RESEARCH PAPER

Still Gap Issues of Education, Skill and Capital to Income Inequality

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Abstract
This study aims to explore welfare economic models that are viewed from the perspective of income inequality that still occurs in many countries today. Based on the theory of economic welfare, in this study, income inequality is influenced by the gap in the allocation/ownership of human and capital resources (L, K), especially in the difference of education level, labor skills mismatch and capital allocation gap. Income inequality and resource allocation gaps are measured by a specific index based on the gap formula. Based on panel data regression analysis with sample data in 33 Indonesian provinces (2007-2013), the estimation results show that the gap of education level, labor skills mismatch and credit allocation gap have proven to have a positive and significant effect on income inequality. This means that if the education gap, labor skills mismatch and credit allocation gap increase, then income inequality also increases. By knowing the magnitude of the inequality of resource allocation, policy-makers can reduce problems through reallocation and redistribution policies.
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JEL Classification: I31, I24, J01, C12, C33.

Introduction

Welfare is the purpose of the society in every country. A prosperous society in an economic context can be achieved if the community gets satisfaction with its utility, while in social policy, a prosperous society can be realized if the scope of service by the state is widely implemented to meet the needs of the community. According to the theory of classical, social welfare can be achieved through market mechanisms for efficient allocation of resources (theorem 1) and redistribution of welfare if the first means fails (theorem 2). But imperfect market competition is happening with various causes such as imperfect information, cartel, monopolist occurred, so the allocations of resources become inefficient and cause injustice and income inequality.

Income inequality and justice has become the attention and debate among the people in the world in the middle of the 20th century until now (where the Gini index has exceeded 0.4). Income inequality in many countries must be reduced, because income it can influence the political stability and ongoing development (Berg and Osrty, 2013), contrary to justice as well as influences the achievement of Millennium Development Goal (MDG), undermines justice and security (Brinkman et al., 2013). In 2018, global income inequality declined slightly, but some countries such as Chile, Mexico and Turkey are still high (the Gini index is more than

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0.4), including Indonesia (the Gini index is 3.8). The relation of income inequality and other macro variable case often makes indecision how to observe the root of the imbalance problem, which is quite high these days.

In many countries, there is a tendency for the Gini index to increase, along with an increase in per capita income and economic growth. So, does the increase in economic growth or per capita income that affects the rise in inequality of income? Kuznets (1955) states that there is a relationship between economic growth and income inequality, where increasing economic growth and per capita income will increase inequality in developing countries, but in countries with mature economies the opposite occurs. Piketty (2015) states that variation can occur if the rate of return to capital (r) is higher than the rate of economic growth (g). This is due to the significant proportion of capital returns coupled with the imbalance of capital ownership between the owners of capital and labor (caused by many factors including political history, regulations, institutions, educational background, etc.), so that even though growth increases but capital owners benefit more than labor.

Before, some economists (Deininger and Squire, 1998; Glaeser et al., 2009) conclude that the different ownership of land and asset factors causes income inequality. The another opinion states that unbalanced ownership/allocation of human resources also affect inequality, especially in skills and technology, that will affect productivity and then inequality (Begrakyan and Grigoryan, 2012; Jaumotte et al., 2013). Some other researchers stated that variations in remuneration in various sectors (Alvarado and Atienza, 2014), differences skills and productivity that are caused by differences in levels of education owned by workers and new job seekers (Charles-Coll, 2011) have an impact on inequality. Barro (2000) says that high income inequality is caused by imperfect credit markets that are not pro-poor; usually the imperfect credit market is only favorable to large-scale businesses. Moreover, Shahbaz et al. (2015) conclude that financial development in Iran reduces income inequality, but economic growth worsens income inequality. Other researchers says that spatial inequality in Iran will decrease if foreign direct investment increases (Pourfaraj et al., 2019), or in other words, the difference in foreign direct capital in each province affects inequality. Income inequality is also influenced by the low number of job choices, lack of employment opportunities and urbanization of labor which then results in urban unemployment (Nations, 2014). Long before, Kaldor (1955) said that inequality also influenced by the low skills and productivity of prospective workers. Kaldor's analysis has inspired researchers to examine spatial labor mismatch, the difference between people willing to work in a region but no job, or there is an opportunity to work in another region, but no one is willing to work due to a different skill or different education level and lack of information of prospective workers.

Many studies were conducted to examine the factors that influence income inequality, including economic growth, which is one of the achievements in a development perspective. But, the study of income inequality from the perspective of the resources allocation gap (labor and capital) to achieve economic growth has not been widely implemented. In this study, we try to explain and prove that resources allocation gaps and resources ownership gap in economic growth, both human and capital resources, have caused income inequality. The difference in human resource allocation is reflected by the education gap and labor skill mismatch, while the capital resource allocation gap is reflected by the capital allocation gap for micro, small, and medium-large enterprises. This research will be useful for policymakers to find out the influence of education level gap, labor skill mismatch, and imbalance in lending to income inequality.

To prove the effectiveness of the inequality of resources allocation on income inequality, Indonesian data from 33 provinces were used during 2007-2013. Indonesia's economic growth is indeed quite stable and the proportion of people living in extreme poverty has decreased to around 8%. However, economic growth has not been balanced with more equitable revenue

sharing. This is indicated by the Indonesian Gini index during the year of research up to now still around 0.4 and making Indonesia's inequality in the sixth worst position in the world.

The outline of the rest of the paper is as follows. Section 2 is a literature review, build the basic framework and model with to obtain the dependent and independent variables from a welfare economic perspective. Section 3 describes the research methodology, section 4 is an empirical result, and the last part is the conclusions and recommendations.

Literature Review

Let's review income inequality starting with welfare theory. Welfare relates to the income distribution in the society, that is how the total income is distributed among all people. One of the concepts of income distribution is functional distribution, that is part of the national income achieved by the owner of the main production factors, where this functional distribution is used to measure the productivity contribution from the different production factors.

Through Social Welfare Function (SWF), the welfare function as follow:

$$W = W(U_i) \tag{1}$$

where U_i is Utility index of the individual i. The optimal Pareto condition of SWF is derived through the functions of consumers and producers, and expanded in the overall economy. And the consumer utility function (U_i) is:

$$U_1 = U_1(q_{11}^*, q_{12}^*, (x_i^0 - x_i^*))$$

$$U_2 = U_2(q_{21}, q_{22}, (x_2^0 - x_2^*)) \tag{2}$$

where q_{11}^* is the number of Q_1 consumed by the 1st consumer, x_i^0 is the primary factor i possessed by the consumer, x_i^* is the number of factors offered to the producer. The production function is in form as follow:

$$F_h(q_{h1},...,q_{hk}, x_{h1},...x_{hj}) = 0 \qquad h = 1, ..., N \tag{3}$$

Where q_{hk} is the output Q_k from the h company and x_{hj} is the number of X_j that is used by the h company. Based on both functions, the maximum welfare (Pareto optimal) can be gained with the general form of two consumers and producers:

$$W^* = W\{(U_1(q_{11}, q_{12}, x_1^0 - x_1), U_2(q_{21}, q_{22}, x_2^0 - x_2))\} + \lambda F(q_{11}, q_{12}, q_{21}, q_{22}, x_1 + x_2) \tag{4}$$

If degraded partially to λ, so

$$\Rightarrow \frac{\partial W^*}{\partial \lambda} = F(q_{11} + q_{21}, q_{12} + q_{22}, x_1 + x_2) \tag{5}$$

$$W^* = F(q_{11} + q_{21}, q_{12} + q_{22}, x_1 + x_2) \tag{6}$$

So, the maximum welfare is the function of output and input factors, and if both functions are separated, then:

$$W^* = F(q_{11} + q_{21}, q_{12} + q_{22}) \rightarrow \text{comodity output function} \tag{7}$$

$$W^* = F(x_1 + x_2) \quad \rightarrow \quad \text{input factor function} \tag{8}$$

If welfare is a function of input factors, then the gap in ownership or allocation of factors causes income inequality between factor owners. Differences in ownership of production factors or resources can be caused by market failures, such as the occurrence of a monopoly.

In traditional welfare theory, two theorems of welfare economic fundamentals were based on Adam Smith statement in "The Wealth of Nations" in 1776, related to resource allocation (Stiglitz, 1991). Social welfare can be achieved through the efficient resource allocation in competitive market (first theorem), and through wealth redistribution, if there was no efficient result achieved (second theorem). Meanwhile, in the new welfare theory, which is a welfare theory after the great depression in the 1930s, or known as 20th century welfare economic theory, Keynes criticized the laissez-faire policy and market forces in the classical era which were less relevant under certain conditions (Keynes, 2018). In addition to Keynes, Romer and Lucas also emphasized the importance of knowledge from human resources in economic growth as a factor of production as well as human resources to increase productivity and ability to achieve prosperity. Besides Keynes, Romer and Lucas also emphasized the importance of knowledge from human resources as a factor of production in economic growth to increase productivity and the ability to achieve prosperity (Lucas Jr, 1988; Romer, 1994). Some of the world's organizations also contributed in the new welfare economy theory related to MDGs, it is about social capital, economic mobility, health, education, entrepreneurship, environment quality and public safety, and usually applied in the concept of welfare state that applies the principle of fairness and efficiency.

If welfare is measured by income distribution ($W^*(y) = \log W(y) = \sum_j \log y_j$), then the denial or divergence toward the welfare theory will cause the imbalance in the people's income distribution. Income inequality is a situation where there is unfairness in the redistribution of household income among the economy performers that can be measured by Gini Index. Gini index is often used to measure how far the distribution of income or consumption spending of the individual or household in an economics diverge from the balanced distribution/diagonal line in Lorenz curve, though it is not quite sensitive in distinguishing the various imbalance (Haughton and Khandker, 2009). Organization for Economic Co-operation and Development (OECD., 2013) described welfare from three measurements: economic development (GNP, GDP, HDI), Inequality (Lorenz Curve, Gini Index), and Poverty (absolute and relative income, poverty line/level).

Meanwhile, statistically, the Central Bureau of Statistics of Indonesia measure the income imbalance uses Gini Index as follow:

$$GR = 1 - \sum_{i=1}^{n} f_{Pi} \cdot (F_{Ci} + F_{Ci-1}) \tag{9}$$

where GR = Gini Coefficient
    f_{Pi} = Population Frequency in income level i
    F_{Ci} = The total expenditure cumulative frequency in expenditure level i
    F_{Ci-1} = The total expenditure cumulative frequency in expenditure level (i-1)

Next, let us review the literature on how inequality in ownership or allocation of resources causes income inequality. According to equation (8), welfare is the function of input factor:

$$W^* = f (K. L) \tag{10}$$

If welfare is seen from inequality approach (see OECD, 2013) and measured with Gini Index, then:

$$IG = f(K, L) \tag{11}$$

Where IG is Gini Index, K is capital and L is Labor.

Based on the new growth theory with human resources as the main factor, the model development with inequality approach as follows:

Education Gap in Economic Growth Process

At the beginning, Solow (1956) assumed that technology in economy growth is exogen, however in reality, technology cannot be transferred from the developed countries to the countries with sparse population and low education level (Convergence Contervention). On the other side, Romer (1994) and Lucas (1988) through endogenous growth's model, emphasized the importance of human capital accumulation, physical capital, innovation and knowledge resulted by the process of research and development. Knowledge learning can be aimed through the education line, so that it can improve skill and labor productivity.

According to Romer, Y = F (R, K, H), or that the production function is a function of research, physical capital and human capital. The production function is considered first-degree homogeneous, and focuses on the role of human capital, when in a simpler model of economic growth, the three inputs are symbolized as K, so that the function becomes Y = F (K) = aK. In the Romer equation, *R* (research) is the people knowledge, caused endogenous technology development, and increased marginal productivity of knowledge and decreased marginal productivity of physical capital. Similarly in Lucas's model, human capital is the activator machine from endogen growth. $Y = A.K^{\alpha}.(uhL)^{1-\alpha}$, where *Y, A* and *K* is output, technology, and physical capital, while *u* is the total time proportion used by the labors to work and *h* is the human capital stock. The human capital is education investment of labor, that will influence productivity in the workplace, and education achieved has external effect on the development through the stock of social knowledge. That is why with a low level of knowledge ownership, causes low economic growth in underdeveloped countries, even though it is supported by a large population.

Koske et al. (2012) and Paredes (2013) also stated that the education level is essential for economic growth and welfare. Other opinions said that there is a negative effect of educational inequality on economic growth (Ibourk and Amaghouss, 2015). Besides, Glaeser et al. (2009) noted that imbalanced education also could cause imbalance wage. Charles-Coll (2011) also indicated that imbalanced income generally is influenced by internal and external factors, where individual who has low access to education has potency to get low pay in the future. Therefore, the inequality in having higher education access will cause the income inequality. Education inequality that generates income inequality is a condition of inequality in education level achieved by the people/workers. The gap between educated human capital and uneducated human capital that is caused by the higher education and lower education can influence labor productivity.

The measurement of education inequality with Education Gini Index has been done by Thomas et al. (1999). But in this study, educational inequality is measured by the educational inequality index based on the environmental conditions of education in Indonesia:

$$Ed_{gap} = (\frac{1}{\mu}) \sum_{i=2}^{n} \sum_{j=1}^{i-1} p_i |y_i - y_j| p_j \tag{12}$$

Or:

$$EdGap = (1/\mu)[p_2(y_2 - y_1)p_1 + p_3(y_3 - y_1)p_1 + p_3(y_3 - y_2)p_2$$

$$+ p_4(y_4 - y_1)p_1 + p_4(y_4 - y_2)p_2 + p_4(y_4 - y_3)p_3$$

$$+ p_5(y_5 - y_1)p_1 + p_5(y_5 - y_2)p_2 + p_5(y_5 - y_3)p_3 + p_5(y_5 - y_4)p_4$$

$$+ p_6(y - y_1)p_1 + p_6(y_6 - y_2)p_2 + p_6(y_6 - y_3)p_3 + p_6(y_6 - y_4)p_4 + p_6(y_6 - y_5)p_5]$$

where:

Ed_{gap}	= Education Gap index
μ	= School average of population
p_i and p_j	= Proportion of workers with specific level of education
y_i and y_j	= School period in specific education level;
n	= The number of education category (n = 6; < SD, SD, SMP, SMA, Dipl/ Academy, Univ).
	$0 \leq Ed_{gap} \leq 1$

Labor Skill Mismatch in Economic Growth Process

Skill is the capacity of an individual to do various tasks in a job. Competence can be gained in school. Therefore, one of the measurements of ability is educational attainment. Because formal education usually consists of the first education, middle and higher education (university), therefor skill can also be classified into low, medium and high skill.

Labor skill or qualification can be distinguished into cognitive/intellectual skill (such as number intelligence, verbal comprehension, perception speed, inductive reasoning, deductive reasoning, and spatial visualization) and physical strength. The difference between the skills possessed by prospective workers and labor skill needed that is based on the education level classification in each province and time, also called as labor skill mismatch. Labor skill mismatch is also defined as "qualifications or skills of workers, individually or in the aggregate, are different from the qualifications or skills required for the jobs" (Sattinger, 2012), caused half of the working group cannot meet the available job vacancies so that they become the unempoyed/jobless. Based on the theory of demand for labor, that labor is paid according to the marginal productivity of labor (MPL), so labor skill mismatch can cause income inequality on labor.

Before, the study of Kaldor (1966) that focused on productivity of the factors in economic growth model (constant ratio on output to capital and labor), stated that the productivity can be increased through the progress of knowledge in science and technology (skill). There is a relationship among the education, skill and productivity that must be possessed by a prospective worker, since they become the requirements of labor demand (job hiring). Knowledge and power of the potential workers that are not suitable with the expectation of the businessmen can hamper or decrease the economic growth since there is a resource which is unused and not efficient. This mismatch skill or qualification mismatch in regional context is mentioned as spatial labor mismatch. As skills are not measured by the regular statistical programes of most countries, then a proxy is used to measure skills, where proxies are also used to measure qualifications and years of education at the supply side (Sparreboom & Tarvid, 2016). According to the European Labor Force Survey, skills mismatch index (SMI) is calculated as the gap between the average proportions of the low-skill, medium-skill and high-skilled in the working age population and the corresponding dimensions in employment.

Şahin et al. (2014) measured labor mismatch index by using the formula matching function (*M*) or job hiring function (*H*) as the function of job vacancy and unemployment, but it does not concern about the labor skill. According to Sahin: $H_{it} = h_t(U_{it}, V_{it})$, where H_{it} is job hiring in *t* on labor market *i*, h_i is the efficiency of the labor market in time *t*, U_{it} is the number of unemployment in the market *i* and in time *t*, and V_{it} is the number of job vacancies

in market i and time t. $H_{it} = 0$ when the number of unemployment is zero and the number of employee maximum. Through the aggregat labor maximized (*max H*) by the function of Cobb-Douglass gained mismatch index: $M_{it} = \frac{1}{2} \sum_{it} | U_{it} - V_{it} |$

Meanwhile, Zimmer (2012) measured labor market mismatch of every area by considering the skill owned by the labor, especially the one with the highest education level. The formula used is: $M_{it} = \sum_{j=1}^{3} (S_{ijt} - D_{ijt})^2$, where S_{ijt} is % working age population with education level (low, middle and high), area and time, while D_{ijt} is % working population with education level, area and time.

Combining two formulas above, our study measures labor skill mismatch by considering the skill porpotion difference of the working group (S) and unemployed population (U), category and skill quality, so that the formula of labor skill mismatch (LM) function is as follows:

$$LM = \frac{1}{n} \sum_{i=2}^{n} \sum_{j=1}^{i-1} \{ (\rho S_i |y_i - y_j| \rho S_j) - (\rho U_i |y_i - y_j| \rho U_j) \} \tag{13}$$

Or:

$$LM = \frac{1}{n} \begin{bmatrix} ((\rho S_2 | y_2 - y_1 | \rho S_1) - (\rho U_2 | y_2 - y_1 | \rho U_1)) \\ + ((\rho S_3 | y_3 - y_1 | \rho S_1) - (\rho U_3 | y_3 - y_1 | \rho U_1)) \\ + ((\rho S_3 | y_3 - y_2 | \rho S_3) - (\rho U_3 | y_3 - y_2 | \rho U_2)) \end{bmatrix}$$

where:

LM   = labor skill mismatch
ρS_i , ρS_j = work group porpotion with skill i and j
ρU_i, ρU_j = unemployment porpotion with skill i and j
i, j   = skill category (low=0, medium=1, high=2)
n   = skill category cummulative number
y_i, y_j = skill category quality i j
$0 < LM < 1$

Credit Allocation Gap in Economic Growth Process

Romer (1994) also uses physical capital as the main production factor in economic growth Q=F(R, H, K). Business credit is not only as the booster factor of economic growth, however, it can also increase the capability of the business practitioners. A person's increase capability through this credit allocation is similar with the thoughts of Amartya Sen in Atkinson (1999) who said that the standard of living is not based on the commodity number, measure of living characteristics and also not in utility, but on someone's capability through the possession of an asset used to achieve the utility purpose.

But in imperfect market, credit is accessed more by the steady/middle-large enterprises, while the poor ones, micro and small enterprises (MSEs) only get little access so that it causes income inequality from those two business groups. The unfair access in credit allocation is described here as a credit allocation gap.

According Barro (2000), credit market is not perfect, does not take side the poor people, it has become one of the causes of income inequality. To decrease the income inequality, this group should be empowered by giving them business capital credit. Kai (2009) also stated that microfinance has essential role in creating the fairness effect that is by providing microcredit. World Bank (2000) concluded that access easiness to have capital (as the land complement), the possibility to be weak is smaller than they who do not have credit acces.

In this study, the gap of business credit allocation that is assumed influences the income inequality in Indonesia, it is measured as follows:

$$CrGap = \frac{1}{n}\sum_{i=2}^{n}\sum_{j=1}^{i}|\rho_i - \rho_j| \qquad (14)$$

Or:

$$CrGap = \frac{1}{n}[(\rho 2 - \rho 1) + ((\rho 3 - \rho 1) + (\rho 3 - \rho 2))]$$

Where:

CrGap   = Credit Allocation gap Index
ρ_i, ρ_j = business credit allocation proportion i and j
i and j   = business credit category (Micro, Small, Medium-Large)
n   = number of business category (n = 3)
$0 \leq CrGap \leq 1$

Methodology

This study uses multiple regression analysis, where the data structure is panel data. The aim of this study is to test the hypothesis which stated that the independent variables derived from the imbalance of human and capital resources have a significant effect to income inequality in Indonesia.

In general, the regression equation is:

$$IG_{it} = \alpha_0 + \beta_1 EduGap_{it} + \beta_2 LM_{it} + \beta_{it} CrGap_{it} + \varepsilon_{it} \qquad (15)$$

IG   =   Gini Index/Income Inequality
EduGap =   Education Gap Index
LM   =   Labor Skill Mismatch index
CrGap   =   Credit Allocation Gap Index
β_0 =   Intercept $\beta_1,…,\beta_6$ = influence coefficient
i   =   Provinces in Indonesia   t   = time/year

The independent variable (Education gap, Labor skill mismatch and the Credit allocation gap) measured by the equation formula (12), (13), and (14), uses the secondary data from the official sources (the Central Bureau of Statistics, Department of Labor, Central Bank of Indonesia), while the income inequality index (Gini Index) has been available in the Central Bureau of Statistics.

Several tests were performed to achieve the BLUE model. In the regression equation, the normality test aims to find out whether the residual value have normally distributed or vice versa, which a good regression model is to have a residual value that is normally distributed. While the detection of classical symptom assumptions was not entirely done in panel regression model, because of the presence of cross-section data so that it does not require an autocorrelation test. Furthermore, because of the cross-section data is large (33 provinces) and exceeding the time series data (7 time periods), Heteroscedasticity-test are also not needed, but Multicollinearity-test are still needed because there are more than one independent variable. So, in this study only conducted normality and Multicollinearity-test. The next test, the Chow-test and Hausman-test are used to select the best model (choosing the Common Effect model, Fixed Effect model or Random Effect model). And the final step is to do a hypothesis test, to test whether there is an influence of independent variables on the dependent variable.

Empirical Result

Based on Indonesia data from 2007-2013 in 33 provinces, we will prove that there is an influence between the gap in ownership and the allocation of resources to income inequality. Before presenting the empirical results, we will first look at the annual average of four variables. The annual average of the four indices of inequality from 2007-2013 are shown in Figure 1. Figure 1 shows that all four indices are increasing with different trend of movement. The Gini index increased sharply in 2011 but was relatively stagnant afterwards, while the CrGap index increased sharply in 2010, decreased in 2011 and was relatively stagnant in the following year, while the EduGap Index and LM Index tended to increase slowly. But all the variables used in this analysis show an increasing trend.

The high average of the Gini index in Indonesia began in 2010, because there are 7 provinces that have a Gini index of more than 0.4, which mostly occurs in Eastern Indonesia. Furthermore, the number of provinces with a Gini index above 0.4 increased in the following years, until there were 12 provinces in 2012. The highest CrGap index every year is in the province of DKI Jakarta, as the capital of Indonesia, and also in areas of petroleum sources.

EduGap index is the highest in almost every year in the provinces of Eastern Indonesia (Papua, West Papua, Maluku) and also DKI Jakarta. In some provinces in Eastern Indonesia, some people have not been able to get a higher education, because the area is not conducive, whereas in DKI Jakarta, there are very significant differences between people who can get the highest education and the general public. Similar to the EduGap index, DKI Jakarta province contributes to the high LM index every year, also from Yogyakarta province.
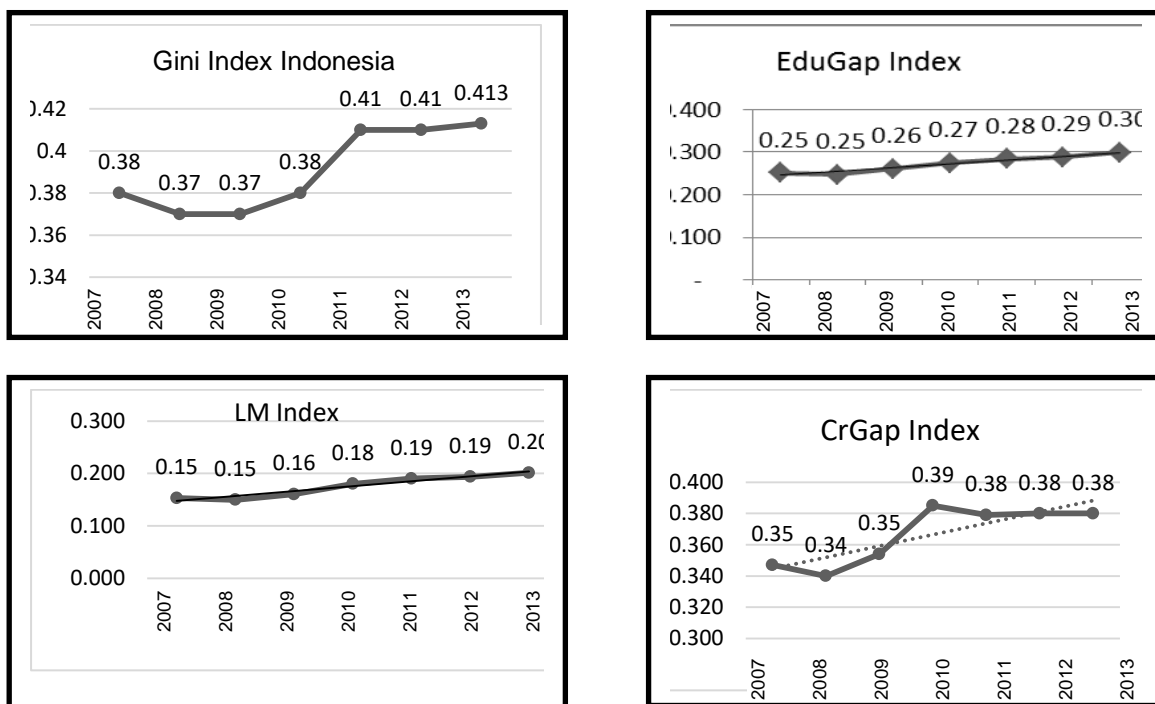

Figure 1. Gini Index and Resources Allocation Gap in Indonesia
Source: Research finding.

The next, the normality test shows that the residual data is normally distributed, as shown in Figure 2, where the probability value of Jaque-Bera is more than 5%.
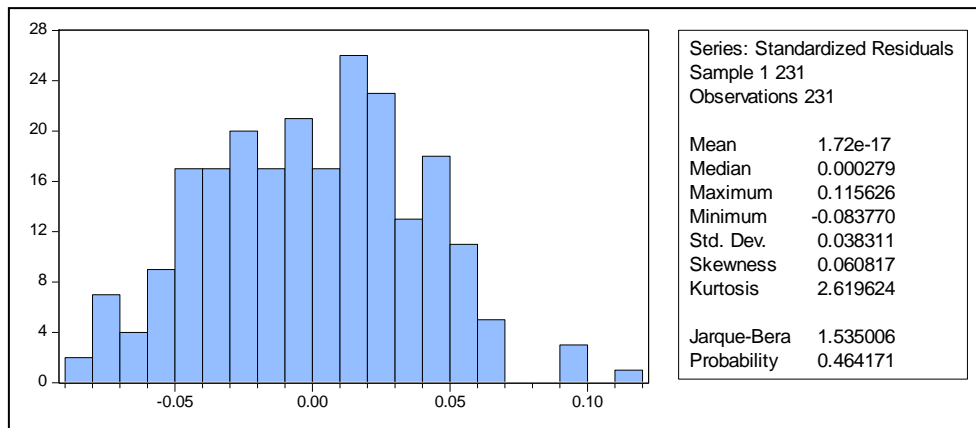
Figure 2. Normality Test
Source: Research finding.

The next step is to detect the assumption of classic symptoms, which in this study only conducted a Multicollinearity-test. Based on Multicollinearity-test using value of Variance inflation factor (VIF) presented in Table 1, VIF for all independent variables is estimated to be less than 5, so there is no multicollinearity on the independent variables.

Table 1. Multicollinearity Diagnostic Test

	EduGap Index	LM Index	CrGap Index
VIF	1.946	1.925	1.029

Source: Research finding.

Meanwhile the measurement result of the three indexes of resource allocation gap toward Gini index is showed on Table 2. Table 2 illustrates the results of Chow-test and Hausman-test. The best model based on two tests is a Least Square Dummy Variable (LSDV)'s model or the Fixed Effect Model. Fixed Effect Model has certain characteristics, where this model has different intercepts for each subject (cross section), but the slope of each subject does not change over time (Gujarati and Porter, 2012).

Table 2 shows the education gap, the labor skill mismatch and the credit allocation gap are significant to income inequality (with different levels of significance). The result using the panel data regression analysis proves that there is a positive influence between education gap, labor skill mismatch and credit allocation gap toward income inequality in Indonesia. This result proves that the allocation gap/resource possession will cause the increase in income 1nequality, with the highest effect is on the labor skill mismatch and the education gap, while the credit allocation gap has effect low.

A considerable influence of the allocation gap/human resource ownership to Income Inequality, because that not all population has access to a higher education in Indonesia and perhaps other developing countries, even half of the population has not been able to complete the basic education. Data from the Central Bureau of Statistics in Indonesia for the period of August 2013 indicates that the working population of university graduates is only 9.47%, the remaining 25.12% of senior high school graduates, 18.46% of junior graduate workers, 28.61 % of elementary school graduates and 18.34% do not attend school or do not finish primary school. Low education causes low skill so that the opportunity to get a job with a standard salary for the workforce with low education is quite impossible that finally boosts income inequality. These results are consistent with those of Charles-Coll (2011), Koske (2012) and Paredes (2013) that higher levels of education will increase income, and the lower level of education leads to lower labor income. In other words, an uneven level of education can lead to wage inequality. The educational level of working population in Indonesia determines the

level of salary received, especially in the environment of government employees, soldiers, police and large corporations. It is therefore reasonable that the educational gap contributes greatly to the increase in income inequality in Indonesia.

Table 2. Summary of Hypothesis Test

	Pool OLS	LSDV/FEM	ECM
Constanta	0.25884	0.087418	0.122955
t-stat	(18.2343)	(5.20422)	(8.03402)
EduGap	0.25629	0.50977	0.411100
t-stat	(3.7890)	(4.9651)	(4.89067)
LM	0.09569	0.57087	0.536532
t-stat	(1.2310)	(5.88844)	(6.50492)
CrGap	0.02365	0.07542	0.068174
t-stat	(1.2882)	(2.82674)	(3.08438)
R^2	0.2635	0.8207	0.5945
F	15.983	31.087	113.391
Chow Test (Pool vs LSDV)		p-Cross-section F	= 0.0000
		P-Cross-section Chi-square = 0.0000	
Hausman Test (ECM vs LSDV)		p-Cross-section random	= 0.0000

Source: Research finding.

Based on Table 2, the equation of the model is:

$$IG_{it} = 0.087418 + 0.50977 EduGap_{it} + 0.57087 LM_{it} + 0.07542_{it} + \varepsilon_{it} \qquad (16)$$

Because the best model of panel data regression is the LSDV or FEM model, the intercept differences in each province can be shown here. Table 3 shows the highest and lowest intercept values in this study. Based on the intercept of the Gini Index of each province (Table 3), when all independent variables affecting the Gini Index have a low / zero value, province with the highest inequality is Gorontalo (one province at Sulawesi Island, island in Eastern Indonesia) with $\beta_0 = 0.043$, the lowest inequality is Riau archipelago (an archipelago at eastern of Sumatera, islands in western Indonesia) with $\beta_0 = 0.012$. That means, if all three independent variables have a very low / zero effect, the inequality in Gorontalo province is 0.043, and in Riau's archipelago is 0.012.

Table 3. The Intercept of Each Province

No.	Province Name	High Value	No.	Province Name	Low Value
1	Gorontalo	.0428	1	Riau islands	.0119
2	Papua	.0382	2	Aceh	.0132
3	West Kalimantan	.0374	3	Jakarta	.0153
4	Central Java	.0347	4	East Kalimantan	.0159

Source: Research finding.

The result also shows the tendency of increasing the labor skill mismatch that causes the increase of income inequality in Indonesia. Based on the theory of demand for labor, labor is paid according to the marginal productivity of labor (MPL). In other words, the wage received by the labor is determined by the labor productivity itself. And according to Kaldor (1966: 290) productivity can be improved through the progress of knowledge in science and technology (skill). So if there is a difference skill between workers, it will affect the income

received by the workforce. Labor skill mismatch in this study is the variable that has the greatest positive influence to income inequality. The high impact of labor skill mismatch on income inequality in Indonesia is really happening when seen from the difference of salary / wage received by workers. According to reliable sources, there are 10 specific skills that have the highest salary, i.e. workers in financial services (such as Banker, Investment banker, investment manager, etc.), oil & gas engineer, young lawyer, pilot, specialist, technology / IT engineer, internet marketers, accountants / auditors, mine engineers, and property agents. Their salary differs considerably compared to the minimum wage in Indonesia.

The result of the study also shows the tendency of the increase of credit allocation gap, it is causing the increase of income inequality in Indonesia. The existence of the effect of the credit allocation gap is in line with Amartya Sen's thinking in Atkinson (1999: 185) which says that the standard of living is not based on the number of commodities, not on the characteristics of standard of living, nor utility, but on one's capability through the ownership of an asset used to achieve the purpose of the utility. One form of utility is the level of welfare (can be measured by the Gini index), and the ownership of the intended asset may be in the form of credit / venture capital owned so that if there is a gap in asset ownership, it can cause income inequality. Barro (2000) who studies on inequality and economic growth also says that the imperfect credit market, which does not favor the poor, is one of the causes of income inequality. The credit allocation gap in Indonesia has a lower influence to inequality index than other independent variables. The low of this effect is due to the average of the credit allocation gap in Indonesia is unstable during the year of study. In the 2007-2010 periods, the credit allocation gap tended to increase, but after 2010-2013 this gap tended to decline slightly. This condition is different with the other two variables analyzed, which shows an increasing tendency. In other words, there is a tendency of equity in the allocation of credit in Indonesia during the period of analysis. The size of the effect might be also different, when the data used is from the developed country, where the resource ownership is quite big and different in the ownership composition.

Based on above conditions, income inequality will continue to increase if there is no correct handling. According to Stiglitz (1991), the market role that is too dominant can cause the preferred condition on unachieved equalization if only some of the people who can feel the benefit, while other groups are still far from empowered. This condition of the society in Indonesia that is less unlucky, low education level, excluded from the work field, and low credit access, causing the increase of income distribution inequality in society, causing the income inequality level in Indonesia is in a quite high. Therefore, it needs the government role through the budget according to the certain function. Furthermore, Sen (1995) –inspired by the thought of John Rawl- also said that the government alignment policy should focus on the worst off people so there will be the fairness.

The model of income inequality detection through the detection of resources gaps is theoretically more appropriate than using a resource scale. In other words, the educational gap is more appropriately used as a variable affecting income inequality than using educational level variables. Similarly, labor skill mismatch is more appropriately used as a variable affecting income inequality than using the skill level of labor, and it is more appropriate to use the credit allocation gap variable than the amount of credit allocated.

Conclusion and Recommendation

The high of income inequality and tend to increase happen not only in developing countries like Indonesia but also in the developed countries. Society welfare is strongly influenced by the allocation/ownership of resources, so that if there is an imbalance in the allocation/ownership of resources, then there is income inequality. The influence of resources

allocation gap on income inequality indicates that the classical welfare economic theory (notably theorem 1) also occur in Indonesia. The first theorem says that the welfare of society can be achieved if the human resources owned are allocated efficiently in the market mechanism. In practice, there are cartels, imperfect information, moral hazards and other negative externalities, so resource allocation becomes inefficient and leads to the gap of resources ownership/allocation, which in turn leads to income inequality.

The welfare with income inequality approaches proven to be influenced by gaps over ownership/allocation resources, including educational gap, labor skill mismatch and credit allocation gap. So the model with an approach of injustice that influenced by the ownership gap of such resources, can be used to detect income inequality by calculating the index of the three variables above.

Several recommendations related to this study include: first, to reduce income inequality, need to increase the average length of school and educational level of the lowest education groups of school-aged children and workers; second, provide a larger portion of the funding allocation for small and medium micro enterprises; third, improve redistribution policies for school-age residents and micro and small entrepreneurs; fourth, relating to the model, namely the importance of determining precisely the classification and weight of resource allocation before calculating the resource gap, because the calculation of the gap in resource allocation is largely determined by the classifications and the level weights analyzed.

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