INFLATION PHENOMENON IN INDONESIA

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Abstract

The purpose of this research is to analyze how the effect of money supply, exchange rate, government expenditure, oil price and output gap on inflation in Indonesia and to find out whether inflation in Indonesia is included in monetary phenomenon or fiscal phenomenon. In this study the variables representing the monetary phenomenon are the money supply and exchange rate, the fiscal phenomenon is represented by government expenditure while the oil price is one of the factors affecting inflation through the supply side, and the output gap is a variable that is believed to predict inflation. This research uses multiple regression model with Error Correction Model (ECM) method. Estimation results indicate the money supply, exchange rate and oil prices have a positive and significant effect on inflation in Indonesia, while government expenditure and output gap have no significant effect on inflation in Indonesia. This research found that inflation in Indonesia is a monetary phenomenon due to the money supply and the exchange rate which is the variable representing the monetary phenomenon affecting inflation in Indonesia, while government expenditure is the variable representing fiscal phenomenon has no effect on inflation in Indonesia.

Keywords:Fiscal Phenomenon;Inflation; Monetary Phenomenon; Oil Price;Output Gap.

INTRODUCTION

The phenomenon of inflation is a symptom or event that can be observed where the general price level increases continuously. The phenomenon of inflation must be experienced by every country in the world so that every country is always trying to create inflation rate in the country which is controlled and stable. Inflation is very influential on the economy of a country.

In its development until now, price stability in general, or inflation stability, wherever it occurs and at any time, the economists believe it is a monetary phenomenon. Research conducted by [1] concluded that the volatility of regional inflation in Indonesia from 1999 to 2009 was a monetary phenomenon. The study conducted by [2] also concluded the same thing that the monetary side was more dominant in influence inflation volatility in Indonesia after the economic crisis in 1997 than the fiscal side. [3] also conducted research on inflation in Nigeria and the results of their research that there was a dominance of monetarist propositions on the dynamics of inflation in Nigeria.The increase in money supply is a monetary phenomenon and it is believed to have a positive relationship between inflation and the rate of growth in the money supply [4]. Research conducted by [5] found that money supply had a positive impact on prices. Exchange rate fluctuations were also included in the monetary phenomenon. Exchange rate fluctuations were also believed to have a positive effect on inflation. Based on the theory of Purchasing Power Parity if there is an increase in inflation then to maintain the balance of law of one price exchange rate should rise.The exchange rate has a positive effect on inflation has been proven in research conducted by [6] found the effect of exchange rate on inflation is positive.

However, nowadays there has been a growing thought that inflation is not just a monetary phenomenon, but also as a fiscal phenomenon. One theory that inflation is a fiscal phenomenon is the fiscal theory of the price level (FTPL). This theory explains that the price level (inflation) is caused by government debt, current taxes and future taxes, government expenditure plans, and no direct relationship to monetary policy [7]. Research conducted by [8] uses government expenditure where government expenditure is a fiscal phenomenon variable, the results of the study indicate that the effect of government expenditure on inflation is positive.

Monetary phenomenon and fiscal phenomenon affect only inflation from the demand side. Inflation is also affected by the supply side. Supply side inflation is the inflation that occurs when the price of one or more resources increase. Rising administered prices are among the factors that can influence inflation from the supply side. Commodities whose prices are regulated by the government one of them is Fuel Oil (BBM). Rising fuel prices will affect prices because oil fuel is the main energy source in the production process, so if the fuel price increase it will cause an increase in production costs which is further accompanied by increases in the price of goods at the consumer level.

In addition to focusing on factors affecting both demand and supply inflation, this study also wants to examine the relationship between inflation and output gap. According to [9] output gap is an important variable in policy especially in predicting inflation rate. The output gap is defined as the difference between the actual output and

the potential output.Research conducted by [10] has confirmed output gap is a useful indicator to forecast inflation.

The purpose of this study is to analyze how the effect of money supply, exchange rate, government expenditure, oil price and output gap on inflation in Indonesia and to find out whether inflation in Indonesia is included in monetary phenomenon or fiscal phenomenon.This research uses multiple regression model with Error Correction Model (ECM) method. ECM is used to determine the effect of independent variables on the dependent variable.

RESEARCH METHODS

This research used data that is secondary data and time series data type which started from 2000:T1 until 2016:T2. This research uses ECM (Error Correction Model) to determine the variables affecting inflation in Indonesia and also to find out whether inflation in Indonesia is more influenced by monetary phenomenon or fiscal phenomenon.

Variables and Data Sources

The variables used in this study are Indonesian inflation as a dependent variable and the money supply, exchange rate, government expenditure, oil price and output gap are the independent variables.

Inflation in this study used the inflation of Consumer Price Index (CPI), the money supply is M1 data, the exchange rate used in the settlement is the rupiah to USD, government expenditure is proxied by using government consumption expenditure. In this study the amount of money supply, exchange rates and government expenditure is change to the ratio of GDP and the price of oil in this study is the change of the average price of fuel oil whose price is set by the government, that are premium, diesel and kerosene, output gap is calculated using data Products Domestic Product (GDP), where the potential output is calculated using the Hodrick-Prescott Filter method.

Inflation data, government expenditure and GDP used to estimate output gap are obtained from the Badan Pusat Statistik (BPS) Indonesia. The money supply and exchange rate were obtained from Bank Indonesia and the oil price was obtained from the Ministry of Energy and Mineral Resources

Error Correction Model (ECM)

In the short term there may be an imbalance. That means, what is desired by economic actors is not necessarily the same as what happened actually. The difference what the economic actors want and what happens then needs to be adjusted. Models that include adjustments to make corrections for imbalances are referred to as Error Correction Model / ECM [11]. ECM is use to determine the effect of independent variables on the dependent variable. The Model Error Correction Model (ECM) is characterized by the incorporation of Error Correction Term (ECT) elements in the model.

$$DINF_t = \beta_0 + \beta_1 \, DRMS_t + \beta_2 \, DREX_t + \beta_3 \, DPP_t + \beta_4 \, DPOP_t + \beta_5 \, DOG_t + ECT \ldots\ldots\ldots (1)$$

With the description as follows:
β_0 : Constanta
$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$: Coefficient
INF_t : Inflation
RMS_t : Money Supply to GDP Ratio
REX_t : Exchange Rate to GDP Ratio
PP_t : Government Expenditure to GDP Ratio
POP_t : Change of Oil Price
OG_t : *Output Gap*
ECT : Error Correction Term

First, in this research there is stationarity test using Augmented Dickey-Fuller (ADF) test. The purpose of stationary test is to see whether the data is stationary or not. Data is said to be stationary if it meets three criteria that are if the mean and its variance are constant over time and the covariance between two time-dependent data depends only on the lag between the two time periods. If the data used in the model is not stationary, it will cause the results of dubious regression or called spurious regression. Spurious regression is a situation where regression results show statistically significant regression coefficients and high coefficient of determination but the relationship between the variables within the model is not related [11].

The second stage, a cointegration test with the Engel-Granger method. Cointegration test is a test whether there is a long-term relationship between the independent variable and the dependent variable. This test is a continuation of the stationary test. The main objective of this cointegration test is to determine whether or not

residual stationary cointegrated. If variables are cointegrated then there is a stable relationship in the long run. Conversely, if there is no cointegration between variables then the implication of no relationship relationship in the long term. The term cointegration is also known as the error, since the deviation of long-term equilibrium is gradually corrected through a partial series of short-term adjustments, after cointegration test, regression with ECM methodpossible to do.

RESEARCH RESULT

Stationary Test Results and Cointegration Test Results
Based on table 1 only oil price (POP) and output gap (OG) are stationary variables at level, it can be seen from t-stat value is smaller than critical value of MacKinnon 5%. In first difference level inflation (INF), money supply (RMS), exchange rate (REX), and government expenditure (RGE), oil price (HM), and stationary gap (OG) output are stasionary, which can be proven from the t-count value is less than the critical value of MacKinnon 5%. So it can be collected all the variables used in research is stationary at first difference level.

Table 1. Stationary Test Result

Variable	t-stat	Crit Value Mac Kinnon (5%)
Stationary Test Result at Level		
INF	-2.153728	-2.907660
RMS	-2.064932	-2.906210
REX	-1.440566	-2.905519
RGE	-0.947514	-2.908420
POP	-8.044774	-2.905519
OG	-3.980362	-2.908420
Stationary Test Result at First Difference		
INF	-10.43810	-2.907660
RMS	-13.36633	-2.906210
REX	-2.971208	-2.908420
RGE	-4.086216	-2.908420
POP	-11.14294	-2.906923
OG	-4.463026	-2.910019

Based on table 2, it can be seen that residual (resid01) is stationary at level which can be seen from the t-stat value is less than the critical value of MacKinnon 5%, then the residual means cointegrated there is a long-term relationship between the independent variable and the dependent variable.

Table 2. Cointegration Test Results

Variable	t-stat	Crit Value Mac Kinnon (5%)
Resid01	-6,573524	-2,905519

Table 3 shows the short-term ECM estimation showing the value of ECT coefficients is negative (-0.719043) and significant at the 0.05 significance level. That mean, the terms for the ECM short-term estimation are meet and the ECM model is declared valid.

Table 3. Error Correction Model (ECM) Estimation Results (Short Term)

Variables	Coefficient	t-stat	Probability
C	0.072217	0.818721	0.4162
D(RMS)	0.087559	2.161760	0.0346
D(EXR)	2.517491	2.594325	0.0119
D(RGE)	0.040006	1.072317	0.2879
D(POP)	0.020449	4.180058	0.0001
D(OG)	-0,045463	-1,085377	0,2821
ECT	-0,719043	-6,013984	0,0000

ECM Estimation Result and Long Term Estimation Result
The ECM estimation results also show that in the short run the variable of money supply, the exchange rate and the price of oil have a positive and significant effect to inflation in Indonesia, it was shown from the coefficient of the three variables that were positive and the probability value was smaller than the level of significance 0.05. While government expenditure variable and output gap have bigger probability value than level of significance 0.05 meaning that government expenditure variable and output gap have no significant effect to inflation in Indonesia.

In the long term that can be seen in table 4, only the exchange rate variable and the price of oil have positive value coefficient and the value of probability was smaller than the level of significance 0.05, which means the variable exchange rate and oil prices have a positive and significant effect on inflation in Indonesia.

Table 4. Long Term Estimation Result

Variable	Coefficient	t-stat	Probability
C	-1.720583	-1.591464	0.1166
RMS	0.052587	1.600189	0.1146
EXR	0.881804	2.950793	0.0045
RGE	-0.025106	-0.524757	0.6016
POP	0.020526	2.628402	0.0108
OG	-0.060642	-1.046949	0.2992

Effect of Money Supply on Inflation in Indonesia

In the short run the money supply has a positive and significant effect on inflation in Indonesia. The results of this study are also supported by research conducted by [1] found money supply has a positive and significant effect on regional inflation in Indonesia. According to classics, the main cause of inflation or price increases was due to the increase or growth in the money supply.In the event of an increase in the money supply, it means that the amount of money held by the public increases, if people hold large amounts of money then they will tend to buy more goods and services. With the increase in the purchase of goods and services will lead to an increase in aggregate demand is too large or rapidly compared with the offer or the aggregate production. The goods were because production can not be increase as soon as possible to keep up with the increasing or growing demand and ultimately the inflation will increase, this is called demand-pull inflation. However, in the long run the money supply has no effect on inflation in Indonesia. The results of this study are supported by Keynes's view that the increase in money does not always raise prices. In times of high unemployment economies, although there is an increase in money in circulation, this increase does not increase the price level. This is because in times of serious unemployment people tend to be careful in shopping and this will reduce the rate of money circulation, so that although the number of circulating increases the increase in the money supply can not raise inflation. Keynes also argues that prices are not only influenced by money supply but also by increases in production costs. So even if the money supply is fixed but the cost of production increases then inflation will still occur.

Effect of Exchange Rate on Inflation in Indonesia

The result of this study are the exchange rate has a positive and significant effect on inflation in Indonesia, both in the short and long term. The result of this study was supported by the results of research conducted by [6] which states that the impact of exchange rate on inflation was positive. The effect of the rupiah exchange rate against USD on inflation in Indonesia is that almost all import-export trading in Indonesia use US dollar [12]. Indonesia is still very dependent on the USD, if the rupiah against USD weakened then this will greatly affect the export and import of Indonesia.When the exchange rate rises, which means the rupiah depreciates, the price of Indonesian export goods abroad was relatively cheaper, so that the demand for Indonesian export goods will increase and finally followed by the increase of aggregate demand, the increase of aggregate demand will cause the increase of inflation. The increase in the rupiah exchange rate against the USD also affects the goods imported by Indonesia, when the rupiah weaken, the price of imported goods from abroad was relatively more expensive. If production producers in Indonesia use a lot of raw materials which are imported materials, it will cause the production cost to increase and will cause the price of consumer goods to increase, and eventually will cause inflation.

Effect of Goverment Expenditureon Inflation in Indonesia

The result of this study state that in the short term and long term government expenditure has no significant effect on inflation in Indonesia. Government expenditures may have no effect on inflation as government spending increases can be caused by government programs such as poverty alleviation programs and a policy of maintaining price stability through the commitment of various types of subsidies [13].

Effect of Oil Priceon Inflation in Indonesia

In the short and long term oil prices have a positive and significant effect on inflation in Indonesia. This resultis supported by research conducted by [14] that inflation have positive respond to oil price shocks. Oil prices are very influential on inflation in Indonesia, because fuel is the main energy in the production process in Indonesia, so that there will be an increase in oil price will increase production costs. In addition to fueling the production process, fuel oil was also a major driver of consumer goods transport to the market. The increase in production cost and the cost of transport will cause prosuden to raise the price of the goods they produce so that the increase in cost can be covered, the increase in the price of these goods will ultimately lead to inflation.

Effect of Output Gapon Inflation in Indonesia

In the short and long term the output gap has no significant effect on inflation in Indonesia. There is no effect on the output gap on inflation in Indonesia was due to supply-side capability can still offset the demand-side increase shown by most industries still able to utilize the maximum available resources, so that although the quantity of goods demanded by consumers increase, producers can also increase the number goods they produce to compensate for the increase in demand, resulting in a balance between the supply side and the demand side. The occurrence of a balance between the supply side and the demand side may prevent demand pressures marked by excess demand. It can be said that the industry still has room to increase production if there is an increase of demand [13].

Inflation in Indonesia Includes Monetary Phenomenon or Fiscal Phenomenon

Based on the results, this research concludes that inflation in Indonesia is a monetary phenomenon which is shown from the variable of money supply money has positive and significant influence to inflation in Indonesia in the short term and exchange rate variable which also have positive effect to inflation in Indonesia either in short or Long term in which the money supply and exchange rate are the variables representing monetary phenomenon, while government expenditure which is the variable representing fiscal phenomenon does not affect inflation in Indonesia either in short or long term.Inflation in Indonesia is a monetary phenomenon, the results of this research in accordance with the result of research conducted by [1] and also [2] which also concluded that inflation is more caused by monetary phenomenon rather than fiscal phenomenon." Based on the regression results, inflation in Indonesia is not only influenced by monetary phenomenon, inflation in Indonesia is also influenced positively by oil price, this result is same with result of research conducted by [14] and also research conducted by [6], oil prices have a positive effect on inflation. The price of oil was one of the commodities whose prices are governed by the government (Administered Prices). Oil prices affect inflation through the supply side, if there is an increase in oil prices, then the increase will be accompanied by an increase in production costs and will eventually raise prices. So that can be said, government policy in regulating oil price very determine stability of inflation in Indonesia.

CONCLUSION

This study has found that the variables of money supply, exchange rate and oil prices have a positive effect on inflation in Indonesia in the short term, and in the long term the exchange rate and oil prices have a positive effect on inflation in Indonesia.

Based on the results, this study concludes that inflation in Indonesia was a monetary phenomenon which is shown from the variable of money supply has positive effect to inflation in Indonesia in the short term and exchange rate variable which also has positive effect to inflation in Indonesia either in short or long term in which the money supply and exchange rate are the variables representing monetary phenomenon, while government expenditure which is the variable representing fiscal phenomenon does not affect inflation in Indonesia either in short or long term. Also, based on the regression result, inflation in Indonesia is not only influenced by monetary phenomenon, inflation in Indonesia was also influenced positively by oil price. The price of oil was one of the commodities whose prices are governed by the government (Administered Prices). Oil prices affect inflation through the supply side, if there is an increase in oil prices, then the increase will be accompanied by an increase in production costs and will eventually raise prices.

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