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.
Keywords : **Economic Growth, Credit Card, Debit Card/ATM, M-Banking**

A. INTRODUCTION

The development of technology and science at this time affects various fields, one of which affects the economic sector including finance and banking. Developments in finance and banking are in line with the development of the payment system in Indonesia. Technological advances in the payment system have shifted the role of cash as a means of payment to noncash payments that are more efficient and economical.

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 (Kredina, et al, 2022; Grzelczak & Soliwoda, 2022). 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; Jiang, & Liang, 2021; Bakhshiyev, 2020).

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 (Indonesian Bank, 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 (Indonesian Bank, 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, BRImo 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).
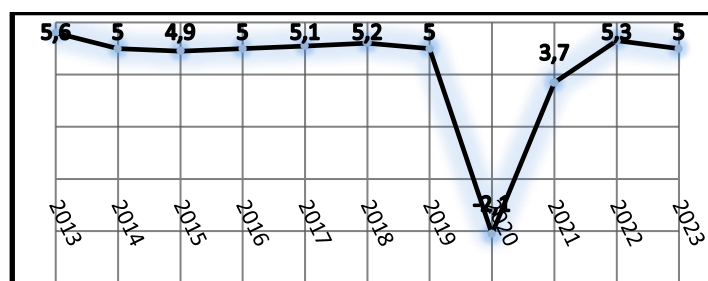
Source: Central Bureau of Statistics
Figure 1. Indonesia's Economic Growth Rate 2013-2023

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.

B. LITERATURE REVIEW
1. Money Demand Theory

Irving Fisher in his book entitled the Purchasing power of money introduced the theory of the demand for money with a velocity approach or money circulation. Irving Fisher explained that money spent is equal to money received, which means, money functions as a medium of exchange. Irving Fisher also revealed that the demand for money is a highly liquid interest for transaction motives. Irving Fisher introduced the transaction equation of money demand as follows:

$$MV = PT$$

Where the value of goods sold multiplied by the average price of these goods (P) must be equal to the amount of money in society (M) multiplied by the average turnover of money (V). The volume of transactions (T) in a given period is determined by the level of output of society (national income) and can be considered to have a certain value in a year.

According to Fisher and the classics, money demand is always assumed to be at full employment. Velocity is determined by factors such as institutions, as well as other factors, such as the level of money demand will be equal to national income. So mathematically it can be written:

$$Md = kPY$$

Where k is the proportion or share of Gross National Product (GNP) that is realized in the form of cash, so the amount is equal to I/VV, while Y is the level of real national income and P is the general price.

2. Innovation Diffusion Theory

This innovation diffusion theory was first proposed by Roger in 1962, which explains how innovations and new technologies are communicated or disseminated

through many channels within a certain period of time, then the innovation is adopted by members of a social system or group of people who have the same goal.

Tee & Ong (2016) in their research also explained the theory of innovation diffusion. According to him, an innovation will spread throughout the community once they hear or know about the innovation, although not in the same period of time the innovation will be adopted by the entire community. Based on this theory, if it is associated with the spread and application of a non-cash payment system where some people now prefer transactions that are fast, safe and efficient. The theory of innovation diffusion in non-cash transactions depends on how quickly people adopt the innovation by switching from cash transactions to non-cash transactions.

3. Relationship between Non-Cash Payment Transaction Value and Economic Growth

According to Sukirno's opinion (in Sastriani, 2020) which states that the occurrence of movements in the non-cash payment system can be used as an initial stage to see economic development. Based on previous research, non-cash payments have a positive influence, which means that if non-cash payments continue to increase, it can reduce transaction costs and the turnover of money will become faster so that it will affect productivity and will ultimately have an impact on output and economic growth.

The innovation and widespread use of non-cash payment instruments such as prepaid cards, debit cards, credit cards and others will cause complications to the use of quantity targets in monetary control. The tendency to use non-cash payment instruments with cards is starting to shift the role of cash payment instruments in the country's economic transactions.

According to Bambang Pramono's research (in Lestari, 2017) , which says that the presence of non-cash payment instruments for the economy provides the benefits of increasing financial efficiency and productivity which encourages real sector activities which in turn can encourage economic growth and improve people's welfare.

In this regard, there is one piece of research evidence by Oyewole (2013) and Lukmanulhakim (2016) which uses non-cash payment variables to analyze their effect on economic growth. The results of his research concluded that non-cash payments have a positive and significant impact on economic growth. The implementation of a non-cash payment system can affect the use of cash in the community. Non-cash payment transactions used by modern economic actors often use data in bank accounts. This means that the payment system is the link between economic activity and money.

C. RESEARCH 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. Thus, the following hypotheses are proposed:

Hypothesis 1 (H1): Credit Card (X1) has significant effect on Indonesia Economic Growth (Y)

Hypothesis 2 (H2): Debit Card/ATM Transaction (X2) has significant effect on Indonesia Economic Growth (Y)

Hypothesis 3 (H3): M-Banking (X3) has significant effect on Indonesia Economic Growth (Y)

Table 1. 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 areintended to provide convenience in transactionactivities, both with the kredit card issuing bank itselfand with sellers of goods or services that accept creditcards 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 m-banking transactions	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 finansial 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:

$$Y = \beta 0 + \beta 1 X1 + \beta 2 X2 + \beta 3 X3 + e$$

Where:
Y = Economic growth as measured by GDP data
β0 = Constant
β1 = Regression coefficient of e-money transaction value
X1 = E-money transaction value
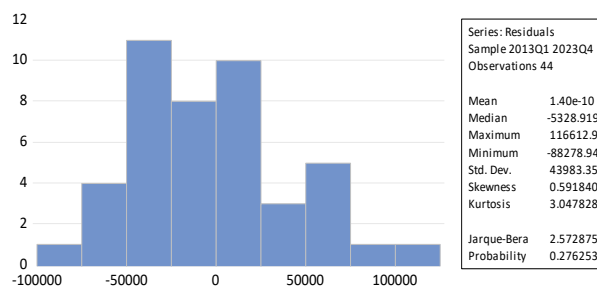β2 = Regression coefficient of credit card transaction value
X2 = Credit card transaction value
β3 = Regression coefficient of m-banking transaction value
X3 = Value of m-banking transactions
e = Residual/error

D. RESULTS AND DISCUSSION

Series: Residuals	
Sample 2013Q1 2023Q4	
Observations 44	
Mean	1.40e-10
Median	-5328.919
Maximum	116612.9
Minimum	-88278.94
Std. Dev.	43983.35
Skewness	0.591840
Kurtosis	3.047828
Jarque-Bera	2.572875
Probability	0.276253

Source: Eviews 12 Data Processing Results (2024)
Figure 2. Normality Test Results

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.

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)

From table 2 (two) above, it can be seen that the VIF value for all independent variables has a value smaller than 10 and the tolerace value is greater than 0.10. So it can be concluded that this study does not have symptoms of multicollinearity between independent variables.

Table 3. Autocorrelation Test Results

Durbin-Watson stat	1,769760

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.

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

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, H0 is accepted, which means there is no heteroscedasticity problem in the regression model.

Table 5. Regression Test

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:

$$Y = 1356453 + 1,520550\,X1 + 0,622015\,X2 + 0,092087\,X3$$

The regression equation above shows that all variables, namely credit cards (X1), debit/ATM cards (X2) and m-banking (X3) have positive constants. From the table above it can also be seen that the probability value of all variables is below 5%. It means that all variables have a significant influence. It means that all variables have a linear relationship to variable Y, namely Indonesia's economic growth/GDP. From the Table 5 (five) above can be concluded that all hypothesis are accepted. This means that if the use of credit cards, debit/ATM cards (X2) and m-banking (X3) increases, then Indonesia's economic growth/GDP will also tend to increase. However, if the use of credit cards, debit/ATM cards (X2) and m-banking (X3) decreases, then Indonesia's economic growth/GDP will also tend to decrease.

This study states that credit cards have a significant positive effect on Indonesia's economic growth (Nursari, 2019; Lestari, 2017 Susilawati and Putri, 2019). 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 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 (Nursari, 2019; Sylveste, 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 usage of 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 (Chohan et al, 2017). The transactions using m-banking provide benefits in the form of increased GDP growth/ economic growth (Afaha, 2019).

E. 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.

Based on the findings of this study, future research may be expanded in several meaningful directions. First, it is recommended to include additional variables related to digital transactions, such as the use of digital wallets (e-wallets), QRIS, and transactions conducted through e-commerce and online marketplaces, to provide a more comprehensive understanding of their impact on economic growth. Second, a region-based analytical approach could be applied to examine whether the influence of digital transactions on economic growth varies across different geographical areas, such as between Java and non-Java regions. Third, a longitudinal study using time-series data would be beneficial in identifying long-term trends and determining whether the observed effects are temporary or persistent over time. Fourth, future research may explore potential mediating or moderating variables—such as digital financial literacy, internet infrastructure availability, and the level of financial inclusion—that could influence the strength of the relationship between digital transactions and economic growth. Fifth, an in-depth analysis of the impact of digital transaction tools on specific economic sectors, such as micro, small, and medium enterprises (MSMEs), tourism, and both modern and traditional retail, would provide more targeted insights. Lastly, a comparative study involving other ASEAN countries or developing nations could offer valuable perspectives on the similarities or differences in how digital transactions contribute to economic growth on a global scale.

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