# Indonesia economic growth determinants: Generalized method of moments (Gmm) model approachment

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## Abstract

This study aimed to analyze the determinants of economic growth in Indonesia by using time series data from the 1986-2017 and Generalized Method of Moments (GMM) model as a method. The results showed that government spending has a positive and significant effect on economic growth. However, employment and education have a negative and significant effect on economic growth. In conclusion, the government must improve the education in order to increase labor productivity, hence optimal economic growth can be achieved.

**Keywords:** Labor, Education, Government Spending, Economic.

# Determinantes del crecimiento económico de Indonesia: enfoque del modelo del método generalizado de momentos (Gmm)

### Resumen

Este estudio tuvo como objetivo analizar los determinantes del crecimiento económico en Indonesia mediante el uso de datos de series temporales del modelo de Momentos Generalizados (GMM) de 1986-2017 como método. Los resultados mostraron que el gasto público tiene un efecto positivo y significativo en el crecimiento económico. Sin embargo, el empleo y la educación tienen un efecto negativo y significativo en el crecimiento económico. En conclusión, el gobierno debe mejorar la educación para aumentar la productividad laboral, por lo tanto, se puede lograr un crecimiento económico óptimo.

**Palabras clave:** Trabajo, Educación, Gasto del Gobierno, Económico.

## 1. INTRODUCTION

The study of economic growth has been done with a variety of models both in developed and developing countries. The results were causing debate because as it different both in the developed and developing countries. For example, studies have been conducted in the developing countries by KIMARO, KEONG, and SEA (2017)., said the involvement of the government in the management of low-income economies in sub-Saharan African countries produce abundant benefits. According to the empirical findings government spending accelerate economic growth in low-income countries in Sub-Saharan

Africa. Similar results were also found in Nigeria (UDEAJA & ONYEBUCHI, 2015).

While studies have been conducted in the developed countries by CHIRWA & ODHIAMBO (2016) found that the determinants of economic growth are physical capital, human capital and fiscal policy. The study corresponds to what happens in Brunei, the determinant of long-term economic growth of Brunei driven by government spending and employment growth that has an impact on the increasing of economic growth.

The structure of the population determines labors that affect economic growth. This is already happening in Japan, an aging population and rapidly shrinking will and continue to contribute to the decline in labor input and decelerating the economic growth rate. A different circumstance is seen in the trend of labor productivity and post-crisis economic growth in trends in Latvia, Lithuania, and Estonia have shown an increase in labor productivity during the crisis is a significant economic driver (EMSINA, 2014; AHMED, ARSHAD, MAHMOOD & AKHTAR, 2016).

Different to Japan, the developing countries, the developed countries in Europe characterized by strong growth where the growth is proportional to the physical and human capital, and indirectly proportional to GDP. Government spending is also as determinant variable of the economic growth as happened in Romania and in Asian countries namely Singapore, Malaysia, Thailand, South Korea, Japan, China, Sri Lanka, India and Bhutan, economic growth and government spending have a causal relationship, the increase in government

spending will boost economic growth and economic growth will increase and increase state revenues.

The determinations of economic growth are education, labor, and government expenditure aspects should also be analyzed in order to complete the previous studies to become more comprehensive. With that, this study is very important to fill the gaps that the previous research has not been evaluated especially with a more accommodating approach to nonlinear GMM in various economic variables so that the study is important to be done.

## 2. THEORITICAL REVIEW

CRUZ & AHMED (2018) found that the maturity has become a problem for the economies of middle-class income countries, while the rapid growth of population will continue in the poorest countries over the next few decades. At the same time, these countries will see a sustained increase in the percentage of the productive age population, this shift has the potential to boost growth and reduce poverty, while by increasing the share of the productive age population contributes to the economic growth that occurred in 180 countries. ARBACHE (2011) said that the slowdown in productive age population tends to depress the labor supply, which causes labor scarcity. As for the increase in labor productivity is fundamental in reducing the impact of demographic changes in economic competitiveness.

The quality of labor input is the most important element in economic growth. When a country has advanced technology but its labor is uncapable to use such technology it still will not bring any change to the country. Similarly, the availability of abundant labor is not accompanied by adequate employment will lead to unemployment and negatively affect economic growth. This is because education is not effective in influencing productivity, few educated people working in the illegal sector that will affect the economic growth in the future and education is not a factor of production contributing to the short term economic growth.

OKORO (2013) says that government's role in increasing capital expenditure and recurrent spending to boost economic growth and economic development funds were considered to improve the welfare of society as this will lead to direct economic growth.

Several other studies support to the above study. These studies find that the government spending has a positive effect on economic growth, which means that government spending is becoming a booster factor that is driving the economic growth in a country, the government spending can promote economic growth. To achieve this goal, the government must also direct their spending towards productive sectors such as social services and infrastructure development to boost economic growth. These expenditures may be distributed properly to allow private sector participation in the development which is the private sector can also play an important role in economic growth.

## 3. METHODS

### 3.1 Data

The data used is the time series data, with using the observation years starting from 1986 until 2017, with total 32 years' sample. The variables used are: economic growth, employment, education and government spending. With instruments variables such are trade, echange rate and remittances.

### 3.2 Analysis Data Model

Generalized Method of Moments (GMM) is a parameter estimation method the expansion of moment method. Moment method can not be used if the number of instrument variables is greater than the number of parameters to be estimated. GMM equate moment by conditions moment of the population with sample condition moment. GMM method is one method that can cope with violations of the conditions of data assumptions on regression analysis.

STOCK, WRIGHT, & YOGO, (2002) stated that a weak instrument could be a problem in GMM, the weak instrument appears when the linear instrumental variables (IV) weak regression is correlated with the included endogenous variables. In the GMM method, a weak instrument is related to the weak identification of some or the entire unidentified parameters. A weak identification will lead to unusual GMM statistical distribution, even in large samples, the GMM estimation can be misleading.

The advantages of the GMM estimation is possible to do more detailed estimation on research data that has problems such as the uncertainty parameter when the dependent variable has unknown parameters and must be estimated as described by (BONTEMPS & MEDDAHI, 2002; ASAD, SHABBIR, SALMAN, HAIDER, & AHMAD, 2018). Based on the consideration of this study using GMM models.

### 3.2.1 GMM Test

This study uses GMM (Generalized Method Of Moments) to test the variables. The following equation GMM models for the inclusion of variables in the model instrument

$$Gt \quad = \quad 0 \quad + \quad Et \quad + \quad t \quad + \quad 2GEt \quad 1L$$
$$+\beta\delta\beta\beta \mathcal{E}t.............................................. ............ (1)$$

G is economic growth, E is educational, L is labor, GE is government spending and α is a constant, B1, β2, β3, an estimated parameter,t a time series and ε is the error term.

## 4. RESEARCH RESULT AND DISCUSSION

### 4.1 Instrument Variable Test

The variable instrument is used to see how the influence of variables such instrument with the variables used in the study in accordance with the theory of STOCK, ET AL, (2002) states that weak

instruments can be a problem in the GMM estimation weak instrument appears when the instrument in the linear variable instrument (IV) of weak regression is correlated with the included endogenous variables.

Table 1: Instrument Variable Test. Resources: Eviews Output Results, 2019.

| Crag-Donald F-Stat | TSLS Critical Value (Relatif Bias) | | Critical Values (Size) | |
|---|---|---|---|---|
| | Persen | Nilai | Persen | Nilai |
| | 5% | 13.91 | 10% | 22.30 |
| 14.00132 | 10% | 9.08 | 15% | 12.83 |
| | 20% | 6.46 | 20% | 9.54 |
| | 30% | 5.39 | 25% | 7.80 |
| SIC-Based | -6.143920 | | | |
| HQIC-based | -4.209007 | | | |
| Relevant MSC | -102.9809 | | | |

This study uses six instrument variables that are: exchange rate, trade, remittances, employment and education. The test results showed Cragg-Donald instruments namely F-Stat14.00132 currently at 15 percent Yogo Stock which is 9.08 means that the instruments variable used in accordance with the existing theory. This also means that this model can be used in this study. ZAHONOGO (2016) explains that the increasing of international trade can generate economic growth by facilitating the diffusion of knowledge and technology from the direct high technology of import goods. Trade openness also allows the

economy to better capture the potential benefits of returns to scale and specialization of the economic impact on economic growth.

Furthermore, the remittances contribution is the most important variable in economic growth. the use of remittances can help the country's economy to maintain and enhance economic growth by investing remittances into consumption and investment (MEYER & SHERAB, 2017). The exchange instrument variable use has the effect of productivity high in the traded goods sector; the country has an incentive to keep the relative prices of traded goods at higher prices. Therefore, the exchange rate is needed to support the traded of goods (HABIB, MILEVA, & STRA, 2017).

### 4.2 Variable Endogeneity Test

Diff prob endogeneity test (J-Stat) must be less than $\alpha = 0.05$. Endogeneity variables test can be seen in Table 2, the test results showed Difference in J-stats with a value of 2.789026 and 0.0949 where the resulting probability is smaller than 0:10 to show that government spending endogenous variables.The results according to the study explained that government spending is endogenous to economic developments. This view is famous as Wagner's Law (Wagner Law), referring to the German economist Adolf Wagner who first proposed it in the 19th century. Wagner saw that government spending is an endogenous variable of economic development. The result of this endogenous is relatively weak but can still be described as a model of analysis.

Table 2: Government Spending Endogeneity Test Result.

|  | Value | df | Probability |
|---|---|---|---|
| Difference in J-stats | 2.789026 | 1 | 0.0949 |
| J-statistic summary: |  |  |  |
|  | Value |  |  |
| Restricted J-statistic | 3.478717 |  |  |
| Unrestricted J-statistic | 0.689691 |  |  |

Resources: Eviews Output Results, 2019.

### 4.3 GMM Estimation Result

The estimation results of GMM can be seen in Table 3, in the GMM model measurement, R-Square is not used as a statistical standard for determining whether good or not a model, but to see J-Statistics (J-stat) assess the validity of the variable instrument (IV) used on the model. By using the instrument rank or IV as 6, can be seen the value of Prob J -Stat0.674505 is greater than 0.05 so that the use of the GMM models are valid.

Table 3. GMM Estimation Result. Resources: Eviews Output Results, 2019.

| Variable | coeffecient | T-Stat | Prob. |
|---|---|---|---|
| constanta | 18.34970 | 3.192519 | 0.0035 |
| Labor | -2.42E-08 | - 2.702142 | 0.0116 |

| | | | |
|---|---|---|---|
| Government Spending | 1.47E-10 | 1.773948 | 0.0869 |
| Education | -1.16E-06 | -1.814965 | 0.0803 |
| Instrument rank | 6 | | |
| Prob(J-statistic) | 0.674505 | | |

The estimation results in Table 3 mostly are based on the theory and statistically significant to be analyzed. Government spending has a significant and positive effect on economic growth. Greater government spending will drive higher economic growth.

Further labor has a negative and significant effect on economic growth. This indicates that the inferior quality of labor can negatively affect economic growth. The influence of negative employment to economic growth is also found by SHAHID (2014). The number of workers must be balanced with the availability of employment if not skilled labor, skilled and less skilled would be neglected and cause unemployment. Such circumstances contribute a negative effect on the economic growth and delays in economic development. Education has a negative effect and significant to economic growth. Contrary to the theory, however, the low quality of education and imbalanced educated labor distribution across regions could negatively affect economic growth.

## 5. CONCLUSIONS

Analysis model used in this study is eligible for analysis tools. The estimation results indicate that government spending has a positive effect and significant to economic growth. However, education and labor have a negative effect and significant to economic growth. This happens because of the quality of education and labor relatively low effect on economic growth. This condition is indicating that the government should improve the quality of education to have more qualified and skilled labor and impacting a positive effect on economic growth.

The limitation of this study is the lack of other macro variables along with the development of the Indonesia economy as well as the deficiency of long-term analysis and short-term in this study. Moreover, the available data available is limited so it is not possible to add variables.

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