

Analysis of the effect of non-cash payment systems on Indonesia's economic growth for the period 2013-2023

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ABSTRACT

This study focuses on analyzing the effect of the use of non-cash payment systems on Indonesia's economic growth. The data used in this study are secondary data in the form of quarterly time series with the period 2013-2023. The method used is quantitative with data collection techniques through literature study and multiple linear regression analysis techniques with Ordinary Least Square (OLS). The results showed that non-cash transactions using credit cards, debit cards/ATMs, and m-banking had a positive and significant effect on economic growth. The effect is shown partially and simultaneously.

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1. INTRODUCTION

Over time, the non-cash payment system continues to develop. Starting from a paperbased or paper-based non-cash payment system, such as checks and current accounts, then developing into card-based, such as debit / ATM cards, credit cards, and e-money cards (Ramadanti & Kistanti, 2024). Then it was developed again to be digital-based, such as internet banking, mobile banking, and financial technology.

Cashless payment has many advantages that make it popular among the public. According to Kaur (2020), one of the advantages of a non-cash payment system is that noncash payments are more efficient than cash payments. In addition, the non-cash payment system is more transparent so that it can reduce transaction errors because it is directly validated by the electronic system. The use of non-cash payments is considered safer than payments using cash. Non-cash payments can prevent robberies and other cash-related crimes (Armey et al., 2014)

The payment system is a concern of Bank Indonesia because if the stability of the payment system is disrupted, it can disrupt the stability of the financial system and ultimately will also disrupt the economic system. Therefore, Bank Indonesia established the National NonCash Movement (GNNT). This is to reduce the use of cash by the public (Rukmana, 2016).

There are several payment instruments that are still developing and used by people in Indonesia. First, debit/ATM cards which are part of non-cash payment instruments using cards used to withdraw cash and move money. Debit/ATM card holders can fulfill their obligations by depositing money with issuers or institutions that have the authority to collect funds, then the balance on the debit/ATM card will be reduced from all cardholder deposits (Bank Indonesia, 2012).

Third, kredit cards are part of payment instruments using cards that can be used to make payment transactions in an economic activity or can be used to withdraw cash. The issuer fulfills the payment

obligation first so that the holder can make a transaction, then at an agreed time the holder must pay off his obligations to the issuer (Bank Indonesia, 2012).

Fourth, m-banking is a service system created by banks used for transactions that can be accessed by customers directly through mobile devices (Ardi & Subchan, 2015). The existing m-banking services in Indonesia include BCA Mobile from BCA, Livin' from Mandiri, BRIImo from BRI, and so on.

The covid-19 pandemic has limited interaction and face-to-face contact, leading to the growing digitalization of the economy through the use of various non-cash payment instruments. At the 43rd ASEAN 2023 Summit, Deputy Minister of SOEs, Rosan Roeslani, noted that the shift towards a digital economy in Indonesia can be clearly seen through the increase in non-cash payments.

The increasing dependence on non-cash transactions signals that non-cash payment instruments have been accepted by the community. The non-cash payment system has gradually become a lifestyle of the Indonesian people due to the convenience of transactions (Lintangsari et al., 2018). The ease of the transaction can encourage a decrease in transaction costs and ultimately stimulate economic growth (Dias in Herlina & Firdaus, 2022)

The role of non-cash payment systems will have a significant impact on a country's economy. Especially with the increasingly dominant role of large-value payment systems compared to small-value ones. Besides having a direct impact on the people who use it, the efficiency and convenience of non-cash payment systems also support the overall national financial system (Marginingsih & Sari, 2019).

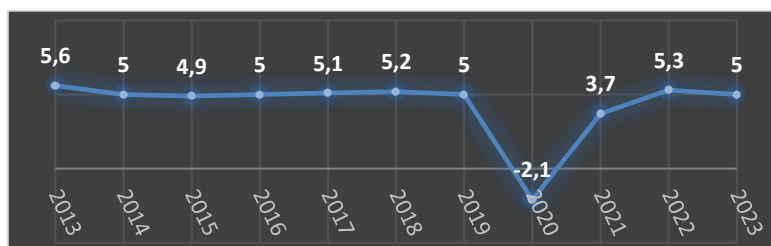


Figure 1. Indonesia's Economic Growth Rate 2013-2023

Source: Central Bureau of Statistics (data processed)

According to Tee and Ong's research (2016) states that non-cash transactions can lead to increased public consumption, economic development, and in the long run the use of e-money affects economic growth. The increase in non-cash payment systems using e-money can encourage various business activities. Economic actors will be encouraged to transact if the barriers to transactions are reduced, both in terms of cost, energy, and time.

Marginingsih and Sari (2019) in their research showed that non-cash transactions have a positive and significant effect on Indonesia's economic growth. This is shown both partially and simultaneously. The increasing use of non-cash payment instruments can cause a decrease in the demand for money in the community.

A decrease in the demand for money can theoretically lead to a decrease in interest rates in the money market as people will choose to use non-cash means of payment coupled with saving money in the bank. This makes borrowing costs more competitive, which in turn increases corporate investment, national real output, economic growth, and public welfare.

According to research by Mashabi and Wasiaturrahma (2021), electronic payment systems, especially transactions using e-money and debit cards, have a positive and significant impact in the long term on economic growth. Meanwhile, transactions using credit cards show significant negative results on economic growth. Transactions using e-money and debit cards give a positive response to economic growth in Indonesia, which means that transactions using electronic payments tend to have the opportunity to grow in Indonesia.

In Lestari's research (2017), the results of which state that non-cash payment instruments for the variable value of e-money transactions have a significant positive effect on Indonesia's economic growth, as well as the variable value of credit card transactions also has a significant effect on economic growth. Meanwhile, the value of debit/ATM card transactions has an insignificant effect on economic growth. The results of this study indicate that not all payment instruments in Indonesia have a significant influence on the increase in economic growth.

Based on the description above, it can be seen that there is a research gap or research gap with previously conducted studies, researchers want to re-examine and try to multiply sources and literature. In this study, researchers examined post-covid-19 data, where the use of non-cash payment systems has been widely used by the public.

2. METHOD

This research is a quantitative study with the aim of analyzing how much influence the non-cash payment system has on Indonesia's economic growth. The analysis technique used is using multiple linear regression analysis method with Ordinary Least Square (OLS) model. The data used is secondary data in the form of quarterly time series of transaction values of credit card transaction values, debit card/ATM transaction values, m-banking transaction values and economic growth, namely gross domestic product (GDP) for the period 2013 to 2023. So that the sample in this study was 220 samples.

Table 1. Operational Definition of Variables

Variables	Indicator	Operational Definition
Credit Card (X1)	Value of credit card transactions	Credit cards are one of the products of banks that are intended to provide convenience in transaction activities, both with the credit card issuing bank itself and with sellers of goods or services that accept credit cards as a means of payment.
Debit Card/ATM (X2)	Value of debit card/ATM transactions	Debit/ATM card is an electronic payment instrument provided by banks to account holders that can be used to conduct electronic transactions such as taking money, checking balances, and transferring money from ATM machines without the need to be served by a teller at the bank.
M-Banking (X3)	Value of transactions m-banking	M-banking is one of the banking services that can be accessed through mobile devices such as smartphones. The existence of m-banking can allow users to perform various kinds of financial transactions, such as sending money, paying bills, and checking balances, directly from their mobile devices.
Economic Growth (Y)	Gross Domestic Product (GDP) at constant prices	Economic growth is the process of increasing output produced by a country. The calculation of economic growth in this study is taken from the value of Gross Domestic Product (GDP) at constant prices.

The multiple linear regression equation used is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e \quad (1)$$

Where:

- Y = Economic growth as measured by GDP data
- β_0 = Constant
- β_1 = Regression coefficient of e-money transaction value
- X1 = E-money transaction value
- β_2 = Regression coefficient of credit card transaction value
- X2 = Credit card transaction value
- β_3 = Regression coefficient of m-banking transaction value
- X3 = Value of m-banking transactions
- e = Residual/error

3. RESULTS AND DISCUSSION

3.1 Normality Test

The normality test is used to test whether the dependent variable and independent variable linear regression models have a normal distribution or not. A good regression model is to have a normal or near normal distribution of residual data. In this study, how to detect the normality of residual data is done with the Jarque Bera test.

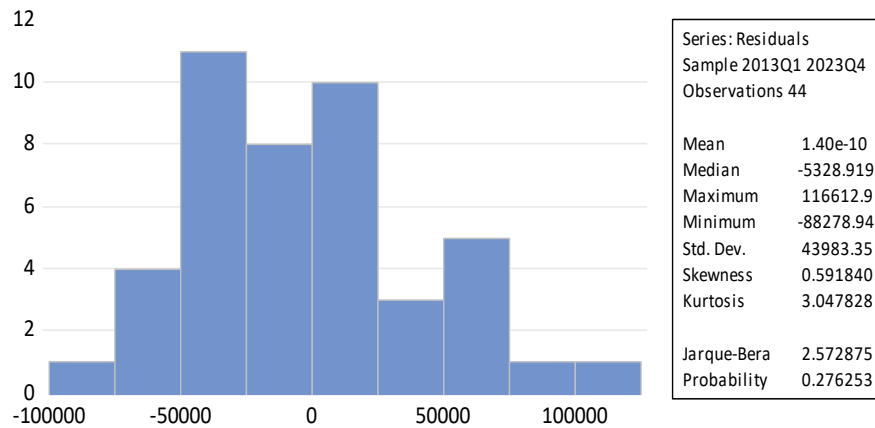


Figure 2. Normality Test Results

Source: Eviews 12 Data Processing Results (2024)

Based on the results of the residual normality test, it can be seen that the Jarque Bera value is 2.635012 with a probability value of 0.267802 which > 0.05 which means that the residuals have a normal distribution, so the residual normality assumption is met.

3.2 Multicollinearity Test

This test is needed to detect whether the regression model found a correlation between independent variables. A good regression model is that there is no multicollinearity. Multicollinearity can be seen from the tolerance value and variance inflation factor (VIF).

Table 2. Multicollinearity Test Results

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	2.56E+09	54.19724	NA
X1	0.416615	48.49730	1.668061
X2	0.000913	50.89877	2.417179
X3	9.32E-05	4.753367	2.454551

Source: Eviews 12 Data Processing Results (2024)

In the table above, it can be seen that the VIF value for all independent variables has a value smaller than 10 and the tolerance value is greater than 0.10. So it can be concluded that this study does not have symptoms of multicollinearity between independent variables.

3.3 Autocorrelation Test

The autocorrelation test is used to determine whether or not there is a correlation between confounding errors in period t (current) with confounding errors in period t-1 (previous) in the regression model. One way that can be done to detect the presence or absence of autocorrelation is the Durbin-Watson (DW) test.

Table 3. Autocorrelation Test Results

Durbin-Watson stat	1,769760
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Source: Eviews 12 data processing results (2024)

It can be seen in the table above that the dw stat value is 1.769760, with the amount of data (n) = 44 and (k) = 3, the dl value obtained is 1.3749 and du is 1.6647. Then the value of 4-dl = 2.6251 and 4-du = 2.3353. Based on these results, it can be concluded that du < dw < 4 du or 1.6647 < 1.769760 < 2.3353. It means that there is no positive or negative autocorrelation in the regression model used.

3.4 Heteroscedasticity Test Results

The heteroscedasticity test is used to test whether in the regression model there is an inequality of variance from the residuals of one observation to another. The consequence if there is heteroscedasticity in the regression model is that the estimator obtained is not efficient, both in small and large samples. One way to determine whether or not there is a heteroscedasticity problem is to use the Glejser test.

Table 4. Heteroscedasticity Test Results

F-statistic	2.391281	Prob. F(3,40)	0.0829
Obs*R-squared	6.691189	Prob. Chi-Square(3)	0.0824

Scaled explained SS	6.374673	Prob. Chi-Square(3)	0.0947
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Source: Eviews 12 Data Processing Results (2024)

Based on the table above, it can be seen that the p-value indicated by the Prob. ChiSquare on Obs*R-Squared, which is 0.0610, where the p-value is $0.0610 > 0.05$, H_0 is accepted, which means there is no heteroscedasticity problem in the regression model.

3.5 Regression Test

Table 5. Regression Test Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1356453.	50612.15	26.80093	0.0000
X1	1.520550	0.645457	2.355772	0.0235
X2	0.622015	0.030224	20.58029	0.0000
X3	0.092087	0.009657	9.536275	0.0000
R-squared	0.981622	Mean dependent var		2551844.
Adjusted R-squared	0.980243	S.D. dependent var		324441.4
S.E. of regression	45602.91	Akaike info criterion		24.37984
Sum squared resid	8.32E+10	Schwarz criterion		24.54204
Log likelihood	-532.3565	Hannan-Quinn criter.		24.43999
F-statistic	712.1619	Durbin-Watson stat		1.769760
Prob (F-statistic)	0.000000			

Source: Eviews 12 Data Processing Results (2024)

Based on the table of analysis results above, the regression equation results are as follows:

$$Y = 1356453 + 1.520550 X1 + 0.622015 X2 + 0.092087 X3 \quad (2)$$

The regression equation above can be made an interpretation of the model as follows: The regression test results show a constant value of 1356453, which means that if the independent variable is equal to zero, then GDP (Y) is 1356453.

The regression coefficient value of the credit card variable (X1) is 1.520550, which means that if credit card transactions increase by 1 unit assuming other independent variables are fixed or constant, then GDP (Y) will increase by 1.520550. The regression coefficient value of the debit / ATM card variable (X2) is 0.622015, which means that if the debit / ATM card transaction increases by 1 unit assuming that the other independent variables are fixed or constant, then GDP (Y) will increase by 0.622015. The regression coefficient value of the m-banking variable (X3) is 0.092087, which means that if the m-banking transaction increases by 1 unit assuming other independent variables are fixed or constant, then GDP (Y) will increase by 0.092087.

The results of the analysis show that the significant value of the effect of variable X1 on variable Y is 0.0235, where $0.0235 < 0.05$, which means that there is a significant effect on credit card transactions on Indonesia's economic growth/GDP. The existence of credit cards can boost the economy because it increases the usability of money by moving unproductive ones to be more productive. The money stored in the bank will be channeled back by the bank to those in need, so that it can be used for transactions or productive economic activities. The results of this study are in line with research by Nursari (2019), Lestari (2017), Susilawati and Putri (2019) which states that credit cards have a significant positive effect on Indonesia's economic growth. However, the results of this study contradict the research of Mashabi and Wasiaturrahma (2021) which states that credit cards have no significant effect on Indonesia's economic growth.

The significant value for the effect of variable X2 on variable Y is 0.0000, where $0.0000 < 0.05$, which means that there is a significant effect on debit/ATM card transactions on Indonesia's economic growth/GDP. This is because transactions using debit/ATM cards can affect the demand for money. Demand for cash (M1) is expected to decrease due to the substitution power of using non-cash payment instruments, while M2 has increased due to the increasing amount of money entering the banking system. The ease of transactions using noncash payment instruments (debit/ATM cards) causes faster money circulation. In the transaction process with debit/ATM cards, it can make it easier for consumers to get the desired goods even though they are large in number. This convenience makes many goods desired by consumers and requires producers to provide more goods needed. With the existence of non-cash payment transactions using cards, especially debit/ATM cards, it can also help producers to get or buy the materials needed to expedite the

production process quickly and efficiently. This proves that the value of debit/ATM card transactions has a positive and significant effect on economic growth. The results of this study are in line with research by Nursari (2019), Sylveste Afaha (2019), Marginingsih (2019), Mashabi and Wasiaturrahma (2021) which state that transactions using debit/ATM cards have a significant positive effect on Indonesia's economic growth. However, the results of this study contradict Lestari's research (2017) which states that debit/ATM cards have a significant negative effect on Indonesia's economic growth.

The significant value for the effect of variable X3 on variable Y is 0.0000, where $0.0000 < 0.05$, which means that there is a significant effect on m-banking transactions on Indonesia's economic growth/GDP. This is because m-banking makes it easier for people to access banking services easily and efficiently. People who previously did not have a bank account or access formal banking services can connect to the financial system, opening the door for them to save money and make transactions easily. The growth of m-banking transaction value, which continues to increase from year to year, shows that m-banking is increasingly popular and in demand among people in Indonesia. One of the reasons for the growth of m-banking transaction value is that banks are able to provide features in m-banking with variations that are needed by the community. Even banks work with e-commerce services to make it easier for people to make payments, so that it makes its own attraction for the community. The convenience facilitated by banks can encourage public consumption and also encourage Indonesia's economic growth. This research is in line with the research of Chohan et al (2017), the research is qualitative research, the results show that transactions using m-banking provide benefits in the form of increased GDP growth (economic growth). Sylveste Afaha's research (2019), which states that m-banking has a significant positive relationship with economic growth.

The probability value of the F-statistic is 0.000000, where $0.000000 < 0.05$, it can be concluded that simultaneously the credit card variable (X2), debit card/ATM (X3), and m-banking (X4) have a significant effect on Indonesia's economic growth. The results of this simultaneous research between these four variables have never been done so there is no similar theory with this research. However, the accuracy of these results can be seen from the processed results of eviws 12 above. From this research, a new theory can be born that credit cards, debit cards/ATMs, and m-banking have a significant effect on Indonesia's economic growth. This means that if there is a stable increase in the value of credit card transactions, debit cards/ATMs, and m-banking simultaneously, it can encourage the real sector which in turn can affect Indonesia's economic growth. Meanwhile, the R-Square value is 0.981622. The results of this statistical calculation mean that there is a relationship between credit card, debit card/ATM, and m-banking variables and the GDP variable. This means that overall the independent variables in the research model can explain their influence on the dependent variable by 98.2%. The other 1.8% is explained by other variables outside the model.

4. CONCLUSION

Based on the results and discussion described, it can be concluded that credit cards show significant results in a positive direction. This means that an increase in the trend of using credit cards in transaction activities can affect economic growth. Debit/ATM cards show significant results with a positive direction. When debit/ATM card transactions increase, the economic growth variable will also increase. M-banking shows significant results with a positive direction. When m-banking transactions increase, the economic growth variable will also increase. Simultaneously, all independent variables, namely credit cards, debit/ATM cards, and m-banking, have a significant effect on Indonesia's economic growth.

For future research, this research can be developed by adding other non-cash payment variables, such as Quick Response Code Indonesian Standard (QRIS) so that it can analyze deeper and better.

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