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## THE EFFECT OF VILLAGE FUNDS AND INFRASTRUCTURE ON RURAL INCOME INEQUALITY AMONG PROVINCIAL GOVERNMENTS IN SOUTHERN SUMATERA

*Pengaruh Dana Desa Dan Infrastruktur Terhadap Ketimpangan Pendapatan Perdesaan Antar Provinsi Di Sumatera Bagian Selatan*

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### ABSTRACT

*The purpose of this study was to determine the effect of village funds and infrastructure on income inequality between provincial governments in Southern Sumatera. This study uses a panel data regression model, the data used are secondary data from 2015 to 2020. The data used in this study are time series data obtained from Badan Pusat Statistik (BPS), Ministry of Finance, Ministry of Public Works and Housing People (PUPR) and other related agencies. Based on research and data processing, the best panel data regression model is the fixed effect model. The results of the F-statistical test show that the variables of village funds, road infrastructure, electricity ratios, and cellular telephone ownership jointly reduce income inequality between villages between provincial governments in Southern Sumatera significantly. Meanwhile, based on the statistical results of the t-test, only household cell phone ownership has no significant effect on rural income inequality.*

***Keyword: gini index, infrastructure, village fund***

### ABSTRAK

*Tujuan dari penelitian ini adalah untuk mengetahui pengaruh dana desa dan infrastruktur terhadap ketimpangan pendapatan antara pemerintah provinsi di Sumatera Bagian Selatan. Penelitian ini menggunakan model regresi data panel, data yang digunakan adalah data sekunder dari tahun 2015 sampai dengan tahun 2020. Data yang digunakan dalam penelitian ini adalah data time series yang diperoleh dari*

*Badan Pusat Statistik (BPS), Kementerian Keuangan, Kementerian Pekerjaan Umum dan Perumahan Rakyat (PUPR) dan instansi terkait lainnya. Berdasarkan penelitian dan pengolahan data, model regresi data panel terbaik adalah model fixed effect. Hasil uji F-statistik menunjukkan bahwa variabel dana desa, infrastruktur jalan, rasio kelistrikan, dan kepemilikan telepon slluler secara bersama-sama menurunkan ketimpangan pendapatan antardesa antar pemerintah provinsi di Sumatera Bagian Selatan secara signifikan. Sementara itu, berdasarkan hasil statistik uji-t, hanya kepemilikan telepon seluler dalam rumah tangga yang tidak berpengaruh signifikan terhadap ketimpangan pendapatan pedesaan.*

**Kata Kunci:** *indeks gini, infrastruktur, dana desa*

## INTRODUCTION

Regional disparities in Indonesia are still relatively large, especially the development gap between West Indonesia (KBI) and East Indonesia (KTI). For 30 years (1986-2016) KBI's contribution to the regional gross domestic product (GDP) was very dominant and was never below 80 percent of GDP. Differences between regions are also reflected in 122 regions which are still underdeveloped areas and there are also disparities between villages and cities (Hanafi et al., 2017).

The government has carried out various policies and programs to reduce regional development disparities in Indonesia. As one of the efforts to reduce regional development inequality, the Government of Indonesia through *Nawacita* sided with the development of Indonesia from remote areas through regional and village empowerment under the Unitary State of the Republic of Indonesia (NKRI). To implement the *Nawacita* program, the central government has budgeted sizable village funds for villages, which aim to support village development, improve community welfare, reduce poverty and equitable development and reduce inequality in the development of underdeveloped areas with the hope that these rural areas become more advanced and develop.

Based on the results of the performance evaluation of the implementation of village fund assistance for the first four years (2015-2018), the community has benefited, especially from the increase in village infrastructure built from village funds. In terms of outcomes, the implementation of village funds has also helped reduce poverty and inequality in rural areas. This is reflected, for example, in the reduction in the rural Gini ratio from 0.34 in 2014 to 0.32 in 2018 and a decrease in the number of rural poor from 17.8 million people (14.2%) in 2015 to 15.8 million people (13.2%) in 2018. In addition, the Village Fund succeeded in increasing the status of 6,518 underdeveloped villages to developing villages and the status of 2,665 developing villages to become independent villages (Kementerian Keuangan Republik Indonesia, 2019).

Village funds received by each provincial government in Southern Sumatera vary and depend on the number of villages, population, poverty level, area size, and geographical difficulties. Village fund assistance increases every year. South Sumatera Province received the most village fund assistance in South Sumatera, followed by Lampung and Jambi Provinces, while Bangka Belitung Province received the least village fund assistance. Village funds received from South Sumatera Province are 8 (eight) times the village funds received from the Bangka Belitung Islands Province.

Based on the 2018 Southern Sumatera Village Development Index (IPD) report, the Bangka Belitung Islands Province has the highest IPD score with an index score of 66.06; followed by Lampung Province (64.05), while South Sumatera Province is the lowest after Bengkulu Province. Currently, villages on the island of Sumatera are dominated by developing villages, namely around 81.88 percent of the total 23,241 village units. Meanwhile, the proportion of independent villages was 4.79 percent (1,114 villages) and underdeveloped villages was 13.33 percent (3,097 villages). Judging from its dimensions, accessibility/transportation has the highest index value, which is 77.72, while the condition of infrastructure has the lowest index value, which is only 46.15. (BPS, 2019). This report shows that the state of infrastructure has a significant impact on village development.

The Gini Index data for the Southern Sumatera Province show that the level of development inequality has not changed significantly over the past five years (2015-2020). Existing data shows that the Gini index has changed from year to year and in general is in the moderate inequality range, namely between 0.257 - 0.365 (Central Bureau of Statistics, 2020). South Sumatera Province has the highest income inequality, while the Bangka Belitung Islands Province has the lowest income inequality.

Disparities in economic development between regions are caused by several factors, including: Differences in the content of natural resources, geographical location, demographic conditions, infrastructure conditions, investment and differences in regional economic strength (Sjafrizal, 2008). According to Sadono (2010) these differences make the level of development in various regions different, giving rise to welfare disparities in various regions.

Calderon and Serven (2004, 2008, 2014) found that infrastructure affects income distribution inequality, poor infrastructure as one of the main obstacles to economic development in Sub-Saharan Africa, infrastructure improvements affect growth and equity in the region. Charlery et al. (2016) that roads are a key factor affecting rural income in developing countries. Highways contribute more to reducing income inequality. Poor households benefit more from road construction. Likewise, according to Abduh (2016), that infrastructure development in Indonesia has a positive impact on reducing inequality, and is negatively correlated with price increases. Likewise, according to Panjaitan et

al. (2019) that infrastructure development in North Sumatera encourages economic growth, where road infrastructure increases access to employment opportunities and a more equitable distribution of income. In addition, Setiadi (2006) stated that the development of fundamental infrastructure such as: Transportation infrastructure, electricity and communication networks as well as drinking water installations and networks is very important to improve the economy of the community in an area.

Bappenas (2013) that the gap between regions in Indonesia lies in the availability of regional infrastructure and financial conditions. Infrastructure is an input for the production process that can increase the marginal productivity of production. Adequate and appropriate infrastructure can encourage various economic activities through its functions that can accelerate the production and movement of people, goods and services. Meanwhile, on the other hand, economic disparities between regions can be seen from the perspective of the level of regional income and the quality of regional spending. These two aspects have a significant impact on regional economic performance. Ghosh (2017) said that infrastructure development is very important in every country, the government should prioritize additional investments in electricity, roads, irrigation, housing, and telecommunications to improve overall welfare.

The purpose of this study was to find out how the effect of village funds and infrastructure on the level of rural income inequality between provincial governments in southern Sumatera.

## RESEARCH METHOD

This research was conducted within the scope of the provincial government in southern Sumatera, namely: South Sumatera, Jambi, Bengkulu, Lampung and the Bangka Belitung Islands. The analytical method uses a quantitative descriptive method. The data used is secondary data, namely: Gini index data, infrastructure conditions from 2015 to 2020, as the most complete published data available until 2020. Data comes from Central Bureau of Statistics (BPS), the Ministry of Finance and other relevant agencies. Using the panel data regression model as an analytical tool, with the formulation:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \varepsilon_{it}$$

The operational definitions of the data variables used are as follows:

- a) Rural income inequality is seen from the rural Gini index figures for each provincial government in southern Sumatera.
- b) Village funds are: the amount of village fund assistance received by each provincial government in southern Sumatera.
- c) Infrastructure is the condition of road infrastructure, electrification ratio and ownership of cellular telephones.

- The condition of road infrastructure is the comparison between the condition of provincial and regency/city roads in good condition with the total length of provincial and regency/city roads.
- The electrification ratio is the ratio of the number of electrified household customers from both PLN and non-PLN electricity to the total number of households.
- Ownership of cell phones is the percentage of the population owning/controlling cell phones in rural areas by province in southern Sumatera.

## RESULT AND DISCUSSION

### Income Inequality Between Provinces in Southern Sumatera

Based on the Gini Index figures among provincial governments in Southern Sumatera, income inequality has narrowed from moderate to low over the past six years, and this figure is below the overall national Gini Index, as shown in Table 1. This shows that income inequality between groups people in the province of South Sumatera are relatively better off nationally.

Table 1. Provincial Gini Index Figures in Southern Sumatera, 2015 - 2020

Province	Gini index					
	2015	2016	2017	2018	2019	2020
Sumatera Selatan	0.334	0.362	0.365	0.341	0.339	0.338
Jambi	0.344	0.346	0.334	0.335	0.324	0.316
Bengkulu	0.371	0.354	0.349	0.355	0.329	0.323
Lampung	0.352	0.358	0.333	0.326	0.331	0.320
Kep. Bangka Belitung	0.275	0.288	0.276	0.272	0.262	0.257
Indonesia	0.402	0.394	0.391	0.384	0.380	0.385

Source: Badan Pusat Statistik, 2021

Table 2. Provincial Urban Gini Index Figures in Southern Sumatera, 2015 - 2020

Province	Urban Gini Index					
	2015	2016	2017	2018	2019	2020
Sumatera Selatan	0.390	0.373	0.384	0.381	0.350	0.358
Jambi	0.381	0.377	0.384	0.354	0.350	0.351
Bengkulu	0.405	0.385	0.390	0.394	0.380	0.378
Lampung	0.403	0.393	0.364	0.367	0.350	0.345
Kep. Bangka Belitung	0.291	0.289	0.303	0.296	0.280	0.276
Indonesia	0.428	0.410	0.407	0.401	0.390	0.393

Source: Statistik, 2021

Data on the spatial level of income inequality between rural and urban areas shows that income inequality is higher in urban areas than in rural areas,

as shown in Table 2. Meanwhile, the level of income inequality in rural areas in southern Sumatera is relatively more even and tends to decrease, as in table 3.

Table 3. Provincial Rural Gini Index in Southern Sumatera, 2015 – 2020

Province	Rural Gini Index					
	2015	2016	2017	2018	2019	2020
Sumatera Selatan	0.314	0.293	0.317	0.316	0.300	0.308
Jambi	0.339	0.313	0.284	0.308	0.290	0.287
Bengkulu	0.345	0.302	0.305	0.318	0.290	0.275
Lampung	0.345	0.330	0.297	0.317	0.300	0.298
Kep. Bangka Belitung	0.263	0.240	0.219	0.238	0.230	0.220
Indonesia	0.334	0.327	0.32	0.324	0.32	0.317

Source: Badan Pusat Statistik, 2021

### Village Fund Received by the Provincial Government in Southern Sumatera

Village funds distributed to provincial governments in Indonesia began in 2015. The largest village fund assistance in Southern Sumatera in 2015 was the Province of South Sumatera amounting to IDR 775,044,000,000 while the Bangka Belitung Islands Province received the smallest village funds of only 91,927,560,000. More specifically, the amount of village funds received by the Provincial Government of Southern Sumatera in 2015-2020 is shown in Table 4.

Table 4. Village Funds Received By The Provincial Government In Southern Sumatera, 2015 – 2020 (Rupiah billion)

Province	2015	2016	2017	2018	2019	2020
Sumatera Selatan	775,044	1780,770	2,267,261	2,309,393	2,683,946	2,681,975
Jambi	381,560	856,771	1,090,943	1,037,674	1,184,558	1,206,723
Bengkulu	362,962	813,897	1,035,340	945,638	1,079,419	1,085,021
Lampung	684,728	1,536,762	1,957,488	2,091,398	2,427,111	2,427,738
Bangka Belitung	91,928	206,294	261,662	264,572	309,832	318,401
Total	2,296,221	5,194,493	6,612,694	6,648,675	7,684,866	7,719,858

Source: Kementerian Keuangan Republik Indonesia, 2020

### Condition of Provincial Government Infrastructure in Southern Sumatera

There are differences in the condition of the infrastructure of each province in the southern part of Sumatera in terms of availability and achievements, both in terms of road length, level of electrification and control/ownership of cellular phones. The following is the progress of infrastructure development in each province of South Sumatera from 2015 to 2020.

### ***Road Infrastructure***

The length of national roads, provincial roads and roads that are under the authority of district and city governments in southern Sumatera has not shown significant growth or not many new roads have been built. In general, the country's road infrastructure is in good or moderate condition, namely more than 90%, while the condition of the roads that are under the authority of the provincial government are in good condition, which is quite concerning, only 50% -60% are in good condition, as shown in table 5.

Table 5. Length of Provincial Roads in Good Condition between Provincial Governments in Southern Sumatera, 2015–2020

Province	Provincial Roads in Good Condition (%)					
	2015	2016	2017	2018	2019	2020
Sumatera Selatan	52.15	85.71	13.54	34.68	56.54	56.54
Jambi	52.29	39.20	65.25	40.08	45.98	31.36
Bengkulu	50.61	26.23	45.30	40.63	65.64	66.22
Lampung	52.17	56.23	64.10	67.40	63.79	65.33
Kep Bangka Belitung	52.39	43.05	45.12	55.82	90.48	88.01

Source: BPS, 2021, Statistik Transportasi Darat (land Transportation Statistics)

Likewise, the condition of roads that are under the authority of district/city governments on average are in good condition, still less than 50%, only the Bangka Belitung Islands Province has district/city road conditions that are better than other provinces as shown in Table 6.

Table 6. Length of District/City Roads in Good Condition between Provincial Governments in Southern Sumatera, 2015–2020

Province	Regency / City Roads in Good Condition (%)					
	2015	2016	2017	2018	2019	2020
Jambi	32.00	44.22	44.21	44.84	38.64	43.85
Sumatera Selatan	48.68	55.67	55.68	52.81	45.43	42.24
Bengkulu	40.62	56.90	56.90	47.02	44.87	26.40
Lampung	50.69	32.44	32.44	39.61	38.82	42.17
Kep. Bangka Belitung	40.44	57.40	57.39	51.38	57.54	62.99
Average	42.48	49.32	49.32	47.13	45.06	43.53

Source: BPS, 2021, Statistik Transportasi Darat (land Transportation Statistics).

### ***Electrification Ratio***

The province's electrification ratio in southern Sumatera has continued to increase from 2015 to 2020. In general, the province's electrification ratio in southern Sumatera exceeds the national electrification ratio, only a few provinces have a very low electrification rate compared to the national one, such as Jambi Province (2015-2018), the electrification ratio data is shown in Table 7.

Table 7. Electrification Ratio between Provincial Governments in Southern Sumatera, 2015–2020

Province	Electrification Ratio					
	2015	2016	2017	2018	2019	2020
Sumatera Selatan	89,13	92,92	98,59	100,00	95,58	96,90
Jambi	43,88	46,01	48,77	51,91	93,26	94,98
Bengkulu	85,65	89,24	95,06	99,79	98,74	98,95
Lampung	80,08	83,23	87,30	92,65	95,28	96,04
Kep. Bangka Belitung	98,21	100,76	106,34	100,00	99,98	99,99
Indonesia	86,20	89,10	93,03	97,05	95,75	96,71

Source: PT.PLN Persero, PLN Statistics, 2015 – 2020

### *Telecommunication Infrastructure*

According to BPS data reports, the number of rural households owning/using mobile phones tends to increase in Southern Sumatera between 2015 and 2020. Mass use of the Internet cannot be separated from the rapid development of mobile phone use. In 2020, the average proportion of rural households owning/using cellular phones in the province of Southern Sumatera is 90 percent, and this figure is higher than the national average as shown in Table 8.

Table 8. Percentage of Rural Households Having Cell Phones By Provinces In Southern Sumatera, 2015–2020

Province	Rural Households Having Cell Phones					
	2015	2016	2017	2018	2019	2020
Sumatera Selatan	87.98	88.73	90.99	89.85	90.67	90.73
Jambi	90.13	89.29	90.61	91.10	90.08	90.82
Bengkulu	86.98	84.45	89.49	88.07	88.39	87.92
Lampung	88.38	89.35	88.11	90.10	91.86	90.68
Kep. Bangka Belitung	90.03	89.76	93.60	94.98	93.69	91.67
Indonesia	82.92	83.87	86.58	87.02	88.63	86.45

Source: Badan Pusat Statistik, 2021

### **Panel Data Regression Model Estimation**

#### *Model Selection*

To determine the best model, the Chow test, Hausman test and Lagrange Multiplier test (LM test) are first performed (Widarjono, 2007). The results of the Chow test and Hausman test selected the best fixed effect model. Furthermore, from the results of the classical assumption test, the data and model used passed the normality, multicollinearity, autocorrelation and heteroscedasticity tests.



## Results of Multiple Linear Regression Analysis

From the results of data processing and analysis, a fixed effect model regression equation can be made for the influence of village funds and infrastructure on the level of rural income inequality between provincial governments in southern Sumatera, as shown in Table 9.

Table 9. Panel Data Regression Results (Fixed Effect Model)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.334339	0.193713	1.725948	0.0990
X1	-1.86E-05	7.26E-06	-2.564763	0.0181
X2	-0.000833	0.000343	-2.429456	0.0242
X3	-0.000658	0.000277	-2.375298	0.0271
X4	0.000896	0.002193	0.408688	0.6869
Cross-section fixed (dummy variables)				
R-squared	0.879635			
F-statistic	19.18369 Prob (F-statistic) 0.000000			

Source: Data Processed, 2022

$$Y = 0,3343 - 1,86E-05X_1 - 0,00083 X_2 - 0,000658 X_3 + 0,00896 X_4$$

where: Y = Rural Income Inequality; X<sub>1</sub> = Village Fund Assistance Variable; X<sub>2</sub> = Road Infrastructure Condition Variable; X<sub>3</sub> = Electrification Ratio Variable; and X<sub>4</sub> = Cellular Phone Ownership Variable

The results of the F-statistical test show that the variables of village fund assistance, condition of road infrastructure, electrification ratio and cellphone ownership together have a significant effect on reducing rural income inequality between provincial governments in southern Sumatera. Meanwhile, the statistical results of the t-test show that cell phone ownership alone does not have a significant effect on rural income inequality.

The constant value  $\beta_0 = 0.3343$  means that if the variable value of village fund assistance, road infrastructure conditions, the electrification ratio of cellular phone ownership is zero (0), then the value of rural income inequality or the Gini index is 0.3343. This value indicates that the category of income inequality in rural areas in southern Sumatera is low.

The regression equation shows that the variables of village fund assistance, the condition of road infrastructure and the electrification ratio can reduce inequality in village income between district governments in South Sumatera. Although mobile phone ownership has no significant effect.

The results of the regression analysis gave an R<sup>2</sup> value of 0.8796 which indicated that the variables of village funds, the condition of provincial and district/city road infrastructure were in good condition, the electrification ratio variable and the level of cellular telephone ownership in explaining the variation in rural income inequality levels of 87.96%, while 12.04% is explained by other variables not included in the research model.

## **The Effect of Village Funds on Rural Income Inequality Between Provincial Governments in Southern Sumatera**

The village fund assistance variable received by the provincial government in southern Sumatera has a significant effect on reducing rural income inequality between provincial governments in southern Sumatera. If the village fund assistance distributed increases by Rp. 1 billion, then village income inequality will decrease by: 0.000018 points.

The influence of village funds in reducing income inequality between provincial governments in southern Sumatera is not too large. The small effect of village funds on reducing income inequality is due to relatively low-income inequality in rural areas, and government assistance through village funds is still very low. In 2015, each village only received an average of Rp. 280 million, and in 2019 village fund assistance did not reach Rp. 1 billion per village. Village fund assistance received from the village government is mainly used for the construction of rural physical infrastructure investments that are still lacking, especially in rural areas in southern Sumatera and generally outside Java. The results of this study are in line with the research of Hutapia & Benardin (2020) that village funds have a negative and significant effect on development inequality between districts in Bengkulu Province.

The results of this study are in accordance with the government's objectives, namely channeling village funds for people's welfare, equitable development and reducing development gaps, village funds have succeeded in reducing the ratio of rural inequality from 0.34 in 2014 to 0.32 in 2017 (Kementerian Keuangan Republik Indonesia, 2017). Because rural areas, especially outside Java, lack both the quantity and quality of infrastructure, in order to significantly reduce inequality, village funding assistance must be increased. Going forward, the allocation of village fund assistance must be increased by paying more attention to aspects of inequality, poverty and village infrastructure.

## **The Effect of Infrastructure Development on Rural Income Inequality between Southern Sumatera Provincial Governments**

The good condition of provincial and district/city roads significantly reduces rural income disparities between provincial governments in Southern Sumatera. If the ratio of the condition of provincial roads and district/city roads in good condition increases by one unit, then rural income inequality will decrease by: 0.00083 points. The better the road conditions, the shorter the travel time, lowering travel costs and reducing accidents caused by bad roads.

Brenneman & Kerf (2002), that improving transportation infrastructure and services in a country contributes to improving the business climate and productivity in general and creating a positive environment for reducing poverty. In addition, the overall growth of ICT-based services can improve the

investment climate and entrepreneurial activity, improving the general state of the economy. This increases GDP per capita as well as creates a positive environment for reducing poverty.

The results of this study are in line with research by Calderon and Servén (2004) that infrastructure has a negative effect on the Gini coefficient or income distribution inequality. Improvements in infrastructure development will further improve income distribution towards a more even distribution. Likewise Lokshin & Yemstov (2005), that bridge and road rehabilitation projects in rural areas will increase the level of economic activity, increase the number of small and medium enterprises, and increase access to emergency medical assistance. Higher economic activity and easier access to other cities and medical assistance will lower the cost of goods and services, which in turn will reduce poverty and inequality. Fan & Chan-Kang (2008), road investment has an impact on growth and poverty in China. Low grade (mostly rural) roads have a benefit/cost to national GDP ratio that is roughly four times greater than the benefit/cost ratio for high grade roads. In terms of poverty alleviation, low-grade roads raise far more rural and urban poor above the poverty line per yuan invested than high-grade roads. Road investment provides the highest economic returns in eastern and central China, while its contribution to poverty reduction is greatest in western (especially southwestern) China.

This finding is in line with the results of Sidik (2011), that the most important infrastructure for economic growth in Kalimantan is road infrastructure and electricity infrastructure. Likewise, with Majumder's research (2012) that adequate infrastructure can increase the average standard of living and reduce poverty. Furthermore, Seneviratne & Sun (2013), that better infrastructure in terms of quantity and quality will result in a better distribution of income. Infrastructure is proven to increase productivity and growth. Infrastructure development has a dual effect on poverty reduction and inclusive growth. For ASEAN-5 countries, closing the infrastructure gap will not only increase growth potential but also spread the benefits of growth more evenly. Different types of infrastructure have different impacts on inequality.

According to Gibson & Rioja (2014), infrastructure investment increases economic growth and the government can reduce the level of inequality that exists in their country by investing in infrastructure. Suriani & Kesuma (2015) states that electricity and roads have a positive and significant effect on regional economic growth in 26 provinces in Indonesia. In line with the results of research by Joesoef et al. (2016), that improving transportation infrastructure will increase accessibility and support production and consumption activities. Sukwika (2018) that regions with more complete infrastructure systems tend to have better levels of economic growth and social welfare than areas with limited infrastructure. This study found that there is a positive relationship between the infrastructure gap and the economic gap. This condition indicates

that the infrastructure gap, the length of the road and the number of clean water customers tend to be followed by the economic gap (GDP per capita). Timilsina et al. (2020) found that public investment has a positive impact on economic growth, increasing productivity. There is a significant positive relationship between physical infrastructure and economic growth, especially in low-income countries compared to high-income countries. In addition, investment in physical infrastructure helps reduce inequality and poverty.

Bajar & Rajeev (2016), found different results, where the impact of infrastructure on consumption inequality in 17 Indian states was different, not only for the type of infrastructure but also for the category of state income. In addition, several infrastructure components, particularly electricity and roads, tend to increase interpersonal inequality at the regional level. The results of this study recommend that the government continue to focus on investment in infrastructure. Furthermore, Makmuri (2017), there are different relationships between five different infrastructure categories and income inequality in Indonesia. Infrastructure components, namely roads and telecommunications tend to increase income inequality. Conversely, the quantity of electricity and airports has a positive impact on income distribution and helps reduce income inequality. In addition, the quality of infrastructure that has an impact on income inequality is the quality of the airport.

Raychaudhuri & De (2010), that the accessibility of infrastructure, such as rural roads or electricity, does not help the poor much, so the results can widen income disparities. In 14 countries in the Asia-Pacific region Infrastructure development has indeed reduced inequality, infrastructure development is a significant determinant in achieving higher trade.

The electrification ratio variable has a significant effect on reducing differences in rural income between district governments in southern Sumatera. If the electrification ratio increases by one-unit, rural income inequality decreases: 0.000653 points. The results of this study are in line with Prasetyo & Firdaus (2009) that economic growth is influenced by infrastructure such as the provision of electricity, paved roads and clean water. Electricity has the greatest impact on economic growth, followed by paving roads and clean water. Likewise, according to Jayanthi (2020) found that electricity infrastructure in the form of electrification ratio has a positive and significant effect on economic growth and income distribution. Therefore, the government must expand the availability of electricity networks to all corners of the village. Likewise, according to Winey & Siregar (2019), that electricity and water infrastructure have a positive and significant effect on economic growth, while road infrastructure is not significant.

Furthermore, from the results of the t test, the variable cell phone ownership in rural households has a positive but not significant effect on rural income inequality between provincial governments in southern Sumatera. The

results of this study are different from Oktaviani (2020), that simultaneously the number of internet users, the number of cellular telephone subscribers and household consumption for telecommunications have a significant effect on Indonesia's economic growth. Partially, the number of internet users and household consumption for telecommunications have a positive and significant effect on economic growth, while the number of cellular telephone subscribers has a positive and insignificant effect on economic growth. However, these results differ from the findings of Angelia & Gultom (2020), that the use of ICT does not always have a positive effect on business performance.

The insignificant effect of this cellular phone ownership variable can occur due to the low level of public education and limited human resources causing most rural households to only use cell phones for social media activities and only a few use cell phones for commercial and productive activities. Like Yogaswara (2015), ICT investments in developing countries have not fully played a role in increasing their economic output, this is due to the low level of public education in developing countries. Bandyopadhyay (2013), that inequality (Gini index), is negatively related with newspaper penetration. The ICT variables, phones and ICT indexes have mixed results in relation with inequality. for the complete sample there is a positive, and weak association associations (mostly negative) for a sample of developing countries. ICT spending as GDP percentage was found to have a negative relationship with inequality.

## CONCLUSIONS AND SUGGESTIONS

### Conclusions

The variables of village fund assistance, the condition of road infrastructure and the electrification ratio jointly significantly reduce rural income inequality between provincial governments in southern Sumatera, while the mobile phone ownership variable has no significant effect on reducing rural income inequality.

### Suggestions

The amount of village fund assistance in the future needs to be increased by paying more attention to the aspects of income inequality, poverty and inter-regional fiscal capacity. The government must be able to improve road repair and maintenance so that road quality is always in good condition and build new road infrastructure to increase regional accessibility, especially to production centers, expand the reach of electricity services to villages, and build telecommunications towers to remote villages.

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