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Fiscal Transfer Policies and Road Infrastructure Reduce Income Inequality in Rural-Urban Areas

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Abstract
Fiscal transfer policies and road infrastructure are essential in reducing inequality in Indonesia. However, previous research examining the effect of fiscal transfer policies and road infrastructure still came up with inconclusive findings, thus making it necessary to conduct further research on rural, urban, and sub-national areas in Indonesia. This study examines the impact of fiscal transfer policies and road infrastructure on reducing income inequality in rural, urban, and sub-national areas. The authors utilized time-series data from 2012 to 2021 and 34 provinces. The fixed effect GLS model showed that Kuznets' hypothesis existed at rural, urban, and sub-national levels. The results also showed that the special allocations fund significantly reduced income inequality in rural, urban, and sub-national areas. However, road infrastructure was significant only in urban areas. The findings suggest that the special allocation fund policy can be expanded in scope and increased in number to accelerate the reduction in income inequality.

Keywords:
inequality; road infrastructure; rural; special allocation funds; urban

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INTRODUCTION

The extensive economic inequality, to some extent, is hard to avoid and always becomes an issue and a topic of debate among researchers and policymakers. The government must impose community regulations to minimize income inequality (Chancel et al., 2022). Considering the critical issue of the impact of income inequality on individuals, politics, social, and the economy (McGregor et al., 2019), it is deemed critical that policymakers take preventive measures to avoid a far more severe impact (Shukla & Mishra, 2019). Notably, there has been a huge income inequality gap between urban and rural areas. As stated by Imai & Malaeb (2018), income inequality occurs between urban and rural areas and in several ASEAN countries such as Thailand and Vietnam.

In Indonesia, the UNDP report predicts that the population in the top 10% of income oscillates around 40-50%. Income inequality has increased slightly since 1980, but in the late 1990s and early 2000s, there had been short-run fluctuations (Chancel et al., 2022). Urban inequality in Indonesia contributes significantly to national income inequality. In March 2020, the level of income inequality, as measured by the Gini Ratio, was 0.393, and in rural areas, it was 0.317 (Badan Pusat Statistik, 2021). This condition illustrates that inequality in urban areas is higher than in rural areas. Compared to the previous period, income inequality in urban areas in September 2019 was 0.391 or 0.001 points lower than in urban areas in March 2019, 0.092. Meanwhile, in rural areas in March 2019, it was 0.317 and decreased by 0.002 points compared to September 2019, i.e., 0.315 (Badan Pusat Statistik, 2020).

Many previous studies using the Gini Coefficient or Theil Index have measured inequality, particularly by analyzing income and consumption expenditure metrics using single-dimensional indices (Lazaridis, 2000; Lin, 2007). A pioneer in the study of inequality, Sen (1997) stated that there is nothing mathematically wrong with measuring inequality coming from income. Thus far, the evidence gathered shows that wealth inequality has increased in many countries over the last few decades, albeit at different speeds, highlighting the crucial roles of domestic institutions. These findings have been a concern among academicians, policymakers, and the public and have contributed to renewing the interest in wealth distribution theory (Benhabib & Bisin, 2018).

There are many factors determining the acceleration or deceleration of income inequality from a variety of previous studies, including fiscal decentralization (Chen et al., 2020; Deyin et al., 2017; Goerl & Seiferling, 2014; Makreshanska-Mladenovska & Petrevski, 2019; Sepulveda & Martinez-Vazquez, 2011; Stossberg & Blöchliger, 2017), social and physical infrastructure in the form of roads, and the economic infrastructure such as education, healthcare, communication technology, energy, sanitation, and water (Irianti & Prasetyoputra, 2021; Kocsis & Xiong, 2022; Makmuri, 2017; Zhang & Zhang, 2021; Zolfaghari et al., 2020), equal distribution of education (Bloome et al., 2018; Naveed et al., 2018; Organization of Economic Co-operation and Development, 2015; Shukla & Mishra, 2020), financial cash transfers (Enami et al., 2019; Yusuf, 2018), and poverty (Bourguignon, 2004; Kalwij & Verschoor, 2007; Ogbeide & Agu, 2015; Stevans & Sessions, 2005). Some of these researchers have examined the determinants

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of inequality at the country, inter-countries, and regional levels. Meanwhile, this study examines the determinants of income inequality in urban and rural areas and income inequality in general as conducted by (Imai & Malaeb, 2018; Lu et al., 2022), but retesting for the cases in Indonesia still needs to be done. In the same vein, Zhang & Zhang (2021) also have not included the fiscal transfers and research at the rural and urban levels concerning income inequality.

The roles of government in reducing inequality through fiscal decentralization policy are deemed critical. The essence of the policy is to divert the development budget from the central to the regional government. Fiscal policy directly affects inequality through tax progressivity, well-organized transfer, and the quality of public spending, indirectly affecting other factors determining income and wealth inequality (Odusola, 2019). The same result clearly showed that fiscal decentralization has significantly reduced income inequality (Feld et al., 2021; Goerl & Seiferling, 2014; Makreshanska-Mladenovska & Petrevski, 2019; Su et al., 2019), including rural and urban inequality (Chen et al., 2020; Deyin et al., 2017)

On the other hand, some studies did not support the findings of previous studies, which have found that decentralization increased inequality (Clifton et al., 2017; Saputra, 2012; Sepulveda & Martinez-Vazquez, 2011; Siddique et al., 2008). Liu et al. (2017) also found that fiscal decentralization tends to increase inequality due to variability in levels of economic development, equal regional distributive policies, natural resources, and infrastructure imbalances. The same result revealed by Fan et al. (2020) highlighted that high central-to-regional transfers have not been able to reduce inter-regional inequality in per capita GDP and per capita income; in fact, the equalization effect was only found in urban income. Recent studies have also found that fiscal decentralization or policy increased income inequality (Cevik & Correa-Caro, 2020; Kyriacou et al., 2017; Liu & Long, 2021; Ong et al., 2023) and even tend to be weak (Canare et al., 2020).

Meanwhile, the provision of public capital, such as infrastructure, is deemed critical for the activities of households and companies (Zolfaghari et al., 2020) as well as production and consumption (Zou et al., 2008). Public capital becomes an engine of growth and a determinant of the distribution of wealth, income, and welfare (Chatterjee & Turnovsky, 2012). Infrastructure is a type of capital goods, institutions, and services that serve the activities of many industries in the market (Jain, 2012). It can be divided into two - economic and social infrastructure. The economic infrastructure refers to public utilities such as electricity, telecommunications, water supply, sanitation, and drainage; public engineering constructions such as dams and irrigation systems; and transportation facilities such as railways, ports, and airports.

In contrast, social infrastructure refers to education, health care, and health services (Zou et al., 2008). In addition, infrastructure can support economic growth by increasing labor and capital productivity, thereby reducing production costs and increasing profitability, production, income, and employment (Nallathiga, 2015). This study focuses on road infrastructure as the primary variable, while water supply, sanitation, and drainage become the control variables.

Road infrastructure has been proven to be capable of reducing income inequality. A recent study by Lu et al. (2022) found that road infrastructure is more important for rural residents to increase their income. Even a study has found that public investment in road construction has prompted economic growth and reduced poverty (Churchill et al., 2021; Zou et al., 2008). Other studies have confirmed previous findings that government spending for public capital can increase wealth inequality over time (Chatterjee & Turnovsky, 2012; Zolfaghari et al., 2020). Similarly, previous studies found that road transportation infrastructure can reduce income inequality (Huang et al., 2020; Mishra & Agarwal, 2019; Nugraha et al., 2020; Zhang & Zhang, 2021). On the other hand, some researchers have found less impact of infrastructure development on reducing income inequality (Fullerton Jr. et al., 2014). Other researchers have also shown that transportation infrastructure does not reduce income inequality (Fageda & Olivieri, 2019; Makmuri, 2017).

The differences in the research findings might be related to the differences in the research sites, variable measurement, and the level of economic development as another determining factor (Rodríguez-Pose & Tselios, 2010; Tselios, 2014), government size (Goerl & Seiferling, 2014; Sepulveda & Martinez-Vazquez, 2011), educational expansion (Shukla & Mishra, 2020; Tselios, 2014), poverty (Afandi et al., 2017) and other economic sectors (Zolfaghari et al., 2020). Even though this is not the first study to investigate the impacts of fiscal transfers and road infrastructure on income inequality, it is deemed crucial given the domestic perspective of Indonesia's context, which certainly requires another examination. Evaluating the consistency of the Kuznets curve with rural, urban, and rural-urban analysis units in Indonesia has been carried out previously with individual data (Tadjoeddin, 2013), international (Aktas & Iyidogan, 2022; Sidek, 2021), national (Yusuf et al., 2014), and sectorial district (Yusuf et al., 2021).

Several previous studies that have tested the relationship between fiscal transfers to regions and road infrastructure with income inequality still came up with inconsistent findings. In general, the interrelationships of these variables are analyzed separately, and few combine them in one analysis. In addition, in one study, a few previous researchers have yet to test the determinants of income inequality in rural, urban, and rural-urban areas. Thus, this study aims to examine the effect of fiscal transfer policies, road infrastructure, and control variables on rural, urban, and rural-urban income inequality to complement the existing literature on this issue, especially in the Indonesian context. The researchers used the Generalized Least Square (GLS) panel data regression model to find reliable evidence. This study adds to previous works, especially on the aspect of fiscal transfers in the form of general allocation funds and expansion of the use of special allocation funds (physical and non-physical) by the provincial government and road infrastructure in reducing various aspects of income inequality by taking into account rural-urban income inequality. Our empirical results corroborate that fiscal transfers and road infrastructure reduce income inequality. Therefore, this study provides results that policymakers can use to formulate policies that focus on strengthening fiscal transfers and building road infrastructure and how plans and interventions can be used as effective instruments to achieve income distribution in urban, rural, and national areas.

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METHODS

This study used a quantitative method with a correlational design to examine the effects of fiscal transfer policy, road infrastructure, and control variables on income inequality using static and dynamic panel data regression. The secondary data refers to data obtained from the processing of a second party or data obtained from BPS (Central Bureau of Statistics) publications, academic literature, or journals, and those relevant to this research. The research used secondary data from a time series between 2012 and 2021 and cross-sectional data for 34 provinces (individuals) in Indonesia.

This research used the Gini Inequality Index (GI) dependent variable to measure income inequality. The data were used to estimate the Gini coefficient of household income inequality at the provincial level. The Gini coefficient is a commonly used measure of inequality (Allison, 1978; Badan Pusat Statistik, 2021). Gini inequality index variables consist of the rural (GIR), urban (GIU), and rural-urban (GI) inequality index as the dependent variable. The Gini coefficient value is 0 – 1 (perfect equality to perfect inequality). Since this research had to use household income data, the Gini coefficient captured the distribution of household income in all household populations rather than the distribution of personal income among individuals. This research also used the inequality approach to income between rural-urban areas over time (Fuguitt et al., 1988; Imai & Malaeb, 2018; Jamal, 2019; Johnson & Lichter, 2020).

This study utilized the general allocation fund, special allocation funds (Mardiasmo, 2006), road infrastructure (Chatterjee & Turnovsky, 2012; Lu et al., 2022; Makmuri, 2017), and GDRP per capita (Chan et al., 2014; Khan & Padda, 2021; Muinelo-Gallo & Roca-Sagalés, 2013; Naguib, 2017) as the leading independent variables. Meanwhile, the control variables in this study included the mean years of schooling (Badan Pusat Statistik, 2022), poverty (Afandi et al., 2017; Khusaini et al., 2020), health infrastructure (Zolfaghari et al., 2020), and economic openness (Agusalim & Pohan, 2018; K. Huang et al., 2022; Khan & Padda, 2021; Sukoco et al., 2020). In addition, the authors also utilized the control variables, namely water supply and sanitation (Irianti & Prasetyoputra, 2021), unemployment (Badan Pusat Statistik, 2022; Taresh et al., 2021) and gender empowerment index (Badan Pusat Statistik, 2022).

This study used the panel data regression model to predict the effects of fiscal transfer policy and road infrastructure on income inequality in rural, urban, and rural-urban areas. This model comprises ordinary least squares (OLS), fixed, and random effects models. This study used the Hausman Test to choose between the fixed and random effects models (Baltagi, 2005), which maintains that the fixed effects model remains applicable. Before applying the fixed effect panel regression method, this study tested the classical assumptions as an OLS linear regression to choose the right method to use in the data. In general, the panel data model can be written as follows:

$$y_{it} = \alpha_{it} + \beta' X_{it} + e_{it} \quad (1)$$

Based on equation (1), the specifications of the general econometric model of this study are:

$$g_{it} = \gamma_{it} + \gamma_1 \ln (gdrpcap)_{it} + \gamma_2 lngaf_{it} + \gamma_3 lnsaf_{it} + \gamma_4 lnroad_{it} + \beta_i Z_{it} + e_{it}$$

where g = Gini inequality index (rural, urban, and rural-urban), *ln(gdrpcap)* = log natural of per capita income, *lngaf* = log natural of general allocation funds, *lnsaf* = log natural of special allocation funds, *lnroad* = log natural of road length province with an asphalt surface, i = provinces 1, 2, …, 34 and t = 2012 to 2021, Z = control variable consisting of mean years of schooling/*mys*, poverty/*pov*, unemployment/*unemp*, economic openness/*openness*, health infrastructure/*inhealth*, proper sanitation/*sanit*, clean water sources/*water*, and index gender empowerment/*gei*. γ = estimated parameter and e = error term.

Therefore, the use of random effects and generalized leans square (*GLS*) models is able to cope with the heteroscedasticity dan autocorrelation problem (Greene, 2003) because the *OLS* assumption is not fulfilled. The use of *OLS* may result in parameter estimation that is no longer efficient. The use of the *REM* equation model in a simple form can be written as follows:

$$y = \beta X + \varepsilon + \omega \quad (2)$$

Then equation (2) can be written as an error ($\mathcal{E}$) equation:

$$\varepsilon = y - X\beta - \omega \quad (3)$$

To obtain an estimate of β with Generalized Least Squares is to minimize the squared error function ($\mathcal{E}$).

$$\sum_{i=1}^{n} \varepsilon_i^2 = \varepsilon'\varepsilon = (y - X\beta - \omega)'(y - X\beta - \omega) \quad (4)$$

In order for the value of $\mathcal{E}'\mathcal{E}$ to be a minimum, a first-degree derivation of β is needed and equated to zero, as follows:

$$\frac{\partial(\varepsilon'\varepsilon)}{\partial\beta} = 0$$

$$-2X'y + 2X'X\hat{\beta} + 2X'X\omega = 0$$

$$X'X\hat{\beta} = X'y - X'\omega$$

so,

$$\hat{\beta} = (X'X)^{-1}(X'y - X'\omega) \quad (5)$$

since β is equal with β_{GLS}, then

$$\hat{\beta}_{GLS} = (X'\varphi X)^{-1}(X'\varphi y - X'\omega)$$

where ϕ is the weight

RESULT AND DISCUSSION

A descriptive analysis of the condition and development of income inequality at the regional, provincial, and national levels is presented before elaborating on the fiscal transfer policies and infrastructure's effects on income inequality. In 2013 and 2015,

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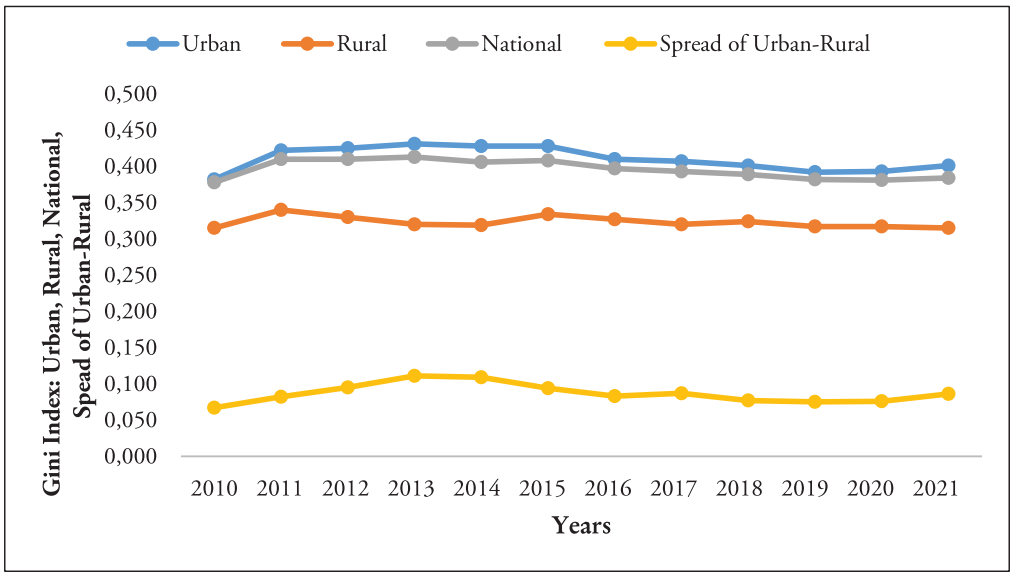
the Gini inequality index increased, indicating that the distribution of the population's expenditure in that period was getting worse. Meanwhile, since 2016, the expenditure disparity has continued to decline, showing the improvement in the distribution of population expenditure, as shown in Figure 1.

Figure 1. The Development of Indonesia Gini Index, Urban, Rural and the Difference of Urban and Rural, 2010 – 2021



Source: Badan Pusat Statistik (2021, 2022)

Figure 1 above also explains that the income or expenditure inequality measured by the Gini index between urban and rural areas had the same trend during 2010-2021. Still by region, in 2011-2013, the Gini Ratio in urban areas increased and started to decline from 2014 to 2020 (Badan Pusat Statistik, 2021, 2022), but it increased in 2021. On the other hand, a different pattern occurred in rural areas. In 2011-2013, the rural Gini Ratio declined but increased in 2015 and 2018 before the expenditure inequality decreased in 2019-2021. The development pattern of income inequality among residents of urban areas follows the pattern of national development.

The development of the Gini index between 2012 and 2021 is presented to identify the decline rate in expenditure inequality with the Gini index during the research period. The calculation results showed that the highest decline in expenditure inequality was found in Papua, with 11.18%, followed by Kalimantan, with 10.88%. However, in 2012 and 2021, the expenditure disparity in the Nusa Tenggara region experienced the opposite condition compared to other regions, which increased by 5.34%. The changes in expenditure inequality among urban, rural, and urban-rural by region are presented in Table 1.

Table 1. The Development of Index in Accordance to Urban-Rural Area, 2012 and 2021

Area	Year	Urban	Δ Urban	Rural	Δ Rural	Urban- Rural	Δ Urban- Rural
Sumatera	2012	0.379		0.311		0.359	
	2021	0.342	-9.64%	0.268	-13.98%	0.314	-12.47%
Java and Bali	2012	0.406		0.321		0.398	
	2021	0.396	-2.46%	0.312	-2.80%	0.385	-3.10%
Kalimantan	2012	0.374		0.301		0.357	
	2021	0.333	-11.00%	0.271	-10.03%	0.315	-11.61%
Sulawesi	2012	0.412		0.359		0.398	
	2021	0.393	-4.57%	0.338	-5.72%	0.371	-7.53%
Nusa Tenggara	2012	0.387		0.299		0.358	
	2021	0.371	-4.01%	0.319	6.70%	0.362	-6.62%
Maluku	2012	0.335		0.290		0.344	
	2021	0.299	-10.76%	0.253	-12.61%	0.297	-13.66%
Papua	2012	0.367		0.365		0.427	
	2021	0.310	-15.42%	0.409	12.21%	0.378	-11.49%

Table 1 shows that the changes in urban expenditure inequality in 2012 and 2021 occurred in all regions. In urban areas, the fastest rate of decline was found in Papua, with 15.42%, while the slowest was found in Java and Bali, with only 2.46%. However, two regions in rural areas experienced a rise: Nusa Tenggara and Papua. Conversely, other regions experienced a decrease in income inequality. This condition indicated that the income inequality in rural areas during this period was worse than in urban areas.

Furthermore, by comparing the average acceleration of decrease or increase in the disparity in expenditure/income among residents at the provincial level, such as in Eastern Indonesia and Western Indonesia, this study revealed that the decline in the average expenditure inequality in Eastern Indonesia was lower than that of Western Indonesia so that by the end of 2021 the Gini index level in Eastern Indonesia had been higher, with an average of 0.358 (see Table 2).

Table 2. The development of the Gini Index based upon the West-East Indonesia area, in 2012 and 2021

Area	Year	Urban	Δ Urban	Rural	Δ Rural	Urban-Rural	Δ Urban-Rural
West Indonesia	2012	0.386		0.311		0.371	
	2021	0.357	-7.57%	0.284	-8.86%	0.338	-8.85%
East Indonesia	2012	0.375		0.328		0.381	
	2021	0.343	-8.46%	0.330	0.57%	0.352	-7.76%
Average		0.358	-8.01%	0.314	-4.14%	0.357	-8.30%

Table 2 shows that the decline rate in expenditure inequality in urban areas from 2012 to 2021 in Eastern Indonesia was more rapid than in Western Indonesia's urban

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areas, with an average decline of 8.01%. In contrast, income inequality was getting worse in rural areas in Eastern Indonesia (up 0.57%), and the overall Gini index in rural areas decreased by 4.14%. The provincial development target, as recorded in the National Medium-Term Development Plan (Indonesian, RPJMN) 2020-2024, states that "inequality between provinces was reduced by encouraging the transformation and accelerating development in the Eastern Region of Indonesia, including Kalimantan, Nusa Tenggara, Sulawesi, Maluku, and Papua and by maintaining the momentum of growth in Java, Bali and Sumatera Regions" (Appendix I of the Presidential Regulation, 2020). However, this effort would be hard to realize because differences in resources and characteristics in each region are the primary factors of the increasing expenditure and development inequality (Heinrich Mora et al., 2021; Kamaruddin & Alam, 2019), especially in rural areas. Therefore, policymakers at the provincial level should pay more concern to the economic sectors that absorb more labor to make a real contribution to increase economic growth and empower people with lower incomes (Raharti et al., 2021).

A summary of the research data statistics should also be presented to control the research data before testing the relationship between variables. Statistical summary includes the average values, maximum values, and minimum values. The average Gini index value during the study period (2012-2021) in urban areas was higher than in the sub-national and rural areas. Table 3 presents the aforementioned statistical summary.

Table 3. Statistical Summary

Variables, n = 340	Mean	Std. Dev
giu	0.372	0.043
gir	0.312	0.042
gr	0.360	0.039
lngdrpcap	10.402	0.560
lngaf	7.124	0.787
lnsaf	5.842	1.768
lnroad	6.998	0.573
pov	11.205	5.912
mys	8.222	0.996
unemp	5.325	1.955
openness	5.722	7.614
lnhealth	2.444	0.317
sanit	68.296	15.851
water	76.372	13.976
gei	67.706	6.660

Table 3 shows that the average provincial per capita income in 2010 showed constant values at the national level, with IDR 39,712,220 per population per year. The average value of general allocation funds (Indonesian, DAU) and special allocations (Indonesian, DAK) was IDR 1,241.41 billion and IDR 695.22 billion, respectively. The average value

of the length of paved roads under the province's authority was 995.41 kilometers. The average poverty score for the province was 11.16%, and the mean years of schooling was 8.22 years. The average unemployment rate per province per year was 5.29%.

Meanwhile, the average ratio of imports to exports was 5.72% per year, and health facilities in hospitals, health centers, and auxiliary health centers were 277.97 units. The average percentage of the population accessing proper sanitation and clean water was 28.96% and 36.37%, respectively. The average women's empowerment index was 76.71%.

Table 4. The Results of the Regression of Fixed Fffect of GLS Rural and Urban

Variables	Rural[a]			Urban		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 2
lngdrpcap	0.760*** (0.222)	-0.077*** (0.016)	0.912*** (0.311)	0.206 (0.237)	-0.064** (0.024)	0.635** (0.265)
lngdrpcap^2	-0.039*** (0.011)	-	-0.047*** (0.015)	-0.015 (0.012)	-	-0.031** (0.013)
lngaf	-	0.001 (0.002)	0.002 (0.002)	-	0.004 (0.003)	0.002 (0.002)
lnsaf	-	-0.003*** (0.001)	-0.003*** (0.0001)	-	-0.003** (0.001)	-0.004** (0.001)
lnroad	-	0.027*** (0.006)	0.031*** (0.007)	-	-0.021** (0.009)	0.0003 (0.008)
pov	-	-0.0002 (0.001)	0.0002 (0.001)	-	0.002 (0.002)	0.001 (0.001)
mys	-	-0.001 (0.008)	-0.002 (0.007)	-	-0.142 (0.009)	-0.010 (0.009)
unemp	-	-0.002 (0.001)	-0.002 (0.001)	-	-0.002* (0.001)	-0.001 (0.001)
opennes	-	0.0001 (0.0001)	0.0001 (0.0001)	-	0.0001 (0.0003)	-0.0001 (0.0002)
lnhealth	-	0.0002 (0.056)	0.034 (0.055)	-	-0.112 (0.071)	-0.165*** (0.056)
sanit	-	-0.0002 (0.0002)	-0.0001 (0.0002)	-	0.0002 (0.0002)	-0.0001 (0.0002)
water	-	0.0006*** (0.0001)	0.0004** (0.0002)	-	0.0003 (0.0003)	0.0002 (0.0003)
gei	-	0.0007** (0.0003)	0.0005* (0.0003)	-	-0.011*** (0.003)	-0.001** (0.0003)
Constant	-3.278***	0.872***	-4.358***	-0.150	2.524***	-2.381*
R^2	0.8442	0.8623	0.8640	0.8238	0.8588	0.8407
Adjusted R^2	0.8263	0.8411	0.8425	0.8036	0.8307	0.8157
F-stat	47.022	40.573	40.096	40.623	30.556	33.625
Prob.(*F*-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Obs.	330	330	330	340	340	340

Note: *sig. = 10%, **sig. = 5%, ***sig. = 1%; a = not including DKI Jakarta Province

First, the researchers conducted the Chow test to select the Common Effect (CE) or Fixed Effect (FE) model. The test results showed that all cross-section Chi-square

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values were 336.324 - 582.525, and the probability value was 0.000 < 0.005; thus, the FE model was selected. Furthermore, the researchers chose between the Fixed Effect and the Random Effect (RE) models utilized with the Hausman test (Hausman, 1978). Both models were potentially valid in estimating the panel model with the unobserved provincial heterogeneity. Hence, the FE or RE model could be a valid model based on the results of the Hausman specification test. A formal test of the Hausman specification was estimated to generate the right decision between the two models: FE and model and RE model. The test results for all models showed that the Chi-square statistic of the cross-sectional random was 12.249 – 66.054 while the Probability value was 0.000 – 0.002 < 0.05. Thus, the effects model remained consistently applicable for the analysis.

The results of the residual normality of all analytical models with Jarque-Berra resulted in a Probability value of 0.3507 - 0.9368 > 0.05, indicating the normal distribution of the data. The correlation value between independent variables could be used for multicollinearity. The correlation calculation result showed that r = -0.3151 – 0.6059 < 0.80, indicating that the model is free from multicollinearity. Also, since the panel data have cross-sectional and time series dimensions, data analysis commonly faces heteroscedasticity and serial correlation (Beck, 2001; Hsiao, 2007). Some of the causes of this problem have been extensively discussed by Beck (2001), who revealed the following results. First, provincial governments can have their variants of error related to their unique regional characteristics; second, there might be a spillover of the errors (surprise) in one provincial government to other regions within the same region. This condition may lead to serial autocorrelation if a shock from one provincial government is correlated to the shocks from other provincial governments in the same year; third, within the same provincial government, shocks or errors in the current years might be correlated with errors in the previous period or periods.

Based upon the problems related to the nature of the data in the panel model, the researchers tested the results of the autocorrelation test using the Durbin-Watson (DW) value criterion, i.e., the DW value between 1 and 3 (Field, 2009). Thus, conservatively, there would be no autocorrelation problem (though the value around two also becomes a concern). In this model, the value of DW was 1.517 – 1.885; hence, the model is free from the autocorrelation problem. Finally, the heteroscedasticity test was carried out using the White-Heteroscedasticity test, namely the Obs*R-squared of 9.675 – 161.493 and the probability value for all models of 0.000 – 0.022 < 0.05. On this basis, it was found that there was a heteroscedasticity problem in the regression model.

Further, the relationship between fiscal transfer policy road infrastructure and income inequality was examined. Here, several income inequality models used a panel estimation analysis of Generalized Least Squares (GLS). This estimator produced not optimally biased results for considering heteroscedasticity and serial correlation in panel data (Hansen, 2007; Musau et al., 2015). Table 4 below presents the results of the GLS panel containing coefficients, standard error, probability values, R2, and F-stat.

Table 5. The results of the Regression of Fixed Effect of *GLS* all (Rural-Urban)

Variables	Rural-Urban		
	Model 1	**Model 2**	**Model 3**
lngdrpcap	0.3337** (0.155)	-0.036*** (0.016)	0.526*** (0.182)
lngdrpcap^2	-0.021*** (0.007)	-	-0.026*** (0.008)
lngaf	-	0.0005 (0.001)	0.001 (0.001)
lnsaf	-	-0.003*** (0.001)	-0.003*** (0.0008)
lnroad	-	0.006 (0.005)	0.008 (0.005)
pov	-	0.002** (0.0009)	0.002** (0.0009)
mys	-	-0.019*** (0.005)	-0.017*** (0.006)
unemp	-	-0.001 (0.001)	-0.001 (0.0008)
opennes	-	0.0001 (0.0001)	0.00003 (0.00009)
lnhealth	-	-0.036 (0.039)	-0.072** (0.039)
sanit	-	0.00003 (0.0001)	0.0001 (0.0001)
water	-	0.0004** (0.0002)	0.0002 (0.0002)
gei	-	0.00001 (0.0002)	-0.00004 (0.0002)
constant	-0.867	0.950***	-1.961**
R^2	0.8883	0.9128	0.9229
Adjusted R^2	0.8754	0.8895	0.9108
F-stat	69.060	68.441	76.218
Prob.(*F*-statistic)	0.0000	0.0000	0.0000
Obs.	340	340	340

Note: *sig.=10%, **sig.=5%, ***sig.=1%

Tables 4 and 5 show that Kuznets' hypothesis showing the relationship between per capita income and income inequality has existed in rural, urban, and rural-urban areas for all provinces in Indonesia (with control and uncontrol variables), except in urban areas (Urban Model 1) that was without control variables. Hence, it is clear that the increase in people's income at the beginning was proven to increase income inequality significantly, but when reaching the threshold of certain income per capita, increasing income per capita was able to reduce income inequality in rural, urban, and rural-urban areas (with control variables). On the other hand, the coefficient value of fiscal transfer

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as measured by the general allocation fund was 0.001 – 0.004, which was statistically insignificant in the rural, urban, and rural-urban models (see Tables 4 and 5). This result means that the general allocation fund increased the average income inequality in rural, urban, and rural-urban, although it was insignificant.

The coefficient value of the special allocation fund was -0.003 to -0.004 (rural, urban, and all models 2 and 3). This result indicates that special allocation funds could reduce the average income inequality in Indonesia's rural, urban, and rural-urban areas. The road infrastructure coefficient value was -0.021 – 0.031. It was statistically significant by 1% and 5% in the rural and urban models, but insignificant in the urban model 3 and the rural-urban model (see Table 4 and Table 5). This pinpoints that road infrastructure could reduce the average income inequality in urban areas but not in rural and rural-urban. Income per capita as a control variable consistently reduces income inequality in rural, urban, and rural-urban areas.

Furthermore, the control variable that significantly reduced income inequality in urban areas and throughout the province was health infrastructure—the mean years of schooling variable only had a significant effect at the whole province level. The variables of women's empowerment and economic openness only had a significant effect in urban areas.

The results of evaluating the Kuznets' curve model of income inequality in Indonesia by provincial level and rural existed without control variables. Also, they existed with control variables for rural, urban, and rural-urban models. The income threshold could be achieved at IDR 27.80 million in rural, IDR 38.62 million in urban, and IDR 37.72 million in the sub-national average level in achieving welfare when income inequality started to decrease. It highlights that the level of income distribution started to improve when the average level of per capita income in each region reached the threshold level during the study period. This condition also illustrates opportunities to improve community welfare through regional economic activities.

The results of Kuznets' hypothesis testing showed a number of differences between rural, urban, and provincial averages. The differences in the evaluation results between rural and urban areas were caused by higher income inequality in urban areas compared to rural areas in 2012 – 2021. In addition, the Kuznets curve inequality model estimation in rural areas did not include the inequality data for Jakarta Province since it did not have rural areas. Another reason, as stated by Kuznet (1955), was the alteration from low-productivity agriculture to more productive sectors such as manufacturing and services during the growth process. Consequently, inequality widened in urban areas and decreased in rural areas. The findings of this study were in line with the research by (Aktas & Iyidogan, 2022; Sidek, 2021; Tadjoeddin, 2013).

We showed that fiscal transfers significantly reduce income inequality in rural, urban, and rural-urban areas. The instruments for fiscal transfers to the regions were in the form of general allocation funds and special allocation funds, where special allocation funds to the province are strongly related to the declining income inequality at the regional

level, while general allocation funds do not, although there was a positive relationship between them. This condition illustrates that the general allocation funds transferred to the province cannot redistribute income directly to the community, given the fact. Bearing in mind that the general allocation funds implemented by the government are for equal distribution of provincial financial capabilities, thereby reducing gaps in provincial funding sources and fiscal gaps between provinces in the context of meeting regional needs in decentralization. It means that general allocation funds could not increase people's income in rural, urban, and rural-urban areas. This result differs from previous studies, which found that fiscal transfer policies can reduce income inequality among residents in rural, urban, and rural-urban areas (Kyriacou et al., 2017; Ong et al., 2023). Another study that did not confirm these results was conducted in South America by Clifton et al. (2017), which showed that fiscal policy has been proven to reduce income inequality in the region. However, these results confirmed previous research findings that the relationship between fiscal decentralization policies and inequality was weak (Canare et al., 2020).

The special allocation fund significantly reduced income inequality in rural, urban, and rural-urban areas. In other words, there was an increase in special allocation funds, thereby reducing income inequality. This study has proven that one of the keys to reducing income inequality was increasing government budget allocations through the mechanism of special allocation funds. The results of this study are consistent with the study of Enami et al. (2019), which found that the fiscal transfer system was both directly and indirectly effective in reducing the Gini income inequality index in Iran. Also, the findings of this study confirmed previous findings revealing that the decentralization of fiscal revenues is negatively correlated with income inequality in urban, rural, and rural-urban areas (Chen et al., 2020; Deyin et al., 2017). Qomariyah et al. (2019) specifically emphasized that special allocation funds may reduce income inequality. In addition, Su et al. (2019) concluded that fiscal decentralization impacted increasing population income and fiscal spending, encouraging income growth for urban and rural residents. However, the growth rate slowed over time. Meanwhile, other researchers have also emphasized that fiscal decentralization is an important determinant that significantly reduces inequality (Makreshanska-Mladenovska & Petrevski, 2019).

However, the empirical results of this study did not confirm any research findings highlighting that decentralization increases inequality (Saputra, 2012; Sepulveda & Martinez-Vazquez, 2011). A similar research finding also articulated that fiscal decentralization did not impact income inequality (Cevik & Correa-Caro, 2020; Fan et al., 2020). Likewise, Mudayen & Maridjo (2017) also found an inverse relationship between special allocation funds and income inequality between provinces in Indonesia. The special allocation fund for assignment supports accelerating the development of basic service infrastructure focused on priority locations (sub-districts) in the district/city. The provincial government has a vital role in managing transfer funds from the central government through special allocation funds to accelerate area-based development, namely

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rural and urban areas. Following its designation, special allocation funds aim to accelerate infrastructure development for education, health, road transportation, drinking water, sanitation, housing, and settlements to reduce income inequality in rural, urban, and rural-urban areas. After this, it directly impacts improving the economy and community welfare.

Transportation development is expected to increase public access to ensure the smooth operation of economic activities to increase people's income. Road infrastructure has become the center of attention at the urban, rural, and national levels because of its very influential role in ensuring the mobility of goods and services in the regions. However, the results of this study show different results regarding the effect of road infrastructure on income inequality by region. The research findings have shown that road infrastructure significantly reduced income inequality in urban areas. In other words, improving road infrastructure could reduce income inequality in urban areas. Hence, road connectivity in urban areas was better than in rural areas. The empirical test has confirmed previous findings that transportation infrastructure significantly affected income inequality (Z. Huang et al., 2020; Mishra & Agarwal, 2019).

On the other hand, the results of empirical testing showed that road infrastructure did not significantly reduce income inequality in rural and rural-urban areas. This result means that the improvement of road infrastructure increases income inequality in rural and rural-urban areas. This finding corroborates previous research, which found that road infrastructure improvement does not impact income distribution (Fullerton Jr. et al., 2014). The wealth generated by rural people working in cities is poorly distributed to themselves, exacerbating income inequality within cities (Zhang & Zhang, 2021). Likewise, (Fageda & Olivieri, 2019) showed that massive transportation infrastructure investment reduces the income gap between regions. The results of previous studies in Indonesia with provincial-level data show that an increase in the number of roads widens the income gap in Indonesia (Makmuri, 2017).

Road infrastructure for rural communities is critical to increase their income (Lu et al., 2022). The income received by people in rural areas is starting to approach that in urban areas, so rural residents are also starting to benefit from the provision of transportation infrastructure. On the one hand, the income of the rural population can increase when the excess rural workforce has the option of working in the secondary and tertiary sectors in urban areas (Liu & He, 2019). Hence, it is necessary to improve the quality and quantity of road infrastructure development because it has proven to impact increasing income distribution in urban areas. Road infrastructure development is not merely intended for luxury but serves the basic needs of the community that must be met. Therefore, income inequality between residents shall be reduced through the improvement and addition of proper roads in urban areas because it can increase the income and welfare of people in urban areas. Increasing income may reduce overall income inequality (Chatterjee & Turnovsky, 2012; Liu & He, 2019; Zhang & Zhang, 2021; Zolfaghari et al., 2020). Since Indonesia is an archipelagic country, there needs to be better connectivity between regions in rural areas, thus hindering community access

to economic activities that ultimately lead to longer time for distribution and expensive transportation costs.

As a consequence, this condition has exacerbated income distribution in rural areas. In contrast, urban areas have better connectivity with better, flexible, and accessible road infrastructure to increase income distribution. In addition, the positive impact of urban roads on the Gini coefficient lies in the development of the road network and the urban economy, leading to large numbers of rural people migrating to cities for work. In this case, those living in rural areas become increasingly marginalized, increasing income inequality.

Although research findings have proven that fiscal transfer policy and transportation development reduce inequality in rural, urban, and rural-urban areas, they also added to the consistency of previous findings, indicating some weaknesses. The drawback of this research mainly lies in the measurement of fiscal transfer, which needs to include the tax and non-tax revenue sharing, which is included in the transfer fund. Although the revenue-sharing funds are not as significant as the general allocation funds and special allocation funds, the use of these funds by the regions can be directed at increasing income distribution. In addition, this study also did not include roads under the authority of the central and district/city governments as well as railways. However, the total number of roads in all regions, either both national, provincial, and city districts, as well as railways, has proven to be significant in reducing income inequality (Zhang & Zhang, 2021) since it can increase the economic activities without disturbing people's connectivity in the form of roads. Therefore, it is unsurprising that this research has shown that road infrastructure only contributes to reducing income inequality in urban areas. Another weakness of this study is related to the limited length of the series. Thus, as a consequence, it was not easy to do modeling for data analysis to produce relevant analysis.

CONCLUSION

This study uses the GLS fixed effect panel based on time series data from 2012 to 2021 in 34 provinces to examine the relationship between fiscal transfer policy and road infrastructure and income inequality in Indonesia. The researchers concluded that this research contributes to the development of the existing body of knowledge and inputs of policies to reduce income inequality. The study results have shown that the Kuznets' hypothesis existed in rural and rural-urban areas (without control variables) and all models (with control variables). The main results show that the special allocation fund significantly reduces income inequality in rural, urban, and rural-urban areas. However, the general allocation fund does not significantly reduce income inequality. The government plays an essential role in determining policies to decrease income inequality. In addition, it was also revealed that road infrastructure is a determinant factor in reducing income inequality in urban areas but only in rural areas and rural-urban for some provinces. Developing and improving road transport

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infrastructure does not automatically lead to decreasing income inequality. Hence, the government is suggested to improve the ability of low-income groups in urban areas to utilize transportation infrastructure to increase their income, such as e-commerce and logistics transportation-based economic activities. The government can also minimize the increasing flow of urbanization from rural areas and move the orientation of rural economic infrastructure development to increase people's incomes in rural areas to create an even distribution of economic development.

Referring to the study's limitations in which infrastructure was not significantly correlated with income inequality in rural areas and on a national average, it is necessary to retest by adding different data and analytical models (e.g., System Dynamic Panel). Also, road transportation has ignored rail transportation, which all levels of society have widely used. In addition, the following studies must include land transportation variables in the form of trains in an analytical model to generate more comprehensive analytical results. The regional fiscal transfer policy also needs to address the existence of tax and non-tax revenue-sharing funds to the regions not included in the model in predicting income inequality; thus, future researchers should add tax and non-tax revenue-sharing variables.

REFERENCES

Afandi, A., Rantung, V. P., & Marashdeh, H. (2017). Determinant of Income Inequality in Indonesia. *Economic Journal of Emerging Markets*, *9*(2), 159–171. https://doi.org/10.20885/ejem.vol9.iss2.art5.

Agusalim, L., & Pohan, F. S. (2018). Trade Openness Effect on Income Inequality: Empirical Evidence from Indonesia. *Signifikan: Jurnal Ilmu Ekonomi*, *7*(1), 1–14. https://doi.org/10.15408/sjie.v7i1.5527.

Aktas, E. E., & Iyidogan, P. V. (2022). Nonlinear Effects of Income Inequality on Economic Growth: A Comparative Analysis of Selected Countries. *Economic Journal of Emerging Markets*, *14*(1), 72–84. https://doi.org/10.20885/ejem.vol14.iss1.art6.

Allison, P. D. (1978). Measures of Inequality. *American Sociological Review*, *43*(6), 865–880. https://doi.org/10.2307/2094626.

Badan Pusat Statistik. (2020). *Statistik Indonesia 2020*. Jakarta: Badan Pusat Statistik.

Badan Pusat Statistik. (2021). *Penghitungan dan Analisis Kemiskinan Makro Indonesia Tahun 2021*. Jakarta: Badan Pusat Statistik..

Badan Pusat Statistik. (2022). *Statistik Indonesia 2022.*. Jakarta: Badan Pusat Statistik.

Baltagi, B. H. (2005). *Econometric Analysis of Panel Data* (Third). John Wiley & Sons, Ltd.

Beck, N. (2001). Time-Series–Cross-Section Data: What Have We Learned in the Past Few Years? *Annual Review of Political Science*, *4*(1), 271–293. https://doi.org/10.1146/annurev.polisci.4.1.271.

Benhabib, J., & Bisin, A. (2018). Skewed Wealth Distributions: Theory and Empirics. *Journal of Economic Literature*, *56*(4), 1261–1291. https://doi.org/10.1257/jel.20161390.

Bloome, D., Dyer, S., & Zhou, X. (2018). Educational Inequality, Educational Expansion, and Intergenerational Income Persistence in the United States. *American Sociological Review*, *83*(6), 1215–1253. https://doi.org/10.1177/0003122418809374.

Bourguignon, F. (2004). The Poverty-Growth-Inequality Triangle. *Presented at the Indian Council for Research on International Economic Relations.*

Canare, T., Francisco, J. P., & Caliso, R. A. C. (2020). Decentralization and Income Inequality in a Panel and Cross-Section of Countries. *Journal of International Development*, *32*(4), 543–579. https://doi.org/10.1002/jid.3468.

Cevik, S., & Correa-Caro, C. (2020). Growing (un)equal: Fiscal Policy and Income Inequality in China and BRIC+. *Journal of the Asia Pacific Economy*, *25*(4), 634–653. https://doi.org/10.1080/13547860.2019.1699985.

Chan, K. S., Zhou, X., & Pan, Z. (2014). The Growth and Inequality Nexus: The Case of China. *International Review of Economics & Finance*, *34*, 230–236. https://doi.org/10.1016/j.iref.2014.08.004.

Chancel, L., Piketty, T., Saez, E., & Zucman, G. (2022). *World Inequality Report 2022*. Retrieved from:https://wir2022.wid.world/www-site/uploads/2022/03/009821_wil_rim_executive_ summary.pdf

Chatterjee, S., & Turnovsky, S. J. (2012). Infrastructure and Inequality. *European Economic Review*, *56*(8), 1730–1745. https://doi.org/10.1016/j.euroecorev.2012.08.003.

Chen, X., Zhang, X., Song, Y., Liang, X., Wang, L., & Geng, Y. (2020). Fiscal Decentralization, Urban-rural Income Gap, and Tourism. *Sustainability*, *12*(24), 1–14. https://doi.org/10.3390/su122410398.

Churchill, S. A., Baako, K. T., Mintah, K., & Zhang, Q. (2021). Transport Infrastructure and House Prices in the Long Run. *Transport Policy*, *112*, 1–12. https://doi.org/10.1016/j.tranpol.2021.08.006.

Clifton, J., Díaz-Fuentes, D., & Revuelta, J. (2017). Has Latin American Inequality Changed Direction?: Looking over the long run. In L. Bértola & J. Williamson (Eds.), *Fiscal Policy and Inequality in Latin America, 1960–2012* (pp. 387–406). Springer Nature-IDB. https://doi.org/10.1007/978-3-319-44621-9.

Deyin, C., Yiduo, H., & Jinghua, Z. (2017). Chinese Decentralization and Income Inequality Between Urban and Rural Residents: An Empirical Study Based on The Dual Dimensions of Internal and External Budget. *China Finance and Economic Review*, *6*(3), 62–87. https://doi.org/10.1515/cfer-2017-060305.

Enami, A., Lustig, N., & Taqdiri, A. (2019). Fiscal policy, Inequality, and Poverty in Iran: Assessing The Impact and Effectiveness of Taxes and Transfers. *Middle East Development Journal*, *11*(1), 49–74. https://doi.org/10.1080/17938120.2019.1583510.

Fageda, X., & Olivieri, C. (2019). Transport Infrastructure and Regional Convergence: A Spatial Panel Data Approach. *Papers in Regional Science*, *98*(4), 1609–1631. https://doi.org/https://doi.org/10.1111/pirs.12433.

https://journal.uinjkt.ac.id/index.php/etikonomi
DOI: https://doi.org/10.15408/etk.v22i2.28618

Fan, F., Li, M., Tao, R., & Yang, D. (2020). Transfer-Based Decentralisation, Economic Growth and Spatial Inequality: Evidence from China's 2002–2003 Tax Sharing Reform. *Urban Studies*, *57*(4), 806–826. https://doi.org/10.1177/0042098019856780.

Feld, L. P., Frey, C., Schaltegger, C. A., & Schmid, L. A. (2021). Fiscal Federalism and Income Inequality: An Empirical Analysis for Switzerland. *Journal of Economic Behavior and Organization*, *185*, 463–494. https://doi.org/10.1016/j.jebo.2021.02.028.

Field, A. (2009). *Discovering Statistics Using SPSS.* London: SAGE Publications Ltd.

Fuguitt, G. V., Heaton, T. B., & Lichter, D. T. (1988). Monitoring The Metropolitanization Process. *Demography*, *25*(1), 115–128. https://doi.org/10.2307/2061481.

Fullerton Jr, T. M., Morales, C. R., & Walke, A. G. (2014). The Effects of Education, Infrastructure, and Demographics on Regional Income Performance in Missouri. *Regional and Sectoral Economic Studies*, *12*(1), 5–22. https://ideas.repec.org/a/eaa/eerese/v14y2014i1_1.html.

Goerl, C.-A., & Seiferling, M. (2014). Income Inequality, Fiscal Decentralization and Transfer Dependency. *IMF Working Papers*, *14*(64), 1. https://doi.org/10.5089/9781484354711.001.

Greene, W. H. (2003). *Econometric Analysis.* New Jersey: Prentice Hall.

Hansen, C. B. (2007). Generalized Least Squares Inference in Panel and Multilevel Models with Serial Correlation and Fixed Effects. *Journal of Econometrics*, *140*(2), 670–694. https://doi.org/10.1016/j.jeconom.2006.07.011.

Hausman, J. A. (1978). Specification Tests in Econometrics. *Econometrica*, *46*(6), 1251–1271. https://doi.org/10.2307/1913827.

Heinrich Mora, E., Heine, C., Jackson, J. J., West, G. B., Yang, V. C., & Kempes, C. P. (2021). Scaling of Urban Income Inequality in the USA. *Journal of the Royal Society Interface*, *18*, 1–8. https://doi.org/10.1098/rsif.2021.0223.

Hsiao, C. (2007). Panel Data Analysis—Advantages and Challenges. *TEST*, *16*(1), 1–22. https://doi.org/10.1007/s11749-007-0046-x.

Huang, K., Yan, W., Sim, N., Guo, Y., & Xie, F. (2022). Can Trade Explain the Rising Trends in Income Inequality? Insights from 40 years of Empirical Studies. *Economic Modelling*, *107*, 105725. https://doi.org/10.1016/j.econmod.2021.105725.

Huang, Z., Xu, H., Li, J., & Luo, N. (2020). Has Highway Construction Narrowed the Urban–Rural Income Gap? Evidence from Chinese Cities. *Papers in Regional Science*, *99*(3), 705–723. https://doi.org/10.1111/pirs.12504.

Imai, K. S., & Malaeb, B. (2018). *Asia's Rural-Urban Disparity in The Context of Growing Inequality* (pp. 1–30). International Fund for Agricultural Development (IFAD).

Irianti, S., & Prasetyoputra, P. (2021). Rural–Urban Disparities in Access to Improved Sanitation in Indonesia: A Decomposition Approach. *SAGE Open*, *11*(3). https://doi.org/10.1177/21582440211029920.

Jain, S. C. (2012). Market Evolution in Developing Countries. In Kaynak, E., & Jain, S. C. (Eds). *Market Evolution in Developing Countries*. London: Routledge.

Jamal, H. (2019). Smoothing Sporadic Poverty and Inequality Estimates: Pakistan, 1985-2016. *MPRA Paper No. 91834*.

Johnson, K. M., & Lichter, D. T. (2020). Metropolitan Reclassification and the Urbanization of Rural America. *Demography*, *57*(5), 1929–1950.

Kalwij, A., & Verschoor, A. (2007). Not by Growth Alone: The Role of the Distribution of Income in Regional Diversity in Poverty Reduction. *European Economic Review*, *51*(4), 805–829. https://doi.org/10.1016/j.euroecorev.2006.06.003.

Kamaruddin, C. A., & Alam, S. (2019). Analisis Potensi Sektor Unggulan dan Pemetaan Kemiskinan Masyarakat di Wilayah Maminasata Sulawesi Selatan. *Jurnal Administrare: Jurnal Pemikiran Ilmiah dan Pendidikan Administrasi Perkantoran*, *5*(2), 85-90. https://doi.org/10.26858/ja.v5i2.7886.

Khan, S., & Padda, I. U. haq. (2021). The Impact of Tax and Expenditures Policies on Income Distribution: Evidence from Pakistan. *Etikonomi*, *20*(2), 369–384. https://doi.org/10.15408/etk.v20i2.18121.

Khusaini, K., Remi, S. S., Fahmi, M., & Purnagunawan, R. M. (2020). Measuring the Inequality in Education: Educational Kuznets Curve. *Jurnal Ekonomi Malaysia*, *54*(3), 1–18. https://doi.org/10.17576/JEM-2020-5403-05.

Kocsis, D., & Xiong, J. (2022). A Divide Quantified—Exploring The Relationship Between ICT Infrastructure Diffusion and Income Inequality. *Journal of Electronic Business & Digital Economics*, *1*(1/2), 34–49. https://doi.org/10.1108/jebde-09-2022-0033.

Kuznet, S. (1955). Economic Growth and Income Inequality Simon Kuznets. *The American Economic Review*, *45*(1), 1–28.

Kyriacou, A. P., Muinelo-Gallo, L., & Roca-Sagalés, O. (2017). Regional Inequalities, Fiscal Decentralization and Government Quality. *Regional Studies*, *51*(6), 945–957. https://doi.org/10.1080/00343404.2016.1150992.

Lazaridis, P. (2000). Decomposition of Food Expenditure Inequality: An Application of the Extended Gini Coefficient to Greek Micro-Data. *Social Indicators Research*, *52*, 179–193. https://doi.org/https://doi.org/10.1023/A:1007131116344.

Lin, C. H. A. (2007). Education Expansion, Educational Inequality, and Income Inequality: Evidence from Taiwan, 1976-2003. *Social Indicators Research*, *80*(3), 601–615. https://doi.org/10.1007/s11205-006-0009-8.

Liu, H., & He, Q. (2019). The Effect of Basic Public Service on Urban-Rural Income Inequality: A Sys-GMM Approach. *Economic Research-Ekonomska Istrazivanja*, *32*(1), 3205–3223. https://doi.org/10.1080/1331677X.2019.1661005.

Liu, Y., & Long, C. (2021). Urban and Rural Income Gap: Does Urban Spatial Form Matter in China? *SAGE Open*, *11*(1). https://doi.org/10.1177/21582440211002215.

https://journal.uinjkt.ac.id/index.php/etikonomi
DOI: https://doi.org/10.15408/etk.v22i2.28618

Liu, Y., Martinez-Vazquez, J., & Wu, A. M. (2017). Fiscal Decentralization, Equalization, and Intra-Provincial Inequality in China. *International Tax and Public Finance*, *24*(2), 248–281. https://doi.org/10.1007/s10797-016-9416-1.

Lu, H., Zhao, P., Hu, H., Zeng, L., Wu, K. S., & Lv, D. (2022). Transport Infrastructure and Urban-Rural Income Disparity: A Municipal-Level Analysis in China. *Journal of Transport Geography*, *99*, 103292. https://doi.org/10.1016/j.jtrangeo.2022.103292.

Makmuri, A. (2017). Infrastructure and Inequality: An Empirical Evidence from Indonesia. *Economic Journal of Emerging Markets*, *9*(1), 29–39. https://doi.org/10.20885/ejem.vol9.iss1.art4.

Makreshanska-Mladenovska, S., & Petrevski, G. (2019). Decentralisation and Income Inequality in Central and Eastern European Countries. *Post-Communist Economies*, *31*(1), 123–136. https://doi.org/10.1080/14631377.2018.1461526.

Mardiasmo. (2006). *Akuntansi Sektor Publik*. Yogyakarta: Andi Publisher.

McGregor, T., Smith, B., & Wills, S. (2019). Measuring Inequality. *Oxford Review of Economic Policy*, *35*(3), 368–395. https://doi.org/10.1093/oxrep/grz015.

Mishra, A., & Agarwal, A. (2019). Do Infrastructure Development and Urbanisation Lead to Rural-Urban Income Inequality? Evidence from Some Asian Countries. *International Journal of Sustainable Economy*, *11*(2), 167–183. https://doi.org/10.1504/IJSE.2019.099054.

Mudayen, Y. M. V., & Maridjo, H. (2017). The Impacts of Fiscal Decentralization, Institutional Transformation, and Regional Revenue on Income Disparities between Provinces in Indonesia. *Journal of Economics, Business & Accountancy Ventura*, *20*(3), 247–259. https://doi.org/10.14414/jebav.v20i2.878.

Muinelo-Gallo, L., & Roca-Sagalés, O. (2013). Joint Determinants of Fiscal Policy, Income Inequality and Economic Growth. *Economic Modelling*, *30*, 814–824. https://doi.org/10.1016/j.econmod.2012.11.009.

Musau, V. M., Waititu, A. G., & Wanjoyo, A. K. (2015). Modeling Panel Data: Comparison of GLS Estimation and Robust Covariance Matrix Estimation. *American Journal of Theoretical and Applied Statistics*, *4*(3), 185–191. https://doi.org/10.11648/j.ajtas.20150403.25.

Naguib, C. (2017). The Relationship between Inequality and Growth: Evidence from New Data. *Swiss Journal of Economics and Statistics*, *153*(3), 183–225. https://doi.org/10.1007/BF03399507.

Nallathiga, R. (2015). Assessing the Infrastructure Level and Growth Performance of Indian States. *Journal of Infrastructure Development*, *7*(1), 76–100. https://doi.org/10.1177/0974930615581225.

Naveed, T. A., Gordon, D., & Ullah, S. (2018). Measurement of Educational Disparities in Punjab (Pakistan): An Analysis from MICS's Micro-data. *The Pakistan Journal of Social Issues*, *IX*, 26–49.

Nugraha, A. T., Prayitno, G., Situmorang, M. E., & Nasution, A. (2020). The Role of Infrastructure in Economic Growth and Income Inequality in Indonesia. *Economics and Sociology*, *13*(1), 102–115. https://doi.org/10.14254/2071-789X.2020/13-1/7.

Odusola, A. (2019). Fiscal Policy, Redistribution and Inequality in Africa. In Odusola (Ed). *Income Inequality Trends in sub-Saharan Africa: Divergence, Determinats, and Conequences,* pp. 154–177. United Nations Development Programme.

Ogbeide, E. N. O., & Agu, D. O. (2015). Poverty and Income Inequality in Nigeria: Any Causality? *Asian Economic and Financial Review*, *5*(3), 439–452. https://doi.org/10.18488/journal.aefr/2015.5.3/102.3.439.452.

Ong, K., Matthews, K., & Wang, B. (2023). Growth versus Equity: The Effects of Centralized Fiscal Transfers on Chinese Provinces. *Regional Studies*, 1–16. https://doi.org/10.1080/00343404.2022.2160868.

Organization of Economic Co-operation and Development. (2015). Growth and Income Inequality: Trends and Policy Implications. *OECD Economics Department Policy Note*, *26*, 3–13.

Qomariyah, S. N., Harti, & Hariyati. (2019). Social Interaction, Socio-Economic Status, and Basic Economic Knowledge of Students' Economic Behavior. *Jurnal Pendidikan Ekonomi Dan Bisnis (JPEB)*, *7*(2), 101–111. https://doi.org/10.21009/jpeb.007.2.1

Raharti, R., Laras, T., & Oktavianti, O. (2021). Model Ketimpangan Pembangunan Ekonomi di Indonesia. *Jurnal Samudra Ekonomi Dan Bisnis*, *12*(2), 257–270. https://doi.org/10.33059/jseb.v12i2.2422.

Rodríguez-Pose, A., & Tselios, V. (2010). Inequalities in Income and Education and Regional Economic Growth in Western Europe. *Annals of Regional Science*, *44*(2), 349–375. https://doi.org/10.1007/s00168-008-0267-2.

Saputra, B. (2012). Dampak Desentralisasi Fiskal Terhadap Korupsi di Indonesia. *Borneo Administrator*, *8*(3), 251–260. https://doi.org/https://doi.org/10.24258/jba.v8i3.92.

Sen, A. K. (1997). From Income Inequality to Economic Inequality. *Southern Economic Journal*, *64*(2), 384–401. https://doi.org/https://doi.org/10.2307/1060857.

Sepulveda, C. F., & Martinez-Vazquez, J. (2011). The Consequences of Fiscal Decentralization on Poverty and Income Equality. *Environment and Planning C: Government and Policy*, *29*, 321–343. https://doi.org/10.1068/c1033r.

Shukla, V., & Mishra, U. S. (2019). Educational Expansion and Schooling Inequality: Testing Educational Kuznets Curve for India. *Social Indicators Research*, *141*(3), 1265–1283. https://doi.org/10.1007/s11205-018-1863-x.

Shukla, V., & Mishra, U. S. (2020). Expansion in Education and Its Impact on Income Inequality: Cross-sectional Evidence from India. *Indian Journal of Labour Economics*, *63*(2), 331–362. https://doi.org/10.1007/s41027-020-00221-w.

Siddique, M. A. B., Wibowo, H., & Wu, Y. (2008). Economics Fiscal Decentralisation and Inequality in Indonesia : 1999-2008. *Working Papers.* The University of Western Australia.

https://journal.uinjkt.ac.id/index.php/etikonomi
DOI: https://doi.org/10.15408/etk.v22i2.28618

Sidek, N. Z. M. (2021). Do Government Expenditure Reduce Income Inequality: Evidence from Developing and Developed Countries. *Studies in Economics and Finance*, *38*(2), 447–503. https://doi.org/10.1108/SEF-09-2020-0393.

Stevans, L. K., & Sessions, D. N. (2005). *The Relationship Between Poverty, Economic Growth, and Inequality Revisited*. Retrieved from: https://ideas.repec.org/p/wpa/wuwpge/0502002.html.

Stossberg, S., & Blöchliger, H. (2017). Fiscal Decentralisation and Income Inequality: Empirical Evidence from OECD Countries. *Jahrbucher Fur Nationalokonomie Und Statistik*, *237*(3), 225–273. https://doi.org/10.1515/jbnst-2017-1108.

Su, X., Lu, K., Hu, X., & Xiang, Y. (2019). Reforms on County-Level Fiscal Governance in China: Impact on Urban-Rural Income Inequality. *International Review of Public Administration*, *24*(2), 81–100. https://doi.org/10.1080/12294659.2019.1608011.

Sukoco, S., Hartono, D., & Patunru, A. (2020). The Impacts of Liberalization and Trade Facilitation on Economic Performance, Poverty and Income Inequality: An Analytical Study. *Economic Journal of Emerging Markets*, *12*(1), 67–79. https://doi.org/10.20885/ejem.vol12.iss1. art6.

Tadjoeddin, M. Z. (2013). Miracle That Never Was: Disaggregated Level of Inequality in Indonesia. *International Journal of Development Issues*, *12*(1), 22–35. https://doi.org/10.1108/14468951311322091.

Taresh, A. A., Sari, D. W., & Purwono, R. (2021). Analysis of The Relationship Between Income Inequality and Social Variables: Evidence from Indonesia. *Economics and Sociology*, *14*(1), 103–119. https://doi.org/10.14254/2071-789X.2021/14-1/7.

Tselios, V. (2014). The Granger-Causality Between Income and Educational Inequality: a Spatial Cross-Regressive VAR Framework. *Annals of Regional Science*, *53*(1), 221–243. https://doi.org/10.1007/s00168-014-0626-0.

Yusuf, A. A. (2018). The Direct and Indirect Effect of Cash Transfers: The Case of Indonesia. *International Journal of Social Economics*, *45*(5), 792–806. https://doi.org/10.1108/IJSE-03-2017-0072.

Yusuf, A. A., Anglingkusumo, R., & Sumner, A. (2021). A Direct Test of Kuznets in a Developing Economy: a Cross-District Analysis of Structural Transformation and Inequality in Indonesia. *Regional Studies, Regional Science*, *8*(1), 184–206. https://doi.org/10.1080/21681376.2021.1924850.

Yusuf, A. A., Sumner, A., & Rum, I. A. (2014). Twenty Years of Expenditure Inequality in Indonesia, 1993–2013. *Bulletin of Indonesian Economic Studies*, *50*(2), 243–254. https://doi.org/10.1080/00074918.2014.939937.

Zhang, J., & Zhang, Y. (2021). The Relationship Between China's Income Inequality and Transport Infrastructure, Economic Growth, and Carbon Emissions. *Growth and Change*, *52*(1), 243–264. https://doi.org/10.1111/grow.12472.

Zolfaghari, M., Kabiri, M., & Saadatmanesh, H. (2020). Impact of Socio-Economic Infrastructure Investments on Income Inequality in Iran. *Journal of Policy Modeling*, *42*(5), 1146–1168. https://doi.org/10.1016/j.jpolmod.2020.02.004.

Zou, W., Zhang, F., Zhuang, Z., & Song, H. (2008). Transport Infrastructure, Growth, and Poverty Alleviation: Empirical Analysis of China. *Annals of Economics and Finance*, *9*(2), 345–371.

https://journal.uinjkt.ac.id/index.php/etikonomi
DOI: https://doi.org/10.15408/etk.v22i2.28618