ANALYSIS OF THE RELATIONSHIP BETWEEN ELECTRONIC MONEY (E-MONEY) AND MONEY SUPPLY IN INDONESIA (2011–2019)

Kartiko Dhian Pramono¹, Estu Wijaya²
¹,²Faculty of Economics and Business, Universitas Trisect, Jakarta
Corresponding Email: kartiko.dhian@gmail.com

Abstract
This study aims to analyze the relationship between electronic money (e-money) and money supply in Indonesia. The data used is electronic money, APMK and the money supply using cointegration test analysis to determine the long-term balance relationship, and granger causality test to determine the reciprocal relationships between variables.

The results of the analysis show that the variables of electronic money and the money supply have a long-term balance and between electronic money variables and the money supply only have a one-way causality relationship.

Keywords: E-Money, Money Supply, Cointegration, Granger Causality

INTRODUCTION

The role of the payment system in the economy is increasingly important with the increasing volume and value of transactions. With the increasing number of transactions, the risk posed becomes even greater because disruption of the payment system can jeopardize the stability of the system and the financial market as a whole (Bank Indonesia, 2003).

The payment system from time immemorial has played an important role in the economy. The economic system is processed from the point where everyone independently exchanges goods with each other. The exchange of goods and services without using money is called barter, where the barter system precedes the use of all forms of money (Davidson, 2009).

But along with the development of the times, the barter payment system is considered no longer efficient. Because there is no common unit to measure and express the value of goods and services intended and it is difficult to get the desired goods. With the limitations of the system and with the development of the times, a payment system for a medium of exchange that has a fixed value and is accepted by the wider community
has emerged. The medium of exchange is coins and paper money which is known as currency.

The use of e-money is mostly in the transportation sector, this is natural because the initial introduction of e-money was to pay for transportation costs. Based on the Cermati.com survey, 59% of respondents or 7,967 people use e-money to pay tolls, followed by a convoy of 7,374 respondents using online transportation and 7,303 respondents using public transportation.

The most users of electronic money are private employees of the capital who on weekdays prefer to use public transportation to get to the office. In addition to public transportation, online transportation with non-cash payments is also the choice of office employees. It is evident from the use of the most types of electronic money is Go-Pay (7,795 respondents). This is also supported by a 30% discount for Go-Pay users from the normal tariff. Apart from Go-Pay, other types of e-money the most widely used by the public is the Flazz card from BCA (57.6%). This card can be used for a variety of non-cash payments, ranging from paying for Transjakarta, train, Parking, Toll Roads, to shopping at minimarkets. Apart from Flazz, another card-shaped e-money with a lot of users is Mandiri E-money (52.9%). Underneath it is T-Cash (29.3%), e-money from the cellular operator Telkomsel.

LITERATURE REVIEW

Payment System
Payment System is a system that includes contract/agreement arrangements, operational facilities, and technical mechanisms used for the delivery, ratification and receipt of payment instructions, as well as fulfillment of payment obligations through the exchange of "value" between individuals, banks, and other institutions, both domestic and cross-border. 'Between countries' (Bank Indonesia, 2003).

Electronic Card (e-money)
According to Bank Indonesia Regulation No. 11/12/PBI/2009 regarding electronic money (Electronic Money), are a means of payment with the value of money that has been stored electronically on a server or card and the procedures for use and issuance have been regulated and supervised directly by Bank Indonesia.

Electronic money (e-money) is divided into two types based on its shape, namely prepaid cards and e-wallet.

1. Prepaid Card
   This kind of product is issued by a bank that already has a license from Bank Indonesia. This card is not PIN protected, so it is transferable. The nominal stored on this card is not guaranteed by LPS and has a limit of IDR 1,000,000. Several banks have electronic money products in the form of cards, including BCA Flazz, Mandiri E-money, BNI TapCash, Brizzi BRI, and so on.
2. Electronic wallet (E-Wallet)
   Besides in the form of cards, there is also electronic money (E-Wallet). Unlike cards, e-wallet services are not only provided by banks, but also by telecommunications operators. Some of them are CIMB Niaga Mobile Accounts, Mandiri E-Cash, and so on.

Money
According to Thomas (2001) money is everything that is available and generally accepted by the general public as a means of payment for the purchase of goods and services, as well as for paying off debts. The special functions of money include:
   a. Money as a medium of exchange
   b. Money as a means of storing value/purchasing power
   c. Money as standard/unit of value

Amount of Money Supply
According to Mankiw (2006), the understanding of the money supply (JUB) is simply the amount of money available. In an economy using commodity money, the money supply is the sum of the commodity.

Classical economists (but not all) are inclined to interpret the money supply as currency, because it is this money that is really a purchasing power that can be directly used (spent) and therefore directly affects the prices of goods. What is included in the definition of currency as money in circulation is not all banknotes and coins, but only banknotes and coins that are in the hands of the general public (excluding banks and the state treasury).

From the above understanding, we can conclude that the money supply is only interpreted in terms of currency. Meanwhile, as we can see today, the use of currency, especially in developed countries, has begun to decrease. Some people have kept their cash in the bank. In developed countries, some payments have been made by check.

Previous Research
There are several previous studies related to the research conducted by the author, some of these studies are:

A. Ahmad RadhiBajili (2016) with title Analysis of the influence of the use of electronic money (e-money) on the demand for currency in Indonesia. Result Stating that the circulating APMK has a significant influence Positive and significant effect on the amount of demand for currency in Indonesia. The amount of clearing turnover has a negative and significant effect on the demand for currency in Indonesia. Ethnic group deposit interest has a negative and no significant effect on the demand for currency in Indonesia.

B. Vahid Farhadi Cheshme Morvari (2015) with title Possible Effects of Electronic Payments on the Money Supply in the economy. Stating that the flow of M1 in the hands of the community, with an increase in rd and brake, cause degradation
Non-cash Payment Transactions decreases, which means reducing the potential impact of electronic money on the money supply.

Conceptual Framework
The conceptual framework in this study can be described as follows:

<table>
<thead>
<tr>
<th>Non-cash Payment Transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electronic Money</strong></td>
</tr>
<tr>
<td>• Volume</td>
</tr>
<tr>
<td>• Value</td>
</tr>
<tr>
<td><strong>APMK</strong></td>
</tr>
<tr>
<td>• Volume</td>
</tr>
<tr>
<td>• Nilai</td>
</tr>
<tr>
<td><strong>Money Supply (M1)</strong></td>
</tr>
</tbody>
</table>

Research Hypothesis
The hypothesis is a temporary answer to the problem that is the object of research, the truth of which still needs to be proven or tested empirically.

Based on the problem, the hypothesis of this research is as follows:

1. E-Money transactions have a positive effect on the money supply in Indonesia
2. E-Money transactions have a positive effect on the money supply in Indonesia
3. APMK transactions have a positive effect on the money supply in Indonesia
4. APMK transactions have a positive effect on the money supply in Indonesia

RESEARCH METHODS
The type of research used in this study is descriptive and quantitative in the form of monthly data in the form of numbers. The scope of this research is to analyze how the influence of the use of electronic money (e-money) on the money supply in Indonesia. The type of research used in this research is descriptive and quantitative in the form of monthly data in the form of numbers. This study analyzes the effect of electronic money on the money supply. The dependent variable is the Money Supply, while the independent variable is the volume and transaction value of e-money and Card Payment Instruments (Credit Card, Debit and ATM). The type of data used in this study is secondary data in the form of time series data that is quantitative in nature, using monthly data in the form of numbers. To address data limitations, testing the empirical research in this study was conducted in the period January 2009-December

2017 (108 months).

**Data Analysis Technique**
The analytical method used in this research is the Granger Causality test and Cointegration Test. This test was conducted to determine the reciprocal relationship between the e-money variable and the amount of money in circulation.

**Estimation Selection**

**Normality Test**
Normality test is conducted to determine whether the data is normally distributed or not. The normality test used is the Jarque Bera test. Jarque Bera test is a type of goodness of fit test that is useful for measuring whether the skewness and kurtosis of the sample are in accordance with the normal distribution.

**Cointegration Test**
Cointegration is a long-term relationship between variables which although individually are not stationary, but the linear combination between these variables can be stationary. Cointegration test can be used to determine whether two economic variables or financial variables have a long-run equilibrium relationship. The cointegration test method used in this study is a multivariate approach, namely the Johansen Cointegration Test.

**Granger Causality Test**
The Granger causality test in this study aims to examine whether A precedes B, or B precedes A, or the relationship between A and B is reciprocal. Granger causality test aims to see the past influence of a variable on the condition of other variables in the present. In other words, the Granger causality test can be used to see if the y forecast can be more accurate by including the lag variable x (Nachrowi, 2006).

**RESULT AND DISCUSSION**

**Normality Test**

<table>
<thead>
<tr>
<th>Variabel</th>
<th>Jarque-Bera</th>
<th>Probability</th>
<th>Keputusan</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(JUB)</td>
<td>0.17429</td>
<td>0.916544</td>
<td>Data Normally Distributed</td>
</tr>
<tr>
<td>NTEM</td>
<td>4.149039</td>
<td>0.125617</td>
<td>Data Normally Distributed</td>
</tr>
<tr>
<td>VTEM</td>
<td>5.046623</td>
<td>0.080194</td>
<td>Data Normally Distributed</td>
</tr>
<tr>
<td>NTAPMK</td>
<td>3.202389</td>
<td>0.201655</td>
<td>Data Normally Distributed</td>
</tr>
<tr>
<td>VTAPMK</td>
<td>4.588014</td>
<td>0.100861</td>
<td>Data Normally Distributed</td>
</tr>
</tbody>
</table>

The Table shows the results of the data normality test for the five variables. The table shows the results of the JUB variable, that the data that has been tested is normally
distributed. This can be seen from the probability value, which is 0.9165%, which is greater than 0.05 at 5% significance. The variable volume of e-money transactions has a normal distribution as seen from the probability value, which is 0.080194%, which is greater than 0.05 at 5% significance. So is with the variable value of e-money transactions has a normal distribution seen in its probability value of 0.125617% greater than 0.05 at a significance of 5%. The transaction value and volume of e-money transactions can be normally distributed after the data undergoes a logarithmic transformation.

Meanwhile, in the variable volume of APMK transactions, it is known that the probability value of 0.100861% is greater than 0.05 at a significance of 5%, indicating that the data is normally distributed. And on the variable value of APMK transactions, the data has a normal distribution as seen from the probability value, which is 0.201655%, which is greater than 0.05 at 5% significance.

**Cointegration Test Cointegration Test Result**

<table>
<thead>
<tr>
<th>Cointegration Rank Test (Trace)</th>
<th>Cointegration Rank Test (Max-Eigenvalue Statistic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesize d of No. Trace Statistic 0.05 Critical Value Hypothesize d of No. Max-Eigenvalue Statistic 0.05 Critical Value</td>
<td></td>
</tr>
<tr>
<td>CE(s)</td>
<td>c</td>
</tr>
<tr>
<td>At most 1*</td>
<td>62.57</td>
</tr>
<tr>
<td>At most 2*</td>
<td>34.07</td>
</tr>
<tr>
<td>At most 3</td>
<td>10.96</td>
</tr>
<tr>
<td>At most 4</td>
<td>0.694</td>
</tr>
</tbody>
</table>

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level. Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level.

*Denotes rejection of the hypothesis at the 0.05 level.

Based on the results of the cointegration test that has been carried out, it shows that there is a cointegration relationship at a significance level of 5%. This is found in the long-term relationship between the Money Supply in a narrow sense (M1) and the variables that influence it, namely the volume and value of transactions. Electronic Money (E-Money) as well as the volume and value of APMK transactions (Card-Based Payment Instruments).
Granger Causality Test Result

Table 2
Granger Causality Test

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Obs</th>
<th>F-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTEM does not Granger Cause D(JUB)</td>
<td>105</td>
<td>3.14355</td>
<td>0.0474</td>
</tr>
<tr>
<td>D(JUB) does not Granger Cause NTEM</td>
<td></td>
<td>1.26233</td>
<td>0.2875</td>
</tr>
<tr>
<td>VTEM does not Granger Cause D(JUB)</td>
<td>105</td>
<td>2.47906</td>
<td>0.0490</td>
</tr>
<tr>
<td>D(JUB) does not Granger Cause VTEM</td>
<td></td>
<td>0.31517</td>
<td>0.7304</td>
</tr>
<tr>
<td>NTAPMK does not Granger Cause D(JUB)</td>
<td>105</td>
<td>3.30800</td>
<td>0.0406</td>
</tr>
<tr>
<td>D(JUB) does not Granger Cause NTAPMK</td>
<td></td>
<td>0.89967</td>
<td>0.4100</td>
</tr>
<tr>
<td>VTAPMK does not Granger Cause D(JUB)</td>
<td>105</td>
<td>3.57423</td>
<td>0.0317</td>
</tr>
<tr>
<td>D(JUB) does not Granger Cause VTAPMK</td>
<td></td>
<td>0.04835</td>
<td>0.9528</td>
</tr>
</tbody>
</table>

Based on the results of the Granger Causality Test above, it shows how the relationship between each independent variable and its dependent variable is. That is between the variables of e-money transaction volume against JUB, value of e-money transactions against JUB, APMK transaction volume against JUB, and APMK transaction value against JUB.

CONCLUSIONS AND SUGGESTIONS

Based on the data analysis and discussion described in the previous chapter, the following conclusions can be drawn:

1. There is no causal relationship between the value of electronic money transactions (e-money) and the amount of money in circulation, where the value of electronic money transactions in the past affects the current money supply.

2. There is no causal relationship between the volume of electronic money transactions (e-money) and the Money Supply, where the volume of electronic money transactions in the past affects the current Money Supply.
3. There is no causal relationship between the transaction value of APMK (Card-Based Payment Instruments) and the Money Supply, where the value of past APMK transactions affects the current Money Supply.

4. There is no causal relationship between the volume of APMK transactions (Card-Based Payment Instruments) and the Money Supply, where the volume of past APMK transactions affects the current Money Supply.

**Suggestions**

From the results of the analysis and conclusions of this study, several suggestions can be made, namely:

Based on the research above, the authors can provide some suggestions, namely as follows:

1. Non-cash payments are currently prestigious in the community, because they provide convenience in the payment system. Therefore, Bank Indonesia and conventional banks should be able to improve services to the non-cash payment system in each of their retail outlets.

2. To regulate the JUB, BI must maintain the circulation of the four variables (e-money transaction value, e-money transaction volume, APMK transaction value, and APMK transaction volume), where this will have an impact on inflation stability.

**REFERENCES**


*Ekonomi Moneter*, Ghalid Indonesia, Medan.


