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Analysis of Factors Impacting Indonesia's Economic Development Using the Partial Adjustment Model (PAM)

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Abstract:- The goal of this analysis is to examine and ascertain the impact on the economic growth of short- and long-term government expenditure (GE), interest rate (IR), and expenditure (INV) variables as calculated by Gross Domestic Product (GDP). This research analyzes economic development in Indonesia using the Partial Adjustment Model (PAM) method for the 2000-2018 period. The analytical findings of this analysis indicate that, both in the long and short term, government expenditure and investment factors have a major positive impact on economic development. This illustrates that rising levels of government expenditure and investment would have an impact on Indonesia's rising GDP. This analysis is in line with the hypothesis proposed by Keynesian on the basis of these findings. The interest rate vector in this analysis, however, has a negative and marginal effect on GDP. This means that, both in the long and short term, the interest rate has little impact on economic development in Indonesia. Based on the findings of this report, it is hoped that, in order to further improve the efficiency of domestic growth so that more domestic and foreign investors can invest in the region, it can become an appraisal material for stakeholders and development planners.

Keywords:- *Government Expenditure, Interest Rate, Economic Development, Partial Adjustment Model.*

I. INTRODUCTION

One of the essential metrics for evaluating a phase of economic progress in a region or a world as calculated by the Gross Domestic Product (GDP) for a given year is economic growth. One of the biggest priorities of a region is to raise the rate of economic growth since it impacts macroeconomic conditions in the aggregate (Susilo et al., 2020). Economic growth is also an explanation of the factors that lead to a short or long-term rise in per capita production. As well as how these variables connect and affect each other, such that economic development is processed (Ervani, 2014). A certain benchmark, especially economic growth, is used to assess the progress of economic development, demonstrating the actual effect of the development policies adopted (Putri et al., 2015).

Economic growth is characterized as the increase in per capita public production or income induced by a variety of factors. These influences can become patterns that increase each year in a different way, as they have succeeded in encouraging an increase in the economic development of a region or nation. There are several variables or metrics that can be used to see a country's economic growth, especially by looking at each period's GDP growth rate. In the growth theory of the Sollow - Swan, based on the production function of Cobb-Douglas, it is clarified that input is needed in each production process to obtain an output. Any of these inputs are exogenous variables in the form of money, labor, and technology (Kuncoro, 2010).

The government takes measures to promote economic development and growth by planning capital investments every year to support economic development and growth (Putri et al., 2015). Furthermore, by drawing domestic and international investors, the government is also attempting to improve economic growth. This can be seen from the realization, released by the Investment Activity Council, of private investment in the form of international investment and domestic investment.

Indonesia is one of the emerging economies in Southeast Asia. However, as a nation with the ability to boost the largest economy after China and India, Indonesia is also one of the contestants. As a developing nation, in order to boost economic growth, Indonesia continues to seek progress, especially sustainable economic development. This research would therefore investigate the factors influencing Indonesia's economic development, both in the short and long term, during the period from 2000 to 2018.

Several previous scholars have performed research that analyzes the variables that affect Indonesia's economic development. There is still controversy, however, on some of the implications of these trials. As Hapsari & Iskandar (2018) studies suggest that the variables of capital spending, population and education have a substantial positive impact on economic growth, while private consumption and health variables have a negative and marginal impact on economic growth. Unlike research by Putri et al., (2015), which notes that the investment variable has had a substantial positive impact on Indonesia's economic growth in the 2008-2012 period.

In line with Ervani (2014) research, which notes that investment, human capital, and deposit interest rates strongly affect economic development in Indonesia. It differs from

Indri (2018) research that notes that government spending, human capital expenditure, the population, and domestic expenditure impact economic development.

On the basis of these reports, it can be shown that there are many influences or variables influencing Indonesia's economic development. For this cause, this study will examine, both in the short and long term, the deciding factor or variables influencing economic growth in Indonesia in the 2010-2018 period. Government spending, interest rates, and expenditure are the independent variables that will be included in this analysis, while GDP per capita will be the contingent variable in this study. This thesis would use the Partial Adjustment Model (PAM) analysis of the Eviews 10 analysis tool in order to achieve more detailed data and test findings for the short and long term.

The aim of this research is to study the relationship between government expenditure, interest rates, and economic growth investment, which relates to many expert theories. This research would, in particular, test theories about the factors impacting economic development in a developing world such as Indonesia. This research is organized on the basis of several elements, including the context of the problem under study, models and methods of analysis, research, examined data sources and variables, scientific, evidence-based on previous research, and the understanding and analysis of outcomes of data processing.

II. LITERATURE REVIEW

In the literature and previous findings, the theoretical association between government spending, interest rates, expenditure, and economic development is explicitly presented. In economics, there are many hypotheses about the relation between these variables. The Keynesian macroeconomic theory, which suggests that increased government spending continues to contribute to faster economic growth, is one of them (Loto, 2011). Wagnerian thought, however, bent in the opposite direction. Researchers in various countries with different time spans have published many experiments on the effects of government spending, interest rates, and expenditure on economic development based on current hypotheses. The outcomes of these studies differ significantly as well.

Research on the effects of government spending on economic development in the countries of the European Union was undertaken by Pascual & Alvarez-García (2011), which concluded that government spending had a positive effect on economic growth. In his study, Dandan (2011) also notes that government spending has a positive effect on GDP growth, which is in line with Keynesian theory. However, it is not proven that the interest rate variable influences the GDP variable. Unlike the case of Nurudeen & Usman (2010) study, which notes that government spending has a negative influence on economic development.

In their study, Ervani (2014) and Putri et al., (2015) note that economic growth is heavily affected by interest rates and investment, especially in Indonesia. This statement is not in line with studies by Hapsari & Iskandar (2018), Nurudeen & Usman (2010), and Udoka & Roland (2012) that state that there is no impact on economic growth in investment and interest rates. This can be seen by the findings of the data analysis test, which indicates that GDP is negatively influenced by investment variables and interest rates, meaning that a rise in investment and interest rates for a given time frame would ultimately lower GDP over that period.

This research would analyze more closely, on the basis of some of the literature, the effects of government expenditure, interest rates, and investment in Indonesia's GDP over the period 2000-2018, using the Partial Adjustment Model review to achieve more precise long-term and short-term outcomes.

III. RESEARCH METHOD

A. Types and Data Bases

The category of data used in this analysis is secondary data for the period 2000-2018. Reporting from the Central Bureau of Statistics (BPS) and World Bank publications. The data used in this report contain data on per capita gross domestic product (GDP), actual government expenditure (GE), interest rates (IR), and investment (INV).

B. Model of Partial Adjustment

The statistical model that defines the long and short term relationship between the independent variable and the dependent variable (Olulu et al., 2014), based on mathematical theory, can be written as follows:

$$GDP = f(GE, IR, INV) \dots\dots\dots\dots\dots\dots (1)$$

Then it is transformed into the following model of the equation:

$$GDP = \beta_O + \beta_1 GE + \beta_2 IR + \beta_3 INV + c_t \dots\dots\dots\dots\dots (2)$$

In which:

GDP : Gross Domestic Product
GE : Government Expenditure
IR : Interest Rate
INV : Investment

This study uses a type of dynamic analysis, namely the analysis model of the Partial Change Model (PAM). This model will study both long-term and short-term economic phenomena and investigate the coherence of the viability of the analytical model with economic theory Santos & Nurcahyaningtyas (2013). The indolence coefficient of the dependent variable, situated at 0 β 1 and β must be statistically meaningful for a positive coefficient, must be satisfied by the PAM model (Alshahrani & Alsadiq, 2014). The general PAM model type is as follows:

$$y_t = \alpha_0 + \alpha_1 X_t + \alpha_2 Y_{t-1} + N_t \dots\dots\dots\dots\dots (3)$$

It is possible to write the fundamental model of this study as follows:

$$GDP = f(GE, IR, INV)c.p \dots\dots\dots\dots\dots (4)$$

As follows, extracted into a regression equation:

$$GDP_t = \beta_0 + \beta_1 (GE)_t + \beta_2 (IR)_t + et \dots\dots\dots\dots\dots (5)$$

Since it is not possible to explicitly observe GDPt, a partial modification theory is written as follows:

$$GDP_t - GDP_{t-1} = \lambda(GDP_t - GDP_{t-1} \dots\dots\dots\dots (6)$$

$$GDP_t = GDP_{t-1} + \lambda(GDP_{t-1})$$

$$GDP_t = \lambda GDP^*_t - \lambda GDP_{t-1} + GDP_{t-1}$$

$$GDP_t = \lambda GDP^*_t + (1-\lambda)GDP_{t-1} \dots\dots\dots\dots (7)$$

In which:

$GDP_t - GDP_{t-1}$ = The Actual Improvement

$GDP_t^* - GDP_{t-1}$ = The improvement that is wanted

λ = Coefficient of Adjustment ($0 < \lambda < 1$)

Then the latter equation is replaced by:

$$GDP_t = \lambda(\beta_0 + \beta_1(GE)_t + \beta_2(IR)_t + \beta_3(INV)_t + (1-\lambda)\beta_4 GDP_{t-1} \dots\dots\dots (8)$$

$$GDP_t = \lambda\beta_0 + \beta_1\lambda(GE)_t + \beta_2\lambda(IR)_t + \beta_3\lambda(INV)_t + (1-\lambda)\beta_4 GDP^d{}_{t-1} \dots\dots (9)$$

The formulation of the Partial Adjustment Model (PAM) is:

$$LOG(GDP)_t = \alpha + \alpha_1 LOG(GE)_t + \alpha_2 LOG(IR)_t + \alpha_3 LOG(INV)_t + \alpha_4 LOG(GDP)_{t-1} + et \dots\dots\dots\dots (10)$$

Meanwhile, the long-term PAM model formulation is as follows:

$$LOG(GDP)_t = \alpha + \alpha_1 LOG(GE)_t + \alpha_2 LOG(IR)_t + \alpha_3 LOG(INV)$$

IV. RESULTS AND DISCUSSION

A. Classic Assumption Test

a. Multicolinearity Test

The multicollinearity test used was the VIF test in this analysis. The findings of the VIF test show that in this analysis all independent variables, namely Government Spending (GE), Interest Rate (IR), and Investment (INV), have a VIF value of less than 10 (<10), so it can be inferred that in this study there is no issue of multicollinearity.

b. Autocorelation Test

In this analysis, the autocorrelation test uses the Breusch-Godfrey test, which indicates that the value of Prob. Chi-Square is higher than the value of importance or > 0.05, which is equal to 0.5413. It can be inferred that this study is exempt from issues of autocorrelation.

c. Heteroscedasticity Test

Based on the results of the Breusch-Pagan-Godfrey heteroscedasticity measure, the Obs *R-Squared value is found to be greater than the significance value, namely 0.9258> 0.05. For this reason, it is mentioned that this study is free from the heteroscedasticity problem.

d. Normality Test

This analysis used the Jarque-Bera test to see the ordinary distribution of the results. Jarque-Bera scores suggest that the data are typically distributed in this analysis. From the Jarque-Bera value, which is greater than the importance value, which is 2.899481> 0.05, this can be seen.

e. Linearity Test

It indicates that the F-statistic value is 0.789989, which means it is greater than the significance value of 0.05, based on the findings of the Ramsey RISET test, so it can be inferred that the model used in this analysis is linear or that the model definition is accurate or appropriate for use in this study.

B. Simultaneous Test

It can be seen from the test results that the F-statistic value is 506.8693 with a statistical likelihood of 0.000000 or 0.05, which means that the independent variable has a meaningful influence on the dependent variable together or concurrently in this sample.

C. Partial Test

Headings, or heads, are organizational devices that guide the reader through your paper. There are two types: component heads and text heads.

a. Government Expenditure (GE)

The findings of the study show that the coefficient value of the GE variable is 0.471484 with a probability value of 0.0092 0.05, which means that the variable of government spending has had a substantial positive influence on Indonesia's economic development over the period 2000-2018. The findings of this study are consistent with the findings of Dandan (2011), Hapsari & Iskandar (2018), and Pascual & Alvarez-García analysis (2011).

b. Interest Rate (IR)

The findings of the study show that the coefficient value of the IR variable for the period 2000-2018 is -0.149448 with a probability value of 0.0613> 0.05, which means that the IR variable has a negative and marginal effect on Indonesia's economic development. The findings of this study are consistent with studies by Ervani (2014) and Putri et al (2015).

c. Investment (INV)

The findings of the study show that the coefficient value of the IR variable for the period 2000-2018 is -0.149448 with a probability value of 0.0613> 0.05, which means that the IR variable has a negative and marginal effect on Indonesia's economic development. The findings of this study are consistent with studies by Ervani (2014) and Putri et al (2015).

D. Determination Coefficient Test

It can be shown that the coefficient of determination (R2) in this analysis is 0.993629 based on the test findings, indicating that the GDP variable is 99.36 percent affected by the independent variables GE, IR, and INV, and the remaining 0.64 percent is affected by other variables that are not in this study.

Partial Adjustment Model (PAM)

The following findings are derived based on the results of data analysis using Eviews 10:

Table 1. Results for Short Run Model Production

Variable	Coefficient	Probability	
GE	0.471484	0.0092	
IR	-0.149448	0.0613	
INV	0.09029	0.0091	
GDP(-1)	0.502222	0.0482	
C	1.611339	0.3412	
R-squared			0.993629
F-statistic			506.8693
Prob(F-statistic)			0.000000
Durbin Watson			2.659913
Significant at α = 0.05			

Source: Results of *Eviews 10* data analysis results

Based on the effects of the calculation in Table 1, it is clarified that the GE and INV variables have a major impact on Indonesia's GDP indicator or short-term economic growth. Meanwhile, in the short term, the IR variable has no major negative impact on Indonesia's GDP variable or economic growth. In line with the statistical relation, with the sign of a negative coefficient of the IR vector impacting economic development, the effect on the economic growth of the interest rate cannot be seen in the short term. Table 1 is the research outcome of the PAM model for the short term only, while the regression coefficient with the change coefficient value (δ) can be separated into Table 1 for the long-term analysis results (Nurfitriyani, 2016).

The adjustment coefficient is (δ):

$$\delta = 1 - 0.502222 = 0.49778$$

Table 2. Long-Run Model estimation results

Variable	Coefficient
GE	0.471484/0.49778 = **0.947173**
IR	-0.149448/0.49778 = **-0.300229**
INV	0.09029/0.49778 = **0.181385**
C	1.611339/.049778 = **3.237051**

Source: Results of *Eviews 10* data analysis results

Based on the outcome of these equations, it can be shown that the GE variable and the INV variable are the independent variables that greatly affect economic growth in Indonesia in the long term. The long-term PAM regression equation, based on the observations in Table 2, is as follows:

$$GDP = 3.237051 + 0.947173\,GE - 0.300229\,IR + 0.181385\,INV$$

The findings of the data analysis from this study indicate that Indonesia's economic growth was heavily affected by government expenditure and investment in the 2000-2018 period. The findings of this study are consistent with the Keynesian hypothesis that government investment is the major force supporting a region's growth in gross domestic product (GDP). Similarly, for investment, the greater the amount of investment a nation receives, the higher the GDP of the country, and with a rise of investment, more free jobs can be generated and the number of unemployed in a country will be lowered so that it can also have an effect on welfare. It will mean that the people of that country are becoming more affluent if GDP or economic growth grows. The interest rate, in comparison, has a negative GDP coefficient. This means that the interest rate ultimately decreases GDP in the long or short term, or that interest rates can be said to be an obstacle to economic growth in Indonesia in the 2000-2018 period.

E. Conclusion

Several conclusions can be reached as follows, depending on the findings of the study and data collection carried out:

1. The GE and INV variables have a positive and important impact both in the short and long term, beginning from the measurement period, namely 2000-2018. This is in line with the principle of Keyness, which notes that an increase in government expenditure or government spending and an increase in investment would improve economic growth in a given timeframe by increasing GDP in a region. It can therefore be reported that economic growth or GDP in Indonesia was influenced by government expenditure (GE) and investment (INV) in the 2000-2018 period.
2. In this analysis, the interest rate variable (IR) is recorded to have a negative and negligible impact, indicating that the long-term and short-term interest rates did not influence economic growth or GDP in Indonesia during the period 2000-2018.
3. In this analysis, the dependent variable, namely economic growth or GDP in Indonesia over the 2000-2018 period, was influenced by all the independent variables evaluated jointly.

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