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## INFLATION, GOVERNMENT EXPENDITURE, AND ECONOMIC GROWTH IN INDONESIA

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**Abstract.** This study estimates long run and short run association between inflation, government expenditure, and economic growth in Indonesia from 1981 to 2018. This study run diagnostic and specification test on time-series datasets in the model. This study employs Engel-Granger Cointegration Test and Error Correction Model (ECM) to estimate the long run and short run association in the model. This study further disaggregates government expenditure data in Indonesia into routine and development expenditure to analyse the individual and combined effect of the variable in the model. Result of the study suggested that the association between inflation and economic growth is negative, while the association between government expenditure and economic growth is positive. Moreover, routine expenditure has insignificant effect. Finally, ECM concluded that short-term adjustment in the model is less than one percent and specifically stable in all regression models.

**Keywords:** *Inflation, Government Expenditure, Economic Growth, ECM.*

### INTRODUCTION

Prominent studies developed theoretical and empirical studies on the short run and long run association between inflation, government expenditure and economic growth. Such association has been intensively discussed in current empirical studies in developed and developing countries (Attari & Javed, 2013; Eggoh & Khan, 2014; Hung, 2016;

Mohseni & Jouzaryan, 2016; Sriyalatha & Torii, 2019). The results of previous studies mainly suggested that controlling inflation and government expenditure has significant role in economic development. However, the association, in the short run and long-term effects were not thoroughly estimated for the case of Indonesia. Furthermore, as it is evident in Table

1, the association between inflation, government expenditure, and economic growth does not appear to be obvious in the current periods. Therefore, it is essential to estimate the short run and long run association between inflation, government expenditure, and economic growth in Indonesia.

**Table 1. Trend of Economic Growth, Inflation, and Government Expenditure in Indonesia, 2014-2018**

Year	Growth	Inflation	Government Expenditure (in Billion Rupiah)
2014	4.88	6.39	541,241.61
2015	5.03	6.36	238,021.22
2016	5.07	3.52	647,389.75
2017	5.17	3.80	1,043,337.02
2018	5.02	3.19	1,088,512.81

Source: Central Bureau of Statistics, Central Bank of Indonesia, Directorate of Fiscal Balance, Ministry of Finance.

## LITERATURE REVIEW

Published studies had estimated the relationship between inflation and economic growth in developing and developed countries (Mohseni & Jouzaryan, 2016). These studies were mainly based on strong macroeconomic background on the association between inflation and economic growth. Mohseni & Jouzaryan (2016) examined the role of inflation and unemployment on economic growth in Iran by

employing Autoregressive Distributed Lag (ARDL) model. The study presented significant and negative effect of inflation and unemployment on economic growth in the long term.

Further empirical literature found that incorporation of fiscal variable such as government expenditure diversified the association between inflation and economic growth (Attari & Javed, 2013; Eggoh & Khan, 2014; Hung, 2016; Hussain & Zafar, 2018; Sriyalatha & Torii, 2019). Eggoh & Khan (2014) employed panel smooth transition regression (PSTR) and dynamic GMM model on inflation and economic growth. The empirical result suggested the non-linear relationship between inflation and economic growth. It is also found that the non-linearity is sensitive to country's level of government expenditures, financial development, and capital accumulation. Attari & Javed (2013) estimated the relationship between inflation, economic growth, and government expenditure in Pakistan in 1980-2010. The study found that government

expenditure result in positive externalities in the long run and short run, while inflation rate had no significant effect in the short run.

Hussain & Zafar (2018) employed ARDL Bounds Testing approach on cointegration test and ECM approach to study the long run and short run impact of money supply, inflation, government expenditure, and economic growth in Pakistan. The study concluded the Distributive Lag (ARDL)-ECM approach to estimate the association of fiscal variables and inflation on economic growth. The result concluded that government expenditure had positive and significant effect on economic growth and Toda-Yamamoto's Granger Causality result revealed bidirectional causality between inflation rate and economic growth in Singapore and Sri Lanka. Moreover, further studies of Chandio & Rehman (2016), Hasnul (2016), Roşoiu (2015) emphasized the significance of government expenditure on economic growth.

According to the literature review, the association between inflation and economic growth is

short run relationship between the variables, but the speed of adjustment is relatively slow, which is less than 20 percent.

Hung (2016) developed simple endogenous growth model and results demonstrated that increased government expenditure led to higher inflation rate and increased economic growth for countries with high initial inflation rates. Sriyalatha & Torii (2019) employed Autoregressive complex and relied upon certain variables in model specification, such as government expenditure. Despite growing literature, this phenomenon requires deeper analysis regarding inflation, government expenditure, and economic growth on country-specific study. Therefore, this study attempts to estimate the association between inflation, government expenditure, and economic growth in Indonesia.

## **METHODOLOGY**

This study aims to estimate the long run and short run association between inflation, government expenditure, and economic growth in Indonesia from 1981 to 2018. This

study includes annual datasets collected from Central Bank of Indonesia (Bank Indonesia), Directorate of Fiscal Balance, Ministry of Finance, and Indonesia's Central Bureau of Statistics. Variables and data sources are summarized in Table 2.

This study employs Engel-Granger Cointegration Test to estimate long run association between inflation, government expenditure, and economic growth and further employ Error Correction Model (ECM) to estimate short run association between selected variables. This study further run diagnostic and specification tests to determine the association between inflation, government expenditure, and economic growth on time series datasets. Therefore, I employ long run and short run estimate based on the following equations:

$$\ln GDP_t = \beta_0 + \beta_1 INF_t + \beta_2 \ln GOVEXP_t + \varepsilon_t \dots \dots \text{(Eq.1)}$$

where  $\ln GDP_t$  is natural logarithmic of economic growth in period  $t$ ;  $\ln GOVEXP_t$  is natural logarithmic of government expenditure in period  $t$ ;

$INF_t$  is the annual inflation rate of period  $t$ ; and  $\varepsilon_t$  is the error term.

$$D(\ln GDP)_t = \alpha_0 + \alpha_1 D(INF)_t + \alpha_2 D(\ln GOVEXP)_t + \alpha_3 RES(-1) \dots \dots \text{(Eq.2)}$$

where  $D(\ln GDP)_t$  is the first difference of natural logarithmic economic growth in period  $t$ ;  $D(\ln GOVEXP)_t$  is the first difference of natural logarithmic government expenditure in period  $t$ ;  $D(INF)_t$  is the first difference of inflation rate in period  $t$ ;  $RES(-1)$  is the short-term error term.

Furthermore, following Attari & Javed (2013) this study disaggregates government expenditure into routine expenditure and government development expenditure to determine variability of government expenditure on economic growth in Indonesia. This study also develops controlled variables, such as investment and labour in the model. Thus, this study further estimates the individual effect and combined effect of both expenditures based on the following model:

$$\ln GDP_t = \gamma_0 + \gamma_1 INF_t + \gamma_2 \ln GOVEXP_t + \varepsilon_t \dots \text{(Model 1)}$$

$$\ln GDP_t = \gamma_0 + \gamma_1 INF_t + \gamma_2 \ln GOVEXP_t + \gamma_3 \ln INVEST_t + \gamma_4 \ln LABOUR_t + \varepsilon_t \dots \text{ (Model 2)}$$

$$\ln GDP_t = \gamma_0 + \gamma_1 \ln ROUTINE_t + \gamma_2 \ln DEV_t + \gamma_3 \ln INVEST_t + \gamma_4 \ln LABOUR_t + \gamma_5 INF_t + \varepsilon_t \dots \text{ (Model 3)}$$

where  $\ln GDP_t$  is natural logarithmic of economic growth in period  $t$ ;  $\ln ROUTINE_t$  is natural logarithmic of routine government expenditure in period  $t$ ;  $\ln DEV_t$  is natural

logarithmic of government development expenditure in period  $t$ ;  $\ln INVEST_t$  is natural logarithmic total private investment in period  $t$ ;  $\ln LABOUR_t$  is natural logarithmic of total labour in period  $t$ ;  $INF_t$  is the annual inflation rate of period  $t$ ; and  $\varepsilon_t$  is the error term.

**Table 2. Summary of Variables**

Variable	Indicator	Notation	Data Source
Economic Growth	Annual growth of Gross Domestic Product	GDP	Central Bureau of Statistics
Inflation		INF	Central Bank of Indonesia
Total Government Expenditure	Annual overall government expenditure	GOVEXP	Directorate of Fiscal Balance, Ministry of Finance
Routine Expenditure	Annual routine expenditure	ROUTINE	Directorate of Fiscal Balance, Ministry of Finance
Development Expenditure	Annual development expenditure	DEV	Directorate of Fiscal Balance, Ministry of Finance
Investment	Real private investment	INVEST	Central Bureau of Statistics
Labour		LABOUR	Central Bureau of Statistics

Source: Central Bureau of Statistics, Central Bank of Indonesia, Directorate of Fiscal Balance, Ministry of Finance.

## RESULTS AND DISCUSSION

To avoid misspecification and biased estimates in the regression, firstly, this study employs Augmented Dickey-Fuller (ADF) unit root test to identify stationarity of the variables. Table 3 presents ADF unit root test results. The results shown in Table 3 shows that GDP, government expenditure, routine expenditure, and development expenditure are non-stationary at level 0. The results

further suggested that GDP, government expenditure, inflation, routine expenditure, and development expenditure are stationary at first difference in 1 percent level of significance. The result revealed that the datasets are appropriate to estimate long-run association in the model.

Diagnostic and specification test results are summarized in Table 4. The diagnostic and specification tests include Jarque-Bera normality test,

Breusch-Godfrey serial correlation LM test, and Breusch-Pagan-Godfrey Test. The results revealed that residual terms are normally distributed and there are no evidence of serial correlation and heteroskedasticity in all model. Therefore, the diagnostic test rejects the null hypothesis.

**Table 3. ADF Unit Root Test Statistic**

Variables	MacKinnon P-Values Level 0	MacKinnon P-Values Level 1 (First Difference)
lnGDP	0.9520	0.000
lnGOVEXP	0.9534	0.000
INF	0.0004	0.000
lnROUTINE	0.9513	0.000
lnDEV	0.9553	0.000

Source: Own data, estimated with E-views 10.

**Table 4. Diagnostic Test Results**

Diagnostic Tests Indicator	Model 1	Model 2	Model 3
Breusch-Godfrey Serial Correlation LM Test	0.915	0.793	0.753
Breusch-Pagan-Godfrey Test	0.873	0.312	0.831
J-B Normality Test	0.714	0.731	0.774

Source: Own data, estimated with E-views 10.

**Table 5. Cointegration Test Results**

Variable	(1)	(2)	(3)
RES (-1)	0.035	0.035	0.037

Note: The result provides *p-value* of Engel-Granger Cointegration test results on long run estimation

Source: Own data, estimated with E-views 10

To validate the long run relationship or cointegration among the variables in the regression model, we conduct Engel-Granger Cointegration Test. Cointegration test result is summarized in Table 5. The results suggested that long run relationship among variables in the models are evident. Therefore, we estimated long run estimates of the regression model as it is summarized in Table 6.

Column 1 presents significant association between inflation, government expenditure, and economic growth in Indonesia. The result suggested that 1 percent increase of inflation led to 0.009 percent decrease of economic growth in Indonesia, while 1 percent increase of government expenditure result in increase of economic growth by 1.014 percent. As discussed in the previous section, we added other explanatory and control variables to avoid problems of misspecification and biased estimate results. Added explanatory and control variables are included in Column 2 and Column 3.

**Table 6. Long Run Estimate Results (Dependent Variable: lnGDP)**

	(1)	(2)	(3)
INF	-0.009*** (0.002)	-0.009*** (0.004)	-0.009*** (0.0004)
lnGOVEXP	1.014*** (0.044)	1.205*** (0.086)	-
lnROUTINE	-	-	-2.112 (0.849)
lnDEV	-	-	1.321** (0.078)
lnINVEST	-	0.291** (0.257)	0.268** (0.018)
lnLABOUR	-	3.831*** (0.001)	1.297*** (0.001)
R-squared	0.970	0.923	0.865

Note: The result provides long run estimates on time series datasets.

All regressions include a constant. Standard errors in parenthesis.

\*, \*\*, \*\*\* is significant at 1%, 5%, and 10%.

Source: Own data, estimated with *E-views 10*

Column 2 shows that by taking investment and labour into account, it results in slightly higher effect of government expenditure on economic growth, with the elasticity of 1.205 percent. Essentially, the results in Column 1 and 2 shows that the direction of the association between inflation, government expenditure, and economic growth are consistent and robust.

In Column 3, disaggregation of government expenditure is considered in the model. Relative to the results in Column 1 and Column 2, the association between inflation and economic growth is consistent. However, disaggregation of government expenditure into routine

and development expenditure suggested mixed result. Routine expenditure has insignificant association with economic growth, while development expenditure has significant and positive association with economic growth. This implies that one percent increase of development expenditure leads to the increase of economic growth by 1.321 percent.

To determine short run association between variables in the model, this study employ ECM approach as it is summarized in Table 7. The short run estimates presented consistent and robust association of inflation, government expenditure, and economic growth in Indonesia.

**Table 7. Short Run Estimate Results (Dependent Variable: D(lnGDP))**

	(1)	(2)	(3)
D(INF)	-0.001 (0.078)	-0.002* (0.653)	-0.015* (0.093)
D(lnGOVEXP)	0.779*** (0.074)	0.779*** (0.487)	-
D(lnROUTINE)	-	-	0.355 (0.790)
D(lnDEV)	-	-	1.297*** (0.008)
D(lnINVEST)	-	0.291** (0.257)	0.143** (0.277)
D(lnLABOUR)	-	3.831*** (0.001)	2.281*** (0.015)
RES (-1)	-0.057*** (0.069)	-0.059*** (0.069)	-0.069*** (0.368)
R-squared	0.919	0.926	0.912

Note: The result provides run estimates on time series datasets. All regressions include a constant. Standard errors in parenthesis. \*, \*\*, \*\*\* is significant at 1%, 5%, and 10%.

Source: Own data, estimated with *E-views 10*

The results further emphasized the ECM coefficient which measured the speed of adjustments to adjust long run estimates after a short-term shock. Error Correction Term (ECM) is -0.057, -0.059, and -0.069 in respective models. The result implies that 0.057 percent, 0.059, and 0.069 percent of disequilibrium in previous period's shock will be adjusted in the current period's long run equilibrium.

To summarize, the result confirmed that inflation and government expenditure indeed has significant association with economic growth in Indonesia. The result is in line with studies of Attari & Javed (2013), Cavalcanti Ferreira (1999),

Eggoh & Khan (2014), Hung (2016, Landau (1985), and Sriyalatha & Torii (2019). As for the disaggregation of government expenditure, this study consistently emphasized the insignificant impact of routine expenditure on economic growth. This result further supported findings of Attari & Javed (2013), which highlighted the insignificant effect of routine or current expenditure on economic growth. Finally, the short-term adjustment suggested that less than 1 percent of the disequilibrium will be adjusted in the current year's long run equilibrium. In conclusion, such significant error correction term



suggested stable long run association between variables in the study.

## CONCLUSION

This study attempts to estimate the long run and short run association between inflation, government expenditure, and economic growth in Indonesia from 1981 to 2018. This study further employs Engel-Granger Cointegration Test and Error Correction Model (ECM) to estimate long run and short run association on selected variables. The results concluded that inflation, government expenditure, and economic growth has significant association in Indonesia. The results also emphasized the consistent direction in the long run and short run estimates of the model developed in the study. This implies that inflation tend to decrease economic growth both in long run and short run, while government expenditure tends to increase economic growth in the long run and in the short run. Further analysis confirms that routine expenditure has no significant effect on economic growth, while

development expenditure has significant and positive effect on economic growth. Moreover, the findings also concluded that short-term adjustment is stable in estimating long run association in the regression models.

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