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# Building Acceleration of Economic Growth Model Through Education and Health Budget Allocation: Cases in Indonesia

Hasyim<sup>1</sup>, Rina Anindita<sup>2</sup>, Baharudin<sup>3</sup>, Gunawan<sup>4</sup>

<sup>1,2</sup>Esa Unggul University, Jakarta, Indonesia. Email: Rina.anindita@esaunggul.ac.id

<sup>3,4</sup>STIE AMKOP, Makassar, Indonesia

## Abstract

The Role of Capital Expenditure on Education, Health Expenditure, on the effort to reduce poverty level is an interesting study because the allocation of expenditure to several countries including Indonesia is quite large, so it is necessary to review the effectiveness of the budget allocation to reduce poverty and increase human economic growth (Psacharopoulos, 1972) in Todaro, 2000). The level of public welfare can no longer be measured from monetary values such as income per capita, but should include non-economic measures (Connolly and Munro (1999); Perkins (2001); Todaro and Smith (2002); and Van Den Berg 2005), and more focus on human development which can be measured from the high government commitment in allocating budget for education, health and other factors which are strongly related to the development of human resources. The objectives of this research are to analyze and assess on how: (i) the impact of the allocation of education capital expenditure and the allocation of health expenditure on the Human Development Index; (2) the influence of human development index on economic growth; (3) the effect of economic growth on the level of poverty; and (4) the interpretation of the economic growth acceleration model. The research was conducted by taking samples in 23 regencies/municipalities in South Sulawesi Province which is one of the provinces with the highest economic growth rate in Indonesia. The data used is Panel data with period 2004 - 2016, then processed by using regression analysis method. The Result of the Research from the first model., it shows that from the t test, it is found that the variables contained in the data which give significant effect to the Human Development Index is the allocation of Education fund, at the real level of 5%. The value of R<sup>2</sup> generated in this model is 0.637 which means that 63.7% of the human development index in 23 urban districts for 10 years is explained by the variables in the model, the allocation of education and health funds, the rest by other variables in the model. The variables in the allocation of education funds have a negative influence on the human development index. The value of regression coefficient of this variable is 0.72 with p-value of 0.003. meaning that any 1% increase in health allocation funds will reduce the human development index by 0.72. For the panel data analysis with this random effect model there are individual and time effects that show differences in human development indexes between districts and municipalities and between years. So the value of constants to be obtained will be different for each district/municipality and different for each time. The determinant coefficient value generated in model 1 shows the figure of 0.637 means that 63.7% of the human development index is explained by the variables in the model, i.e. the allocation of education and health funds. In model 2 it was found that the value of determinant coefficient is 0.0854, which means that only 8.5% of the diversity of economic growth in the twenty three districts/municipalities in South Sulawesi in the period 2007-2016 explained by the variables on the human development index.

**Keywords:** Education Budget Allocation, Human Development Index, Economic Growth, Developing Countries

## INTRODUCTION

The problem of poverty in Indonesia has always been the main concern, as the government has realized that failure to overcome the problem of poverty will lead to the emergence of various social, economic, and political issues within the community. Over the last few decades Indonesia's economic growth has experienced ups and downs in accordance with world economic conditions, where the national income which is the benchmark of economic growth shows fluctuating growth

According to Mankiew (2008), human resource development can be done through improving the quality of human capital. Human capital that refers to education and health is a fundamental development objective in a region, namely education is essential to achieve a decent life, while health is the core of prosperity. Improving the quality of human capital depends on the availability of infrastructure to support investments in human resources, such as housing and transportation, which are public goods provided by the government in order to meet the needs of the community.

The allocation of local government expenditures reflected in the Regional Budget (APBD) will have a positive impact on human development as well as economic growth, primarily the allocation of direct spending on education, health and infrastructure. These three direct expenditure allocations will be outlined in personnel expenditure, goods and services expenditures, and capital expenditures, indicating that personnel expenditures and goods and services expenditure are incapable of contributing to human development and economic growth, and only capital expenditures is capable of responding to human development and economic growth.

Connolly and Munro (1999); Perkins (2001); Todaro and Smith (2002); and Van Den Berg (2005), similarly offer a measurement of the achievement of economic development objectives on more abstract matters relating to the social, cultural and economic aspects of society which focus more on the level of human development progress.

In the essence that development is human development, so it needs to be prioritized that the allocation of spending for this purpose lies in the preparation of budget (Adi, 2009). Human development can be observed through the size of the Human Development Index (HDI), where HDI is one way to measure the level of physical and non-physical qualities of the population. Physical quality is reflected in life expectancy, while non-physical (intellectual) quality through the average of school attendance and literacy rate, as well as the economic capacity of the community as reflected in the purchasing power value of parity index.

Based on these perspectives, there is a need for in-depth and systematic study on the performance of regional development policies through the implementation of local expenditure allocations to reduce poverty levels through HDI and economic growth. Conceptually the development approach puts development policy in a strategic and important position in development acceleration. This can be spelled out in more effective and efficient regional fiscal policies that can directly address the basic needs and requirements of the community through the allocation of local spending for public services and the construction of basic community infrastructure.

Empirically, there have not been many studies that specifically verified and estimated capital spending capabilities of education, health, and infrastructure in APBD in reducing poverty through economic growth in response to human development, and Social Overhead Capital (SOC) especially the regencies/municipalities in South Sulawesi. Thus, local development policy makers do not have sufficient scientific references in allocating their APBD expenditures appropriately to reduce poverty, aimed at increasing the acceleration of economic growth.

The objectives of this research are (i) to analyze and examine the effect of allocation of education capital expenditure and health expenditure allocation to Human Development Index in South Sulawesi Province; (2) analyze and test the effect of HDI on economic growth in South Sulawesi Province; (3) analyze and examine the

effect of economic growth on poverty level in South Sulawesi Province; and (4) interpretation of the economic growth acceleration model.

## LITERATURE REVIEW

### Education and Health Expenditure with Development Index

The allocation of spending on education and health is an instrument for improving the quality of human resources, which in turn impacts on poverty alleviation. As Sepulveda, 2010 states that pro-poor government spending is the allocation of basic health spending and basic education. This is because good education and health enable the poor to increase the value of their assets because their most important asset is their labor (Lanjouw, Pradhan, Saadah, Sayed, and Sparrow, 2001).

According to Todaro (2006), education and health are the fundamental development goals, to form broader human capacities that are at the heart of the meaning of development. On the other hand, poor communities who generally have no resources except energy capital, health becomes the most essential need. Health and education can be seen as a vital component of growth and development and an input of an aggregate production function. Its double role as input and output causes health and education very important in economic development.

Improvements in education and health will affect human development outcomes. Considering that indicators in the human development index (HDI) by UNDP put education and health as the main indicators in addition to economic indicators. Psacharopoulos (1972) in Todaro (2000) proves that education does have a positive influence on the development of economic growth. Improving health, education and nutrition is not only able to increase the capability, but also an important means in improving "human capital" in the future.

### Human Development (IPM) Against Economic Growth

Human capital is one important factor in the process of economic growth. It can be believed that the economic performance will be better if human capital is qualified, in this case shown in the level of education, health, or other indicators as can be seen in various human development reports published by the United Nations Agency for Human Development (UNDP).

Thus, economic development should be considered in order to spur economic growth, including in the context of regional economies. This is important because development policies that do not encourage human quality improvement will only make the area concerned lag behind other regions, including in terms of its economic performance. Furthermore, improving the quality of human capital is also expected to provide benefits in reducing imbalances between regions, especially countries that have a wide area and a high level of socio-economic diversity.

High human development will be achieved as a result of stable economic growth conditions, through which economic growth will create health and education services, and open employment opportunities for the population. Conversely, high achievement of human development will encourage stable economic growth, which human development will create a qualified workforce, the birth of technological innovations, and trusted management.

### Economic Growth and Poverty Rate

The Neo Classics pioneered by Solow who initiated the early model of economic growth (Solow Growth Model) argue that how savings, population growth and technological advances affect the level of economic output and growth over time. The Solow model is based on a production function that relies on capital and labor stocks, then assumed to have a constant scale return, so as not to affect the relationship between output workers and working capital, if the size of the economy is measured by the number of workers. Furthermore, (Lin, 2003;

Bourguignon, 2004; Ravalion, 2005; and Warr, 2000, 2006) argue that high economic growth will enlarge economic capacity (Gross Domestic Product). High GDP is expected to create trickle down effect so that the welfare of society will increase, and will ultimately reduce the level of poverty, or better known as pro-poverty economic growth.

The concept of pro-poverty growth was first introduced in the 1950s and later confirmed by Chenery in 1974. (Kakwani and Pernia, 2000). Furthermore, it is implicitly described in the World Development Report 1990 (World Bank, 1990). Furthermore Bigsten and Levin (2000) argue that successful countries in growth are likely to succeed in reducing poverty, especially if there is appropriate policy support and institutional environment. Dollar and Kraay (2002) say that growth will provide far greater benefits for the poor if growth is accompanied by policies such as law enforcement, fiscal discipline, openness in international trade, and poverty alleviation strategies.

## RESEARCH METHODS

### Data

The data in this study are collected from 23 regencies/municipalities in South Sulawesi Province covering 20 districts and 3 cities, during the period of 2004-2014. This study uses pooled data by combining 23 districts/municipalities cross-section data and 11-year time-series data. Because the relationship between variables in this study is time-lag, the observation period for exogenous variables (predictors), which in this case the allocation of capital expenditure (education, health, and infrastructure) in APBD earlier in the year (t-1), both on the initial and final period of observation, while human development, social overhead capital, and economic growth, which is the endogenous variable (intervening), and the poverty level which is the endogenous variable (dependent) is the actual year period (t). Year 2004 was chosen as the initial observation for exogenous variables, and 2014 as the final year of observation for endogenous variables.

### Data Analysis Method

Methods of data analysis using panel data regression, with several models built. In the first model the factors that determine the Human Development Index, with the variables of educational expenditure and health expenditure. The first model built is as follows

$$Y_{it} = \alpha + \beta_1 x_{1it} + \beta_2 x_{2it} + \mu_i + \gamma_t + v_{it}$$

With

- $i$  : 1, 2, ..., 23, shows number of districts/municipalities in South Sulawesi
- $t$  : 1, 2, ..., 10. time period under study \*2007- 2016
- $\alpha$  : Interception coefficient
- $\beta_1, \beta_2$  : Slope Coefficient
- $\mu$  : The specific influence of the individual no.-
- $\gamma$  : Effect of time t
- $v_{it}$  : Effect of error on the i-th district/municipality and time t
- $Y_{it}$ : Dependent variables (Human Development Index) for i-district and time-t
- $x_{1it}, x_{2it}$ : The independent variable (Education and Health fund) for the i-th district and the time t

Second model is the factor that determines the rate of economic growth, with the variable is determined as Human Development Index.

The second model is

$$Y_{1it} = \alpha + \beta_3 Y_{it} + \mu_i + \gamma_t + v_{it}$$

- $Y_{1it}$  : Dependent variable (Economic Growth) for district i and time t
- $Y_{it}$  : The independent variable (Development Index) for the i-th district and the t-th time

The third model is the factor that determines the level of poverty, with the variables are the level of economic growth and Human Development Index.

The Third Model is

$$Z_{it} = \alpha + \beta_4 Y_{1it} + \beta_5 Y_{2it} + \mu_i + \gamma_t + v_{it}$$

$Z_{it}$  : Dependent variable (Poverty Rate) for district i and time t

$Y_{1it}, Y_{2it}$  : Independent variable (Human Development Index and Economic Growth) for the district i and time t

After the model is made, then we proceed with the appropriate model specification for the three models, with the following stages:

1. Chow test, to test whether there is influence between individual and time. Chow test is done twice, the first to test whether there is an individual influence on the model used, with the following hypothesis:

$$H_0: \mu_1 = \mu_2 = \dots = \mu_{N-1} = 0$$

$$H_1: \text{at least there is one } i \text{ so } \mu_k \neq 0$$

The second is to test whether or not there is a time influence on the model used, the hypothesis test is as follows:

$$H_0: \gamma_1 = \gamma_2 = \dots = \gamma_{N-1} = 0$$

$$H_1: \text{there is at least one } t \text{ so } \gamma_k \neq 0$$

If from the second hypothesis testing it is obtained that  $H_0$  is not rejected, then the appropriate model has no influence of time and individual from the model, as follows:

$$Y_{it} = \alpha + \beta_1 x_{1it} + \beta_2 x_{2it} + v_{it}$$

If in the first hypothesis  $H_0$  is rejected, and in the second hypothesis  $H_0$  is not rejected, then there is an individual influence on the model:

$$Y_{it} = \alpha + \beta_1 x_{1it} + \beta_2 x_{2it} + \mu_i + v_{it}$$

If the first hypothesis  $H_0$  is not rejected and the second hypothesis  $H_0$  is rejected, then there is a time influence on the model:

$$Y_{it} = \alpha + \beta_1 x_{1it} + \beta_2 x_{2it} + \gamma_t + v_{it}$$

If in the first hypothesis  $H_0$  is rejected and in the second hypothesis  $H_0$  is rejected, then there is the influence of both individual and time on the model, so that the model is formed as follows::

$$Y_{it} = \alpha + \beta_1 x_{1it} + \beta_2 x_{2it} + \mu_i + \gamma_t + v_{it}$$

2. Testing violations of assumptions, lack of correlation using Durbin Watson test, normality by looking at the standard leftover graph, and non-multicollinearity by looking at the value of Variance Inflation Factor
3. Model evaluation and Interpretation of coefficients

## RESULT AND DISCUSSION

### Result of Model Testing 1

The first model, with dependent variable is the human development index, the independent variables of education and health funds. The first model specification, for the first stage of the CHOW test, is performed to select the appropriate model, between the combined model, the individual fixed influence model or the fixed influence model of time. Chow test uses statistics F. In the first Chow test is a hypothesis to test whether there is

influence of individuals on the model used. The result obtained is the -p value of the statistic F less than 0.05, so  $H_0$  is rejected, which means that in this model there is an individual influence. Continued on the second hypothesis for the Chow test, the p-value obtained from the static F test is also less than 0.05 so that the second hypothesis is rejected, meaning in the model there is the effect of time. These results can not be determined whether the right model is the model of individual fixed influence (Fixed Effect) or the model which is influenced by time (random effect). The model specification is proposed by using Hausman Test to determine whether the appropriate model is a model with Fixed Effect or model with Random Effect.

Hausman Test, using the following hypothesis:

$$H_0: \text{there is at least one } t \text{ so } \gamma_k \neq 0 \text{ (Random Effect)}$$

$$H_1: \text{at least there is one } i \text{ so } \mu_k \neq 0 \text{ (Fixed Effect)}$$

The Hausman test uses the statistical value of F Test. The result of the test for this model, the obtained value of -p from the statistic F is 0.8306 or greater than 0.05 so that  $H_0$  is not rejected, it means that the correct model for the first model is Random Effect. It estimates that the data on panels may be interconnected between time and between individuals. In the random effect model, interdependent differences are accommodated by the error terms of each district/municipality. By seeing that in the first proper model is the random effect, the built equations do not need to test the heterosexuality, since the advantage of the random effect model has eliminated the problem of heterosecondasticity and auto correlation.

After going through various stages of testing, it has been obtained that the appropriate model is the model of random influence, as follows:

$$Y_{it}(\text{Human Development Index}) = \alpha + \beta_1 x_{1it} + \beta_2 x_{2it} + \mu_i + \gamma_t + v_{it}$$

$$Y_{it}(\text{Human Development Index}) = (\mu_i + \gamma_t) - 90.228 - 0.196 \ln X_1 - 0.72 \ln X_2 + v_{it}$$

The model illustrates the effect of variables in 23 districts/municipalities in South Sulawesi from 2007 to 2016. Based on the F test it has been achieved that p-value for F statistics is 0.000. This shows at the real level of 5% that there is at least one independent variables in the model that significantly influence the Human Development Index.

As for the t test, it is found that the variables contained in the data which give significant influence to the Human Development Index is the allocation of Education fund, at the real level of 5%. The value of  $R^2$  generated in this model is 0.637 means that 63.7% of the human development index in 23 districts/municipalities for 10 years which is explained by the variables in the model, i.e. the allocation of education and health funds, as much as any other variables in the model. The variables in the allocation of education funds have a negative influence on the human development index. The value of regression coefficient of this variable is 0.72 with p-value of 0.003 meaning that any 1% increase in health allocation funds will reduce the human development index by 0.72. For the panel data analysis with this random effect model there are individual and time effects that show differences in human development indexes between districts and municipalities and between years. So the value of constant to be obtained will be different for each district/municipality and the value is different for each time.

## Model 2 Test Results

Second model, with economic growth rate as dependent variable, independent variable of human development index. The first model specification, for the first stage of the Chow test is performed to select the appropriate model, between the combined model, the individual fixed influence model or the fixed influence model of time. Chow test uses statistics F. In the first Chow test there is a hypothesis to test whether there is influence of individuals on the model used. The result obtained is the -p value of the statistic F is less than 0.05, so  $H_0$  is rejected, which means that in this model there is an individual influence. Continued on the second hypothesis for the Chow test, the value obtained -p is 0.007 from the static test of F which is also less than 0.05 so that the second hypothesis is rejected, meaning that the model is the effect of time. These results can not be determined whether the right model is the model of individual fixed influence (Fixed Effect) or the model is influenced by time (random effect). For that we do not need a model specification by using Hausman Test.

The second model is Fixed Effect. This model assumes that individual differences, in this study means each district/municipality, can be accommodated from different interceptions. Nevertheless the slope is the same for the inter district/municipality. But with the Fixed Effect model must pass Autocorrelation test. Autocorrelation test uses Wooldridge test for panel data, the result is the value of  $-p$  for F test of 0.43 or above 0.05 means that this data is independent from autocorrelation problem.

After going through various stages of testing, it was found that the appropriate model is the model of random influence, as follows:

$$Y_{1it} = \alpha + \beta_3 Y_{it} + \mu_i + v_{it}$$
$$Y_{1it}(\text{Economic Growth}) = \mu_i - 20.878 - 0.199Y_{it} + v_{it}$$

The model illustrates the effect of independent variables for 23 districts/municipalities in South Sulawesi on Economic Growth in the period of 2007-2016. From t test it is found that the human development index variables give p-value of 0.000 at 5% real level. Thus, the human development index is a variable affecting the rate of economic growth. The value of R2 is 0.0854, which means that only 8.5% of the diversity of economic growth in the twenty-three districts/municipalities in South Sulawesi in the period 2007-2016 can be explained by the independent variable of the human development index, while the rest is explained by other variables outside the model. The human development index has a negative influence on economic growth. The coefficient value of this variable is -0.199 with a p-value of 0.000, meaning that any increase in 1 index of human development will decrease economic growth by 0.199%.

For the analysis of panel data with this fixed effect there are individual effects showing different economic growth between districts/municipalities based on the model specifications used, the constant values held by each district/municipality remain at all times observed and the value is different for each district/municipality.

## Discussion

In general, the economic growth of the regencies/municipalities of South Sulawesi Province in the last five years (2009-2013), shows that the economic growth is quite high, even exceeding the national economic growth, which grows on average 7.32 percent per year and grows by 1.5 percent during the period of 2009-2013, where in 2009 the economic growth of South Sulawesi experienced 6.43 percent increase to 7.93 percent in 2013. The problem is the allocation of education funds and the allocation of health funds based on the results of statistical calculations using panel data, shows that the variable is negatively correlated. With the index of human resource development, in other words, the change of education fund allocation and health funding is inversely proportional to the development of human resources

The cause of this is probably due to unfulfilled macro assumptions in the implementation of allocated funds. According to Mankiw (2008) human resource development can be done through the improvement of the quality human capital that refers to education and health as a fundamental development objective in a region, namely education is essential to achieve a decent life, while health is the core of prosperity. Barro and Sala-i-Martin (2004) introduced an endogenous model that emphasized the importance of fiscal policy to foster economic growth that ultimately leads to poverty. The neoclassical model, in general, emphasizes the supply of labor, capital stock and technological change in the process of economic growth, which later developed into a human capital model in economic growth

## Research Findings

The results showed that in model 1, there was a negative correlation between the variables of the allocation of education funds and the allocation of health funds to the human development index variables. This means that the increase in the allocation of education and health funds actually saw a decrease in the human resource development index, this finding is contrary to the theory used which states that supplementary allocations of education and health funds should encourage an increase in human development index.



Similarly in model 2 there is a negative effect between human development index variables on the rate of economic growth in South Sulawesi Province. This means that in the event of a decline in the human development index on the other hand there is economic growth. This condition indicates a paradox on factors that should run linearly between indices of human development and economic growth. A further hypothesis of this paradox is that there are assumptions that are not included in the calculations such as the assumption that an increase in the human development index leads to an increase in the level of consumption ultimately prompting the Demand Pull Inflation.

## CLOSING

### Conclusion

In model 1 the allocation of education funds and the allocation of health funds are negatively correlated with human development index. In Model 2 human development index is also negatively correlated with economic growth. Thus it is concluded that the findings of this study need to be followed up by incorporating new assumptions such as budget allocation control factors to maintain effectiveness at budget allocations.

The results show that the right model to see the effect of education and health fund allocation on human development index is random effect model and to see the effect on economic growth and poverty rate we can use fixed effect. Further results indicate that the allocation of education funds has an impact on the human development index. The human development index affects economic growth and high economic growth will reduce poverty levels.

### Suggestion

The allocation of education funds and health funds as an effort to improve and develop human resources should be done through the improvement of the supervision of allocation of funds in order to target the right, then the importance of fiscal policy to encourage economic growth which ultimately leads to the level of poverty. Assumptions that need to be considered are the provision of labor, capital stock and technological changes in the process of economic growth, which later developed into a human capital model in economic growth. In further research it is necessary to consider other variables that lie outside the scope of this study, such as the effect of huge infrastructure spending.

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