REDUCING ECONOMIC INEQUALITY IN INDONESIA: ANALYSIS USING PANEL MODEL

by Wilson Rajagukguk

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Wilson Rajagukguk
Universitas Kristen Indonesia, Jakarta

Abstract

Indonesia is still experiencing development inequality. This inequality has influenced economic and welfare inequality. This study aims to investigate how to reduce economic inequality. The data come from the Indonesia Database for Policy and Economic Research (INDO-DAPOER) of the World Bank in 2017. The unit analysis is province in 2001-2011 period. The analysis methods used are the bivariate and multiple regression with random effects analyses. The response variable is the log total GDP excluding oil and gas at current price. Meanwhile, the explanatory variables are the monthly per capita household education expenditure (million rupiah), monthly per capita household health expenditure (million rupiah), fiscal tranfers (million rupiah), log number of people employed household, percentage of households with electricity, and net enrollment ratio for junior secondary school (in %). The results of analyses show that all explanatory variables statistically have significant positive effects on economic growth in Indonesia.

Keywords: Inequality, economic growth, panel data, fiscal transfers, Indonesia.

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Abstract

Indonesia is still experiencing development inequality. This inequality has influenced economic and welfare inequality. This study aims to investigate how to reduce economic inequality. The data come from the Indonesia Database for Policy and Economic Research (INDO-DAPOER) of the World Bank in 2017. The unit analysis is province in 2001-2011 period. The analysis methods used are the bivariate and multiple regression with random effects analyses. The response variable is the log total GDP excluding oil and gas at current price. Meanwhile, the explanatory variables are the monthly per capita household education expenditure (million rupiah), monthly per capita household health expenditure (million rupiah), fiscal tranfers (million rupiah), log number of people employed household, percentage of households with electricity, and net enrollment ratio for junior secondary school (in %). The results of analyses show that all explanatory variables statistically have significant positive effects on economic growth in Indonesia.

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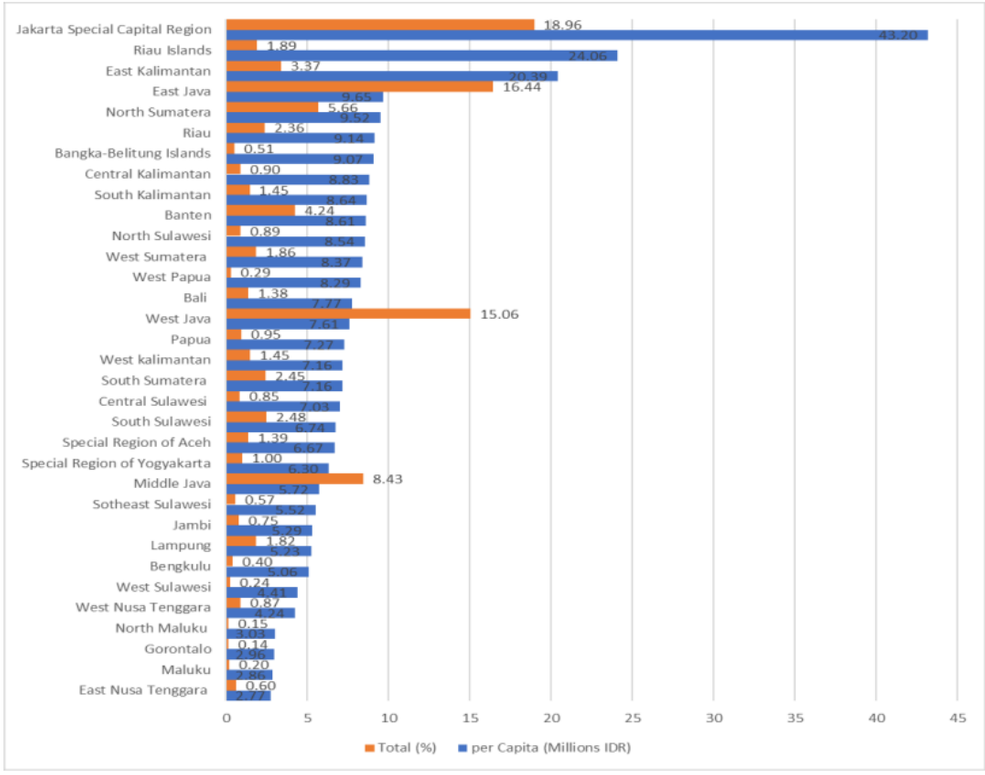
Introduction

Indonesia is still experiencing significant development inequality across its regions. This inequality can be observed in many development variables. In this study, the inequality is portrayed through the gross domestic product (GDP) per capita.

It can be seen from Figure 1 that there is income inequality across provinces in Indonesia. In 2011, the GDP per capita was highest in DKI Jakarta (43.20 million rupiah), Riau Islands (24.06 million rupiah) and East Kalimantan Timur (20.39 million rupiah) and lowest in Gorontalo (2.96 million rupiah), Maluku (2.86 million rupiah) and East Nusa Tenggara (2.77 million rupiah).

On the other hand, the largest GDP per capita pie was enjoyed by the three largest of DKI Jakarta (19.0%), East Java (16.4%) and West Java (15.1%) and by the three smallest of Gorontalo (0.1%), North Maluku (0.1%) and Maluku (0.2%).



Source: World Bank (2017)

Figure 1

GDP Per Capita (Million Rupiah) and Total GDP (%) by Province: Indonesia 2011

For the sake of all Indonesians, the inequality should be alleviated. To alleviate the inequality across regions, the Government of Indonesia has

established the umbrella law. The Government and all stakeholders have considered it. Indonesia has issued Laws on equalization across regions.

Decentralization concept was started since Indonesia entered the Reform Era. The Government has issued Law No. 22 of 1999 on regional administrations and Law No. 25 of 1999 concerning Revenue Sharing of Central and Regional Government. This Law is considered as the start of new era of fiscal decentralization which was effective since January 1, 2001. In their implementation and development process, these two Laws experienced improvement. In 2004, these two Laws were replaced by Law No. 32 of 2004 and Law No. 33 of 2004, respectively.

How to reduce development inequality across provinces in Indonesia? Will economic growth inequality alleviation reduce this inequality? How should it be done? In which development areas?

OECD (2012) identified the inequality patterns across OECD countries. It found that education, anti-discrimination policy, good-invented labor market institution, and progressive tax and fiscal transfer system can reduce inequality.

A key question in this study is which development areas can reduce inequality across provinces in Indonesia. There is a consensus that in analyzing economic performance, the focus should not only be on the economic growth, but also on the income distribution, taking into account the trade-off between the two (OECD, 2012).

The theory of economy traditionally has emphasized that the accumulation of physical capital is the most robust source of the economic growth (Self and Grabowski, 2004; Ozturk, 2001).

Education becomes the most powerful engine of growth for global growth and success (Bexheti and Mustafi, 2015). Intervention on high quality

education, especially since childhood and targeted to unfortunate children, can have substantial impact on future life outcome (Heckman et al. 2013).

For general education program, the rate of return has a positive impact not only for parents, but also the society who finance it. General education increases productivity, unity, civility and health (Becker 1993). People and society must be aware that education is a good public good when all society invest in education. Investment in education promotes human capital formation that contributed to economic growth.

Cooray (2009) used some proxy variables for education quantity and quality using cross section data for some low and middle income countries. The results of the study show that enrollment ratio affect economic growth. In addition, the study also found that government expenditure for education has a great effect on economic growth through the improvement in education quality. Education improves productivity and creativity and promotes entrepreneurship and technological progress. Education has a crucial role in securing economy and social progress and improves income distribution.

Health is also an important asset for human being. Good health enables capacity enhancement. If health asset is not developed perfectly, it can cause physical and emotional weakening and can be a barrier in human life. In a theoretical basis, Mankiw et al. (1992), Barro (1996) and Grossman (1972) have developed an economic growth model that involves health as a significant factor of economic growth. Barro (1996) argued that health is a productive capital asset and the economic growth engine.

Health problem can reduce and can be a barrier in economic development. Ainsworth and Over (1994) conducted a study on AIDS impact on economic growth in Africa. They found that AIDS occurred on young workers and affected productivity and domestic saving rate.

Baltagi and Moscone (2010) used a panel data from 20 OECD countries during 1971-2004. They found that health care positively related to economic growth. Health care expenditure is a necessity. Investment in health improves economic growth and is a variable that can eliminate poverty traps (Aguayo-Rico et. Al. 2005; World Health Organization 1999).

Eggoh et al. (2015) carried out a study on the relationship between human capital and economic growth in 49 African countries during 1996-2010. Employing cross-section and dynamic panel techniques, they found that public expenditure for education and health have positive impact on economic growth. Public investment in education and health must be done jointly so that it will have positive impacts on human capital growth in Africa. Higher human capital promotes economic growth.

For developing countries, besides side effects, fiscal decentralization is believed as a solution for all economic problems (Jumadi et. al. 1993). Jumadi et al. (2013) examined and analyzed the implementation of fiscal decentralization on economic development in East Java Indonesia. They found that a positive relationship between fiscal decentralization and human development and physical development and between human development and local economic growth.

Employment opportunity and economic growth has a reciprocal relationship. A number of studies show that the relationship is negative (Sudrajad, 2008), positive (Herman 2011; Kitov and Kitov no date; Ajakaiye et. al. 2016; Khan 2007) and no relationship (Melamed et. al. 2016).

The effect of employment on economic growth is called 'employment elasticity' or 'employment intensity' of growth. Policy related to the number of people employed with economic growth is not only job creation, but also ensuring labors are well paid to eliminate poverty. Today, almost half of labors live below $2 per day (Melamed et al. 2011).

Herman (2011) conducted a research on the effects of employment on economic growth European Union countries during 2000 and 2010. The results show the low elasticity of employment on the economic growth. Meanwhile, Sudrajad (2008) studied the relationship between employment and regional economic growth at district level during 1993-2003 in Indonesia. He found that employment negatively relates to GDP.

Kitov and Kitov (no date) modeled the employment/population ratio in largest developed countries. The results of their study show that the evolution of employment rate since 1970 can be predicted and has a linier relationship with the logarithm of real GDP per capita. Ajakaiye et. al. (2016) found that the employment elasticity in Nigeria in the last decade is positive and quite low, in particular in manufacturing. Meanwhile, Melamed et. al. (2016) recorder there is direct relationship between economic growth, employment and poverty reduction. Further, Khan (2007) found that employment elasticity of GDP growth in developing countries is 0.7. So, there is a positive relationship between employment growth and economic growth.

The International Energy Agency (IEA) estimate in the World Energy Outlook 2009 that 1.5 billion people were lack of access to electricity in 2008, more than a fifth of world population. About 85% of people had no access to electricity in less developing countries, in particular Sub-Saharan Africa and South Asia. However, there is a significant increase in access to electricity in Sub-Saharan Africa in 2016. Overseas Development Institute (2016) reported that about 600 million (70%) experience lack of access to electricity. Half of business doers stated that lack of access to electricity is the main barrier for business operation. Meanwhile, ADB et al. (2010) carried out a study on economic growth in Indonesia. Companies stated that access to electricity is a main barrier in their operation. Some industries and manufactures have to use private generator because electricity from the Government (PLN) is not available or inadequate. Private generator is very expensive and is not easy, in particular for small and medium enterprises.

Access to energy can promote the economic growth. Stern (2010) argued that energy has an important role in economic growth where production is considered as a function of capital, labor and energy. Further, Campo and Sarmiento (2013) studied the relationship between energy consumption and economic growth in 10 Latin American countries during 1971 and 2007. They found that an increase in energy consumption will increase GDP. Also, Chang et al. (2001) examined the relationship between energy consumption and economic growth in Taiwan during 1982-1997. They found that energy consumption has positive impact on employment and economic growth.

The role of education performance on the economic growth has been confirmed. Ozturk (2001) argued that improvement in school enrollment and years of schooling contribute to the economic growth and help alleviate poverty in developing countries.

Data and Methods

Data

Data in this study come from the Indonesia Database for Policy and Economic Research (INDODAPOER), published by the World Bank (2017). Selected data covered all provinces in Indonesia during 2001 to 2011. Therefore, the data is a panel data.

It can be seen from Table 1 that there is a significant gap in development across provinces in Indonesia. The monthly per capita household education expenditure (in IDR millions) ranged from 0.002 to 0.096. The monthly per capita household health expenditure (in IDR millions] also differed greatly from a lowest of 0.002 to a highest of 0.046. Meanwhile, the total revenue (in IDR millions) varied from 47.090 to 28.300.000. Log number of people employed ranged from 4.871 to 7,286. In term of household access to electricity (in % of total household), the lowest was 36.16 and the highest was 99.97. In term of education, the net enrollment ratio for Junior Secondary (in %) varied from 36.82 to 81.2.

Table 1

Variable, Observation, Mean, Standard Deviation, Minimum, and Maximum

Variable	Obs.	Mean	Std. Dev.	Min	Max
Log total GDP excluding oil and gas constant price	363	7.335	.5542	6.192	8.625
Monthly per capita household education expenditure (in IDR millions)	363	0.015146	0.0121334	0.002	0.096
Monthly per capita household health expenditure (in IDR millions]	363	0.0074	0.0057	0.002	0.046
Total revenue (in IDR millions)	363	2,227,072	3204271	47,090.07	2.83×10^7
Log number of people employed	363	6.192653	0.4645006	4.871	7.286
Household access to electricity: Total (in % of total household)	363	80.54192	16.0032	36.16	99.97
Net Enrollment Ratio: Junior Secondary (in %)	363	62.77206	8.918597	36.82	81.2

Sumber: World Bank (2017) (Author's calculation).

Methods

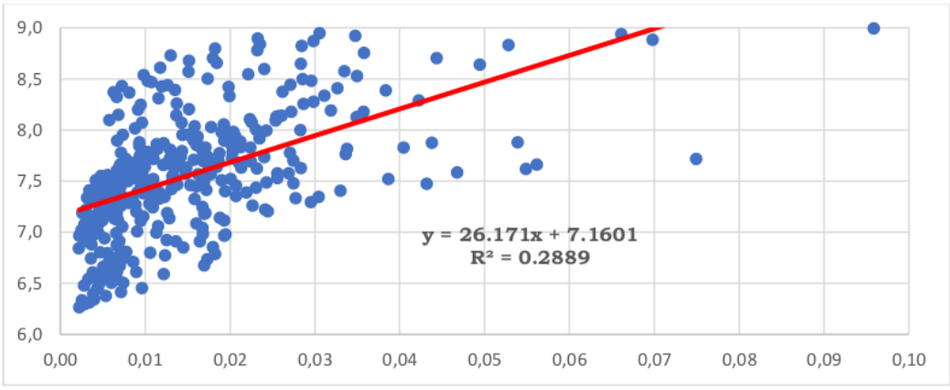
The data were analyzed using bivariate and panel regression with random effect analyses.

Bivariate Analyses

The bivariate analyses are done using the scatter diagrams and simple linear regression between each independent variable (monthly per capita expenditure for education, monthly per capita expenditure for health, total revenue, number of people employed, households with electricity and net enrollment ratio for Junior Secondary education) and the dependent variable (economic growth). The results are presented in Figure 1 – Figure 6.

The monthly per capita education expenditure has a positive relationship with the economic growth (Figure 1). It means that one million rupiahs increase in the monthly per capita education expenditure will increase GDP 26.171%.

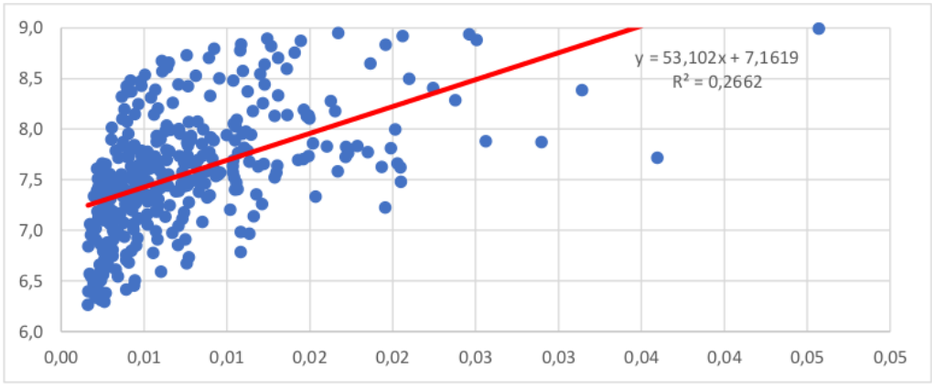
The monthly per capita health expenditure has a positive relationship with the economic growth (Figure 2). It means that one million rupiahs increase in the monthly per capita health expenditure will increase GDP 53.102%.



Source: World Bank (2017) (Author's calculation).

Figure 1

Monthly per Capita Education Expenditure (million rupiah) and Log(GDP Excluding OIL and Gas at Current Price) by Province: Indonesia 2001-2011



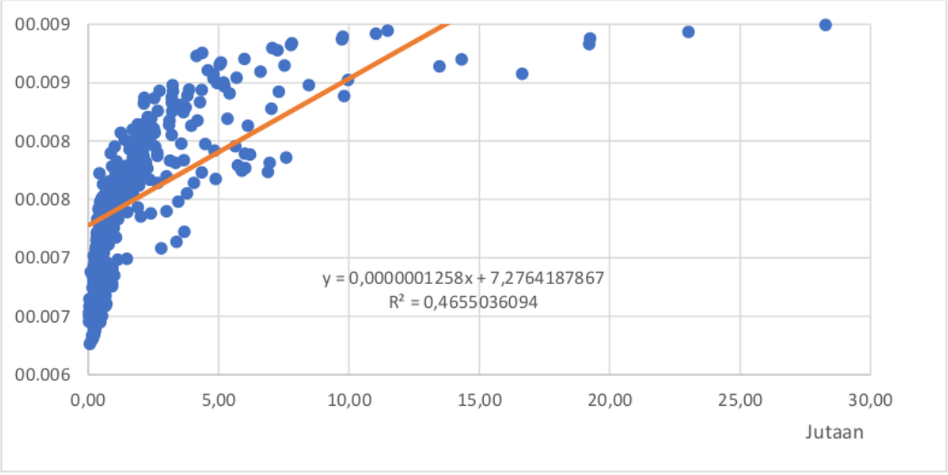
Source: World Bank (2017) (Author's calculation).

Figure 2

Monthly per Capita Health Expenditure (million rupiah) and Log(GDP Excluding OIL and Gas at Current Price) by Province: Indonesia 2001-2011

The economic reform through the total revenue has a positive relationship with the economic growth (Figure 3). It means that a million rupiahs increase in the total revenue will increase GDP 0.00000013%.

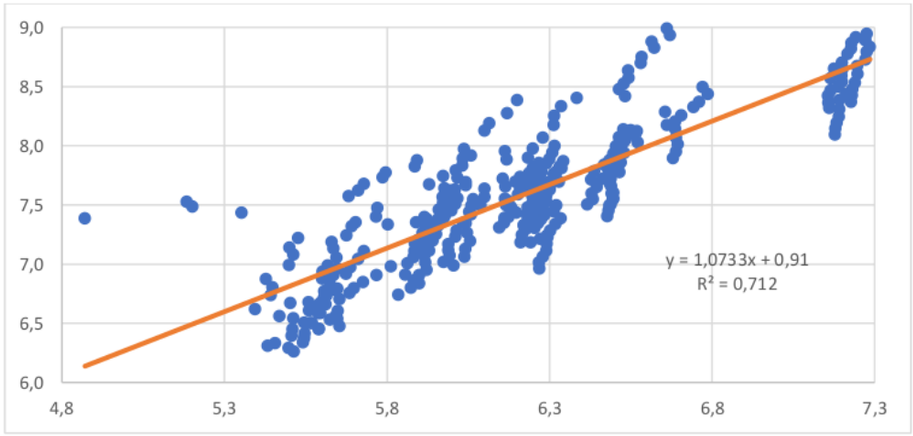
The number of people employed has a positive relationship with the economic growth (Figure 4). It means that a 1% increase in the number of people employed will increase GDP 1.07%.



Source: World Bank (2017) (Author's calculation).

Figure 3

Total revenue (million rupiah) and Log(GDP Excluding OIL and Gas at Current Price) by Province: Indonesia 2001-2011



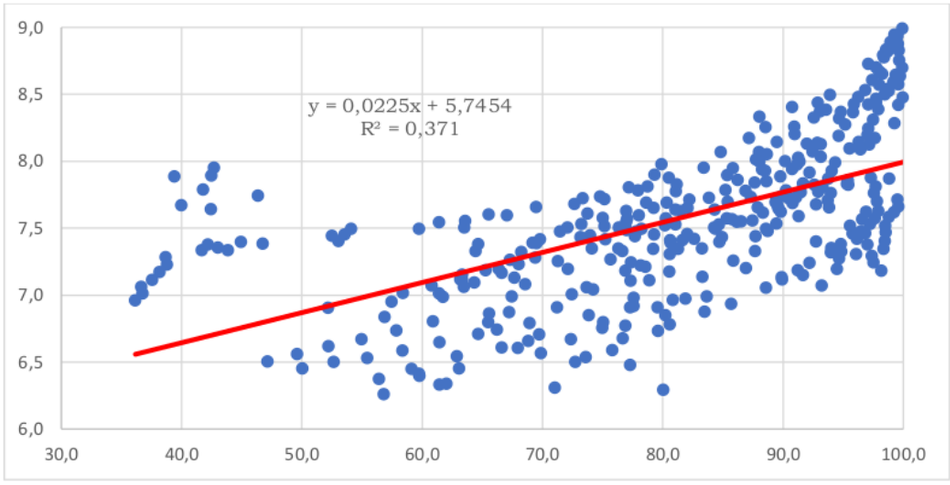
Source: World Bank (2017) (Author's calculation).

Figure 4

Log(number of people employed) and Log(GDP Excluding OIL and Gas at Current Price) by Province: Indonesia 2001-2011

The household access to electricity has a positive relationship with the economic growth (Figure 5). It means that a 1% increase in the net enrollment ratio for Junior Secondary education will increase GDP 0.023%.

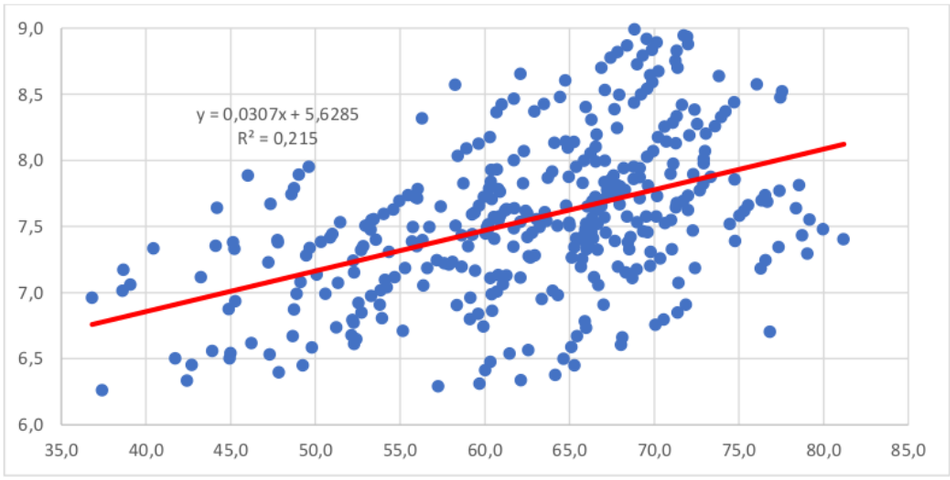
The net enrollment ratio for Junior Secondary education has a positive relationship with the economic growth (Figure 6). It means that a 1% increase in the net enrollment ratio for Junior Secondary education will increase GDP 0.03%.



Source: World Bank (2017) (Author's calculation).

Figure 5

Household Access to Electricity (in % of total household) and Log(GDP Excluding OIL and Gas at Current Price) by Province: Indonesia 2001-2011



Source: World Bank (2017) (Author's calculation).

Figure 6

Net Enrollment Ratio for Junior Secondary and Log(GDP Excluding OIL and Gas at Current Price) by Province: Indonesia 2001-2011

Regression Model with Random Effect

The regression analysis method employed in this study is the panel regression with random effect model[1].

The model equation is as follows.

$$Y_{ij} = \alpha + \beta X_{it} + \varepsilon_{it}\ ; \quad \varepsilon_{it} = u_{it} + v_t + w_{it}$$

Where Y_{ij} : Log GDP for province i at time t,

X_{it} : Independent variables for province i at time t,

u_i : Error cross section component,

v_t : Time series component,

w_{it} : Joint error component.

The results of panel regression with random effect model are presented in Table 2. It can be seen that all variables in the model positively affect the economic growth significantly and statistically. It means that the higher the monthly per capita expenditure for education, monthly per capita expenditure for health, total revenue, number of people employed, households with electricity and net enrollment ratio for Junior Secondary education, the higher the economic growth. A one million rupiahs increase in monthly per capita expenditure for education will increase GDP 8.8%. A one million rupiahs increase in monthly per capita expenditure for health will increase GDP 3.811%. A one million rupiahs increase in total revenue will increase GDP 0.00000001%. A one percent increase in the number of people employed will increase GDP 0.4332%. A one percent increase in the households with electricity will increase GDP 0.01%. A one percent increase in the net enrollment ratio for Junior Secondary education will increase GDP 0.006%.

[1] Regression model with random effect is also called variance component model.

Table 2

Variable, Coefficient, Standard Error, t, P>t, dan 95% Coef. Interval Model

Variable	Coefficient	Std. Err.	t	P >t	[95% coef. Int.]	
Constant	3.449502	0.3240687	10.64	0.000	2.814339	4.084665
Monthly per capita expenditure for education	8.808178	1.363617	6.46	0.000	6.135539	11.48082
Monthly per capita expenditure for health	3.811693	2.254831	1.69	0.091	-0.607694	8.231081
Total revenue	1.09×10^{-8}	3.59×10^{-9}	3.04	0.002	3.90×10^{-9}	1.8×10^{-8}
Log number of people employed	0.4332532	0.0552716	7.84	0.000	0.324923	.5415835
Household acces to electricity	0.0105476	0.0008926	11.82	0.000	0.008798	.0122971
Net enrollment ratio for Junior Secondary education	0.0061893	0.0013334	4.64	0.000	0.0035759	.0088026

Dependent Variable: Log (GDP excluding oil and gas constant price Indonesia 2001-2011)
Source: World Bank (2017) (Author's calculation).

Policy Recommendation

From the results of bivariate panel model analyses it was found that the growth of GDP across provinces in Indonesia can be improved and therefore the inequality can be alleviated. Based on the results of this study it is recommended that the province government should enhanced the per capita expenditure for education, per capita expenditure for health, total revenue, number of people employed, household access to electricity and net enrollment ratio for Junior Secondary education. These six development areas significantly and positively affect the growth of GDP in Indonesia.

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