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ANALYSIS OF THE INFLUENCE OF ECONOMIC AND ADMINISTRATIVE INFRASTRUCTURE ON ECONOMIC GROWTH OF PROVINCES OUTSIDE JAVA ISLAND

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Abstrak: Penelitian ini bertujuan untuk mengetahui pengaruh infrastruktur ekonomi dan administrasi terhadap pertumbuhan ekonomi provinsi-provinsi di luar Pulau Jawa. Jenis data yang digunakan dalam penelitian ini adalah data sekunder yang diperoleh dari Badan Pusat Statistik (BPS). Data yang digunakan merupakan data time series dari tahun 2019-2021 dan data *cross section* provinsi-provinsi di luar Pualau Jawa. Analisis yang digunakan adalah regresi data panel dengan metode *Error Generalized Least Square* (EGLS) dengan *cross section weight* dan *cross sectin seemingly unrelated residual*/SUR (PSCE). Untuk Mengestimasi regresi data panel ada tiga pendekatan, yaitu *Common Effect Model* (CEM), *Fixed Effect Model* (FEM), *Random Effect Model* (REM). Prosedur analisis data menggunakan Uji Asumsi Klasik yaitu Uji Normalitas, Uji Multikolinearitas, Uji Heteroskedastisitas, Uji Autokorelasi dan Uji Hipotesis yaitu Uji t, Uji F dan Koefisien Determinasi. Hasil penelitian menjelaskan bahwa Air Minum Layak (X1) dan Pelanggan Telefon (X4) berpengaruh posistif dan signifikan terhadap pertumbuhan ekonomi provinsi-provinsi di luar Pulau Jawa, sedangkan Fasilitas Jalan (X2), Listrik yang Didistribusi (X3) dan Realisasi Investasi Penanaman Modal dalam Negeri (X5) berpengaruh negatif dan signifikan terhadap pertumbuhan ekonomi provinsi-provinsi di luar Pulau Jawa dengan koefisien determinasi sebesar 99,9%.

Kata kunci : *Infrastruktur, Ekonomi, Regresi Data Panel*

Abstract: This study aims to determine the effect of economic and administrative infrastructure on economic growth in provinces outside Java. The type of data used in this study is secondary data obtained from the Central Statistics Agency (BPS). The data used is time series data from 2019-2021 and cross section data for provinces outside Java Island. The analysis used is panel data regression using the Error Generalized Least Square (EGLS) method with cross section weight and cross sectin seemingly unrelated residual / SUR (PSCE). To estimate panel data regression, there are three approaches, namely the Common Effect Model (CEM), Fixed Effect Model (FEM), Random Effect Model (REM). The data analysis procedure uses the Classical Assumption Test, Normality Test, Multicollinearity Test, Heteroscedasticity Test, Autocorrelation Test and Hypothesis Test, t test, F test and Coefficient of Determination. The results explained that Safe Drinking Water (X1) and Telephone Subscription (X4) had a positive and significant effect on the economic growth of provinces outside Java Island, while Road Facilities (X2), Distributed Electricity (X3) and Realization of Domestic Investment (X5) had a

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negative and significant effect on the economic growth of provinces outside Java Island with a coefficient of determination of 99.9%.

Keywords: *Infrastructure, Economy, Panel Data Regression*

INTRODUCTION

National development is one of the goals to create the welfare of its people. To realize these national goals, various activities are needed that support development in all aspects, including one of them in the economic aspect. The development of a country's economy can be seen from the economic growth rate which is also one of the development indicators to evaluate the results of the programs that have been implemented and as a reference for future development by the government. Economic growth is a process of continuous change in economic conditions that occurs in an area to achieve a better situation (Kemenkeu, 2018).

Economic growth is related to the process of increasing the production of goods and services in the economic activities of the community as indicated by the size of the Gross Regional Domestic Product (GRDP). An increase in the rate of economic growth that exceeds the population growth rate will increase Gross Regional Domestic Product (GRDP) income, which is expected to automatically improve the standard of living and welfare of the population.

Based on data from the Badan Pusat Statistik (BPS), in 2019 to 2020 the Gross Regional Domestic Product (GRDP) in Indonesia decreased by 0.86% due to the Covid-19 case, while in 2020 to 2021 it increased by around 3.63%. However, this decrease and increase in economic growth is not accompanied by an equitable level of development. On the island of Java, which has an area of only 6.77% of the outside of Indonesia. However, judging from the contribution of Gross Regional Domestic Product (GRDP) at constant 2010 prices for 2021, Java Island alone contributed 57.85% of the total GRDP. Meanwhile, provinces outside Java Island only contributed 42.15% of the total GRDP for the same year. This proves that there is a concentration of economic focus in Java. Based on this data, it is clear that there is a development imbalance between Java and provinces outside Java.

Economic growth in a country can be influenced by many things, one of which is infrastructure. The existence of this infrastructure is closely related to the smooth mobilization and distribution of goods and services which indirectly determines economic growth through the smooth economic activities of the community.

Infrastructure development is still one of Indonesia's economic problems. Internationally, Indonesia still has weak competitiveness in infrastructure when compared to ASEAN countries. Based on the 2019 Global Competitiveness Index (GCI) released by the World Economic Forum, Indonesia's

competitiveness rank fell 5 places to 50th out of 141 countries surveyed. The decline made Indonesia's competitiveness even further behind Singapore, Malaysia, Brunei Darussalam, Thailand, and Laos. The government's infrastructure development has still not been able to boost Indonesia's competitiveness ranking. In the report, Indonesia's infrastructure competitiveness ranking actually fell to 72nd from the previous year in 71st position (Aria, 2019). This proves that infrastructure investment in Indonesia is still very low.

Based on previous research conducted related to transportation infrastructure research on economic growth conducted by Panjaitan et al. (2019) stated that infrastructure supply is one of the factors driving the productivity of a region. The government will prioritize the allocation of the infrastructure budget in the state budget, hoping that this method can improve economic infrastructure in driving a better real sector, so that poverty and social inequality can be reduced. Angelina and Wahyuni. (2021) also said, infrastructure is part of physical capital which is indispensable in the formation of aggregate output. The growth of this physical capital is expected to play an important role in increasing economic growth.

Based on the explanation above, the problem that arises in this study is that the conditions of economic growth in Indonesia are not accompanied by an equitable level of development. The provinces on the island of Java are very concerned about their development by the government compared to the provinces outside Java which are very far behind. So, researchers want to see the economic growth model in provinces outside Java using panel data regression, and how the influence of economic and administrative infrastructure on the economic growth of provinces outside Java in 2019-2021.

From the problems arising above, this study aims to analyze the effect of infrastructure on economic growth in provinces outside Java by applying Panel data regression. As well as the extent of the influence of economic and administrative infrastructure on the economic growth of provinces outside Java. This study is expected to be able to provide an overview of the panel data regression model of economic and administrative infrastructure outside Java Island and its effect on economic growth, in order to provide insight for the government, society, and as science in an effort to increase economic growth in Indonesia.

RESEARCH METHOD

The objects of this study are economic growth, economic infrastructure (decent drinking water, road facilities, distributed electricity, telephone Subscription), administrative infrastructure (realization

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of domestic investment). The unit of analysis includes provinces outside Java. Data processing in this research is assisted by Eviews software.

The data used is secondary data obtained from the official website of Badan Pusat Statistik through bps.go.id. The variables used are Gross Regional Domestic Product at 2010 Constant Prices (Y), Safe Drinking Water (X1), Road Facilities (X2), Distributed Electricity (X3), Telephone Subscription (X4), Realization of Domestic Investment (X5). The data consists of 84 observations in the form of provinces outside Java Island.

The steps in this research are as follows ; (1) Estimating the panel data regression model using the following approaches; Estimate Common Effect Model (CEM), Fixed Effect Model (FEM), Random Effect Model (REM). (2) Determine the panel data regression method to select the best model using the Chow Test, Hausman Test, Lagrange Multiplier Test. (3) Performing panel data regression model suitability assumption tests including; Heteroscedasticity Test, Autocorrelation Test, Normality Test, Multicollinearity Test. (4) Perform parameter significance test with F test and partial with t test. (5) Checking the goodness of the model using the coefficient of determination. (6) Perform model interpretation and draw conclusions from the analysis results.

RESULTS AND DISCUSSION

1. Gross Regional Domestic Product

Based on Figure 1, the province with the highest Gross Regional Domestic Product (GRDP) value is East Kalimantan Province. This can be due to the fact that East Kalimantan is a province that produces a large number of mines, such as oil, natural gas and coal. The average GRDP at 2010 Constant Prices of East Kalimantan for the 2019-2021 period was 41334,224 (Thousand Rupiah) per year. On the other hand, the lowest GRDP at 2010 Constant Prices is East Nusa Tenggara Province.

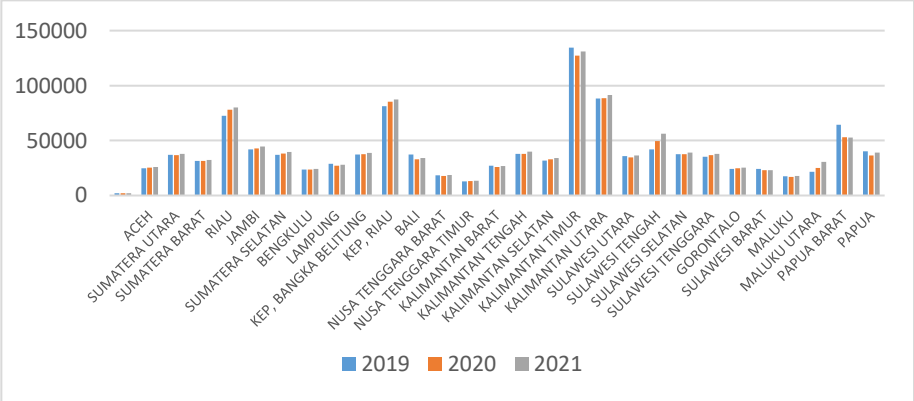

Figure 1. Gross Regional Domestic Product Period 2019-2021 (Thousand Rupiah)

2. Economic Infrastructure

a. **Safe Drinking Water**

In general, the percentage of clean water in provinces outside Java Island has increased from year to year. The average increase is 83.39 percent each year. Based on Figure 2, the largest percentage of clean water distributed by water companies is Bali Province. This also indicates that Bali is the province with the highest consumption of clean water. This is due to the high population in Bali, which increases the demand for clean water. Meanwhile, the province with the lowest percentage of clean water is Bengkulu Province.

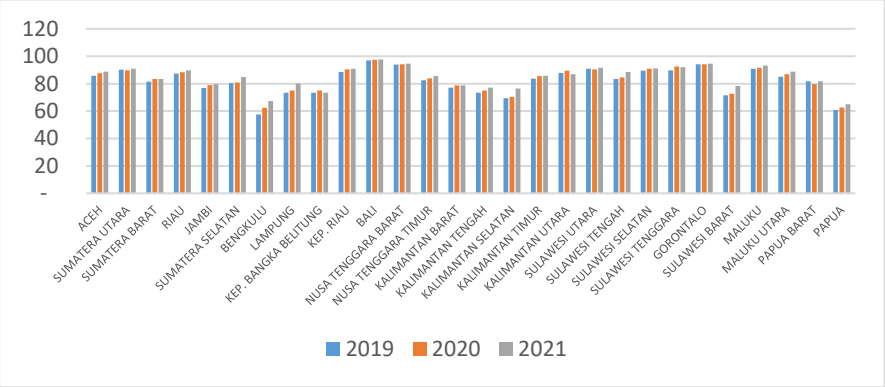

Figure 2. Safe Drinking Water Period 2019-2021 (Percent)

b. Road Facilities

Figure 3 shows road facilities in good and medium condition for provinces outside Java for the 2019-2021 period. The province with the highest road facilities is North Sumatra Province. On the other hand, the province with the smallest road facilities is North Kalimantan Province. The average increase in road length is 3.3 percent per year.

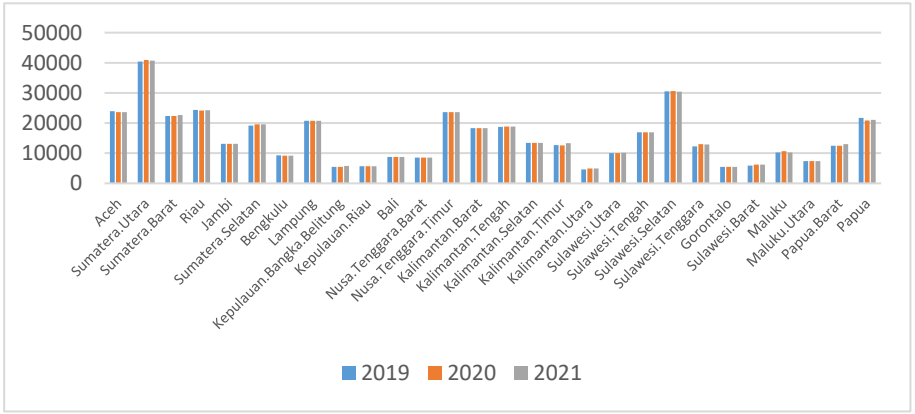

Figure 3. Road Facilites Period 2019-2021 (Kilometer)

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c. Distributed Electricity

As seen from Figure 4, the province with the highest distributed electricity is North Sumatra. While the province with the lowest distributed electricity is North Kalimantan. In general, the average electricity distributed by provinces outside Java Island has increased from year to year by 3.4 percent.

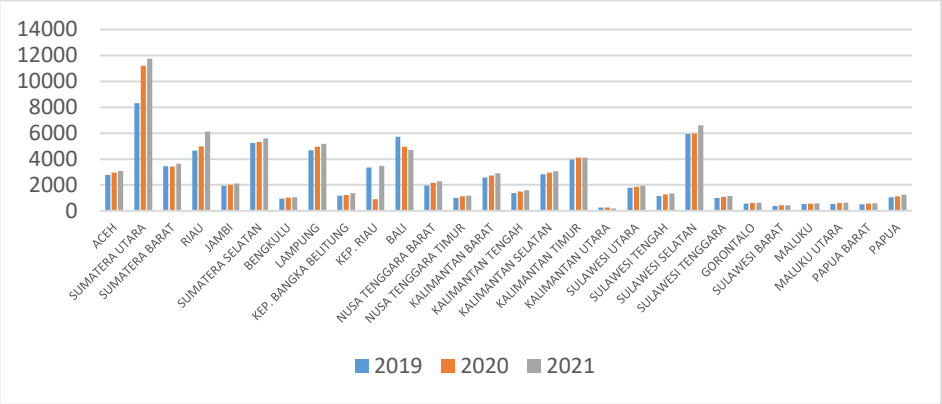

Figure 4. Distributed Electricity Period 2019-2021 (GWh)

d. Telephone Subscription

Based on Figure 5, the province with the highest telephone subscription is in East Kalimantan Province, while the lowest telephone subscription are in Papua Province. In general, the average number of telephone subscription i in provinces outside Java from year to year is 63.2%.

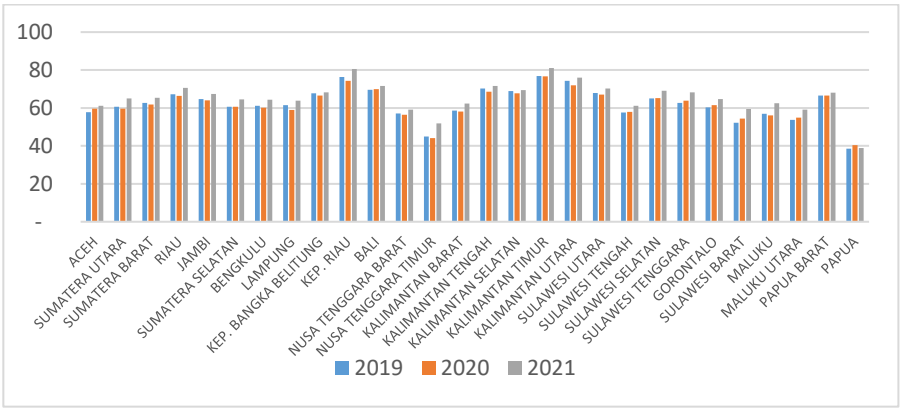

Figure 5. Telephone Subscription Period 2019-2021 (Percent)

3. Administrative Infrastructure

Based on Figure 6, the provinces with the largest domestic investment realization values are Riau Province, North Sumatra and East Kalimantan. This is due to the large economic activity in North Sumatra. North Sumatra is one of the largest rubber and palm oil producing provinces in Indonesia. Meanwhile, Riau and East Kalimantan are large mining producing provinces, such as oil,

natural gas and coal. This causes funds to be channeled to support their economic activities so that the realization of regional domestic investment in the three provinces is high. Meanwhile, the provinces with the lowest domestic investment realization values are West Sulawesi and Gorontalo.

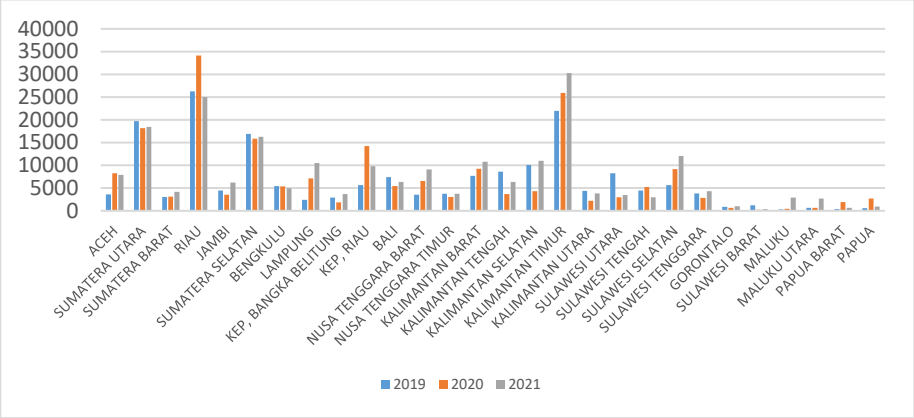

Figure 6. Realization of Domestic Investment Period 2019-2021 (Billion Rupiah)

4. Panel Data Regression Model Estimation Results

The Chow test results using E-Views software show that the value F_{hitung}= 1062.44 > F_{tabel} = 1.7053 and a p-value of 0.000 < α = 0,05. So it can be concluded that it H_0 is rejected, meaning that the model testing the effect of economic and administrative infrastructure on economic growth Fixed Effect Model (FEM) is better than the Common Effect Model (CEM).

The results of the Hausman test using E-Views software show that the chi-square statistical value is 0.0000 < $\chi^2_{(0,05;5)}$ = 1.1454 So it can be concluded that H_0 fails to be rejected, meaning that in the model testing the effect of economic and administrative infrastructure on economic growth Random Effect Model (REM) is better than the Fixed Effect Model (FEM). However, if there is a warning stating that the variance in the Hausman test is invalid (*Cross section test variance is invalid. Hausman statistic set to zero*) it means that the Hausman test results are invalid. The invalid Hausman test results make this study have to re-use the results of the previous test, namely the results of the Chow test. So it can be concluded that the right regression model used in this study is the Fixed Effect Model (FEM).

The residual variance-covariance structure test is used to determine whether the residual variance-covariance structure of the selected model is homoskedastic or heteroskedastic. After the test is carried out, the following results are obtained.

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Table 1. Variance-Covariance Structure Test

Variabel	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
C	0,437027	0,106295	4,111462	0,0001
X1	0,005622	0,000563	9,981820	0,0000
X2	-1,83E-05	5,48E-06	-3,330771	0,0016
X3	-3,75E-05	1,69E-05	-2,223918	0,0306
X4	-0,002852	0,00359	-7,945671	0,0000
X5	-4,33E-06	1,47E-06	-2,939279	0,0049

Table 1 shows that all p-values <0.05, so it is rejected, meaning that the residual variance is heteroscedastic.

To find out whether the heteroscedastic residual variance-covariance structure has a correlation between provincial residuals or not, an autocorrelation test is carried out. The Durbin Watson (DW) value of 2,6107 is obtained, which is not in the range of dU < d < 4-dU (1,7732 < d < 2,2268), so it H_0 is rejected, which means there is negative or positive autocorrelation.

Based on the test results above, the estimation method chosen is the Error Generalized Least Square (EGLS) method and the model chosen is the Fixed Effect Model (FEM) with cross section weight and cross section seemingly unrelated residual/SUR (PSCE), so that the estimates are obtained as shown in Table 2.

Table 2. Fixed Effect Model (FEM)

Variabel	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
C	36382,52	3219,068	11,30219	0,0000
X1	108,7983	38,54769	2,822434	0,0068
X2	-0,581539	0,153173	-3,796612	0,0004
X3	-0,145711	0,007384	-19,73425	0,0000
X4	77,62981	12,94978	5,994682	0,0000
X5	-0,089889	0,025712	-3,496028	0,0010

Based on Table 2, the panel data regression model conducted with the Fixed Effect Model (FEM) is as follows.

$$\hat{Y}_{it} = (36382{,}52 + \alpha_i{}^*) + 108{,}7983X_{1it}{}^* - 0{,}581539X_{2it}{}^* - 0{,}145711X_{3it}{}^* + 77{,}62981X_{4it}{}^* - 0{,}089889X_{5it}{}^* \quad (1)$$

with

$\hat{Y}_{it}$ = Gross Regional Domestic Product at 2010 Constant Prices
X_{1it} = Safe Drinking Water
X_{2it} = Road Facilities
X_{3it} = Distributed Electricity
X_{4it} = Telephone Subscription
X_{5it} = Realization of Domestic Investment

Note : *) significant to α = 0,05

The amount of intercept α_i value varies for each province as presented in Table 3

Table 3. Estimate Intercept Provinsi

No.	*Provinsi*	α_i	*No.*	*Provinsi*	α_i
1	Aceh	-10662,98	15	Kalimantan Tengah	-666,0919
2	Sumatera Utara	12415,88	16	Kalimantan Selatan	-8282,984
3	Sumatera Barat	-5225,069	17	Kalimantan Timur	88790,12
4	Riau	41945,55	18	Kalimantan Utara	39283,46
5	Jambi	12,94978	19	Sulawesi Utara	-10314,43
6	Sumatera Selatan	969,5749	20	Sulawesi Tengah	-7618,228
7	Bengkulu	-18593,98	21	Sulawesi Selatan	5174,175
8	Lampung	-8441,673	22	Sulawesi Tenggara	-7618,228
9	Kep. Bangka Belitung	-8970,715	23	Gorontalo	-23714,64
10	Kep. Riau	36277,84	24	Sulawesi Barat	-21885,83
11	Bali	-11199,02	25	Maluku	-27595,22
12	Nusa Tenggara Barat	-27429,83	26	Maluku Utara	-22832,68
13	Nusa Tenggara Timur	-21979,59	27	Papua Barat	14391,72
14	Kalimantan Barat	-11668,20	28	Papua	2597,020

The panel data regression equation with the Fixed Effect Model in equation (1) can be written as follows:

$$\hat{Y}_{it} = 36382{,}52 - 10662{,}98D_{2i} + 12415{,}88D_{3i} + \ldots + 2597{,}020D_{29i} + 108{,}7983X_{1it}{}^* - 0{,}581539X_{2it}{}^* - 0{,}145711X_{3it}{}^* + 77{,}62981X_{4it}{}^* - 0{,}089889X_{5it}{}^* \quad (2)$$

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EGLS method and the model chosen is Fixed Effect Model (FEM) with cross section weight and cross section seemingly unrelated residual/SUR (PSCE). This method has accommodated heteroscedasticity and autocorrelation elements. Therefore, there are only two classical assumptions that will be tested, namely the normality assumption and the multicollinearity assumption.

5. Asumsi Test

The normality test was carried out using the Jarque-Bera test. From the Jarque Bera test, the p-value = 1.989104 > 0.05, then it H_0 fails to be rejected, which means that the residuals are normally distributed. Meanwhile, the multicollinearity test is shown in Table 4.

Table 4. Multicollinearity Test

	X1	X2	X3	X4	X5
X1	1	-0,0138974	0,23207547	0,32174214	0,16351690
X2	-0,0138974	1	0,71947402	-0,2368909	0,41984708
X3	0,23207547	0,71947402	1	0,21518489	0,65338060
X4	0,32174214	-0,2368909	0,21518489	1	0,39113162
X5	0,16351690	0,41984708	0,65338060	0,39113162	1

Based on Table 4, the correlation coefficient value of each variable is <0,85. Therefore, it can be concluded that there is no multicollinearity between independent variables.

6. Simultan Test (F Test) and Parsial Test (t Test)

The best model is the Fixed Effect Model (FEM) with cross section weight and cross section seemingly unrelated residual / SUR (PSCE) from the model obtained a statistical value of F = 2901,967 > F_{tabel} = 1,7053 then H_0 is rejected which means that at least one of the independent variables in the model affects the economic growth of provinces outside Java with a significance level of 5%.

In the best model produced, there are five variables that have a p-value of less than 0.05, namely safe drinking water, road facilities, distributed electricity, telephone subscription, and relalization of domestic investment. This indicates that these variables have a significant influence on the economic growth of provinces outside Java at the 5% significance level.

7. Coefficient of Determination (R^2)

From the research results, the coefficient of determination (adjusted) based on the best model used is 99.9%. Which means that the independent variables are able to explain the dependent variable by 99.9% and the rest is explained by other variables not contained in the research model.

8. Interpretation

Interpretation for each cross section unit, for example Aceh Province, the regression equation can be seen in Equation (3).

$$\hat{Y}_{it} = 36382{,}52 - 10662{,}98 + 108{,}7983X_{1it}^{*} - 0{,}581539X_{2it}^{*} - 0{,}145711X_{3it}^{*} + 77{,}62981X_{4it}^{*} - 0{,}089889X_{5it}^{*} \quad (3)$$

The interpretation of the panel data regression model on the economic growth of provinces outside Java Island obtained is as follows:

1. The intercept value of the model of 36382,2-10662,98 = 25719,54 mathematically states that if all independent variables are equal to 0 then the value of Y is 25719,54 units. In other words, the value of economic growth in Aceh Province without economic and administrative infrastructure is 25719,54 units.

2. Safe drinking water has a positive influence on economic growth, with each increase of one unit of safe drinking water, economic growth will increase by 108,7983 units. In accordance with Solow's theory that proper drinking water has a significant effect on economic growth and in addition to previous research, namely: Agenor and Moreno-Dodson (2009) and Syahputra (2021) state that safe drinking water has a positive effect on economic growth because of the link between public infrastructure and economic growth, among others, can be explained through the role of infrastructure in increasing the productivity of workers where these workers are actually used as inputs in the production process. This result is also in accordance with what states that safe drinking water is an important part of basic infrastructure that can have an influence on economic growth (Bulohlabna, 2008).

3. Road facilities have a negative effect on economic growth, with each increase of one unit of road facilities, economic growth will decrease by 0.581539 units. The results of this study are the same as previous research conducted by Syahputra (2021) which states that road facilities have a negative effect on economic growth in Subulussalam City. This result is not in accordance with the theory which states that roads have a dual function, namely roads have a function as a driver of economic

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growth by facilitating the flow of goods and services between production centers and marketing areas and vice versa. On the other hand, roads serve to reduce development imbalances between regions. Therefore, road development is the main foundation of a region's development (Syahfrizal, 2012). In the case of provinces outside Java, road infrastructure development has not yet affected economic growth because road development in provinces outside Java has not been maximized and there are still some areas that are still isolated.

4. Distributed electricity has a negative effect on economic growth, with each increase of one unit of distributed electricity, economic growth will decrease by a unit. The results of this study are the same as previous research conducted by Syahputra (2021) which states that electricity infrastructure has a negative effect on economic growth. The results of this study are also the same as previous research conducted by Anas on 306 companies in Indonesia showing that due to lack of electricity, 64 percent of companies have their own electricity generators and 18 percent of company investment is shown for electricity infrastructure, so that large companies have to pay US $ 0.07 / MW to produce electricity while small companies pay US $ 1.68 / MW (Anas, 1996). In this case, provinces outside Java often experience rolling blackouts, therefore many companies have their own electricity generators. Meanwhile, according to Sunggu Aritonang, Director of Commerce and PLN services, PLN cannot add new customers anymore because it must prioritize old customers first amid PLN's limited electricity capacity. This is what causes distributed electricity to have a negative and significant effect on economic growth.

5. Telephone subscription have a positive influence on economic growth, with each increase of one unit of telephone subscription, economic growth will increase by 1 unit. This research is similar to Solow Theory and previous research, namely: Canning (1999) states that telephones have a significant effect on economic growth. Telephones are the most important asset for the current era if they are supported by excellent design, high quality, and sufficient quantity.

6. Realization of domestic investment investment has a negative influence on economic growth, with each one unit increase in the realization of domestic investment investment, economic growth will decrease by a unit. This is due to the Daftar Negatif Investasi (DNI) in Indonesia. DNI is a list of business deposits compiled by the government as information, especially regarding joint ownership. This policy aims to provide more business opportunities to domestic companies, especially UMKM, and protect national interests. With the DNI, foreign investors cannot invest in business sectors dominated by UMKM, which can hamper economic growth. Instead, foreign investors are directed to business sectors that are larger, require larger capital, and absorb a larger workforce as well.

CONCLUSIONS AND SUGGESTIONS

The best panel data regression model in analyzing economic growth in provinces outside Java Island in 2019-2021 is using the Fixed Effect Model (FEM) estimate with cross section weight and cross section seemingly unrelated residual / SUR (PSCE), where the estimate has a coefficient of determination of 99.9% and has met the assumption test and model feasibility test so that the model can be said to be good. The results of modeling the economic growth of provinces outside Java using panel data regression are as follows:

$$\hat{Y}_{it} = 36382{,}52 - 10662{,}98\mathrm{D}_{2\mathrm{i}} + 12415{,}88\mathrm{D}_{3\mathrm{i}} + \ldots + 2597{,}020\mathrm{D}_{29\mathrm{i}} + 108{,}7983\mathrm{X}_{1\mathrm{it}}{}^{*} - 0{,}581539\mathrm{X}_{2\mathrm{it}}{}^{*} - 0{,}145711\mathrm{X}_{3\mathrm{it}}{}^{*} + 77{,}62981\mathrm{X}_{4\mathrm{it}}{}^{*} - 0{,}089889\mathrm{X}_{5\mathrm{it}}{}^{*}$$

Based on the results of the research conducted, the variables of decent drinking water and telephone subscribers have a positive and significant effect on the economic growth of provinces outside Java Island. Meanwhile, the variables of road facilities, distributed electricity and realization of domestic investment have a negative and significant effect on the economic growth of provinces outside Java Island.

Suggestions from this researcher for future researchers are the need for additional independent variables related to infrastructure and affect economic growth. In addition, other methods can also be used, such as semiparametric spline truncated regression, geographically weighted regression. The results of this study are expected to provide insight to the government in an effort to improve the economy in Indonesia, especially in provinces outside Java.

REFERENCES

Agenor, Pierre-Richard, dan Blanca Moreno-Dodson. " *public infrastructure and growth : New channels and policy implications*. World Bank Policy Research Working Paper No.4064.2006

Angelina dan Wahyuni. (2021, November). Pengaruh Infrastruktur Ekonomi dan Sosial terhadap Pertumbuhan Ekonomi Indonesia, 2015-2019. In *Seminar Nasional Official Statistics* (Vol. 2021, No. 1, pp. 733-742).

Badan Pusat Statistik Jakarta Pusat, 2022. *Produk Domestik Regional Bruto Atas Dasar Harga Konstan 2010 Provinsi-Provinsi di Indonesia* .

Baltagi, B. H., and Edition, F. (2008). *Professor* Badi H. Baltagi (auth,)- *Econometrics-Springer Berlin Heidelberg*.

Bulohlabna, C. (2008). *Tipologi dan pengaruh infrastruktur terhadap pertumbuhan ekonomi Kawasan Timur Indonesia (Skripsi)*. Bogor: Institut Pertanian Bogor.

p-ISSN 2089-8878; e-ISSN 2715-8276

Canning, David. : *infrastructure's contribution to Aggregate Output*," World Bank Policy Research Working Paper No. 2246. 1999.

Panjaitan, H. A. M., Mulatsih, S., & Rindayati, W. (2019). Analisis dampak pembangunan infrastruktur terhadap pertumbuhan ekonomi inklusif Provinsi Sumatera Utara. *Jurnal Ekonomi dan Kebijakan Pembangunan, 8*(1), 43-61.

Solow, Robert M., *Growt Theory* : An Exposition, Oxford University Press, 1987.

Syahputra, T. S. A., Purba, E., & Damanik, D. (2021). Pengaruh Infrastruktur Terhadap Pertumbuhan Ekonomi Di Kota Subulussalam. *Jurnal Ekuilnomi, 3*(2), 104-114.

Syahfrizal, 1997. *Pertumbuhan Ekonomi dan Ketimpangan Regional Wilayah Indonesia Bagian Barat, PRISMA, Maret 1997.*Yogyakarta :LP3ES.