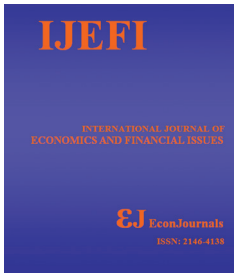

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Impact of Agricultural Sectors and Income Inequality in Rural Toward Role of Public Education in Decreasing Educational Inequality in Indonesia

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ABSTRACT

Generally, the aims of this research was to analyze the role and the inputs allocation of public education and the factors which affected educational inequality. Using panel data in 33 provinces during 2010–2016 which then analyzed by stochastic frontier method. The results showed excessive allocation of resources in the addition of school buildings at primary and junior secondary school. Reducing education inequality could be encouraged through the addition government spending on education, number of teachers in junior secondary education and lecturer in higher education, and number of school buildings in senior secondary school and college education. The role public education performance was only able to affect 83.8 of educational inequality, and its remaining 16.2% due to the high percentage of rural school age labor, percentage of labor in the agricultural sector, farmer's terms of trade, and gross domestic product per labor on the agricultural sector.

Keywords: Education Inequality, Public Education, Agricultural Sector, Income Inequality
JEL Classifications: I24, H41, Q19, D63

1. INTRODUCTION

One of unfinished problems dealed by developing countries and emerging markets is poverty, income inequality and educational inequality (Jhingan, 2011). Meanwhile, education plays a role in poverty alleviation, income inequality, and productivity improvement, therefore it is an important indicator of economic development (WorldBank, 2016; 2018). The existence of educational inequality becomes the root of economic development problems because it contributes in generating income inequality. Even one-fifth of income inequality in Indonesia is due to different levels of education (Chongvilaivan and Kim, 2015; Digdowiseiso, 2009; Silva and Sumarto, 2013; Wicaksono et al., 2017).

In addition, developing countries and emerging markets also face constraint which is a limitation of educational finance that results in the provision of public education that is only able to fulfill primary education and junior secondary level, but has not yet been able to provide full education for free to the community (Todaro and Smith, 2015). In Indonesia itself, the low of School Enrollment Ratio at the senior secondary school level is presumed to be due to improper budget allocations directed towards personnel expenditure rather than funding for the addition of teachers and school buildings for senior secondary levels that are currently minimal compared to ideal requirements (BPS, 2016a; Chang et al., 2014; OECD, 2010). Based on that, the role of government in the allocation of public education input is very important to the educational inequality.

The education level achievement is also comodities whose demand is determined by price and income level of society, even the

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elasticity of demand differs per income level (Checchi, 2006). It means that income inequality affects the number of demand for educational services. Income inequality itself occurs because the economic structural change has not finished thus the labor surplus of the agricultural sector has not been absorbed by the modern sector and the productivity differences between sectors, where the lowest productivity occurs in the agricultural sector resulting in subsistence wages in the agricultural sector. It is not surprising that household income in the agricultural sector is the lowest compared to other sectors (Dethier and Effenberger, 2012; Yang and Greaney, 2016). As a result, poverty is vulnerable to household labor in the agricultural sector in rural areas. Even in Indonesia alone, the level of income inequality is 0.395 and rural poverty is 17.2 million people (BPS, 2016c).

The Engle Curve principle shows that increased incomes will increase educational expenditure along with increased spending on other needs (Wongmonta and Glewwe, 2016). Thus, any pro-poor growth policy measures that can encourage income raise in low-income communities will lead to decrease in educational inequality (Epo and Baye, 2016). The main impact of rural poverty on education demand is child labor. Working at school age leads to a disruption to school time allocation and even spent all their school time allocation because they help to increase household income (Todaro and Smith, 2015). Increased agricultural sectors performance and labor movement from agriculture to non-agricultural sectors have great response to rural poverty reduction (Imai et al., 2017; Suryahadi et al., 2009). Furthermore, farmer welfare is largely determined by the farmer terms of trade (FTT) (Colman, 2010), therefore the success of any agricultural business in every growing season will ensure the fulfillment of farmer household needs including education services consumption. Some of these factors can be an impediment to educational inequality decrease even though education cost obtained by poor households is relatively small. This condition shows that income inequality and poverty have an effect on educational inequality. These factors come from the agricultural sector and income inequality in rural areas. Based on these descriptions, this paper would like to answer some of the following objectives: (1) To analyze the impact of public education allocation of various levels in reducing educational inequality, (2) to measure the role of public education in reducing educational inequality, and (3) to identify the impact of agricultural sector factors and income inequality in rural to educational inequality.

2. BRIEF LITERATUR REVIEW

Research on the determinant of educational inequality divides in to 2 outlines which are the supply of public education and demand of public education. Akyol (2016), Cordoba and Ripoll (2013), Gupta et al., (2002), and Shindo (2010) state that government spending and subsidies for education encourage educational investment because it provides incentives to individuals thus makes education consumption becomes higher, leads to the decline of educational inequality. While Craigwell et al. (2012) and Scippacercola and D'Ambra (2014) also assume that besides financial input, increasing supply of public education is driven by increased physical input of public education, the number of teachers and the number of classrooms. As for aggregate Yang et al. (2014) suggests that the role of applied education system capable of discriminating educational consumers therefore can be profitable for a particular group of consumers, will ultimately determine the level of educational inequality. Supply side of public education studies are able to disclose important factors affecting the educational attainment of each individual to determine educational inequality are the financial input, physical and educational system.

On the demand side of public education, various studies indicate factors that can influence educational inequality derived from indicators of economic development. Castelló-Climent (2010) reveal the causes of differences in educational inequality caused by different levels of economic development namely fertility rate and life expectancy rate. While Devkota and Upadhyay (2016) and Zhang et al. (2015) decompose factors affecting educational inequality into income, social and demographic distribution so they find that income distribution, urbanization and distance to schools determines the level of educational inequality. Senadza, 2012, Agrawal, 2014, Huanfeng, 2016 developed a determinant of inequality in education between regions where rural inequality is much greater than that of urban inequality caused by rural poverty is more vulnerable than urban. In addition, the rural poor are more vulnerable to child labor. Poverty happened mostly in rural areas will lead to relatively greater levels of educational inequality in rural areas. Epo and Baye (2016) state that the decrease in educational inequality comes from pro-poor growth government programs. The findings indicate that the increase in income of the poor people is a major driver of the decline in educational inequality.

Limitations of previous research are (1) public education study is not comprehensive in answering the role of public education in decreasing educational inequality due to the decomposition of educational input is too minimal because it does not decompose the input at every level in detail, (2) the educational demand side factors that have not been decomposed into more focused factors to accomodate taking policy decision (3) there is no study comparing the effect of educational supply side and education demand side simultaneously to educational inequality, and (4) from Epo and Baye (2016) findings it can be seen that the direction of educational inequality determinant development incline to derivative factors that are able to determine different levels of economic development. Therefore, in this study the development of factors affecting educational inequality comes from education supply factors in entire levels, factors derived from the agricultural sector and income inequality in rural which at the same time determine educational inequality.

3. THEORETICAL FRAMEWORK

Based on the assertion of the literature review, the theoretical framework is structured as follows. The efficient condition of public goods supply being achieved by government when sum marginal rate of substitution condition of public education services is equal to the marginal rate of transformation of public education services that is in equilibrium between supply of public goods and demand of public goods at the quantity and quantity level of certain public goods prices. The interaction of supply and demand

of public goods is assumed to occur as perfect competitive market with prices equal to marginal revenue and equal to marginal cost (MC), therefore all factors affecting supply and demand of public goods will affect the achievement of equilibrium (Binger and Hoffman, 1988; Stiglitz, 2000).

Public education only comes from the government thus the total amount of public education output is generated from all educational inputs used by government namely government expenditures for education function (F) and physical input of education (K), its model assumed as follows.

$$Q_{SE} = F^{\frac{1}{2}}.K^{\frac{1}{2}} \quad (1)$$

The additional cost of each additional input to increase the output of public education (MC) with r is the opportunity cost of using government budget for education and f is the price of the physical input of education.

$$\mathrm{MC} = \frac{\delta TC}{\delta Q_{SE}} = \frac{2rQ_{SE}^{\ 2}}{K} \quad (2)$$

The public education supply condition by government occurs when $PQE = MR = MC$, so the level of efficient public goods supply are:

$$P_{Q_E} = \mathrm{MC} \quad (3)$$

$$Q_{SE} = \frac{P_{Q_E}K}{2\mathrm{r}} \quad (4)$$

Demand of public goods is the sum of all public goods demand derived from the utility maximization of each individual to consume public education services (Q_{Ei}) and other goods consumption (Q_{x_i}) with budget constraints (M_i) at the public education price level (P_{Q_E}) and the price of other goods (P_{Q_x}) are certain.

$$Max.U_i = Q_{Ei}Q_{x_i} \quad (5)$$

$$\mathrm{s.t.}\,\mathrm{M}_i = P_{Q_E}Q_{Ei} + P_{Q_x}Q_{x_i} \quad (6)$$

The demand of public education services level that maximize the utility and demand of total public education (Q_{Ei}) is the demand of all individuals for public education services therefore public education directly influenced the level of individual income, occurs under the following conditions.

$$Q_{Ei} = \frac{\mathrm{M}_i}{2P_{Q_{Ei}}} \quad (7)$$

$$Q_{DE} = \frac{1}{2P_{Q_E}}\sum_{i=1}^{n}\mathrm{M}_i \quad (8)$$

The efficient condition is equilibrium between supply of public goods and demand of public goods (Q^*) occurs in $QDE = QSE$ resulting in equilibrium price (P_{Q_E}).

$$\frac{1}{2P_{Q_E}}\sum_{i=1}^{n}\mathrm{M}_i = \frac{P_{Q_E}K}{2\mathrm{r}} \quad (9)$$

$$P_{Q_E} = \left(\frac{r}{k}.\sum_{i=1}^{n}M_i\right)^{\frac{1}{2}} \quad (10)$$

$$Q_{SE} = Q^* = Q_{DE} = \frac{1}{2P_{Q_E}}\sum_{i=1}^{n}\mathrm{M}_i \quad (11)$$

$$Q^* = \left(\frac{K}{2\mathrm{r}}\sum_{i=1}^{n}\mathrm{M}_i\right)^{\frac{1}{2}} \quad (12)$$

The existence of income inequality effect so it is assumed that there are three income levels.

$$\sum_{k=1}^{n}\mathrm{M}_k = \sum_{i=1}^{n}\mathrm{M}_1 + \sum_{i=1}^{n}\mathrm{M}_2 + \sum_{i=1}^{n}\mathrm{M}_3 \quad (13)$$

$$k = 1, 2, 3. \quad (14)$$

The difference in income leads to differences in the amount of demand for public education services. The equilibrium output of education (Q^*) assumed to be a proxy of the educational attainment of the population. If there is a difference in demand of education (Q_{DEk}) then make differences in the number of people who are able to achieve a certain level of education (n_k).

$$Q_{SEk} = Q_{DEk} = Q^*_k = \left(\frac{K}{2\mathrm{r}}\sum_{i=1}^{n}\mathrm{M}_k\right)^{\frac{1}{2}} = n_k \quad (15)$$

$$k = 1, 2, 3. \quad (16)$$

To measure the distribution educational attainment of the population or level of educational inequality (GNED), the Education Lorentz Curve index is used. The formulation as follows (Bellu and Liberati, 2006; Ozdemir, 2016).

$$GNED = 1\text{-}([S_k+S_{k\text{-}1}][Y_k\text{-}Y_{k\text{-}1}]) \quad (17)$$

$$S_k = \sum_{k=1}^{n=k}\frac{E_k}{E_T} \quad (18)$$

$$Y_k = \sum_{k=1}^{n=k}\frac{n_k}{n_T} \quad (19)$$

Where:

Y_k = Cumulative percentage of the amount population at the k education level of the total number of individuals.

S_k = Cumulative percentage of education level k to total education level.

E_k = Achievement of education in k level.

E_T = The total level of education achievement

n_k = Number of individuals from k education level.
n_T = Total number of individuals.

Changes in supply of public education (Q_{SE}) and demand of public education (Q_{DE}) and the factors affecting it determine the level of educational inequality.

$$GNED = 1-([S_k+S_{k-1}][Y_k-Y_{k-1}]) \quad (20)$$

$$GNED = 1-\left(\left[\left(\sum_{k=1}^{n=k}\frac{E_k}{E_T}\right)+\left(\sum_{k=1}^{n=k}\frac{E_k}{E_T}\right)\right]\left[\left(\sum_{k=1}^{n=k}\frac{n_k}{n_T}\right)+\left(\sum_{k=1}^{n=k}\frac{n_{k-1}}{n_T}\right)\right]\right) \quad (21)$$

$$GNED = 1-\left(\left[\left(\sum_{k=1}^{n=k}\frac{E_k}{E_T}.\right)+\left(\sum_{k=1}^{n=k}\frac{E_k}{E_T}\right)_{k-1}\right]\left[\left(\sum_{k=1}^{n=k}\frac{\left\{\left(\frac{K}{2r}\sum_{i=1}^{n}M_k\right)^{\frac{1}{2}}\right\}_k}{n_T}\right)+\left(\sum_{k=1}^{n=k}\frac{\left\{\left(\frac{K}{2r}\sum_{i=1}^{n}M_k\right)^{\frac{1}{2}}\right\}_{k-1}}{n_T}\right)\right]\right) \quad (22)$$

$$GNED=1-(f[K,M,r]) \quad (23)$$

Equation (23) shows that the capability supply of public education to reduce educational inequality. To see how vast the affect between the supply and demand of public education, Stochastic Frontier Analysis is used. The use of such analysis is due to its ability to separate the influence of supply and demand of public education on educational inequality. To be used, the equation (24) is transformed as follows.

$$(1-GNED)_i=(f[K_i, M_i, r_i]) \quad (24)$$

$$(1-GNED)_i=\beta_1 K_i+\beta_2 r_i+v_i-M_i \quad (25)$$

In order to separate the supply of public education side effects which are K_i and r_i, the public demand factor described by the income level of the individual M_i is considered to be an aggregate of a set of residual factors besides public education inputs that determine educational inequality, and v_i is random error. As Coelli et al. (2005) suggests that in the use of stochastic analysis Frontier there are 2 interaction functions that are analyzed together that is input production and function of other specific factors. The separation of suppy side of public education from equation (25) is:

$$(1-GNED)_i=\beta_1 K_i+\beta_2 r_i \quad (26)$$

While the side of demand of public education is:

$$M_i=\delta_1 Z_{1i}+\delta_2 Z_{2i}+\delta_n Z_{ni} \quad (27)$$

4. RESEARCH METHODS

The data in this research is in the form of panel data that is combination of time series data and cross-section data in the period 2010–2016 from 33 Provinces in Indonesia. The data in this study were collected by literature study method that was sourced from several institutions namely the Central Bureau of Statistics (BPS), the Ministry of Finance, and the Ministry of Education and Culture (Kemdikbud).

The level of educational inequality was measured using Gini Education Index calculated using the Education Lorenz Curve using the education attainment data of 15 years old and over in each province. The Calculation of the Gini Education Index as formulated earlier in the equation (20).

To answer the first objective of public education input allocation influence in reducing educational inequality, use the function of supply public education in equation (26), educational input (K_i) used is the number of teacher/lecturer and the number of school buildings at each level of education, the level of opportunity cost of using budget for education (r_i) proxied by the amount of education budget allocated by the government. The function is analyzed using ordinary least square estimated method which is as follows.

$$ln(1-GNED)=\beta_0+\beta_1 lnGEEDU_{it}+\beta_2 lnNTBS_{it}+\beta_3 lnNTJS_{it}+\beta_4 lnNTSS_{it}+\beta_5 lnNTHS_{it}+\beta_6 lnNSBS_{it}+\beta_7 lnNSJS_{it}+\beta_8 NSSS_{it}+\beta_9 NUHS_{it}+v_{it}-M_{it} \quad (28)$$

Where:
GNED = Educational inequality level (percent)
GEDU = Government expenditures for education (million Rupiah)
NTBE = Number of teachers at elementary level (person)
NTJS = Number of teachers at junior secondary school level (person)
NTSS = Number of teachers at senior secondary school level (person)
NTHE = Number of lecturers at Higher Education level (person)
NSBE = Number of elementary school (unit)
NSJS = Number of junior secondary school (unit)
NSSS = Number of senior secondary school (unit)
NUHE = Number of Universities (units)
β_0, β_i = Constants and parameter estimators (i = 1,2,… 7)
v = Random error
M = Non-negatif random, described role of demand side of public education
Signs and expected parameters: $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7>0$.

To answer the second objective, measuring the role of public education on the decrease in educational inequality (RPE_{it}) is

analyze by using Stochastic Frontier Analysis as in equation (25). This analysis has been widely used in addition to measuring efficiency, as has been done by (Baltas, 2005) to analyze differences in demand of food, (Menoncin and Vigna, 2013) to analyze financial markets, and (Aysun et al., 2014) to analyze structural unemployment. Frontier estimation on lowest level of educational inequality estimated by using maximum likelihood estimator (MLE) method on public education function in equation (27) as conducted by (Coelli et al., 2005) in estimating the frontier of a producer's production level, formulated as follows.

$$RPE_{it} = \frac{(1-GNED)_{it}}{(1-GNED)^{*}} = \frac{\exp(\beta_1 K_i + \beta_2 r_i - M_i)_{it}}{\exp\left(\beta_1 K_i + \beta_2 r_i\right)_{it}} = \exp onen(-M_{.it}) \quad (29)$$

RPE_{it} = The role of public education supply in reducing educational inequality

K_i, r_i = Input variable in supply of public education function

$(1\text{-}GNED)_{it}$ = Actual level of inequality condition

$(1\text{-}GNED)^*$ = The lowest frontier condition of the level of educational inequality.

The stochastic frontier analysis in this study uses truncated normal distribution, therefore the frontier is supposed to involve parameters on the production input function and function parameter of the specific factors (Coelli et al. 1998). Based on that, the lowest frontier of the level of educational inequality is also determined by the factor of public education demand hence the difference between $(1\text{-}GNED)^*$ and $(1\text{-}GNED)$ is caused role of demand side of public education thus can be seen that the inhibition of the low educational inequality achievement is thought to be influenced by factors from the agricultural sector and several other factors as follows.

$$M_{it} = \alpha_0 + \alpha_1 PLSA_{it} + \alpha_2 RLYAS_{it} + \alpha_3 PLGS_{it} + \alpha_4 PIEC_{it} + \alpha_5 FTT_{it} + \alpha_6 GNIV_{it} + \varepsilon_{it} \quad (30)$$

M_{it} = Role of demand side of public education that obtained the gap between the current level of educational inequality (actual) to the level of minimum educational inequality (frontier).

PLSA = Percentage of school-aged labor (15–19 years) in rural (Persons)

RLYAS = Gross domestic product (GDP) per labor of agricultural sector (Million Rupiah/person)

PLGS = Percentage of labor in agricultural sector of total labor (percent)

PIEC = Education consumer price index in rural areas

FTT = Farmers terms of trade index (FTT)

GNIV = Rural income inequality index

α_0, α_i = Constants and parameter estimators (i = 1,2,… 7)

5. RESULTS AND DISCUSSION

Based on the result of parameter estimation on public education stochastic frontier function result in yield value of R^2 showing independent variable explains 64% from total variation of dependent variable. In addition, the F_{hit} value of 27,153 indicates that the input variables of education collectively have a very significant effect on the equity of education. The result tabulation of parameter estimation on the supply of public education function presented in Table 1 is generated using the index (1-*GNED*), therefore all the signs of the parameters in the tabulation are counterclockwise to the level of educational inequality (*GNED*). Table 1 shows that the increase in government expenditure on education has a significant effect on the decreasing level of educational inequality at a 5% error level. These results indicate that increasing the amount of government expenditure will increase the output of education hence years of school per individual increases, which ultimately decreases educational inequality. These results are supported by the finding of Diaz et al., (2016) which shows that the magnitude of education expenditure can increase the output of educational improvement. However, in developing countries and emerging markets this is very constrained given the low government revenues that most of the development funds come from foreign debt.

The results tabulation in Table 1 shows that not in every level of education the teacher influences significantly to the decrease educational inequality. Negative sign of parameter estimation on educational inequality indicate that the increase in the number of elementary, junior secondary and senior secondary school teachers and the number of lecturers capable of reducing educational inequality, despite only the number of junior secondary school teachers and the number of lecturers which are significant. These findings indicate that the number of teachers is one of the important inputs in increasing the output of education and to reduce educational inequality. Agasisti et al. (2016) also found similar findings indicating that the number of teachers has a significant effect on the increase of education output. Findings of Diaz et al. (2016) and (Zoghbi et al., 2013) in according with the fact that the number of teachers has a significant effect on educational outcomes caused by the role of teachers who are inputs of human resources in producing educational output that is in the form of

Table 1: Parameter estimation result of supply public education function

Variable	Estimated parameter	t-ratio
Constant	4.493	16.168[a]
GEDU	0.064	2.502[b]
NTBE	0.023	0.395
NTJS	0.046	2.573[b]
NTSS	0.026	0.556
NTHE	0.017	2.064[c]
NSBE	−0.587	−11.376[a]
NJSS	−0.230	−3.523[a]
NSSS	0.561	8.475[a]
NUHE	0.047	2.069[b]
OLS goodness of fit		
R^2	0.637	
F hit	50.432 [a]	
Maximum likelihood estimator (MLE) goodness of fit		
σ^2	0.013	5.684[a]
γ	0.901	27.561[a]
LR test		124.873[a]

Source: Processed data (2018) based on FRONTIER 4.1. *Description:* [a]*Significant on* α = 1%, [b]*significant on* α = 5%, [c]*significant on* α = 10%, OLS: Ordinary least square

academic ability to be able to continue to the next level. The level of significance of the number of teachers/lecturers to educational inequality shows the direction of allocation of human resource placement in public education.

The allocation of the number of educational buildings is very significant in determining changes in educational inequality. From Table 1, it shows that all educational building inputs have a significant effect on the 5% error level, but the impact of allocation of school building differs between levels. An increase in the number of senior secondary school buildings and the number of university buildings is very significant in reducing educational inequality. Meanwhile, the increase in the number of schools at the primary and junior secondary school significantly increased educational inequality, this is meant a negative level of marginality.

The excessive addition of school at primary and junior secondary school levels is an improper allocation because the level of educational participation (APS) at primary and junior secondary levels has reached 91% and 95%. Meanwhile, education participation rate (APS) at senior secondary school and university level only reached 71.4% and 24.77% (BPS, 2018). Whereas the budget allocation for the construction of the building is very small compared to the teacher allowance (Kemenkeu, 2017) and the percentage of the state senior secondary school level building only reaches 38.17% (BPS, 2017). These conditions indicate the addition of excessive school buildings allocations at the primary dan junior secondary school will reduce the budget allocation for the construction of senior secondary school and university level schools, thereby increasing the educational inequality.

According to Tabel 1, the result using MLE method on supply public education funcion shows that the LR-test value of 124.873 is bigger than the value of χ^2 Kodde-Palm of 17.75, it means that the model used is very good in maximizing the probability which produce good parameter estimation. The sigma-squared (σ^2) value of 0.013 has a significant effect which means that there is a significant effect of residual variation (v_{it}–M_{it}) which is a factor other than supply side of public education, which determines 1.3% of educational inequality level. While the value of gamma (γ) of 0.901 has a significant effect indicates the role variation from the demand side of public education (M_{it}) that explains 90% of residual variation (v_{it}–M_{it}). The value of gamma (γ) indicates the significant impact of certain factors beyond the allocation of public education inputs that also determine the level of educational inequality.

After estimating the minimum level of frontier education with the MLE estimation method, it can be estimated the level of public education role in reducing educational inequality. Table 2 shows that public education determines 83.8% of changes in educational inequality. This result means that there is a gap between the actual GNED conditions and the frontier levels of potential GNED educational inequality determined by the frontier function. The occurrence of this gap is caused by demand of public education influence factors that determine the amount of public education consumption that also affect the educational inequality. Based on that, it can be seen that supply side of public education role dominates the change in the level of educational inequality of 83.8% and demand side of public education factor takes a role in determining 16.2%. Demand side of public education is likely determined by factors such as agricultural sector performance and income inequality in rural areas.

According to Table 3 that shows the percentage of school-aged labor (PLSA) has a positive and significant effect on the increase in educational inequality. School-age labor are caused by the poverty of agricultural households who do not have enough budget to finance their living needs much less to finance their family members' education. Given the capital of the working poor is just the working time, therefore there is a demand for increased household income leads the household to increase the total number of working hours of the household by increasing the number of family members to work. As a result, all family members were included to earn a living. The implications will result in school-age family members being forced to work and drop out of school. School time is an opportunity cost for the household because the allocation of school time will reduce the allocation of time to work thus reducing household income, this is especially the case for poor households and low-income households. Based on this, school-aged workers caused by rural poverty will reduce educational attainment and increase educational inequality (Agrawal, 2014; Sim et al., 2016; Todaro and Smith, 2015). Decrease of poverty in rural areas is important in reducing educational inequality.

For rural communities, an increase in income will result in increased purchasing power of goods and services, including the purchasing power of education services. Increasing the consumption of public education services will result in decreased educational inequality. All the variables that increase the income of the rural community will lead to decreased educational inequality. Based on Table 3 shows that the GDP per labor of agricultural sector has a negative

Table 2: Level of public education's role in reducing educational inequality

Percentage	The extent of public education's role in reducing educational inequality
	Total (%)
0.91-1.00	8 (24.24)
0.81-0.90	14 (42.42)
0.71-0.80	9 (27.27)
0.51-0.70	2 (6.06)
Total	33 (100)
Minimum	0.569
Maximum	0.983
Average	0.838

Source: Processed data (2018) based on FRONTIER 4.1

Table 3: Estimation result of factors demand side of public education affecting educational inequality

Variable	Estimated parameter	t-ratio
PLSA	0.209	4.476[a]
RYLAS	−0.109	−4.130[a]
PLGS	0.121	5.847[a]
PIEC	0.147	0.985
FTT	−0.316	−1.861[c]
GNIV	0.134	1.548

Source: Processed data (2018) based on FRONTIER 4.1. Description: [a]*Significant* on $\alpha = 1\%$, [b]*significant on* $\alpha = 5\%$, [c]*significant on* $\alpha = 10\%$

and significant effect on the level of educational inequality. That indicator is a description of the income level of the agricultural labor. The increase in income per labor in the agricultural sector (RLYAS) generates income effects for rural households that will increase the purchasing power of education services. Duchesne and Nonneman (1998) and Liu et al. (2006) found that household income levels will be able to provide great access for an individual to continue his education to a higher level. Increased household income in the agricultural sector will reduce the constraints on education finance so that the achievement of the level of household education also increases.

Table 3 also shows that the percentage of labor in the agricultural sector on total labor or the share of labor in the agricultural sector (PLGS) has a positive and significant effect on the level of educational inequality which means that the higher the share of labor in the agricultural sector will lead to an increase in educational inequality. The mobility of labor from the agricultural sector to the non-agricultural sector will encourage the population to be free of poverty and have a decent and higher income, low wages in agricultural due to excess labor in rural areas are subsistence wages (Ghatak, 2005; Menon and Rodgers, 2017). Even in Indonesia, the ratio of GDP per labor in the agricultural sector, industrial sector and service sector is 1:3:7. The condition shows that the service sector is the sector with the highest income per worker rate in Indonesia and is the most responsive growth sector in poverty reduction (BPS, 2016c; Suryahadi et al., 2009).

The rural education customer price index shows (PIEC) an insignificant effect on the level of educational inequality, although the sign is as expected. The rural education customer price index is a proxy of education cost received by rural communities. An increase in price will decrease demand of education services level thus it will increase inequality. Meanwhile, FTT has positive and significant impact on the level of 10% toward the level of educational inequality which shows that the success of farming is one of the determinants of increasing educational equality. FTT is also a proxy that describes the ability of purchasing power of farmers resulting from farming income. Therefore, FTT is a form of pro-poor growth that encourages income effect for farmers' households thus the total consumption of education services will increase, including the poor farmer's household which depends on their farming income. The effects of pro-poor growth resulted in a decrease educational inequality in rural areas (Epo and Baye, 2016). These findings suggest a link between the agricultural sector and educational equity. The success of farmers in their farming will determine the level of education services consumption and will ultimately increase educational equity.

The rural income inequality index represents the share of poor people in rural areas, increasing inequality showing the increasing number of poor people. The existence of income inequality in rural areas shows an increase in income is not evenly distributed in rural areas. The rural income inequality index (GNIV) has a positive effect on the increase education inequality in rural areas even though it has no significant effect but is an important factor in preventing educational equity. Due to the improvement of the poor and low-income groups is the community with the least education services consumption level compared with other community groups. The lower the income level will result in lower financing ability to continue education to the higher level (Langsten, 2015). In the lower income class the education expenditure budget will be substituted faster than the daily expenditure requirement which indicates the demand for education will be more elastic at lower income class level (Checchi, 2006).

6. CONCLUSION

Based on the purpose and result of discussion in this research, it can be concluded briefly. Excessive allocation of resources to the addition of school building inputs at primary and junior secondary school levels have negative impact on educational inequality. The allocation of government expenditures for education functions, improving teachers in junior secondary school education, improving teachers in higher education, and improving school buildings in senior secondary schools and college education have significant effect on reducing educational inequality.

Public education plays a role of 83.8% in influencing educational inequality and the remaining 16.2% is determined by factors from the demand side of education. Although the role of public education is dominant to reduce education inequality but the role of demand side of public education also determines the rate of decline in education inequality. The demand side of public education which influences the level of education inequality is the decrease of the percentage of labor force at school age (15-19 years) in rural areas, the decreasing of labor force percentage of agricultural sector to total Indonesian worker, increasing ratio of GDP on labor in the agricultural sector, and increase in the FTT.

Based on the conclusions of this study, there are some policy implications to accelerate the decrease in education inequality. Government spending and public education are still the main instruments for the government in education. Increased government spending on education functions and prioritizing increased share of input provision at higher levels of education which are increasing school for senior secondary and college education levels, as well as improving the number of teacher especially at junior secondary school, senior secondary school, and College.

Public education input allocation is not the only factor that determines the decline in educational inequality. The existence of demand-side factors also influence educational inequality. Therefore, the government should take these factors into account in the various education policy decisions that must be done. The policy that can be done to decrease educational inequality is: (1) Policy to increase income per worker of agricultural sector through increasing investment and Foreign Direct Investment in agricultural sector, (2) policy to increase FTT (NTP) through pricing policies, subsidizing agricultural inputs and other policies, (3) policies to reduce income inequality in rural areas by increasing access to farming finance for poor households to increase business capital, and (4) increasing the rate of structural change by increasing economic stimulus in service sector to be able to absorb excess labor in the agricultural sector.

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