



Analysis of the Effect of Economic Growth, Average Years of Schooling, and Labor Force Participation Rate (TPAK) on Income Inequality in the Province of the Special Region of Yogyakarta

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Abstract: Income inequality remains a development issue in the Special Region of Yogyakarta Province, despite relatively good economic growth and human resource quality. This study aims to analyze the influence of economic growth, average years of schooling, and the labor force participation rate (TPAK) on income inequality for the period 2014–2023. The study used a quantitative approach with panel data regression across five regencies/cities in Yogyakarta Special Region. The results show that average years of schooling significantly influence income inequality, while economic growth and TPAK do not. Simultaneously, all three variables influence income inequality. These findings indicate that educational improvement and economic growth in the Special Region of Yogyakarta are not fully inclusive, necessitating policies that are more oriented toward regional equity.

Keywords: Income Inequality, Economic Growth, Average Years of Schooling, TPAK

Introduction

Income inequality remains one of the main problems in economic development in developing countries such as Indonesia, even though various economic indicators show an upward trend. Recent studies show that economic growth and improved human development in several regions have not been able to significantly reduce income inequality (Ardiani & Prabowo, 2024). This indicates that increased economic output does not automatically create equitable income distribution.

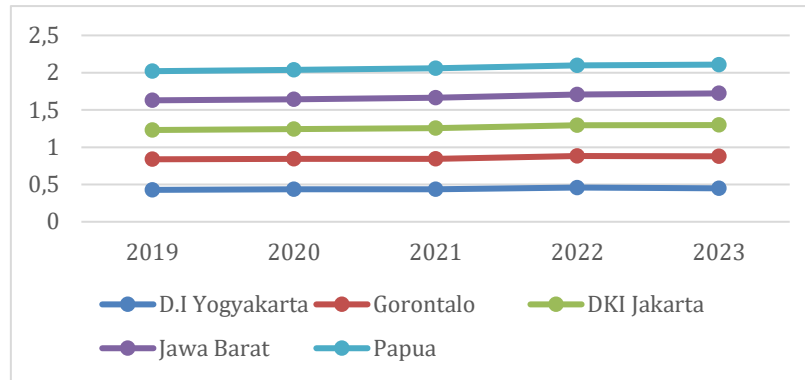


Figure 1. Provinces with the Highest Gini Index 2019–2023

Figure 1 shows the provinces with the highest Gini Index in the 2019–2023 period. The Special Region of Yogyakarta (DIY) is included in the category of provinces with relatively high levels of inequality. On the other hand, DIY has a Human Development Index (HDI) that is relatively high compared to the national average (Handayani & Hanifa, 2024). This condition reveals a development paradox, where the quality of human resources and economic activity has improved, but income distribution remains uneven.

Theoretically, the relationship between economic growth and inequality is explained by Simon Kuznets' inverted U-curve hypothesis. In the early stages of development, growth tends to increase inequality due to the concentration of economic activity in certain groups. However, in the long term, the expansion of economic opportunities is expected to reduce inequality. Nevertheless, various empirical findings show that this relationship is not always linear and is greatly influenced by the economic structure of the region (Febriyan & Hasmarini, 2024).

In the neo-classical growth perspective proposed by Robert Solow, economic growth is determined by the accumulation of capital, labor, and technological advances, including the quality of human resources. Education, as part of human capital, as explained by Gary S. Becker, plays a role in increasing productivity and opportunities to earn higher incomes. However, if access to and quality of education are not evenly distributed across regions, then an increase in average years of schooling can actually widen the income gap (Rahmawati et al, 2024).

In addition, the Labor Force Participation Rate (LFPR) also has the potential to affect income distribution. High labor force participation can increase community involvement in economic activities, but its impact on inequality is highly dependent on the quality of available jobs, particularly whether the labor force is absorbed in the productive formal sector or the informal sector with low wages (Azhar & Nuryadin, 2025).

Based on these phenomena and theoretical foundations, this study aims to analyze the effects of economic growth, average length of schooling, and Labor Force Participation Rate on income inequality in the Special Region of Yogyakarta Province for the period 2014–2023. This study is expected to provide empirical contributions to the formulation of more inclusive development policies at the regional level.

Research Method

This study uses a quantitative approach with secondary data obtained from the Central Statistics Agency (BPS) of the Special Region of Yogyakarta for the period 2014–2023. This study aims to analyze the effect of Economic Growth (X1), Average Length of Schooling (X2), and Labor Force Participation Rate (X3) on Income Inequality (Y) as measured by the Gini Ratio. The analysis method used is panel data regression because it combines the dimensions of time and region. Data processing was performed using EViews 13. The regression model used is formulated as follows:

$$Y_{it} = \alpha + \beta_1 X1_{it} + \beta_2 X2_{it} + \beta_3 X3_{it} + e_{it}$$

Explanation:

Y = Dependent variable (Income Inequality)

α = Constant

X1 = Independent variable 1 (Economic Growth)

X2 = Independent variable 2 (Average Length of Schooling)

X3 = Independent variable 3 (Labor Force Participation Rate)

e = Error term

t = Time

i = Entity i

Result and Discussion

Chow Test

The Chow test is used to determine the most appropriate regression model between the Common Effect Model (CEM) and the Fixed Effect Model (FEM) in panel data analysis:

Table 1. Chow Test

Redundant Fixed Effects Tests			
Equation: Untitled			
Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.387535	(4,42)	0.0662
Cross-section Chi-square	10.244267	4	0.0365

Based on Table 1, the Chow Test results show a Cross-section Chi-Square probability value of $0.0365 < 0.05$. This result indicates that H_0 is rejected and H_1 is accepted, so the more appropriate model to use in this study is the Fixed Effect Model (FEM).

Hausman test

The Hausman test was applied to compare the regression models between the Fixed Effect Model (FEM) and the Random Effect Model (REM):

Table 2. Hausman test

Correlated Random Effects - Hausman Test			
Equation: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	9.465222	3	0.0237

Based on Table 2, the Hausman Test results show a Cross-section Random probability value of $0.0237 < 0.05$. This means that H_0 is rejected and H_1 is accepted, so that the Fixed Effect Model (FEM) is the most appropriate model to use in this research analysis. This result is the same as the Chow Test, which also chose FEM, so it can be concluded that the Fixed Effect Model is the best model in this study. Thus, the Lagrange Multiplier (LM) test does not need to be performed because the model selection has been determined through these two tests.

Classical Assumption Test Multicollinearity Test

Table 3. Multicollinearity test

	X1	X2	X3
X1	1.000000	0.160074	0.033714
X2	0.160074	1.000000	-0.257557
X3	0.033714	-0.257557	1.000000

Based on Table 3, the results of the multicollinearity test show that the correlation values between the independent variables, namely X1 (Economic Growth), X2 (Average Length of Schooling), and X3 (Labor Force Participation Rate), are below the specified limit (< 10). Thus, it can be concluded that there is no multicollinearity between the independent variables in this research model.

Heteroscedasticity Test

Table 4. Heteroscedasticity Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.145787	0.077191	1.888656	0.0659
X1	-0.000983	0.000702	-1.401202	0.1685
X2	0.000848	0.009104	0.093185	0.9262
X3	-0.001828	0.000993	-1.841251	0.0727

Based on Table 4, the results of the heteroscedasticity test show that variable X1 (Economic Growth) has a probability value of $0.1685 > 0.05$, variable X2 (Average Length of Schooling) has a value of $0.9262 > 0.05$, and variable X3 (Labor Force Participation Rate) has a value of $0.0727 > 0.05$. Since all probability values are greater than the significance

level of 0.05, it can be concluded that the regression model in this study does not experience heteroscedasticity problems.

Coefficient of Determination Test (R^2)

Table 5. Coefficient of Determination (R^2)

R-squared	0.774882
Adjusted R-Squared	0.737362

Based on Table 5, the results of the coefficient of determination test show an R-squared value of 0.774882 or 77.49%. This value indicates that the independent variables, namely Economic Growth (X1), Average Length of Schooling (X2), and Labor Force Participation Rate (X3), are able to explain 77.5% of the variation in income inequality. The remaining 22.5% is influenced by other factors outside the scope of this study.

F Test (Simultaneous)

Table 6. F test

F-statistic	20.65265
Prob (F-statistic)	0.000000

Based on Table 6, the Prob. (F-statistic) value of 0.000000, which is smaller than the significance level of 0.05, indicates that the variables of Economic Growth (X1), Average Length of Schooling (X2), and Labor Force Participation Rate (X3) simultaneously have a significant effect on income inequality.

t-test (Partial)

Table 7. t-test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.056797	0.120288	-0.472171	0.6392
X1	-0.001089	0.001506	-0.723213	0.4736
X2	0.043437	0.013065	3.324668	0.0018
X3	0.000622	0.001266	0.491769	0.6254

1. The significance value of $0.4736 > 0.05$ indicates that Economic Growth does not have a significant partial effect on Income Inequality.
2. The significance value of $0.0018 < 0.05$ indicates that Average Length of Schooling has a positive and significant partial effect on Income Inequality.

3. The significance value of $0.6254 > 0.05$ indicates that Labor Force Participation Rate does not have a significant partial effect on Income Inequality.

The Effect of Economic Growth on Income Inequality in the Province of DIY

The results of the Fixed Effect Model estimation show that economic growth has a probability value of $0.4736 > 0.05$, so it does not have a significant effect on income inequality in the Province of DIY for the period 2014–2023. This means that changes in economic growth do not significantly affect the level of income inequality. This finding is in line with the phenomenon in DIY, which has high economic growth and HDI, but the Gini Ratio remains in the moderate to high category, indicating that growth is not yet fully inclusive. Theoretically, this condition can be explained by Simon Kuznets' Hypothesis (1955), which states that at a certain stage of development, growth can increase or indirectly reduce inequality. In addition, Robert Solow's (1956) neo-classical growth theory explains that growth that is not accompanied by equitable distribution of capital and technology has the potential to maintain income gaps.

The Effect of Average Length of Schooling on Income Inequality in the Province of Yogyakarta

The regression results show that average length of schooling has a positive and significant effect on income inequality with a probability value of $0.0018 < 0.05$. This indicates that an increase in average length of schooling correlates with an increase in income inequality in Yogyakarta in the period 2014–2023. Theoretically, this finding is in line with Gary S. Becker's Human Capital Theory, which states that education increases individual productivity and income. However, if access to and quality of education are uneven across regions, such as the differences between Yogyakarta City and other districts, then increased education can actually widen the income gap. Thus, equal access to education is an important factor in reducing inequality.

The Effect of Labor Force Participation Rate on Income Inequality in DIY Province

The test results show that the Labor Force Participation Rate (TPAK) has a probability value of $0.6254 > 0.05$, so it does not have a significant effect on income inequality. This means that increased labor participation has not been able to significantly reduce income inequality in DIY during the 2014–2023 period. In theory, increased labor participation should expand income-earning opportunities, as explained in N. Gregory Mankiw's labor market theory. However, if this increase is dominated by the informal sector with low productivity and wages, its impact on income equality will be limited. This condition shows that the quality of work is more decisive than simply increasing the number of workers.

Conclusion

Based on the results of the analysis tested in the 2014–2023 period, it was found that economic growth had a significance value of 0.4736 (>0.05), so it did not have a significant effect on income inequality in the Special Region of Yogyakarta. The average length of schooling shows a significance value of 0.0018 (<0.05), which means it has a positive and significant effect on income inequality, so that uneven improvements in education have the potential to widen the gap. Meanwhile, the Labor Force Participation Rate (LFPR) has a significance value of 0.6254 (>0.05), indicating that this variable does not have a significant effect on income inequality. These findings indicate that education is a more dominant factor in explaining the dynamics of inequality than economic growth and labor participation in DIY.

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