

## The Influence of Debit Card, Credit Card, and E-Money Transactions Toward Currency Demand in Indonesia

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### Abstract

This study aims to determine the effect of debit card transactions, credit card transactions and e-money transactions to currency demand in Indonesia. This research using model estimation Vector Error Correction models (VECM). The data was collected using secondary data obtained from the website of Bank Indonesia and Bureau Central of Statistic in Indonesia. The data were obtained from January 2009 to August 2017 consisting of debit card transaction, credit card transaction, e-money transaction, and cash amount data in circulation data. The findings showed that debit card transactions have a significant negative effect on the demand for currency in Indonesia in the long term, credit card transactions have a significant positive effect on the demand for currency in Indonesia in the long term, while e-money transactions have a significant positive effect on currency demand in Indonesia in the short and long term.

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## INTRODUCTION

The payment system has an important role in transaction activity in the modern era. The rapid development of technology and information requires a safe and effective payment system, thereby reducing the risks arising from technological and information developments (Intanie, 2006). With the development of technology and information, the payment system used for the medium of exchange in economic activity will also develop from time to time. Banks also create non-cash money as the innovation of modern technology to facilitate the community in conducting economic transactions. Non-cash money is a means of payment that uses media or instruments without cash, such as ATM cards, checks, credit cards, and e-money. Non-cash money can improve effectiveness and efficiency in various economic activities (Ramadani, 2016; Wulandari et al. 2018).

The use of non-cash money is relatively easier, faster and cheaper transaction cost, non-cash money is also considered more secure because people do not have to worry if you have to carry large amounts of money (Wulandari, Soseco & Narmaditya, 2016). In addition to effective and safe, non-cash transactions will also facilitate the recording of transactions, so the calculation of economic activity will be easier. Therefore, central banks in the world are encouraging and increasing the use of non-cash money, including Bank Indonesia. Indonesia has a great potential for the expansion of the access to payment systems services, though the use of non-cash instruments in Indonesia is relatively low compared to other ASEAN countries. Though its use is still relatively low, the number of transactions and non-cash instruments in Indonesia has increased.

In Indonesia, the value of debit card transactions shows an increase from 2009 to 2016. In 2009 the value of debit card transactions amounted to Rp. 1.8 Billion and continue to increase until the year 2016 reached Rp. 5.6 Billion. The value of credit card transactions in Indonesia experienced significant increases in 2009 to 2015, with a transaction value of Rp. 136.69 Trillion in 2009 and Rp. 280.54 Trillion by 2015. In 2016, although not very significant, the value of credit card transactions has increased, amounting to Rp. 281.02 trillion. This happens because the increase of the credit card type is published, an increasing number of customers, and the soaring number of credit cards in circulation as well as the value of transactions in the last seven years (Pranoto & Salma, 2018). The value of e-money transactions in Indonesia also showed an increase since 2009. In 2009, the value of e-money transactions of Rp 519 billion up to the year 2014 is Rp. 3.31 trillion. In the year 2015 and 2016, the value of e-money transactions began to show significant improvement. In the year 2015 e-money transaction value of Rp 5.28 trillion by the year 2016 and reach Rp 7.06 trillion.

Non-cash payments can improve efficiency, effectiveness and financial productivity, which are expected to increase economic activity in Indonesia, which will promote economic growth and community welfare. The existence of these non-cash cash payments may shift the role of cash in economic transactions in Indonesia. According to Bank Indonesia (2006), non-cash payment instruments can replace the role of cash in economic transactions in Indonesia. While the development of payment instruments using cards, especially e-money can reduce currency demand Pramono et al. (2006). Non-cash payment policy can increase the growth of the country's financial stability, so it will also cause the stability of business, prices and the economy Khanna & Kumari (2017). Non-payment of cash by using electronic payment systems transfer through modern financial markets will reduce the need or request of the necessity of maintaining a number of liquidity (reserves balances) at the central bank (as one of the components of base money). Research by Syarifuddin et al. (2009), the increase in non-cash payment causing effect efficiency and substitution. The effect of efficiency occurs due to the use of non-cash payment will reduce transaction costs, which will lower the price level. Meanwhile, the effects of substitution would cause the level of money demand decreases and Kartal M1 and M2 increases.

In contrast with research conducted by Hafidh & Sholeh (2016), where the results showed that the Debit card and ATM transactions have a positive relationship towards the demand for cash, that is because the majority of society using an ATM for cash withdrawals. It is expected that the government provides infrastructure and policies regarding the use of non-cash payments in public transactions activities in order to realize an efficient economy. The same is also shown in Istanto & Fauzie (2014) research, which shows the volume of credit card, debit/ATM, e-money, SKNBI, and BI-RTGS transactions have a positive influence on M1. An explanation of some of the previous studies, it shows different results. Therefore, the authors are interested in conducting research on this topic to review how the effect of using non-cash payments, such as the use of debit cards, credit cards and e-money against currency demand in Indonesia.

## **METHOD**

The study followed quantitative research, where the data was measured in a number scale by using time series data. The data was arranged by time on a particular variable. The Data was collected using secondary data obtained from the website of Bank Indonesia and Bureau Central of Statistic in Indonesia. The data were obtained from January 2009 to August 2017 consisting of debit card

transaction, credit card transaction, e-money transaction, and cash amount data in circulation data.

Further, the data was analyzed using the Vector Error Correction Model (VECM). VECM model provides benefits in conducting both long-term and short-term analyzes. The step that must be done in the VECM estimation model is Mukhlis & Simanjuntak (2017):

1) Stationary Test

This stationary test can be performed with the Augment Dickey-Filler Test (ADF). The ADF test was chosen because this test was able to minimize the risk of autocorrelation on the residual value. Assessment criteria used as the basis for decision making, where  $H_0$  is rejected and  $H_a$  accepted,  $ADF \text{ Table} < \text{critical value}$  (at a certain degree of confidence), then the data analyzed stationary. There are two behaviors of stasionerity data: Mean Stationarity, that means that the data are stationary at the Center (mean) value. If the data is not stationary, step to do is differentiate (differencing) first and second stage against the original data. Variance Stationarity, which means that data fluctuates with fixed variants over time. If the data is not stationary, the step to do is to transform the original data with natural logarithm or square root (Ekananda, 2014).

2) The degree of integration test

The degree of an integration test is performed when the observed data are not all stationary. This test aims to determine at what degree the observed data becomes stationary after the difference. The non-stationary  $X_t$  variable will be the one-time difference to be stationary, meaning that the  $X_t$  variable is integrated into degrees one or  $I(1)$ . If the variable  $X_t$  is still not stationary on the first degree, then the difference is twice to be stationary, which means that the variable  $X_t$  integrates on a degree two or  $I(2)$ .

3) Cointegration test

Cointegration test is a method used to test the cointegration relationship in the time series data variable, where the long-term relationship between observed variables. Cointegration test can be done by using Johansen Method approach model. The test criteria on the Johansen approach, ie  $H_0$  is rejected and  $H_a$  accepted, if the value of trace  $>$  critical value (95%), then the observed variables are cointegrated.

4) Optimal lag length

Optimal lag length can be seen from the value of Akaike Information Criterion (AIC), Schwartz Criterion (SC), Hannan Quinn Criterion (HQC) (Mukhlis & Simanjuntak, 2017). In Optimal lag length the longer best value criteria can be seen the minimum AIC, SC, and HQC values in the existing VAR equation.

5) VECM Estimation.

The use of the VECM model provides benefits in doing an analysis of long term or short term. As for the VECM models can be expressed with the following equation:

$$\Delta x = \alpha_1 (y_{(t-1)} - [\beta x]_{(t-1)}) + \gamma_{11} \Delta x_{(t-1)} + \gamma_{12} \Delta y_{(t-1)} + \varepsilon_{1t}$$

## RESULTS AND DISCUSSION

Stationary test results at the first-difference level show that the KRTL and EMON variable data are stationary (not containing the root of the unit), while the DBT and KRD variable data is not stationary or still contains the root of the unit. In order DBT and KRD variable data to be stationary, then tested again at second-difference level. Based on these results, it can be concluded that the data variable DBT, KRD, EMON, and KRTL have different degrees of stationarity.

Augmented Dickey-Fuller (ADF test) stability test results give the following results.

Table 1. Stasioneritasy Test (ADF Test)

Variale	Critical Value	Conclusion
KRTL	5%	Stationer on 1 <sup>st</sup> difference
DBT	5%	Stationer on 1 <sup>st</sup> difference
KRD	5%	Stationer on the 2 <sup>nd</sup> difference
EMON	5%	Stationer on 1 <sup>st</sup> difference

Source: Stationarity Test Sources (processed, 2018)

Table 2. Cointegration Test

	Eigen V $\lambda$ 1	Trace Statistics	$\lambda$ trace(95%)	p.value (prob)
<b>None *</b>	0.274228	50.60071	47.85613	0.0138
<b>1</b>	0.106100	18.86926	29.79707	0.6369
<b>2</b>	0.065864	7.765268	15.49471	0.5197
<b>3</b>	0.010251	1.020080	3.841466	0.3125

Sources: Cointegration Test (processed, 2018)

Based on table 2, it can be seen that trace statistic value of 50.60071 with a p-value of 0,0138. Due to the trace value statistic > critical value (95%) then Ho is rejected, it can be concluded that the observed data are mutually cointegrated.

Table 3. Optimal Lag Length Test

Lag	LogL	LR	FPE	AIC	SC	HQ
0	594.5216	NA	5.34e-11	-12.30253	-12.19568	-12.25934
1	792.4988	375.3319	1.20e-12	-16.09373	-15.55949*	-15.87778
2	825.0212	58.94690	8.55e-13	-16.43794	-15.47631	-16.04924*
3	845.7673	35.87332	7.78e-13	-16.53682	-15.14780	-15.97535
4	864.4681	30.77843	7.42e-13	-16.59308	-14.77667	-15.85886
5	889.4783	39.07843	6.23e-13	-16.78080	-14.53699	-15.87381
6	910.5343	31.14543	5.73e-13	-16.88613	-14.21494	-15.80639
7	933.4724	32.01774*	5.10e-13*	-17.03068*	-13.93209	-15.77818
8	945.1506	15.32764	5.80e-13	-16.94064	-13.41466	-15.51538

Source: Optimal Lag Length Test (processed, 2018)

From the five criteria at table 3, it was found that three of the five criteria recommended the length of lag at number 7. With LR criteria of 32.01774; FPE of 5.10; and AIC of -17,03068.

Table 4 VECM Estimation

Cointegrating Eq:	CoIntEq1
KRTL(-1)	1.000000
DBT(-1)	-1.638045
	(0.26009)
	[-6.29798]
KRD(-1)	0.673788
	(0.26814)
	[ 2.51280]
EMON(-1)	0.271343
	(0.07319)
	[ 3.70716]
C	2.006824

Error Correction:	D(KRTL)	D(DBT)	D(KRD)	D(EMON)
CointEq1	-0.098304 (0.16918) [-0.58106]	0.094921 (0.14587) [ 0.65071]	-0.160146 (0.15011) [-1.06688]	-1.166167 (0.43082) [-2.70688]
D(KRTL(-1))	-0.579347 (0.21244) [-2.72714]	-0.114934 (0.18317) [-0.62747]	0.219560 (0.18849) [ 1.16486]	0.920736 (0.54097) [ 1.70201]
D(KRTL(-2))	-0.597759 (0.21888) [-2.73098]	-0.294829 (0.18872) [-1.56222]	-0.011877 (0.19420) [-0.06116]	0.181255 (0.55738) [ 0.32519]
D(KRTL(-3))	-0.276642 (0.22286) [-1.24134]	-0.045937 (0.19215) [-0.23906]	0.089870 (0.19773) [ 0.45451]	0.402511 (0.56750) [ 0.70927]
D(KRTL(-4))	-0.508281 (0.20213) [-2.51464]	-0.313084 (0.17428) [-1.79644]	-0.098788 (0.17934) [-0.55085]	-0.428568 (0.51472) [-0.83263]
D(KRTL(-5))	-0.031443 (0.20109) [-0.15637]	-0.187571 (0.17338) [-1.08182]	0.019742 (0.17842) [ 0.11065]	-0.577403 (0.51207) [-1.12758]
D(KRTL(-6))	-0.074827 (0.17024) [-0.43953]	-0.135495 (0.14679) [-0.92307]	0.028405 (0.15105) [ 0.18805]	-0.744020 (0.43352) [-1.71623]
D(KRTL(-7))	0.046751 (0.14637) [ 0.31940]	0.170622 (0.12620) [ 1.35196]	0.201675 (0.12987) [ 1.55294]	0.397191 (0.37273) [ 1.06563]
D(DBT(-1))	0.129435 (0.30979) [ 0.41781]	-0.577594 (0.26711) [-2.16236]	-0.416877 (0.27487) [-1.51666]	-1.756401 (0.78889) [-2.22643]
D(DBT(-2))	0.090751 (0.29867) [ 0.30385]	-0.179483 (0.25752) [-0.69697]	-0.279543 (0.26500) [-1.05489]	-1.002793 (0.76056) [-1.31849]
D(DBT(-3))	-0.371351 (0.26683) [-1.39171]	-0.228354 (0.23007) [-0.99255]	-0.399452 (0.23675) [-1.68726]	-1.642327 (0.67948) [-2.41703]
D(DBT(-4))	0.359514 (0.20623) [ 1.74328]	-0.162568 (0.17782) [-0.91425]	-0.027256 (0.18298) [-0.14896]	-1.662771 (0.52516) [-3.16624]
D(DBT(-5))	0.250646 (0.20853) [ 1.20194]	0.077934 (0.17980) [ 0.43344]	0.247307 (0.18502) [ 1.33663]	-0.324605 (0.53103) [-0.61128]
D(DBT(-6))	0.093227 (0.19146) [ 0.48694]	0.174777 (0.16508) [ 1.05875]	-0.031839 (0.16987) [-0.18743]	0.017964 (0.48754) [ 0.03685]
D(DBT(-7))	-0.069042 (0.16511) [-0.41816]	0.025124 (0.14236) [ 0.17648]	-0.095499 (0.14649) [-0.65190]	-0.416786 (0.42045) [-0.99129]
D(KRD(-1))	-0.046326 (0.20494) [-0.22605]	-0.138143 (0.17670) [-0.78178]	-0.846421 (0.18183) [-4.65496]	0.110066 (0.52187) [ 0.21091]
D(KRD(-2))	0.038443 (0.23745) [ 0.16190]	-0.471126 (0.20474) [-2.30115]	-0.690912 (0.21068) [-3.27947]	-0.360015 (0.60466) [-0.59540]
D(KRD(-3))	0.390594 (0.24513)	-0.225579 (0.21135)	-0.219397 (0.21749)	-0.569821 (0.62421)

	[ 1.59344]	[-1.06731]	[-1.00878]	[-0.91287]
D(KRD(-4))	-0.137590	-0.284612	-0.218019	-0.881812
	(0.22087)	(0.19044)	(0.19597)	(0.56245)
	[-0.62294]	[-1.49447]	[-1.11251]	[-1.56780]
D(KRD(-5))	-0.042758	-0.005673	-0.101861	-1.264777
	(0.21210)	(0.18288)	(0.18819)	(0.54011)
	[-0.20159]	[-0.03102]	[-0.54128]	[-2.34170]
D(KRD(-6))	0.095245	-0.139642	0.066219	-0.780436
	(0.19468)	(0.16786)	(0.17273)	(0.49575)
	[ 0.48924]	[-0.83190]	[ 0.38336]	[-1.57425]
D(KRD(-7))	0.030907	0.066400	0.124661	-0.056994
	(0.16753)	(0.14445)	(0.14864)	(0.42662)
	[ 0.18448]	[ 0.45968]	[ 0.83866]	[-0.13360]
D(EMON(-1))	0.120082	0.082792	0.208588	-0.014255
	(0.05476)	(0.04722)	(0.04859)	(0.13945)
	[ 2.19280]	[ 1.75343]	[ 4.29301]	[-0.10222]
D(EMON(-2))	0.084752	0.037019	0.066556	-0.082659
	(0.05577)	(0.04809)	(0.04948)	(0.14202)
	[ 1.51963]	[ 0.76982]	[ 1.34502]	[-0.58202]
D(EMON(-3))	0.015242	-0.014240	0.006634	0.104061
	(0.05300)	(0.04570)	(0.04703)	(0.13497)
	[ 0.28758]	[-0.31161]	[ 0.14107]	[ 0.77101]
D(EMON(-4))	0.083114	0.033134	-0.010597	0.302091
	(0.04818)	(0.04154)	(0.04275)	(0.12269)
	[ 1.72510]	[ 0.79761]	[-0.24789]	[ 2.46227]
D(EMON(-5))	0.040262	-0.062976	-0.052456	-0.036950
	(0.04744)	(0.04091)	(0.04210)	(0.12082)
	[ 0.84862]	[-1.53945]	[-1.24611]	[-0.30583]
D(EMON(-6))	0.034185	0.024117	0.070422	0.057313
	(0.04521)	(0.03898)	(0.04011)	(0.11513)
	[ 0.75613]	[ 0.61869]	[ 1.75558]	[ 0.49782]
D(EMON(-7))	0.064625	0.001573	0.024924	-0.224273
	(0.04498)	(0.03878)	(0.03991)	(0.11454)
	[ 1.43681]	[ 0.04057]	[ 0.62455]	[-1.95810]
C	0.003210	0.017628	0.009204	0.064160
	(0.00602)	(0.00519)	(0.00534)	(0.01533)
	[ 0.53314]	[ 3.39569]	[ 1.72296]	[ 4.18470]
R-squared	0.597559	0.691314	0.731808	0.639507
Adj. R-squared	0.420728	0.555679	0.613966	0.481109
Sum sq. resids	0.043058	0.032011	0.033896	0.279216
S.E. equation	0.025542	0.022023	0.022662	0.065043
F-statistic	3.379277	5.096873	6.210079	4.037339
Log likelihood	233.8403	248.0711	245.3242	144.1076
Akaike AIC	-4.246672	-4.543148	-4.485922	-2.377242
Schwarz SC	-3.445313	-3.741789	-3.684563	-1.575884
Mean dependent	0.004373	0.005783	0.003480	0.013187
S.D. dependent	0.033559	0.033039	0.036475	0.090294
Determinant resid covariance (dof adj.)		1.91E-13		
Determinant resid covariance		4.27E-14		
Log likelihood		932.7865		
Akaike information criterion		-16.84972		
Schwarz criterion		-13.53744		

Source: Authors (2018)

From Table 4, it is found that the KRTL variable in the past influenced the current of KRTL variable in the short term. This can be seen from the statistical value on KRTL variables lag 1, lag 2, and lag 4 > 95% ( $t_{89}^{0,05}=1,9870$ ). The model has an error correction coefficient (ECT) of -0.098304, the figures show that the effect of the adjustment from short term to long term of 0.098 per cent. Debit card transactions have a significant negative effect on the demand for currency in Indonesia in the long term. This indicates that the higher the people make transactions using debit cards, the demand for currency in Indonesia will decrease further. In contrast to research by Lukman & Dauda (2013), which states that money demand shows a negative effect on electronic money innovations in the short term. Meanwhile, in the long run, the demand for money has a positive effect on the debit card.

Credit card transactions have a significant positive effect on the demand for currency in Indonesia in the long term. This is supported by the development of credit card transactions, which every year from 2009 to 2016 continue to increase, which indicates an increase in needs and public confidence in credit cards. The increasing number of credit card transactions is also due to the increasing number of offers made by credit card providers. The results of this study contradict previous research conducted by Istanto & Fauzie (2013) which states that APMK transactions through credit card transaction proxy transactions have a positive and significant effect on M1 in the short term but not significant in the long term.

Meanwhile, the e-money transactions, have a significant positive effect on the demand for currency in Indonesia in the short and long-term, which increased e-money transactions, will increase the demand for currency in Indonesia in the short and long term. The results reject the initial hypothesis of the negative effect of e-money transactions on demand for currency on the short term. However, the finding in contrasts with the study conducted by Oyelami & Yinusa (2013) which stated that the demand for money showed a negative relationship to the innovation of electronic payments and payment of the internet in the short term, and in the long run showed a positive relationship. Indonesia is a developing country that still has a level of non-cash payments are very low, compared to other Asian countries, such as Malaysia, Singapore, and Thailand. Sutarmin & Susanto, (2017) remarked that the number of non-cash transactions in Indonesia only reached 0.6 per cent, while the countries of ASIA, such as Malaysia has reached 7.7 per cent. Indonesia needs an increased use of e-money transactions. One of the efforts that the Government has done, that Bank Indonesia, was with the establishment of noncash campaign in August 2014, which aims to increase the use of non-cash payment instruments which were later expected to be lowering the use of cash-money.

## CONCLUSION

It can be concluded that debit card transactions have a significant negative effect on the demand for currency in Indonesia. However, debit card transactions do not affect the demand for currency in the short term. Credit card transactions have a significant positive effect on the demand for currency in Indonesia in the long term, while credit card transactions do not affect the demand for currency in the short term. But in the long-term credit cards have an effect on the demand for currency. E-money transactions have a significant positive effect on the demand for currency in Indonesia in the short and long term. There are suggestions that can be given research that need to be done to increase the use of debit card, such as socialization procedure of debit card usage, so that people who have not to use debit card service because of lack of knowledge about the procedure of its use, are moved to use debit card. There is a need for policies to expand and raise public awareness in the use of

non-cash payment instruments, so that the use of non-cash instruments can be perceived by anyone and more easily accessible.

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