Measurement and Descriptive Analysis of the Education Inequality Levels in Indonesia

DoddyIsmunandar Bahari[1]*, Hermanto Siregar[2], Sahara Sahara[2], HandewiPurwatiSaliem Rachman[3]

[1](Doctoral Student of Agricultural Economics, Faculty of Economics and Management, IPB University, Indonesia)
[2](Department of Economics, Faculty of Economics and Management, IPB University, Indonesia)
[3](Indonesian Centre for Agricultural Socio Economic and Policy Studies, Ministry of Agriculture, Indonesia)

Abstract:*The study aimed to analyze (1) the measure and difference of education inequality per year, (2) opportunity to reduce education inequality, (3) linkages of historical description of education inequality to economic growth, number of poor people, and provision of education by the government. This research used time-series data from 1978 to 2017 in the shape of the education level data. Data were analyzed used (1) Education Lorenz Curve (2) the average measurement and calculation of changes in education structure, and (3) scatter plot chart analysis. The result showed that in 1978 the Indonesian education inequality index was 0.926 and experienced a decline in education inequality by 45.14 percent for 20 years as indicated by the level of education inequality by 0.508 in 2017. The Rate of Change in education inequality showed decrease drastically from 1978 to 1997 because of the INPRESS Program Policy. Opportunities for Reducing Education Inequality emerged from the increase of school participation rates, especially in the age group of 16-18 years, which are achieved through an increasing number of schools at the senior secondary level. Increased education participation will also depend on decreasing the share of the population in the two lowest income quintiles and increasing per capita income. Economic growth, a decrease in the number of poor people, and the allocation of the education budget in a descriptive historical context tend to be essential factors in determining the change in education inequality every year.*

I. Introduction

Education is an inherent asset of every person without depreciation. Education provides benefits for every person and the economy or society. In general World Bank[1] summarizes all the benefits of education based on the stylized fact of all countries, these benefits are presented in Table 1.

Tabel 1. Benefit of Education for Individuals/Households and for the Society/Country

Education Benefit	Individuals/Households	Society/Country
Financial	Higher probability of work	High Community Productivity
	Better productivity	Rapid economic growth
	Higher-income	Reducing poverty
	Poverty reduction	Long-term Development
Non-Financial	Better health	Increased social mobility
	Improving the education and health of children / households	Institutions / service providers that function better
	Better endurance and adaptability	Higher levels of citizenship involvement
	Better choice	Greater social cohesion
	Greater life satisfaction	Reducing negative externalities

Souce:Worldbank[1].

Based on Table 1 shows that education is not only an input of sustainable development but also an indicator of the economic development achievements of a country. This table also describes that education is one of the determinants of economic fluctuations in both the demand and supply side. The implication is education level also influences the economy of a country.

One of the goals of economic development is to increase human capital through increased education. Education can improve the ability to achieve efficient performance quicker so that education can substitute long working experience in handling a business[2]. As a result, high human capital is one of the factors of high

---

economic growth. As the Stylized Fact of the world phenomenon shows that improving education is one of the drivers of East Asian countries achieving high levels of economic growth and resolve the problem of poverty[3][4].

The general conditions of developing countries that tend to occur in most countries in the world include (1) Lower levels of life and productivity, (2) Relatively low levels of human capital, (3) High levels of income inequality and poverty, (4) High population growth rates, (5) High Urbanization, (6) Financial markets and other underdeveloped markets, and others. Countries on these characteristics will choose priority policies so that not every post of financing will be budgeted. Therefore developing countries in the early stages of economic development will experience problems in the distribution of education between individuals [5].

Education is the usual service. Education has costs in its provision, so the cost that must be equal by consumers willing to pay. In this case, access and consumption of education are primarily determined by the education provider and the purchasing power of education consumers. As a result, not everyone can achieve relatively higher education, even though individuals and the community know the benefits and importance of education. To guarantee the achievement of education, the role of education providers need to guarantee all individuals access to education.

Education is as goods as others that were supplied by producers and equilibrium with demand from consumers. Provision of education has a cost, therefore its resulting prices must be fulfilled by consumers. In this case, access and consumption of education are mostly determined by the education service supplier and the purchasing power of education. As a result, not everyone can achieve relatively higher education, even though individuals and the community know the benefits and the importance of education. To guarantee the achievement of education participation, so the role of education providers are needed to ensure that all individuals can access education.

General characteristics of developing countries that show high-income inequality will result in a high percentage of households that deficient levels of education consumption. As a result, education attainment tends to be dominated at the level of primary education, eventually resulting in education disparity. Thomas et al.[6] suggest that the Equal distribution of chances is desirable to a reallocation of current assets or incomes. Education constructs new resources and increases social welfare by its excess effect, without causing every person to worse off. Education Gini could be used as one of the signs of welfare distribution, balancing average education level, health and nutrition, income per capita, and other welfare indicators.

Tabel 2. Percentage of the total workforce at different levels of education and the number of poor people.

Year	Non Educated(%)	Elementry School(%)	Junior High School(%)	Senior High School(%)	College School(%)	Number Of Poor People (Billion)
1978	69.17	21.80	8.55	3.66	0.48	47.20
1987	46.35	33.83	8.59	9.49	1.75	30.0
1997	30.12	34.66	13.50	17.73	3.99	29.29
2007	17.23	36.51	19.19	20.56	6.51	37.17
2017	15.79	25.09	17.95	29.09	12.08	26.58

Education inequality in Indonesia is still very high, so it needs to be measured and analyzed to be used as important information for policy considerations in Indonesia's economic development. As presented in Table 1.2, the share of primary education in Indonesia is still high that signs of education inequality. That sign indicates a high share of Junior High School, and it's below in the workforce that reaches 58.83. Whereas the share of high schools and college education in the workforce which only reached 41,17 percent. On the other side, a high number of poor people in the middle of the high share of Junior High School, and it below leads to the creation of vicious circles in the Indonesia population. This condition caused the children from poor households do not possess the opportunity to access education at a relatively high level of education. This condition caused the children from poor households do not possess the opportunity to access education at a relatively high level of education, so there is a high probability for can not escape from poverty. In the long-term, previous poverty always will generate new poverty that causes an increase in poverty. The current state information of level and rate of change from education inequality will provide information to policymakers about how many education inequality levels should be reduced.

The development of education from 1973 until now has resulted in changes in the educational attainment of the population in Indonesia, which will also change the composition of the population at a certain level of education. Analysis of education inequality between years will be relatively difficult if it does not determine a value that can represent the level of education inequality in Indonesia. Indonesia's education level consists of several levels to determine a value representing its inequality so that an indexing method is needed.

As far as the search in literature, the measurement of the gap Indonesian education in a long period is still minimal. Digdowiseiso[7] measures only four years using data SUSENAS. This research can provide historical information about education inequality that has not been revealed by so far and useful to advanced research on the same topic. Also, this research gives a new finding historically that has not been researched and measured in an extended period. Historically findings can not be obtained in a period relatively short or measurements in one regional provincial.

In the development of education in Indonesia, Dick[8] showed that one of the legacies of Indonesia's First Order was the education level of Indonesian people that very low if compared to neighboring countries such as Thailand, Singapore, Philippines, South Korea, and Hong Kong. Bayhaqi[9] also explained that large-scale education development occurred since 1973, especially at basic education. Even though the massive increase in education facilities only at the level of basic education. Until 1994-1995 the number of secondary and tertiary level education provided by the government was less than that provided by the private sector. In 2016, the schools number at junior secondary provided by the government had dominated the number of schools at that level. Increasing the number of schools at the junior secondary level indicates that there has been a change in the allocation of the education budget in the development of education, resulting in an acceleration of the supply of schools. Changes in education development from 1973 to 2017 will also change the rate of decline in education disparities every year. The calculation result of education inequality is crucial information to analyzed and utilized in the description of the conditions of acceleration or deceleration in declining education inequality. Therefore, the rate of education inequality is presumed not to decline consistently, so an analysis of the rate of change in declining education inequality is needed.

Economic growth is an indicator of increasing living standards and household income. Therefore, fluctuations in economic growth will cause the share of household income for education funding declining. Noorbakhsh and Culp[10] use the Ordinary Demand Function or Marshallian Demand Function to determine the demand function of education. Noorbakhsh and Culp[10] found that education demand for individual/household is affected by the price of the education service, which is proxied by the education cost, other institutions education cost in the close area (substitution commodity prices) and the level of Consumer household income. Those factors are budget constraints of education consumption. Based on these findings, the concept of the Substitution Effect and Income Effect can explain education participation.

The findings of Noorbakhsh and Culp[10] mean that household income, the provision of public education by the government, and various government subsidies are determinants of school-age household members' continuing education. Further impacts will occur on relatively low-income households and poor households that are very vulnerable to Withdraw From School school or preferable to seek a job. As a result, this will encourage many Indonesians to possess relatively low levels of education.

At a certain tax ratio level, a decrease in GDP, or a decline in economic growth will result in a decrease in government revenue. Under these conditions, even though the education share budget remained, this resulted in a reduction of the education budget. Decreasing the education budget can impact the government's ability to provide education facilities so that it cannot equalize the growth of education facilities and the growth of the school-age population and education subsidies. This condition can also encourage a decrease in education participation. Therefore it tends to inhibit the reduction of education inequality.

Fluctuations in economic growth also became determinant of fluctuations in the number of poor people. As stated by BPS[11] that in 1988 there was a massive increase in the poor because of the economic recession. Suryahadi et al[12] suggested that economic growth in every sector in Indonesia will reduce poverty even though different magnitude. Therefore, the contraction in Gross Domestic Product will increase the number of poor people who will increase in the share of the population incapable of financing the education of their household members. Therefore, it is suspected that the magnitude of reduction in education inequality fluctuated between years, between decades and between regimes, because of the tendency of the influence of macroeconomic performance and poverty factors. As the description of the problem described earlier, therefore to solve the problem, this study has the following objectives : (1) Calculate and analyze the level of education inequality in Indonesia annually, (2) Analyzing and comparing the rate of change in education inequality between decades, (3) Analyzing opportunities for reducing education inequality in Indonesia, and (4) Describe the historical relationship between changes in GNED on economic growth, reduction in the number of poor people, and the provision of education by the government.

II. Brief Literature Reviews

The difference in education levels between individuals will result in the gap of human capital marginal product between individuals. As a result, variations of human capital are supposed to affect economic growth. Lopez et. al.[13] succeeded in proving empirically that income per capita was negatively and significantly affected by the distribution of education levels. These findings indicate that education inequality will inhibit a country's economic growth because of its negative impact on the economy. To measure variations in the

distribution of human capital, Thomas et al.[6] suggested one way of measuring education inequality using the Education Lorenz Curve or the determination of an education inequality index by calculating cumulative percentages among residents at various levels of education. Description of Education Lorenz Curve can be seen in the following figure.
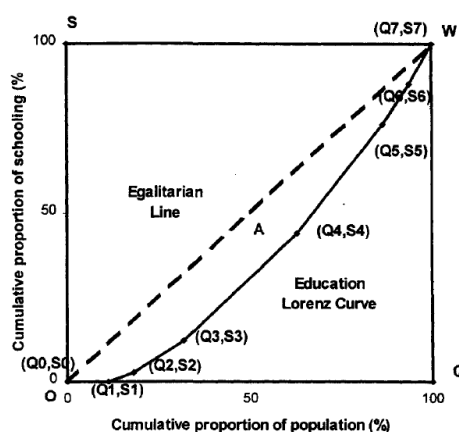

Figure 1. Education Lorenz Curve (Thomas et al. (2001)).

On the Horizontal-Axis side, the picture shows the cumulative percentage of the population at the i-th education level (i = 1,2,3,4,5,6), whereas the Vertical-Axis side is the cumulative percentage of education level i. Based on this figure, point (Q1S1) illustrates the percentage of the population that can reach the level of education at level 1. Todaro and Smith[5] suggested that the method can generate a comparison of education inequality between countries through Education Lorenz Curve. If Education Lorenz Curve is increasingly away from the 45-degree line (Egalitarian Line) then the level of education inequality will increase because it illustrates the percentage of lower education levels relatively more than the higher education level, vice versa. Furthermore, Todaro and Smith[5] stated that in determining the index of education inequality using the Education Lorenz Curve, it can be done by calculating the ratio between the region between the Education Lorenz Curve line (Region A) to the OWQ triangle region. The use of Education Lorenz Curve makes it very easy to compare interpretations of education inequality calculations. Observing changes in the value of the Education Inequality Index, which is declining, it can be interpreted that there is a decrease in the population share with relatively low education.

Stiglitz[14] suggests that the role of education in individual productivity. First, education can provide excellent performance in the working environment through more obedience to commands, follow directions, and play a functional role in working as a team. In this way, education provides social and economic capabilities that make it more valuable in the workplace. Secondly, education can recognize and sharpen the potential abilities of each individual therefore, that it can guide to a job that better on utilizes the best level of productivity of the individual. Van der Sluis et al.[15] suggested that returns from investment in education are much greater than those obtained by entrepreneurs compared to labor. Entrepreneurs are able and have the opportunity to freely maximize the use of the level of education that they get more productively than as labor. Educated entrepreneurs are easier to apply innovative ideas directly to the market. The implication is education will encourage the increase and support of successful beginner entrepreneurs and encourage the impact of education on the economy.

Checci[16] stated that high-income people who tend to consume more education, in this case, indicate a distribution problem. On the other hand, education is a factor that increases productivity and individual wages[16],[17] ,[18]. Education is a commodity that has externalities, but not every individual can access it. Therefore one of the objectives of the government in providing education is due to externalities[14]. Based on that, the government's goal in education should only reducing education inequality and increase people's participation in education.

Stiglitz[14] argues that the allocation of public goods/services including efficient education occurs when the sum of all marginal rates of substitution of consumers of education goods/services equals the marginal rate of transformation of providers of education goods/services, as well as in the provision of education by the government. The entire marginal rate of substitution of consumers of public goods/services is illustrated by the cumulative willingness to pay of consumers to consume education provided by the government. Meanwhile, the government's provision curve of public education, which is the marginal rate of transformation of the providers of public goods/services, is illustrated by the increase in costs incurred by each rise in the quantity of public education for consumers. Based on this, it can be seen that the demand level for education services and the

education provision by the government is the main determinant of the variability of the level of education achieved by the society.

Ibourk and Amaghouss[19] calculate the level of education inequality in the Penn World Table data on the Barro-Lee Dataset[20] that using calculations using the Gini Index Education method as stated by Thomas et al. [6]. The calculation results show that the level of education inequality selected country in Asia indicates that Korea, Singapore, and the Philippines have the lowest level of education inequality in Asia. Comparison of calculation results shows that the achievement of education inequality in Korea, Singapore, and the Philippines is lower than that of the middle east countries, both middle-income countries and high-income countries. Calculations made by Ibourk and Amaghouss[19] cannot analyze historical descriptions because Barro-Lee Dataset[20] does not provide data per year but only provides data per five years. Therefore, changes between years cannot be analyzed.

Yu et al[21] used calculations using the Gini Index Education method as formulated by Thomas et al.[6] in 1990, 2000, 2005, 2010, in every province in China. The calculation results show that the highest level of education inequality was calculated at 0.72 in 1990 in the Province of Tibet. The lowest level of education inequality was 0.18 in 2010 in several provinces. The calculation of the average in all data levels of education inequality in China shows an average level of magnitude of 0.28 with a standard deviation of 0.08. Limitations of calculating the level of education inequality in China conducted by Yu et al.[21] is calculated only in a particular year therefore, it has not explored the historical description of the rate of change in the level of education inequality per year.

Agrawal[22] calculates and analyzes levels of education inequality between cities and villages in India using panel data in 1993, 1999, 2004, and 2009. The findings are in the form of village and city education inequality accompanied by a description of the rate of change in inequality. National education inequality decreased by 57 percent from 1994 to 1999, decreased by 57 percent from 1999 to 2004, and decreased by 51 percent between 2004 and 2009. The resulting research data shows that the highest level of education inequality is 0.80 in rural areas in 1993 While the lowest level of education inequality occurred in 2009 in urban areas of 0.26. The limitations of Agrawal[22] research are the same as the limitations of the research of Yu et al.[21] and Ibourk and Amaghouss[19], which is using unsorted data year by year.

Senadza[23] examines the level of education inequality focused on gender issues and education disparities between regions. The study uses data from the Ghana Living Standards Survey in 2005/2006. The data is in the form of survey data conducted on 8,687 households and 37,128 individuals. Of the 37,128 individuals were aged 15 years and above. Senadza's[23] research identifies education inequality that occurred in the survey year, which resulted in findings in the form of education inequality in gender comparisons. The study shows that education inequality is relatively higher in the female sex, whereas inter-regional analysis indicates that several regions produce relatively higher education inequality levels. The findings resulted from Senadza[23] explore to maximize regional differentiation and socioeconomic factors in analyzing education inequality, even though they only use one year.

Several previous studies have shown that the calculation of education inequality using the Gini Index Education as formulated by Thomas et al. [6]. In contrast, this study calculates the level of education inequality by using the Education Lorenz Curve. The existence of this study can generate material of comparisons of calculations between the Gini Index Education method and the Lorenz Curve Education method. The comparison will enrich the findings of research on education inequality. Some of those studies are more focused on panel data and census data while in this study trying to explore education inequalities by using time series data, which much longer series. The findings that are expected with this long period series data are historical descriptions of changes in changes in the level of education inequality that can be linked with a description of fluctuations in macroeconomic performance and poverty.

III. Material And Methods

To answer the objectives of this study, it starts with calculating the level of education inequality conducted every year in 1978-2017. Furthermore, calculate the ratio of the rate of change in education inequality between decades. Then, this study also descriptively analyzed the opportunities for reducing education inequality in Indonesia. The study ended by analyzing the historical description of "stylized fact" to determine the relationship between education inequality and economic growth, poverty, and the education budget.

Source and Data Type. This study used time-series data in the period from 1978 to 2017. Data Usage in that period due to constrained data publishing when this study was conducted, therefore in the future, similar research could be updated with used the latest data. The data was obtained from several sources, which is the Indonesian Central Bureau of Statistics (Badan Pusat Statistik Indonesia-BPS) and documentation of previous research data. The data was needed in this study in the form of workforce education level at several criteria, that is the level of primary education (elementary school), junior high school (SMP), senior high school (SMA),

diploma education, and higher education. The school participation rate data (Angka Partisipasi Sekolah-APS or SPR) taken in the period 2011-2017.

Data Collection Technique. Data collection was conducted by digitally or manually through recording on hardcopy documents. Digitalized documentation was documented by collecting digital data online on the BPS website and offline at the BPS Indonesia Office. Manually documentation of data was conducted by copying data from BPS Publication Book 1998-1978 that had not digitalized. Additionally, Manually documentation of data was conducted on the data contained in previous studies which were Yudhoyono's[24] dissertation data.

Data Analysis Method. Education Inequality calculations were conducted by the Education Lorenz Curve method. Description of the stylized fact between education inequality, economic growth, and poverty, resulted from an analysis of measurement average values and analysis of alteration in education inequality. Data analysis stages were sorted as follows : (1) Calculated the Education Gini Index every year in the period 1978-2017, (2) Tabulated the Education Gini Index each year and calculated the average decline in education inequality every decade, (3) Calculated the alteration in GNED every year in the period 1978-2017, and (4) Analyzed the results of the alteration calculation of GNED each year using a scatterplot chart.

Measurement of the level of educational inequality in Indonesia was calculated used The Education Lorenz Curve method as Thomas et al.[6] develop. The Education Lorenz Curve described the cumulative percentage distribution of the population towards the cumulative percentage distribution of educational levels that an individual has achieved. The cumulative percentage of the population from several levels of education (Q_i) were as follows.

a). Illiterate and not graduate from elementary school

$$Q_1 = (p_1) / (p_1 + p_2 + p_3 + p_4 + p_5 + p_6)$$

b). Graduated from Elementary School (SD)

$$Q_2 = (p_1 + p_2) / (p_1 + p_2 + p_3 + p_4 + p_5 + p_6)$$

c). Graduated from Junior High School (SMP)

$$Q_3 = (p_1 + p_2 + p_3) / (p_1 + p_2 + p_3 + p_4 + p_5 + p_6)$$

d). Graduated from Senior/Vocational High School (SMA/K)

$$Q_4 = (p_1 + p_2 + p_3 + p_4) / (p_1 + p_2 + p_3 + p_4 + p_5 + p_6)$$

e). Graduated from Higher Education Diploma Level

$$Q_5 = (p_1 + p_2 + p_3 + p_4 + p_5) / (p_1 + p_2 + p_3 + p_4 + p_5 + p_6)$$

f). Graduated from Undergraduate and Postgraduate Universities

$$Q_6 = (p_1 + p_2 + p_3 + p_4 + p_5 + p_6) / (p_1 + p_2 + p_3 + p_4 + p_5 + p_6)$$

While the cumulative percentage of education levels at several levels of education towards total education level (S_i) were as folows.

a). Illiterate and not graduate from elementary school r

$$S_1 = (p_1 y_1) / (p_1 y_1 + p_2 y_2 + p_3 y_3 + p_4 y_4 + p_5 y_5 + p_6 y_6)$$

b). Graduated from Elementary School (SD)

$$S_2 = (p_1 y_1 + p_2 y_2) / (p_1 y_1 + p_2 y_2 + p_3 y_3 + p_4 y_4 + p_5 y_5 + p_6 y_6)$$

c). Graduated from Junior High School (SMP)

$$S_3 = (p_1 y_1 + p_2 y_2 + p_3 y_3) / (p_1 y_1 + p_2 y_2 + p_3 y_3 + p_4 y_4 + p_5 y_5 + p_6 y_6)$$

d). Graduated from Senior/Vocational High School (SMA/K)

$$S_4 = (p_1 y_1 + p_2 y_2 + p_3 y_3 + p_4 y_4) / (p_1 y_1 + p_2 y_2 + p_3 y_3 + p_4 y_4 + p_5 y_5 + p_6 y_6)$$

e). Graduated from Higher Education Diploma Level

$$S_5 = (p_1 y_1 + p_2 y_2 + p_3 y_3 + p_4 y_4 + p_5 y_5) / (p_1 y_1 + p_2 y_2 + p_3 y_3 + p_4 y_4 + p_5 y_5 + p_6 y_6)$$

f). Graduated from Undergraduate and Postgraduate Universities

$$S_6 = (p_1 y_1 + p_2 y_2 + p_3 y_3 + p_4 y_4 + p_5 y_5 + p_6 y_6) / (p_1 y_1 + p_2 y_2 + p_3 y_3 + p_4 y_4 + p_5 y_5 + p_6 y_6)$$

Description :

p_i = population or total population at the i-th level of education

y_i = length of school at the i level of education

$p_i.y_i$ = quantification of education level calculation using years schooling
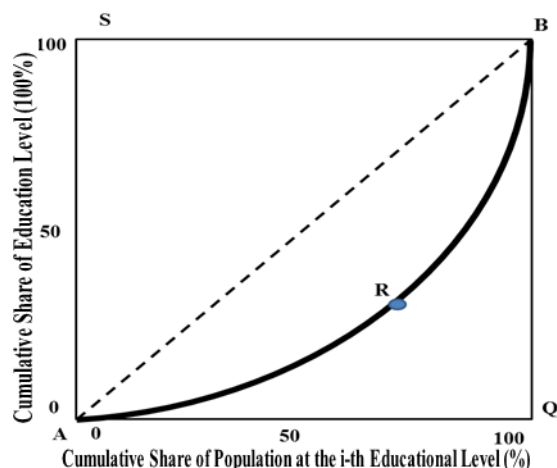
Figure 2. Several Area on Education Lorenz Curve

Eduaction Lorenz Curve Index was obtained from the ratio between ARB area to the AQB triangle area. According on this, the Education-Lorenz-Curve Index can be formulated as follows[25],[26], [27].

$$\text{Eduaction Lorenz Curve Index} = 1 - \sum_i [(S_i + S_{i-1})(Q_i - Q_{i-1})] \qquad ...(1)$$

The usage of average values aimed to summarize a set of data into one value that was assumed capable of representing. The average value was the basis of comparison between different data sets in different periods of years. The comparison will produce differences in the characteristics of macroeconomic variables between periods. There were various methods to calculate the average, therefore in this study, the selected method was measurement average values. According to Kuncoro[28], choosing this method was to obtain the actual average value because the data had not yet been classified. The mean formula on frequency data distribution would produce bias due to risk grouping errors. The calculation formula for the measurement average values was as follows.

$$\overline{X_t} = \frac{\sum_n^i X_t}{n} \qquad ...(2)$$

Description : $\overline{X_t}$ = Measurement Average Values, n = Total amount of time series data processed, X_t = time series data in the t-year.

In this study, changes in the education inequality index were calculated in the inter-year period, decade, and between decades. Usage of the value of change in the education inequality inter-year aimed to see its dynamics or fluctuations and examine the extreme value and volatility of educational inequality in 1978-2017. The formula for calculation of changes in educational inequality values is as follows.

Inter-Year Change $\quad = \quad \Delta GNED_{t_{1+i}-t_i} = GNED_{t_2} - GNED_{t_1}$ $\qquad ...(3)$

Decade Change (%) $\quad = \quad \Delta GNED_{t_{10}-t_1} = \left(\frac{GNED_{t_{10}} - GNED_{t_1}}{GNED_{t_1}}\right).100$ $\qquad ...(4)$

Between Decades Change(%) $\quad = \quad \Delta GNED_{t_{11-20}-t_{1-10}} = \left(\frac{\frac{\sum_{10}^1 GNED_{t_{11-20}}}{10} - \frac{\sum_{10}^1 GNED_{t_{1-10}}}{10}}{\frac{\sum_{10}^1 GNED_{t_{1-10}}}{10}}\right).100$ $\qquad ...(5)$

Analyzing the calculation results of the change in the education inequality index every year was conducted with a scatterplot chart. Scatter diagrams generate dots of data distribution that could provide information about the distribution of educational inequality at extreme points so that it could appear the tendency of the involvement from certain macroeconomic variables towards those fluctuations historically. Usage of this scatters analysis for historical descriptive analysis was conducted using data distribution of

changes in educational inequality between years (Vertical Axis) paired with the year of observation (Horizontal Axis). The scatter diagram analysis method is as follows.

1. Data of changes in educational inequality index were placed on the vertical axis,
2. Another Data in the form of observation years are placed on the horizontal axis,
3. Determine the overlap points between the dots from data of change educational inequality index and the observation years,
4. After generating the overlap points, it could be analyzed visually based on their distribution, extreme points, and fluctuations between years.

III.   Result andDiscussion

A. Result Analysis

Calculation results of the education inequality index using the Lorenz curve concept [29], which, as formulated in equation (1), are presented in Table 5.1. The education inequality index of 0.926 in 1978 shows the index almost reaches to 1, which is the value of perfect inequality. Based on BPS data[30] in 1978 describes education conditions with an uneducated as many as 31.73 million people, elementary school graduates of 11.44 million, junior high school graduates of 2.18 million, high school graduates of 1.67 million, and only 0.26 million people can study at tertiary education. The calculation results show that within 20 years, the Indonesian government was able to reduce the education inequality index by 45.14 percent, as indicated by the achievement of the education inequality index of 0.508 in 2017. The decline was achieved by decreasing 11.5 million uneducated population while increasing the workforce on the level of junior secondary education, senior secondary education, and tertiary education, respectively of 20.8 million, 35.5 million, and 15.2 million.

Tabel 3. Calculating result of Education Inequality in Indonesia each year in the period 1978-2017.

Year	Education Inequality Index	Year	Education Inequality Index	Year	Education Inequality Index	Year	Education Inequality Index
1978	0.926	1988	0.827	1998	0.763	2008	0.627
1979	0.916	1989	0.837	1999	0.745	2009	0.620
1980	0.906	1990	0.819	2000	0.695	2010	0.603
1981	0.897	1991	0.803	2001	0.690	2011	0.597
1982	0.890	1992	0.799	2002	0.688	2012	0.581
1983	0.876	1993	0.788	2003	0.672	2013	0.565
1984	0.863	1994	0.775	2004	0.664	2014	0.559
1985	0.858	1995	0.761	2005	0.658	2015	0.527
1986	0.853	1996	0.737	2006	0.640	2016	0.505
1987	0.841	1997	0.728	2007	0.646	2017	0.508
Declining in the period 1978-1987		Declining in the period 1988-1997		Declining in the period 1998-2007		Declining in the period 2008-2017	
9,17 percent		11,9 percent		15.33 percent		18.79 percent	

Even though the current conditions, the level of education inequality in Indonesia is still relatively high when compared to some countries in the ASEAN region such as the Philippines, Singapore, and Vietnam. Even the level of education inequality in Indonesia is far high compared to East Asian countries such as Korea, China, and Japan[19]. The delay causes this condition in starting education development, and also obstacles to the development of education equality due to Indonesia's landscape is widespread and fragmented. The high level of education inequality at the beginning of development is prevalent. As Todaro and Smith[5] stated that there is a choice for a country between efficiency and equity, which is to encourage the achievement until relatively high education for some people as capital to boost economic productivity or equalize the level of education for all society.

Furthermore, if divided into four decades, it shows the difference in the percentage of decline between those decade periods. The lowest education inequality decrease occurs in the early decade of the research period which is 9.17 per cent in the period 1978-1987, while the highest education inequalitydecrease occurs at the end of the decade which was 18.79 in the period 2008-2017. Comparison of the decline in education inequality in intra-decade shows each decade the decline in education inequality is getting more drastic. Besides, the change in education inequality decline between decades also shows a difference in magnitude. The most significant decline in the average of education inequality index occurs between period 1978-1987 to 1988-1997 of 29.77 per cent. While the lowest decline in the average of education inequality index occurs between period 1998-2007 to 2008-2017 of 22.57 per cent. This finding shows that the drastic decline occurs in education inequality between 2 early decades, even though the declining between each year were smaller than in 2008-2017. The high marginality is due to the drastic increase in education development which has caused education level to change drastically as well.

Table 4. School Participation Rate of Indonesian Population in the Period of 2011-2017

Year	Level of Participation Rate of Indonesian			
	07-12 Year	13-15 Year	16-18 Year	19-24 Year
2011	98.99	87.99	57.95	27.68
2012	99.36	89.76	61.49	28.55
2013	99.66	90.81	63.84	29.18
2014	99.82	94.44	70.31	32.93
2015	99.84	94.72	70.61	33.07
2016	99.9	94.88	70.83	33.94
2017	99.85	98.09	82.15	34.28

Education Inequality at 0.508 level achieved in 2017 still has many opportunities to be declined faster in the future. A faster decline occurs if every school-age population in Indonesia is willing to participate in senior secondary education and tertiary education. As presented in Table 5.2, describe that the school participation rate of the age group 07-12 year and 13-15 year in 2017 has reached 99.09 per cent and 94.8 per cent, respectively. Even though, the school participation rate at the level of 16-18 years and the age group upper 18 years is still not optimal which are 73.8 per cent and 27.12 The level of participation of elementary schools and junior high schools that are already high. Those are the main capital to decline education inequality faster because the government only focuses on increasing participation at the next level. Therefore, the opportunities for declining education inequality are derived from an increase in school participation rates in the 16-18 year age group or at the senior high school level. The further impact of increasing population schooling participation at the senior high school level is to increase the probability of an individual to attend school at a higher level of education.

Based on Figure 5.1. visually it was discovered that the magnitude variation of declining education inequality in the 1996-2017 period was higher than the magnitude variation of declining education inequality in 1978-1995. This magnitude variation is presumed to be caused by three cases: (1) There are determinants of declining education inequality that became more fluctuate since 1996-2017, (2) fluctuations in the addition of education development budget, (3) additional of determinants which contributing to determine the declining education inequality. Other findings from scatterplot in Figure 5.1. are the magnitude of the declining education inequality each year in the period 1978-2017 describe the most changes in education inequality are at a negative value. Nevertheless, the declining education inequality does not occur each year because increasing education inequality occurs in certain year.

The greatest of declining education inequality per year occurred in 2000, which was -0.050 points or 6.71 per cent. In that year, there was a decreasing the uneducated workforce of 1.958 million people while at the same time, the workforce with secondary education and above increasing to 1.926 million[31],[32]. These findings indicate that the declining education inequality in 2000 is caused by a drastic change in the composition of the workforce education level at the senior secondary level. The highest of increasing education inequality per year occur in 1998 amounted to 0.036 points or 4.92 per cent.
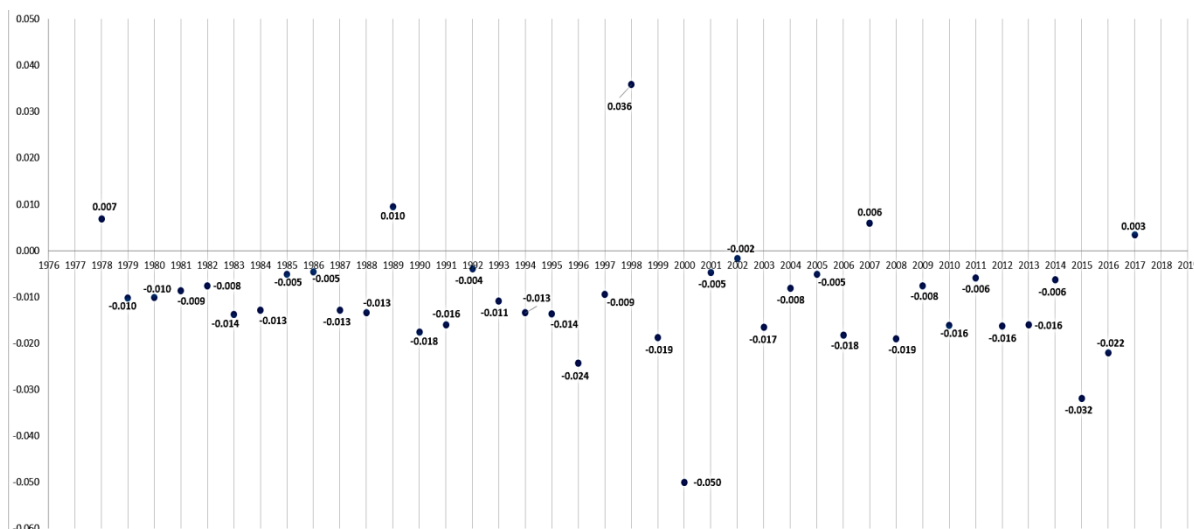

Figure 3. Scatterplot of the change in education inequality index each year in the period 1978-2017

Based on BPS data [31],[32] shows that in 1998 there was an increase the junior secondary education workforce and its below became 2.97 million people, however an increase the senior secondary education workforce and its above only increase of 1.02 million. Based on the data of this phenomenon, it is indicated that the increase education inequality in 1998 was caused by the workforce at level junior secondary education and its below which increased significantly more than the senior secondary education workforce and its above. Therefore, the increasing education inequality indicates that there is an additional new workforce or school-age population perforced to became workforce. Even though they do not complete half of the total education levels that can be taken in Indonesia, at least graduates from senior secondary school.

B. Discussion

The difference in the percentage of declining in inequality education occurs in between decades. The highest percentage declining in inequality education occurs in the first two decades that is period 1978-1997 while percentage declining in inequality education occur in the last two decades that is period 1998-2017. The high marginality in education inequality declining between 1978-1987 and 1988-1997 can be caused by education development begin in the two first decades. Bayhaqi[9] suggested that the drastic change in the level of GNED was caused by the massive initial development of Indonesian education in 1973-1975. Education development is conducted through the INPRES Program, which is focused on the number of primary schools in each district. The existence of INPRES Programme has resulted in a drastic increase in school participation rates at the primary education level. The government funds INPRES Programme on a large scale because the government obtain a massive revenue from the First Economic Boom that caused by Increasing of Oil Price. The existence of the program also induces of alleviation of illiteracy in the new order, which is the principal capital to support the reduction of education inequality. The profound change in the past two decades is due to the fact the facilities and teaching staff are much better than in the first two decades. Therefore, the differences between the last two decades are not too drastic.

Another research finding is the opportunity of declining education inequality, which one is focusing on the contribution of increasing the number of schools in secondary education and its above, but still has an obstacle. Central Bureau of Indonesia Statistics (BPS) describes that there is a shortage of schools at the level of senior secondary education, therefore involves the role of the private sector in senior secondary education. The growth of students at senior secondary education level is around 2.41 per cent per year. While the growth of schools in secondary education level that organized by the Ministry of Education only to 1.66. The Central Bureau of Indonesian Statistics/BPS[33] also stated that the percentage of the number of private schools at secondary education level even reach 61.83 per cent while state schools at secondary education level only reach 38.17 per cent. This condition indicates that school infrastructure at the senior secondary education level provided by the state is still deficient so that the role of the private sector in providing secondary education in Indonesia is vital.

The orientation of the administration of education between Private and State is different. The private sector will always be commercial or profit-oriented. At the same time, the orientation of state education provision is non-profit-oriented that pursue education externalities and to fulfil the mandate of the constitution. This condition will cause the probability of the existence of budget constrain to go to school in senior secondary education level became greater caused by higher opportunities for education commercialization. The facts that stated by[33] indicate that the higher level of household income per capita will increase the level of participation in senior secondary education. In the top 3 quintiles, senior high school participation rates were above 80 per cent, while in the bottom two quintiles, they were only able to reach participation rates of 75.4 per cent and 62.44 per cent. The level of household income is very influential on the participation of school-age children in the household. Caner and Okten[34] suggested that a high level of household income would encourage an increase in education consumption to the higher education level even more dominating not only in private but also state school. These conditions indicate that the increase in household income tends to influent the increasing demand for education. Therefore, low-income households have a high probability of difficulty to send household members to school because they confront to mostly commercial or profit-oriented school.

Increased education participation will depend on decreasing share of the population in the bottom 2 Quintiles and increasing per capita income growth. Bahari et al.[27] stated that poverty is an inhibitor declining education inequality even though government increase in education supply. Education participation of poor households is a huge opportunity cost. School-age of Poor households member must select between using the time to go to school or using the time to increase household income. Therefore, the opportunity cost of school participant time from a poor household is an additional income for the household. An increase in per capita income will generate the increasing ability of each household to fund various expenses include spending on education. Increasing education expenditure will also increase the participation in education, therefore increase the level of education that can be achieved by a school-age household member.

On the other hand, the government's ability to equalize the growth rate of state schools at the senior secondary level is highly dependent on the magnitude of the government's fiscal allocation for education development. While the government's fiscal capacity is determined by how much government revenue, increase in per capita income growth will raise government revenue so that the ability to finance education will also increase. This condition indicates that which one of the determinants of declining education inequality is poverty reduction and rising per capita income growth.

The results of the scatterplot analysis provide findings of historical description of changes in declining education inequality level of Indonesian over the period 1978-2017. Based on visualization, it can be seen that the distribution of the declining education inequality index in the period 1996-2017 shows a higher variation than the previous period. However, this distribution shows findings that in the longer the time makes greater the difference of decline, as described in Table 5.1, there is an effect on the parent education level towards their children. A higher parent education level will induce their children to obtain a greater probability to have an opportunity to the higher level of education later. As a result, the next generation will have a higher chance to get a better education[35]. The higher level of education is the crucial determinant of income differences indicate that a higher level of education will increase individual income[36]. Therefore, the parent's education level will determine the ability of a household to finance the education of school-age household members to go to school. The increasing number of household heads who reach a higher level of education will generate more school-age children who have the opportunity to pursue a higher level of education. The impact those are declining education inequality, but in the further impact will generate an increased acceleration of the declining education inequality in the future.

Economic growth will increase the purchasing power of society. Furthermore, it will also enhance the ability of households to finance members of school-age households to pursue a higher level of education. Historically the main characteristics of Indonesia's economic growth as described by Boediono[37] show that the Indonesian economy is characterized by three periods which are the Oil Boom period (1969-1981), the Export Expansion period (1982-1996), and the period of increasing exports or the Boom Export period 2004-2006. The high economic growth of those periods was one of the essential sources of funding of development in Indonesia, including education development. The existence of the oil boom period allowed the government to start and expand education development programs without having to sacrifice the stability and macroeconomic balance that had been painstakingly achieved in the early years of the New Order.

Historically description of change rate in declining Education inequality that is associated with poverty reduction and increased per capita income growth can be explained as follows. There is a massive burden on the New Order government in developing education in Indonesia. Although the availability of development funds from the Oil Boom Period in large numbers, but is used not only for education development but also used to finance other developments such as health and infrastructure. Education funding can exclusively be focused on the development of basic education but has succeeded in increasing elementary school participation by up to 62 per cent from the previous figure[38]. Although in the 1978-1987 period, Indonesia achieved high economic growth due to the Oil Boom in the early development of education. Therefore the level of declining education inequality equity on the workforce in each year was still very small at 9.17 per cent.

The re-availability of development funds for education is the impact of the success of the Export Expansion Period so that the government can improve education programs that are focused on increasing junior secondary level education participation. The program is known as 9-year compulsory education with a target of 95% education participation. This achievement on this programme was the participation of junior high schools (SMP) which reached 70 per cent in 1997[38]. The success of government development in improving education is supported by the success of the government in improving the social welfare of the Indonesian people. The indicator is a significant reduction in poverty followed by consumption expenditure of rural and urban people which is also very substantial. During this period, many programs were oriented towards rural areas, thereby encouraging consumption growth in rural areas that was equivalent to urban areas[37]. During this period, the Indonesian people experienced a better standard of living than before, which helped encourage the Indonesian people to allocate more funding for future lives such as education. These conditions cause a decrease in education inequality on period 1978-1997 much faster than others period. The declining education inequality in 1978-1987 only 9.17 per cent, but become 11.9 per cent in the period 1988 to 1997.

The economic crisis in 1998 resulted in huge economic shocks not only for the economy but also for the social welfare of the Indonesian people. In this case, it can be seen from the drastic increase in poverty levels in only 1-2 years. In addition, the constant decline in the education inequality index since 1978 stopped in 1998. For the first time in Indonesian history, education inequality has increased in that year. The increase in education inequality even occurred by 4.93 per cent. Nevertheless, in 2004-2006, Indonesia experienced economic growth caused by the Boom Export. The economic growth is driven by the increase in world market prices for Indonesia's commodity exports of raw materials which made economic growth reach more than about 5 per cent in the period 2004-2007[37]. The existence of economic recovery and the Boom Export made an

increase in education inequality in 1998 finally show a sharp decline. In 1998-2007, declining education inequality became faster, which is from 12.31 per cent in the 1987-1996 period to 15.37 per cent in the 1998-2007 period.

The mandate of the 1945 Constitution Amendment Article 31 (2) and the decision of the Constitutional Court dated August 13, 2008 Number 13 / PUU - IV / 2008 in the form of government obligations to fund education at least 20 per cent of the APBN, began to be allocated in 2010. Such funding resulted in a drastic reduction in education inequality by 18.98 per cent in the 2008-2017 period. That decrease is faster than in the previous periods. This condition indicates that the role of the state on declining education inequality is very important. The government's decision to fund education is very important because BPS data[39][40] show that in the last ten years household expenditure for education has never exceeded 5 per cent of total spending. This policy helps increase the amount of household education expenditure to encourage each household to be able to finance up to a higher level of education.

Historically, dynamics of education inequality per year in Indonesia shows that the results of high economic growth largely fund education development due to rising oil prices and the successful expansion of non-oil exports, as well as the Export Boom period. Although in that period there was no mandate of the 1945 Constitution Amendment Article 31 (2) and the decision of the Constitutional Court dated August 13, 2008 Number 13 / PUU - IV / 2008 in the form of government obligations to fund the education of at least 20 per cent of the APBN. Besides, poverty plays an important role in the dynamics of Indonesia's education inequality. The rate of decline in Indonesia's education inequality was only stopped once during the 1998 economic crisis, which at the same time, the poverty level of the Indonesian population increased dramatically. The mandate of the 1945 Constitution Amendment Article 31 (2) and the Constitutional Court's decision dated August 13, 2008 Number 13 / PUU - IV / 2008 in the form of the government's obligation to finance the education of at least 20 per cent of the APBN also provide a significant impact on reducing education inequality.

Based on the historical description of education inequality, it can be concluded that the declining in education inequality is closely related to economic growth, poverty levels and programs and government budget allocations in advancing education. Economic growth can provide increased national revenue. Therefore it can contribute to increasing the national expenditure including for the education function. In addition, the government's program to continue to conduct the mandate of the 1945 Constitution Amendment Article 31 (2) although in the high demands for government spending to other necessary allocations to encourage a reduction in education inequality.

IV. Conclusion and Research Implication

A. Conclusion

The results of the calculation of the education inequality index describe that in 1978 the Indonesian education inequality index was 0.926, and experience declining education inequality by 45.14 per cent for 20 years as indicated by education inequality index in 2017 by 0.508. The lowest GNED decrease occurred in the early decade of the research period which was 9.17 per cent which is in the period 1978-1987, while the highest GNED decrease occurs at the end of the decade which was 18.79 which is in the period 2008-2017.

The rate of change in education inequality shows a drastic decline. This condition is achieved because education development in the first two decades is conducted massively through the INPRES Program, which specified for the increase in the number of primary schools in each district. The existence of the INPRES Programme results in a drastic increase in school participation rates at the primary education level. This programme funded by a surplus of government revenue that is obtained from economic growth during the First Oil Boom Effect.

Opportunities for declining education inequality are sourced from an increase in school participation rates, especially in the age group of 16-18 years, which is conducted through an emphasis on increasing the number of schools at the level of secondary education and its above. However, school infrastructure at the senior secondary level is still dominated by the role of the private sector. Difference Orientation of educational supply between the state and the private sector can lead to the commercialization of education. This condition leads to the declining of probability from 16-18-year-old school children that constrained by the cost of attending school to increase their education to a higher level. Therefore, besides to improving the education infrastructure provided by the state, the increasing education participation will depend on decreasing population share in the 2 Quintiles of the lowest income people and increasing growth in income per capita.

Economic growth, a decrease in the number of poor people, and the allocation of the education budget in descriptive historically tend to be the factors that have an important role in determining fluctuations of educational inequality each year. The economic growth tends to be able to provide an increase in the national revenue and cause an increase in state education spending to develop education. Besides that, economic growth additionally can improve living standards better than previously consequently can encourage Indonesian people to allocate more spending for future lives such as education.

B. Research Implication

Creating a national education system that focuses on reducing educational inequality. The synergy between public and private education to widespread education through increase the number of schools. Public Education can focus on equitable education through increasing the quantity of absorption of students, while private education can be more focused on improving the quality of education.

The importance of government to allocate expenditure to encourage economic growth more equally helps reduce inequality of population income. Quality economic growth is marked by an increase in per capita income and a massive reduction in the number of poor people. Equality economic growth is a supporting condition for the rapid decline in education inequality.

Equality economic growth can be achieved by increasing the participation and contribution of the poor in economic growth. Increased participation can be implemented by focusing on economic growth in the agricultural sector. Where the highest percentage of poverty occurs in rural areas where most of the population works in the agricultural sector.

References

[1]. Worldbank. World Development Report 2018: Learning to Realize Education's Promise. World Bank Washington, DC: World Bank. Url: https://openknowledge. worldbank.org/bitstream/handle/10986/28340/9781464810961.pdf?sequence=68&isAllowed=y
[2]. Lagarda AM, Madrigal DF, Flores MT. Factors associated with learning management in Mexican micro-entrepreneurs. EstudiosGerenciales. 2016;32(141):381-6.
[3]. WorldBank. World Development Report 2007 : Development and the Next Generation. Washington: The World Bank; 2007.
[4]. WorldBank. Global Monitoring Report 2015/2016 : Development Goals in an Era of Demographic Change. Washington, DC: World Bank; 2016. Available from: https://openknowledge.worldbank.org/handle/10986/22547.
[5]. Todaro MP, Smith SC. Economic development. 12th ed. New Jersey: Pearson Education; 2015.
[6]. Thomas V, Wang Y, Fan X. Measuring Education Inequality: Gini Coefficients of Education. World Bank Policy Research Working Paper 2001;No. 2525.
[7]. Digdowiseiso K. Education inequality, economic growth, and income inequality: Evidence from Indonesia, 1996-2005. MPRA Paper Munich Personal RePEc Archive. 2009(17792).
[8]. Dick HW. The emergence of a national economy: an economic history of Indonesia, 1800-2000: University of Hawaii Press; 2002.
[9]. Bayhaqi A. Education And Economic Growth In Indonesia [Dissertation]. Singapore: National University Of Singapore; 2006.
[10]. Noorbakhsh A, Culp D. The demand for higher education: Pennsylvania's nonresident tuition experience. Economics of Education Review. 2002;21(3):277-86.
[11]. BPS [Central Bureau of Statistics]. [Indonesian Statistic] Statistik Indonesia. [Indonesian Central Bureau of Statistics]Badan Pusat Statistik Indonesia. 1999.
[12]. Suryahadi A, Suryadarma D, Sumarto S. The Effects Of Location And Sectoral Components Of Economic Growth On Poverty: Evidence From Indonesia. Journal of Development Economics. 2009;89(2009):109–17.
[13]. Lopez R, Thomas V, Wang Y. Addressing the Education Puzzle. The World Bank Policy Research Working Paper. 1998
[14]. Stiglitz JE. Economics of The Public Sector. 3rd ed. New York W.W. Norton Company; 2000.
[15]. Van der Sluis J, Van Praag M, Vijverberg W. Education and entrepreneurship selection and performance: A review of the empirical literature. Journal of economic surveys. 2008;22(5):795-841.
[16]. Checchi D. The Economics of Education : Human Capital, Family Background and Inequality. New York: Cambridge University Press; 2006.
[17]. Meier V, Schiopu I. Optimal higher education enrollment and productivity externalities in a two-sector model. Journal of Public Economics. 2015;121:1-13.
[18]. Popescu M, Crenicean LC. Innovation and change in education–economic growth goal in Romania in the context of knowledge-based economy. Procedia-Social and Behavioral Sciences. 2012;46:3982-8.
[19]. Ibourk A, Amaghouss J. Inequality in Education and Economic Growth: Empirical Investigation and Foundations - Evidence from MENA Region. International Journal of Economics and Finance. 2013;5(2):111-24.
[20]. Barro R, Lee J-W. Educational Attainment Data Set. In: Dataset B-L, editor. 1966 to 20102014.
[21]. Yu N, Yu B, Jong Md, Storm S. Does inequality in educational attainment matter for China's economic growth? International Journal of Educational Development. 2015;41(2015):164–73.
[22]. Agrawal T. Educational inequality in rural and urban India. International Journal of Educational Development 2014;34(2014):11–9.
[23]. Senadza B. Education inequality in Ghana: gender and spatial dimensions. Journal of Economic Studies. 2012;39(6):724-39.
[24]. Yudhoyono SB. The Rural and Agricultural Development as an Effort to Alleviate Poverty and Unemployment: a political economic analysis of fiscal policy [Dissertation]. Bogor-Indonesia: Bogor Agricultural University; 2004.
[25]. Bellu LG, Liberati P. Inequality Analysis: The Gini Index. 2006; Food and Agriculture Organization of the United Nations, Module 40.
[26]. Ozdemir D. Applied Statistics for Economics and Business. Switzerland: Springer International Publishing; 2016.
[27]. Bahari DI, Siregar H, Sahara S, Rachman HPS. Impact of Agricultural Sectors and Income Inequality in Rural Toward Role of Public Education in Decreasing Educational Inequality in Indonesia. International Journal of Economics and Financial Issues. 2019;9(1):151. DOI: https://doi.org/10.32479/ijefi.6924
[28]. Kuncoro H. Statistika Deskriptif Untuk Analisis Ekonomi Cetakan pertama PT Bumi Aksara Jakarta. 2018;284.
[29]. Lorenz MO. Methods of measuring the concentration of wealth. Publications of the American statistical association. 1905;9(70):209-219.
[30]. BPS [Central Bureau of Statistics]. [Indonesian Statistic] Statistik Indonesia. [Indonesian Central Bureau of Statistics]Badan Pusat Statistik Indonesia. 1978.
[31]. BPS [Central Bureau of Statistics]. [Indonesian Statistic] Statistik Indonesia. [Indonesian Central Bureau of Statistics]Badan Pusat Statistik Indonesia. 1999.
[32]. BPS [Central Bureau of Statistics]. [Indonesian Statistic] Statistik Indonesia. [Indonesian Central Bureau of Statistics]Badan Pusat Statistik Indonesia. 2000.

[33]. BPS. Potret Pendidikan Indonesia [Portrait of Indonesia Education]. Jakarta – Indonesia Badan Pusat Statistik Indonesia (BPS) [Indonesian Central Bureau of Statistics]; 2017.
[34]. Caner A, Okten C. Higher education in Turkey: Subsidizing the rich or the poor? Economics of Education Review. 2013;35:75-92.
[35]. Duarte R, Ferrando-Latorre S, Molina JA. How to escape poverty through education? : Intergenerational evidence in Spain. Applied Economics Letters. 2017;25(9): 624-7.
[36]. Chongvilaivan A, Kim J. Individual Income Inequality and Its Drivers in Indonesia: A Theil Decomposition Reassessment. Social Indicators Research: An International and Interdisciplinary Journal for Quality-of-Life Measurement. 2015;126(1):79-98.
[37]. Boediono. Ekonomi Indonesia Dalam Lintasan Sejarah. Bandung-Jawa barat: PT Mizan Pustaka; 2016.
[38]. Kristiansen S, Santoso P. Surviving decentralisation?: Impacts of regional autonomy on health service provision in Indonesia. Health Policy. 2006;77(3):247-59.
[39]. BPS [Central Bureau of Statistics]. [Indonesian Statistic] Statistik Indonesia. [Indonesian Central Bureau of Statistics]Badan Pusat Statistik Indonesia. 2004.
[40]. BPS [Central Bureau of Statistics]. [Indonesian Statistic] Statistik Indonesia. [Indonesian Central Bureau of Statistics]Badan Pusat Statistik Indonesia. 2015.