Energy Policy Analysis, Monetary and Fiscal on Inflation Volatility in Indonesia

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ABSTRACT

This study aims to analyze inflation’s volatility as a combined phenomenon of energy, monetary and fiscal policies in Indonesia. By using secondary data in the form of a quarter-time series from 2011 to 2019. This study uses descriptive and quantitative data analysis techniques with the help of the Eviews 10. The findings are that all variables have a significant effect on inflation volatility in Indonesia except tax revenue. Thus, it is evident that the volatility of inflation in that country is not only influenced by the monetary side in the form of the money supply, interest rates, and the rupiah exchange rate against the US dollar as seen by monetarists, but is also influenced by the fiscal side in the form of government spending, and policy, energy, namely the price of oil and electricity tariffs.

Keywords: Energy Policy, Monetary, Fiscal, Inflation

JEL Classifications: E31, E42, E60, E62, Q48

1. INTRODUCTION

The occurrence of price increases over a certain period of time continuously and generally is known as inflation (Sukirno, 2002). The people’s standard of living will continue to fall if the inflation rate prevailing in the region is high. This is due to a decrease in the real income they receive. As a result, the number of poor people has increased. From the perspective of economic actors, the instability of inflation will cause uncertainty in making decisions to invest and produce (for producers) and consume (for consumers), resulting in a decline in economic growth. Nationally, the inflation rate in neighboring countries that is lower than that of the domestic ones will pressure the domestic currency’s value due to the uncompetitive domestic real interest rate.

Thus, the community’s social and economic conditions will be negatively affected by instability and high inflation levels. On the other hand, stable and low inflation is a prerequisite for sustainable economic growth and is beneficial for improving people’s welfare (Bank Indonesia, 2018).

An increase in inflation is often associated with an increase in oil prices, electricity tariffs, which are a source of energy. Energy is one of the most important dynamics of economic growth worldwide. In particular, developing countries need more energy to provide economic growth (Asuman and Bersu, 2017). However, energy often cannot be controlled by the government because it is an unsystematic factor. The inflation experienced by the world economy during the last decade could have been greatly reduced if the world were not too dependent on energy imports (Thoresen, 1983). Reducing imports on average by half reduced world inflation by more than 30%. Countries that supply their own energy can benefit from having lower inflation than energy importing countries. A low inflation rate is easiest to achieve if domestically produced energy follows the national price index. In most countries, several alternative energy sources can compete with imported energy when all the economic benefits of domestic...
energy production are considered. The problem that often occurs is that not all countries can explore their energy sources due to limited knowledge, human resources, and capital.

The idea of inflation is also generally understood as a monetary phenomenon seen from Friedman’s statement (in Hossain, 2010, p. 142) that “inflation is always and wherever it is a monetary phenomenon.” The basis is the theory of monetarists, who argue that money growth is a major inflation source. Therefore, efforts to control inflation are dominated by monetary policy, such as managing the exchange rate and interest rates and the money supply in the country.

However, there has long been a growing thought that inflation is not just a monetary phenomenon (Tutino and Zarazaga, 2014) and a fiscal phenomenon (Carlstrom and Fuerst, 2000). This thinking is based on The Fiscal Theory of The Price Level, which states that inflation (price level) does not have a direct relationship with monetary policy but is influenced by fiscal conditions in the form of government spending plans, including to pay debts and revenues from the taxation sector (Hervino, 2011).

Thus, inflation control should be carried out through energy policy by reducing energy imports, fiscal policy by reducing government debt, and fiscal policy by streamlining state spending and tax revenue. This difference in thinking is what motivates researchers to study the volatility of inflation. Which policies apply in Indonesia?

Annual data on inflation in Indonesia shows a fairly high figure in 2014, reaching 8.36%, then decreased in the following year to 3.35%. For the 2014-2019 period, an increase in inflation occurred again in 2017, reaching 3.61% and falling again in the next 2 years to 2.72% in 2019. From the energy side, in 2014, world oil prices experienced an increase at the highest level, namely USD 110/barrel from the previous year USD 98 / barrel. From the monetary side, the highest interest rate and money supply growth also occurred in 2014, reaching 7.75% and 11.87%. In the same year, the rupiah exchange rate against the USD reached the lowest at only IDR 12,440. Then from the fiscal side, tax revenue and government spending have always increased every year as indicated by the growth rate, which has always been positive from 2014 to 2019. However, in 2014 the growth in tax revenue was lower than the growth in government spending.

Based on the differences in theoretical views and the data mentioned above, the question arises, is the volatility of inflation in Indonesia energy, monetary, fiscal phenomenon or a combination of the three? This is important in making the right policies by related parties to control a country’s inflation. Therefore, this study aims to analyze inflation’s volatility as a combined phenomenon of energy, monetary and fiscal policies in Indonesia.

2. LITERATUR REVIEW

Research on energy and monetary inflation has been studied by Rehman (2013). The result is that both energy and monetary effects impact inflation, and monetary tightening can be counterproductive if used to reduce energy-driven inflation trends. Furthermore, according to Hooker (2002), an increase in oil prices results in inflation shocks, increasing inflation. According to Behname (2013), oil consumption is directly and indirectly included in family expenses, so the increase causes inflation. When the general price level includes an increase in oil price, the inflationary effect of the oil price becomes important. Research on Indonesia’s inflation related to its status as a fiscal or monetary phenomenon was conducted by Hervino (2011). His research shows that the money supply and foreign debt in the short term hurt Indonesian inflation. Furthermore, the monetary and fiscal side simultaneously, in the long run, affects the inflation volatility of the country. However, after the 1997 economic crisis, the monetary side was more dominant than the fiscal side in influencing the volatility of Indonesian inflation. In this study, the fiscal side is seen from the government external debt variable, while the monetary side is seen from the money supply variable.

The research results on regional inflation volatility as a monetary phenomenon in Indonesia in the 1999-2009 period show that every 1% increase in the money supply value causes an increase in inflation of 0.368% (Trisdian, 2015). The dominance of the monetary phenomenon over regional inflation, in the long run, is also found in West Sumatra (Azhar et al., 2019). More detailed research results show that the money supply (M2) has a negative and insignificant effect in the short term and a significant positive effect in the long term. Interest rates have a significant positive effect in the short and long term. Government spending has a significant negative effect in the long term and negatively does not significantly affect the short term. In the short and long term, local taxes have an insignificant negative effect on inflation in West Sumatra.

Nadiah and Rosyidi (2018) show that the money supply (M1) has a significant negative effect on inflation. In line with this, Utami and Soebagiyono (2013) found that the money supply has a significant negative effect. The exchange rate has a significant positive effect on Indonesia’s inflation.

On the other hand, Rizqiansyah (2019) argues that broad money (the amount of money in circulation) and the exchange rate have a significant positive effect, while government expenditure has a negative but insignificant effect on inflation. Furthermore, Hutauruk et al. (2015) stated that foreign investment or export openness has a significant relationship with inflation to reduce/increase the increase in inflation by the foreign currency exchange rate. Meanwhile, Ronald Shone in Halwani (2002, p. 164) argues that the effect of the exchange rate on prices is short-term; in fact, prices affect the exchange rate more than the exchange rate affects prices.

Individually, the money supply and exchange rate have a significant positive effect, while interest rates have a positive but insignificant effect on inflation in Indonesia (Saputra and Nugroho, 2014). Meanwhile, Djambak (2008) found that an increase in the money supply and growth in the rupiah depreciation did not have a partial significant effect on inflation in Indonesia but had a simultaneous effect. Furthermore, Sutawijaya and Zulfahmi (2012)
found that the interest rate, the money supply, and the exchange rate simultaneously positively affect inflation in Indonesia.

Maggi and Saraswati (2013) suggest that the money supply and interest rates significantly affect the long term. Still, only interest rates have a significant effect in the short term on inflation in Indonesia. Ginting (2016) found that the exchange rate, money supply, and interest rates have a significant positive effect on Indonesia’s inflation rate.

There are many studies on inflation from the monetary aspect, but it is still limited from the fiscal aspect. Surjaningsih et al. (2012) found that an increase in government spending causes a decrease in inflation, while an increase in taxes causes an increase in inflation.

This research’s novelty lies in the completeness of the variables used in assessing the volatility of inflation in Indonesia. From the fiscal side, the variables of tax revenue and government spending are used. Meanwhile, the variables of exchange rates, interest rates, and the money supply are used to assess inflation volatility from the monetary side.

3. DATA AND METHOD

This research will analyze the volatility of inflation in energy, monetary, and fiscal policies in Indonesia. The research objects are inflation, oil prices, electricity rates, money supply, interest rates, exchange rates, tax revenues, and government spending.

This study’s type of data uses secondary data in the form of a quarter-time series from 2011 to 2019. The data sources in this study are data on oil prices and electricity tariffs from the Ministry of Energy and Mineral Resources (ESDM), inflation data, money supply, interest rates, and exchange rates are obtained from Bank Indonesia (BI), as well as data on tax revenues and government spending from the Ministry of Finance.

The Ordinary Least Squares (OLS) analysis model was used in this study, with the following estimation forms:

$$\text{INF}_t = \alpha + \beta_1 \text{OIL}_t + \beta_2 \text{ELC}_t + \beta_3 \text{MS}_t + \beta_4 \text{IR}_t + \beta_5 \text{ER}_t + \beta_6 \text{TAX}_t + \beta_7 \text{GOV}_t + \varepsilon$$

Where:

- INF = Inflation
- \(\alpha\) = Constant
- \(\beta\) = Coefficient
- OIL = Oil Price
- ELC = Electricity rate
- MS = Total Money Supply
- IR = Interest Rate
- ER = Exchange Rate
- TAX = Tax Receipts
- GOV = Government spending
- \(\varepsilon\) = element error (error term)

4. RESULT AND DISCUSSIONS

Before discussing the estimation test results, the normality, multicollinearity, autocorrelation, and heteroscedasticity tests will first be carried out.

4.1. Normality Test

The normality test using the Jarque-Bera method shows a probability of more than 0.05, namely 0.984406, as presented in Figure 1. This means that the residuals of the estimated linear regression model have been normally distributed.

4.2. Multicollinearity Test

The multicollinearity test using the Variant Inflation Factor (VIF) method in Table 1 shows that Centered VIF is <10. This means that there is no multicollinearity between the five independent variables used in estimating the research model.

4.3. Correlation Serial Test

The serial correlation test using the Lagrange Multiplier method (LM test) in Table 2 shows that the F-statistic probability is more than 0.05, namely 0.3695. Thus, H0 is accepted, which means there is no serial correlation.

4.4. Heteroscedasticity Test

The heteroscedasticity test using the Glejser method in Table 3 shows that the F-statistic probability is more than 0.05, which is 0.2101. Thus, H0 is accepted, which means there is no heteroscedasticity.

Based on the results of the normality test, multicollinearity, serial correlation, and heteroscedasticity above, it can be concluded that the estimation model produced by OLS in Table 2 is suitable for use.

4.5. Estimation Test Results

Based on the OLS estimation results in Table 4, an estimation model can be made from this study. The model can be written as follows:

Table 1: Multicollinearity test

<table>
<thead>
<tr>
<th>Variable</th>
<th>Centered VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>OIL</td>
<td>1.552070</td>
</tr>
<tr>
<td>ELC</td>
<td>1.750787</td>
</tr>
<tr>
<td>MS</td>
<td>1.780174</td>
</tr>
<tr>
<td>IR</td>
<td>1.051548</td>
</tr>
<tr>
<td>ER</td>
<td>1.440570</td>
</tr>
<tr>
<td>TAX</td>
<td>1.581372</td>
</tr>
<tr>
<td>GOV</td>
<td>1.273096</td>
</tr>
<tr>
<td>C</td>
<td>NA</td>
</tr>
</tbody>
</table>

Table 2: Autocorrelation test

<table>
<thead>
<tr>
<th>F-statistic</th>
<th>Prob. F(2,27)</th>
<th>Obs*R-squared</th>
<th>Prob. Chi-square(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.03332</td>
<td>0.3695</td>
<td>2.488529</td>
<td>0.2882</td>
</tr>
</tbody>
</table>

Table 3: Heteroscedasticity test

<table>
<thead>
<tr>
<th>F-statistic</th>
<th>Prob. F(5,29)</th>
<th>Obs*R.-squared</th>
<th>Prob. Chi-square(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.534164</td>
<td>0.2101</td>
<td>7.321316</td>
<td>0.1978</td>
</tr>
<tr>
<td>6.247607</td>
<td>0.2829</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
INF = -1.036443 + 0.143497 OIL + 0.682818 ELC + 0.067714 MS + 0.009572 IR + 0.033287 ER – 0.087350 TAX – 0.061981 GOV

Based on each independent variable’s t-statistical probability value, the estimation results presented in Table 4 can be explained as follows. OIL’s probability is 0.0172 <0.05, with a coefficient value of 0.143497, which means that oil prices have a positive and significant effect on inflation in Indonesia. The findings of this study prove that the amount of money circulating in a country’s economy positively impacts the volatility of national inflation. An increase in the money supply will increase people’s purchasing power. If an increase does not follow this in production, there will be excess demand, which will trigger producers to increase their prices, causing inflation. Thus, the occurrence of inflation volatility, in this case, is due to the demand to pull inflation.

In this connection, the money supply’s growth should not be higher than the producers’ ability to increase their aggregate supply. In other words, BI, as the central bank and controlling the money supply in Indonesia, plays an important role in controlling inflation volatility in this country.

The results of this study are in line with Rizqiansyah (2019), Ginting (2016), Trisdian (2015), and Saputra and Nugroho (2014) who found that the money supply has a significant positive effect on inflation. Likewise, Maggi and Saraswati (2013) found that the money supply had a significant positive effect in the long run on inflation in Indonesia. Azhar et al. (2019) also found that the money supply (MS) has a significant positive effect in the long run, although it is not significant in the short term.

The probability of IR is 0.0488, with a coefficient value of 0.009572, which means that the interest rate has a positive and significant effect on Indonesia’s inflation. These findings prove that the interest rate prevailing in a country will affect inflation volatility in that country. For Indonesia’s country, an increase in the interest rate is not effective in reducing the rate of inflation but instead raises it. This is because an increase in interest rates will increase production costs and investment obtained through bank credit, thus triggering producers to raise commodity prices. Thus, the occurrence of inflation volatility, in this case, is due to cost-push inflation.

The results of this study are in line with Dawood and Anjalia (2017) and Ginting (2016) who found that interest rates have
a significant positive effect on Indonesian inflation. Likewise, Azhar et al. (2019) stated that interest rates have a significant positive effect in the short and long term. Furthermore, Maggi and Saraswati (2013) also found that interest rates significantly affect Indonesia’s long and short-term inflation rates. This result is supported by the argument of Thomas Humphrey in Ariffin (1998. p. 11), which explains that high-interest rates to suppress inflation in an inflationary economy due to cost push will only drive inflation higher.

Finally, GOV’s probability is 0.0201 with a coefficient value of -0.061981, which means that government spending has a negative and significant effect on inflation in Indonesia. The findings in this study prove that an increase in government spending, which will increase the money supply, does not always lead to inflation, as Keynes’s theory argues that price increases are influenced by an increase in the money supply and by an increase in production costs. Even though the money supply increases, production costs do not change or even go down, inflation will not occur, or deflation will occur. This is what has happened in Indonesia, where government spending actually hurts inflation volatility in the country.

This is in line with the research results by Surjaningsih et al. (2012), who found that an increase in government spending causes a decrease in inflation. Furthermore, Azhar et al. (2019) stated that government spending has a significant negative effect in the long term, and the negative price is not significant in the short term. Likewise, the results of Rizqiansyah’s (2019) research found that government expenditure hurt inflation, although it was different in terms of significance.

Based on the results of this study, it can be concluded that the variables from the monetary side, namely the money supply, interest rates, and exchange rates, have a significant positive effect on inflation. On the other hand, the fiscal side in tax revenue and government spending hurts a different significance. Where government spending has a significant effect while tax revenue does not. This is due to the ineffective application of taxation policies in Indonesia to influence the volatility of inflation that occurs in that country.

Although tax revenue is partially insignificant to inflation, overall, all energy, monetary, and fiscal variables used in this study significantly impact inflation volatility in Indonesia. This is indicated by the probability of the F-statistic being <0.05, which is only 0.000003. Thus, it is evident that the volatility of inflation in that country is not only influenced by the monetary side in the form of the money supply, interest rates, and the rupiah exchange rate against the US dollar as seen by monetarists but is also influenced by the fiscal side in the form of tax revenue and government spending. John Maynard Keynes’s theory explains that in a country’s economic system, inflation is influenced by two things, namely the level of expenditure spent and the tax revenue received by the government of the country concerned. And energy policies, namely oil prices and electricity rates. According to Thoresen, 1983, energy imports must be limited. Domestic energy use can be maximally absorbed; price determination is not influenced by external parties and can create new energy sources.

In this regard, controlling inflation through energy management through oil prices, electricity rates, money supply, interest rates, and exchange rates as monetary policy instruments has not fully influenced inflation volatility in Indonesia. Still, it is necessary to combine it with fiscal policy in effectiveness: tax revenue and government spending. Fiscal and monetary policymakers should be able to make appropriate and proportional policies in controlling inflation in Indonesia.
5. CONCLUSION

This study aims to analyze inflation’s volatility as a combined phenomenon of energy, monetary and fiscal policies in Indonesia. By using secondary data in the form of a quarter-time series from 2011 to 2019. This study uses descriptive and quantitative data analysis techniques with the help of the Eviews 10. The findings are that all variables have a significant effect on inflation volatility in Indonesia except tax revenue. This is because taxes are a separate problem for Indonesia, where their absorption has not been maximized. Thus, it is evident that the volatility of inflation in the country is not only influenced by the monetary side in the form of the money supply, interest rates, and the rupiah exchange rate against the US dollar as seen by monetarists but is also influenced by the fiscal side in the form of tax revenue and government spending. And energy policies, namely oil prices and electricity rates.

In this regard, controlling inflation through energy management through oil prices, electricity rates, money supply, interest rates, and exchange rates as monetary policy instruments has not fully influenced the volatility of inflation in Indonesia. Still, there needs to be a combination with fiscal policy in the form of effectiveness. Tax revenue and government spending. Fiscal and monetary policymakers should be able to make appropriate and proportional policies in controlling inflation in Indonesia.

REFERENCES


