

RELATIONSHIP BETWEEN HUMAN DEVELOPMENT INDEX AND ECONOMIC GROWTH IN INDONESIA USING SIMULTANEOUS MODEL

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Abstract

This research aims to provide contribution for the success of the development process that can done by local and central governments, which are basically the regulator of economic activity. Full commitment of the government as a facilitating institution in the economy perfectly understands the need for human resources to increase quality of life so that the goal of human development can be successful. This research was performed on problems that occur in various regions of Indonesia, for example, the inequality of economic growth and development of human quality in the western and eastern regions of Indonesia. A more visible phenomenon can also be found in the various regions of Indonesia, which has experienced looped economic growth and human development. This was a quantitative research and the subjects were all provinces in Indonesia. The type of data used were secondary data using panel data from 34 provinces in the 2015-2019 period. Data were collected using observation and documentation techniques, and then the data were analyzed using simultaneous analysis (2SLS) technique. The results indicated that education, public expenditure on education, economic growth and poverty provided a significant effect on the human development index, so total government expenditure and the human development index provided a significant effect on economic growth.

Keywords: Human Capital, Human Development Index (HDI), Economic Growth.

I. INTRODUCTION

Economic development is one area of life that has always been a priority for all countries, including Indonesia. The ultimate goal of development is how every citizen in the country achieves prosperity with ideal proportions. In achieving these goals, those countries are willing to generate large funds to build supporting economic facilities. The interpretation of development can lead to interesting topics to be debated and studied (Suleman et al., 2020). Human development is

one of the goals in increasing economic growth, with an expectation that that quality resources are able to encourage efficiency in economic activities and in aggregate can affect economic growth. (Hidayat and Lumbantoruan, 2013).

Long-term economic growth is supported not only by the increase in the quantity of capital reserves and labor, but also by the improvement of the quality of human capital and the utilization of technological advances. The development of human quality can be done

by encouraging important aspects of human life, including: life span, education, and a decent standard of living (Andaiyani, 2012). Economic growth also provides a high level of income as one of the conditions in meeting basic needs and improving the quality of human capital, meaning that it will create an important repetition effect in the long term to increase human development. Finally, human development and economic growth become input variables as well as the main goals in the development process (Ezkirianto and Alexandi, 2013). Referring to the data of Statistics Indonesia, human development in Indonesia is inequal as measured by the human

development index. The average HDI value in the 2015-2019 period presented in Figure 1 shows that there is a gap in human development between regions in Western and Eastern Indonesia.

Economic growth is an important element in observing the condition of people's income in general and it can be seen from the GRDP per capita. In Figure 2, the lowest average value of GRDP per capita for all provinces is found in the eastern Indonesia. The gap among provinces is very significant both in nominal income and in accelerating the growth of GRDP per capita.

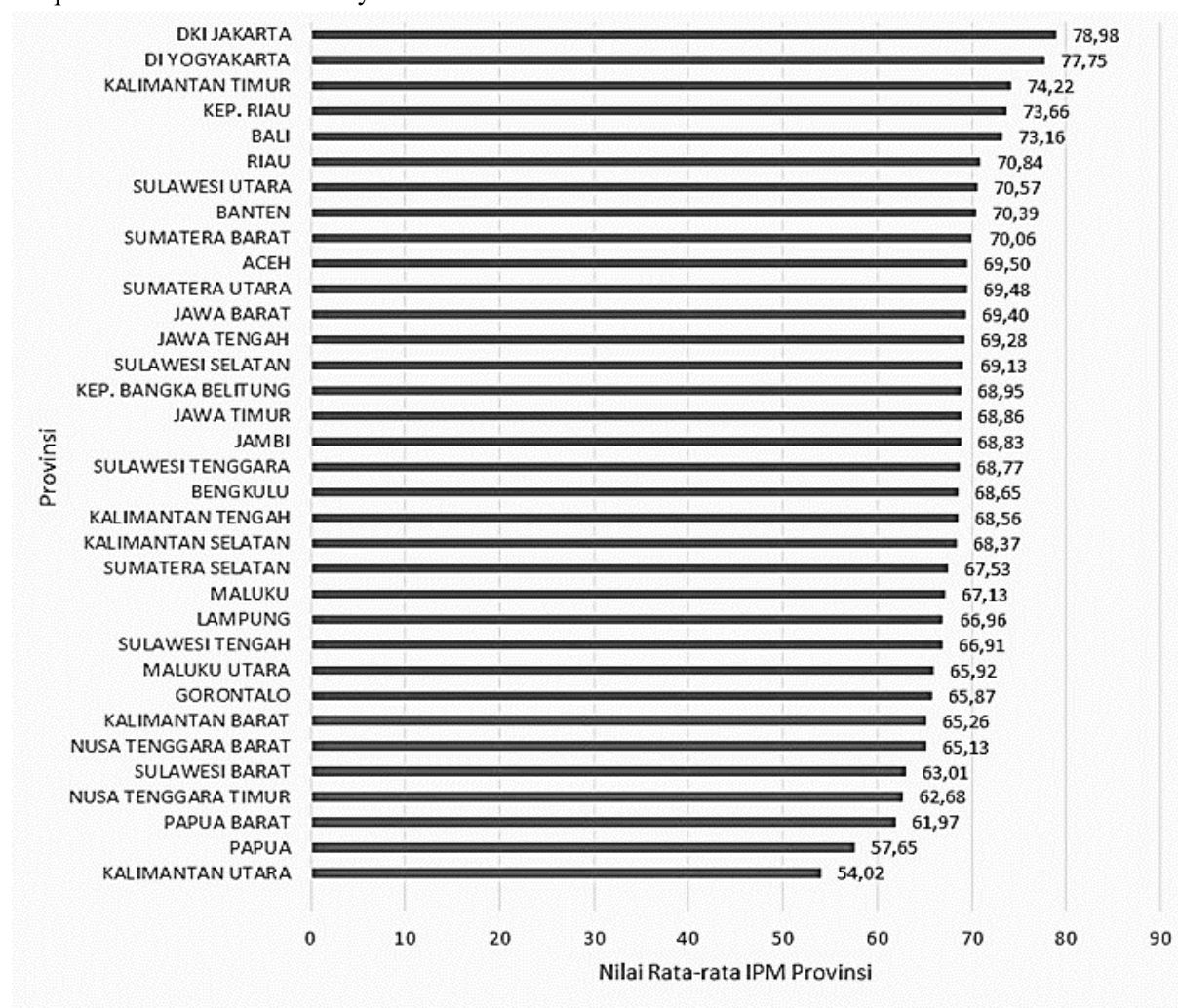


Figure 1. Average HDI value in Indonesia (BPS, 2020a)

This condition indicates looped economic growth, meaning that the high economic growth is not followed by the increase in human development, and looped human development, meaning that the increase in

human development is not accompanied by the increase in economic growth.

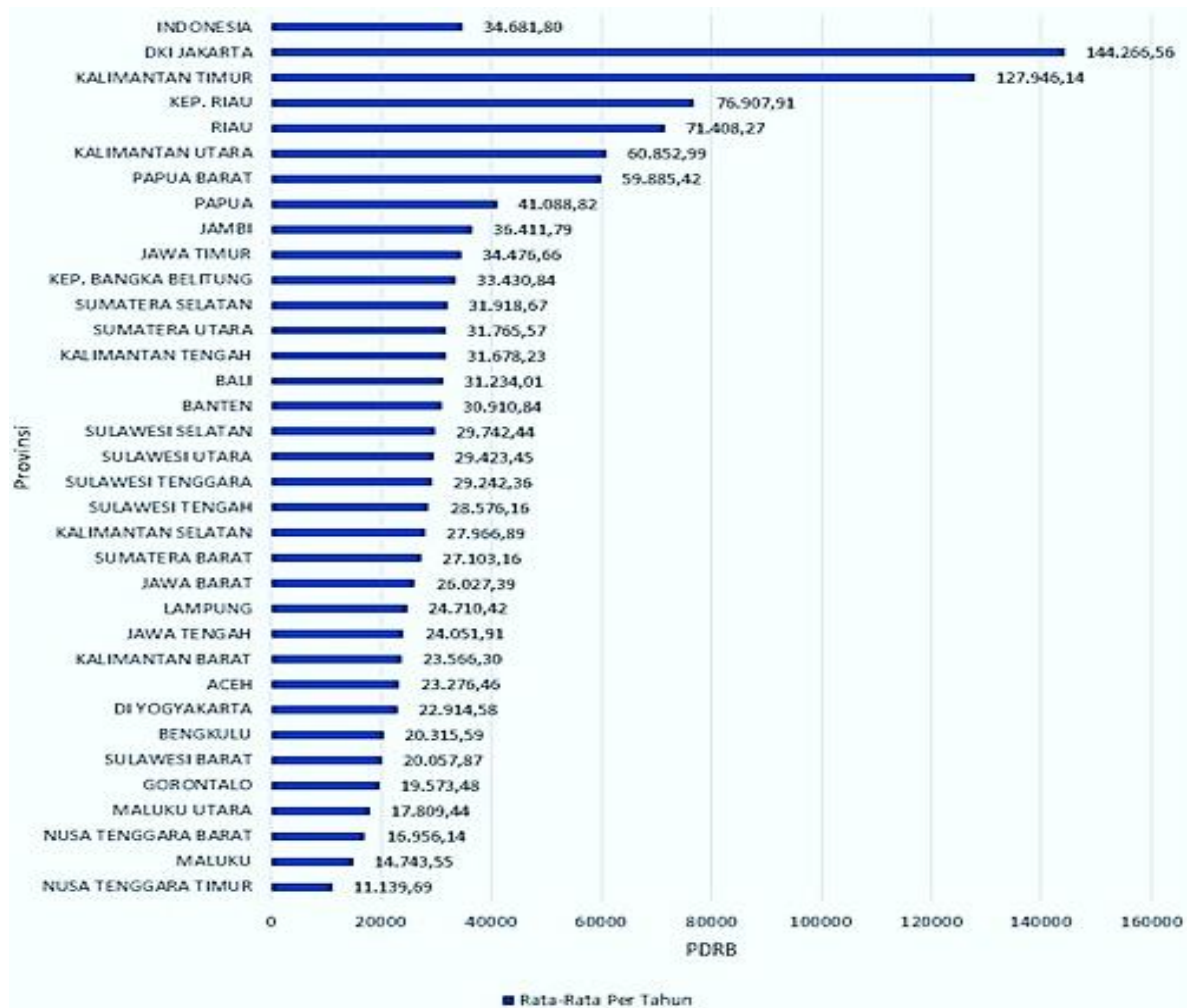


Figure 2. Average GRDP Value Per Capita (Statistics Indonesia, 2020b)

Based on this background, the research problems are formulated as follows: Do HDI and Economic Growth affect each other and what factors affecting human development and economic growth in Indonesia. Objectives of this research are to find the relationship between HDI and GRDP per Capita, the effect of the average of study period, government expenditure on education, poverty and GRDP per capita on the human development index, and the effect of total government expenditure, Gini index, population density and human development index on GRDP per capita.

This research aims to contribute ideas for solving problems and be used as an evaluation for the national development policy system. This research is in line with PRN RI 2020-2024 trying to focus on access to and improvement of the quality of education in areas that so far have been unreachable from policy outputs,

improving human quality as development capital and solving problems of inequality and poverty among regions. It is expected that this research can be used as one of the considerations in restoring the nation's right to receive proportional education and life.

2. LITERATURE REVIEW

Human Capital

There are several factors to be considered for the process of economic growth, such as capital, labor, technology and abilities/skills. At first, skills and education were not likely to receive attention because they were more focused on how to channel abundant resources as supporting input for economic growth (Muslikhati, 2018). But then, there are many research findings show that in addition to

natural resources, education and skills are also needed. Human capital becomes a device providing effects on the economy in a country to grow and develop. Education and skills can promote improvement in capital stock so that it can encourage productivity of existing capital to be greater (Manish, 2014).

Human Development Index (HDI)

Physically and mentally human development implies a meaning that the increase in the basic capacities of the population will then increase the opportunity to be able to participate in the development process. The basic capacities, which are also the three main values of successful economic development, are sustenance, self-esteem, and freedom (Desrindra, Murialti and Anriva, 2015). Human development according to United Nations Development is a stage in expanding choices for the population, so it can be seen that the population is the ultimate goal of development, meaning that development does not only prioritize economic growth (Todaro and Smith, 2013). HDI explains how humans as citizens are able to access development outcomes to earn income, health, education, and etc.

In 1990, UNDP introduced this index in its annual Human Development Report, where this index was compiled using three basic dimensions, including: longevity and healthy living; knowledge (education); and a decent standard of living (Muslikhati, 2018). A high HDI will encourage the welfare of the population, where the level of welfare can be measured from the health factor, seen in the life expectancy; education factor, seen in the number of literacy rate and the average of school period; economic factor, seen in real expenditure per capita (Ariza, 2016).

Economic Growth

Economic growth can be defined as the process of increasing GDP without considering whether the impact of the increase in income is greater or less than the level of human growth in a region, or taking into account whether economic structure growth occurs or not. (Ariza, 2016). Romer's endogenous growth

theory explains that economic growth is a process that originates from within the system with the three main elements, including: an element of externality as a result of advances in knowledge; an increase in the scale of output that leads to increase in specialization and division of labor; and the shorter use of time in utilizing knowledge due to the research development. In general, Romer's growth theory is:

$$Y_i = AK_i^\alpha L_i^{1-\alpha} K^\beta$$

Y_i is the output of company production I , K_i is the capital reserve, L_i is labor, and A is knowledge/technology reserves (technical knowledge) as a whole assumed to have a positive impact on the production of each company (Imamah, 2018).

Government Expenditure

Education is a fundamental field in a country because education can provide positive benefits for development. Education contributes to the development of socio-economic life through increasing knowledge, skills, abilities, attitude and productivity so that education is expected to produce quality labor (Desrindra, Murialti and Anriva, 2015). If income per capita increases, then the government expenditure relatively will also increase. This happens because the government is obliged to regulate the relationships that arise in society, education law, and so on.

There are two types of government expenditure in the field of education, namely: individual education costs and indirect education costs (Sanggелorang, Rumat and Siwu, 2015). Education also affects the level of poverty because education is one of the main components in the vicious cycle of poverty. Therefore, poverty can be eradicated by improving the quality of education. The most elementary public education service is basic education. In determining the education budget, the amendment to the 1945 Constitution requires an education budget allocation of at least 20 percent of the total budget (Ilhami, 2014). If the education budget is used and allocated appropriately, it is expected that it can

increase the literacy rate and the school period, which in turn will increase the HDI.

Based on research performed by Astri, it is found that government expenditure in education and health sectors affect HDI simultaneously (Astri, Nikensari and Kuncara, 2013). The results of research conducted by Putra found that partially, the variables of government expenditure in the education and health sectors did not provide significant effect on HDI (Putra, 2017).

Gini Index

The low quality of human beings is affected by the inequality of income distribution because an increase in population. The increase in human population tend to provide a negative impact on people with disadvantaged background, especially those who are very poor. Most of the needy families have a large number of family members so that the economic condition of those who are in the poverty line is getting worse along with the worsening inequality in income distribution or welfare. (Todaro and Smith, 2013). The income distribution gap in developing countries is caused by high population growth resulting in a decrease in income per capita. Therefore, it is not able to encourage the improvement of human quality, both from education and health sectors (Aggina and Artaningtyas, 2017).

Population density

Population density is a comparison between the total population and the area inhabited by the population. The commonly used measurement is the number of inhabitants per one Km² or every 1 mile. Migration from rural to urban areas as a part of urbanization that affects the distribution of population in each province in Indonesia. Each provincial capital is the center of all economic activity and is a pull factor for residents outside the capital area to migrate. Massive migration flows cause population accumulation, especially in the provincial capital area (Antara and Suryana, 2020).

Critical Framework and Research Hypotheses

Based on the theoretical framework and the results of previous research explained earlier,

the critical framework can be described as follows:

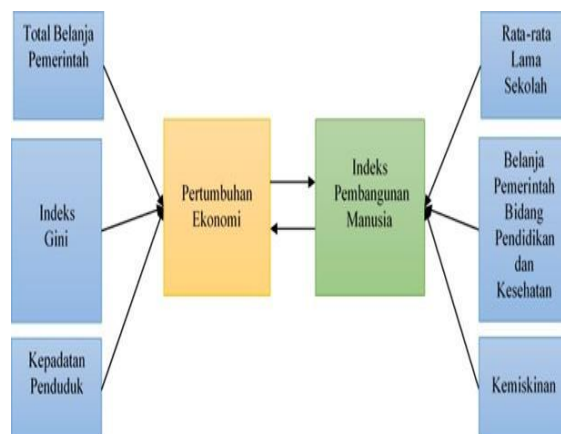


Figure 3. *Critical Framework of the Research*

According to Figure 3 above, the research hypotheses were formulated, as follows:

H1 = average school period, government expenditure on education and health, GRDP per capita, and poverty affect the human development index.

H2 = total government expenditure, Gini index, population density, and human development index affect economic growth.

State of The Art

Novelty of this research is an attempt to find answers to the relationship between the human development index and economic growth, which are also affected by the average school period, government expenditure on education and health, poverty, total government expenditure, Gini index, and population density using the simultaneous equation with panel data.

3. RESEARCH METHOD

Data Types and Sources of the Research

This research used literature and field research design with a quantitative approach. The research was planned to be performed in 2021. This research was conducted in Indonesia which administratively covers 34 provinces. The type of data used was secondary data obtained from Statistics Indonesia, as well as

the Ministry of Finance of the Republic of Indonesia. Each observed variable is presented in Table_1.

Data Collection Method

Data collection method implemented was by collecting reports published by related institutions, such as the Ministry of Education and Culture, Indonesian and Provincial BPS (Statistics Indonesia), as well as Bank Indonesia and the Ministry of Finance. Samples used were data published in 2015-2019.

Data Analysis Technique

Model Testing Techniques

The model analyzed in this research was a simultaneous equation model of the human development index equation and GRDP per capita. Hausman specification test was used for simultaneous testing and identification of order conditions was used to determine the analysis method. Furthermore, testing was carried out to choose the right estimation method between fixed effect and random effect.

Model Specification

This research examined two-way relationship between human development and economic growth. Empirical research was the basic for model selection. The model used was a simultaneous equation model which consisted of the equation of human development and the equation of economic growth.

Human Development Equality Model

In analyzing the two-way relationship of human development, it was required to have several variables used as parameters for a good research. The level of education of the people generally determines consumption patterns, and their contribution to the increase in human capital, where good health and nutrition conditions will directly boost productivity. Government expenditure on education and health is able to expand public access to adequate education and health services. Poverty can hinder human development because needy people will find difficulty to get access to education and health, which in turn reduces

productivity directly. The level of GRDP per capita also contributes to the improvement of human quality. High population spending will result in better fulfillment of basic needs, meaning that the level of consumption for education and health will increase, which eventually affect the human development index. Based on the reasons above, the human development model for this research is as follows:

$$HDI_{it} = \alpha_0 + \alpha_1 EDU_{it} + \alpha_2 PSPEND_{it} + \alpha_3 Y_{it} + \alpha_4 POV_{it} + e_{it}$$

Description:

α_0 : intercept of i province

HDI_{it} : Human development index of i province in year t

$PSPEND_{it}$: Government expenditure on education and health of i province in year t

EDU_{it} : Average school period for 15-year-old students and above of i province in year t

Y_{it} : GRDP per capita of i province in year t

POV_{it} : Percentage of poor population of i province in year t

e_{it} : error term

Economic Growth Equation Model

Economic growth is expressed by GRDP per capita, which explains the average individual income. However, there are variables of government expenditure, income distribution inequality, population density, and the human development index as parameters to measure economic growth. Government expenditure strengthens the performance of a more productive economy. Economic growth accompanied by an even distribution of income becomes an indicator of the long-term welfare of the community. Population density is also expected to provide effects on increasing productivity or production efficiency from the agglomeration that occurs. Lastly, human quality as capital in production is also considered to provide effects on economic growth that contributes to production activities.

Based on this explanation, the economic growth equation model is as follows:

$$Y_{it} = \beta_0 + \beta_1 GE_{it} + \beta_2 GR_{it} + \beta_3 DENS_{it} + \beta_4 HDI_{it} + u_{it}$$

Description:

β_0 : Intercept of i province

Y_{it} : GRDP per capita of i province in year t

GE_{it} : Total government expenditure per population of i province year t (in logs)

GR_{it} : Gini index of i province in year t

$DENS_{it}$: Population density of i province in year t (in logs)

HDI_{it} : HDI of i province in year t

u_{it} : error term

4. ANALYSIS AND DISCUSSION

Analysis

a. Model Identification and Specification

Exogenous variables in this research were larger than endogenous variables, so the two equations in this research were overidentified. Therefore, the appropriate estimation method was the estimation of the panel data model with two-stages least square (2SLS). Furthermore, it is necessary to test whether there is a simultaneous relationship between the variables of the Human Development Index and Economic Growth. The results of the simultaneous test with the Hausman test in observing the significance of the OLS equation error was found to be significant error in affecting the HDI and Y variables. Therefore, it can be concluded that there is a simultaneous relationship between HDI and Y.

b. Selection of Panel Data Regression Model

Chow test is used to determine whether the FEM model is better than the CEM model. Null hypothesis in the chow test is the CEM model and the alternative hypothesis is the FEM model. If the p-value is lower than 0.05, it

means that the FEM model is better than the CEM model with a confidence level of 95%. Then the Hausman test was conducted to determine whether the FEM model was better than the REM model. The null hypothesis in the Hausman test was the REM model while the alternative hypothesis was the FEM model. If the p-value of the Hausman test is lower than 0.05, it means that the best model chosen is the FEM model with a confidence level of 95%. Based on Table 4.8, the results show that both the Chow and Hausman tests show the FEM model as the best panel data model to be used in this research.

c. Human Development Index Equation

Estimation on the HDI equation was carried out using the 2SLS FEM model. Partially, through the t test, it was found that variables of EDU, PSPEND, Y and POV provided a significant effect on HDI. Likewise, overall, through the F test, it was found that variables of EDU, PSPEND, Y, and POV collectively provided a significant effect on HDI. The adj R² value of 0.99177 indicates that the variation of HDI can be explained collectively by variations of EDU, PSPEND, Y, and POV of 99.18% and the rest is explained by other variables outside the model. The equation obtained was:

$$HDI_{it} = \alpha_{0i} + 0,037626 EDU_{it} + 0,009837 PSPEND_{it} + 0,126030Y - 0,005255 POV_{it} + e_{it}$$

Coefficient value of the regression equation with a positive sign indicates that the independent variable provides a positive effect on the dependent variable and vice versa. Meanwhile, if it is negative, it means that the independent variable provides a negative effect on the dependent variable. The EDU variable coefficient of 0.037626 means that for every increase of 1 year in the average length of school, there is an increase in the regional human development index of 0.037626% with the assumption that other variables remain fixed (*ceteris paribus*). This is in line with research conducted by (Citrawan, 2018) that education provides a positive and significant

effect on the human development index (MYS affects HDI, within intercept (constants) about 19.99000 with t-statistic of 4.090348 and probability of $0.0264 < 0.05$ (significant).

Next, PSPEND variable coefficient of 0.009837 means that for every 1% increase in government expenditure on education and health, there is an increase of 0.009837% in the human development index with the assumption that other variables remain fixed (*ceteris paribus*). This result is also in line with research conducted by (Edeme, Nkalu and Ifelunini, 2017) that government expenditure on education and health provides a positive marginal impact on human development. However, there are still provincial governments that have a low ratio of regional financial independence and a high level of dependence on central funds.

The provincial government must try to increase local revenue (PAD) by optimizing the potential of the local revenue. The central government's budget efficiency policy is carried out due to the state's financial condition in 2018. It is necessary to have strategic steps so that the existing funds can be channeled and used for the welfare of the community. The economic growth variable has a coefficient value of 0.126030 meaning that for every 1% increase in GDP per capita, there is an increase of 0.126030% in the development index with assumption that other variables remain fixed (*ceteris paribus*). This result also supports the results of research by (Zamruddin Hasid, 2019), which is found that partially, the economic growth variable provides a positive and significant effect on the Human Development Index (HDI) in West Sulawesi Province with a coefficient value of 0.432, and this result also supports the trickle-down effect hypothesis which states that fast growth economy will lead to human development.

Next, the poverty variable has a coefficient value of 0.005255 meaning that for every 1% increase in the percentage of the needy, there is a decrease of 0.005255% in the development index with assumption that other variables remain fixed (*ceteris paribus*). This results is also in line with research conducted by

(Regina, Sinring and Arifin, 2020). The intercept value of the human development index equation for each province is presented in table 4.10 below:

d. Economic Growth Equation

Estimation on Y equation was carried out using 2SLS FEM Model. Partially, through the t-test, it is found that the government expenditure (GE) variable and the human development index (HDI) provide a significant effect on economic growth (Y) and the Gini ratio (GR) variable provides a significant effect on economic growth. Meanwhile, the population density (DENS) variable does not provide a significant effect on economic growth. Overall, through the F test, it is found that variables of GE, GR, DENS, and HDI collectively provide a significant effect on Y. The value of adj R² of 0.996886 indicates that the variation of Y can be explained collectively by variations of GE, GR, DENS, and HDI by 99.68% and the rest is explained by other variables outside the model. The equation obtained was:

$$Y_{it} = \alpha_{0i} + 0,156652 GE_{it} - 0,268288 GR_{it} - 0,068439 DENS_{it} + 2,133026 HDI_{it} + e_{it}$$

The coefficient value of the independent variable is positive, meaning that the variables of total government expenditure (GE) per population and the human development index (HDI) provide a positive effect on GRDP per capita (Y). Meanwhile, the Gini index (GR) and population density (DENS) variables provide a negative effect on Y. The GE variable coefficient of 0.156652 means that for every 1% increase in government expenditure, there is an increase in GRDP per capita by 0.156652% with assumption that other variables remain fixed (*ceteris paribus*). These results are in line with research conducted by (Prasetyo, 2020) that government expenditure provides a positive and significant contribution to small and medium enterprises, which in turn will encourage economic growth. The GR variable coefficient of 0.268288 means that for every 1% increase in the Gini index, there is a decrease of 0.268288% in GRDP per capita with the assumption that other variables remain fixed (*ceteris paribus*). The HDI variable

coefficient of 2.133026 means that for every 1% increase in the human development index, there is an increase of 2.133026% in GRDP per capita with the assumption that other variables remain fixed (*ceteris paribus*).

Source: processed data (2021)

The individual coefficient values for each province indicate the initial capital (initial endowment) owned by a province. Special Capital Region of Jakarta Province has a constant of 1.207214 which is the highest among 34 provinces. This means that with a slight increase in the value of GE, GR, and HDI, the level of income per capita Y in DKI Jakarta Province is relatively high compared to other provinces. In the other hand, Banten Province has the smallest constant value, which is -2.16, requiring to make relatively large changes in exogenous variables so that per capita income can have equal constant value to other provinces. Next is the acquisition of the intercept value of the economic growth equation of each province presented in the following table 4.11:

Discussion

High economic growth in a country is able to encourage the increased in human development, and vice versa, human development promoted by the government is able to affect economic growth. However, human development is not always followed by an increase in economic growth. On the contrary, this is also the case with economic growth. Based on the results obtained, it turns out that the achievement of the human development index and economic growth of each province has a very significant difference. In table 4.10, it can be seen that Special Region of Yogyakarta Province has the highest human development index intercept value. However, table 4.11 found that the highest economic growth intercept value is hold by Special Capital Region of Jakarta Province.

Virtuous classification means that the province shows the performance of the human development index (HDI) and GRDP per capita that is above the national average (Y). While the vicious classification shows provinces that

have a performance in the human development index and GRDP per capita that is below the national average. Based on Table 4.12, it is found that North Sulawesi is the only Province with human development and economic growth above the national average. However, there are nine provinces included in the vicious classification.

Economic growth in several regions in Indonesia (10 provinces) is relatively high because of the available resources, productivity, education level of the population, availability of infrastructure, as well as efficiency and effectiveness of local government policies. For example, the economic growth of Special Capital Region of Jakarta Province cannot be separated from the role of the central government, which since the old order era made Special Capital Region of Jakarta Province and Java Island as development priority areas. This has brought a very significant economic impact compared to other provinces, although in the past few decades, equity has begun to be carried out with fiscal decentralization and regional autonomy. Provinces on the Java Island, which is the most populous island in Indonesia, has no visible significance in encouraging human development, even lagging behind several provinces on the islands of Sumatra and Kalimantan.

This shows that the high birth rate and urbanization are not accompanied by higher population productivity. Therefore, in aggregate, the population growth does not provide a significant impact on economic growth. Based on BPS data, in general, expenditure per capita of the government in some of provinces such as Papua, West Papua, North Kalimantan, East Kalimantan, Aceh are categorized as the 4 provinces receiving the lowest per capita allocation of government budget and the education spending.

This affects the urgency of the proportionality of the allocation of funds from the central government to local governments as an effort to provide employment opportunities that can balance population growth, improve the quality of education, and balance development. Papua

and West Papua provinces are included in the looped economic growth condition with a fairly high GRDP per capita but a very low HDI. A high level of GRDP per capita does not necessarily indicate that every Papuan population has an above-average income. BPS data shows that the lowest average Gini index of 8 provinces in Indonesia since 2015-2019 were Bangka Belitung, West Kalimantan, East Kalimantan, Central Kalimantan, North Kalimantan, North Maluku, West Sumatra, North Sumatra.

Meanwhile, the highest average Gini index is found in Special Region of Yogyakarta, Special Capital Region of Jakarta, West Java, Papua, West Papua, and South Sulawesi. The data shows that there is a very significant income gap in Papua Province. The province of West Papua shows slightly better income but not much merely different. Looped human development condition shows a condition of high human development, but it is not accompanied by high economic growth as well. Several provinces, especially from the IBB region, are included in this classification, including Special Region of Yogyakarta and Maluku. Special Region of Yogyakarta Province has a fairly high HDI value of 78.88, which is in the top 2 national rankings, while the GRDP per capita is below the average with a value of 24,750.74 rupiah. Likewise with Maluku Province which has an HDI value of 68.23, but its GRDP per capita is only 15,966.65 rupiah.

5. CONCLUSIONS AND SUGGESTIONS

1. Conclusions

a. The results of simultaneous test with the Hausman test in observing the significance of the OLS equation error are found to have significant errors in affecting the HDI and Y variables. Therefore, it can be concluded that there is a simultaneous relationship between HDI and Y, and both the Chow and Hausman tests show the FEM model as the best panel data model that can be used in this research.

b. Partially, through the t-test, it is found that the variables of education, government expenditure on education, economic growth and poverty provide a significant effect on the human development index. Likewise, overall, through the F test, it is found that the variables of education, government expenditure on education, economic growth and poverty collectively provide a significant effect on the human development index. The adj R2 value of 0.99177 indicates that variations in the human development index can be explained collectively by variations in education, government expenditure on education, economic growth and poverty by 99.18% and the rest is explained by other variables outside the model.

c. Partially, through the t-test, it is found that variables of government expenditure (GE) and the human development index (HDI) provide a significant effect on economic growth (Y) and the Gini ratio (GR) variable provides a significant effect on economic growth. Meanwhile, the population density (DENS) variable does not provide a significant effect on economic growth. Overall, through the F test, it is found that variables of GE, GR, DENS, and HDI collectively provide a significant effect on Y. The value of adj R2 of 0.996886 indicates that the variation of Y can be explained collectively by variations of GE, GR, DENS, and HDI by 99.68% and the rest is explained by other variables outside the model.

2. Suggestions

a. The local government holds an important role in the success or failure of the development of a region. Government expenditure on education and health has proven to have a positive and significant effects on human development. It also applies to the level of education which provide an effect on individual capabilities and understanding of technology as a condition for increasing economic productivity. The government should gradually increase the education budget and implement proportional distribution of education funds, especially in remote and isolated areas. Without adequate financial support, efforts to provide quality education

services are difficult to achieve. Inadequate education cannot motivate people to get a longer education.

b. The effect of local governments in economic development can be seen in their role as the policy makers for the provision of infrastructure and in the allocation of government expenditures. Government spending is proven to significantly affect the level of GRDP per capita of a region. The provision of good physical facilities can increase the mobility of economic activities that affect the economic growth of a region. However, the performance of economic growth and human development shows a significant gap between provinces in Western Indonesia and Eastern Indonesia.

c. Poverty rates in several provinces are still relatively high. Papua Province had highest poverty rate during 2015-2019. In this regard, government policies play a very important role in breaking the chain of poverty in Papua Province and in other provinces in Indonesia. In addition, the community must also play an active role in empowering themselves to be able to improve their quality. The government has made policies and budgets for the needy through poverty fund assistance. If they are unable to continue their education, the community must ask for assistance from the relevant agencies to be empowered through programs improving the quality of human resources. The general allocation fund (DAU) by the government has implemented a policy to achieve budget tightness and efficiency. These funds are used to optimize public services and increase the human development index.

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