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# Fiscal and monetary policies to reduce inflation rate in Indonesia

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**Abstract**

***Purpose –*** This paper analyzes the fiscal and monetary policies to control the inflation rate in Indonesia.

***Methods –*** This study uses a vector error correction model (VECM) to estimate the inflation model based on the annual data from 1991-2020.

***Findings –*** The results present the significant effects of fiscal and monetary variables on the inflation rate. These findings reveal that the fiscal and monetary policies are inflationary in this country. Specifically, government spending and narrow money significantly contribute to the increase in the inflation rate. The research also finds the impacts of those variables have occurred over a long period. This study asserts that the government budget deficit does not affect the domestic price level. This paper concludes that domestic inflation is closely related to both the fiscal and monetary financial sectors.

***Implication –*** The government, as well as the central bank, should apply prudent economic policies to control the inflation rate.

***Originality –*** This paper confirms the Fiscal Theory of Price Level (FTPL) as well as the quantity theory of money or the Cambridge equation.

**Abstrak**

**Tujuan –** Artikel ini menganalisis kebijakan fiskal dan moneter untuk mengendalikan laju inflasi di Indonesia.

**Metode –** Penelitian ini menggunakan model VECM untuk menganalisis model inflasi berdasarkan data tahunan dari tahun 1991-2020.

**Temuan –** Hasil analisis menunjukkan pengaruh signifikan variabel fiskal dan moneter terhadap tingkat inflasi. Temuan ini mengungkapkan bahwa kebijakan fiskal dan moneter bersifat inflasioner. Secara khusus, pengeluaran pemerintah dan uang sempit berkontribusi secara signifikan terhadap peningkatan tingkat inflasi. Penelitian ini juga menemukan bahwa dampak dari kebijakan tersebut telah terjadi dalam jangka waktu yang lama. Studi ini juga menemukan bahwa defisit anggaran pemerintah tidak mempengaruhi tingkat harga domestik. Hasil penelitian ini menyimpulkan bahwa inflasi domestik terkait erat dengan sektor keuangan fiskal dan moneter.

**Implikasi –** Pemerintah serta bank sentral harus menerapkan kebijakan ekonomi yang hati-hati dan bersifat ketat untuk mengendalikan tingkat inflasi.

**Orisinalitas –** Hasil studi ini mendukung teori fiskal penyebab inflasi (*Fiscal Theory of Price Level*) dan teori kuantitas uang atau persamaan Cambridge.

## Introduction

The Indonesian economy has experienced some crises since the 1990s, which caused high inflation. For example, the global financial crisis in 2008 affected Indonesia's economic instability until the early 2010s. The inflation rate has increased for more than one decade, which has caused some challenges to prudent monetary and fiscal policies. The central government set a more tightened fiscal policy, meanwhile, the central bank (Bank Indonesia) devised various monetary policies to reduce the inflation rate. Moreover, the government has also applied some packages of fiscal stimulus policies that gradually successful recovered the economy. However, the inflation rate in the period 2008-2010 was still higher than the target. It remains some challenges to the fiscal and monetary policies' effectiveness in reducing the inflation rate in the next period. Previous papers have emphasized that the fiscal and monetary policies' credibility is one of the most important policies regarding inflation reduction (Raji, Juzhar, and Jantan, 2014; Nguyen, 2015).

The challenge to price stability is not only either fiscal or monetary policy concern itself. The phenomena of the increase in inflation rate in some countries strongly relate to monetary and fiscal sector dynamics. Monetary and fiscal variables changes such as money supply as well as government spending theoretically will cause an inflation rate (Parkin, 2014). Classical economic theory state that monetary policy plays an important role in controlling price level. Meanwhile, the fiscal theory of price level highlights that government spending is associated with the inflation rate. Some papers noted that increases in money supply are the most important determinant of the price level (Kandil, 2005; Raji, Juzhar and Jantan, 2014; Nguyen, 2015). Other monetary variables such as interest rate and the exchange rate may also affect the inflation rate both in the short and the long run perspective.

An analysis of the inflationary process in Indonesia for the period 1952-2002 was conducted (Hossain, 2005). He found a co-integrating relationship between price and either narrow money or broad money. Moreover, his study reveals a long-run causal relationship between money supply and inflation. The empirical model indicates high stability for several sub-samples when the model uses narrow money. The findings also highlight that the exchange rate is part of a long-run dynamic relationship with the inflation rate. The impact of money demand on inflation in Bangladesh has also been studied by Hossain (2010). Using annual data from 1973-2008 and co-integration and the error correction approach, he found the existence of a causal relationship between money and inflation rate. Previous research on the price stabilization policy in Indonesia highlight that the practice of prudential and harmonization of fiscal and monetary policies are key factors regarding this issue (Hossain, 2005; Tirtosuharto and Adiwilaga, 2013; Thanh, 2015). However, not all these policies have successfully reduced the inflation rate in the long period. Some stages of enhancement of fiscal and monetary indicators are associated with the inflation rate.

As also mentioned by Auerbach, Gale and Harris (2010), the expansive fiscal policy has strong positive effects on inflation. This statement is in line with the concept of activist fiscal theory as well as the fiscal theory of price level. The fiscal consolidation programme regarding inflation targeting should be a priority policy in some countries. For example, government spending, which is part of fiscal policy, potentially leads to positive price expectations of economic agents. This phenomenon asserts that fiscal policy effectiveness on price stabilization depends on the credibility of the policy itself. That is why the issues of fiscal and monetary policy credibility regarding macroeconomic stabilization have attracted attention in recent years. Some papers have examined the role of fiscal and monetary policy on price stabilization as well as economic growth for various countries. However, the results of the previous studies are mixed and contradictory to each other. Some papers confirm a strong monetary policy on the inflation rate for various countries (Hossain, 2005; Gupta and Uwilingiye, 2008; Gali, 2010; Nikolaos and Constantinos, 2013; Bozkurt, 2014; Raji, Juzhar and Jantan, 2014).  Meanwhile, other papers assert the significant effects of fiscal policy through budget deficit and government spending management on inflation (Khundrakpam, 2010; Bukhari and Yusof, 2014; Fakher, 2016). Moreover, a few papers provide findings that both fiscal and monetary policies effectively reduce the inflation rate in some countries (Berument and Doan, 2003; Hamilton, 2012; Duncan and Martínez-García, 2015).

Focus on fiscal policy; the main variables are government spending, tax ratio, and budget deficit. The effects of budget deficit on inflation have been deeply discussed in the public policy literature as well as in public economic research. Lin and Chu (2013) studied the relationship between budget deficit and inflation in 91 countries for the period of 1960-2006. Based on the autoregressive distributed-lag model, the study found a strong impact of deficits on inflation at various inflation levels. The paper also notes that the fiscal deficit affects the inflation rate stronger in high-inflation phases than those in low-inflation periods. Moreover, this study also reported the existence of dynamic adjustment of the inflation rate for a limited period. Another interesting paper by Nguyen (2015) also highlights that budget deficits and inflation have a strong relationship in selected Asian countries. Meanwhile, the impact of fiscal deficit on inflation is a key finding in India (Mohanty and John, 2015). This study also mentions the role of a shock variable on the inflation rate for some period. A recent study also emphasizes that budget deficit is the main determinant of inflation in selected Asian countries (Fakher, 2017).

Based on the previous studies, it is clear that price stabilization depends on various economic policy qualities. An analysis of determinants of inflation rate covers not only monetary and fiscal variables but also involves other macroeconomic variables in an econometric model. Some previous papers mention that monetary variables have played an important role as well as other economic factors factor in price stabilization (Naz, Mohsin, and Zaman, 2012; Bhattacharya, 2014; Ghosh, 2014). Monetary variables such as narrow money, broad money, and interest rate are usually associated with price volatility for a long time. Raji, Juzhar, and Jantan (2014) analyzed the causality between price level, money supply, and government budget deficit in Nigeria. Based on annual data for the period 1970-2010, the study found that there is a unidirectional causality relationship between real money supply and inflation as well as between a budget deficit and the price level. For the long-run relationship, the findings indicate bidirectional causality between money supply and price level. This finding is similar to the phenomena in India, where the fiscal and monetary variables simultaneously determine the inflation rate (Mohanty and John, 2015). The study also asserts that as an impact of the global financial crisis in 2008, the inflation rate in India has changed over time, indicating significant effects of time variation. Other research conducted by Ajaz, Nain, and Kamaiah (2016) also examined the dynamic relationship between inflation and openness in India based on the data from 1970 to 2014. The empirical results reveal an asymmetry relationship between openness and inflation both in the short-run as well as in the long-run period. Overall, a strong positive relationship between inflation rate and openness in India is the main important finding of the study.

In fact, not only monetary and fiscal variables affect inflation. Other factors such as time-variant, expectation, uncertainty and adjustment behaviour of economic agents also potentially determine the inflation rate in a country. Other macroeconomic variables that may affect the inflation rate are real output, wage rate, and shock variables (Sriyana, 2018). International economic factors such as exchange rate, international trade, and global inflation are also important factors in determining the inflation rate in some countries (Ghosh, 2014). For example, Falahi and Hajamini (2017) confirm an asymmetric behaviour of inflation in Iran based on monthly data for the period 1990 to 2013. He also found the existence adjustment process regarding the inflation rate from the period level. The asymmetric behaviour of an inflationary process in the country shows that the effect of explanatory variables on inflation rates is not balanced over time. Another study also provides findings regarding the role of time-variant and shocks variables on inflation (Khundrakpam, 2010; Deev and Hodula, 2016). As an example, Heidari and Bashiri (2010) found a significant impact of the uncertainty factor on the inflation rate in Iran. This study asserts that the real inflation rate depends on the domestic economic agents' behaviour.

Based on the recent papers mentioned, most of them confirm the significant effect of fiscal and monetary policies on the inflation rate in various regional economies. A few papers consider the monetary variables as determinants of the inflation rate in some countries. Meanwhile, limited papers focus on the role of fiscal indicators such as deficit budget and government spending as an inflation determinants. The fiscal and monetary policies in some countries are less effective, indicating the existence of inflationary effects. Therefore, identification of both fiscal and monetary

policies on the inflation rate may provide new insight for the central government and central bank to control domestic price level. Indeed, the aim of this study is to analyze the inflationary effects of fiscal and monetary variables on the inflation rate in the case of Indonesia. Such varied Indonesia's experiences in price stabilization for a long period may be useful for other countries especially relating to fiscal and monetary policy strategies. Specifically, this paper may contribute to the current literature on avoiding the inflationary effects of fiscal and monetary policies. This study attempts to estimate the inflation rate as a function of selected fiscal and monetary variables for the Indonesian case. We apply the dynamic econometric approach, the vector error correction model, to estimate an empirical model of the inflation rate in Indonesia.

## Research Methods

### Stationary Data and Co-integration Test

This study concerns with dynamic analysis of inflation rate determinants. As a consequence of this objective, the empirical estimation of the dependent and independent variables should be estimated in the first difference form. Many papers have applied the co-integration technique regarding the dynamic analysis of the relationship among economic variables (Feridun and Adebiyi, 2005; Hossain, 2005; Khundrakpam, 2010; Bozkurt, 2014; Fakher, 2016). The procedure of co-integration analysis implies some prerequisite tests regarding some issues of stationary properties of the data before estimating the empirical model. Generally, most of the fiscal and monetary variables contain data that are not stationary at their level; we should transform them into the first difference to achieve their stationary form. Statistically, the estimated variable is stationary if its mean and variance are zero and unchanged over time (Enders, 2010).

The co-integration test should cover two steps, that is, stationary testing of the variables and the estimation process of the co-integration estimation. This analysis applies Augmented Dickey-Fuller (ADF) and Phili-Peron (PP) methods for data stationary testing and Johansen's multivariate procedure for co-integration analysis (Dicky and Fuller, 1981; S Johansen, 1991). As also applied in previous research, the Johansen co-integration method applies the vector autoregression (VAR) model to test the co-integration relationship among time series variables. Co-integrating or long-run relationship in a set of the inflation rate, fiscal, and monetary variables, for example, is indicated by the significant results of maximum eigenvalues ($\lambda_{max}$) and trace tests. The hypothesis of at least one or more co-integrating vectors is tested using the likelihood ratio trace test. The hypothesis may be rejected or accepted based on the probability value of MacKinnon, Haug, & Michelis (1999). The existence of a co-integrating relationship may be concluded due to rejecting at least one co-integrating equation.

### The Model Specification

This study considers a dynamic inflation rate model as a function of fiscal and monetary variables. As mentioned before, the dynamic model is concerned with co-integration and vector error correction model to capture the effect of selected fiscal and monetary explanatory variables on the inflation rate. Since this study uses an alternative one, we should establish an estimable model in the vector error correction form. Further, the model which explains the impact of selected fiscal and monetary variables on the inflation rate is formed by normalizing the coefficients of the lagged dependent variables in the equation. The complete estimable equation is as follows:

$$\Delta \pi_t = \delta_0 + \sum_{i=1}^{q} \sigma_i \, \Delta\pi_{t-i} + \sum_{i=1}^{m} \phi_i \, \Delta f_{t-i} + \sum_{i=1}^{n} \varphi_i \, \Delta m v_{t-i} + \sum_{i=1}^{q} \gamma_i \, \Delta x_{t-i} + \lambda \, ECT_{t-1} + v_t$$

The mentioned equation is also known as a part of the vector error correction model (VECM), which explains the existence of the short-run relationship between the real inflation rate and its explanatory variables, including shock variables. A negative significant error correction term ($\lambda$) indicates the existence of a long-run relationship between inflation rate and fiscal and monetary variables (Feridun and Adebiyi, 2005; Bozkurt, 2014; Fakher, 2016). The error correction term also measures the speed of adjustment from short-run deviations to its long-run equilibrium.

Meanwhile, the empirical equation capturing the long-run equilibrium between inflation rate with fiscal and monetary variables will be explained using the co-integration approach. The optimum lag length of this empirical model is determined using information criteria such as the Schwarz criterion (SC) and Akaike information criterion (AIC).

### Data and variables

This study estimates co-integration and VECM equation of inflation rate ($\pi_t$), which involve fiscal and monetary variables. Fiscal variables include tax ratio, government spending, and budget deficit. Meanwhile, the monetary variables are narrow money and quasi-money. The data are annual time series for the period of 1970-2020. All the monetary data are from several annual statistical reports of the Bank Indonesia (http://www.bi.go.id/en/). Meanwhile, the data on fiscal variables such as inflation and fiscal variables are from annual reports of the Indonesia Fiscal Policy Agency (http://www.fiskal.kemenkeu.go.id/).

## Results and Discussion

Prior to presenting the empirical inflation rate model, this section exhibits the behaviour of estimated variables in the study. Table 1 presents the data on the inflation rate, tax ratio, government spending, budget deficit, narrow money, and quasi-money. For additional information, the data of monetary variables as well as inflation rate increased sharply at the beginning 1990s. After that period, the inflation rate gradually slows down for about five years. Unfortunately, the deep Asian financial crisis in 1997 caused the inflation rate to jump to about 60 per cent in 1998. Even though the Indonesian economy has recovered faster than expected, the inflation rate was still about 10 per cent average for almost one decade until the 2010s. The sharp increase of some monetary variables in Indonesia, specifically in the post-financial crisis in 1998, has significantly caused harmed the economy.

As stated in the classical quantity theory of money, the inflation rate has a strong association with the monetary sector, especially the money supply. Therefore, increasing narrow money and quasi-money will affect the inflation rate in the country. The expansive monetary policy in Indonesia has contributed to the raising of main monetary variables such as narrow and quasi-money. Inflationary effects of fiscal and monetary policies in Indonesia were suspected as an impact of the package of expansive monetary policy to boost the economy. This economic recovery in the post of the financial crisis also supports the monetary sector development. Moreover, the amount of quasi-money recorded is higher than narrow money, indicating the significant role of financial and banking institutions in financial intermediation. The financial sector development, including Islamic finance and banking in Indonesia since the 1990s, has contributed to the monetary sector expansion. Money creation that comes from various sources in the monetary sector is an important component of aggregate demand which also contributes to the inflation rate.

**Table 1.** Descriptive Statistic of Variables

| Variables | Descriptive Statistic Indicators | | | | |
|---|---|---|---|---|---|
| | Mean | Median | Maximum | Minimum | Standard Deviation |
| Inflation Rate (%) | 13.28 | 9.30 | 58.40 | 3.53 | 9.80 |
| Tax Ratio (% of GDP) | 6.44 | 2.36 | 13.83 | 0.08 | 5.02 |
| Government Spending (% of GDP) | 16.67 | 12.38 | 24.88 | 7.16 | 5.85 |
| Budget Deficit (% of GDP) | 2.03 | 1.99 | 5.91 | 0.11 | 1.20 |
| Narrow Money (Trillion IDR) | 438.66 | 71.33 | 2638.14 | 0.27 | 462.16 |
| Quasi Money (Trillion IDR) | 846.98 | 214.63 | 5964.00 | 6.95 | 1,521.41 |

As mentioned in the methodology, this study applies co-integration analysis and a vector error correction approach. Based on the standard process of this method, we must conduct stationary testing for all variables. Then, we run a unit root test on individual data series with intercept and time trend components. We accept or reject the hypothesis that the data contains a unit root in the level based on the ADF and PP method. In our analysis, we reject the hypothesis

that the variables are stationary in the first difference at least at a 5 % level for all variables (Table 2). We assert that all the data series are stationary in the first difference. For the next step, the co-integration test is valid if data series are stationary at the same degree (Engle & Granger, 1987). Therefore, we estimate the co-integration equation for the analysis of the long-run relationship between estimated variables using the Johansen procedure as a widely recognized method in such analysis (Johansen, 1991).

**Table 2.** Results of Unit Root Test

| Variables | Augmented Dickey-Fuller (ADF) | | Phillips-Perron (PP) | |
|---|---|---|---|---|
| | Level | First Difference | Level | First Difference |
| Inflation Rate | -1.58 | [-7.81]*** | -2.94 | [-18.3]*** |
| Tax Ratio | -2.45 | [-4.58]** | -1.86 | [-4.73]*** |
| Government Spending | -2.16 | [-5.81]*** | -1.98 | [-4.80]*** |
| Budget Deficit | -3.63 | [-3.37]** | -1.33 | [-16.3]*** |
| Narrow Money | -0.55 | [-8.62]*** | 8.51 | [-3.38]*** |
| Quasi Money | -1.41 | [-6.82]*** | 7.15 | [-2.84]*** |

Note: Values in the [ ] are t-statistic. *** and ** indicate significant at 1% and 5% level

The co-integration estimation of a set of variables is summarized in Table 3. We accept the hypothesis of one co-integrating relationship at 5 per cent significant. It implies the existence of a long-run relationship in a set of the series variables, including inflation rate, tax ratio, government spending, budget deficit, narrow money, and quasi-money. The presence of the co-integrating relationship indicates a long-run equilibrium which leads to an error correction mechanism. Therefore, the changes in the dependent variable in the error correction model are a function of the residuals in the co-integration model. The error correction term in VECM captures the adjustment of the Inflation rate as an impact of changes in fiscal and monetary variables.

**Table 3.** Results of Co-integration test

| Hypothesized No. of CE(s) | Eigenvalue | Max-Eigen Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.432 | 24.966 | 22.772 | 0.027 |
| At most 1 | 0.411 | 12.948 | 16.630 | 0.260 |
| At most 2 | 0.318 | 9.961 | 10.439 | 0.250 |
| At most 3 | 0.164 | 4.140 | 6.159 | 0.871 |
| At most 4 | 0.035 | 1.685 | 4.797 | 0.404 |
| At most 5 | 0.022 | 0.968 | 0.224 | 0.331 |

Note: Max-eigenvalue test indicates one co-integrating equation at the 0.05 level. * denotes rejection of the hypothesis at the 0.05 level. **MacKinnon-Haug-Michelis (1999) p-values

The empirical estimation of the vector error correction model is presented in Table 4. The model explains the multi relationship among variables such as inflation, fiscal variables, monetary variables, and error correction term, which come from the residual of the co-integration equation. This model shows the short-run dynamic effect of selected fiscal and monetary variables on the inflation rate. The model also captures the dynamic response of one variable toward other variables in a different form which indicate the short-run dynamic behaviour. Since this study is concerned with the inflationary effects of fiscal and monetary policy, we only explain the effect of fiscal and monetary variables on the inflation rate based on the VECM system. Even though the estimation results of the VECM model provide six equations, the discussion only focuses on the inflation rate model. Moreover, according to the Akaike information criterion, we find the best empirical VECM estimation with two lags. The error correction term (ECT) coefficient, which indicates the validity of VECM, is statistically significant at a 1 per cent level. This coefficient indicates the presence of a long-run equilibrium relationship between inflation rate, fiscal variables, and monetary variables. The value of the error-correction term is -0.53 indicating the moderate response of the inflation rate to the deviations from its long-run equilibrium.

**Table 4.** Results of VECM Estimation

| Independent Variables | Dependent Variables | | | | | |
|---|---|---|---|---|---|---|
| | Δ Inflation Rate | ΔTax Ratio | ΔGovernment Spending | ΔBudget Deficit | ΔNarrow Money | ΔQuasi Money |
| ECT (-1) | -0.534 | -0.045 | -0.002 | 0.008 | -0.989 | 2.488 |
| | [-2.335]*** | [-2.552]*** | [-0.084] | [ 0.349] | [-2.020]*** | [ 2.134]*** |
| Δ Inflation Rate(-1) | 0.001 | -0.004 | -0.036 | 0.005 | 0.511 | -3.230 |
| | [ 0.006] | [-0.287] | [-1.303] | [ 0.268] | [ 1.191] | [-3.161]*** |
| Δ Inflation Rate (-2) | -0.180 | 0.028 | -0.016 | -0.016 | 0.362 | -1.749 |
| | [-1.177] | [ 2.379]*** | [-0.777] | [-1.030] | [ 1.103] | [-2.239]*** |
| ΔTax Ratio (-1) | -5.483 | -0.132 | 0.193 | 0.247 | -0.906 | -13.28 |
| | [-2.382]*** | [-0.741] | [ 0.597] | [ 1.044] | [-0.183] | [-1.133] |
| ΔTax Ratio (-2) | -2.142 | 0.306 | 0.241 | -0.116 | -4.544 | 23.85 |
| | [-1.096] | [ 2.021]** | [ 0.879] | [-0.578] | [-1.086] | [ 2.397***] |
| ΔGovernment Spending (-1) | 4.537 | -0.089 | 0.032 | -0.243 | 2.121 | 5.962 |
| | [ 3.701]*** | [-0.936] | [ 0.188] | [-1.927]** | [ 0.808] | [ 0.954] |
| ΔGovernment Spending (-2) | -0.866 | 0.160 | 0.236 | -0.154 | -2.585 | 6.396 |
| | [-0.587] | [ 1.403] | [ 1.140] | [-1.015] | [-0.818] | [ 0.850] |
| ΔBudget Deficit (-1) | -1.760 | -0.050 | 0.180 | -0.523 | -5.510 | 1.744 |
| | [-1.023] | [-0.376] | [ 0.745] | [-2.950]*** | [-1.496] | [ 0.199] |
| ΔBudget Deficit (-2) | -4.068 | 0.002 | 0.235 | 0.073 | -3.120 | -14.84 |
| | [-2.375]*** | [ 0.018] | [ 0.979] | [ 0.417] | [-0.850] | [-1.701]* |
| ΔNarrow Money (-1) | 0.207 | 0.028 | -0.001 | -0.002 | 0.746 | -0.336 |
| | [ 1.956]** | [ 3.489]*** | [-0.039] | [-0.167] | [ 3.292]*** | [-0.624] |
| ΔNarrow Money (-2) | 0.302 | -0.005 | -0.012 | -0.012 | -0.250 | -0.972 |
| | [ 2.294]*** | [-0.490] | [-0.633] | [-0.946] | [-0.885] | [-1.448] |
| ΔQuasi Money (-1) | -0.069 | 0.002 | 0.003 | -0.0001 | 0.126 | 0.845 |
| | [-1.662]* | [ 0.750] | [ 0.650] | [-0.023] | [ 1.415] | [ 3.981]*** |
| ΔQuasi Money (-2) | -0.032 | -0.006 | -0.001 | 0.003 | 0.128 | 0.235 |
| | [-1.008] | [-2.574]*** | [-0.163] | [ 1.094] | [ 1.843]* | [ 1.413] |
| Constant | -3.711 | -0.174 | 0.146 | 0.238 | -3.322 | 25.747 |
| | [-1.465] | [-0.886] | [ 0.411] | [ 0.915] | [-0.612] | [ 1.996]** |

Note: Values in the [ ] are t-statistic. ***, ** , and * and indicate significant at 1%, 5% and 10% level. The bold font indicates a positive effect of the variables on the inflation rate.

Regarding the analysis of the impact of fiscal and monetary policies on the inflation rate, the discussion section presents these issues in two sections separately. First, we discuss the impact of the fiscal policy on the inflation rate, and second the impact of monetary policy on the inflation rate in the next section. Based on the empirical VECM, government spending has a positive impact on the inflation rate; meanwhile, the increase in tax ratio is associated with the decrease in the inflation rate. Government spending as the main fiscal policy instrument significantly contributes to the increase in the inflation rate. This finding reveals that fiscal policy has had an important role in inflation rate reduction in Indonesia for more last two decades (Sriyana, 2019).

Focusing on the impact of monetary policy, narrow money as one of the important monetary variables also has a significant positive impact on the inflation rate. These results confirm the previous empirical estimation using an error correction model supporting the inflationary effects of monetary variables (Nguyen, 2015; Fakher, 2016). An expansive monetary policy which aims to encourage economic growth has a negative effect on the price level in Indonesia. Regarding economic stabilization policy, the central bank might review the inflation targetting policy and control the money supply, both narrow and quasi-money.

## Conclusion

This research provides an empirical model of the inflation rate based on dynamic econometric analysis. The empirical estimation based on the vector error correction model in this research can explain the determinants of the inflation rate in Indonesia for the long period data. The findings assert that fiscal and monetary policies strongly determine the inflation rate both in the short and long term. The speed of adjustment of the inflation rate from disequilibrium to the equilibrium

level is only about fifty per cent annually. It indicates the low responses of the fiscal and monetary policy in responding to the dynamic situation, which causes price volatility.

These findings reveal the inflationary effects of fiscal and monetary policy in Indonesia. It implies the government should improve the effectiveness of these policies. The government spending and money supply contribute to inflation risk in the long period. Therefore, more government spending leads to a higher price level in the commodity market. This research supports the theory of demand-pull inflation. This study recommends the central government improve the credibility of some fiscal policies. Meanwhile, the central bank should apply more prudent monetary policies.

# References

Ajaz, T., Nain, M. Z. And Kamaiah, B. (2016) 'Inflation And Openness In India: An Asymmetric Approach', *Macroeconomics And Finance In Emerging Market Economies*, 9(2), Pp. 190–203. Doi: 10.1080/17520843.2016.1162825.

Auerbach, A. J., Gale, W. G. And Harris, B. H. (2010) 'Activist Fiscal Policy', *Journal Of Economic Perspectives*, 24(4), Pp. 141–164.

Berument, H. And Doan, B. (2003) 'Openness And The Effectiveness Of Monetary Policy: Empirical Evidence From Turkey', *Applied Economics Letters*, 10(4), Pp. 217–221. Doi: 10.1080/1350485022000015842.

Bhattacharya, R. (2014) 'Inflation Dynamics And Monetary Policy Transmission In Vietnam And Emerging Asia', *Journal Of Asian Economics*, 34, Pp. 16–26.

Bozkurt, C. (2014) 'Money, Inflation And Growth Relationship: The Turkish Case', *International Journal Of Economics And Financial Issues*, 4(2), Pp. 309–322.

Bukhari, Z. And Yusof, Z. (2014) 'Macroeconomic Effects Of Fiscal Policy In Malaysia : Real Or Inflationary ?', In *Proc. Of The Second Intl. Conf. On Advances In Social Science, Management And Human Behaviour.* Zurich, Switzerland: Institute Of Research Engineers And Doctors, Usa, Pp. 204–207.

Burstein, A. T. (2006) 'Inflation And Output Dynamics With State-Dependent Pricing Decisions', *Journal Of Monetary Economics*, 53(7), Pp. 1235–1257. Doi: 10.1016/J.Jmoneco.2005.05.006.

Deev, O. And Hodula, M. (2016) 'The Long - Run Superneutrality Of Money Revised : The Extended European Evidence', *Review Of Economic Perspectives*, 16(3), Pp. 187–203. Doi: 10.1515/Revecp-2016-0012.

Dicky, D. . And Fuller, W. A. (1981) 'The Likelihood Ratio Statistics For Autoregressive Time Series With A Unit Root', *Econometrica*, 49(4), Pp. 1057–1072.

Domowitz, I. And Elbadawi, I. (1987) 'An Error Correction Approach To Money Demand: A Case Of Sudan', *Journal Of Development Economics*, 26(2), P. 257–375. Doi: Doi.Org/10.1016/0304-3878(87)90029-0.

Duncan, R. And Martínez-García, E. (2015) *Forecasting Local Inflation With Global Inflation : When Economic Theory Meets The Facts.* Working Paper No. 235. Federal Reserve Bank Of Dallas, Dallas.

Enders, W. (2010) *Applied Econometric Time Series.* 3rd Ed. New York: John Wiley & Sons.

Engle, R. F. And Granger, C. W. J. (1987) 'Co-Integration And Error Correction: Representation, Estimation, And Testing', *Econometrica*, 55(2), Pp. 251–76.

Fakher, H. (2016) 'The Empirical Relationship Between Fiscal Deficits And Inflation (Case Study: Selected Asian Economies)', *Iranian Economic Review*, 20(4), Pp. 551–579.

Falahi, M. And Hajamini, M. (2017) 'Asymmetric Behavior Of Inflation In Iran: New Evidence

On Inflation Persistence Using A Smooth Transition Model', *Iranian Economic Review*, 21(1), Pp. 101–120.

Feridun, M. And Adebiyi, M. A. (2005) 'Forecasting Inflation In Developing Economies: The Case Of Nigeria', *International Journal Of Applied Econometrics And Quantitative Studies*, 2(4), Pp. 103–132.

Gali, J. (2010) 'Inflation Pressures And Monetary Policy In A Global Economy', *International Journal Of Central Banking*, 6(1), Pp. 93–102.

Ghosh, A. (2014) 'How Do Openness And Exchange-Rate Regimes Affect Inflation?', *International Review Of Economics & Finance*, 34, Pp. 190–202.

Gupta, R. And Uwilingiye, J. (2008) *Time Aggregation, Long-Run Money Demand And The Welfare Cost Of Inflation*. 2008–25. Pretoria, South Africa.

Hamilton, J. D. (2012) 'Import Prices And Inflation', *International Journal Of Central Banking*, 8(1), Pp. 271–280.

Heidari, H. And Bashiri, S. (2010) 'Inflation And Inflation Uncertainty In Iran: An Application Of Garch-In-Mean Model With Fiml Method Of Estimation', *International Journal Of Business And Development Studies*, 2(1), Pp. 131–146.

Hossain, A. (2005) 'The Sources And Dynamics Of Inflation In Indonesia: An Ecm Model Estimation For 1952-2002', *Applied Econometrics And International Development*, 5(4), Pp. 93–116.

Hossain, A. A. (2010) 'Monetary Targeting For Price Stability In Bangladesh: How Stable Is Its Money Demand Function And The Linkage Between Money Supply Growth And Inflation', *Journal Of Asian Economics*, 21(6), Pp. 564–578.

Johansen, S. (1991) 'Estimation And Hypothesis Testing Of Cointegration Vectors In Gaussian Vector Autoregressive Models', *Econometrica*, 59(6), Pp. 1551–1580.

Kandil, M. (2005) 'Money, Interest, And Prices: Some International Evidence', *International Review Of Economics And Finance*, 14(2), Pp. 129–147. Doi: 10.1016/J.Iref.2003.11.013.

Khundrakpam, J. K. (2010) 'Fiscal Stimulus And Potential Inflationary Risks : An Empirical Assessment Of Fiscal Deficit And Inflation Relationship In India', *Journal Of Economic Integration*, 25(4), Pp. 703–721.

Lin, H. Y. And Chu, H. P. (2013) 'Are Fiscal Deficits Inflationary', *Journal Of International Money And Finance*, 32, Pp. 214–233. Doi: Dx.Doi.Org/10.1016/J.Jimonfin.2012.04.006.

Mackinnon, J. G., Haug, A. And Michelis, L. (1999) 'Numerical Distribution Functions Of Likelihood Ratio Tests For Cointegration', *Journal Of Applied Econometrics*, 14(5), Pp. 563–577.

Mohanty, D. And John, J. (2015) 'Determinants Of Inflation In India', *Journal Of Asian Economics*, 36, Pp. 86–96. Doi: 10.1016/J.Asieco.2014.08.002.

Naz, F., Mohsin, A. And Zaman, K. (2012) 'Exchange Rate Pass-Through In To Inflation: New Insights In To The Cointegration Relationship From Pakistan', *Economic Modelling*, 29(6), Pp. 2205–2221.

Nguyen, V. B. (2015) 'Effects Of Fiscal Deficit And Money M2 Supply On Inflation: Evidence From Selected Economies Of Asia', *Journal Of Economics, Finance And Administrative Science*. Aedv, 20(38), Pp. 1–5. Doi: 10.1016/J.Jefas.2015.01.002.

Nikolaos, A. And Constantinos, K. (2013). 'A Dynamic Panel, Empirical Investigation On The Link Between Inflation And Fiscal Imbalances. Does Heterogeneity Matter?', *Prague Economic Papers*, 2, Pp. 147–162.

Parkin, M. (2014). *Economics*. 11 Ed. England: Person Education Ltd.

Raji, J. O., Juzhar, J. And Jantan, M. D. (2014). 'Real Money Supply, Price And Fiscal Deficit In Nigeria: Evidence From Multivariate Granger Causality Tests', *Journal Of Economic Cooperation And Development*, 4(4), Pp. 85–112.

Sriyana, J. (2018). Inflationary effects of fiscal and monetary policies in Indonesia. *Business and Economic Horizons*, 14(3), 674-688. http://dx.doi.org/10.15208/beh.2018.47

Sriyana, J. (2019). Price stabilization policy in an emerging economy: An asymmetric approach. *Journal of International Studies*, 12(2), 165-181. doi:10.14254/2071-8330.2019/12-2/10

Thanh, S. D. (2015). 'Threshold Effects Of Inflation On Growth In The Asean-5 Countries: A Panel Smooth Transition Regression Approach.', *Journal Of Economics Finance And Administrative Science*, 20(38), Pp. 41–48. Doi: 10.1016/J.Jefas.2015.01.003.

Tirtosuharto, D. And Adiwilaga, H. (2013) 'Decentralization And Regional Inflation In Indonesia', *Bulletin Of Monetary, Economics And Banking*, 16(2), Pp. 149–166.

Yağcibaşi, Ö. F. And Yildirim, M. O. (2017). 'Welfare Implications Of Alternative Monetary Policy Rules : A New Keynesian Dsge Model For Turkey', *Review Of Economic Perspectives*, 17(4), Pp. 363–379. Doi: 10.1515/Revecp-2017-0019.