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The Government Spending on Education and Health Care in Indonesia's Economic Growth

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***Abstract*—There are pros and cons in examining the relationship between education and health budgets and economic growth. The results of the study show a variety of research findings. This study wants to examine the relationship between government spending in the education and health sectors and economic growth in the country of Indonesia. The variables used are GDP, government education, and health expenditure in 1980-2017. The method used in this study is the Granger causality test. The results showed that the education budget was not statistically significant in affecting vice versa GDP. While the results of calculations for the health budget significantly influence GDP and GDP also affect health. This finding implies that the education sector budget needs to be maximized to be able to contribute to national income.**

Keywords: government expenditure, education, health

I. INTRODUCTION

Economic growth is one approach that can be used to measure the success of a country's development. The concept of economic growth can be identified as the process of economic development of the country from year to year, which show increased output.

In theory, achieving growth in the economy can be achieved with the ownership of the various source of adequate power. These resources include, among others, natural, capital, and human resources. Of the three sources, for developing countries, human resources are abundant resources and have a very fundamental role in economic development. Specifically, in the number of human resources owned by Indonesia, it is one of the countries with the highest population level in the world. According to World Bank statistics, the country Indonesia is a country that ranks fourth in the world with a population of large 261.115.456 inhabitants. With this abundant human resources, it is expected to improve the economy. One way that can be used to achieve this is to create high human resources. To obtain these quality resources needs human capital formation (human *capital*).

In the view of Keynesian government has a very strategic and strategic role in influencing a country's economic growth. One instrument that can be used is fiscal policy. This policy can be directly related to the formation of human capital (human *capital)*. This policy can take the form of a budget from the government in the form of state expenditure allocated in the education and health sector to improve the quality of human resources. Especially for the Indonesian state, in these two sectors from year to year, the budget allocated has been increasing. As in the education sector, based on Law No. 20 of 2003 requires a minimum budget for the education sector is 20% of the total state expenditure budget (APBN), while for health expenditure is required to be allocated at 5% of the APBN. The magnitude of the budget allocated by the Government of Indonesia in the field of education and health are expected can increases the formation of human capital, which in turn can boost economic growth.

II. LITERATURE REVIEW

A. Fiscal Policy in a Perspective of Theory

Fiscal policy is a policy taken by the government in the economic field to steer the economy goes into a better direction by way of changing the sector of state revenues and expenditures. Specifically, this policy relies on the state budget for income and expenditure (APBN). Fiscal policy can be interpreted as a policy that includes all actions taken by the government by increasing or reducing taxes and increasing or reducing government spending. In terms of government expenditure, fiscal policy by increasing or decreasing government expenditure can directly affect the economy. If government spending is increased, people's ability to increase people's purchasing power will ultimately increase economic productivity. While government spending is reduced, it can reduce people's purchasing power, which in turn can also reduce economic productivity.

Fiscal policy can be classified into two types, expansionary and contractive fiscal policy. Expansive fiscal policy can be carried out by changing government revenues/ expenditures to direct the economy towards better conditions. Expansive fiscal policy can be carried out by increasing government spending to boost the economy.

Among the wide range of government expenditures undertaken to improve the economy is government spending concerning the formation of human capital (human *capital).*

The formation of good human capital to achieve good economic growth also requires government spending, which can directly increase the ability or capability of humans. Government spending can be done by increasing the amount of expenditure in two important sectors building human capital. These two sectors are education and health. In this study, aspects of government spending are proxy from government spending used for spending in the education and health sectors.

Some economists have argued that the importance of the role of government expenditure to economic growth. Several studies directly express the effect of spending government to labor productivity. Research on government spending both the factors that cause government spending and the effect of government spending

According to Boediono [1] in macroeconomic theory, government spending can be divided into three components. First, government expenditure used to buy goods and services. Second, government expenditure used to pay employee salaries and the last, government expenditure used for transfers payment (direct payments to citizens such as pension payments). In its development, macroeconomic theory related to government expenditure can be classified into three types, namely, Rostow and Musgrave Theory, Wagner's Law, and Peacock and Wiseman's Theory [2].

Rostow and Musgrave put forward the development of government spending towards the stages of economic development, namely, the initial, intermediate, and advanced stages. In these stages, the development of government spending starts from a very large beginning in the economic development stage because, in the initial stages, the government must provide all the various supporting infrastructure for development such as education, health, transportation, etc. In the second stage, spending by the government begins to decline and is intended to support the take-off stage because, in this stage, spending by the private sector increasingly has a higher role. In the third or take-off stage, the role of expenditure becomes smaller and only more focused than before, which aims to provide various types of infrastructure to be expenses for social activities.

Meanwhile, according to Wagner's Law, it states that if a country's economy has a high level of economic growth reflected by large per capita income, government spending also increases relatively. In this case, Wagner explained that the role of government has become even greater. Besides, Peacock and Wiseman based more on the behavior of the development of government spending. According to him, the government always continues to strive to increase spending while the public does not like people reluctant to pay taxes to cover the increased government spending. This theory, in its development, became a voting theory (see table 1).

TABLE I. PREVIOUS RESEARCH

Researcher (years)	Variable	Methodology	Research result
Rahman [3]	Dependent Variable: Economic Growth Independent variable: Government expenditure in the education sector and government expenditure in the health sector	Error Correction Model (ECM)	There is a relationship of two-stage between government spending in the education sector to economic growth and h an association between the direction of government spending in the health sector with economic growth
Sweep and Sanusi [4]	Dependent Variable: Economic Growth Independent variable: government spending in the social service sector (Education and health services)	Auto Regression Distribution Lag (ARDL)	There is a cointegration relationship between economic growth and government spending in the social service sector (education and health)
Chandra [5]	Dependent variable: Economic growth Independent variable: government spending on education	Granger Causality Test	There is a two-way relationship between government education for education and economic growth
Morgado [6]	Dependent Variable: Economic Growth Independent variable: government spending on health	Vector Auto Regression (VAR)	outcomes of government health field do not affect economic growth
Yun and Yussof [7]	Dependent variable: Economic growth Independent variable: government spending on education and health	Granger Causality Test	Economic growth is shown by the GDP discount the effect of government spending on education and health. Still, the pen g e outcomes of government for education and health do not influence economic growth.

III. METHODOLOGY

In this study, the data used is secondary data which regularly published by the World Bank, Ministry of Finance, Bank Indonesia, and IFS started in 1980-2017. In this study, using the dependent variable in the form of GDP and the independent variable in the form of government spending on education and health, and FDI.

GDP is a proxy used to measure economic growth, which is defined as the final value of goods and services produced by a country's economy within a certain period. Government expenditure on education is the budget from the state expenditure income (APBN), which is used to buy goods and services in the education sector. Government expenditure on health is a budget derived from the APBN, which is used to buy goods and services in the health sector. FDI is the number of international capital flows that enter the country.

A. Vector Auto Regression (VAR)

VAR can be interpreted as a system of dynamic equations by using a minimum assumption that the structure is used to test the relationship between each variable. VAR can be used to explain each variable contained in the equation model by using the past movements of these variables and the movements of other variables contained in the system.

In the form of VAR analysis, the model obtained from the equation of existing variables in the form of time coherent data will later be used as a tool to determine the *interrelationship* between each variable. Simply put, VAR can be described as a simultaneous equation. It's just that if in simultaneous equations, in general, can be distinguished variables that are endogenous and exogenous. While in VAR, all equation variables are considered endogenous variables [8]. Simply put, in the VAR analysis, each research variable can be explained in terms of the past and can be explained through the past other variables in the model.

B. Unit Root Test

To see whether the data used in the study are stationary or not, a unit root test is used. In VAR analysis, the unit root test is a supplementary test tool. Because VAR, when viewed from its purpose, is used to see the causality relationship between each variable, then the existence of this unit root test can be used to increase the accuracy value of VAR further.

The VAR model can be formulated as follows:

$$Y_t = \Gamma Y_{t-1} + \varepsilon_t \quad (1)$$

And vector $Yt = |Y_t, Z_t|$. first, decrease as follows:

$$y_t - y_{t-1} = (\Gamma - 1) y_{t-1} + \varepsilon_t t \text{ and } \Delta yt = \Pi y_{t-1} + \varepsilon_t \quad (2)$$

If all components of the VAR model are integrated, then I (1) then all good model variables contained on the left are I (0). The matrix in the form can produce combinations that are linear in the variable Yt. In this research, the form of tests that will be used to test the stationary data used is the Dickey-Fuller and Philip Person analysis test.

C. Determination of Optimum Lag

To be able to determine the right and good VAR model, it is necessary to explain how many *lag length* variables are needed. In the autoregression model, the time has an important role, and therefore *lag* has an important role. Determining the amount of *lag* can be used to determine a model that is worth estimating (see table 2).

TABLE II. DETERMINATION OF OPTIMUM *LAG*

Criteria	Formula
Final Prediction Error *(FPE)*	$\left[\frac{RSS}{T}\right] X \frac{T+k}{T-k}$
Akaike Information Criterion *(AIC)*	$\left[\frac{RSS}{T}\right] X\ e^{(2k/T)}$
Schwarz Information Criterion *(SIC)*	$\left[\frac{RSS}{T}\right] X\ T^{kj/T}$

The procedure for determining the most optimum *lag length* can be done by looking at the criteria in *Final Prediction Error* (FPE), *Akaike Information Criterion* (AIC), *Schwarz Criterion* (SC), and *Hannan-Quinn* (HQ). The most asterisks in each criterion can make the most optimal *lag length* indication.

D. Granger Causality Test

Empirically the hypothesis proposed in this study would be tested with the Granger Causality analysis. Granger Causality Test is one of the test tools used to see the relationship between the dependent variable or dependent variable with the independent variable (the independent variable), and under the same conditions, the independent variable can also be influenced by the dependent variable. The relationship, in this case, can be interpreted as a two-way or reciprocal relationship [9].

The methods that can be used to measure the presence of Granger causality are as follows:

$$I_t = \Sigma_{i=1}^{m} a_i I_{t-1} + \Sigma_{j-1}^{n} + \Sigma_{j=1}^{n} b_j Y_{t-1} - \mu_t \ldots\ldots\ldots\ldots\ldots \quad (3)$$

$$Y = \Sigma_{i=1}^{r} c_i I_{t-1} + \Sigma_{j-1}^{s} + \Sigma_{j=1}^{n} d_j Y_{t-1} - v_t \ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

Where μ_t and v_t Are *error terms* that are assumed to have no serial correlation, and m = n = r = s. The results obtained from the two regression equation models above can be used as four possible regression coefficient values, namely:

- If the value is $\Sigma_{j=1}^{n} b_j \neq 0$ and $\Sigma_{j=1}^{n} d_j = 0$ then there is a one-way casualization relationship from Y to X.
- If the value is $\Sigma_{j=1}^{n} b_j = 0$ and $\Sigma_{j=1}^{n} d_j \neq 0$ then there is a one-way causality relationship from X to Y.
- If the value $\Sigma_{j=1}^{n} b_j = 0$ and $\Sigma_{j=1}^{n} d_j = 0$, then there is no causal relationship between X to Y and vice versa.
- If the value is $\Sigma_{j=1}^{n} b_j \neq 0$ and $\Sigma_{j=1}^{n} d_j \neq 0$, then there is a bidirectional causality relationship between X to Y.

E. Research Model

The model that will be used in this research is a model derived from the production function [7]:

$$Y_t = (A_t, L_t, K_t) Y_t = (A_t, L_t, K_t)$$

Where, Y_t = total output, At_t = total factor productivity, Lt_t = labor and Ki_t = capital. The production function in developing into a log-linear regression logs sent down into:

$$\ln Y = \alpha + \beta_1 ln\ X_1 + \beta_2 ln X_2 + \varepsilon$$

Where:

Y = GDP

α = regression parameter

β = coefficient of determination

X_1 = Government expenditure in the education sector

X_2 = Government expenditure in the health sector

Based on the above research framework, several research hypotheses can be drawn as follows:

H_1 = it is suspected that there is a positive and significant effect between government spending on education and GDP

H_2 = alleged there is a positive and significant correlation between public expenditure on health to GDP

IV. Results and Discussion

The variables used in research statistically are presented in the following table 3.

TABLE III. Descriptive Research Statistics

	GDP	*EDUCATION*	*HEALTH*
The mean	3548544	38778.37	8896.87
Median	1886036	10247.1	4424.3
Maximum	12406810	143638.7	59639
Minimum	156517.9	1021.5	207.7
Std. Dev	3834865	47777.19	11978.69
Skewness	1.017086	0.951666	2,653103
Kurtosis	2.692552	2.352565	11.71013
Jarque-Bera	5.290472	5.052307	130,0277
Probability	0.070989	0.079966	0
Sum	1.06E + 08	1163351	266906.1
Sum Sq. Dev	4.26E + 14	6.62E + 10	4.16E + 09
Observations	30	30	30

Source: Data Processing Results.

From the descriptive statistics table above, it can be seen that the Health variable has a normal form of data distribution. The Jarque Bera probability value causes this (*p-value*) being smaller than the minimum limit of α (0, 05). Meanwhile, GDP and Education variables have an abnormal form of data distribution because the Jarque Bera probability *value* is greater than the minimum limit α (0, 05). The form of data distribution that is not normally distributed shows that there are values in extreme variables, namely the existence of variable values that are too high or too low.

A. Normality Test Results

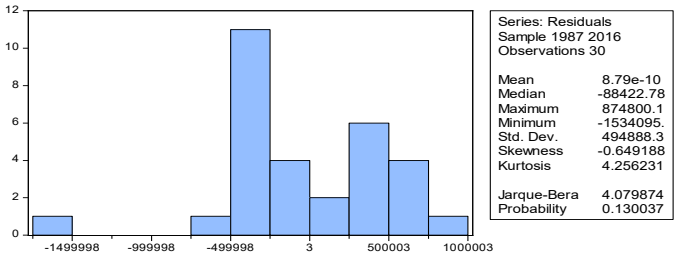

Fig. 1. The results of the normality test.

From the results of the normality test above, it can be seen that the total value of the test for all variables used in the study has a Jarque Bera value (4, 08) with a probability of 0.013 (see figure 1). From the above histogram concluded that the data used were normal.

B. Unit Root Test Results

From the unit root test, it can be seen that the variables used in this study, in the form of GDP, education, and health care are stationary.

TABLE IV. Unit Root Test Results. Stationary Test / Unit Root Test, ADF-Chi Chi-Square

Variable	Stationary Level								
	Zero Order I (0)			*First Level I (1)*			*Second Level I (2)*		
	tstatistik	*pvalue*	*Ket*	*tstastitik*	*pvalue*	*ket*	*tstatistik*	*pvalue*	*Ket*
GDP	10.04	1.00	Not stationary	-0.06	0.94	Not stationary	-6.15	0.00	Stationary
Education	1.56	0.99	Not stationary	-4.34	0.00	Stationary	-0.68	0.83	Not stationary
Health	5.34	0.99	Not stationary	-1.63	0.45	Not stationary	-5.63	0.00	Stationary

Source: Attachment to Data Processing Results.

From the table 4, it can be seen that the GDP and health variables have been stationary in the level 2 test phase. While for Education variables have been stationary in the level 1 test stage. From the results of the stationarity test above, it can be seen that all variables used in the study are stationary.

C. Regression Analysis

TABLE V. Regression Analysis

Variable	Coefficient	Std. Error	t-Statistics	Prob.
EDUCATION	72.41000	3.319477	21,81367	0.0000
HEALTH	34,96740	13,39979	2.641085	0.0136
C	429502.0	122332.3	3,510945	0.0016
R-squared	0.983346	Mean dependent var		3548544.
Adjusted R-squared	0.982113	SD dependent var		3834865.
SE of regression	512890.1	Akaike info criterion		29.22815
Sum squared resid	7.10E + 12	Schwarz criterion		29,36827
Log-likelihood	-435.4223	Hannan-Quinn criteria.		29.27298
F-statistics	797,1244	Durbin-Watson stat		0.930402
Prob (F-statistic)	0.000000			

D. F Test

From the results of the F test above, it can be seen that the F value of this research statistics is 797, 12, and the probability is 0.00. This shows that the independent variable, namely education, and health, simultaneously has a positive and significant effect on the dependent variable, namely GDP.

E. T Test

1) Educational t-test variable: From the results of the regression analysis above, it can be seen that the education variable has a value of 72, 41, and a p-value of 0.00. Thus it

can be concluded that the education variable has a positive and significant influence on GDP.

2) Health variable t-test: From the results of the regression analysis above, it can be seen that the health variable has a value of 34.98 and a p-value of 0.01. Thus it can be concluded that health variables have a positive and significant influence on GDP.

F. Granger Causality Test

TABLE VI. GRANGER CAUSALITY TEST

Null Hypothesis:	Obs	F-Statistics	Prob.
EDUCATION does not Granger Cause PDB	28	0.61447	0.5496
PDB does not Granger Cause EDUCATION		19.4467	1.E-05
HEALTH does not Granger Cause PDB	28	7.21445	0.0037
GDP does not Granger Cause HEALTH		9.21046	0.0012
HEALTH does not Granger Cause EDUCATION	28	11.1057	0.0004
EDUCATION does not Granger Cause HEALTH		8.646489	0.0015

V. CONCLUSION

From the results of the Granger causality analysis, it can be seen that:

- Education does not statistically significantly affect GDP, and vice versa, GDP does not statistically affect Education. This is evidenced by the probability value of both of them is greater than the value of α (0, 05). Therefore, there is no causality for the education and GDP variables.
- Health statistically and significantly influences GDP, and so does GDP statistically and significantly influences Health. This is evidenced by the value of the probability that both are smaller than the value of α (0, 05). Thus, there is a two-way relationship between Health and GDP variables.
- Health statistically and significantly affects Education and so does Education statistically and significantly influences Health. This is evidenced by the value of the probability that both are smaller than the value of α (0, 05). Thus, there is a two-way relationship between Health and GDP variables.

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