IMPACT OF ROAD INFRASTRUCTURE, EDUCATION, HEALTH AND FOREIGN DIRECT INVESTMENT TOWARDS INDONESIA'S ECONOMIC GROWTH: LEVEL OF 33 PROVINCES

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Abstract

Economic growth is the most important factor to gain successful long-term development. The economy growth factors are road infrastructure, education, health, and foreign direct investment. This study analyzes the influence of road infrastructure, education, health and foreign direct investment on economic growth of 33 provinces in Indonesia in 2010-2016. This study uses panel data regression method and uses STATA 14 software. The regression estimation results showed that simultaneously road infrastructure, education, health, and foreign direct investment had an effect on economic growth of 33 provinces in Indonesia, while partially (individually) foreign direct investment doesn't have significant effect.
JEL Classdification: H51, H52, H54
Keywords: Economic Growth, Education, Foreign Direct Investment, Health, Road Infrastructure

1. INTRODUCTION

Economic growth is an indicator to find out how far the development has been realized by government. Indonesia's economic growth showed a decline from 2011 to 2015. Starting in 2011 Indonesia's economic growth of 6.17 percent continued decline to 4.79 percent in 2015. The economic decline is basis for identifying the factors influence of economic growth. Referring to Solow's economic growth model which is the development of Harrod-Domar's model states the factors that influence economic growth include capital stock, labor growth, and technological development. While the Harrod-Domar model shows investment relations and economic growth. Based on the two models of economic growth, the road infrastructure and foreign direct investment variables used as investments in economic growth factors. Furthermore, referring to new (endogenous) growth theory that emphasizes the quality of human capital, the variables of education and labor are used as human capital in economic growth factors.

Infrastructure is a country need in to carrying out activities. Good infrastructure development will push ahead the economic growth.Infrastructure development in economic growth will have a direct or indirect impact. Infrastructure is considered as one of the important conditions for the development of other sectors and as a means of connecting. Empowering resources in infrastructure development will increase economic and social multiplication. The road infrastructure in Indonesia continues to expand from 2010 to 2016 consists of paved roads and non-paved roads. Paved roads in 2010 were 277,775 km, to 326,629 km in 2016. Non-paved roads fluctuations, which initially an expansion from 2010 to 2013 to become narrower in 2014 to 2016. This is because some of the roads have been converted into paved road.

Education is an investment in human capital. The higher education is seen as a source of innovation that will encourage the increased of productivity. The expansion of education is considered as an attractive government policy because of its impact on economic growth. The level of quality education of a country will make the level of living better and will improve the quality of the workforce. In developing countries, education pushing ahead of economic growth. Educationin Indonesia there is a gap between villages and cities. The level of education using the Average Length of

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Schooling (RLS) shows that in rural areas it is only 7.52 while in cities education can reach 9.87 in 2016.

Health is considered as a contribution in a country's economic growth. AHH itself is the number of years of life of a person that is still living. The benefit of AHH is to know the level of prosperity of the population in an area. With increasing life expectancy at birth provides an interpretation that the level of health has improved. Health conditions in Indonesia have increased over the past six years as measured by life expectancy at birth. In 2011 AHH amounted to 70.01 and continued increase, although not as large as 70.9 in 2016. Health can have implications for people's welfare evenly.

One of Indonesia's development financing sources, there is Foreign Direct Investment (FDI). FDI is a very important source of economic growth, especially for developing countries. This allows the country to overcome domestic deficiencies in the capital, technology and expertise, and has a strong and long-lasting effect on growth, through direct and spillover channels. FDI conditions in Indonesia are currently fluctuations from 2011-2016. In 2014 had decline then in 2015 again an increase, and in 2016 a decline again.

2. LITERATURE REVIEW

Harrod-Domar's Growth Theory

Harrod-Domar's growth theory is an extension of Keynes's analysis of national economic activities and labor problems. Harrod-Domar analyzed the economic requirements to develop and grow in the long run. This theory seeks to show what the economy needs in order to grow and develop steadily (steady growth).

Harrod-Domar stated that the GDP growth rate is jointly determined by the savings ratio and capital-output ratio. National income that growth will directly and affect the savings ratio, without intervention from the government (that is, if the GDP component of the economy is saved and invested more, then GDP growth will be greater), but inversely proportional to the capital-output ratio (if the ratio of capital to national output is greater, the GDP growth rate will be lower).

Solow Growth Theory

The Solow neoclassical growth model is a development of Harrod-Domar's theory includes the second factor, labor, and the third factor is technology into the equation of economic growth. Unlike the Harrod-Domar model assumes a constant return to scale, Solow's neoclassical growth model shows a decreasing or constant result of labor and capital factors. Technological progress becomes a residual factor in long-term growth, and the growth rate according to the Solow assumption is determined exogenously means that it is free from the influence of factors other than in the model (Todaro, 2011: 157).

The Solow neoclassical growth model using aggregate functions is:

$$Y = K^\alpha (AL)^{1-\alpha} \qquad \text{... (1)}$$

The notation Y in equation (1) is the Gross Domestic Product, K is the capital stock, A is labor productivity, L is labor, and is the output elasticity of capital.

New Economic Growth Theory

New (endogenous) economic growth theory explains differences in growth rates between countries and factors that give greater proportions to unexplained growth processes and are determined experimentally in the Solow neoclassical growth equation. In this theory, assuming that public and private investments in human capital produce external economies and increased productivity that offset the natural tendency of diminishing returns, endogenous theories attempt to explain the existence of increasing scale of returns and different long-term growth patterns in various countries. Exogenous technological changes in this model are no longer needed to explain long-term growth (Todaro, 2010: 183). According to Romer, there are three basic elements of economic growth. First, the changes in technology produced are endogenous through a process of accumulating knowledge. Second, the creation of new ideas and the third

production of consumer goods produced by the factors of scientific production will grow indefinitely (Arsyad, 2010: 92). In simple terms endogenous growth is described as follows:

$$Y = A.K \qquad \qquad \text{... (2)}$$

The notation Y represents output, K represents the supply of capital (physical capital and human capital), A represents the factors that influence technology. Equation (2) concludes that the accumulation of physical capital and human capital determines economic growth / output. This shows that economic growth is influenced by human capital (quality) characterized by the development of modern technology in the production process (Agenor and Montiel, 2015: 608).

Previous Research

Infrastructure facilities (except railways) more productive to increase aggregate output from other physical capital (Zhang and Ji, 2018). Infrastructure can allow for additional capacity production, reduce input costs in production and transaction costs (Palei, 2015). Road infrastructure and total roads are significant to economic growth (Ma'ruf, 2014).

The development of human resources consisting of education and health has a positive impact on economic growth (Azam and Ahmed, 2018; Hanushek, 2016; Kowal and Roztocki, 2013). Economic growth by human capital is translated into behavior, attitudes as human capital, and education (Abdullah, 2015).

GDP per capita growth, Gini Index and Health Expenditures have significant to the Health Index (Lopez and Soley, 2014). Human capital development which consists of education and health which has a positive impact on economic growth (Azam and Ahmed, 2015). households that use computers, the average length of school, the level of innovation, and life expectancy are good factors for economic growth and national products (Kowal and Roztocki, 2013). In Hansen's and Lonstrup's (2015) study showing that countries with high AHH growth, GDP per capita growth rates were lower at the end of the 20th century. Negative growth in population growth rates was only an effect of mortality shock on countries post demographic modification.

Most FDI relations with economic growth are significantly positive, but in some cases negative zero (Almfraji and Almsafir, 2014). FDI to be less connective in encouraging economic growth due to various factors, price instability in the form of inflation and excessive government roles (Azam and Ahmed, 2015).

3. RESEARCH METHODS AND TECHNIQUES

The initial stage in roaddata method collection is determining variables. The variables in this study come from theory, previous research and several references. After determining the variables, the next step collect data, secondary data derived from the Central Statistics Agency (BPS) and the Investment Coordinating Board (BKPM). Variables in this study are PBRB, road infrastructure, education, health, and foreign direct investment. The data is data of 33 provinces in Indonesia and the period used is 2010-2016.

The analysis technique in this study is panel data regression method, Pooled Least Square (PLS), Fixed Effect Model (FEM), Random Effect Model (REM). The analysis model used in this study is as follows:

$$lneg_{it} = \beta_0 + \beta_1 lnroad_{it} + \beta_2 lnedu_{it} + \beta_3 lnhealth_{it} + \beta_4 lnfdi_{it} + e_{it} \quad \text{.. (3)}$$

The data used in this study are panel data, namely combined time series data and cross section data. The dependent variable in this study is the economic growth of 33 provinces in Indonesia. Independent variables in this study are road length (km), Life Expectancy (AHH), Average School Duration (RLS) and Foreign Direct Investment (FDI).Where$lneg$ is a Product Domestic Regional Bruto in constant where the indicator is used to determine the extent of development that has been realized by the government.$lnroad$is a road in kilometers, a study proves that there is a positive correlation between economic growth and five public works infrastructure variables, one of which is the length of the road.$lnedu$is an education with proxy Life Expectancy

Rate, education itself is an investment in human capital. In state development, education is a trigger for economic growth. There are still a gap in The state of education in Indonesia between villages and cities,the higher someone education will generate higher income so that it has an impact on productivity and better economic growth.*lnhealth*is a health with proxy Average School Length, Health as a form of contribution in the economic growth of a country. The health situation in Indonesia has increased from year to year over the past six years which has increased using life expectancy at birth, an increase in life expectancy is an important determinant in the economic growth of developed countries today.*lnfdi*is foreign direct investment, $\beta_0$is an intercept, $\beta_1, \beta_2, \beta_3, \beta_4$is a regression coefficient, *i*is a cross section unit, *t* is a time series unit, and *e* is an error.

Estimation

a. Before Robust

Table 1 FEM Panel Data Regression Estimation Results

Fixed Effect Model			
Var.Independen	Coef.	Stand. Error	p-value
Lnroad	0.118743	0.0602439	0.050
Lnedu	0.7251612	0.1712381	0.000
lnhealth	18.79687	0.8462114	0.000
Lnfdi	0.0058533	0.004312	0.176
_cons	-63.63486	3.343438	0.000
Obs			231
Prob>F			0.0000
R-squared			0.4163

Source: Stata Regression Results

Table 1 shows the estimated results of panel data regressions using the FEM model, the Lnroad(name of the variable length of the highway) variable p value is significant for the 10% significance point because the p-value value is smaller than the 10% significance point of 0.05 (5%), the Lnedu (name of variable life expectancy) variable p value is significant to the 1% significance point because the p-value is smaller than the 1 percent significance point which is equal to 0,000, the LnHealth (name of proxy health variable Average School Length) variable p value is significant to the 1% significance point because the p-value value is smaller than the 1 percent significance point of 0,000, Lnfdi(name of variable Foreign direct investment) variable p value is not significant to the 10% significance point because the p-value value is greater than the 1 percent significance point which is equal to 0.176 (1.7%)

b. After Robust

Table 2 GLS Regression Results on FEM

lneg	Coef.	Stand. Error	p>|z|
lnroad	0.118743	0.0552087	0.031
lnedu	0.7251612	0.1569261	0.000
lnhealth	18.79687	0.7754856	0.000
lnfdi	0.0058533	0.0039516	0.139
Wald chi2 (36)		180109.23	
N		231	
Prob>chi2		0.000	

Source: Stata Regression Results

Table 2 shows the estimated GLS regression using the FEM model, the Lnroad(name of the variable length of the highway) variable p value is significant for the 5% significance point because the p-value value is smaller than the 5% significance point of 0.03 (3%), the Lnedu (name of variable education) variable p value is

significant to the 1% significance point because the p-value is smaller than the 1 percent significance point which is equal to 0,000, the LnHealth (name of proxy health variable Average School Length) variable p value is significant to the 1% significance point because the p-value value is smaller than the 1 percent significance point of 0,000, Lnfdi(name of foreign direct investment) variable p value is significant for the 10% significance point because the p-value value is smaller than the 1 percent significance point which is equal to 0.139 (1.3%).

4. RESULTS

Based on data at the Central Bureau of Statistics shows that the rate of economic growth in Indonesia in 2010-2016 continued to decline, except in 2016 showed an increase. Economic growth becomes a benchmark for economic performance and economic development in a country has been going well or not. In another sense economic growth is a process of changing a country's economy towards a better state. Economic growth can also be interpreted as a process of increasing the production capacity of an economy which is realized in the form of rising national income.

Fixed Effect Model estimation results in this study stated that simultaneously (together) variables of road infrastructure, education, health, and foreign direct investment had a positive and significant impact on the economic growth of 33 provinces in Indonesia. But simultaneously only foreign direct investment variables have no significant effect.

Table 3 GLS Regression Results on FEM

lneg	Coef.	Stand. Error	p>|z|
lnroad	0.118743	0.0552087	0.031
lnedu	0.7251612	0.1569261	0.000
lnhealth	18.79687	0.7754856	0.000
lnfdi	0.0058533	0.0039516	0.139
Wald chi2 (36)		180109.23	
N		231	
Prob>chi2		0.000	

Source: Stata Regression Results

Based on the regression results in Table 3, it can be explained:

1) Effect of Road Infrastructure on Economic Growth

Road infrastructure has a statistically significant positive relationship to economic growth. The results explained that any improvement in road infrastructure would increase Indonesia's economic growth. This is because road infrastructure is a physical infrastructure that functions to connect various centers of activity both economically and socially. So, with the availability of road infrastructure all activities will run more effectively and efficiently which will affect the future economic growth.If road infrastructure rises by one percent, economic growth increase by 0.11 percent. This is because road infrastructure is a physical infrastructure that serves to connect various centers of activities both economic and social. So, with the availability of road infrastructure all activities will run more effectively and efficiently which will affect the future economic growth. From the general description of the length of roads in 33 provinces in Indonesia, the length of roads has continued to expand over the past 6 years. Especially in the Sumatra province, the expansion of the road is used to build toll roads, where building toll roads is a development so that the mobility of goods and services is easier and has an impact on economic growth.

The estimation results accordance with the research conducted by Palei (2015) explaining the influence of infrastructure on global competitiveness. The result is national competitiveness basically influenced by institutional developments and seven other factors, including road quality infrastructure. Infrastructure increases worker productivity then impacts on economic growth achieved by the initial period of construction workers.

2) Effect of Education on Economic Growth

Education has an important role to improve the ability of the country to develop and absorb modern technology and develop capacity for the realization of further growth and development. Statistical results show that education using RLS has a positive relationship to economic growth in Indonesia. If education rises one percent, economic growth rise by 0.72 percent. Education has an important role to enhance the country ability to develop and absorb modern technology and develop capacity for further growth and development (Todaro, 2011: 446). Statistical results show that education using RLS has a positive relationship to economic growth in Indonesia. BPS data shows that the RLS in 33 Indonesian provinces during 2010-2106 touched a number above 6 years, which means the average length of schooling for Indonesian citizens to complete primary school. According to data provided by BPS, Indonesian RLS continues to increase year by year. This indicates that educational programs launched by the government to support the country's economy such as School Operational Assistance (BOS), Poor Student Assistance, Smart Indonesia Cards, BidikMisi, and LPDP show positive developments.

The estimation results are supported by research Azam and Ahmed (2015) which shows that human capital education has a positive impact on economic growth, because education is a stimulus for economic growth. Then, Abdullah (2014) conducted a study on the implications of increasing human capital to economic growth. In his research explained that education and training of human resources have a central role in increasing economic growth. As a background for improving the quality of human resources, there is a need for early education, because it has a significant influence on national output.

3) Health Influence on Economic Growth

The estimation results show that there is a positive relationship between health and economic growth in Indonesia. As previously explained, health measured using Life Expectancy (AHH) in Indonesia from year to year continues to increase. This reflects that Indonesian health degrees, both from facilities and infrastructure, access, to the quality of health indicate an improvement in the quality of health.If health rises by one percent, economic growth to increase by 18 percent. health measured using Life Expectancy (AHH) in Indonesia from year to year continues to increase. This reflects that Indonesia's health status, both from facilities and infrastructure, access, to the quality of health shows an improvement in quality of health. Equity needs to be considered by the government, because each province has a different and quite sharp AHH according to BPS data. The low level of AHH in certain provinces is due to the fact that the baby's penology is still low and access to treatment to be difficult to reach, especially in rural areas.

The estimation results are different from the research conducted by Hansen and Lønstrup (2015) which, precisely if AHH is high, the GDP growth rate per capita is low, this is due to the effects of mortality shock on transition countries. But supported a study by Azam and Ahmed (2015) that investment is needed in education and health. Improved education and health must be directed simultaneously to stimulate economic growth. By using a proxy for life expectancy, health has a positive effect on economic growth.

4) Effect of Foreign Direct Investment on Economic Growth

The estimation results statistically prove that foreign direct investment has a negative relationship to Indonesia's economic growth. This explains that an increase in FDI will reduce economic growth. Foreign Direct Investment (FDI) can be negative or positive towards the host country. It is negative if the import growth is greater than the export growth due to itself, which results in a trade balance / export-import balance deficit.If foreign direct investment rises by one percent, economic growth rise by 0.005 percent. The p-value indicates foreign direct investment has no significant effect on the growth of Indonesian economy. Foreign Direct Investment (FDI) can be negative or positive towards the host country. Negative if import growth greater than export growth

caused by industry itself, and caused export-import balance deficit. In 2012 to 2014 Indonesia's trade balance a deficit which caused by decreasing economic growth, because one component of state revenue was net exports. Another factor is inflation in Indonesia increase in 2013 to 2014. High inflation caused foreign investors to be less interested in investing in Indonesia.

The estimation results are supported by research conducted by Azam and Ahmed (2015) that FDI is less conclusive in driving economic growth due to various factors, price instability in the form of inflation. The FDI effect is weak to the economic growth of newly independent countries. And studies conducted by Almfraji and Almsafir (2014) state that most FDI relations with economic growth have a positive relationship, but in some cases the relationship is negative. In its application, there are several factors that influence FDI with economic growth, adequate human capital, a well-developed money market, investment relations within the country and abroad, and an open trade regime.

5. CONCLUSION

Simultaneously the regression results show that the variables of road infrastructure, education (RLS), health (AHH) and Foreign Direct Investment (FDI) have a positive and significant effect on economic growth in Indonesia for 2010 to 2016. The regression results partially show that the roadinfrastructure variable, education (RLS) and health (AHH) have a positive and significant effect on economic growth in Indonesia for 2010 to 2016. While FDI variable has no significant effect. This is because import growth greater than export growth caused by the industry itself, which results in a trade balance/export-import deficit. In 2012 to 2014 Indonesia's trade balance deficit caused by decreasing economic growth, because one component of state revenue was net exports. Another factor is inflation in Indonesia increase in 2013 to 2014. High inflation caused foreign investors to be less interested in investing in Indonesia.

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