Does E-Money Affect Inflation In Indonesia

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ABSTRACT

The purpose of this study aims to explain the effect of electronic money on inflation and how much influence it has on the Indonesian economy. In this study the authors used a quantitative approach. The variables used are inflation, electronic money, exchange rate, money supply (M1), and BI interest rate. Result: The previous money supply (LQMprev) and the interest rate (BI Rate) were the main factors affecting inflation. In this result, e-money and exchange rates are not the main components driving inflation. Based on SPPS processing using regression, e-money and exchange rates do not have a significant effect on inflation in Indonesia, but LQMprev has a significant effect on inflation. From the results of this study it is still too early to analyze the effect of e-money on inflation because it is still relatively new in Indonesia.

Keywords: Inflation, electronic money, economy, Indonesia, Policy, Bank of Indonesia

INTRODUCTION

Money cannot be separated from our daily activities and our economy. In ancient times before the introduction of money, the barter system was used as a medium of exchange. However, bartering is not efficient because it requires one party to trade goods that both parties are willing to accept, therefore money is created to replace the barter system. Money has three principles, namely as a medium of exchange, a measure of value, and a store of value. In economics, money is defined as any asset that can be used to make purchases. Examples of money today in our modern society are banknotes and coins. Coins can be in the form of metal, silver or gold as a form of money in the past. However, over time the form of money is always associated with the technological progress of an economy. The innovation of money through time always increases convenience and efficiency. The paper money we use today has a flaw in it. Our world is currently experiencing a new era, namely digitalization. Gradually, changes in digitalization began to change from business operations, government systems, and money. Money has changed form from paper to paperless. Nowadays electronic money provides convenience and security in the eyes of the Central Bank and the public. Indonesia currently has many electronic money issuers and is monitored by the Indonesian Financial Services Authority to ensure anti-money laundering activities (OJK, 2018). Electronic money is very popular among Indonesians, especially people who make online purchases in e-commerce and attract Indonesians to use it because it is convenient and reliable (Nugroho & Samudera, 2018). Bank Indonesia recorded the growth of electronic money transactions in 2018 of 300.4 percent, supported by the preferences of Indonesians who make transactions through financial technology and e-commerce (Fauzia, 2018).

Even though money is issued by the government, a high rate of money growth can lead to inflation. The basic illustration is that Bank Indonesia wants to replace the old Rp10,000 banknote with a new note of the same value. Inflation should not have occurred if the bank could remove all the Rp10,000 banknotes in public at once, but that would be difficult and expensive. The more money circulating in the market, the higher the community will bid on the prices of goods and services available. This problem may not be experienced in the use of electronic money because the Central Bank can easily control the circulation of money by the system. Inflation is always a problem in the economy and the Central Bank ensures that inflation is at the optimal level. Indonesia has experienced significant inflation control in the last four years at below 4 percent under the Joko Widodo administration (Kuwado, 2018). Indonesia's highest inflation rate in 2005 was 17.11 percent and the lowest was in 2016 at 3.02 percent (Indonesian Statistics Agency, 2019). The Indonesian economy continues to grow robustly accompanied by strong investment. The real GDP growth rank was 5.1 percent in Q1 2018, experiencing a slight decrease compared to Q4 2017 of 5.2 percent (World Bank, 2018). It is not easy to control an economy with 260 million people in Indonesia. Indonesia's GDP of around US $ 1 trillion is the sixteenth largest economy in the world and the seventh largest in purchasing power parity (PPP) (Breuer et al., 2018).

According to the International Monetary Fund, there are three trends that are likely to change the Indonesian economy and one of them is the digital economy (Breuer et al., 2018). By 2025 Indonesia can realize growth of USD 150 billion, 10 percent of GDP, by adopting digitalization (Das, Gryseels, Sudhir, & Tan, 2016). In addition, there has been a significant shift in the financial sector from traditional banks to digital banks. The IMF noted, through research conducted by Pricewater house Coopers in 2017, the number of individuals who went to traditional banks fell to 45 percent from 75 percent (Breuer et al., 2018). Electronic money is often used by young Indonesians or low-income people. The growth and popularity of electronic money is supported by digital companies. No wonder a survey shows that Jakarta is ranked the 8th best city out of 45 cities in the world for digital companies (Marzuki, 2018). However, Indonesia faces challenges in digitalization adoption. Internet access in Indonesia is not expensive, but the quality is poor when compared to other countries (Das et al., 2016). Of course, the use of electronic money requires an internet connection. If the infrastructure is not well developed, it may become a threat. Whereas for average transactions, internet speed is sufficient for making payments online. Electronic money was recognized by Bank Indonesia in 2009 and is still in the early adoption stage. The use of electronic money can solve the insecurity and problems of using the old money system. Based on the above background, the authors conducted a study in which the research question was whether electronic money affected inflation in Indonesia?

LITERATURE REVIEW
Electronic Money
Electronic money is an innovative means of electronic payment using cards which have developed into a more practical form. Recently in Indonesia, a payment instrument known as e-money is developing. Although e-money contains slightly different characteristics from other payment instruments such as credit or debit cards, the use of these instruments remains the same as credit cards and ATM / Debit cards intended for payment (Bank Indonesia, 2009 in accordance with Bank Indonesia Regulation Number 11 / 12 / PBI / 2009 concerning Electronic Money). Simply put, e-money is a payment medium in electronic form where the value of money is stored in the form of server-based chips. Users must first deposit money to the publisher and store it in electronic media before it is used to make payments. When used, the transaction value will reduce the value of e-money stored in electronic media after which it needs to be top-up. The use of e-money as an innovative and wise payment method is expected to foster smooth payments for mass, fast and micro economic activities, so that this development can help smooth operations on toll roads, in the field of transportation, public buses, and other public transportation, or deals in wholesale stores. fast food restaurants, or even parking lots. Even though there are several benefits of e-money, there are risks that need to be considered carefully from its users, such as: The risk of e-money being lost, because it is usually stored on a card, and can be used by other parties, because in principle e-money is the same as cash which if lost cannot be claimed to the issuer.

Risks due to the user's lack of understanding in using e-money, such as users who do not know the e-money being used is tapped 2 (two) times to the reader for the same transaction so that the amount of e-money decreases greater than the nominal transaction. (Bank Indonesia, 2009). There are 34 registered e-money issuers that have been authorized by Bank Indonesia. Consists of 12 banks and the rest are dominated by private companies. It is hoped that the development of e-money can also be used as an alternative means of non-cash payment that can reach people who do not have access to the banking system. (Papadopoulos, 2007). The European Central Bank defines e-money broadly as an electronic storage of monetary value on a technical device that can be widely used to make payments to entities other than e-money issuers. The device acts as a prepaid carrier instrument which does not necessarily involve a bank account in the transaction. It categorizes E-money into hardware-based products and software-based products. Hardware-based products (chip cards) do not require an internet connection to a remote server, usually using a device to read the device. On the other hand, software-based financial products emphasize the use of software that makes use of computers, smartphones, or tablets to transfer monetary values. Apart from that, it also requires a real-time internet connection with a remote server as the server contains all the information and verification required to carry out a transaction successfully.

Money Supply and Reserve Requirements

The monetary system, such as the Central Bank, has a commitment to control and supervise the money supply. The main components of the money supply, which based on economic theory, consist of money held by the public, bank deposits (including savings, time deposits in rupiah and foreign currency, and demand deposits in foreign currency), and securities issued by monetary institutions. Central banks do not direct the money supply directly, but can stimulate the money supply indirectly in several ways, one of which is through market operations. Buying on the open market increases the money supply, on the other hand selling on the open market reduces the money supply. The money supply can be explained in general terms (M1) and in a complex way (M2). M1 consists of public deposits and bank deposits in Rupiah, while M2 takes into account M1 plus quasi money (including savings, time deposits in rupiah and foreign currency, as well as demand deposits in foreign currency), and securities issued by the monetary system owned by domestic private sector. In the equation, the money supply (M1) can be formulated as follows:

$$Money\ Supply = Currency\ held\ by\ the\ public + Bank\ Deposits$$

It is known that bank deposits are bank reserves divided by the ratio of reserves to reserves with the following formula

$$Money\ Supply = Currency\ Held\ by\ The\ Public + \frac{Bank\ reserves}{desired\ reserve-deposit\ ratio}$$

Inflation

Frank et al (2015) inflation can be said to be an increase in prices which is continuous within a certain period of time. If the price increases only for two or three goods, it cannot be said to be inflation unless the price increase is comprehensive and spreads between one good and another, while deflation is the opposite of inflation. Basically, in measuring inflation using the Consumer Price Index (CPI). The shift in the CPI from period to period shows fluctuations in the price of goods and services consumed by the public. The calculation of goods and services in the CPI basket can be determined based on the Cost of Living Survey (SBH) conducted by the Central Statistics Agency (BPS). Then, BPS will monitor the development of monthly prices for these goods and services in several cities, especially in traditional and modern markets for several types of goods / services in each city. Currently, BPS publishes inflation based on another classification called inflation disaggregation. Inflation disaggregation is carried out to show inflation proxies that reflect the influence of fundamental factors. In Indonesia, the disaggregation of CPI inflation is grouped into:

1. Core inflation, namely the element of inflation that is most likely to be a persistent or persistent component of inflation fluctuations and is fostered by fundamental factors ranging from demand-supply interactions, the external environment (exchange rates, international commodity prices, trading partner inflation) and inflation expectations from traders. and consumers.

2. Non-core inflation, namely the elements of inflation that have a high chance of movement because it is obtained in addition to fundamental factors. Non-core inflation components consist of:

• Volatile Food Inflation: Inflation which is principally caused by food shocks such as harvests, natural disturbances, or domestic food price development factors as well as international food commodity prices.

• Administered Prices: General inflation. influenced by sudden Government pricing policies, such as assisted fuel prices, powertariffs, transportation rates, etc.

Inflation and Interest Rates

There are two kinds of interest rates, namely real and nominal. According to Frank et al (2015), the real interest rate is the annual percentage in the increase in the purchasing power of a financial asset, but the nominal interest rate shows the percentage of annual increase in the market value of financial assets.When inflation is unexpectedly high, the real interest rate is below expectations, which is detrimental. lender but profitable for borrower and vice versa. Lenders must charge high nominal interest rates when inflation is high and charge a low nominal interest rate when inflation is low to obtain a certain real rate of return. The Fisher effect is when the probability of nominal interest rates being high when inflation is expected to be high and low at nominal interest rates when inflation is low. For better understanding, illustrations are provided. For example, assuming a nominal interest rate of 6% and an inflation rate of 4% per year, the real interest rate is 3%. As a result, when a person earns 6% of income from an interest

perspective, his spending capacity, purchasing power, increases by only 2%. This supports the Fisher Effect theory which states that when inflation is high, the debtor loses money and the creditor gains. In simple terms, when interest rates fall, people tend to borrow more money. As a result, consumers have more money to spend, encouraging the economy to grow and inflation to rise. However, when interest rates are low, individuals will tend to spend and borrow less. So that it has an impact on decreasing economic growth and decreasing inflation Money Supply and Inflation In macroeconomics, the amount of the economy's money flows and the general price level are closely related in the long run (Frank et al., 2015). In other words, inflation usually occurs when money growth increases. The more money in circulation, the higher the price of the goods and services available (Frank et al., 2015). The quantity theory of money is the longest existing inflation theory starting in the 1600s (Colander, 2017). The theory states that inflation is triggered by an increase in the money supply, so it focuses on the exchange equation:

$$MV = PQ$$

Money is expressed in M. P is the price level while Q represents the real quantity of goods. In other words, PQ is nominal GDP for V, velocity of money is the number of times Rupiah is spent on goods and services per year. Quantity theory works under three assumptions: (1) Speed remains constant, (2) Real output does not depend on the money supply, and (3) the causes of money to price (Colander, 2017). In connection with the three assumptions above, the theory develops into a quantity theory of money:

$$MV \rightarrow PQ$$

This theory removes all other theories about inflation in order to see the relationship between money and inflation. Therefore, the direction of this theory is from left to right: $MV \rightarrow PQ$ Nominal GDP measures the current value of rupiah production, as well as e-money transactions. Therefore, GDP turnover will be converted into e-money transactions. Likewise, Q, real GDP, will be converted into the amount of E-money. Real GDP measures the physical volume of actual production.

RESEARCH METHODOLOGY
These data are provided by two credible sources, namely Bank Indonesia and Investing.com. The author decided to use one source, namely Bank Indonesia, the central bank of Indonesia, to maintain data consistency, providing all data on monetary policy, but not exchange rate data. Therefore, Investing.com is used to provide USD-IDR historical data. The data period will be from 2009-2018 every month. This time period was chosen on purpose because Bank Indonesia recognized electronic money in 2009 by enacting a new regulation. This study aims to evaluate the factors that influence inflation in Indonesia. Inflation is the dependent variable in this study. Inflation data is taken from Bank Indonesia from 2009-2018. The independent variables in this study are e-money, exchange rates, interest rates, and the money supply in the previous period. The explanation and justification will be discussed briefly in this section. Based on general economic theory, inflation is influenced by the exchange rate, interest rates, and the money supply. However, Kartika and Nugroho (2015) show that the use of

electronic money reduces the money supply in ASEAN-5 countries (Indonesia, Malaysia, Philippines, Singapore, and Thailand). Sasongko (2018) conducted research on inflation in Indonesia and found that the main cause of inflation is the money supply. Therefore, electronic money is considered a new independent variable. The final objective is to test whether electronic money transactions have an effect on inflation in Indonesia. The exchange that will be used is Rupiah (IDR) against US Dollar (USD). The data source comes from Investing.com as it provides average monthly rates from 2009-2018. Interestingly, Bank Indonesia decided to switch from the BI Rate to the 7-Day Reverse Repo Rate which was effective on 19 August 2016 (Riwayati, 2016). According to Agus D.W. Martowardojo, Governor of Bank Indonesia, increased the effectiveness of monetary policy transmission and strengthened policy effectiveness in achieving the set inflation target. The BI 7-Day Repo Rate, as a new instrument, is closely related to money market interest rates, is transactional or traded on the market, and encourages financial market deepening, particularly the use of the repo instrument. These actions will not change the current stance of monetary policy. The 7-Day Reverse Repo rate is part of the futures structure. This has been done by other Central Banks as a best practice. With the use of the 7-day BI (Reverse) Repo Rate instrument as a new interest rate policy, it is hoped that there will be three main impacts. First, strengthening monetary policy signals with a 7-day (Reverse) Repo Rate as the main reference in the financial sector. Second, increasing the effectiveness of monetary policy transmission through its influence on movements in money market interest rates and bank interest rates. Third, deeper formation of financial markets, particularly transactions and formation of interest rate structures on the interbank money market with a tenor of 3 to 12 months. Thus, the data used for interest rates in this study are the BI Rate (January 2009 - July 2016) and the 7-Day Reverse Repo Rate (August 2016 - December 2018). Macroeconomic theory suggests that the previous money supply will have a relationship with current inflation. This can be seen from research conducted by Sasongko and Hurata (2018) in Indonesia. Based on this theory, this research wants to prove that this theory can be applied in the case of Indonesia or not. The e-money process involves taking a Bank account balance and transferring it to e-money whether it is stored on a media chip or a special server. Therefore, M1 fits the e-Money criteria. Previous researchers have explored the relationship between the money supply and inflation; However, e-money is outside of their equation. Based on the Morsa model (Morsa, 2015) in this study a modified Ordinary Least Square (OLS) model was used, with the following equation:

$$Inf\,t = \alpha 0 + \beta 1\,(EMoney) + \beta 2\,(Exchange\ Rate)\ + \beta 3\,(liquid\ money\,t) + e$$

Inft = inflation rate for a month
E-Money = electronic money in a month
Liquid money (LQMprev) = the amount of electronic money that has decreased in a month
Exchange rate = exchange rate in a month
e = error rate

The purpose of the research conducted by the author by means of an explanatory study. A deductive approach was chosen for this study. The methodological choice is a single quantitative method. The strategy is archival and documentary research, especially statistics obtained from the Central Bank of Indonesia. Longitudinal time horizon. The sampling technique is non-probability purposive theoretical. The analysis used is descriptive statistics, correlation and multiple regression.

RESEARCH RESULTS AND DISCUSSION

In the first stage, the authors conducted a descriptive statistical test in which e-money, LQMprev, exchange rates, interest rates and inflation were the abbreviations in this test. The test results are as follows:

Statistics	E-money	LQM prev	Nilai Tukar	Suku Bunga	Inflasi
N	150	150	150	150	150
Mean	14.38440	2.791771	15921.01	4.956472	.0739733
Percentile 50	10.80614	3.649282	10738.0	7.5	.07375
Max	18.89816	5.942323	12212.3	6.25	.0731
Min	8.38237	.0671292	5200	5.17	.0111
Std.dev	2.73345	.7205746	2071.484	2.091673	.0206519
Kurtosis	2.471632	4.417217	1.95913	2.364325	3.256815
Skewness	.4040942	-.7046709	.0190225	-.3335153	.5204081

Descriptive testing aims to change the raw data set to be easy to understand in the form of more concise information in other words in order to explain or describe some characteristics of the data, such as what is the average, how far the data varies from the average, how much the median data, and so on. From the data collection, there are 150 observations in each variable where the Mean and Median percentile is 50 of all variables, so in other words, the data is normally distributed. The standard deviation must not be greater than the mean so that from these results, all variables, it can be seen that the mean is higher than the standard deviation. For the results on skewness and kurtosis to be able to measure the data distribution that is different from the normal distribution curve. Positive skewness indicates a right-leaning distribution. In Kurtosis, it aims to measure the narrowness of the distribution. The bigger the kurtosis, the more the tufts will be distributed. Kurtosis is calculated and reported as both absolute and relative values. Absolute values are always positive numbers. To test whether or not there are signs in the independent variable, the writer will do a multicollinearity test by looking at the variance inflation factor (VIF). In general, this test should not exceed a

value of 10 so that the collinearity level can be tolerated. The following are the results of the tests conducted by the author in the multicollinearity test as follows:

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	E-Money	.672	1.522
	Nilai tukar	.976	1.073
	LQMprev	.699	1.567

If the VIF value < 10 then there are no symptoms of multicollinearity among the independent variables. if the VIF value > 10 then there are symptoms of multicollinearity among the independent variables. Decision: E-money has a VIF of 1,582 <10 The exchange rate has a VIF of 1.155 <10 LQMprev has a VIF of 1,533 <10 Thus it can be concluded that there are no symptoms of multicollinearity among the independent variables. From these results, it can be concluded that there is no multicollinearity symptom among the independent variables.

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.063	.275		-.300	.765
E-Money	2.147	.074	.910	12.721	.110
Nilai Tukar	.292	.058	.140	2.231	.211
LQMprev	-.212	.079	-.130	-2.761	.038

a. Dependent Variable: Inflasi

In column t, it is known that tcount for e-money is 12.721 where t table is 1.66, therefore tcount for e-money is greater than ttable, so Ho is rejected and Ha is accepted.In column t, it is known that tcount for exchange rate is 2.231 where t table of 1.66, therefore the tcount for the exchange rate is greater than the t table, so Ho is rejected and Ha is accepted, while in column t it is known that the tcount for LQMprev is -2.761 where the t table is 1.66 therefore the tcount for LQMprev is greater than t table then Ho was rejected and Ha accepted. In the sig column, it is known that the sig number in e-money is 0.110, the sig number at the exchange rate is 0.211 while the sig number in LQMprev is 0.038 so that the probability below 0.05 is that Ho is rejected and Ha is accepted by LQMprev has an effect on inflation while e- money and exchange rates have no effect on inflation. In the table above the coefficients illustrate that the regression equation:

$$Y = -0{,}063 + 2.143 X_1 + 0.292 X_2 - 0.212 X_3$$

Y = inflation, X1 = e-money, X2 = exchange rate and X3 = LQMprev. From the regression equation it can be concluded that: 1) A constant of -0.063 states that if there is no decrease in the value of the e-money variable (X1), the exchange rate (X2) and

LQMprev (X3), then the inflation rate (Y) is -0.063. 2) The regression coefficient of 2.143 states that each addition of one value to the X1 variable will give an increase in the score of 2.143. 3) The regression coefficient of 0.292 states that each addition of one value to the X2 variable will give an increase in the score of 0.292, 4) A regression coefficient of -0.212 states that each reduction of one value in the X3 variable will give an increase in the score of -0.212.

RESEARCH RESULTS AND DISCUSSION

E-Money and Exchange Rate do not have a significant effect on inflation For the case of Indonesia, the results of the study indicate that electronic money has no effect on inflation. This is because the use of e-money is still relatively new compared to other countries. In addition, Indonesia's financial literacy rate is still low. Based on a survey by the Financial Services Authority (OJK) in 2013, only 21.84 percent knew about e-money and 75.69 percent who knew enough about e-money, the rest did not know at all about the existence of e-money (OJK, 2013). In addition, the infrastructure to facilitate e-money in Indonesia is still limited. In general, private and government banks still have not benefited from e-money, so from this it is necessary to build an online system and make cards as initial capital. It is necessary to have a large enough budget to be able to expand the use of electronic money in Indonesia, both commercial banks and state-owned banks. The exchange rate does not have a significant effect on inflation, but is influenced by other factors outside of this study that can affect inflation such as investor expectations of Indonesia's economic growth and political conditions. In order to see an important factor in terms of politics which is the USD / IDR exchange rate, recently this exchange rate has finally broken through the position of IDR 14,850 per US dollar. From August 2020 the inflation rate was 1.32%, this is evidence that the effect of rupiah exchange rate pressures on inflation is minimal because last month's inflation was relatively lower than that. The low inflation was caused by the government and the national central bank succeeded in maintaining the availability of food supplies and prices, so as not to cause inflation. LQMprev has a positive effect on inflation. LQMprev has an influence on inflation, this shows that when LQMprev increases, the inflation rate will also increase. Inflation is caused in one way or another when the money supply grows faster than gross domestic product. These findings support Anari and Kolari (2016) that interest rates and inflation are related to Fisher's Effect macroeconomic theory. When interest rates are low, people in general will borrow more money, which people will consume more so that people's purchasing power increases. When the economy grows, inflation will increase. Conversely, when interest rates are high, people tend to save their money. Therefore, people's purchasing power will decrease because people will be more conservative in shopping.

CONCLUSIONS

From the results of the research conducted by the author, there are several conclusions, namely that e-money and exchange rates do not have a significant effect on inflation in Indonesia, but LQMprev has a significant effect on inflation. From this it can be concluded that if the money supply increases, it means that there is a large amount of money circulating in the economy, and the price level will later increase as well as people who will bid a much higher price. Furthermore, if the interest rate is low, people will tend to borrow money so that later people will tend to have a consumptive lifestyle. If the interest rate is high, people will try to think again when borrowing money or funds so that it will be conservative. The exchange rate does not have a significant effect on inflation, this is because the value of exports in Indonesia is greater than the value of imports so that it has no influence on the fluctuation of the exchange rate. Suggestion From the results of this study, there are several suggestions put forward by the author, namely 1. Bank Indonesia in intervening to maintain control over the circulation and circulation of e-money, the government should provide assistance to facilitate infrastructure and promote it to the community, especially in rural areas, because many people do not know about it, therefore it is necessary to provide education by means of education. The authors of this paper argue that this method is ineffective. 2. The author proposes to create advertisements to persuade as well as how to use e-money. Bank Indonesia can make advertisements ranging from television, radio, newspapers, or even social media. This is done so that everyone can understand the message to be conveyed. The government needs to encourage internet access to rural areas to further promote electronic money, so that even street vendors can accept electronic money payments to facilitate payments made by customers. In an effort to encourage the government to access the internet, it can also work with startup companies such as private financial technology companies in order to create promotions and build effective and efficient infrastructure for e-money.

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