

The Effect of Population Density, Educational Access Inequality and Health Access Inequality on Economic Growth

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ARTICLE INFO

Keywords:

population density;
access inequality;
health access;
economic growth

Article history:

Received 2022-01-11

Revised 2022-04-22

Accepted 2022-09-01

ABSTRACT

The public welfare is related to population growth and the availability of public goods such as education and health. Workforce with good welfare is expected to generate high labor productivity, so it can produce more output of goods and services and increase economic growth. Population density, educational access inequality, and health access inequality will have a negative effect on economic growth. The aimed of this study: First, to analyze the picture of economic growth, population density, educational access inequality, and health access inequality in Indonesia. Second, to analyze the effect of population density, educational access inequality, and health access inequality to economic growth in Indonesia. This research type is explanatory research by using quantitative method. The analysis technique used multiple regression analysis with dummy variable. The result of this study are obtained: 1) population density has a significant effect on economic growth; 2) Educational access inequality has a significant effect on economic growth; 3) Health access inequality has no significant effect on economic growth.

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1. INTRODUCTION

One indicator that has been used as a basis for the economic development of a country is said to be successful is economic growth. Economic growth describes an increase in economic output in a country from one year to the next. The economic output in question is measured by Gross Domestic Product at constant prices. Gross Domestic Product is the total value of goods and services produced by the economy in a given year. The higher the value of economic growth, meaning that the ability of a country to produce goods and services is faster.

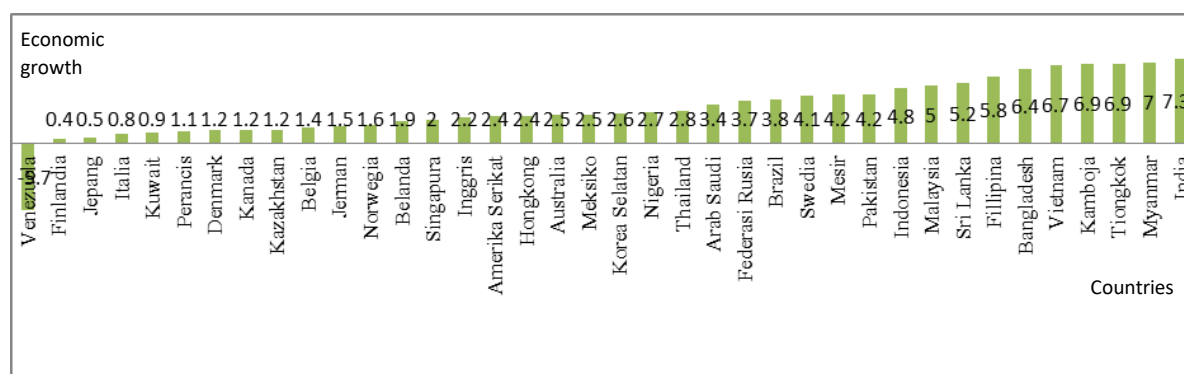


Figure 1. The Rate of Economic Growth in Several Countries in the World According to Constant Prices (percent) in 2015

Source: International Monetary Fund (IMF): "World Economic Outlook", April 2016

Economic growth in Indonesia ranked 10th out of 38 countries in the world in 2015. Based on Figure 1, developed countries in general experienced low economic growth compared to developing countries. Nevertheless, the absolute value of the development of national income in developed countries is very different from developing countries. The absolute value of the development of national income in developed countries is higher than that of developing countries. The high economic growth is needed for developing countries, as one of the proofs in the world that these countries are experiencing accelerated economic development. This is useful for attracting foreign investors to invest in these countries.

Labor is one of the factors of production that often gets more attention, related to the welfare of the people in a country. Labor is expected to have high labor productivity, so that it can produce more output of goods and services. Although it is currently a high-tech era, human labor is still needed to operate machinery with advanced technology, thus it needs effort to motivate the workforce to produce higher labor productivity. Efforts to increase labor productivity are related to improving community welfare.

Community welfare is related to living standards that can be achieved. Living standards, not only related to wages received but also there are other factors that can be a measure of community welfare. Malthus (1798) in Skousen (2005: 85) in his Essay on Population states that people's welfare is related to excessive population growth. Essay on Population contains two basic natural laws, namely: the population tends to increase according to geometry and food production tends to increase according to arithmetic. As a result, natural resources are unable to meet the growing needs of the population, so that welfare decreases. Excessive population growth is identical to the high population density in a region. Population density in an area can be caused by many factors, including: uncontrolled births, population migration, and economic concentration in a region.

Simon (1996) in Skousen (2005: 107) shows how life is better, in contrast to Malthus' pessimistic theory. The two arguments put forward, namely: on the supply/supply side, natural resources are actually not limited in the long run and on the demand side, large and ever-increasing populations will benefit, because they will increase the stock of knowledge and workers who are trained and created also living standards higher. Supported by Shabani et.al. (2011: 114), and Rachmawati (2018) in her study found that population density has a significant effect on economic growth.

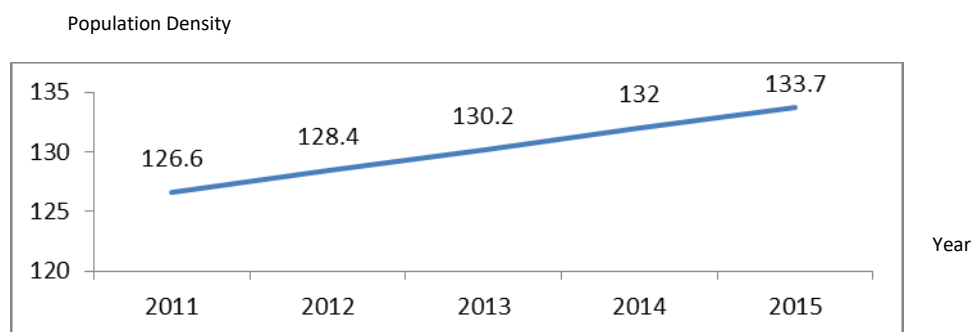


Figure 2. Population Density in Indonesia in 2011-2015

Source: United Nations. 2015. World Population Prospects: The 2015 Revision.

Population density in Indonesia in 2011-2015 experienced an upward trend. How the influence of population density on economic growth needs to be analyzed further. Based on the two theories that have been conveyed population density can have a positive or negative effect on economic growth. Of course, this finding will be useful in determining government policies relating to population arrangements.

In addition to being related to population, public welfare is also related to the availability of public goods such as: education and health. According to Rosen (2005: 56), public goods are goods that, if provided, the cost of additional resources for consumption of other goods for these goods is zero (consumption is nonrival) and for the cost of preventing others from consuming these items is very expensive and impossible (consumption is non-excludable). Thus public goods have characteristics: non-rivalry, non-exclusive, and non-excludability. The ease of obtaining access to education and health is one measure of community welfare. In accordance with the function of social welfare (social welfare function) proposed by Arrow (1963) in Mangkoesoebroto (2001: 59), the easier it is for people to gain access to education and health, showing that the community is increasingly prosperous.

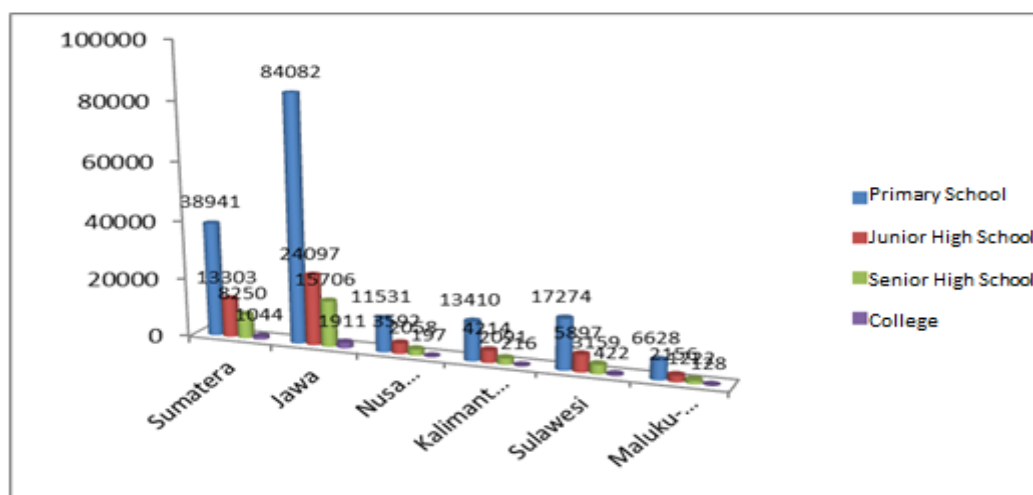


Figure 3. Number of Schools Based on Levels in Each Island in Indonesia in 2015

Source: Central Bureau of Statistics, 2017b: 133

The more public goods that can be enjoyed, the better the welfare of the community. However, the provision of public goods, especially access to education or access to health in different regions. This difference in the provision of access to education and health access causes inequality in access to education and inequality in access to health between provinces in Indonesia. Uneven provision for access to education and health access between regions will affect labor productivity, thus affecting economic growth. Supported by Majeed (2016: 12); Li and Liang (2010: 110); Irmen and Kuehnel (2008: 38); and Bloom and Canning (2005: 1), in their study they found that access to education significantly affected economic growth.

Figure 4 shows the provision of unequal access to education between islands in Indonesia. Access to education is measured by the number of schools based on school level, namely: elementary level, junior high school level, high school level and university level. Providing centralized access to education on the island of Java both at the elementary, junior high, high school and university levels. This could be due to years since Indonesia's independence, the center of Indonesian economic activity was centered on Java. Nevertheless, the condition of inequality in providing access to education in every province in Indonesia and its influence on economic growth needs to be further analyzed.

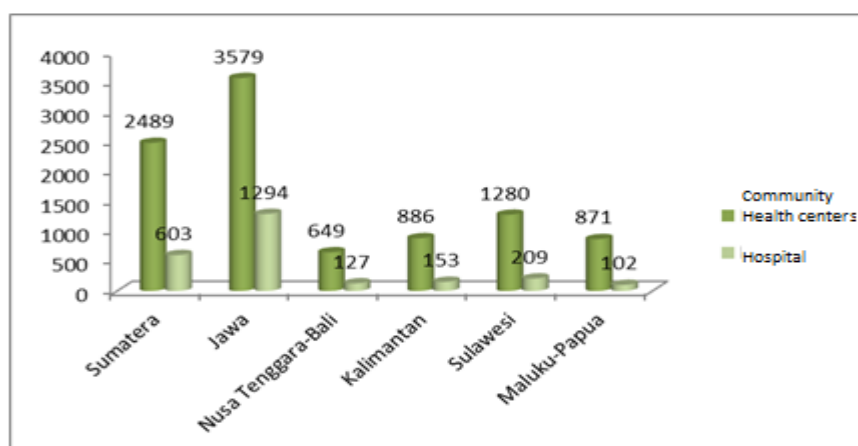


Figure 4. Number of Community Health Center and Hospitals in Each Island in Indonesia, 2015

Source: Indonesian Ministry of Health, 2016: attachments 2.1 and 2.5

No different from the provision of access to education, providing health access is also centered on Java. Health access is measured by the number of health centers and hospitals on each island in Indonesia. Figure 5 shows that the number of health centers and hospitals is most widely available in Java. Thus, the condition of inequality in providing health access to every province in Indonesia and its effects on economic growth also need to be further analyzed. Supported by Li and Liang (2010: 110); Rico and Turrubiates (2005: 7); Bloom and Canning (2005: 1); and Bhargava (2001: 424) in their study found that significantly health access inequality affects economic growth. The novelty of this study found that there is an influence of population density, educational access inequality and health access inequality to economic growth in Indonesia that were done studied by other studies before.

Based on the explanation above, it is suspected that there is a significant influence on population density, educational access inequality and health access inequality to economic growth in Indonesia. The purpose of this study was to determine the effect of population density, educational access inequality and health access inequality to economic growth in Indonesia. This study is very important for managing government policies related to population, education and how to encourage economic development of our country in the near future.

2. METHODS

This type of research was explanatory research using quantitative methods. This study examined and analyzed the effect of independent variables namely population density (X1), inequality of access to education (X2), and inequality of access to health (X3) on economic growth (Y) in Indonesia. The research design is illustrated in Figure 5.

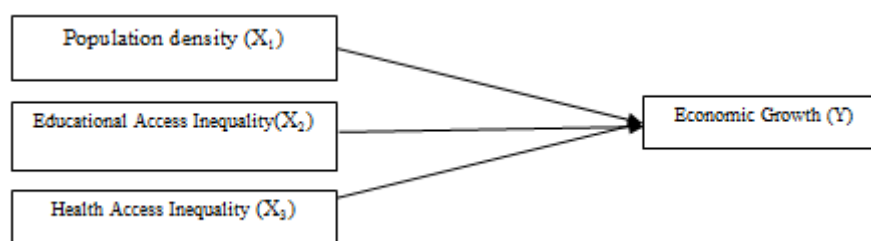


Figure 5. Research Design.

In this study the population is all provinces in Indonesia, namely 24 provinces. The research sample was 24 provinces which were chosen based on the sampling technique by simple random sampling. The documentation method in this study is data collection which is secondary data taken from the Central Bureau of Statistics.

Operationally the definition of variables is explained as follows: 1) Population density is the population density of each province in Indonesia. Data is available at the Central Bureau of Statistics; 2) Inequality in access to education is the unequal access to education between provinces in Indonesia, calculated by developing the Wiliamson inequality index; 3) Inequality in access to health is the unequal access to health between provinces in Indonesia, calculated by developing the Wiliamson inequality index; 4) Economic growth is the increase in the Gross Domestic Product of the provinces in Indonesia. Data is available at the Central Bureau of Statistics.

Educational access inequality, measured by educational access quality index. Educational access inequality index describes the level of inequality that occurs related to the provision of access to education in each province in Indonesia. This index compares the provision of access to education in relation to the total population of each regency/city in the province. The number of educational access inequality index shows the level of inequality, getting closer to the number 1 and even exceeding the number 1 means the inequality of access to education in the province is getting higher. This means that the distribution of access to education in the province is uneven. Conversely, the closer to 0 means that the inequality of access to education in the province will be lower. This means the distribution of access to education is evenly distributed in the province. Educational access inequality index explained in the following formula:

$$\text{educational access inequality index}_i = \frac{\sqrt{\sum_i^n (\text{eduacc}_j - \text{eduacc}_i)^2 \left(\frac{\text{pop}_j}{\text{pop}_i}\right)}}{\text{eduacc}_i}$$

Note:

<i>educational access inequality index_i</i>	=	<i>educational access inequality index of Province-i</i>
<i>eduacc_i</i>	=	<i>average education access in Province-i</i>
<i>eduacc_j</i>	=	<i>education access of regency/city-j in Province-i</i>
<i>pop_i</i>	=	<i>total population of Province-i</i>
<i>pop_j</i>	=	<i>population of regency/city-j in Province-i</i>

Educational access inequality index is divided into 3 categories: 1) If the value is less than or equal to 0.3, it means: inequality of access to education is in the low category; 2) If the value is between 0.3-0.5, it means: inequality of access to education is in the medium category; 3) If the value is more than or equal to 0.5, it means: inequality of access to education is in the high category.

Likewise, educational access inequality, health access inequality is measured by health access quality index. The health access inequality index describes the level of inequality that occurs in relation to the provision of health access in each province in Indonesia. This index compares the provision of

health access in relation to the total population of each regency/city in the province. The amount of health access inequality index shows the level of inequality, getting closer to the number 1 and even exceeding the number 1 means the inequality of access to health in the province is getting higher. This means that the distribution of health access in the province is uneven. Conversely, the closer to 0 means that the inequality of access to health in the province will be lower. This means that the distribution of health access is evenly distributed in the province.

Health access inequality index explained in the following formula:

$$\text{health access inequality index}_i = \frac{\sqrt{\sum_i^n (\text{healthacc}_j - \text{healthacc}_i)^2 \left(\frac{\text{pop}_j}{\text{pop}_i}\right)}}{\text{healthacc}_i}$$

Note:

<i>health access inequality index_i</i>	=	<i>health access inequality index of Province-i</i>
<i>healthacc_i</i>	=	<i>average health access in Province-i</i>
<i>healthacc_j</i>	=	<i>health access of reency/city-j in Province-i</i>
<i>pop_i</i>	=	<i>total population of Province-i</i>
<i>pop_j</i>	=	<i>population of regency/city-j in Province-i</i>

Health access inequality index is divided into 3 categories: 1) If the value is less than or equal to 0.3, it means: inequality of access to health is in the low category; 2) If the value is between 0.3-0.5, it means: the inequality of health access is in the medium category; 3) If the value is more than or equal to 0.5, it means: inequality of access to health is in the high category.

The data obtained will be processed and analyzed to answer the problems in the study. Multiple regression analysis techniques are used to answer the problem of whether there is influence of population density, inequality of access to education and inequality of health access to economic growth in Indonesia.

The multiple linear regression model is described by the following equation:

$$y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + e$$

Note:

<i>y</i>	=	<i>population density</i>
<i>b₀, b₁, b₂, b₃</i>	=	<i>coefficient parameter</i>
<i>X₁</i>	=	<i>population density</i>
<i>D₂</i>	=	<i>dummy of educational access inequality:</i>
		<i>1= high-educational access inequality</i>
		<i>2= medium-educational access inequality</i>
		<i>3= low-educational access inequality</i>
<i>D₃</i>	=	<i>dummy of health access inequality:</i>
		<i>1= high-health access inequality</i>
		<i>2= medium-health access inequality</i>
		<i>3= low-health access inequality</i>

Hypothesis statistic:

H₀ : *b₀, b₁, b₂, b₃ = 0*, each variable X₁, X₂, X₃ has no effect on Y

H₁ : *b₀, b₁, b₂, b₃ ≠ 0*, each variable X₁, X₂, X₃ has effect on Y

Decision making criteria:

1. Reject H₀ if prob.t stat < α (0,05), it's means each variable X₁, X₂, X₃ has effect on Y
2. No reject H₀ if prob.t stat > α (0,05), it's means each variable X₁, X₂, X₃ has no effect on Y

3. FINDINGS AND DISCUSSION

3.1 Variable Description

3.1.1 Economic Growth

High economic growth is generally the target of regional development. High economic growth describes the number of goods or services produced by an area. Based on Figure 7, Sulawesi Tengah Province has high economic growth compared to other provinces. Central bureau of statistics the Sulawesi Tengah Province (2018) stated that the biggest contributor to the Gross Regional Domestic Product of Sulawesi Tengah Province was derived from the sectors of Agriculture, Forestry and Fisheries.

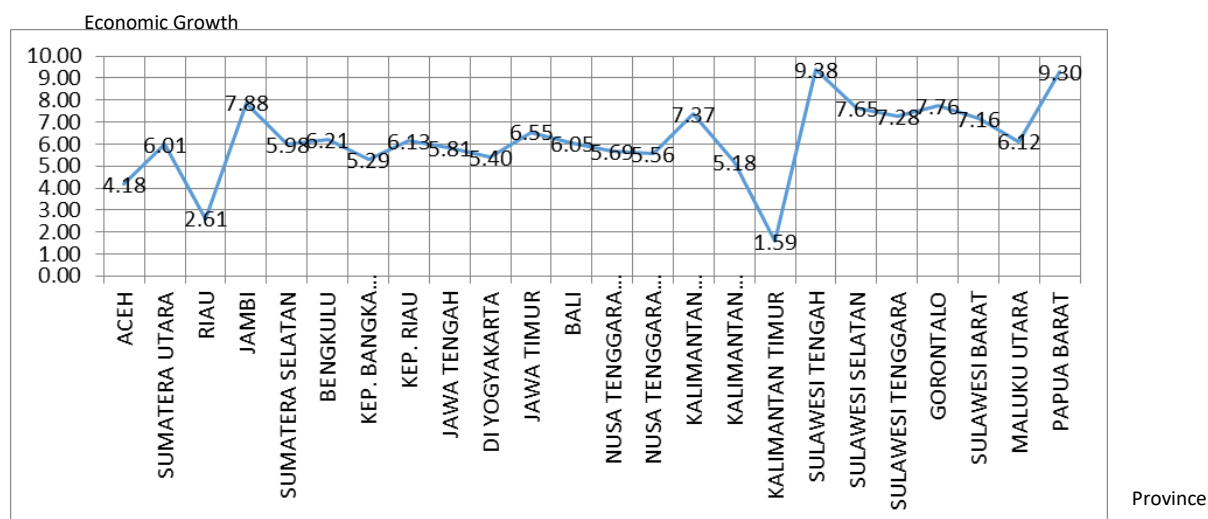


Figure 6 Economic Growth of each Province in Indonesia, 2015

3.1.2 Population Density

Population density in Indonesia is unbalanced. Population density is concentrated in Jawa Island, with the highest population density in Jawa Timur Province, which is 1147 people/km². This can happen because Jawa Island is the center of Indonesia's economic activities. Population density owned by Jawa Tengah Province (1014 people/km²) and DIY. Yogyakarta (1147 people/km²) is the largest in Indonesia. Malthus (1798) in Skousen (2005: 85) has argued that large population will cause problems in the economy, therefore it is necessary to take action from the government to control the population so that it is not too much and crowded in an area. Although in fact there is also a natural control, in the form of death or natural disasters, it is considered not to be able to control the problem of overpopulation on a regular basis. There are several suggested ways to control the population, such as family planning, transmigration, urbanization, etc.

The Indonesian government has actually implemented these programs. However, the success of the program still cannot be seen, shown in Figure 8 and it has been mentioned previously that Java Island is still the center of Indonesian population activities. The Family Planning Program has entered into an era of quality family program policies, which suggest families to only have one child, but with good quality. The transmigration program has also been carried out, but many people are reluctant to migrate because the supporting infrastructure facilities in the migrant area are not the same as the area of origin. The government is currently starting to develop infrastructure that is fairly large, it is expected that with this development economic activities and the Indonesian population will spread throughout the territory of Indonesia. All programs run by the government also require community support. The community also needs to understand about the programs that are being run by the government, so that the programs implemented will provide results as planned.

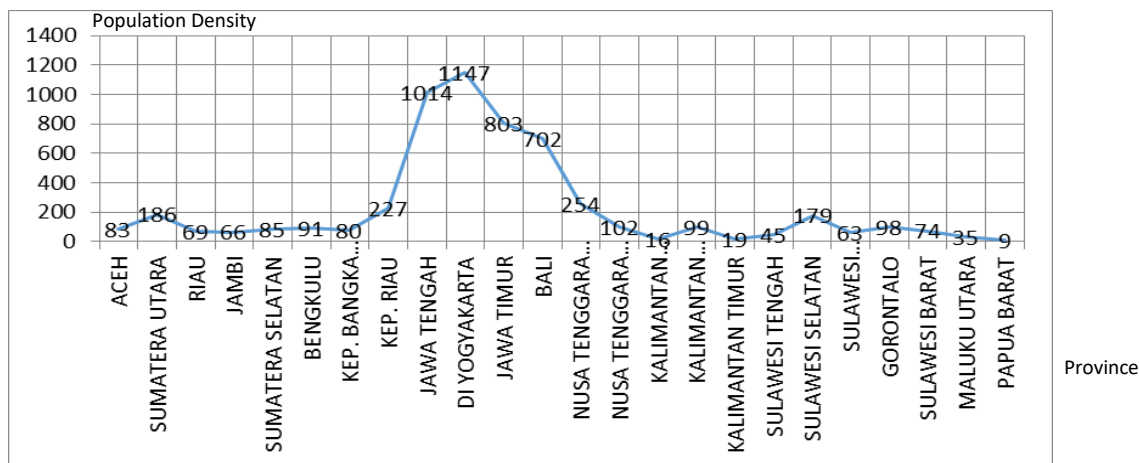


Figure 7 Population Density (people/km²) Every Province in Indonesia

3.1.3 Education Access Inequality

The category of inequality in access to education as described in Figure 8 shows that 54% of the inequality of access to education in the Indonesian region is in the high category. Education is one of the factors that can determine the success of economic development. To overcome the imbalance in access to education, a government policy is needed to equalize access to education in all parts of Indonesia. The problems that arise are not only related to the development of access to education, but also supporting infrastructure that facilitates the development of access to education, especially in disadvantaged areas.

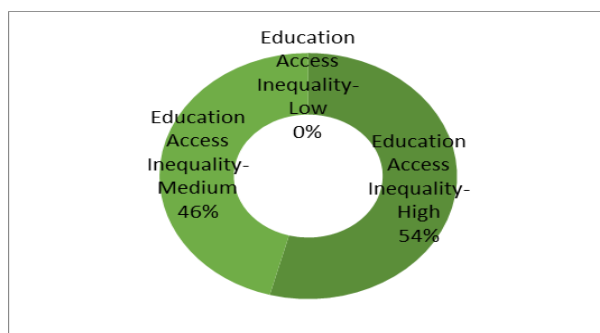


Figure 8 Categories of Inequality in Access to Education in Indonesia

3.1.4 Health Access Inequality

Not only educational access inequality, health access inequality is also of concern. As much as 59% inequality of access to health is high. Inequality of health access, will have an impact on people's welfare. Prosperous communities are expected to have good health, and of course good health is supported by the provision of adequate health access.

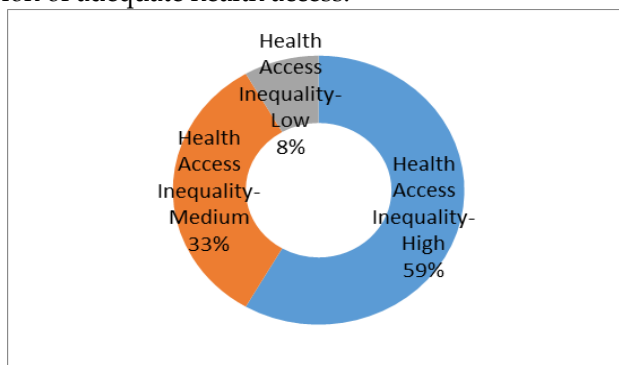


Figure 9 Categories of Access to Health Inequality in Indonesia

3.2 Discussion

Based on data analysis in Table 1, the following results are obtained: 1) Prob. t The statistic for testing the effect of population density (X1) on economic growth is 0.001 less than α (0.05). It can be concluded that population density has a significant effect on economic growth. Coefficient value is positive, this means that population density has a positive effect on economic growth, namely the higher population density, the higher economic growth; 2) Prob. t The statistic to test the effect of educational access inequality (D2) on economic growth is 0.040 less than α (0.05). It can be concluded that educational access inequality has a significant effect on economic growth. Coefficient value is negative, this means that educational access inequality has a negative effect on economic growth, namely the higher the educational access inequality, the lower economic growth; 3) Prob. t Statistic to test the effect of health access inequality (D3) on economic growth of 0.298 is greater than α (0.05). It can be concluded that health access inequality health access inequality has no significant effect on economic growth.

Table 1. Results of Data Analysis

Model	B	Bootstrap ^a				95% Confidence Interval	
		Bias	Std. Error	Sig. (2-tailed)	Lower	Upper	
1 (Constant)	2,152	,025 ^b	,260 ^b	,001 ^b	1,763 ^b	2,721 ^b	
X1	7,708E-5	-2,157E-5 ^b	,000 ^b	,714 ^b	,000 ^b	,001 ^b	
D2	-,329	-,013 ^b	,216 ^b	,183 ^b	-,784 ^b	,040 ^b	
D3	,042	-,008 ^b	,135 ^b	,747 ^b	-,255 ^b	,298 ^b	

3.2.1 Effect of Population Density on Economic Growth

Based on the results of data analysis, population density has a significant and positive effect on economic growth. The results of this study support the findings of previous studies Shabani et al. (2011: 114), and Rachmawati (2018) who found that population density has a significant effect on economic growth.

Population density describes the provision of a large workforce, which is expected to support the economy. A relatively large population is expected to create more and varied products. Simon (1996) in Skousen (2005: 107) shows how life is better with a large population and continues to grow, because it will increase the stock of knowledge and workers who are trained and created a higher standard of living. The opinion expressed by Simon (1996) in Skousen (2005) also applies in Indonesia. The large population of Indonesia and creating a large supply of labor. Besides that a large population will also create demand for goods and services as well as getting bigger, thus the economy will continue to grow.

Concentration of economic activities in a region will open new opportunities. In terms of production for companies, it will encourage companies to produce various types of goods and services, thus attracting investors to invest. In terms of consumption, will improve the welfare of the community, with many types of goods and services, the prices will be cheap, so that people will be able to buy more goods and services and increase welfare.

However, even though population density has a positive impact on economic growth, there must still be control from the government regarding population distribution throughout Indonesia. Malthus (1798) in Skousen (2005: 85) states that excessive population growth causes natural resources unable to meet the growing needs of the population, so that welfare decreases. A large population will only be a development burden if it is not balanced by an increase in the knowledge and skills of workers and the provision of many employment opportunities. Need to think about how the large population of Indonesia, not only concentrated in one region, but evenly distributed to all regions of Indonesia. It is hoped that thus, economic growth will also be evenly distributed throughout Indonesia.

3.2.2 Effect of Educational Access Inequality on Economic Growth

Inequality in access to education has a significant and negative effect on economic growth. This study supports Majeed (2016: 12); Li and Liang (2010: 110); Irmen and Kuehnel (2008: 38); and Bloom and Canning (2005: 1), which found that educational access inequality significantly affected economic growth.

Educational access inequality, will have an impact on the decreased opportunity for people in a region to get access to more appropriate education. This will encourage the inability of the workforce to create high economic growth, due to the low level of labor education. Workers with low education will only be able to enter the labor market, informal sector or unemployed. Indonesian Central Bureau of Statistics (2017a) describes that 42.20% of Working Population has Primary School or below as their highest education attainment. Unemployment Rate of 5.61, meaning that 6 out of 100 people in working age are unemployed. In addition, a total of 31.90% worked in Agriculture, Forestry, Hunting, and Fisheries.

Government policy is needed to equalize access to education in all parts of Indonesia. Of course, this is not an easy thing to do, because it is related to the regional budget. Physical development requires large funds, while the ability of regions to create income is not the same. Collaboration between the role of the community and the government can be carried out, so that responsibility for proper education equity can be tackled together.

3.2.3 Effect of Health Access Inequality on Economic Growth

Based on the results of data analysis, inequality in access to health has no significant effect on economic growth. This study is different from the findings of research conducted by Li and Liang (2010: 110); Rico and Turrubiates (2005: 7); Bloom and Canning (2005: 1); and Bhargava (2001: 424) in their study found that significantly health access inequality affects economic growth.

Although it does not have a significant effect on economic growth, it does not mean that health access inequality does not require attention. However, health will affect people's welfare. A healthy society will be better able to produce higher labor productivity, which will increase economic activity. Communities that are healthy and able to work will generate greater income and improve their welfare. The opportunity for people to be healthy will be greater if the access to health provided is easier for them to obtain.

4. CONCLUSION

Population density has a significant and positive effect on economic growth. However, even though population density has a positive impact on economic growth, there must still be control from the government regarding population distribution throughout Indonesia.

Educational access inequality has a significant and negative effect on economic growth. Collaboration between the role of the community and the government can be carried out, so that responsibility for proper education equity can be tackled together.

Health access inequality has no significant effect on economic growth. Although it does not have a significant effect on economic growth, it does not mean that inequality in access to health does not require attention. However, health will affect people's welfare.

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