



The Effect of Infrastructure Development on Economic Growth

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Abstract

The development gap between The Western Indonesia (TWI) and The Eastern Indonesia (TEI) is still quite visible, this gap can be seen from infrastructure development consisting of the Special Allocation Fund (DAK), Long Road Infrastructure (IPJ) and Construction Workforce (TKK). This study aims to determine the effect of infrastructure development on economic growth. The data used is secondary data using panel data regression analysis. This study uses a combination of data between time series data, namely 2015-2019 and cross section data consisting of 34 provinces in Indonesia. The dependent variable used is economic growth, while the independent variables in this study are the Special Allocation Fund (DAK), Long Road Infrastructure (IPJ), Construction Workers (TKK) and the dummy variable, namely the difference between KBI and KTI. The results of the study indicate that DAK has a positive but not significant effect on economic growth. Meanwhile, IPJ and TKK have a positive and significant impact on economic growth. There is also a difference between KBI and KTI that the economic growth is greater in KBI.

Keywords: *Infrastructure Development, Economic Growth*

Abstrak

Kesenjangan pembangunan Kawasan Barat Indonesia (KBI) dan Kawasan Timur Indonesia (KTI) masih cukup terlihat. Kesenjangan tersebut dapat dilihat dari pembangunan infrastruktur yang terdiri dari Dana Alokasi Khusus (DAK), Infrastruktur Panjang Jalan (IPJ) dan Tenaga Kerja Konstruksi (TKK). Data yang digunakan yaitu data sekunder dengan menggunakan analisis regresi data panel. Penelitian ini menggunakan gabungan data antara data time series tahun 2015-2019 dan data cross section dari 34 provinsi di Indonesia. Variabel dependen yang digunakan adalah pertumbuhan ekonomi, sedangkan variabel independen dalam penelitian ini adalah Dana Alokasi Khusus (DAK), Infrastruktur Panjang Jalan (IPJ), Tenaga Kerja Konstruksi (TKK) dan variabel dummy yaitu perbedaan KBI dan KTI. Hasil dari penelitian menunjukkan bahwa DAK memiliki pengaruh positif tetapi tidak signifikan terhadap pertumbuhan ekonomi. Sementara IPJ dan TKK memiliki pengaruh positif dan signifikan terhadap pertumbuhan ekonomi. Terdapat juga perbedaan antara KBI dan KTI lebih besar pertumbuhan ekonominya di KBI.

Kata Kunci: *Pembangunan Infrastruktur, Pertumbuhan Ekonomi*

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INTRODUCTION

The economic development of a country is a process of planning for the country's economic development gradually in the long term. One of the main indicators in assessing the success of development in a country's economy can be seen from economic growth (Nugraha et al., 2020). Economic growth is a measure of the development of the production of goods and services in a country with the aim of improving people's welfare (Sukirno, 2011).

Economic growth can be influenced by capital accumulation in the form of investment in land, equipment and machinery, facilities, natural resources, and human resources in quality and quantity, as well as technological progress, access to information, innovation and self-development capabilities and work culture (Todaro, 2000). Capital accumulation is needed to increase and encourage production activity (Merus, 2015).

Supporting production activities can be done by completing supporting investments such as direct investment in physical capital stock in the form of economic infrastructure investment, such as road construction, irrigation, drinking water, sanitation, housing, and so on. With good infrastructure investment, economic development will experience good growth (Mohmand et al., 2020).

According to The Global Competitiveness Report 2019 issued by the World Economic Forum in 2019, Indonesia achieved a score of 67,7 points and is ranked 72nd out of 141 countries in terms of infrastructure development (Schwab, 2019). The provision of infrastructure in Indonesia is considered not to meet the expected conditions (Maryati et al., 2021).

The provision of inadequate quality infrastructure can affect Indonesia's productivity activities to date, still experiencing inequality in all regions of Indonesia. Rapid economic development tends to occur in provinces in Java, while areas outside Java are relatively lagging. This gap can also be clearly seen between economic developments in the Western Region of Indonesia (KBI) and the Eastern Region of Indonesia (KTI).

In KBI, the rate of economic growth is growing rapidly, namely in 2015-2019 it tends to increase by an average of 5,23 percent (Central Statistics Agency, 2019), because it is supported by the availability of infrastructure and adequate quality of human resources that can encourage the development of this region.

This is very different from KTI which has abundant natural resources and has the potential to be developed, but its economic growth is still slow compared to KBI, which is an average of 4,86 percent (Central Statistics Agency, 2019). The structure of the Indonesian economy in 2015-2019 was still dominated by KBI which contributed to GDP. This can be seen in figure 1.



Figure 1. Contribution of GDP by KBI and KTI in Indonesia 2015-2019 (Percent)

Source : Central Statistics Agency, 2019

Figure 1 shows that the structure of the Indonesia economy in 2015-2019 is still dominant in KBI which contributes to GDP of more than 80 percent, while KTI's contribution to GDP is only 18-19 percent. Even though most of Indonesia's natural wealth is in KTI, the ability to generate economic output contributed by KBI is higher due to the concentration of wealth and economic activity which still tends to be focused on KBI (Arsyanti and Nugrahadi, 2020).

The progress of economic growth between KBI and KTI shows that there is inequality in all regions of Indonesia. One of the efforts made by the central government to encourage regional economic growth is through fiscal decentralization policies that are applied to local governments. According to the Law of the Republic of Indonesia Number 33 of 2004 concerning the financial balance between the central government and regional governments.

In this case, the central government is needed to assist local governments through transfers to regions that are sourced from the State Revenue and Expenditure Budget. The total funds transferred to the regions are balancing funds consisting of the general allocation fund, revenue sharing fund, and the special allocation fund.

The availability of infrastructure is one of the important and main aspects to accelerate economic development, the presence of inadequate infrastructure and low quality and even lack of maintenance in infrastructure development participation can cause a slowdown in economic growth (Sugiarto and Nugrahadi, 2019).

Infrastructure development in 2015-2019 is one of the priority programs of the working cabinet of President Joko Widodo and Vice

President Jusuf Kalla (Ministry of Finance of the Republic of Indonesia, 2018). The government in resolving various inequalities between KBI and KTI continues to strive to build infrastructure in KTI areas so that they can be even more advanced. Therefore, the government in determining the special allocation funds for road infrastructure in KTI is quite large compared to KBI. This can be seen in figure 2.

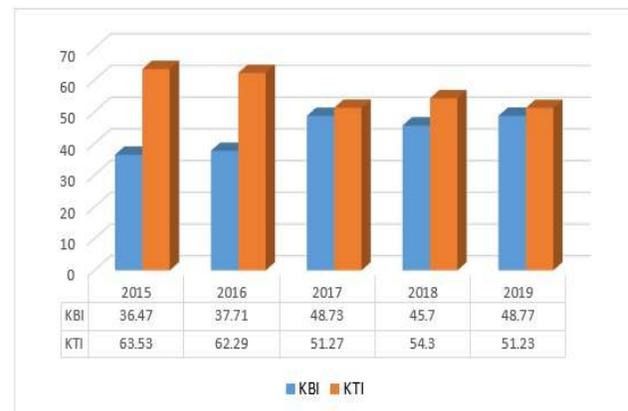


Figure 2. Special Allocation Fund for Road Infrastructure by KBI and KTI in Indonesia 2015-2019 (Percent)

Source : Ministry of Public Works and Public Housing, 2019

Figure 2 Based on this figure, it is known that the government in issuing special allocation funds for road infrastructure development in 2015-2019 to KBI was an average of 43,48 percent, while special allocation funds issued in KTI were on average of 56,52 percent. This shows that the special allocation funds for road infrastructure are larger in KTI compared to KBI.

The allocation of significant funds in this period aims to advance Indonesia economically through infrastructure development (Brilyawan and Santosa, 2021). It is hoped that the increase in the infrastructure development budget is

expected by the central and regional governments to be able to further accelerate careful preparation steps as an effort to ensure the timely absorption of infrastructure development budgets in determining economic performance, meaning that government spending is of good quality in terms of absorption and utilization.

Road construction with good condition is expected to boost the regional economy. Therefore, it is necessary to build roads with good conditions between KBI and KTI to increase economic growth. Even though the government has allocated a budget for infrastructure development, the proportion of road infrastructure between KBI and KTI still experiences a significant disparity. This can be seen in figure 3.

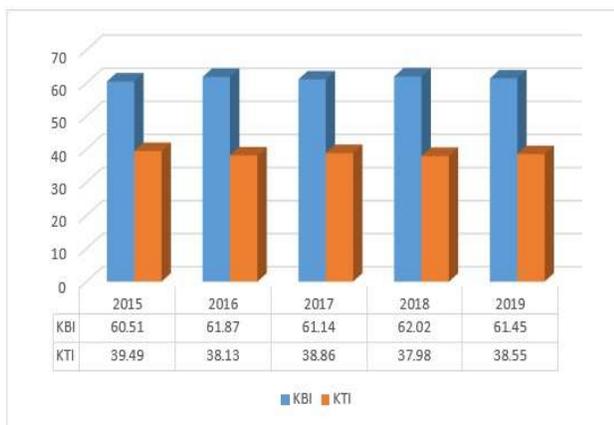


Figure 3. Road Infrastructure by KBI and KTI in Indonesia 2015-2019 (Percent)

Source : Transportation Statistics, 2019

Figure 3 shows that the inequality in road infrastructure can be seen in the percentage of total road lengths between the two regions which are very much different. The percentage of road length in 2015-2019 in KBI was an average of 61,40 percent, while in KTI the average was 38,60 percent. This shows that the development

of road infrastructure is not evenly distributed in all regions of Indonesia and is still centered in KBI, while the development of road infrastructure in KTI is still far behind.

With KTI which has an area of 67,78 percent, while the KBI area is only 32,13 percent of the total area in Indonesia (Central Statistics Agency, 2019). This is very ironic with the existence of an area twice the area of the KBI and the abundance of natural resources, but KTI must face the backwardness of infrastructure development and the low level of community welfare when compared to KBI (Nurhayani, 2014).

Government spending, among others, is used to improve physical infrastructure which of course can directly or indirectly absorb labor and reduce unemployment (Bawuno et al, 2015). With a larger budget allocated by the government in the KTI region, it is expected to increase the number of workers in the region. However, this is not in line with expectations because the number of workers in Indonesia is still experiencing inequality, one of which is the construction workforce. Where the number of construction workers in KBI is more than KTI.

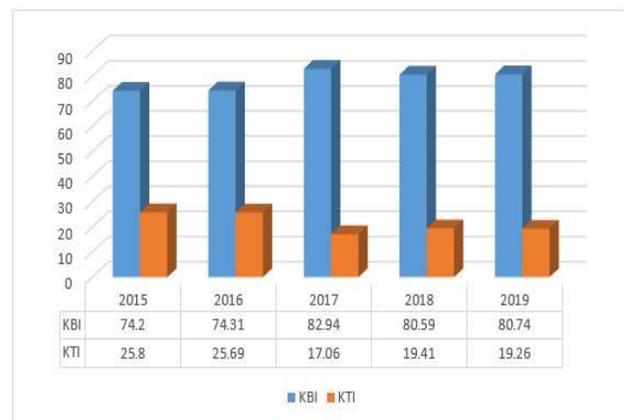


Figure 4. Construction Workers in KBI and KTI 2015-2019 (Percent)

Source : Central Statistics Agency, 2019

In fact, along with the increase in construction work in KTI, the need for manpower will increase, especially for competent construction workers, which are needed for the smooth running of all construction works. Because in the construction industry, labor is the main key factor that determines the completion of a construction project and is related to the productivity they can produce (Nirmalawati et al, 2013). This can be seen in figure 4.

Figure 4 shows that the percentage of construction workers during 2015-2019 at KBI was more, namely an average of 78,56 percent compared to KTI which was only 21,44 percent on average. This shows that the absorption of construction labor in KTI is still low compared to KBI. Even though the government's budget allocation for the construction sector is mostly in KTI, this has not been able to absorb construction workers in the region.

With the absorption of labor in the construction sector, it is hoped that one day the wage level in KTI will increase. This wage increase will reduce the difference in income levels between KBI and KTI (Bawuno et al, 2015). The number of people working in KTI is only a quarter of the population working in KBI, or it can be said that 80 percent of the population working in KBI is while KTI is only 20 percent (Central Statistics Agency, 2019).

Therefore, it causes the proportion of the number of workers to be higher in KBI compared to KTI. Even though the KTI area is wider than the KBI, there should be more distribution of labor in the KTI so that infrastructure development runs evenly and there is no inequality in economic growth. Labor is an important element in economic growth

(Rofii and Ardyan, 2017). With many people who work and have good skills or abilities, they will be able to encourage the rate of economic growth.

Due to the availability of many workers, it can increase regional development, one of which is the construction of roads for transportation access. There are several studies that link infrastructure development with economic growth, namely research by Burhanuddin et al (2020) with the results that road infrastructure has not had a significant effect on economic growth. The results of Maharani and Isnowati's research (2014) show that government spending and labor have a positive and significant effect on economic growth.

Meanwhile, research by Perkasa et al (2021) shows that the special allocation fund has a positive but not significant effect. From several previous studies and problems, it is known that Indonesia's infrastructure development has been going on for quite a long time in accordance with national priorities which prioritize KTI, but in this area the infrastructure development is still low compared to KBI.

Various improvements made by the government are still not able to balance the development achievements in KBI. There is a need for a study that discusses how infrastructure development affects economic growth between KBI and KTI, so that it can be seen the contribution of each infrastructure development consisting of the Special Allocation Fund (DAK), Long Road Infrastructure (IPJ), and Construction Workforce (TKK). Thus, the government can determine the policy direction in infrastructure development in accordance with national priorities to reduce the inequality of economic growth between KBI and KTI.

RESEARCH METHODS

The data analysis technique in this study uses panel data regression model analysis (panel pooled data). The specification of the analytical model in determining the regression function model used in this study is the function model of the special allocation fund (DAK), road length infrastructure (IPJ) and construction workforce (TKK), and the dummy variable, namely the difference between KBI and KTI to determine whether significant effect on economic growth (PE). With the equation model in this study as follows :

$$\text{LOGPE}_{it} = \beta_0 + \beta_1\text{LOGDAK}_{it} + \beta_2\text{LOGIPJ}_{it} + \beta_3\text{LOGTKK}_{it} + \beta_4D_1 + \mu_{it} \dots\dots\dots(1)$$

Where LOG is Natural logarithm transformation, PE is Economic Growth (Billion IDR), DAK is Special Allocation Fund (Billion IDR), IPJ is Infrastructure Road Length (Km), TKK is Construction Workforce (Person), β_0 is Constant number, β_1 - β_4 is The coefficient of each independent variable, D_1 is Differences in economic growth Dummy: ($D = 1$ if the province is in KBI) ;($D = 0$ if the province is in KTI), μ is Residual value (confounding factor) outside the model, i is Province ($i = 1,2,3,\dots,10$) and t is year t (2015-2019).

This research is descriptive research with a quantitative approach. The type of data used in this study is panel data which is a combination of time series data and cross section data. The number of observations used in this study was 170, with details of time series data in the 2015-2019 period, and cross section data of 34 provinces in Indonesia. The hypothesis testing tool uses the E-views 9.0 program.

The data collection technique used in this research is the documentation method from

various related agencies, namely the Central Statistics Agency, the World Economic Forum, the Ministry of Public Works and Public Housing and other institutions. In addition, data sources were also obtained through official websites, statistical publications, and books related to this research.

RESULTS AND DISCUSSION

To determine the best estimation model, two test are used namely the chow test and the hausman test. The following are the results of the chow test and hausman test. The Chow test determines the best model between Common Effect Model (CEM) and Fixed Effect Model (FEM). The results of the regression output in this study used the likelihood ratio method can be seen on table 1.

Table 1. Chow Test Results

Effect Test	Statistic	d.f.	Prob.
Cross-section F	1.968815	33.126	0.0041
Cross-section Chi-Square	68.197629	33	0.0003

Source : Output Results E-views 9.0, 2021

Table 1 show the Cross-section F value is 1.968815 with a significant probability value of 0.0041 at the level of = 5%. So, it can be concluded that the best model used is the Fixed Effect Model (FEM) because $0.0041 < 0.05$. The Hausman test to determine the best model between Fixed Effect Model (FEM) and Random Effect Model (REM). The results of the regression output in this study can be seen on table 2.

Table 2 show the best models between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). It is known that the random cross-section value is 10.947186 with a

probability value of 0.0272 which is significant at the level of = 5%, so it can be concluded that the model used is the Fixed Effect Model (FEM) because $0.0272 < 0.05$.

Table 2. Hausman Test Results

Test	Chi-sq.Statistic	Chi-Sq.d.f	Prob.
Cross-section random	10.947186	4	0.0272

Source : Output Results E-views 9.0, 2021

Table 3 show the result of the value of Adjusted R2 is 0.871550 which means that from a 100% scale the variables of special allocation funds (DAK), road length infrastructure (IPJ), construction workforce (TKK), and the difference between KBI and KTI (dummy) in the model can explain 87% of the variable economic growth in Indonesia and 13% of the variable economic growth in Indonesia are explained by other variables outside the model. To see the results of the F test in this study can be seen in table 4.

Table 3. Results of the Coefficient of Determination (R Square)

R-Squared	0.900708
Adjusted R-squared	0.871550

Source : Output Results E-views 9.0, 2021

Table 4 show that the Fcount value is 30.89133 and the Ftable result is 2.65. This explains that $F_{count} > F_{table}$ is 30.89133 with a prob F statistic of 0.000000 with a level of = 5%, it can be concluded that the independent variables are special allocation funds (DAK), road length infrastructure (IPJ), construction

labor (TKK), and the difference between KBI and KTI (dummy) simultaneously affects the dependent variable, namely economic growth (PE).

Table 4. F Test Results

F-statistic	30.891333
Prob (F-statistik)	0.000000

Source: Output Results E-views 9.0, 2021

The partial effect of the independents variable on the dependent variable can be seen on table 5. Based on table 5, the overall model can be written as follows:

$$LOGPE_{it} = 0.274247 + 0.094506 LOGDAK_{it} + 0.277708 LOGIPJ_{it} + 0.707006 LOGTKK_{it} + 0.723457 Diit + \mu_{it} \dots \dots \dots (2)$$

It is known that the Fixed Effect Model (FEM) test shows that the influence of the independent variable, namely special allocation funds (DAK) have a positive but not significant effect, while road length infrastructure (IPJ) and construction workforce (TKK) have a positive and significant effect on growth. economy in 2015-2019. Meanwhile, for the dummy variable, there is a positive and significant difference in economic growth between KBI and KTI.

The first hypothesis proposed in this study is that the Special Allocation Fund (DAK) has a positive effect on economic growth in Indonesia. Based on the results of regression analysis using the fixed effect model, the results of the t-test, which is a partial test between the DAK variable and economic growth, show a t-statistic value of 1.311793 which is smaller than the t-table of 1.690924 and the probability value of 0.1920 is greater than 0.05.

The results of this study indicate that the special allocation fund on economic growth has a positive but not significant effect in contributing to economic growth in Indonesia. This is not in accordance with the grand theory of the trickle-down effect that the greater the government spending in economic development, the more economic growth will increase (Arina et al, 2019). Based on the Ministry of Public

Works and Public Housing (2019) that the government in promoting equitable development and the economy tries to prioritize the development of road infrastructure in KTI, one of which is Papua Province, which is given a special allocation fund for road infrastructure, which is larger than other provinces at 7.59 percent of the total funds. special allocation of road infrastructure in Indonesia.

Table 5. t test results

Variable	Coeffisien	t-statistics	Probability	T-table ($\alpha=5\%$)	Result
Constanta	0.274247	0.294672	0.7687	1.690924	-
LOGDAK	0.094506	1.311793	0.1920	1.690924	Not Significant
LOGIPJ	0.277708	2.277420	0.0244	1.690924	Significant
LOGTKK	0.707006	11.01255	0.0000	1.690924	Significant
DUMMY	0.723457	4.704426	0.0000	1.690924	Significant

Source : Output Results E-views 9.0, 2021

However, this is not in line with expectations where the special allocation fund is high but the economic growth rate in 2019 in Papua Province has decreased by -15.72 percent of the total economic growth in Indonesia because the construction sector has not contributed significantly to the Papuan economy (Badan Planning, Papua Regional Development, 2019).

The insignificant effect of special allocation funds on economic growth is because the value of special allocation funds distributed by the central government is not maximized for various activities in sectors related to economic growth (Rizal et al, 2021). This study is in accordance with the research of Perkasa et al (2021) which shows that the special allocation fund for economic growth is positive but not significant in contributing to economic growth.

The second hypothesis proposed in this study is that the length of road infrastructure

(IPJ) has a positive effect on economic growth in Indonesia. Based on the results of regression analysis using the fixed effect model, the results of the t-test, namely the road length infrastructure variable with economic growth, show a t-statistic value of 2.277420 which is greater than the t-table of 1.690924 and the probability value of 0.0244 is less than 0.05.

The results of panel data regression analysis on the road length infrastructure variable have a significant positive effect on economic growth in Indonesia with a regression coefficient value of 0.277708 which means that when road length infrastructure increases by 1 percent, it can increase economic growth by 0.277708 percent with the assumption *ceteris paribus*.

This is in accordance with Solow's theory that economic growth occurs when capital changes are in the form of physical investments such as road infrastructure development. The

existence of good capital accumulation will increase economic growth (Mankiw, 2007). Road infrastructure as measured by the total length of state, provincial and district/city roads with good and moderate conditions has a positive relationship to Indonesia's Gross Regional Domestic Product in 2015-2019.

This means that the better the provision of available roads, the more economic activity will be through the value of the Gross Regional Domestic Product at constant prices. The province in Indonesia which has the widest proportion of road infrastructure in stable condition, namely East Java Province, on average 9.28 percent of the total length of roads in Indonesia (Transportation Statistics, 2019).

With the construction of this road infrastructure, it can facilitate economic turnover in the East Java region, so that East Java Province is one of the provinces that contributes to Gross Domestic Product with the highest average value of Gross Regional Domestic Product in Indonesia of 14.82 percent of the total product. Gross Regional Domestic Product in Indonesia (Sugiarto, 2019).

This research is in accordance with the research of Brilyawan and Santosa (2021) which states that the road variable has a positive and significant effect on economic growth. Angelina and Wahyuni (2021) stated that road infrastructure has a positive and significant effect on economic growth. This study is not in line with the research of Kurniawan and Nihayah (2021) which states that road infrastructure has a negative effect on economic growth. That is, economic growth is less influenced by physical capital and may come from other factors such as human resources or technological developments.

The third hypothesis proposed in this study is that the construction workforce (TKK) has a positive effect on economic growth in Indonesia. Based on the results of regression analysis using the fixed effect model, the results of the t-test, which is a partial test between the variables of construction labor and economic growth, show a t-statistic value of 11.01255 which is greater than the t-table of 1.690924 and the probability value of 0.00000 is less than 0.05.

The results of panel data regression analysis on the variable construction workforce have a significant influence on economic growth with a regression coefficient value of 0.707006 which means that if the construction workforce increases by 1 percent, it can increase economic growth by 0.707006 percent with the assumption *ceteris paribus*. This is in accordance with Solow's theory that economic growth occurs when changes in labor are the main component factors that affect economic growth (Todaro, 2006).

Construction sector development in infrastructure development can contribute to the absorption of construction workers to increase economic growth in Indonesia in 2015-2019. To achieve equity and increase economic growth, it is necessary to increase the number of workers. With the number of workers, especially educated and trained, it will increase productivity. Thus, increasing the amount of production or output, thereby increasing added value, which in turn will increase economic growth between regions in Indonesia (Eliza, 2015)

In 2015-2019 the province with the highest number of construction workers compared to other provinces was the Province of the Special Capital City Region of Jakarta, amounting to

28.26 percent of the total construction workforce in Indonesia. With this abundant workforce, the Province of the Special Capital Region of Jakarta contributes to the Gross Domestic Product by 16.35 percent higher than other provinces.

This is because the Special Capital Region of Jakarta is the center of government and the national economy, so Indonesia's economic activity tends to be centered in the Special Capital Region of Jakarta (Central Statistics Agency, 2019).

The results of this study are in accordance with research by Lubis (2014) which states that the number of workers has a positive and significant effect on economic growth in Indonesia. This research is in line with research by Munzir et al (2017) which states that an increase in the workforce will affect economic growth. The fourth hypothesis proposed in this study is that there are differences in economic growth between the Western Region of Indonesia (KBI) and the Eastern Region of Indonesia (KTI) in Indonesia.

Based on the results of regression analysis using the fixed effect model, that there is a significant difference in economic growth between KBI and KTI and has a positive relationship to economic growth with a t-statistic of 4.704426 greater than t-table of 1.690924 and a probability value of 0.0000 less than 0,05. The regression coefficient value is 0.723457, which means that there is a difference in economic growth between KBI and KTI. The coefficient value means that the difference in economic growth in KBI is higher by 0.723457 percent compared to KTI with the assumption of *ceteris paribus*.

This means that if KTI's economic growth is 1 percent, then KBI's economic growth is

1.723457 percent. This is in accordance with the growth pole theory that to achieve a high level of income, a center of economic activity must be built. One of them is infrastructure development centered in KTI. The growth center can cause a spread effect from the center of the growth area to the surrounding area (Emilia and Farida, 2018).

In 2019, the proportion of road infrastructure in good and moderate condition was still dominated by KBI at 61.46 percent of the total length of steady roads in Indonesia, especially Java and Sumatra islands. This is because most of the economic centers are still centered in KBI. However, the absorption of construction workers in 2015-2019 was more in KBI with an average of 78.56 percent of the total construction workforce in Indonesia because most of the population lives in this area, so most of the economic activity is in KBI. This shows that the role of economic activity in KBI makes a high contribution to the formation of Indonesia's GDP when compared to KTI (BPS, 2019).

CONCLUSION

Based on the results of research and discussion, The Special Allocation Fund (DAK) has a positive and insignificant effect on economic growth in Indonesia. Long Road Infrastructure (IPJ) and Construction Workers (TKK) has a positive and significant impact on economic growth in Indonesia.

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