

## ARTICLE

# The Effect of Geographical Conditions on the Role of the Special Autonomy Fund for the Availability of Road Infrastructure in Papua

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## a OPEN ACCESS

Citation: Saktina, R. J., & Khoirunnurrofik, K. (2022). The Effect of Geographical Conditions on the Role of the Special Autonomy Fund for the Availability of Road Infrastructure in Papua. *Jurnal Bina Praja*, 14(1), 111–122. <https://doi.org/10.21787/jbp.14.2022.111-122>

Received: 14 January 2022

Accepted: 9 March 2022

Published: 29 April 2022

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**Abstract:** This study identifies the relationship of the Special Autonomy Fund (DOK) to Road Infrastructure by looking at variations in the Construction Cost Index as a proxy that describes the geographical conditions in Papua. Infrastructure development is a sector that is expected to accelerate the provision of basic infrastructure to reduce the development gap. However, the success of infrastructure development in Papua is inseparable from geographical factors. By using data from 29 regencies/cities in Papua Province and 11 regencies/cities in West Papua Province from 2010 to 2020, to determine the correlation of the Special Autonomy Fund on Road Infrastructure, the fixed effect panel data method and the moderating regression model were used to see if the moderating variable Construction Cost Index can strengthen or weaken the relationship of the Special Autonomy Fund to Road Infrastructure. This study found a positive relationship between the Special Autonomy Fund on Road Infrastructure and identified a negative moderating of the Construction Cost Index variable on the relationship of the Special Autonomy Fund to Road Infrastructure. This shows that the higher the Construction Cost Index, the higher the price of construction materials, increasing the total cost of road infrastructure development. As a result, the Special Autonomy Fund allocated is only able to buy fewer road construction materials, which has an impact on the reduced quantity of road infrastructure built in the provinces of Papua and West Papua.

**Keywords:** Construction Cost Index; Special Autonomy Fund; road infrastructure

## 1. Introduction

Welfare and economic growth in Papua during the period of granting the Special Autonomy Fund continued to increase, but when compared to other provinces in Indonesia, it was still very far behind. The status of being left behind in several districts in Papua is contained in the Presidential Regulation of the Republic of Indonesia Number 63 of 2020. For the years 2020 to 2024, as many as 22 districts in Papua Province and eight districts in West Papua Province are declared underdeveloped areas. Aspects of Regional Characteristics, Accessibility, Economy, Facilities and Infrastructure, Human Resources, and Regional Financial Capability are the categories for determining disadvantaged areas in several districts in Papua.

The importance of paying attention to the geographical conditions in Papua by allocating special autonomy funds to districts/cities based on the scale of backwardness, inequality, and poverty is one of the important points from the results of the evaluation conducted by the central government to measure the progress of the implementation of the special autonomy policy that has taken place for 20 years. So that the results can be felt by the Papuan people, especially Papuan Indigenous People. Where infrastructure development in Papua is a sector that is expected to accelerate the provision of basic infrastructure to reduce the development gap in Papua.

The government issued Law Number 2 of 2021 concerning the second amendment to Law Number 21 of 2001 concerning Special Autonomy for the Provinces of Papua and West Papua, in response to the evaluation results that had been carried out. The government lists several criteria that need to be considered in allocating special autonomy funds, including the number of indigenous Papuans, area size, geographical difficulty level, and construction cost index. Where the old special autonomy law did not contain some of these criteria, causing districts/cities to not get sufficient special autonomy funds and following the conditions of each district/city in the context of implementing development in Papua.

According to research by [Iek and Blesia \(2019\)](#), the factor that explains the large disparity between regions in Tanah Papua is the difficult geographical location. Statistics Indonesia describes difficult geographical conditions in regencies/cities throughout Indonesia using the Construction Cost Index (IKK) variable, which compares the Construction Costly Level of a region by comparing it to the national average Construction Costliness Level. The Construction Cost Index has been used by the central government (Ministry of Finance) as a proxy to reflect the level of geographical difficulty of an area in the formulation of the General Allocation Fund calculation, with the definition that the higher the Construction Cost Index, the more difficult the geographical location of the area. With the allocation of the General Allocation Fund, which differs between regions, regions with a high level of construction cost can catch up with infrastructure development, lagging behind other regions with better infrastructure facilities. However, this also needs to be supported by local government cooperation through the formulation of development policies and strategies in synergizing the allocation of funds to achieve better development results, especially infrastructure development in the area.

Since President Joko Widodo's leadership era, the development of transportation infrastructure in Papua has been intensively carried out, specifically road infrastructure with a large budget to reduce the gap with other provinces. The results of a retrospective analysis by [Hong et al. \(2011\)](#) in China show that the unequal distribution of transportation infrastructure can result in disparities between regions, resulting in low levels of welfare. Several research studies include [Boopen \(2006\)](#) in Africa, [Melo et al. \(2013\)](#) in Europe and the United States, [Cantos et al. \(2005\)](#) in Spain, [Hong et al. \(2011\)](#) in China, and [Siska et al. \(2015\)](#) in Indonesia identified that investment in transportation infrastructure is an economic development strategy through increasing connectivity between regions which will have a broad impact on economic development in the form of increasing employment opportunities, per

capita income as well as economic growth. The importance of development, road development, and road rehabilitation as an economic driver can be seen from the commitment of several developing countries to invest a budget of 6.9% of Gross Domestic Product (Ianchovichina et al., 2013).

For approximately nineteen years, funds in the context of special autonomy channeled to the provincial governments of Papua and West Papua have continued to increase in line with the increase in the National general allocation fund. The percentage of the use of the Special Autonomy Fund in Papua Province is mainly in the transportation sector, while for other sectors such as education, health, and others, it has a smaller percentage (Winardito, 2005). This is also supported by the results of a study conducted by the Supreme Audit Agency regarding the financial management of the Special Autonomy Fund by the regional government in Papua. The budget allocation for infrastructure is greater than for education and health. Where the district/city government, on average, allocates special autonomy fund budgets for the infrastructure sector above 50 percent of the total Special Autonomy Funds disbursed (Haris, 2011).

The phenomenon of special autonomy in Papua as a form of implementing asymmetric decentralization policies has been widely studied because the problems in implementing special autonomy policies in Tanah Papua have not given optimal results. In addition, research related to government transfer funds for infrastructure and the Special Autonomy Fund on development performance indicators has been widely studied. However, research on the relationship between the Special Autonomy Fund and road infrastructure moderated by the IKK has yet to be conducted. Previous research, Tamberan et al. (2020) examines the effect of the Special Autonomy Fund in the field of community economic empowerment and infrastructure on regional economic inequality. Cahyaningsih and Fitriady (2019) examines the causal effects of the Special Autonomy Fund on education and health outcomes.

Meanwhile, research related to government spending on infrastructure in Aritenang (2020) in Indonesia explains that intergovernmental transfer funds determine infrastructure spending in the region rather than local revenue, namely the effect of the General Allocation Fund and the Special Allocation Fund is positive and significant on infrastructure capital spending in the developed region. The transfer fund's impact depends on the characteristics of the district, the size of urbanization, and the structure of the area so that infrastructure can encourage economic growth for the welfare of the community. An empirical study conducted (Roy, 2008) in Canada explains that infrastructure growth is highly dependent on governance, economic structure, and local culture.

Asymmetric decentralization or known as "Special Autonomy." Special autonomy in Indonesia is the application/special authority over the solution to solving problems in the relationship between the central government and local governments to prevent the nation's disintegration, which is only given to certain regions (Tauda, 2018). Similar things have been done in several countries, such as Mindanao in the Philippines (Verbrugge, 2015), Quebec in Canada, Basques in Spain (McGarry, 2007), and Bougainville in Papua New Guinea (Ghai & Regan, 2006). The implementation is in the provinces of Papua, West Papua, and Nanggroe Aceh Darussalam. The first asymmetric decentralization policy in 2001 was given to Papuan local governments to manage their regions with minimal intervention from the central government. With two main objectives, namely: policy support for the fulfillment of accelerated development to improve people's welfare for the fulfillment of a sense of justice (accelerated development) and efforts to accelerate development so that social inequality and spatial inequality in Papua can be minimized.

The Constitution of Special Autonomy for the Papuan People is financed with 2 percent of the total National General Allocation Fund. Distribution and Allocation of Special Autonomy Funds between districts/cities and provinces to be regulated in a fair and balanced manner in Special Regional Regulations and priorities for underdeveloped regions. The regency/municipal portion of the Special Autonomy

Fund is allocated for financing infrastructure development at least 20% of the total Special Autonomy Fund received by regencies/cities in Papua Province. Meanwhile, infrastructure development financing for West Papua Province is 20% (twenty percent) of the total Special Autonomy Fund received by districts/cities in West Papua Province.

The level of geographical difficulty of an area can be measured using the Construction Cost Index (IKK) proxy; the higher the price level in the area, the more difficult the geographical location of an area (Statistics Indonesia of Provinces and Regencies/Cities, 2020). The difficult geographical location factor explains the large development gap between regions, leading to high poverty rates that can trigger social and political conflicts at both regional and national levels and jealousy and social violence in various regions in Indonesia (Tek & Blesia, 2019). The Construction Costliness Level (TKK) of a district/city or province against the national average Construction Costly Level of Construction Cost Index is reflected by the Construction Costly Index (Central Bureau of Statistics, 2020) figure, which describes a comparison of prices for different regions in a certain period. This variable is used to estimate construction costs in each area that describes the level of wages and changes in material prices from time to time (Rachman Waliulu, 2020).

Infrastructure is an important element to achieve economic growth and equity, both in terms of quantity (access to infrastructure), quality (reliability of infrastructure), and accompanying services (Fourie, 2006). The availability of transportation infrastructure strongly supports economic growth. Where transportation infrastructure in the water sector contributes more to economic growth than land transportation infrastructure, another study in the United States found that investment in road transport infrastructure in the long term can increase economic growth and increase per capita income (Berechman et al., 2006). The development of land transportation in opening access as a fixed asset and connecting services with other regions is important to catch up reduce economic disparities in underdeveloped and remote areas. Weak infrastructure networks in the regions can lead to inefficiency in transporting raw materials and the potential for increased production and competitiveness (Démurger, 2001). The research study conducted by Hong et al. (2011) in China also explains that the cause of economic inequality is uneven transportation infrastructure.

The provision of road infrastructure is inseparable from several influencing factors, including geographical location, availability of raw materials, and human resources (Zemtsov & Smelov, 2018). Supported by basic economic theory (Pindyck & Rubinfeld, 2012) related to the supply function, the quantity of a product is highly dependent on production costs, wages, interest expenses, and raw material costs. The product's price and quantity are also determined from the elasticity of demand and supply; the more inelastic the demand curve, the more consumers will buy an item in a certain amount, regardless of the price. The provision of road infrastructure is also very dependent on the number of residents in an area; whereas the population increases, the need for infrastructure will also increase. This is evidenced by the research results (Glover, 1992), population density has a significant and positive impact on road infrastructure. According to Sun's research (2013), difficult geographical conditions with high elevations and far from the coastline are inhibiting factors in developing transportation infrastructure. Several important aspects also affect the smoothness of infrastructure development, including time, cost, governance factors—finance, and weather (Al-Hazim & Abusalem, 2015). According to research by Prabowo et al. (2021), dynamic security conditions with prolonged conflict are also a factor that disrupts the stability of development in Papua.

Based on the phenomena, policies, theories, and problems above, the research question that will be answered in this study is how the influence of geographical difficulties explained by the variation of the Construction Cost Index value on the role of the Special Autonomy Fund for the availability of road infrastructure in Papua.

## 2. Methods

The study was a quantitative method, using data on 28 districts one city in Papua Province and ten districts one city in West Papua Province, which provides information on reports on the realization of the Regional Budget of Regencies/Cities to the Directorate General of Fiscal Balance of the Regional Government which is accessed through the website address <http://www.djpk.depkeu.go.id>. From the report on the realization of the APBD, data is obtained regarding the amount of realization of the Special Autonomy Fund and the Special Allocation Fund for 2010 to 2020. This study also uses secondary data (road length, Construction Cost Index, population density, area, and Gross Regional Domestic Product contribution in the agricultural sector). They are taken from the Regency in Figures document and the Regency/Municipal Construction Cost Index in the Provinces of Papua and West Papua on the website of the Statistics Indonesia.

The dependent variable in this study is the length of district/city roads in Papua and West Papua provinces. Meanwhile, the main independent variable (independent variable) is the Special Autonomy Fund for districts/cities in Papua and West Papua Provinces. In this study, the moderating variable is used, which is a variable that will strengthen or weaken the relationship between the independent variable and the dependent variable. The moderating variable used is the Construction Cost Index variable, a proxy for describing the geographical conditions of districts/cities in Papua. This variable was suspected to be closely related in weakening the relationship of the Special Autonomy Fund to the length of the road. Assuming that the level of geographical difficulty is high, the price of construction materials will also increase, which will result in a decrease in the number of road lengths built in the area. Of the several main explanatory variables, we use several control variables, namely the Special Allocation Fund for Road Infrastructure, Gross Regional Domestic Product per capita, and population.

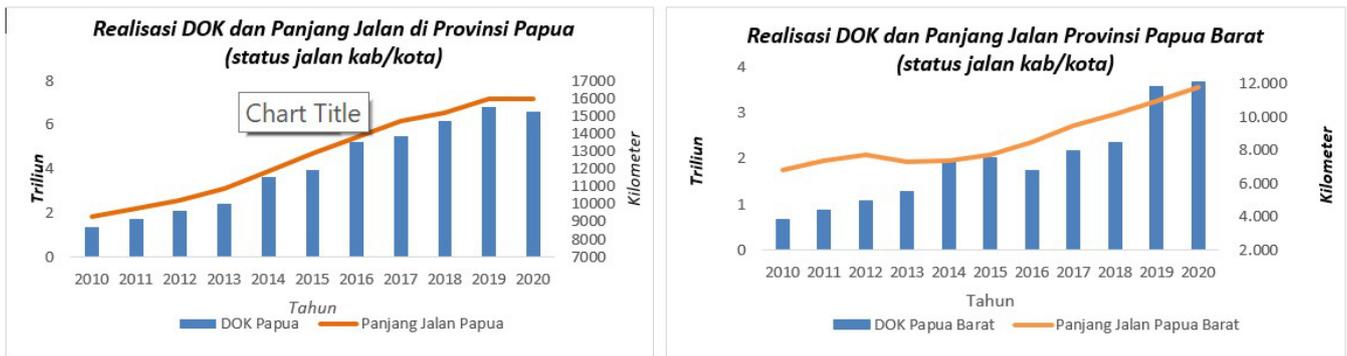
The fixed effect panel data regression model in this study uses an interaction test, also known as Moderated Regression Analysis (MRA). It is a special application of multiple linear regression; the moderating variable cannot stand alone in the model but is attached to the main independent variable, where the regression equation contains elements of interaction or multiplication between the moderating and independent variables (Zeng et al., 2021), the equation is as follows:

$$\ln\_pjg\_jln_{it} = \beta_0 + \beta_1 \ln\_dok_{it} + \beta_2 ikk_{it} + \beta_3 \ln\_(\text{dok} * ikk)_{it} + \beta_4 \ln\_dak\_infras_{it} + \beta_5 \ln\_gdp_{it} + \beta_6 \ln\_populasi_{it} + \varepsilon_{it} \dots \dots (1)$$

<i>where:</i>	
$pjg\_jln_{it}$	= the length of the regency/city road <i>i</i> in year <i>t</i> , the length of the road used is included in the class of regency/city status roads, the unit used is kilometers (km)
$dok_{it}$	= special autonomy funds are the realization of special autonomy funds (includes additional infrastructure funds) district/city <i>i</i> in year <i>t</i> , the unit used is billions in constant form (divided by the Consumer Price Index)
$ikk_{it}$	= construction cost index that describes the level of geographical difficulty of district/city <i>i</i> in year <i>t</i>
$dok * ikk_{it}$	= interaction variable of special autonomy fund with construction cost index
$dak\_infras_{it}$	= realization of special allocation funds for district/city road infrastructure <i>i</i> in year <i>t</i> , with units of billion in constant form (divided by the Consumer Price Index)
$gdp\_perkapita_{it}$	= Gross Regional Domestic Product per capita in district/city <i>i</i> in year <i>t</i> , with units of million in constant form
$populasi_{it}$	= population of district/city <i>i</i> in year <i>t</i>
$\varepsilon_{it}$	= individual error component <i>i</i> -th period <i>t</i>
$\beta$	= regression coefficient (slope)
$\beta_0$	= intercept

## 3. Results and Discussion

The total realization of spending on special autonomy funds from 2010 to 2020 tends to increase and the total length of roads in Papua Province as a whole, both unpaved and newly opened or in the process of hardening. The Special Autonomy Fund provided by the central government to Papua Province is quite large, but the increase in the number of roads in Papua Province is still far from expected. Based on the target in the five-year planning of the Papua Province for 2018–2023, in 2020, the percentage of accessibility between regencies/cities connected to road transportation

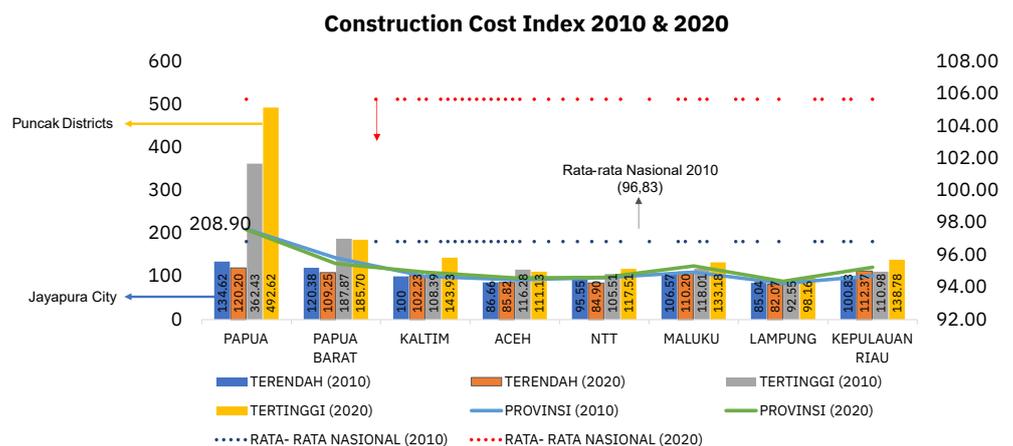


**Figure 1.** Realization of the Special Autonomy Fund (Trillion Rupiah) and Road Length (Km) From 2010 to 2020 in the Provinces of Papua and West Papua

Source: DJPK Ministry of Finance & Statistics Indonesia, data processed

facilities will reach 65.52 percent. There are still many access roads that connect between regencies in Papua Province that are not yet open/isolated, especially regencies located in mountainous highlands. The use of air transportation by plane in the Papua region is still very dominant, i.e., of the total number of districts/cities in Papua Province, 89.66 percent still use air transportation. Meanwhile, the use of land transportation modes by regencies/cities in Papua Province is only 62.07 percent of the total regencies/cities in Papua Province.

The total development of the realization of the Special Autonomy Fund in West Papua Province from 2010 to 2020 has an increasing trend. In 2014 and 2019, there was a significant increase in the realization of Special Autonomy Fund spending, but a significant increase did not follow this in road length. This is because the allocation of the Special Autonomy Fund in districts/cities in West Papua is more for the health and education sectors. The total length of roads in West Papua Province as a whole, both unpaved and newly opened or in the process of hardening, continues to increase in line with the provision of the Special Autonomy Fund. This is in line with the results of Winardito's research (2005) and a study conducted by the Supreme Audit Agency that the percentage of the use of the Special Autonomy Fund is mostly allocated for infrastructure development with an average use of 50 percent of the total Special Autonomy Fund provided by the central government.



**Figure 2.** Comparison of 2010 and 2020 Construction Cost Index

Source: Statistics Indonesia Construction Cost Index 2010 & 2020, data processed

The Construction Cost Index (IKK) varies in several provinces in Indonesia, which describes the level of construction cost and different geographical conditions in each region. The higher the Construction Cost Index, the more difficult the geographical conditions in the area. The development of the Construction Cost Index from 2010 to 2020 has increased, wherein in 2010, the national average Construction Cost Index

was 96.83, then increased in 2020 to 105.65, followed by several provinces in Indonesia. Specifically, the Papua Province Construction Cost Index ranks the highest, namely the Construction Cost Index in Puncak Regency, where there is a very significant increase from 2010 of 362.43 to 492.62 in 2020. When compared to the National Average Construction Cost Index, it is almost five times the size. This is indicated due to the high cost of transportation which is not followed by an increase in road infrastructure, so that it has an impact on increasing inflation.

The high Construction Cost Index in Papua, which occupies the highest position of all provinces in Indonesia, reflects those geographical conditions and connectivity between regions in Papua province are very difficult. Geographical constraints are very difficult, almost scattered throughout the districts/cities, causing the development costs to be quite high and the development process cannot run optimally.

The condition of the vast plains area in the form of swamps in the coastal area and the topography of the hills in the middle, and the limited availability of transportation services are the biggest obstacles for development in Papua. However, with the allocation of the Special Autonomy Fund, it is hoped that the geographical conditions that are a challenge in the development of road infrastructure in Papua will be resolved and be able to reduce the high Construction Cost Index.

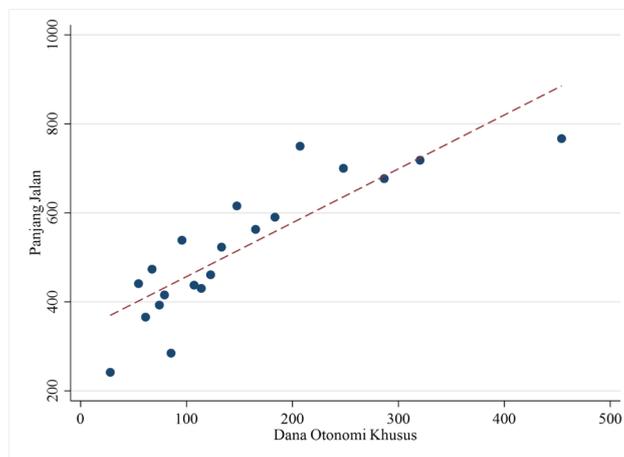


Figure 3. Correlation of Road Length Variables with the Special Autonomy Fund

Source: processed

The positive correlation between the variables of the Special Autonomy Fund and the length of roads in districts/cities in the Provinces of Papua and West Papua defines that the larger the Special Autonomy Funds are given to districts/cities, the length of roads will also increase the road that is built is also a bit.

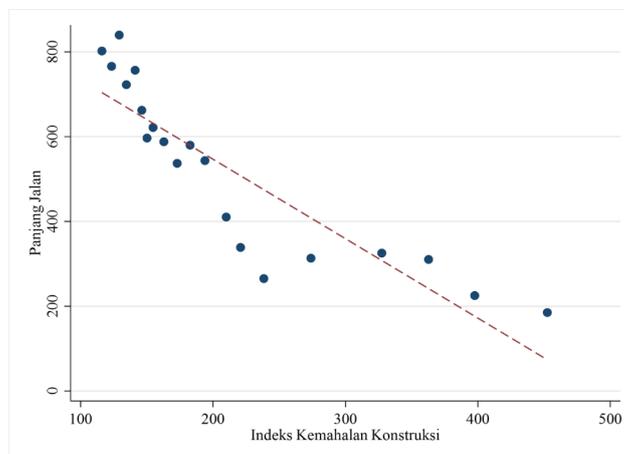


Figure 4. Correlation Between Road Length Variables and Construction Cost Index

Source: processed

The graph shows a negative correlation between the length of roads in districts/cities in Papua Province and the Construction Cost Index. This indicates that the Construction Cost Index variable as a proxy describing geographic conditions moderates the negative relationship between the Special Autonomy Fund and the length of the road. The higher the construction cost index, the less the length of the road building. Likewise, the longer the road is built when the Construction Cost Index is low. A high Construction Cost Index in an area illustrates the price of construction materials, rental of heavy equipment, and a high level of wages (Statistics Indonesia, 2020), resulting in the quantity of output length of roads being built decreasing. Several factors affect the high price of goods in areas with a high Construction Cost Index regarding the inelasticity of supply and demand due to the limited supply of goods (Pindyck & Rubinfeld, 2012). There are also other factors, namely the difficulty of distributing goods to the place of production.

### 3.1. Analysis of Results

The results of the fixed effect panel data regression model and the relationship of the Special Autonomy Fund to Road Infrastructure (road length) using the Construction Cost Index variable as the moderating variable can be described as follows:

**Table 1.** Fixed Effect Model Estimation Results

VARIABLES	Model 1	Model 2	Model 3	Model 4
	Pjg_jln	Pjg_jln	Pjg_jln	Pjg_Jln
ln_dok	0.430*** (0.0358)	3.095*** (0.628)	2.803*** (0.643)	2.746*** (0.631)
ikk		0.0145*** (0.00279)	0.0138*** (0.00281)	0.0136*** (0.00278)
ln_dok_ikk		-2.751*** (0.645)	-2.549*** (0.654)	-2.514*** (0.642)
ln_dak_infr			0.0428** (0.0211)	
ln_populasi			0.588** (0.242)	
ln_gdp_perkapita				0.596*** (0.189)
Constant	5.910*** (0.0231)	17.33*** (2.843)	9.847** (4.278)	14.51*** (2.951)
Observations	440	440	431	440
R-squared	0.266	0.319	0.330	0.336
Number of code_kab	40	40	40	40

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: processed data

The first empirical test is regression model 1 using one main independent variable, the Special Autonomy Fund, to determine whether the Special Autonomy Fund is associated with Road Infrastructure (road length). In Table 1, the beta coefficient value for the Special Autonomy Fund value on the length of the road is 0.430 with a P-value of 0.000 (smaller than the alpha value = 0.05). This means that the relationship between Special Autonomy Fund and road length is positive and significant; in other

words, if Special Autonomy Fund is increased by one percent, it will increase road length infrastructure by 0.430 percent, assuming other independent variables remain.

Furthermore, the empirical test used is regression model 3, which uses panel data regression moderation regression model by adding control variables, namely the Special Allocation Fund for infrastructure, GDP per capita, and population. This regression model 3 was carried out to determine whether the Special Allocation Fund and the number of residents affected the number of roads in districts/cities in Tanah Papua. [Table 1](#) shows that the Special Allocation Fund for infrastructure has a significant and positive correlation with road length with a beta coefficient of 0.0428, assuming that the Special Allocation Fund for infrastructure allocated by the central government in districts/cities in Papua also has an impact, which is positive towards improving road infrastructure in districts/cities in Tanah Papua. Likewise, the population variable also affects the quantity of road infrastructure, and this is in line with research ([Glover, 1992](#)) that population density has a significant and positive impact on road infrastructure where the provision of road infrastructure is highly dependent on the number of residents in an area, increasing population, the need for infrastructure will also increase.

An empirical test of model 4, using the control variable GDP per capita, it is assumed that the level of community welfare influences the development of road infrastructure in districts/cities in Papua. [Ismail \(2015\)](#) explains that the success of the development is also supported by an increase in economic development, which is indicated by an increase in per capita income. The regression results show that the GDP per capita variable positively and significantly affects the number of roads with a beta coefficient of 0.596. In line with research ([Aritenang, 2020](#)) that the growth of infrastructure development is more visible in developed regions with higher welfare levels.

The results of the Empirical Test in this study are regression model 2 using panel data regression moderation model used in answering this research, which uses the Construction Cost Index variable as the moderating variable and the Special Autonomy Fund interaction variable with the Construction Cost Index to determine whether the Construction Cost Index as a variable moderation can strengthen or weaken the relationship of the Special Autonomy Fund to Road Length. The regression [Table 1](#) shows that the value of the Moderating Construction Cost Index variable on the number of roads is positive and significant with a beta coefficient of 0.0145. A positive Construction Cost Index means that the size of the area can cause a high level of geographical difficulty, so a high Construction Cost Index requires high road infrastructure development as well.

However, when the Construction Cost Index interacts with the Special Autonomy Fund, which shows financial capacity, developing infrastructure is limited. Areas with a high Construction Cost Index with available money can only build less road infrastructure. With the results of the beta coefficient of -2.751 with a P-value of 0.000 (smaller than the alpha value = 0.05). This means that the Construction Cost Index has a negative and significant moderation on the relationship between the Special Autonomy Fund and the length of the road. The negative beta coefficient results indicate that the high value of the Construction Cost Index will weaken the relationship between the Special Autonomy Fund and the length of roads in districts/cities in Papua and West Papua provinces.

Based on the regression results, the Construction Cost Index as a proxy used to describe the geographical conditions of an area, it can be defined that a high Construction Cost Index describes very difficult geographical conditions with more expensive construction material prices resulting in high costs in road infrastructure development, this is in line with research by [Rachman Waliulu \(2020\)](#). Thus, the special autonomy funds allocated can only purchase less road construction materials, which in turn has an impact on the relatively fewer kilometers of roads that can be built compared to other regions with lower Construction Cost Index.

In terms of accelerating development catching up with backwardness and poverty in Tanah Papua, the Special Autonomy Fund has an important role in developing road transport infrastructure. However, the Special Autonomy Fund received by regencies/cities has not balanced the need for road infrastructure in the area. Suppose the calculation of the allocation of the Special Autonomy Fund still does not consider the Construction Cost Index variable as a proxy that describes the geographical conditions of an area. In that case, it can result in a slowdown in development in the Papua Province. This is in line with research by [Al-Hazim and Abusalem \(2015\)](#) that high construction prices can cause delays in infrastructure development and make gaps between regions in Papua continue to occur, especially in mountainous areas where the IKK is very high, causing high economic costs.

The high cost of development (input to production) will result in a poor Infrastructure Network where the accessibility of the area becomes very difficult and then has an impact on economic activity ([Hong et al., 2011](#)) and the quality of health and education. Moreover, if the economic activities of an area are disturbed, it will become a factor inhibiting the human development process ([Suri et al., 2011](#)) in that area.

The commitment of the central and local governments is very important in carrying out the authority of Special Autonomy following the signs as mandated in the Special Autonomy Law Number 2 of 2021 in alleviating problems that are pressure on people's lives in isolated and underdeveloped areas (especially the mountainous region of Papua) by varied regional characteristics and extreme regional conditions as well as the uneven distribution of the population. If not, regional disparities will continue to occur because the high construction cost index as a proxy that describes difficult geographical conditions will certainly have an impact on the high unit cost of development.

#### 4. Conclusion

In conclusion, the relationship of the Special Autonomy Fund to road infrastructure is positive and significant, which indicates that an increase will also follow an increase in the allocation of the Special Autonomy Fund in road infrastructure.

The effect of the Moderating Variable Construction Cost Index, by interacting the Construction Cost Index and the Special Autonomy Fund, the results are negative and significant, indicating that the high value of the Construction Cost Index will weaken the relationship between the Special Autonomy Fund and the length of roads in regencies/cities in Papua and West Papua Provinces. Thus, a high Construction Cost Index, which represents a very difficult geographical condition, has implications for decreasing the effectiveness of the Special Autonomy Fund for the provision of road infrastructure in Papua. The cost of construction materials is more expensive, resulting in high construction and maintenance costs on road infrastructure. By not taking into account the Construction Cost Index in the current allocation of the Special Autonomy Fund, local governments can only afford to purchase fewer road construction materials.

The Special Autonomy Fund plays a very important role in improving road infrastructure but is still far from the optimal point for the infrastructure needs required by each region. It is hoped that by using the Construction Cost Index variable in the formula for calculating and allocating the Special Autonomy Fund as mandated in Law Number 2 of 2021, regions that are still isolated and included in the disadvantaged category will be able to compensate for other more advanced regions.

Based on the results and conclusions, the suggestions for the central and local governments are:

1. Improve coordination and synergy between the central and regional governments in increasing transparency in the process of calculating and allocating special autonomy funds, taking more into account the geographical aspect as reflected by

the Construction Cost Index variable in accordance with the mandate of the Special Autonomy Law Number 2 of 2021

2. The high cost of infrastructure development still requires the support of the central government so that the success of development in the context of catching up with gaps and backwardness in the provinces of Papua and West Papua with other provinces in Indonesia can be achieved.

This study is limited to the analysis of the Special Autonomy Fund for Road Infrastructure by paying attention to variations in the Construction Cost Index as a proxy that describes the geographical conditions of districts/cities in Papua. In the context of the success of Special Autonomy as mandated in the Special Autonomy Law that the Special Autonomy Fund can be investigated in other sectors, not only in the infrastructure sector but can be studied from various aspects with different periods so that the purpose of special autonomy for the Provinces of Papua and West Papua as mandated in the Special Autonomy Law can be achieved.

#### Acknowledgment

The authors are grateful for the Pusbindiklatren BAPPENAS for the degree scholarship so that this research can be completed properly and to the editor and anonymous reviewers for their valuable suggestions.

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