Abstract:** The purpose of this study is to examine how the growth of digital payment systems has affected Indonesia's financial system and rupiah stability. More people are using digital payment methods like e-money, credit cards, debit cards, RTGS, and QRIS as a result of technical advancements. Additionally, Bank Indonesia still encourages the adoption of digital payment methods to speed up, secure, and streamline transactions. The Two Stage Least Squares (TSLS) method is used in this study's simultaneous regression model, which employs secondary data from 2020 to 2024. The findings indicate that while inflation has a positive but negligible impact on the exchange rate, the use of credit cards and RTGS has a considerable positive impact. In the meantime, debit cards and e-money significantly reduce inflation. Inflation is significantly reduced by QRIS and the exchange rate. In order to maintain Indonesia's economic stability, it is crucial to keep enhancing literacy and security when using digital payment methods.

**Keywords:** Digital-Payment System; Rupiah Stability; Financial-System Stability.

### 1. Backgrounds

The central bank with the authority to uphold Indonesia's economic stability is Bank Indonesia. In order to preserve the value of the rupiah and promote economic expansion, Bank Indonesia, an autonomous organization, is in charge of developing and carrying out monetary policy. It is anticipated that these initiatives will keep inflation under control, maintaining the stability of people's purchasing power (Andriani & Mohamad, 2022).

A weaker rupiah, slower economic growth, and higher unemployment are all consequences of high inflation (Nasution & Novalina, 2020). High inflation increases poverty by making it harder for people to meet their basic requirements since costs are rising. Furthermore, the rate of inflation in Indonesia tends to vary every year (Fadhila & Purnamasari, 2021).

Received: May 21, 2025

Revised: June 04, 2025

Accepted: June 18, 2025

Online Available: June 20, 2025

Curr. Ver.: June 20, 2025



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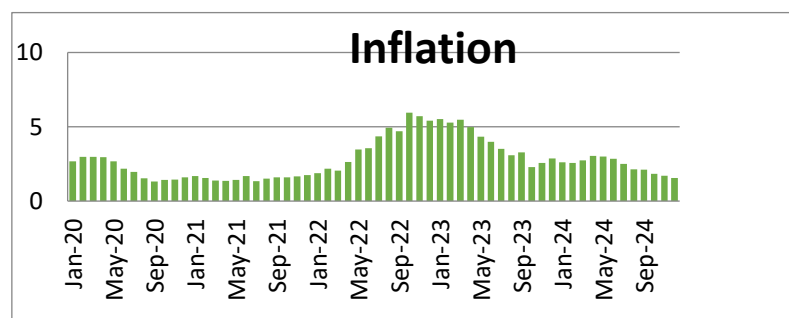


Figure 1. Inflation Trend Graph in Indonesia

Source: Bank Indonesia

There are noticeable variations when looking at the inflation trend graph for the January 2020–December 2024 timeframe.

An excessive money supply that exceeds public demand is the main source of inflation, according to the monetarist perspective (Panjaitan & Wardoyo, 2016). However, Keynesians and other non-monetarists agree with this viewpoint but point out that inflation can also happen without a rise in the money supply. Rather, it can be the consequence of high aggregate demand brought on by rising net exports, government spending, investment, or consumption. Accordingly, both monetary and non-monetary forces have the potential to cause inflation (Ronaldo, 2019).

The landscape of the financial sector, including the role and function of central banks, has undergone tremendous change as a result of the growth of digital technology. In the digital age, central banks, which have historically been entrusted with preserving the stability of the monetary and financial systems, are now confronted with both new opportunities and problems. As a result, they now play a bigger role in fostering the development of financial technology while preserving the stability of the financial system in the face of swift change (Silalahi & Ompusunggu, 2024).

Individual and institutional mindsets, behaviors, and relationships have changed as a result of the advent of digital technologies. It has both positive and negative effects, even though it creates a lot of chances for corporate innovation and economic progress (Pratama et al., 2025). The public now expects faster, more accurate, and secure payment options due to technological advancements (Abidin, 2015). Digital payments are becoming more and more preferred by Indonesians over cash these days (Handayani & Soeparan, 2022).

The Theory of Reasoned Action (TRA) was expanded upon by Davis in 1989 with the introduction of the Technology Acceptance Model (TAM). TAM was created to forecast information system adoption and utilization as well as the advantages they offer for work performance (Hatta, 2011). TAM holds that a person's behavioral intention, which is based on two important perceptions, affects how they use information technology (Venkatesh & Davis, 2007): Technology's perceived usefulness (PU) is the conviction that it will improve performance. The idea that technology will be simple to use is known as perceived ease of use, or PEOU.

A payment system, as defined by Law No. 23 of 1999, is a collection of regulations, organizations, and procedures that make it easier to conduct business or transfer money. The payment system has changed throughout time to incorporate infrastructure, suppliers, instruments, and cross-border funding sources (Atmaja & Paulus, 2022). In order to support monetary policy, preserve financial stability, and improve economic efficiency, the payment system is essential. There are two types of payment systems in Indonesia:

Cash payment systems, which use actual money (coins and banknotes), are usually employed for small-scale transactions but are less effective for larger ones. According to Andrianto et al. (2019), non-cash payment systems make use of tools like paper, cards, or electronic media, which are thought to be more useful and effective.

Achieving monetary and financial stability requires an effective and safe payment system. As a result, the central bank is essential to the management of the payment system, especially in terms of overseeing, administering, and regulating it. This seeks to manage a number of risks, including systemic risks and those resulting from regular transactions, such as credit and liquidity risks (Subari & Sri, 2017).

Maintaining public confidence in the various payment instruments used in economic activity requires improving payment system security (Lintangsari et al., 2018). Furthermore, in order to guarantee that consumers understand the risks and obligations associated with utilizing digital payment systems, consumer education is essential. Digital payment systems can foster secure transactions, promote digital economic growth, and increase user trust by protecting security and privacy (Mulligan, 2014).

## 2. Research Methodology

### 2.1. Simultaneous Regression Method

The research methodology used in this study is associative/quantitative. The goal of associative/quantitative research, according to Rusiadi (2023), is to ascertain the strength of the correlation and the pattern or type of effect between two or more variables. This kind of study aids in the creation of hypotheses that explain, forecast, and regulate particular occurrences.

A simultaneous model is used to facilitate quantitative analysis because it can explain long-term reciprocal interactions by treating economic variables as endogenous.

Bank Indonesia (BI), the Indonesian Payment System Association (ASPI), and Satu Data Perdagangan (Ministry of Trade) provided the secondary data used in this study, which covered the years January 2020–December 2024.

After identifying the simultaneous equations, the Two Stage Least Squares (TSLS) approach is applied. E-money, RTGS, credit and debit cards, QRIS, inflation, and currency rates are among the variables that are used. The construction of the econometric model is as follows:

First Equation:

**KURS= (RTGS, KK, and INF)**

**LOG(KURS)= C(10)+C(11)\*LOG(RTGS)+C(12)\*LOG(KK)+C(13)\*LOG(INF)**

Second Equation:

**INF= (EM, KD, QRIS, and KURS)**

**LOG(INF)=**

**C(20)+C(21)\*LOG(EM)+C(22)\*LOG(KD)+C(23)\*LOG(QRIS)+C(24)\*LOG(KURS)**

Where:

KURS = Exchange rate

INF = Inflation

EM = E-money

RTGS = Real-Time Gross Settlement

KK = Credit card

KD = Debit card

QRIS = Quick Response Code Indonesian Standard

To ascertain whether the equation is under-identified (unable to be recognized), exactly-identified (identified precisely), or over-identified (more than one solution exists), simultaneous identification is then performed.

**Table 1.** Equation Identification Test

Dependent Variable	K-k	m-1	Result	Identification
Exchange Rate (Equation I)	5-2	3-1	3>2	<i>Over identified</i>
Inflation (Equation II)	5-2	4-1	3=3	<i>Exactly identified</i>

TSLS analysis can be carried out following verification that the simultaneous equations have been accurately recognized. The model must then meet the traditional assumptions, which are examined through the use of autocorrelation and data normality tests.

### 3. Results and Discussion

First, the results are tested using the traditional assumptions, namely the autocorrelation and normalcy tests.

The Jarque-Bera value is used in the normality test; if the probability is higher than 0.05, the data are deemed to be normally distributed. In the meanwhile, the Adj. Q-Stat probability is referred to as the autocorrelation test; autocorrelation is present if the chi-square value is less than 0.05 (Fikri, 2021).

**Table 2.** Classical Assumption Test

Classical Assumption Test	
Jarque-Bera 0.3607>0.05	Prob.Adj Q-Stat 0,000<0,05
Passed the normality test	Passed the autocorrelation test

The data in this study satisfy the requirements of the classical assumptions, according to the findings of the tests of the classical assumptions mentioned above. As a result, the simultaneous equations can be accurately estimated under these circumstances.

**Table 3.** TSLS Estimation Test Results

	Coefficient	Std. Error	t-Statistic	Prob.
C(10)	5.770385	0.554469	10.40705	0.0000
C(11)	0.078448	0.029706	2.640819	0.0095*
C(12)	1.078190	0.132079	8.163212	0.0000*
C(13)	0.018948	0.011603	1.632984	0.1054
C(20)	-87.17770	41.75528	-2.087825	0.0391
C(21)	-2.013888	0.770913	-2.612341	0.0103*
C(22)	-7.172339	2.444033	-2.934633	0.0041*
C(23)	2.045215	0.415537	4.921855	0.0000*
C(24)	14.86631	5.530418	2.688099	0.0083*
Determinant residual covariance		7.70E-05		
Equation: LOG(KURS)=C(10)+C(11)*LOG(RTGS)+C(12)*LOG(KK)+C(13)				
*LOG(INF)				
Instruments: EM RTGS KD KK QRIS C				
Observations: 59				
R-squared	0.594305	Mean dependent var		9.614858
Adjusted R-squared	0.572176	S.D. dependent var		0.048558
S.E. of regression	0.031761	Sum squared resid		0.055482
Durbin-Watson stat	1.622460			
Equation: LOG(INF)=C(20)+C(21)*LOG(EM)+C(22)*LOG(KD)+C(23)				
*LOG(QRIS)+C(24)*LOG(KURS)				
Instruments: EM RTGS KD KK QRIS C				
Observations: 59				
R-squared	0.017363	Mean dependent var		0.918462
Adjusted R-squared	-0.055425	S.D. dependent var		0.450775
S.E. of regression	0.463099	Sum squared resid		11.58087
Durbin-Watson stat	1.851369			

\* Significant at  $\alpha = 5\%$ 

Source: EViews Output, 2025

$$\text{KURS} = 5.770385 + 0.078448 * \text{RTGS} + 1.078170 * \text{Credit Card} + 0.018948 * \text{Inflation}$$

According to the estimation results,  $R^2 = 0.5943$  indicates that the variables RTGS, credit cards, and inflation can account for 59.43% of the variation in the exchange rate, with the remaining 40.57% being influenced by factors outside the purview of this study. The t-statistics show that two variables significantly affect the exchange rate at the 5% significance level ( $\alpha = 0.05$ ): a. RTGS, with a probability value of  $0.0095 < 0.05$ ; b. Credit cards, with a probability value of  $0.000 < 0.05$ . As a result, both RTGS and credit cards have a significant impact on the exchange rate, while inflation, with a probability of  $0.1054 > 0.05$ , has no significant influence. The coefficient value of RTGS is 0.078448, with a probability of 0.0095, indicating that RTGS has a positive and significant effect on the exchange rate.

With a coefficient of 1.078190, credit cards also have a positive and considerable impact on the exchange rate; a 1 percent rise in credit card use would result in a 0.0107819 percent increase in the exchange rate.

Achsan et al. (2020), who contend that the price of imported items rises when the rupiah depreciates, influencing the quantity of rupiah spent, confirm this finding. Credit card bills rise when purchases are made with credit cards, thus increasing the risk of default.

However, the inflation coefficient produces a result that is positive but not statistically significant. This contradicts the results of Silitonga et al. (2017), who discovered that inflation significantly and negatively affects the exchange rate. Due to higher production costs (such as labor wages and raw materials), rising inflation brought on by rising prices can lower production levels, which in turn lowers exports and raises imports. In essence, higher prices correspond to a drop in the currency's worth.

$$\text{Inflation} = -87.17770 - 2.013888 * \text{EMoney} - 7.172339 * \text{Debit Card} + 2.045215 * \text{QRIS} + 14.86631 * \text{Exchange Rate}$$

E-money, debit cards, QRIS, and exchange rates only account for 1.73% of the fluctuation in inflation, according to the R-squared ( $R^2$ ) value of 0.0173; other factors not covered in this study account for the other 98.27%.

With a probability value of 0.0083 (less than the 5% significance level), the t-statistic results show that the exchange rate has a positive and significant impact on inflation. This suggests that inflation tends to rise as the exchange rate declines.

With an e-money coefficient of  $-2.01$ , a 1% increase in e-money transactions will result in a 2.01% decrease in inflation. According to N. E. Putri and Yewiwati (2024), this implies that an increase in non-cash transactions may aid in containing inflation.

Additionally, with a p-value of 0.0041 and a coefficient of  $-7.17$ , the debit card variable exhibits a negative and substantial impact on inflation. This suggests that using debit cards aids in better financial management, transaction efficiency, and spending control (Rosanti & Maulida, 2022).

Conversely, with a coefficient of 2.04 and a p-value of 0.000, QRIS significantly and favorably affects inflation. This result runs counter to earlier study that demonstrated using QRIS lowers inflation (R. D. Putri & Murialti, 2025).

With a p-value of 0.0083 and a coefficient of 14.87, the exchange rate (KURS) significantly and strongly influences inflation. Imported items cost more when the currency rate declines, which raises inflation (Sari & Nurjannah, 2023). In the end, this devaluation affects inflation by shifting consumer preferences toward domestic products, boosting local demand, and raising manufacturing costs if raw materials are imported (Ginting, 2016).

#### 4. Conclusions

According to the study of the simultaneous equation model: While inflation has a positive but insignificant effect on the currency rate, RTGS and credit card transactions have a positive and considerable impact. While QRIS and the exchange rate have a positive and large impact on inflation, the use of debit cards and e-money has a negative and considerable impact.

#### References

- [1] M. S. Abidin, "Dampak Kebijakan E-Money di Indonesia sebagai Alat Sistem Pembayaran Baru," *\*Jurnal Akuntansi AKUNESA\**, vol. 3, no. 2, pp. 1–21, 2015.
- [2] W. Achsan, N. A. Achsan, and B. Bando, "Impact of Macroeconomic Condition on Credit Card Default in Emerging Economy: Empirical Evidence from Indonesia," *\*Int. J. Finance Bank. Res.\**, vol. 6, no. 3, pp. 37–43, 2020, doi: 10.11648/j.ijfbr.20200603.11.
- [3] F. Andriani and R. Mohamad, "Urgensi Bank Sentral Indonesia Dalam Mengendalikan Laju Inflasi Melalui Sektor Riil," *\*Mutawazin: Jurnal Ekonomi Syariah IAIN Sultan Amai Gorontalo\**, vol. 3, no. 1, 2022, doi: 10.54045/mutawazin.v3i1.608.
- [4] Fatihuddi Andrianto, D. Andrianto, and M. A. Firmansyah, *\*Manajemen Bank\**, 2019. [Online]. Available: <http://www.qiaramediapartner.blogspot.com>
- [5] Y. S. Atmaja and D. H. Paulus, "Partisipasi Bank Indonesia Dalam Pengaturan Digitalisasi Sistem Pembayaran Indonesia," *\*Masalah-Masalah Hukum\**, vol. 51, no. 3, pp. 271–286, 2022, doi: 10.14710/mmh.51.3.2022.271-286.
- [6] A. S. Fadhila and A. Purnamasari, "Pengaruh Inflasi Terhadap Pertumbuhan Ekonomi Indonesia," *\*Ekonomika Sharia\**, vol. 7, no. 1, 2021.
- [7] A. A. H. S. Fikri, "Analisis Simultan Sektor Moneter Di Indonesia (Pendekatan Parsial Mundell-Fleming)," *\*J. Ekon. dan Pendidik.\**, vol. 18, no. 1, pp. 95–103, 2021, doi: 10.21831/jep.v18i1.39895.
- [8] A. M. Ginting, "Analisis Faktor-Faktor yang Mempengaruhi Inflasi: Studi Kasus di Indonesia Periode 2004-2014," *\*J. Pusat Penelitian Badan Keahlian DPR RI\**, vol. 21, no. 1, pp. 37–58, 2016.
- [9] N. L. P. Handayani and P. F. Soeparan, "Peran Sistem Pembayaran Digital Dalam Revitalisasi UMKM," *\*Transformasi: J. Econ. Bus. Manag.\**, vol. 1, no. 3, pp. 20–32, 2022, doi: 10.56444/transformasi.v1i3.425.
- [10] A. J. Hatta, "Model of Information System Operation Based on Technology Acceptance Model for Micro Financial Institutions," *\*J. Econ. Bus. Account. Ventura\**, vol. 14, no. 3, pp. 251–268, 2011, doi: 10.14414/jebav.v14i3.52.
- [11] N. N. Lintangari, N. Hidayati, Y. Purnamasari, H. Carolina, and W. F. Ramadhan, "Analisis Pengaruh Instrumen Pembayaran Non-Tunai Terhadap Stabilitas Sistem Keuangan Di Indonesia," *\*J. Din. Ekon. Pembang.\**, vol. 1, no. 1, p. 47, 2018, doi: 10.14710/jdep.1.1.47-62.
- [12] D. K. Mulligan, "The enduring importance of transparency," *\*IEEE Secur. Priv.\**, vol. 12, no. 3, pp. 61–65, 2014.
- [13] L. N. Nasution and A. Novalina, "Pengendalian Inflasi di Indonesia Berbasis Kebijakan Fiskal dengan Model Seemingly Unrelated Regression," *\*Ekonomikawan: J. Ilmu Ekon. Stud. Pembang.\**, vol. 20, no. 1, 2020, doi: 10.30596/ekonomikawan.v%vi%i.4306.
- [14] M. N. Y. Panjaitan and Wardoyo, "Faktor-faktor yang mempengaruhi Inflasi di Indonesia," *\*J. Ekon. Bisnis\**, vol. 21, no. 3, 2016, doi: 10.24036/ecosains.11065357.00.
- [15] M. F. Pratama et al., "Transformasi Digital Ekonomi dalam Mendukung Inklusi Keuangan di Indonesia," *\*MUQADDIMAH: J. Ekon. Manaj. Akunt. Bisnis\**, vol. 3, no. 1, pp. 65–85, 2025, doi: 10.59246/muqaddimah.v3i1.1184.
- [16] N. E. Putri and Yewiwati, "Hubungan Antara E-Money dan Inflasi di Indonesia," *\*Media Riset Ekon. Pembangunan (MedREP)\**, vol. 1, no. 3, pp. 295–303, 2024. [Online]. Available: <https://medrep.ppj.unp.ac.id/index.php/MedREP/login>
- [17] R. D. Putri and N. Murialti, "Pengaruh E-Money dan Qris terhadap Inflasi di Indonesia," *\*J. Pendidik. Tambusai\**, vol. 9, pp. 4620–4626, 2025.
- [18] R. Ronaldo, "Pengaruh Inflasi dan Tingkat Pengangguran Terhadap Pertumbuhan Ekonomi Makro di Indonesia," *\*J. Ekon.\**, vol. 21, no. 2, 20