

Macroeconomic Variables and The Growth of E-money on Inflation in Indonesia

Regina Niken Wilantari
University Of Jember, Indonesia

Eddy Priyanto
STIE Jaya Negara Tamansiswa Malang, Indonesia

Abstract : This study aims to determine whether or not there is an influence between macroeconomic variables and the growth of e-money on inflation in Indonesia in the short and long term. Macroeconomic variables in this study consist of exchange rates, interest rates, and economic growth variables. The method used in this study is the Error Correction Model (ECM), using a monthly data time period from January 2009 to December 2017. The results of this study indicate that in the short term only the interest rate and economic growth variables have a positive and significant effect on inflation in Indonesia, and only has a negative and insignificant effect on the money growth variable. However, in the long run, all independent variables, namely exchange rates, interest rates, economic growth and e-money growth have an influence positive and significant impact on inflation in Indonesia. The results of each independent variable on inflation differ depending on the economic conditions that occurred in Indonesia in the year concerned.

Keywords: Macroeconomic Variables, E-Money Growth, ECM

JEL Classification : C10,M12,M2

1 INTRODUCTION

The development of the world financial system is supported by its existence technological developments have made financial integration stronger among several countries in the world. However, with the development of financial integration there is an effect that can lead to a financial crisis so that it will be easy to spread quickly and worsen the inter-connected economy. The financial crisis occurred in the last two decades, namely the financial crisis in East Asia in 1997 and the global financial crisis in 2008, the source of the crisis was always linked to several indicators of macroeconomic variables. The impact of the 2008 crisis in East Asian countries was not as bad as during the 1997 crisis, so that countries in East Asia could

easily and quickly recover their economies, this is because these countries learned a lot during the 1997 crisis (Raz,et al., 2012). The 2008 global financial crisis was related to the deteriorating economic development in the United States, which had a broad impact on countries in the world. The crisis was caused by the ease of housing credit (subprime mortgage) for creditors in the United States, which in fact disbursing credit to the public should not have been done because it was seen from its economic capacity to fulfill the credit made. This has resulted in an inability to pay their obligations to the financial institutions concerned which will lead to bankruptcy and will affect financial institutions in the world, especially countries that have put their money in the financial institutions of the United States.

Inflation can not be separated from its influence on the exchange rate system adopted by a country, namely the fixed exchange rate system (Fixed Exchange Rate) and the floating exchange rate system (Floating Exchange Rate). According to Frieden et al (2000) a country with an open economy will easily experience turmoil in its economy, so domestic shocks and shocks will easily affect other countries. However, with an increasingly developing economy, the choice of an exchange rate regime will also easily influence a country's financial markets. So that a country with an increasingly open economy tends to use a free floating exchange rate regime, with a market mechanism that will carry out open market operations from its exchange rate instability (Hagen and Zhou, 2002). In this exchange rate regime it can also be used as a reference in controlling inflation to keep it stable and low. So that the development of the exchange rate will be able to affect both directly and indirectly on price stability and inflation, a country will experience a decline in the exchange rate against inflation as a result of activity trade between countries as well as from credible monetary policy by the central bank. This decline occurred in countries that implemented a monetary policy framework that was aimed at price stability (Warjiyo and Juhro, 2016).

Current technological developments are also followed by various transactions in the payment system with economic activities that continue to develop from time to time. This is due to the fact that globalization is increasingly modern and encourages economic activity, especially in the payment sector, as well as banking to innovate and transform the payment system, where previously people used cash (cash based) to switch to non-cash (non-cash). According to Law number 23 of 1999 concerning Bank Indonesia, the payment system is a system that includes a set of rules, institutions and mechanisms, which are used to carry out the transfer of funds to fulfill an obligation arising from an economic activity, which has now been changed to Law number 3 of 2004 that in order to regulate and maintain the smooth operation of the payment system, Bank Indonesia has the

authority to determine the payment instruments used by the public to meet security requirements for users.

The development of non-cash payment systems is not just as innovations from the banking sector but also as a need for the Indonesian people today in transaction processes that are safe, easy, and efficient to use. This electronic network-based payment system is usually known as electronic money (e-money) or electronic money. The electronic payment system (Electronic Payment System) is a service in modern financial or banking institutions that can be utilized by using technology so that activities or performance can be carried out appropriately, quickly, and accurately which can result in an increase in productivity (Priscylia, 2014).

Meanwhile, electronic money (e-money) is a value of money stored in an electronic device so that it can be used to make payments and as the value of money stored. Electronically in the device by the issuer and issued at the receipt of funds with the aim that it can be made as a payment transaction that can be accepted by people other than the issuer (Fung Ben et al., 2014). The increase in the use of e-money is also driven by the high income that the community receives so that it can show the level of welfare of the community evenly and from the purchasing power that has been made. The payment system and financial market are interconnected with each other, where the rapid growth of financial markets requires support of inadequate infrastructure development so that it shows a clear interdependence that there is growth in GDP and electronic transactions (Olena & Anna, 2014). Various economic upheavals experienced by Indonesia have caused macroeconomic variables to continue to fluctuate, triggering inflation. If this inflationary phenomenon occurs and is experienced by a country continuously, it will have a negative impact on the country's development and the economy will decline. Therefore, society as an economic actor must share the consequences of uncontrolled price increases (inflation) so that the cost of living they must bear will be higher. However, inflation also has a positive impact, especially for producers or entrepreneurs and debtors (debt recipients), because from this it will be able to increase their income from an increase in the number of goods produced, especially for goods purchased and consumed by the public. Therefore, further research is needed on the influence of the macroeconomic variables and e-money growth that have been described above, on inflation in Indonesia.

2 LITERATURE REVIEW

Inflation in a simple sense is a price increase that occurs continuously and generally within a certain period of time, an increase in the price of one or two items is not referred to as inflation but if the increase occurs widely (Bank Indonesia, 2018). According to Gardner (1973),

inflation is a macro phenomenon that must be experienced by every country in the world, whether that has happened in the past or that can occur as a threat in the future. Sadono (1998), the inflation rate is a percentage caused by an increase in prices within a certain period of time in a year, and inflation is also referred to as a measure to indicate the level of weakness or ugliness of economic problems faced by a country. Inflation will always occur anywhere as a monetary phenomenon. Therefore, the high rate of inflation experienced by a country continuously and continuously is caused by the high rate of growth in the amount of money in circulation so that money growth and inflation are closely related.

According to Keynes, an increase in the money supply will increase output (employment opportunities and economic growth) and prices will not increase. Keynes also disagrees and disagrees with the quantity theory regarding the elasticity and velocity of money because according to Keynes this elasticity and velocity of money are very difficult to predict because it is also very much influenced by society's expectations and on goods that are substitutes for money. (Suseno and Astiyah, 2009). According to Mishkin (1984), it is explained that inflation is a monetary symptom that every country will experience, and inflation will also occur continuously or continuously in the long run (continuous inflation). According to the structuralist theory, inflation that occurs especially in developing countries is caused more by the presence of structural factors in the economy, namely; First, there is a slowdown in export growth compared to growth in other sectors due to a weaker level of production responsiveness for exported goods to rising prices, and likewise with the import side. Import is one of the ways for Indonesia to meet the needs of its country so that it can be fulfilled and as a substitute or substitute for imports from established policies even though this causes high costs, which causes high prices of goods or inflation. Second, the slowing and weakening rate of domestic foodstuff production is not proportional to the high population growth and income per capita, which triggers high domestic food prices, which is followed by an even increase in prices for other goods which leads to inflation. Therefore, with such inflation, it cannot be corrected only by reducing the amount of money in circulation, but it must also be resolved by increasing productivity and building a deposit for foodstuffs and for export goods.

The theory of inflation, which was previously a form of the development of the quantity theory, basically discusses the factors that cause changes in the price level caused by an increase in the money supply which will also affect the rate of the price increase. The economists who adhere to the quantity theory are known as economists with the flow of monetarists, where one of the monetarist economists, Milton Friedman, has sparked the money demand theory. As determinants of the demand for

money by the community, namely the variables of economic growth, interest rates, and the price level (inflation rate) which are also the basis of the money demand theory itself. So that in the explanation of the money demand theory it is stated that if the money supply in the community is greater than what is needed by the community, it will cause the price level to increase and the emergence of inflation. Likewise, if the money supply in the community is smaller than what is needed, the price level will decrease, causing deflation. The monetarist theory states that inflation is a definite monetary phenomenon based on any country anywhere, which is caused by an increase in the quantity of money excessively and rapidly compared to the level of output (Samuelson and Nordhaus, 1992). Monetary also indicates that in the long run the level of output is determined by the stock of capital goods, the size and quality of the workforce, and the state of technology. And in the long run, the level of economic activity does not affect the quantity of money, but the nominal level of economic activity will be determined by the money supply so that in the long run money will have an impact on the price level, if the money supply in society is high, the inflation rate will also be high which an increase in price increases and vice versa (Froyen, 1996).

The monetary policy pioneered by Keynes can be seen in the performance of the central bank on aggregate demand through the use of the money supply, the interest rate as a tool to keep inflation and output in line with predetermined targets. Keynes's theory also contradicts the assumptions of quantity theory, in which Keynes states that there is no full employment in the economy, Keynes also explains that the velocity of money will change. Keynes in his theory distinguishes from each objective in the motive of holding money which consists of transaction motives, precautionary motive, and speculation motive (Handa, 2009).

Keynes's view of the theory of interest rates differs from that of Classical interest rate theory, where Classical theory states that the interest rate is the result of the interaction of saving and investment. However, this is different from Keynes's theory, where the interest rate is determined by the demand and supply of money. In this theory there are also three motives for someone to be willing to hold cash, namely; as a motive for transactions, precautions, and speculation. Of these three motives, the source of the emergence of money demand by Keynes is called the liquidity preference, which according to Keynes, the demand for money depends on the interest rate. If the interest rate is low, then people will choose to hold more money, on the other hand, if the interest rate is high, people will choose to hold less money and if the interest rate is the price, the amount must be determined by the relationship between supply and demand. Therefore, the interest rate will change if the demand and supply of money also changes. Schumpeter, who stated

that economic development originates from a social, political and technological environment that can encourage the creativity of economic actors or entrepreneurs who will also encourage economic growth or implement new ideas in the economy. And the influence of these innovations, namely: to create and introduce new technology, gain profits, technological innovations that will spread and cause imitation for other entrepreneurs (Hasyim, 2016). In addition, Malthus argues that the future economic conditions are pessimistic, because in increasing the level of public production, there is no calculation about this and the role it plays in technological development. With good technological development, the community's need for a certain item can be fulfilled in accordance with the amount needed by the community which also aims for community welfare. In view of the neo-classical theory by Robert Solow also states that one of the important ways and factors for a country so that economic growth can increase is by encouraging technological progress, increasing expertise or skills and increasing the skills of workers in using technology so that they can produce products or maximum and quality output for the welfare of society (Murni, 2006).

Electronic money (e-money) is a currency value stored in the form of an electronic card so that it can facilitate transaction activities. According to Bank Indonesia, e-money is a means of payment which one of the elements must be fulfilled, such as the value of money stored electronically in a media server or chip, where the value of electronic money can be transferred as a means for making transactions in payments and / or transfers of funds. Broadly speaking, e-money is a storage of electronic monetary value on technical devices that can be used as a means of payment to actors other than the issuer without having to involve a bank account in the transaction, but as a prepaid instrument. The value of money from e-money will automatically decrease if consumers use it for payments that have been made, e-money which is meant in this case is e-money which can be used for various types of payments. E-money is different from debit and credit cards, because e-money is a prepaid product whose value of money has been recorded in the e-money instrument and the overall recorded funds are under consumer control. Meanwhile, debit and credit cards are access products whose funds are not recorded in the card instrument and the overall funds are controlled by the bank (Hidayati et al., 2006).

The intensive development of digital technology can create an increase in savings because new technology provides sustained suppression of inflation. In research Buchheim and Kedert (2016) state that in setting the inflation target in a country in order to stay awake there are difficulties in adjusting the inflation target, therefore it is necessary to identify further reliable data sources on the way in which digitalisation affects the level of

inflation. The central bank noted that there was a decline in the number of currencies circulating in the community, but the growth in payment innovations for banks and non-bank financial institutions must also be accompanied by caution (Kamnar, 2014). Competition against electronic money (e-money) will also prevent the reduction of the opportunity cost of default, as well as in the household sector that uses electronic money as a medium of exchange to support its intermediation costs and as a process of preventing the circulation of counterfeit money. As an electronic instrument, e-money has proven to have benefits as an alternative payment instrument, especially for micro and retail payments in Indonesia, thus encouraging people, especially those who lack cash in using e-money, but e-money also does not play a major role in the economy in Indonesia. based on the real money balance approach, the increase in cash will have an impact on the velocity of money (Abednego & Apriansah 2010).

3 RESEARCH OBJECTIVE AND METHODOLOGY

This study uses secondary data in the form of time series data in the form of monthly data from January 2009 to December 2017. The determination of the time span and place in this study is based on the existence of an economic phenomenon so that this phenomenon shows the form of the problem which is considered appropriate to the discussion in the study This is also influenced by the emergence of a new electronic-based payment system in Indonesia (e-money) and there is an influence on macroeconomic variables in developed and developing countries. The object of this research focuses on the state of Indonesia. Meanwhile, most of the data sources used were obtained from Bank Indonesia, the International Monetary Fund (IMF), and the World Bank. The phenomenon of inflation is a phenomenon that must occur and be experienced by every country in the world, which emerges due to the influence of several macroeconomic variables.

In addition, inflation can also be influenced by the existence of a new phenomenon that is developing in Indonesia, namely e-money, the development of e-money in Indonesia in the world of economy, causing various positive and negative responses. The dependent variable data used in this study is inflation which is measured based on the CPI indicator, while the independent variables consist of exchange rates, interest rates, economic growth (GDP), and e-money growth which is measured based on the growth in the amount of electronic money in circulation. The problem of this economic phenomenon is what makes it interesting to be raised in research problems. The dependent and independent variables in the specification of this research model use inflation which is the dependent variable and for the independent variables used are exchange rates, interest rates, economic growth (GDP) and e-money

growth with an econometric model to be:

$$INF_t = \beta_0 + \beta_1 ER_t + \beta_2 IR_t + \beta_3 GDP_t + \beta_4 EMONEY_t + \varepsilon_t$$

Where:

β_0 = constant

β_1 β_4 = regression coefficient

INF = inflation (%)

ER = exchange rate (US \$)

IR = interest rate (%)

GDP = Gross Domestic Product (%)

EMONEY = Electronic Money (million rupiah)

ε_t = error

4 RESULTS AND DISCUSSION

In this descriptive analysis, the focus of research carried out is in the country of Indonesia which is associated with the movement of the behavior of each variable used as an indicator in research on the relationship of macroeconomic variables (exchange rates, interest rates, economic growth) and e-money growth to inflation in Indonesia. , where each independent variable affects the dependent variable. The independent variables consist of exchange rates, interest rates, economic growth and money growth. Meanwhile, the dependent variable itself is inflation. From the descriptive statistics on the variables studied, it can be shown in Table 1 below:

Table 1 Descriptive Statistics Test Results

Variable	N	Minimum	Maximum	Mean	Median	Std. Dev.
INF	108	2.41	9.17	5.198426	4.575	1.750326
ER	108	8508	14657	11139.89	11294.5	1886.524
IR	108	4.25	8.75	6.409722	6.5	1.036404
GDP	108	4.628871	6.223854	5.447485	5.307367	0.499733
EMONEY	108	576264	1.14E+08	27440020	26698253	21222064

Source : Author Computation

Based on the results of descriptive statistics Table 1 above can it is interpreted that there are five variables with 108 total observations (N) as a whole. Where in the table it is shown that the minimum value is the lowest value of all variables, the maximum value is the highest value of each variable under study, as well as the mean and median of the value of each variable, as well as the standard deviation of the values of each variable. from the results of statistical calculations, can be explained as follows:

1. INF

The results of the descriptive statistical test based on the table above show that the maximum value of INF that occurred in Indonesia from January 2009 to December 2017 was 9.170000, and the minimum value was 2.410000. Meanwhile, the average (mean) value of INF is 5.198426, with a standard deviation value of 1.750326.

2. ER

The results of the descriptive statistical test based on the table above show that the maximum value of ER circulating in Indonesia from January 2009 to December

2017 is 14657.00, and the minimum value is 8508,000. Meanwhile, the mean value (mean) ER is 11139.89, with a standard deviation value of 1886,524.

3. IR

The results of the descriptive statistical test based on the table above show that the maximum value of IR set in Indonesia from January 2009 to December 2017 is 8.750000, and the minimum value is 4.250000. Meanwhile, the average (mean) value of IR is 6.409722, with a standard deviation value of 1.036404.

4. GDP

The results of the descriptive statistical test based on the table above show that the maximum value of GDP experienced by Indonesia from January 2009 to December 2017 was 6.223854, and the minimum value was 4.628871. Meanwhile, the average (mean) GDP is 5.447485, with a standard deviation value of 0.499733.

5. E-MONEY

The results of the descriptive statistical test based on the table above show that the maximum value of EMONEY circulating in Indonesia from January 2009 to December 2017 is 1.14E + 08, and the minimum value reaches 576264.0. Meanwhile, the E-MONEY mean value is 27440020, with a standard deviation value of 21222064. The estimation results in Table 1 show that the distribution of data used during the study period, the estimation results obtained by comparing the average value (mean) with standard deviation. So, in this case, it can be concluded that the independent and dependent variables used in this study have good data distribution because the mean value of each variable in the study used is greater than the standard deviation (mean > Std. dev).

The Error Correction Model (ECM) method is used to determine the effect of short-term and long-term relationships between the dependent variable and the independent variable. With the relationship between the variables that are co-integrated in the research model used, the use of the Error Correction Model (ECM) method can then be carried out with the results of short-term equations and from these results as a way to change the form to 1 st difference from the dependent variable, and independent. In determining the estimation results on the ECM method, namely by looking at the comparison of the t-statistical and t-table values associated with each coefficient of the independent variable on the dependent variable in the research model. Meanwhile, in determining the estimation results can be interpreted and seen from the F-statistical probability value, Rsquare adjustment, and the value of the Error Correction Term (ECT). To see how much influence the relationship between the independent variable and the dependent variable partially can be seen from how big the comparison is generated from the estimate to the coefficient value of the variables used.

1. Short-term ECM Estimation Results in Indonesia

Short-term estimation results will be able to be carried

out and known after the variable data under study shows that it is stationary and has a co-integrated relationship. Table 2 below will show the variables which have a significant or insignificant influence and relationship on the inflation variable in Indonesia in the short term.

Table 2 Estimation Results of Short-Term ECM in Indonesia

Variables	Coefficients	t-Statistics	Probability
C	-6.66E-05	-0.001052	0.9992
D(ER)	0.000261	1.115481	0.2673
D(IR)	0.867533	2.551321	0.0122**
D(GDP)	2.488578	2.491518	0.0144**
D(EMONEY)	-8.48E-10	-0.065037	0.948E-01
ECT(-1)	-0.216035	2.157513	0.0334

Source : Author Computation

Table 2 explains that the ECT value in the model has a significant and negative value for the estimation results of the inflation variable. However, there are several variables whose probability value is more than the predetermined level of significance, which is indicated by the exchange rate variable where the probability value is 0.2673 > 0.1 which means that the effect of the exchange rate on inflation is not significant, as well as the money growth variable which has no significant effect. against inflation, where the growth of e-money probability value is 0.9483 > 0.1. And in the results of this short-term ECM test, there are two variables that have a significant effect on inflation in Indonesia, namely interest rates with economic growth, with an interest rate probability value of 0.0122 < 0.05 and for economic growth of 0.0144 < 0.05.

The long-term estimation test on the ECM method can be explained. There is a long-term balance between the economic variables used, where there is a possibility that in the short term it will not experience balance or with an error correction process as a form of balance between short-term and long-term behavior. From the estimation results of the ECM method in the long term in Indonesia, it can be explained in Table 3 as follows:

Table 3 Estimation Results of Long-Term ECM in Indonesia

Variables	Coefficients	t-Statistics	Probability
ER	2.58E-04	1.820062	0.0717***
IR	1.378528	10.24788	0.0000*
GDP	2.13152	6.750387	0.0000*
EMONEY	2.61E-08	2.300925	0.0234**
C	-1.88E+01	-7.056956	0.00E+00

Source : Author Computation

Table 3 above is the result of long-term ECM estimation in Indonesia where it can be explained that all the independent economic variables used to have a significant value and have a strong influence because the probability value has met the predetermined significance level, namely 1%, 5%, and 10%. Meanwhile, this is also

supported by the existence of an independent variable that is able to strongly explain the dependent variable as seen from the F-statistical probability value of 0.000000. So that in the long run, the variables (exchange rates, interest rates, economic growth, and e-money growth) have a significant effect on inflation in Indonesia. With the Adjusted R-squared results from the long-run estimation model of 0.645505, which means that the independent variable will be able to explain its effect on the dependent variable and the rest is influenced and explained by other variables outside the model.

5 CONCLUSION

Based on the results of the analysis previously described with the ECM method, both the results of descriptive analysis and the results of quantitative analysis can be concluded as follows:

The results of testing the ECM estimate in the short term show that the exchange rate variable has a positive and insignificant effect. Meanwhile, the long-term ECM estimation results show that the exchange rate variable has a significant and positive effect. Thus, the results of this study can be stated in accordance with the purchasing power parity theory or PPP (Purchasing Power Parity Puzzle). The interest rate variable estimated by ECM in the short and long term has a positive and significant effect in Indonesia. So in this case there is a disagreement with the theory which states that if the interest rate is higher then inflation will fall or be lower. In the long run, interest rates also have a positive and significant effect on inflation, so in this case, the research conducted also has a mismatch with theories relating to interest rates and inflation, where if interest rates rise, inflation will also increase. The ECM estimation results in this test indicate that the short-term and long-term economic growth (GDP) variables have a positive and significant effect on inflation in Indonesia. So this research is not in accordance with the theory which states that economic growth increases due to the encouragement and impact of low inflation rates, as stated by Robert Solow that changes or movements in inflation will experience a decline and decline if economic growth is encouraged. with advances in technology. In the short term, the EMONEY variable shows a negative and insignificant effect on inflation in Indonesia, this is not in accordance with the theory that if the money supply in this case money increases, inflation will also increase and vice versa. However, in the long run, the EMONEY variable has a positive and significant effect on inflation so that in this case there is compatibility with theory. And the development of digitalization or technology, especially in the payment system sector, will be able to maintain and serve as a bridge so that the inflation rate in accordance with the target can be achieved.

REFERENCES

- Abednego,P,Apriansah. (2010). Correlation Between Electronic Money an The Velocity of Money. Gunadarma University
- Bank Indonesia. (2018). 2018 Economic Report on Indonesia. Jakarta: Bank Indonesia
- Buchheim, V., Kedert, M. (2016). Digitisations Effect on The Inflation Rate. KTH Industrial Engineering and Management
- Frieden, Jeffry, et al. (2000). Politics and Exchange Rate In Latin America. Research Network Working Paper, R-421
- Fung Ben, et al. (2014). Electronic Money and Payments: Recent Developments and Issues. Bank of Canada Discussion Paper
- Froyen T Richard. (1996). Macroeconomics: Theories & Policies. Fifth Edition. Prentice-Hall, Inc
- Gardner,A. (1973). Macro economic theory Volume II. Jakarta: University of Indonesia
- Hagen,Jurgen Von and Jizhong Zhou. (2002). The Choice Of Exchange Rate Regimes: An Empirical Analysis For Transition Economies. Zentrum fur Europaishe Integrationsforschung Center, B 03
- Handa,J. 2009. Monetary Economics (2nd Ed). New York: Taylor and Francis eLibrary
- Hasyim, I. A. 2016. Macroeconomics. Jakarta: Prenadamedia Group
- Kamnar P. N. (2014). The Use of Electronic Money and Its Impact on Monetary Policy.JCEBI. Vol.1. No.2
- Murni, A. 2006. Macro Economics. Bandung: Refika Aditama
- Olena,S, Anna,P. (2014). The Electronic Payments As A Major Factor For Futher Economic Development. Economics and Sosiologi. Vol.7. No.3
- Priscylia A. Donna. (2014). The Influence of Bank Indonesia Certificate Interest Rate (SBI) Non-Cash Payment on Money Demand in Indonesia. Journal of Development Economics. Vol. 12. No.2
- Raz Arisyi F, et al. (2012). The Global Financial Crisis and Economic Growth: An Analysis of the East Asian Economies. Bulletin of Monetary Economics and Banking
- Sadono, S. (1998). Introduction to Macroeconomic Theory Second edition. Jakarta: PT Raja Grafindo Persada
- Samuelson A. Paul and Nordhaus D. William. 1992. Fourteenth Edition of Macroeconomics. Jakarta: PT. Gelora Script Primary
- Suseno and Siti Astiyah. (2009). Inflation. Jakarta: Center for Education and Central Banking Studies (PPSK) Bank Indonesia
- Warjiyo, P. and Juhro S. M. (2016). Central Bank Policy: Theory and Practice. Jakarta: Rajawali Pers