



Article Type: Research Paper

Do Poverty and Economic Growth Matter for Income Inequality Reduction in Yogyakarta Province?

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Abstract: It has been observed that income inequality is an economic element that may impede a nation's economic development. In general, Indonesia's Gini ratio has remained low for nearly a decade, although one region, Yogyakarta Province, unexpectedly exceeds the national average. The provincial government of Yogyakarta must focus more on reducing income inequality. Therefore, this study employs the Poverty-Growth-Inequality Triangle model approach to investigate the complexity of income inequality in Yogyakarta Province. The data is collected from five cities in Yogyakarta Province from 2010 to 2021. For the quantitative study, a Simultaneous Equation Model analysis with three iterations of least squares is performed. The results indicate that there is no causal relationship between income inequality and economic growth or poverty. According to the model of income inequality, education and the district minimum wage have a significant impact on income inequality. Therefore, local governments are advocated to evaluate policies aimed at reducing income inequality through education system reform, equity in district minimum wage and economic growth, and efficiency in the utilization of income inequality-related funds.

Keywords: Income Inequality; Economic Growth; Poverty

JEL Classification: I31; O11; O15; O40



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THIS ARTICLE IS AVAILABLE IN:

<http://journal.umy.ac.id/index.php/esp>

DOI: 10.18196/jesp.v23i2.15859

CITATION:

Maurilla, A., Suriani, S., & Nasir, M. (2022). Do Poverty and Economic Growth Matter for Income Inequality Reduction in Yogyakarta Province? *Jurnal Ekonomi & Studi Pembangunan*, 23(2), 308-322.

ARTICLE HISTORY

Received:

13 Aug 2022

Revised:

14 Nov 2022

Accepted:

29 Nov 2022

Introduction

Since the 1950s, development economics has promoted economic expansion at the expense of inequality. It is based on the notion that rising inequality in emerging nations is essentially inescapable and does not affect the economy as long as poverty is diminishing annually. Policy efforts seem likely that measures to minimize inequality will impair economic growth and poverty alleviation (Ravallion, 2014).

Then, in the 2000s, a new challenge cast doubt on this long-held pro-poverty perspective. It was discovered that achieving equity was critical for achieving other important goals like human growth and poverty alleviation. High inequality will be seen as a threat to the nation's progress.

One of the Sustainable Development Goals (SDGs) agenda is reducing inequality. Unchecked income inequality can impede economic growth in several ways (Wan et al. 2006). Between 1980 and 2000, China had strong economic growth and a decrease in poverty, but the prevalence of income

inequality increased the risk of continuing to live in poverty (Wan, 2008). Additionally, income inequality adversely affects the provision of public goods and services because elites have more authority (Bourguignon & Dessus, 2009). As a result, income inequality can have an impact from both an economic and social perspective.

In Indonesia, one of the measures employed to describe inequality is the Gini ratio. As illustrated in Figure 1, within the decade, the movement of the income Gini ratio in Indonesia showed a negative trend, as it started from a moderate level of Gini ratio (> 0.4) to a low level of Gini ratio (< 0.4).

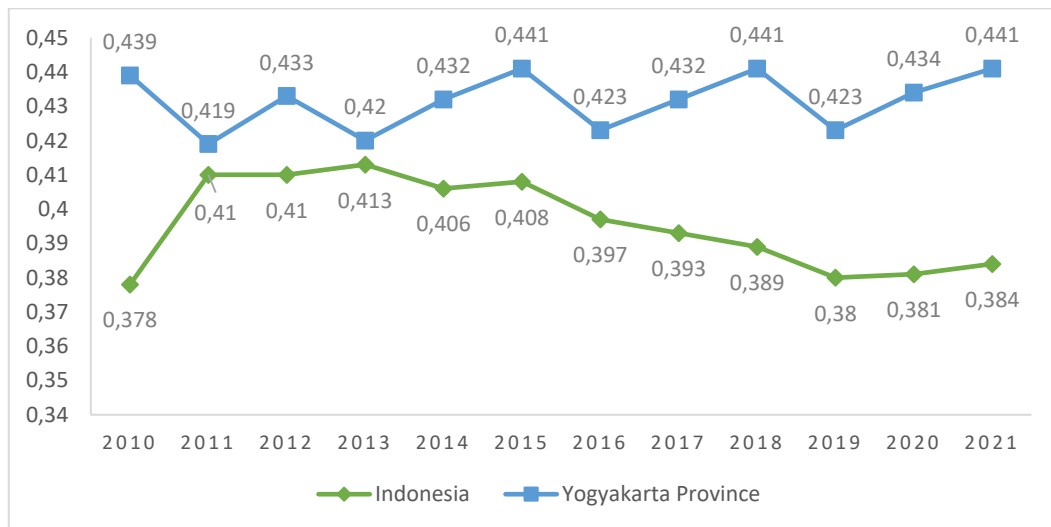


Figure 1 The Evolution of The Gini Ratio in Yogyakarta Province and Indonesia for the Period 2010-2021

Source: BPS - Statistics Indonesia

Although Indonesia is generally having a low level of Gini ratio, it is found that several regions have a moderate Gini ratio, including Yogyakarta Province. Yogyakarta Province is expected to have the highest Gini ratio in 2021 out of all 33 provinces. As shown in Figure 1, Yogyakarta Province's average Gini ratio between 2010 and 2021 was higher than 0.4 (moderate category), continually exceeding the nation's level of inequality. In 2021, the Gini ratio was 0.441. Based on the districts in Yogyakarta Province, which are Kulon Progo, Gunung Kidul, Bantul, Sleman, and Yogyakarta, the Gini ratio tend to be higher in urban area such as Sleman dan Yogyakarta.

Another measure that can describe income inequality is the distribution of expenditure among the population. Based on that, 20% of the wealthiest population of Yogyakarta is spending about 50% of all expenditures. However, the poorest 40% of the population only contribute up to 15% of total expenditures. According to the World Bank, moderate inequality exists when the distribution of expenditure from 40% of the poorest ranges from 12% to 17% of all expenditures. Hence, the distribution of expenditure data also shows moderate income inequality in Yogyakarta Province.

Income inequality research is constantly expanding. One of them is the analysis of income inequality through a macroeconomic approach. This approach relies on cross-country data on inequality, poverty, and growth rates. When economic growth is strong, the decomposition frequently favors growth. Thus, changes in income inequality can affect whether poverty is increasing or decreasing while economic development is slowing (Ferreira, 2010). According to Breunig and Majeed (2020), when a region has a high rate of poverty, income inequality has a negative effect on economic growth. The study found that when poverty rates approach 60%, inequality has a detrimental influence on economic growth, and it gets worse as poverty levels rise. In other words, the rate of economic growth acceleration, the decline in inequality, and the eradication of poverty are all directly tied to the level of development pursued by a nation (Todaro, 2012). Another study by wan (2008) discovered that China's rapid economic growth was a miracle and had a strong positive impact on the reduction of poverty. However, this growth, which traded off efficiency (growth) for inequality, resulted in a sharp rise in inequality across the board and increased urban poor. The analysis of income inequality, economic growth, and poverty must be methodical, exhaustive, and cogent to fully grasp the development process in developing nations (Wan et al., 2020).

Previous studies have found that growth can have a variety of effects on income inequality. The nexus of inequality growth has produced conflicting results. On the other side, income inequality affects both growth and the spread of poverty. Therefore, further research is required to understand better the connection between inequality, growth, and poverty. One approach that can be utilized to comprehend this complex relationship is the Poverty-Growth-Inequality (PGI) triangle model, which was conducted by Buourguignon (2004). From the study, Bourguignon (2004) found that changes in poverty are caused by changes in people's average income and income inequality. Wan (2008) emphasizes the value of investigating the PGI model. Essentially, the PGI model is hinged on inequality issues. The future poverty reduction may be influenced by trends in inequality. The PGI model explains how inequality and poverty are distributed globally and offers the government fresh perspectives on how to solve these issues while promoting economic progress. In addition, The PGI model can also be used to group nations according to how well-equipped they are to handle economic difficulties. It included economic growth and inequality and how they interact with poverty (Michálek & Výboštok, 2019).

The PGI model has been used by Dartanto (2013) to analyze the relationship between poverty, growth, and inequality in Indonesia. Inclusive growth had less impact on poverty and inequality than in previous periods, as Indonesia's economic sector has turned toward economic services and capital-intensive sectors. These sectors need skilled personnel, which makes them unaffordable for the poor and leads to inequality. However, no one has investigated income inequality in Yogyakarta Province using the PGI approach.

The macro goals in Yogyakarta Province's development planning document (RPJMD) for the 2017–2022 period include reducing poverty, promoting economic growth, and reducing inequality. The government is targeting economic growth to reach 5.34%; the poverty rate at 7%; and income inequality with a Gini ratio of 0.36 in 2021. The Yogyakarta

Province's Central Bureau of Statistics reports that in 2021, the economy grew by 5.53%, above the desired rate. For poverty, its rate was 12.8% in 2021. The poverty rate in this country exceeded the national average (which was 10.14% throughout Indonesia) and fell short of the RPJMD target). Moreover, some districts have a more than 20% poverty rate during the 2010-2016 period, such as Kulon Progo dan Gunung Kidul. Next, on the income inequality side, it is demonstrated that the Gini ratio of Yogyakarta Province did not yet reach the RPJMD's target in 2021.

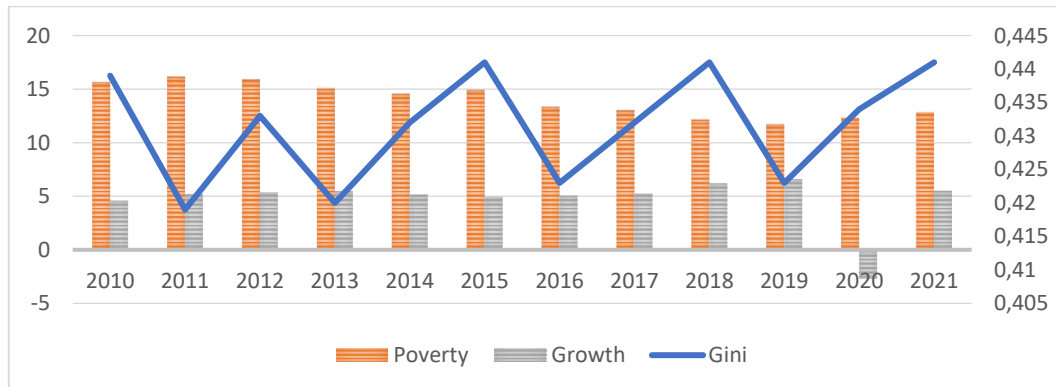


Figure 2 The Evolution of Poverty, Growth, and Inequality in Yogyakarta Province Period 2010 – 2021

Based on the previous explanation, referring to Bourguignon (2004), this study assumes that income inequality changes also contribute to economic growth and poverty. As shown in Figure 3, there is a complex link in Yogyakarta Province between poverty, growth, and inequality. Thus, the purpose of this study is to examine the relationship between income inequality, economic growth, and poverty in Yogyakarta Province using the PGI Triangle Model.

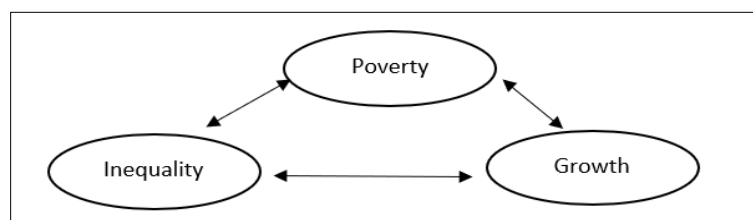


Figure 3 The Poverty, Growth, and Inequality (PGI Triangle)

Prior studies related to income inequality in Yogyakarta Province analyzed poverty on income inequality (Dewi & Rachmawatie, 2020) or growth on income inequality separately (Suryani & Woyanti). These earlier investigations examined the relationships between the variables in isolation, which revealed a one-way link. However, this study views the interaction between them as an ongoing, interconnected relationship (two-way direction). In addition, this study about income inequality in Yogyakarta using the PGI (Poverty-Growth-Inequality) Triangle Model is still limited.

Therefore, the novelties of this study are the use of the PGI model in the analysis and see the simultaneous relationship between variables. This study provides a new perspective on the relationship between income inequality, economic growth, and poverty in Yogyakarta Province. This study's writing is organized as follows. The study approach connected to the pertinent analytical methods and the model used is discussed in Section 2. Section 3 will give the empirical findings and a discussion of the selected model, and Section 4 will conclude with recommendations for government action.

Research Method

This study relies on secondary data from the BPS - Statistics Indonesia. Panel data were used in 5 districts of Yogyakarta Province from 2010 to 2021. The districts in this study are Kulon Progo, Gunung Kidul, Bantul, Sleman, and Yogyakarta. The dependent variables of this study are income inequality, economic growth, and poverty. While, the predetermined variables are unemployment, investment, education, and wage. The annual data collected include the Regional Gross Domestic Product (economic growth) the number of poor people (poverty), the Gini ratio (income inequality), the open unemployment rate (unemployment), gross fixed capital (investment), the average length of schooling (education), and district minimum wage (wage).

This study employs contemporaneous interdependence between the dependent variables as a method of quantitative analysis. Therefore, a system of simultaneous equations model (SEM) was developed to examine the connection between income inequality, economic growth, and poverty. By considering the data from other equations, this model might allow a causal interaction between variables (Housseima & Ben Rejeb, 2012) which would make the relationship highly complex. Additionally, the two-way link between the variable and this model can be examined using this model (Suriani & Seftarita, 2022).

Due to its consistency and efficiency compared to estimates based on a single equation or 2SLS (two-stage-least-square) (Zellner & Theil, 1962), this study uses the three-stage-least-square (3SLS) estimation method. This method allows for unobserved correlation disturbances across multiple equations (Bakhsh et al., 2017). Based on Housseima and Ben Rejeb's (2012) work, the simultaneous equations model's system is adjusted in this study and can be observed as follows:

$$\text{LnRGDP}_{it} = \alpha_1 + \beta_{11}\text{LnPov}_{it} + \beta_{12}\text{LnGini}_{it} + \beta_{13}\text{LnInv}_{it} + \varepsilon_{1it} \quad (1)$$

$$\text{LnPov}_{it} = \alpha_2 + \beta_{21}\text{LnGini}_{it} + \beta_{22}\text{LnRGDP}_{it} + \beta_{23}\text{LnEdu}_{it} + \beta_{24}\text{LnUn}_{it} + \varepsilon_{2it} \quad (2)$$

$$\text{LnGini}_{it} = \alpha_3 + \beta_{31}\text{LnPov}_{it} + \beta_{32}\text{LnRGDP}_{it} + \beta_{33}\text{LnWage}_{it} + \beta_{34}\text{LnEdu}_{it} + \varepsilon_{3it} \quad (3)$$

Where α_i are constant coefficients, β_{ij} subscription parameter coefficients, ε_i are residuals, RGDP is the regional gross domestic product, Pov is the number of the poor population, Gini is the income Gini ratio, Inv is gross fixed capital, Edu is the average length of schooling, Un is the open unemployment rate, and Wage is the district minimum wages in each district.

This system of equations includes three structural models. The first model expresses the economic growth equation. The second model represents the poverty equation and the third model is the income inequality equation. The endogenous/dependent variables on the system equation are economic growth (RGDP), poverty (Pov), and income inequality (Gini). The independent variables (in SEM, it is called predetermined variables) are investment (Inv), unemployment (Un), education (Edu), and district minimum wage (Wage). The RGDP, Pov, Gini, Edu, and Wage are expressed in the natural logarithmic form indicating their growth so that in its interpretation, they are expressed in percentage. Inv is expressed in billion rupiahs and Un is expressed in percentages.

Economic growth is the total economic output from each district (regional gross domestic product) in the form of a natural logarithm as a proxy for economic growth on an annual basis based on fixed prices in 2010. This study uses data for the month of March for the population of the poor in each district, which is based on semi-annual statistics. Income inequality is the income Gini ratio in each district, which is semi-annual data, and the Gini ratio used is for the March period. Investment is gross fixed capital in each district, collected annually on fixed prices in 2010. Unemployment is the ratio of unemployed individuals to the labor force, often known as the open unemployment rate. This analysis utilizes the semi-annual statistics for the open unemployment rate for the month of August. Education is annual data on the average length of schooling in each district. Wage is annual data on the district minimum wage in each district.

The steps for this research method are as follows. First, the simultaneity problem or endogeneity of the variables (economic growth, poverty, and income inequality) will be tested using the Hausman Simultaneity Test (Gujarati, 2009). Second, identify the structural equation to ensure the 3SLS estimation method can be used. 'K' is the sum of predetermined variables in the system, and k is the sum of predetermined variables in each structural equation. 'm' is the sum of endogenous variables in each structural equation. The structural equation is Over-identified if $K-k > m-1$, Exactly-identified if $K-k = m-1$, and Under-identified $K-k < m-1$ (Gujarati, 2009). For estimation to be carried out, the equation identification results must be exactly identified or overidentified ($K-k > m-1$).

Third, estimate the system equation model using STATA using the 3SLS approach. Fourth, the estimation of the model must typically be checked for the classical assumptions using the normality test, heteroscedasticity test, multicollinearity test, and autocorrelation test (Karina & Syahnur 2021). The purpose of these assumptions is to guarantee that the estimators are the Best Linear Unbiased Estimators (BLUE). The assumption of autocorrelation is unnecessary because the data used is panel data. The F-test and t-test are employed to examine the impact of the independent variable on the dependent variable.

Result and Discussion

Before the model was estimated, the Hausman Simultaneity Test was conducted. A rejection of the null hypothesis indicates that the Ordinary Least Square (OLS) estimator

will not be consistent. Hence, instrumental variable techniques are required, such as the simultaneous equation model (Omri, 2013). Table 1 provides information about the Hausman Simultaneity Test in the system equations. Res_1 significant at $\alpha=1\%$ shows that there is a simultaneity problem between LnRGDP and LnPov. Res_2 is also significant at $\alpha=5\%$, showing that there is a simultaneity problem between LnRGDP and LnGini. Res_3 significant at 10% shows that there is a simultaneity problem between LnPov and LnGini. These results support that a simultaneous equation model is more appropriate to use.

Table 1 Result of The Hausman Simultaneity Test

Variables	Residual	Statistics	Probability
LnRGDP-LnPov	Res_1	2.94	0.005
LnRGDP-LnGini	Res_2	-2.12	0.039
LnPov-LnGini	Res_3	-1.93	0.059

The simultaneous model in this study has three structural equations with three endogenous variables ($m=3$) and four predetermined variables ($K=4$) in the system equation. The findings of the identification models are reported in Table 2. For the LnRGDP model, since $K-k > m-1$, the equation is overidentified. For the LnPov model and LnGini, since in their $K-k = m-1$, each equation is exactly identified. These identification results show that the 3SLS estimation method can be carried out.

Table 2 Results of Structural Model Identification

Structural Equation	K	k	m	K-k	m-1	Identification
LnRGDP	4	1	3	$4-1=3$	$3-1=2$	Overidentified
LnPo	4	2	3	$4-2=2$	$3-1=2$	Exactly identified
LnGini	4	2	3	$4-2=2$	$3-1=2$	Exactly identified

The estimation result can be shown in Table 3. To ensure the estimation result is BLUE, it is necessary to do some classical assumption tests (normality, heteroscedasticity, and multicollinearity). For the normality assumption, the overall system normality test using the Anderson-Darling Z test shows that the statistic value is 0.0092 with a probability is 0.9885. It can conclude that the overall system fulfills the normality assumption as its p-value is not significant at $\alpha=5\%$. For the heteroscedasticity assumption, on overall system heteroscedasticity test using the Breusch-Pagan LM test shows that the statistic value is 5.4425 with a probability of 0.1421. It can conclude that there is no heteroscedasticity problem as its p-value is not significant at $\alpha=5\%$. Multicollinearity based on the cross-correlation among variables shows that the majority correlation value is low, except for the correlation between the LnRGDP and Inv variables, which is fairly high (0.8690). However, this study uses simultaneous equation models, which be used to develop accurate final multiple regression models when collinearities among explanatory variables are thought to be present, then this is not a problem (Graham, 2003).

Based on the F- test, each equation, LnRGDP, LnPov, and LnGini is significant as its p-value is lower than 0.01 (significant at $\alpha=1\%$). Growing income inequality, poverty, and investment all have a joint big impact on economic growth. Meanwhile, economic

growth, the growth of income inequality and education, and unemployment have joint effects on poverty growth. Moreover, economic growth, the growth of poverty, education, and district minimum wage have joint significant effects on income inequality growth.

On the economic growth (LnRGDP) model, poverty has a negative effect on economic growth. It means that an increase in poverty growth by 1% will reduce economic growth by 0.268%. This result is in line with the study by Perry et al. (2006), that poor regions cannot contribute to national growth. Poverty harms economic growth caused by limited access to credit and financial funding, and health problems that can interfere with productivity and low levels of education, so their human capital stock is also of low quality. Next, the investment variable also has a positive and significant on economic growth. An increase of 1 billion rupiahs in investment will increase economic growth by $1.62 \times 10^{-7}\%$. This result is in line with the study by Almfraji and Almsafir, the investment may significantly give a positive effect on economic growth influenced by several factors such as well-developed financial markets, adequate levels of human capital, open trade regimes, and the complementarity between domestic and foreign investment. Meanwhile, the result differs from the study by Yuliadi (2020), who found that the investment (foreign investment, domestic investment, and length of road) had no significant effect on economic growth.

Moreover, in the economic growth model, the influence of income inequality on economic growth is not significant. This is consistent with the findings of Benos and Karagiannis (2018), which discovered that changes in income inequality do not affect economic growth. Similarly, under the model of income inequality, economic growth does not affect income inequality. This finding is congruent with the findings of Niyimbanira (2017), who revealed that economic growth reduced poverty but had no effect on income inequality. These outcomes may have occurred due to the inequality in economic growth among the districts in Yogyakarta Province. In 2018-2019, for instance, the construction of the Yogyakarta International Airport (YIA) in Kulon Progo drove economic growth to reach more than 10%. Kulon Progo's economic growth reached its peak in 2019, which was about 13.49%, while other regions only achieved economic growth of around 5-6%. According to the Gini ratio, Kulon Progo has a low-income inequality during the 2010-2021 period (< 0.4) with values that tend to be consistent.

On the other hand, in the poverty (LnPov) model, economic growth has a significant positive effect on poverty. An increase in economic growth by 1% will increase poverty growth by 0.603%. The possibility of a positive association between economic growth on poverty cannot be ruled out (Gupta & Mitra, 2004). This positive result can happen since the region's income inequality is still considered high. As the results of a study by Wan (2008), rapid economic growth without considering income inequality can trigger new poverty.

Table 3 Result of Estimation of Simultaneous Equation

Three-Stage-Least-Square			
Equation	Observation	'R-Sq'	Probability
LnRGDP	60	0.738	0.000*
LnPov	60	0.487	0.000*
LnGini	60	0.481	0.000*
LnRGDP	Coefficient	t-student	Probability
Cons	17.105	34.80	0.000*
LnPov	-0.268	-2.78	0.005*
LnGini	0.120	0.31	0.757
Inv	1.62e-7	9.79	0.000*
LnPov	Coefficient	t-student	Probability
Cons	-3.431	-1.01	0.310
LnGini	-1.424	-2.03	0.042**
LnRGDP	0.603	3.36	0.001**
LnEdu	-1.269	-2.24	0.025**
Un	-0.175	-3.57	0.000*
LnGini	Coefficient	t-student	Probability
Cons	-6.872	-6.78	0.000*
LnPov	0.105	1.12	0.263
LnRGDP	-0.027	-0.39	0.694
LnWage	0.341	5.44	0.000*
LnEdu	0.475	1.72	0.086***

Endogenous variables: LnRGDP, LNPov, LnGini

Exogenous variables: Inv LnEdu Un LnWage

Note: Indicates significance: *at 1% level, ** at 5 % level, *** indicates at 10 % level.

As illustrated in Table 3, on the poverty model, income inequality significantly affects poverty, an increase of 1% in the growth of the Gini ratio will reduce poverty growth by 1.424%. On the other side, poverty does not significantly affect income inequality. This is in line with a study by Suriani, et al. (2020), who found that there is a one-way causal relationship between income inequality and poverty. In Yogyakarta Province, income inequality and poverty are peculiar occurrences. Kulon Progo and Gunung Kidul are regions with lower income inequality, but higher poverty rates compared to other regions. Moreover, based on the Poverty Severity Index (P2), which demonstrates the discrepancy in spending between the poor, both districts have a greater P2 index value than other regions. When the overall income Gini ratio in Kulon Progo and Gunung Kidul is low, inequality among the poor is significantly greater than in other districts. The poverty level in some areas of Yogyakarta Province is still rather high, and there is still a discrepancy in spending among the poor people. Therefore, poverty has little effect on income inequality.

Furthermore, in the poverty model, unemployment has a negative and significant effect on poverty. The decline in the unemployment rate will increase the poverty rate. This is in line with the study by Wintara et al. (2021) found that the unskilled workers in Aceh cause a person's opportunity to become manual workers was greater so they will earn relatively small incomes and have the opportunity to be poor greater even though they are already working. Moreover, economic growth was found to affect significantly and

positively on poverty. An increase of 1% in economic growth will increase the growth of the poverty rate by 0.603. The positive impact was possible due to the unequal distribution of economic growth, higher population growth, and lower equality of human resources. Meanwhile, according to a study by Wau (2022), economic growth does not significantly affect poverty in underdeveloped regions due to the lower rate. Thus, the government needs to focus on accelerating economic growth, especially for those regions.

Next, on the income inequality model, the district minimum wage has a significant effect ($\alpha=5\%$), and education growth also has a significant effect ($\alpha=10\%$) on income inequality. An increase in district minimum wage growth by 1% will increase Gini ratio growth by 0.341%. An increase in education growth by 1% will increase the Gini ratio growth by 0.475%. This is in line with research by Sungkar et al. (2015), Hidayat et al. (2020), and Suryani & Woyanti (2021), the increase in the district minimum wage shows that the price of labor is getting more expensive so that it can cause a decrease in demand for labor. The decline in the demand for labor will cause unemployment to increase and more people without an income, so income inequality is higher. As the neoclassical theory states that an increase in the minimum wage of workers will increase income inequality because a non-market will be instrumental in setting the minimum threshold in the labor market, so the demand for labor will decrease (Yuliani et al., 2021).

The education variable has a significant positive effect on income inequality. This is in line with the research findings of Battistón et al. (2014) that an increase in the education sector increases inequality due to the convexity of returns to education on the labor market. However, investments in education are still needed because of the many positive implications for economic growth, poverty alleviation, inequality of opportunity, and others. The result of the study by Suriani, et al. (2021) found that distribution in education, such as from zakat, is beneficial in achieving sustainable development goals.

Table 4 The Government Budget of Yogyakarta Province Related to Reducing Income inequality from 2017 to 2021

No	Year	Programs	Activities	Budget (Billion Rupiah)	Gini Ratio
1	2017	5	7	58,40	0.432
2	2018	5	17	163.00	0.441
3	2019	5	17	163.00	0.423
4	2020	5	17	163.00	0.434
5	2021	13	17	324.82	0.441

Table 4 illustrates the effort of the local government of Yogyakarta Province to overcome income inequality. In the last five years, from 2017 to 2021, the government of Yogyakarta Province has established programs and activities designed by the Regional Development Planning Agency of Yogyakarta Province to overcome income inequality. The budget for reducing income inequality continues to increase from 58,40 billion rupiahs in 2017 to 324,82 billion rupiahs in 2021. This budget should be a potential for the government to overcome inequality. The conventional neoclassical model stated that an increase in government expenditure on the productive side would reduce income inequality in the long run (Turnovsky & Erasuskin, 2021).

In 2022, they will prioritize equitable development, such as expanding access to health care, education, and infrastructure that can be felt by all individuals. These policies are expected to increase Human Development Index (HDI), as the result of a study by Suryani & Woyanti (2021) stated that increasing HDI will reduce income inequality. Labor productivity will rise when the quality of HDI gets better. The workers' pay is increased, and the community's welfare is more equitably distributed (Fadliansah, et al., 2021). The government expenditure on health and education had a considerable and favorable effect on social welfare (Wiksadana & Sihaloho, 2021). This expenditure fosters economic growth to improve educational attainment and health. Accordingly, education-focused policies are suitable in light of the findings of this study.

The previous studies of Yogyakarta Province's income inequality found that economic growth did not have a significant effect on income inequality. It is caused by the unequal distribution of economic growth between the districts (Suryani & Woyanti, 2021; Yuliani, 2021). Yogyakarta district, which is the center of the economy, tends to have higher economic growth. Tjahjadi and Widhyharto (2018) studied the impact of education on people's income in Yogyakarta Province. In 2007, the average income of high school graduates was 333 thousand rupiahs per month. It increased to 936 thousand rupiahs per month in 2014. This salary rise is more than that of individuals with a lesser level of education. Another study by Shidiqi and Pasiya (2019) also stated that the educational attainment of manufacturing workers is dramatically increasing their incomes. It is likely that workers in manufacturing industries have a strong educational background and earn better wages, and this trend is expanding as a result of incremental education. Consequently, prior research confirms the findings of this study.

These findings suggest that neither economic development nor poverty effectively reduces income inequality. The objective of policies designed to minimize economic inequality should not be to improve social outcomes. It should contemplate continuing long-term expansion (Cingano, 2014). Taxes and transfers, as redistribution policies, are an instrument for ensuring the equitable allocation of economic growth. Besides that, it is essential to promote equality of opportunity through accessibility and quality of education. In the end, the creation of productive human resources will ultimately be able to support economic growth and reduce inequality and poverty (Murdiono and Setiartiti (2014). This is also consistent with the primary objective of the government, which is equitable development.

Although economic growth and poverty did not significantly affect income inequality, the local government cannot simply ignore these two economic indicators. This study found a two-way relationship between economic growth and poverty. Therefore, the policies related to increasing economic growth and poverty alleviation must be mutually sustainable. Economic growth must be felt, especially by the poor, or growth policies must be pro-poor growth (Odusola, 2019).

The development process is inseparable from income inequality, particularly in the early stage of development. However, increasing income inequality must be restrained because

it generates societal discontent and leads to a variety of horizontal conflicts (Suparmono & Partina, 2021).

Conclusion

This study provides empirical evidence on the application of the poverty-growth-inequality triangle in understanding the problem of income inequality in Yogyakarta Province. The annual panel data used are regional gross domestic product, poor population, income Gini ratio, gross fixed assets, average school year, open unemployment rate, and district minimum wage in 5 districts/cities of Yogyakarta from 2010 to 2021. These data were analyzed using the Simultaneous Equation Model (SEM) method. The analysis showed that there is no causal relationship between economic growth or poverty on income inequality. On the other hand, economic growth and poverty have a causal relationship. Additionally, district minimum wages and education influence income inequality.

The implications of these results are the government should focus on equal distribution of wages and equal education in each district. Therefore, this study has several recommendations. First, ensuring the equity of economic growth in all districts/cities and all economic sectors of Yogyakarta Province. Second, ensuring the equity of education and its quality. Third, increasing income taxes for the highest income of society and offset by effective and well-targeted government spending such as government assistance to the poor. Fourth, Reduce minimum wage inequality between counties/cities. The last, use budget potential to set strategic goals to reduce income inequality.

This research has limitations in providing comprehensive information regarding the causality relationship between income inequality, poverty, and economic growth. Therefore, future studies can further analyze the causality relationship between them in the long term and short term, using the Granger Causality and Error Correction Model (ECM) methods. Thus, the results of the analysis can be sorted into the form of short-term recommendations and long-term recommendations and applied in short-term and long-term planning documents.

Acknowledgment

The authors gratefully acknowledge a grant from the Indonesian Ministry of Education, Culture, Research, and Technology's Directorate General of Higher Education (DIKTI) for this research. On May 10, 2022, the following grants will be awarded: 145/E5/PG.02.00.PT/2022. The authors would also like to thank Syiah Kuala University's institute for research and community service (LPPM) for arranging grant funding for this study. On May 10, 2022, the following grants will be awarded: 88/UN11.2.1/PT.01.03/DPRM/2022.

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