Research article

The Impact of Cashless Payment on Indonesian Economy: Before and During Covid-19 Pandemic

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Abstract: This study aims to analyze the impact of cashless payments on Indonesia's economy, before and during the COVID-19 pandemic. The economic growth in this study is calculated through GDP at constant price and the cashless payment in this study are represented by transactions through debit card, credit card, and e-money. The data used in this study uses secondary data in the form of time series data from January 2018 to December 2022. The data was obtained from the Central Bank of Indonesia (BI) statistic data and Statistics Indonesia (BPS). The analytical method used in this study is the Autoregressive Distributed Lag (ARDL). Based on the results of estimations indicate that in the short run as well as in the long run, debit card and credit card have an insignificant impact on economic growth, while e-money has a positive and significant impact. Cashless payment has a significant positive impact on economic growth, before and during COVID-19 pandemic, however during the pandemic, the impact of cashless payment on economic growth was bigger. As a result, the current cashless policy should be modified to create an efficient payment system while also considering the impact of using cashless payment instruments during the COVID-19 pandemic.

Keywords: cashless payment, economic growth, COVID-19 pandemic, ARDL

JEL Classification: D14, E40, E42

Abstrak: Penelitian ini bertujuan untuk menganalisis dampak pembayaran non tunai terhadap pertumbuhan ekonomi di Indonesia, sebelum dan saat adanya pandemi COVID-19. Pertumbuhan ekonomi dalam penelitian ini dihitung melalui PDB atas dasar harga konstan dan pembayaran non tunai dalam penelitian ini direpresentasikan oleh transaksi melalui kartu debit, kartu kredit, dan e-money. Data yang digunakan dalam penelitian ini menggunakan data sekunder berupa data time series dari bulan Januari 2018 sampai dengan Desember 2022. Data tersebut diperoleh dari Badan Pusat Statistik (BPS) dan Bank Indonesia. Metode analisis yang digunakan dalam penelitian ini adalah Autoregressive Distributed Lag (ARDL). Berdasarkan hasil estimasi menunjukkan bahwa pada jangka pendek maupun jangka panjang, kartu debit dan kartu kredit berdampak tidak signifikan, sedangkan e-money berdampak positif dan signifikan. Pembayaran non tunai memberikan pengaruh positif terhadap pertumbuhan ekonomi baik sebelum maupun saat adanya pandemi COVID-19, akan tetapi saat pandemi lebih besar pengaruh pembayaran non tunai terhadap pertumbuhan ekonomi. Oleh karena itu, kebijakan non tunai saat ini harus diubah untuk menciptakan sistem pembayaran yang efisien, dengan mempertimbangkan dampak penggunaan metode pembayaran non tunai saat pandemi COVID-19.

Kata Kunci: pembayaran non tunai, pertumbuhan ekonomi, pandemi COVID-19, ARDL

1. INTRODUCTION

The global economy has been severely impacted by the COVID-19 pandemic, and Indonesia is no exception. The reason is, this pandemic has disrupted the industrial production chain, the value of the rupiah continues to weaken sharply, the decline in the Composite Stock Price Index (CSPI) which finally plunged, increased unemployment, decreased economic growth, especially in the tourism, construction, transportation, mining and automotive sectors (Yamali & Putri, 2020) and most importantly, causing panic among consumers and producers which has distorted consumption patterns and created market anomalies (Solihat & Nugraha, 2020). Therefore, the COVID-19 pandemic has changed the pattern of people's lives and behavior in transactions (Jonker et al., 2021).

The World Health Organization (WHO) urges the public to implement contactless activities, including payment transactions to reduce direct contact. This implementation will hamper economic activity and even slow down the economy which will certainly have an impact on the performance of economic growth. This pandemic has also caused a domino effect from health to social and economic problems, thus requiring technology to help cope. Along with the rapid progress of science and technology, this has an impact on the development of the financial and banking systems (Aji et al., 2020). The development of technology in the payment system answers all public requests regarding a payment instrument that is able to respond to agility, accuracy and security in every electronic transaction (De et al., 2020). It is urgently needed by the community during the COVID-19 pandemic, the use of cashless payments payments will help economic activity while still complying with World Health Organization (WHO) appeal.

Existing cashless payments payment instruments are issued by financial institutions. Central Bank of Indonesia (2012) distributed cashless payments payment instruments in two types, namely Card-Based Payment Instruments and electronic money (e-money). Card Payment Instruments (APMK) consist of ATM/debit cards and credit cards. This study will focus on the use of the proportion of cashless payments payments using APMK and e-money as transaction tools used by the public for economic activities that are expected to affect the Indonesian economy, which in this study is proxied into economic growth using Gross Domestic Product (GDP) data at constant prices. It is stated that the efficiency of the payment system has an impact on GDP (Igamo & Falianty, 2018).

Each of these cashless payments payments shows an increasing trend from year to year, both in terms of value and transaction volume. The increase in the use of payment instruments indicates that cashless payments payment instruments have been accepted by the public as a means of transactions (Lintangsari et al., 2018). The use of cashless payments payment instruments is driven by the ease of use in micro and retail payments, scheduling of financial transactions that can be managed anywhere, reducing transaction costs, and being more efficient than the use of cash payment instruments (Thirupathi et al., 2019). In general, cashless payments payment instruments that are widely used are estimated to be related to the declining demand for base money or bank reserve money issued by Central Bank of Indonesia. According to Fung et al., (2014), the consequence of using cashless payments payment will reduce average cash usage for transactions in terms of both value and volume. Abidin (2015) also argues that the more people use electronic money, it can reduce the use of cash and cause an acceleration in the circulation of money. The decline in demand for cash will have an impact on credit and the supply of money which in turn may affect the implementation of central bank's duties in implementing monetary policy, particularly in controlling money supply. Central bank would also lose its autonomy on monetary policy (Ezuwore-Obodoekwe et al., 2014). For central banks that use monetary quantities as operational targets and even final targets, this is very influential and important to note, because it is related to the circulation of money as one of the crucial indicators.

The increase in cashless payments payments has the potential to cause an increase in GDP by using cards and reduced social cost (Choudhary, 2018). According to Kumari & Khanna (2017) adopting a cashless economy strategy improves the country's financial stability and supports the developing economy while also reducing black money. Transactions that provide this convenience can also trigger a reduction in administrative costs and reduce the risk of crime which in turn for the

government can increase the level of tax collection, financial inclusion and will stimulate economic growth (Ulfi, 2020). Cashless can also provide economic development based on study by Zandi et al. (2016) when customers use cashless payments, their spending behavior is seen to be more impulsive. Beside that, cashless and digitalization have positive externalities on economy. It will stimulate other sectors like telecom sector and e-commerce (Maurya, 2019). Based on Figure 1., it can be seen the movement of real GDP before and during the COVID-19 pandemic.
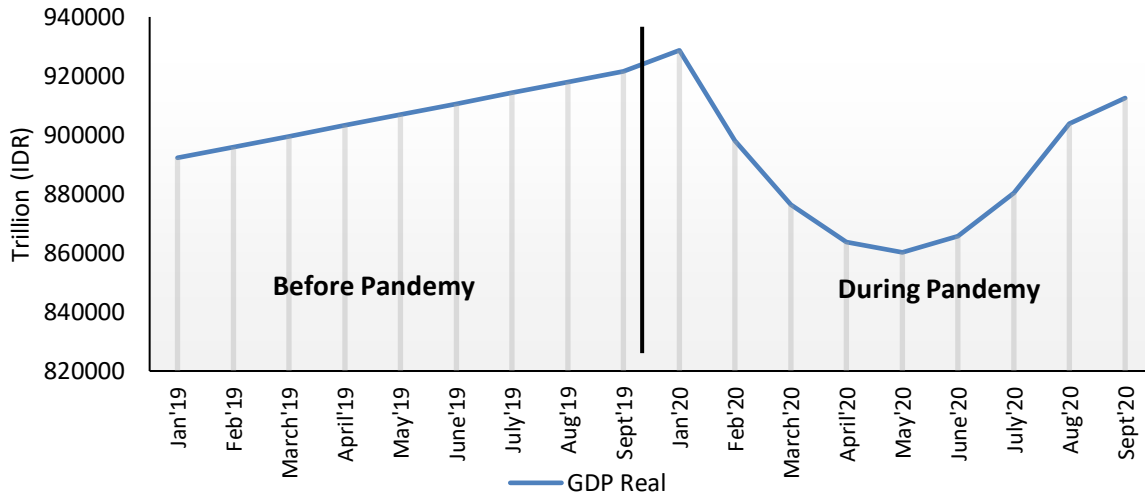

Figure 1. Trend of Indonesia's real GDP before and during the COVID-19 Pandemic
Source: Statistics Indonesia Series, 2019-2020 (Synthesized of authors)

The Indonesian economy based on real GDP in the third quarter of 2020 was IDR 2,720.5 trillion, an increase of 5.05 percent, after experiencing a contraction of 4.19 percent in the previous quarter with a real GDP of IDR.2,589.6 trillion, although the decline started from the first quarter I 2020. Based on these data, economic growth experienced negative growth in the second quarter of 2020 and then improved in the third quarter of 2020. When compared to before the pandemic, economic growth experienced a constant increase from the first to third quarters. This is shown in the first quarter of 2019 at IDR.2,625.2 trillion, then in the second quarter of 2019 at IDR.2,735.3 trillion and in the third quarter of IDR.2,818.8 trillion.
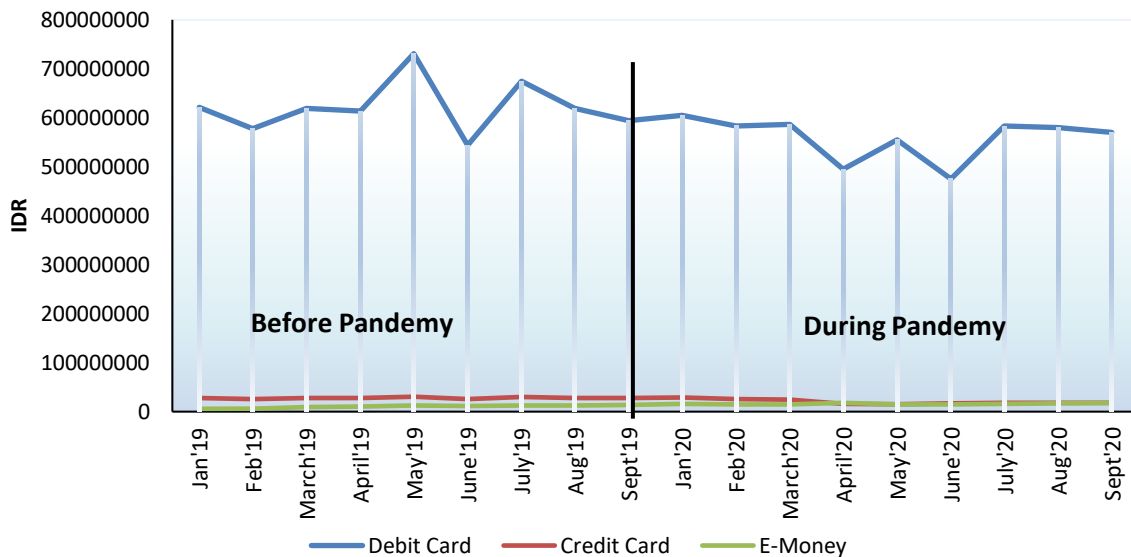

Figure 2. Trend of Indonesian cashless transactions before and during the Covid-19 pandemic
Source: Central Bank of Indonesia Series, 2019-2020 (Synthesized of authors)

The growth of transactions for cashless payments payment instruments, including debit cards, credit cards, and e-money, also decreased by 0.76 percent in January 2020 compared to 2019. The position of cashless payments payment transactions in February 2020 decreased by 1.02 percent (yoy). Cashless payments transactions in March 2020 decreased by 4.7 percent (yoy). The growth in the value of cashless payments transactions in June 2020 still recorded a contraction of 12.80 percent (yoy), although it improved from growth in May 2020 which contracted 24.46 percent (yoy). Furthermore, in August 2020 it improved to 6.86 percent (yoy). Interestingly, the growth of electronic money transactions and the volume of digital banking transactions grew high in May at 17.31 percent (yoy) and 30.33 percent (yoy), even though cashless payments payment transactions contracted greatly. In January it even reached 172.85 percent (yoy). Then the use of debit cards still dominates cashless payments transactions with a share of 93.16 percent.

Even though increased use of cashless payments seems to have had a substantial effect on the economy and is inclined to maintain to do so in the future. However, because cash withdrawal and payment patterns are unlikely to change overnight, this development is unlikely to have a significant effect on monetary policy. There are also not enough insufficient arguments to provide a comprehensive view of the effect of a cashless society on welfare (Fabris, 2019). According to Garg & Panchal (2017) the benefits of cashless payment can not be fully utilizied, due to low level of financial literacy and unreliable power supply especially in developing economies. On the other hand, study conduct by Tee & Ong, (2016); Zandi et al., (2016) shows that an increase in cashless payments payments can affect GDP growth of 56 ccountries and increase consumption. It is important to understand whether the cashless payments payment system has an impact on the economy in Indonesia during the COVID-19 pandemic which increases the use of cashless payments transactions in the economy.

The usage of digital platforms and instruments during the pandemic and the growing demand and acceptability of the public for digital transactions are both driving a significant increase in the number of economic and financial transactions conducted online. On the other hand, the phenomenon of the COVID-19 pandemic has also caused the circulation of money to become unstable, so it is not certain whether the development of cashless payments payments has an impact on the economy. This is due to the implementation of the semi-quarantine policy in Indonesia which will hamper the process of community mobility and global demand. The aim of the study is to provide a comprehensive overview of the comparison of the impact of cashless payment on the Indonesian economy in both the long-run and short-run, as well as to be considered regarding the impact of using cashless payment instruments, especially when dealing with the impact of pandemic. Based on the explanation above, this study is interesting to discuss about "The Impact of Cashless Payments on the Indonesian Economy: Before and During the COVID-19 Pandemic" which will be proxied by economic growth.

2. RESEARCH METHODS

2.1. Data

This study uses time series data. Data taken from January 2018 to December 2019 is used to see the impact of cashless payment on economic growth in Indonesia prior to the COVID-19 pandemic. January 2020 – December 2021 data is used to see the impact of cashless payment transactions on Indonesia's economic growth during the COVID-19 pandemic. Economic growth data is proxied from real GDP data and obtained from the Indonesian Statistics Agency. Cashless payments transaction data uses debit card, credit card and e-money transaction data obtained from Bank of Indonesia. The analysis of this study uses the autoregressive distributed lag (ARDL) model to see the long and short-run impacts. This method was carried out twice, first to see the impact of cashless payment on economic growth before the COVID-19 pandemic. Second, the impact during the COVID-19 pandemic.

2.2. Model specification

This study also uses the autoregressive distributed lag (ARDL) model which is used to analyze long-run relationships involving the concept of cointegration between time series variables Wardani & Lahuddin (2021). The reason for using the ARDL method is because it can analyze the influence and impact of y and x from time to time by distinguishing short-run and long-run responses, the influence of the past y variable on the present y and testing or analyzing the cointegration between variables. The mathematical equations used in the study are as follows:

$$\Delta lnGDP_t = \beta_0 + \beta_1 lnGDP_t + \beta_2 lnDCARD_t + \beta_3 lnCCARD_t + \beta_4 lnEM_t + \beta_5 \sum_{i=1}^{p} \Delta lnGDP_{t-i} +$$
$$\beta_6 \sum_{i=1}^{p} \Delta lnDCARD_{t-j} + \beta_7 \sum_{i=1}^{p} \Delta lnCCARD_t + \beta_8 \sum_{i=1}^{p} \Delta lnEM_t + \varepsilon_t \qquad (1)$$

where: GDP_t is the logarithm of real GDP per capita in Indonesia at time; DCARD, CCARD, and EM represent the matrix of payment channels, denotes DCARD is debit card transactions; CCARD is credit card transactions; EM is e-money transactions, equation represents cointegration ARDL (β) with intercept and time trend (t); coefficient β_i = 1,2,3,4 represent the long-run relation and relation β_i = 5,6,7,8 estimate the short-run relation, while ε is the normal distribution error.

3. RESULTS AND DISCUSSION

In the first session we report on unit root testing on each research variable which is presented in Table 1. We use the Augmented Dicky Fuller (ADF) test which was popularized by Dicky & Fuller. The test is intended to determine whether a time series contains a unit root or not. The test results are compared between the ADF t-statistic value and its critical value. If the absolute value of t-statistics in the ADF test is greater than the critical value, then the time series data is stationary and vice versa. The results of the unit root test obtained are presented in Table 1 as follows:

Table 1. The results of unit root test before the COVID-19 pandemic

Unit root test results at level			Statistic	Prob.**
ADF - Fisher Chi-square			13.131	0.041
ADF - Choi Z-stat			-0.671	0.250
Series	Prob.	Lag	Max Lag	Obs
lnGDP	0.984	1	4	23
lnDCARD	0.004	0	4	23
lnCCARD	0.323	1	4	22
lnEM	0.971	0	4	23
Unit root test results at first difference			Statistic	Prob.**
ADF - Fisher Chi-square			79.570	0.000
ADF - Choi Z-stat			-7.469	0.000
Series	Prob.	Lag	Max Lag	Obs
D (lnGDP)	0.026	4	4	18
D (lnDCARD)	0.002	1	4	21
D (lnCCARD)	0.000	0	4	22
D (lnEM)	0.002	0	4	22

Source: Authors calculation

Table 1 reports the unit root test results, for the period January 2018 to December 2019 is used to see the impact of cashless payments on economic growth in Indonesia prior to the COVID-19 pandemic. ADF statistics at levels for GDP, DCARD, CCARD and EM are not significant at the 1 percent, 5 percent, and 10 percent significant levels. However, the results of the unit root test with the first difference show that the null hypothesis can be rejected, meaning that the data is stationary after being derived once at the degree of integration of one. This is evidenced by the absolute value of the ADF statistic which is greater than the McKinnon critical value at the 1 percent, 5 percent,

and 10 percent significance levels. This implies that the variables in this study have been integrated to the same degree, namely the degree of integration of one or the first difference.

We also do the same for the period January 2020 – December 2021. data is used to see the impact of cashless payment transactions on Indonesia's economic growth during the COVID-19 pandemic. The results obtained by the ADF statistic at the insignificant level at the 1 percent, 5 percent, and 10 percent significant levels, which means it is not stationary. Meanwhile, the first difference shows that the data is stationary after being derived once at the degree of integration of one, where the absolute value of the ADF statistic is greater than the McKinnon critical value at the 1 percent, 5 percent, and 10 percent significance levels, which means it does not contain unit roots.

Table 2. The results of unit root test during the COVID-19 pandemic

Unit root test results at level			Statistic	Prob.**
ADF - Fisher Chi-square			5.319	0.723
ADF - Choi Z-stat			1.432	0.924
Series	Prob.	Lag	Max Lag	Obs
lnGDP	0.886	3	4	20
lnDCARD	0.739	1	4	22
lnCCARD	0.108	0	4	23
lnEM	0.987	0	4	23
Unit root test results at first difference			Statistic	Prob.**
ADF - Fisher Chi-square			71.699	0.000
ADF - Choi Z-stat			-7.091	0.000
Series	Prob.	Lag	Max Lag	Obs
D (lnGDP)	0.000	2	4	20
D (lnDCARD)	0.000	0	4	22
D (lnCCARD)	0.021	1	4	21
D (lnEM)	0.000	0	4	22

Source: Authors calculation

The cointegration testing in this study was carried out with a bound test are presented in Table 3. Table 3 reports that the bound test was carried out to test the presence of long-run association in the ARDL model that had been previously selected. In this approach, the results of the bound test will focus more on the F-statistic value which will be compared to the critical value that has been compiled by Pesaran (1997). If the F-statistic has a value that exceeds the upper bounds value, it can be concluded that cointegration occurs. If the F-statistic value is less than the lower bounds value, it can be concluded that there is no cointegration. However, if the F-statistic is between the upper bounds value and lower bounds value, the result is inconclusive. The results of the bound test on the ARDL model before and during the COVID-19 Pandemic with a significance level of 1 percent, 2.5 percent, 5 percent, and 10 percent.

Table 3 reports that the cointegration test using the bound test approach before COVID-19 Pandemic, show an F-statistic value of 4.867. At the same time, bound tests result during COVID-19 Pandemic indicate that F-statistic value of 7.807. F-statistic is greater than the upper bounds value at the 5 percent significance level, which is 4.35. So, it can be concluded that there is a cointegration or long-run relationship between economic growth, debit card transactions, credit card transactions and e-money at the 95 percent confidence level.

After the stationarity test was conducted, the results showed that all variables were stationary for the same order *I*(1) or first difference and not on *I*(2) or second difference. This is appropriate as a requirement for the ARDL approach. Furthermore, the ARDL model was selected based on the Akaike Information Criterion (AIC) to select the relevant maximum lag length, with the resulting model having the smallest value.

Tabel 3. The result of ARDL bound tests

The ARDL bound tests before COVID-19 Pandemic		
Test statistic	value	K
F-statistic	4.867	3
Critical value bounds significance	*I*(0) Bound	*I*(1) Bound
10%	2.72	3.77
5%	3.23	4.35
2.50%	3.69	4.89
1%	4.29	5.61
The ARDL bound tests during COVID-19 Pandemic		
Test statistic	value	K
F-statistic	7.807	3
Critical value bounds significance	*I*(0) Bound	*I*(1) Bound
10%	2.72	3.77
5%	3.23	4.35
2.50%	3.69	4.89
1%	4.29	5.61

Source: Authors calculation

The test results before COVID-19 pandemic use all AIC values with a negative value and the lowest Akaike Criterion is -8.45 on the ARDL (1,2,2,2) model. This shows that the ARDL (1,2,2,2) model is the best model for study. While the test results for during COVID-19 pandemic use all AIC values with the lowest Akaike Criterion value of -7.88 in the ARDL model (3,1,2,1). This shows that the ARDL (3,1,2,1) model is the best model for study. The estimation results of the model parameter coefficients are divided into two periods, namely before and during the COVID-19 pandemic. The ARDL model parameter coefficients (1,2,2,2) obtained are presented in Table 4 and 5.
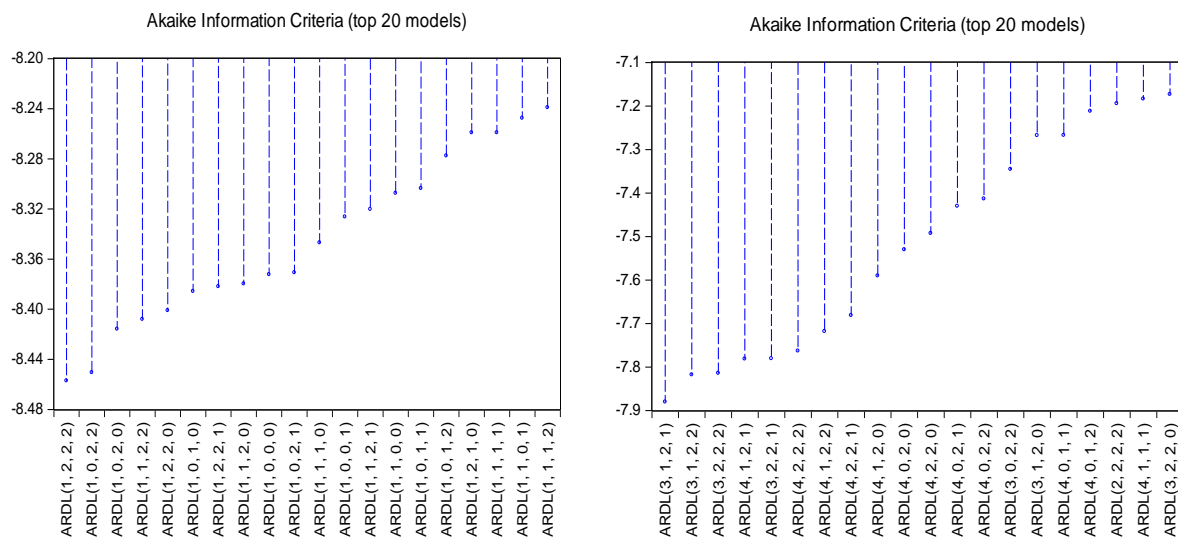

Figure 1. AIC test result before and during the COVID-19 Pandemic
Source: Authors calculation

3.1. Empirical results

Table 4 and 5 reports also, the ARDL model that has been previously selected is tested for model suitability or goodness of fit, so as not to violate econometric rules and become biased. The diagnostic test of the ARDL model was carried out by testing the autocorrelation and stability of the model are presented in Table 4 and 5. The results of the autocorrelation test using the Breusch-Godfrey LM test method, the statistical p-value for the test results before the COVID-19 Pandemic is 0.194 > 0.05 so H0 is accepted, or which means that there is no autocorrelation problem in the

ARDL model residuals (1,2,2,2). Meanwhile, the statistical p-value for the test during the COVID-19 Pandemic is 0.097 > 0.05 so that H_0 is accepted, or which means that there is no autocorrelation problem in the residual ARDL model (3,1,2,1).

Table 4 reports that the long-run estimation results for debit card transactions, credit card transactions, and e-money transactions on economic growth before the COVID-19 pandemic. Debit and credit card transactions variable have negative and insignificant effect on economic growth. Furthermore, the e-money variable has a positive and significant effect on economic growth. The coefficient value is 0.039, meaning that a 1 percent increase in e-money transactions will increase economic growth by 0.039 percent in the long run.

The estimation results of the parameter coefficients from the ARDL model (1,2,2,2) can be interpreted as the relationship between the dependent and independent variables. This model describes the relationship between the variables of debit card transactions, credit card transactions, and e-money that affect the variable of economic growth in this study. Based on the equation, it can be concluded that economic growth has a positive and significant effect on the current value of economic growth. In the first lag, it is obtained at 0.728, which means that if economic growth in the first period increases by 1 percent, the current economic growth will increase by 0.728 percent.

Table 4. Model parameter estimation before the COVID-19 pandemic

Dependent variable: lnGDP			
Variables	Coefficient	t-statistic	P-value
Long-run results			
Constant	13.428	5.591	0.000
lnDCARD	-0.007	-0.048	0.962
lnCCARD	-0.010	-0.062	0.951
lnEM	0.039	4.247	0.001
Short-run results			
Constant	3.643	3.523	0.004
lnGDP (-1)	0.728	6.994	0.000
lnDCARD	-0.018	-0.888	0.393
lnDCARD (-1)	-0.011	-0.450	0.660
lnDCARD (-2)	0.028	1.286	0.224
lnCCARD	0.015	0.625	0.544
lnCCARD (-1)	0.032	0.995	0.341
lnCCARD (-2)	-0.050	-2.250	0.045
lnEM	0.006	0.679	0.510
lnEM (-1)	-0.007	-0.571	0.579
lnEM (-2)	0.011	1.410	0.186
ECM	-0.271	-2.604	0.024
Summary:			
R-Squared	0.994	AIC	-8.457
Adj R-Squared	0.988	SIC	-7.911
F-Statistic	183.3	HQ	-8.328
Prob (F-Stat)	0.000	DW Stat	2.603
Diagnostic test:			
Serial correlation LM test	0.786		0.484

Source: Authors calculation

The changes in debit card transactions have a negative and insignificant effect on changes in economic growth in the zero and first lags. In the second lag, debit card transactions also have no significant but positive effect on economic growth. Credit card transactions have negative and statistically significant effect on economic growth in second lag. The coefficient is 0.050, which indicates that even if credit card in the second period increases by 1 percent, current economic growth will decrease by 0.050 percent. Furthermore, the e-money variable has no significant effect

on economic growth. The R-Squared result is 0.994 which shows that the variables of debit card transactions, credit card transactions, and e-money contribute 99.4 percent in influencing economic growth in Indonesia, while the remaining 0.6 percent is explained by other variables not discussed in this study.

The ECM value is negative and significant which indicates that towards short-run cointegration on the variables of debit card transactions, credit card transactions, e-money transactions, and economic growth. Thus, it can be concluded that the model will be heading towards equilibrium at a rate of 27.1 percent per month. Economic growth in the first and second lags has a positive effect on economic growth, but is not significant at the 1 percent, 5 percent, and 10 percent real levels. Debit card transactions in the short run are not statistically significant for the current period's economic growth. In the first lag of credit card transactions, it is positive and significant effect on economic growth, with a coefficient value of 0.050, which means that if credit card transactions in the first period increase by 1 percent, the current economic growth will increase by 0.050 percent. Furthermore, e-money transactions have statistically insignificant effect.

Table 5. Model parameter estimation during the COVID-19 pandemic

Dependent variable: lnGDP			
Variables	Coefficient	t-statistic	P-value
Long-run results			
Constant	14.58	21.562	0.000
lnDCARD	-0.089	-2.186	0.053
lnCCARD	-0.095	-2.878	0.016
lnEM	0.150	10.239	0.000
Short-run results			
Constant	13.674	5.060	0.000
lnGDP (-1)	0.602	2.644	0.024
lnGDP (-2)	0.013	0.057	0.955
lnGDP (-3)	-0.553	-3.111	0.011
lnDCARD	-0.023	-0.932	0.373
lnDCARD (-1)	-0.060	-2.458	0.033
lnCCARD	-0.026	-1.223	0.249
lnCCARD (-1)	-0.023	-1.024	0.329
lnCCARD (-2)	-0.039	-2.657	0.024
lnEM	0.101	2.030	0.067
lnEM (-1)	0.040	1.361	0.203
ECM	-0.937	-4.564	0.001
Summary:			
R-Squared	0.986	AIC	-7.438
Adj R-Squared	0.972	SIC	-76.89
F-Statistic	71.98	HQ	-7.319
Prob (F-Stat)	0.000	DW Stat	2.356
Diagnostic test:			
Serial correlation LM test	1.138		0.367

Source: Authors calculation

Table 5 reports that the estimation results of the ARDL model (3,1,2,1) can be interpreted as the relationship between the dependent and independent variables. This model describes the relationship between the variables of debit card transactions, credit card transactions, and e-money that affect the variable of economic growth in this study. Based on the equation, it can be concluded that economic growth has a positive and significant effect on the current value of economic growth. In the first lag and third lags, have significant effect on current economic growth. Coefficients in the first lag, it is 0.602, which means that if economic growth in the first period increase by 1 percent, the current economic growth will increase by 0.602 percent. In the third lag, the coefficient is -0.553,

meaning that for every 1 percent increase, it will decrease economic growth by 0.533 percent. The estimation results of the ARDL model (3,1,2,1) obtained are presented in Table 5.

In the first lag, changes in debit card transactions have a negative and significant effect on changes in economic growth. It is -0.060, which indicates that even if debit card transactions in the first period increases by 1 percent, current economic growth will decrease by 0.060 percent. Coefficients in the zero lag has no statistically significant effect on economic growth. Credit card transactions also have no statistically significant effect on economic growth in the zero and first lags, whereas have a negative and significant effect in the second lag. It is obtained at -0.039, which means that if credit card transactions in the second period increases by 1 percent, the current economic growth will decrease by 0.039 percent.

Furthermore, the e-money variable has a positive and significant effect on economic growth. The resulting coefficient at zero lag is 0.101, meaning that for every 1 percent increase, it will increase economic growth by 0.101 percent. In the first lag, e-money transactions have no insignificant impact on economic growth. The R-Squared result is 0.986 which shows that the variables of debit card transactions, credit card transactions, and e-money contribute 98.6 percent in influencing economic growth in Indonesia, while the remaining 1.4 percent is explained by other variables not discussed in this study.

The ECM value is negative and significant which indicates that towards short-run cointegration on the variables of debit card transactions, credit card transactions, e-money transactions, and economic growth. Thus, it can be concluded that the model is heading for equilibrium at a rate of 93.7 percent per month. The economic growth in the first and second lags has a significant positive and significant effect at 1 percent, 5 percent, and 10 percent real levels on economic growth. In the first lag, the resulting coefficient is 0.540 percent, meaning that every 1 percent increase in economic growth will increase 0.540 percent of the current economic growth. Furthermore, the coefficient in the second lag is 0.553 percent. This means that every 1 percent increase in economic growth will increase 0.553 percent of the current economic growth. Transactions with debit and credit cards have a negative and insignificant impact on economic growth. E-money transactions in the short run are also not statistically significant for the current period's economic growth eventhough have a positive effect.
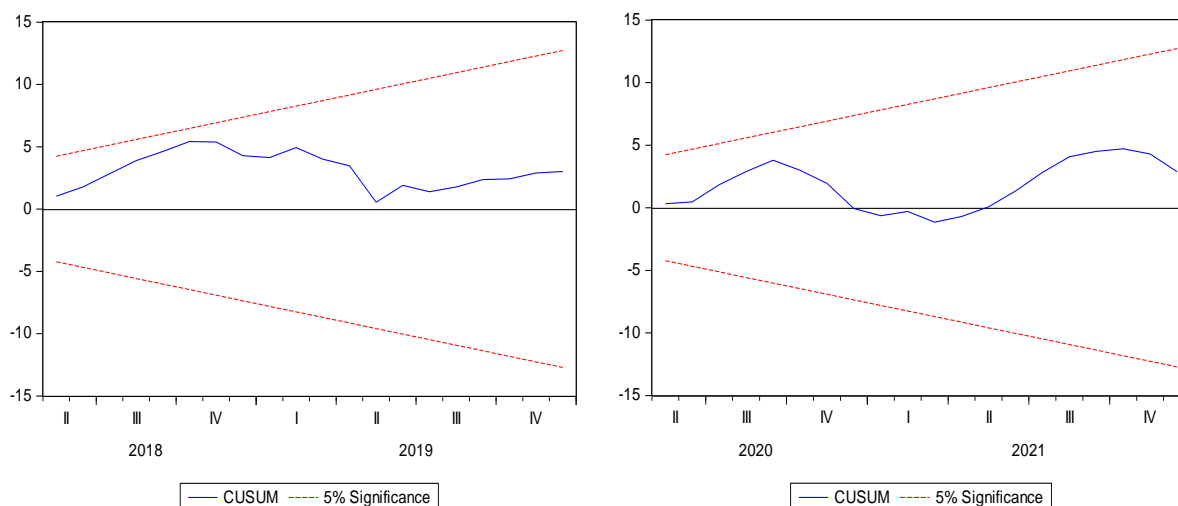

Figure 2. The CUSUM test before and during COVID-19 pandemic
Source: Authors calculation

The stability of the ARDL model will be tested using cumulative sum of recursive residual (CUSUM) with a confidence level of 95 percent. Figure 2 reports that the CUSUM test on the ARDL model (1,2,2,2) before the COVID-19 Pandemic in this study indicate the position of the blue CUSUM line is between the two 5 percent red significant lines. This proves that the ARDL (1,2,2,2) model is stable. Then, the results of the CUSUM test on the ARDL model (3,1,2,1) during the COVID-19

Pandemic in this study indicate the position of the blue CUSUM line is between the two 5 percent red significant lines. This proves that the ARDL (3,1,2,1) model is stable.

3.2. Discussions

3.2.1. The impact of debit card transactions on economic growth

Based on the results of data testing, it shows that the short-run and long-run Debit Card Transaction variables before COVID-19 pandemic are statistically negative and insignificant effect on economic growth. Furthermore, during the COVID-19 pandemic debit card transactions in the short run and long run also have negative and insignificant impact on economic growth. ATM/debit cards do not really increase people's consumption or can delay consumption because if you want to consume, you must first have funds or savings in the bank and then go to an ATM to withdraw the funds. Cashless payments payments in Indonesia have not been very strong and are still dominated by cash transactions (Febriaty, 2019). How big the contribution depends on its share of the total cost, capital, and time. If it is significant enough, of course, it can stimulate business activities. However, if it is relatively small, the impact on economic growth. In this study, the effect is not too significant on economic growth before the COVID-19 pandemic in short run because the use of debit card transactions is still dominated by use for cash withdrawals rather than shopping transactions. Indirectly, this does not have much effect on economic growth, and the short period used also affects the significance of the variables before and during the pandemic COVID-19.

3.2.2. The impact of credit card transactions on economic growth

Before and during the COVID-19 pandemic impact of credit card transactions on economic growth in the short run have a positive and significant effects. This is in accordance with previous study conducted by (Nursari et al., 2019; Susilawati & Putri, 2019) that the value of credit card transactions has a positive and significant effect. The reason is that the increase in the use of credit cards indicates a faster velocity of money. Furthermore, it indicates that public consumption is also increasing and encourages an increase in output to meet consumer needs. In the end, it will increase economic growth. Before the COVID-19 pandemic, credit card transactions in the long run do not have a significant effect on economic growth. This is in accordance with previous study conducted by Mashabi & Wasiaturrahma (2021); Wong et al., (2020) that in the long run credit cards have no effect on economic growth. Wong et al., (2020) argues that the use of credit cards has led to a substansial increase in the household debt. Beside that, the use of credit card is only a lifestyle pattern and is not the main way of transacting in society, because the use of credit cards is subject to credit interest rates charged to users (Agarwal & Qian, 2014). Thus, if the interest rate charged by the issuer is too high, the public will reduce the use of credit cards. This causes not too significant impact on economic growth. Credit card transactions during the COVID-19 pandemic in the long run are statistically negative and significant effect on economic growth. The value of credit card transactions decreased during the pandemic, while the ratio of non-performing loans (NPLs) on credit cards increased due to the COVID-19 pandemic and business conditions that made it difficult for customers to pay. This problem has a negative impact on the country's industrial volume (Dinçer et al., 2018). Banks are hesitant to lend money and take on new credit risks. Due to this, there is an excessive demand for loans, particularly those given to businesses. Following credit limitation, economic activity declines (Systems, 2013) due to reduce spending and investment that directly impacts economic growth (Balgova et al., 2018). Thus, during the pandemic they should allocate credit more efficiently because a strong banking sector will help the growth of the national economy (Wood & Skinner, 2018).

3.2.3. The impact of e-money transactions on economic growth

The e-money transactions have a positive impact and statistically insignificant in the short-run before and during the COVID-19 pandemic. According to (Susilawati & Putri, 2019) the use of e-money causes a shift in public deposits in banks away from savings and time deposits and toward

float, which remains on the liability side of commercial banks' balance sheets. Because e-money transfers funds from banks to non-bank institutions, it increases the velocity of money rather than stimulating economic growth in Indonesia.

In the long-run e-money transactions have a positive and significant effect on economic growth before and during the COVID-19 pandemic. It is shows that the e-money variable has a positive and significant effect in the long run, so that it is in accordance with the study conducted by Nursari et al. (2019) that the e-money variable has a positive and significant influence on economic growth. Study conducted by Slozko & Pelo (2014) states that the increase in electronic money or e-money is closely related to economic growth through increased consumption growth. This is because the demand for goods and services increases and encourages increased production and labor.

3.2.4. The impact of cashless payment on economic growth

The cashless payments consisting of debit card transactions, credit card transactions, and e-money transactions in the short and long run have a positive impact on economic growth. This is based on the estimation results which show significant positive results on economic growth, it can be concluded that cashless payments transactions have a positive impact on economic growth. The results also show that the direction of the relationship is in accordance with Keynes' theory of economic growth which states that a national income is influenced by public consumption, resulting in a positive direction because consumption increases due to the efficient use of cashless payments payments. Furthermore, increasing production and investment. In the end, it can increase national income and have an impact on increasing economic growth. The results of this study are in line with the neoclassical economic growth theory which explains that technological progress in this case the payment system will stand out for economic growth and economic development will depend on technological progress. David Ricardo's economic growth theory also argues that technological advances will slow down the occurrence of The Law Diminishing Return by increasing the productivity of capital and labor.

The endogenous growth theory is also in line with study results where technological progress is part of the process of economic growth that will lead to increasing returns to scale. In the end, cashless payments payments will have a positive impact on economic growth. The results of this study are also in line with studies conducted by Febriaty (2019); Kumari & Khanna (2017); Nursari et al. (2019); Simorangkir (2014); Susilawati & Putri (2019) suggests that cashless payments payments will have a positive impact on economy due to encouraging real sector activity. Kireyev (2017) conclude that cashless payment may lower the underground and grey economies, hence increasing the GDP captured by official statistics and beyond the typical estimates of the underground economy already factored into GDP calculations, making them explicitly contribute to GDP. The debit cards have no significant impact on economic growth, both in the short-run and long-run before and during the COVID-19 Pandemic. This is because people use debit cards mostly for cash withdrawals and not transactions.

Before and during the COVID-19 pandemic, the transactions of credit cards have a positive and significant effect in the first lag in short-run. Credit cards in the long-run are also significant to economic growth during the COVID-19 pandemic, while before the COVID-19 pandemic is insignificant. The cause of the insignificant is the credit card there are fees charged and there are restrictions on use by the issuer. Especially when there is Bank Indonesia's policy to maintain the Countercyclical Capital Buffer (CCB) during the COVID-19 pandemic Bank Indonesia (2020). Based on study conducted by Andaiyani et al. (2021) that this policy will increase bank resilience through increased capital which is expected to reduce excessive credit growth as a source of systemic risk. Thus, it will lead to reduced lending to the public.

The e-money transactions before and during the COVID-19 pandemic have insignificant effect in short-run while it has a positive and significant impact in the long-run because they can increase transactions and economic activity. The effect of cashless payments payments on economic growth during the COVID-19 pandemic was greater than before the COVID-19 pandemic in the short run, which can be seen from the coefficient of e-money transactions. This is because the shock that has

occurred has reduced economic growth, although over time the influence of the COVID-19 pandemic will decrease, especially with the anticipation and monetary policy carried out by the government, but during the COVID-19 pandemic the model reaches a faster balance of 97.3 percent compared to before which was 27.1 percent.

The effect of cashless payments payments on economic growth during the COVID-19 pandemic was greater than before the COVID-19 pandemic in the short run, which can be seen from the coefficient of e-money transactions. This is because the shock that has occurred has reduced economic growth, although over time the influence of the COVID-19 pandemic will decrease, especially with the anticipation and monetary policy carried out by the government, but during the COVID-19 pandemic the model reaches a faster balance of 97.3 percent compared to before which was 27.1 percent. The use of cashless payments payment instruments has an impact on overcoming the impact of the COVID-19 pandemic. This can be seen in the long run, where the e-money variable remains significant to economic growth, indicating that there is no difference in the effect of cashless payments payments on economic growth between before and during the COVID-19 pandemic, but nominally the coefficient is larger during COVID-19 pandemic.

The results of the study are in accordance with the hypothesis in the study because in the long and short run, cashless payments payments have a positive impact and the increase in cashless payments transactions carried out by the public during the pandemic has helped stimulate economic growth and helped reduce the spread of COVID-19 due to the use of money. cash. This finding is in line with Irving Fisher's theory of money demand, which states that an increase in the use of cashless payments payments contributes to a decrease in inflation, due to a decrease in the amount of cash in circulation. This will also affect interest rates on the money market, encouraging increased investment that can increase the national production of goods and services. Furthermore, increasing disposable income and ultimately increasing the rate of growth because public consumption will increase. So that it can support the recovery of the national economy during a crisis due to the pandemic.

The large-scale social restrictions (PSBB) policy in Indonesia implemented by the government has hampered community mobility and activities which have an impact on decreasing domestic demand. The decline caused some business sectors to reduce their activities or close completely and increase unemployment. The COVID-19 pandemic has not only affected the demand side but also the supply side. Thus, the positive impact of cashless payments payments during the pandemic will have a limited impact on economic growth, despite being positive, apart from being caused by the length of the transmission channel from cashless payments payments to affecting a country's economic system. This is also supported by study conducted by Tee & Ong (2016) that the impact of cashless payments payments can only be observed significantly in the long run.

4. CONCLUSIONS

The conclusions that can be obtained from this study are in the form of cashless payments payments to the Indonesian economy before and during the COVID-19 pandemic in the short run that debit card transactions and e-money transactions insignificant impact on economic growth, while credit card transactions have a positive and significant effect in the first lag. Furthermore, there are differences before and during the COVID-19 pandemic. The coefficient value before is greater than during the COVID-19 pandemic, but the speed with which the model reaches equilibrium is greater during the COVID-19 pandemic. In the long run, before the COVID-19 pandemic show that debit card transactions and credit card transactions have no significant impact on the contrary, e-money transactions have a positive and significant impact on economic growth. During the COVID-19 pandemic, debit card transactions have insignificant effect while credit card transactions and e-money transactions have a positive and significant effect. Cashless payments payments have a positive influence on economic growth both before and during the COVID-19 pandemic, but during the pandemic, cashless payments payments have a greater impact on economic growth. Thus, it can be concluded that cashless payments payments have a positive impact on the Indonesian economy both before and during the COVID-19 pandemic, although the impact is insignificant in the short run, while in the long run it is quite significant.

The analysis that has been carried out, there are several suggestions generated in this study. For central bank of Indonesia to continue to support the development of a more inclusive and efficient digital financial ecosystem as well as carry out socialization and education to the public to create a cashless society, especially during the COVID-19 pandemic to limit the spread of COVID-19., The government of Indonesia is expected to be able to support it by improving technology and leveling infrastructure so that all levels of society can use cashless payments payment services.

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