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Analysis of the Influence of Open Unemployment Rate, Economic Growth, and Education Level on Poverty in the Special Region of Yogyakarta

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Keywords
Poverty Rate; Economic Growth; Education Level; Open Unemployment Rate

Abstract
This study aimed to analyze the effects of the Open Unemployment Rate, economic growth, and education level on poverty in the Special Region of Yogyakarta during the 2010–2024 period. The study employed a quantitative approach using time-series multiple linear regression analysis estimated with EV views 12. The data were obtained from official publications of the Central Statistics Agency (Badan Pusat Statistik [BPS]) of the Special Region of Yogyakarta. The results showed that, simultaneously, the three independent variables had a significant effect on poverty. Partially, the Open Unemployment Rate had a positive and significant effect on poverty, indicating that an increase in unemployment was associated with an increase in the number of people living in poverty. Education level also had a significant effect on poverty, with higher average years of schooling significantly associated with lower poverty levels. However, economic growth did not have a significant effect on poverty, suggesting that economic growth in the Special Region of Yogyakarta had not yet been fully inclusive and had not sufficiently benefited all segments of society. Based on these findings, local governments are advised to prioritize education-oriented policies and the creation of high-quality employment opportunities while ensuring that the benefits of economic growth are distributed more equitably, particularly among vulnerable and low-income groups.

INTRODUCTION

Although Indonesia is rich in natural resources and has substantial human resource potential, economic development remains one of its major challenges (Kaminski, 2024). This phenomenon is also known as the resource curse, a condition in which abundant natural resources may lead to an unequal distribution of benefits, slower economic growth, and increased corruption, resulting in persistent poverty (Narh, 2025). According to the World Bank, developing countries such as Indonesia do not necessarily face economic challenges because of a lack of resources but rather because of difficulties in distributing the benefits of economic growth and wealth equitably to improve societal welfare (Bank, 2025).

One of the main factors explaining why economic development remains challenging despite economic growth and abundant natural resources is income inequality (Denis, 2025). Inequality causes the benefits of economic growth to be enjoyed primarily by certain groups, while other segments of society remain disadvantaged. From a modern Keynesian perspective, economic growth that is not inclusive (Agency, 2018) may fail to reduce poverty (Fitz and Suresh, 2021) because of the limited purchasing power of low-income groups

(Stiglitz, 2015a). Therefore, poverty is determined not solely by the magnitude of economic growth but also by how income is distributed within society (Havan, 2024).

The poverty rate in the Special Region of Yogyakarta during the 2010–2014 period showed a declining trend following the recovery from the 2008–2009 global financial crisis, which was triggered by the subprime mortgage crisis in the United States. During this period, economic growth remained at approximately 5% annually, accompanied by declining unemployment and increased labor absorption, particularly in the service, trade, and tourism sectors. Social protection programs such as the Family Hope Program (Program Keluarga Harapan [PKH]) also contributed to reducing vulnerability among poor households. However, during the 2014–2015 period, economic growth slowed from 5.78% in 2013 to 4.79% in 2015 because of inflation following fuel subsidy reforms and labor market conditions dominated by low-income informal employment (Indonesia, 2014).

During the 2016–2019 period, economic conditions stabilized, supported by controlled inflation and recovery in the service, trade, tourism, and micro, small, and medium enterprise (MSME) sectors. This stability encouraged employment growth and contributed to a gradual decline in poverty levels. However, during 2020–2021, poverty increased significantly from 11.70% to 12.80% because of the economic contraction caused by the COVID-19 pandemic, which severely affected the tourism, education, and service sectors. Restrictions on economic activity resulted in layoffs, reduced working hours, and declining incomes, particularly among informal workers, making many households increasingly vulnerable to poverty.

During the 2022–2024 period, poverty levels declined again alongside the post-pandemic economic recovery; however, the rate of decline remained relatively slow (Insani, Nanda and Rohanah, 2025). Uneven economic growth, economic pressures, and challenges faced by the middle class indicate that income gains have not been distributed evenly across society. Overall, poverty dynamics in the Special Region of Yogyakarta during 2010–2024 were characterized by fluctuations influenced by economic shocks. Poverty declined during periods of stable economic growth and controlled inflation but increased during economic slowdowns, increases in the prices of basic commodities, and economic crises because declining household incomes reduced households' ability to meet basic needs.

The poverty phenomenon in the Special Region of Yogyakarta during the 2010–2024 period demonstrated considerable vulnerability to economic fluctuations and external shocks. Poverty declined during periods of stable economic growth and controlled inflation but increased during economic slowdowns, rising living costs, and crises such as the COVID-19 pandemic. This pattern occurred because reductions in household income were not matched by sufficient capacity to meet basic needs, causing vulnerable groups to fall into poverty.

Gini Ratio data from six provinces during the 2019–2024 period show that income inequality varies across regions in Indonesia. The Special Region of Yogyakarta consistently recorded the highest Gini Ratio, indicating relatively unequal income distribution despite its high educational attainment (Hanushek and Woessmann, 2021). This finding demonstrates that improvements in human capital do not automatically result in greater income equality when labor markets are unable to absorb workers evenly, which is consistent with modern Keynesian perspectives (Stiglitz, 2015b). Conversely, Bangka Belitung was among the provinces with the lowest levels of inequality, which may be explained by its relatively homogeneous economic structure and more evenly distributed income patterns (Todaro and

Smith, 2016). DKI Jakarta and West Java showed relatively moderate levels of inequality associated with differences between the formal and informal sectors, while East Java and Central Kalimantan demonstrated moderate inequality with relatively stable fluctuations.

These findings indicate that income inequality in Indonesia is influenced not only by economic growth but also by regional structural characteristics. Differences in economic structures and labor market conditions contribute to variations in inequality across regions. Therefore, the Open Unemployment Rate, economic growth, and education level are important determinants that require further analysis (Aldian S. and Syafri, 2024) to improve understanding of poverty mechanisms, particularly in regions with high income inequality such as the Special Region of Yogyakarta.

The Special Region of Yogyakarta has distinctive economic characteristics, with relatively high income inequality but a low and stable Open Unemployment Rate. Data from the Central Statistics Agency (Badan Pusat Statistik [BPS], 2021, 2024) indicate that the Open Unemployment Rate in Yogyakarta during 2010–2024 tended to remain below the national average, reaching 4.91% in 2024. A significant proportion of the labor force was absorbed by the service, trade, and tourism sectors. However, a low unemployment rate does not necessarily indicate adequate employment quality because many workers remain concentrated in informal and low-wage sectors. Previous research shows that unemployment positively influences poverty, particularly in regions dominated by informal employment, where its effects occur through low wages and increased income vulnerability (Firmansyah and Khairunnisa, 2023; Setyanti et al., 2024). Regarding economic growth, Yogyakarta demonstrated relatively stable performance except during the COVID-19 pandemic, and previous studies indicate that inclusive economic growth contributes to poverty reduction (Pardita et al., 2024).

The Special Region of Yogyakarta also has advantages in education, with consistently high levels of educational attainment and an established role as an educational center. Education contributes to increased productivity and employment opportunities, thereby supporting poverty reduction (J Susanto and Udjianto, 2019). However, high educational attainment has not fully reduced poverty because of a mismatch between graduates' competencies and regional labor market requirements, particularly because industrial sectors capable of absorbing highly educated workers remain limited (Khoiruddin, 2024). This condition indicates that poverty in Yogyakarta is influenced by interactions among unemployment, economic growth, and education levels. Therefore, despite low unemployment and relatively high educational attainment, poverty and inequality remain persistent challenges.

The economic conditions of the Special Region of Yogyakarta demonstrate that poverty is not determined solely by unemployment rates, economic growth, or education levels individually but also by the complex interactions among these factors. This condition helps explain why Yogyakarta continues to face poverty-related challenges despite having relatively low unemployment and high educational attainment while simultaneously exhibiting substantial income inequality.

This study identified several research gaps in poverty analysis in Indonesia. Although numerous studies have examined the effects of the Open Unemployment Rate, economic growth, and education level on poverty, previous findings remain inconsistent, resulting in

limited consensus. Furthermore, studies that simultaneously examine these three variables using time-series analysis in the Special Region of Yogyakarta during the 2010–2024 period remain limited. Therefore, this study, entitled "Analysis of the Influence of Open Unemployment Rate, Economic Growth, and Education Level on Poverty in the Special Region of Yogyakarta," aimed to analyze the effects of the Open Unemployment Rate, economic growth, and education level on poverty in the Special Region of Yogyakarta. This research is expected to provide useful information for local governments in formulating poverty alleviation policies aligned with the economic and social characteristics of the region.

Based on the background described above, the research problem addressed in this study was whether the Open Unemployment Rate, economic growth, and education level influenced poverty in the Special Region of Yogyakarta during the 2010–2024 period. Accordingly, this study aimed to analyze the effect of the Open Unemployment Rate on poverty, examine the effect of economic growth on poverty, and analyze the effect of education level on poverty during the same period. Theoretically, this research contributes to the development of the economics literature, particularly studies on poverty and its determinants. Practically, this study provides a reference for the local government of the Special Region of Yogyakarta in developing more targeted, evidence-based poverty alleviation policies aligned with local economic and social conditions.

METHOD

Research Approach

This study employed a quantitative approach using secondary data. Multiple linear regression analysis was conducted to examine the partial and simultaneous effects of the Open Unemployment Rate, economic growth, and education level on poverty in the Special Region of Yogyakarta. The analysis provided empirical evidence on the contribution of these factors to poverty levels (Becker, 1993).

Place and Time of Research

This research was conducted in two provinces, namely the Special Region of Yogyakarta and the Bangka Belitung Islands Province, which were selected based on differences in their economic and social characteristics, particularly income inequality. The study covered the 2010–2024 period using annual time-series data to examine poverty dynamics and changes in regional socioeconomic conditions. The data were obtained from official publications of the Central Statistics Agency (Badan Pusat Statistik [BPS]) and were selected based on their consistency and comparability across the study period.

Operational Definition and Measurement of Research Variables

The operational definition of a variable is an explanation of the research variable in a form that can be measured and measured, so as to provide clear boundaries and distinguish between interpretations. Definisi operasional also explains howiiwhere a variabel is measured and the unit of measurement used in the research (Sugiyono, 2013).

1. Open Unemployment Rate

In Indonesia, unemployment is generally measured using the Open Unemployment Rate (TPT) published by the Central Statistics Agency (BPS). Open unemployment (*Open unemployment*) is a form of unemployment that is commonly used in employment analysis,

including in the analysis of employment. ini throughi indikator Tlevel of Open Unemployment (TPT). According to (Badan Pusat Statistik (BPS), 2021)Open unemployment includes individu who are unemployed and looking for a job, are preparing for a venture, feel that it is impossible to get a job (desperate), or already have a job but have not started working. The Open Unemployment Rate shows that there is a imbalance between the supply of labor and the ability of economists to provide jobs.

(Badan Pusat Statistik (BPS), 2024) explained that TPT is obtained by dividing the number of unemployed by the number of labor force, so that it is 100 percent. The TPT formula can be written as follows:

$$TPT(\%) = \frac{Number\ of\ Unemployed\ Person}{labor\ Fource} \times 100\%$$

The labor force itself includes both working and unemployed populations. The higher the value of TPT, the greater the proportion of the labor force that has not been absorbed in the economic sector. Therefore, TPT is often used as an important indicator in analyzing employment conditions and formulating development policies in Indonesia.

2. Economic Growth

Economic growth is the process of increasing output and real income per capita in the long term that determines the level of welfare and living standards of the community. Economic growth is important because it affects people's ability to meet basic needs, education, and health. Economic growth is measured through changes in the value of GDP or GDP from one period to the next. If the nilait increases, then the growth of bersifat positif, while the jika decreases, then the growth of is negative. The magnitude of the growth is expressed as a percentage of the change in output riil of an economiction (Mankiw, 2021).

BPS calculates the rate of economic growth using the following formula:

$$Econimic\ Growth\ (\%) = \frac{\frac{PDB}{PDRB_t} - \frac{PDB}{PDRB_{t-1}}}{\frac{PDB}{PDRB_{t-1}}}$$

Description:

- GDP/GDP = the value of GDP or GDP in the current year (constant price)
- GDP/GDP$_{t-1}$ = the value of GDP or GDP in the previous year (constant price)

This formula shows the percentage change in real output from one period to the next. The greater the value of economic growth, the faster the increase in economic activity and the potential for community welfare.

3. Education Level

Education is a consciously planned process aimed at developing individuals' knowledge, abilities, and skills to improve their quality of life and participation in social and economic activities. One indicator of educational attainment is the Mean Years of Schooling (MYS), which represents the average number of years of formal education completed by the population aged 25 years and older. A higher MYS value indicates a higher level of educational attainment within the population. MYS is calculated by dividing the total number of years of formal schooling completed by individuals aged 25 years and older by the total population within that age group (Badan Pusat Statistik (BPS), 2026).

In simple terms, the RLS formula can be written as follows:

$$RLS = \frac{Total\ Years\ of\ Schooling\ of\ the\ Population \geq 25\ years\ old}{Population\ Size\ of\ the\ Specified\ Age\ Group \geq 25\ years\ old}$$

The results of the Mean Years of Schooling (MYS) calculation are expressed in years. For example, if a region has an MYS value of 8.5 years, the population aged 25 years and older in that region has, on average, completed approximately eight and a half years of formal education, which is equivalent to reaching approximately the second year of junior high school.

Measuring educational attainment through Mean Years of Schooling provides a clear indication of the population's accumulated participation in formal education. Although MYS does not directly capture the quality of education or individuals' competencies, it remains a valuable and relevant indicator in socioeconomic analysis because educational attainment is closely associated with labor productivity, income, and community welfare.

Population and Sample Determination

The population in this study comprised all macroeconomic data from the Special Region of Yogyakarta and the Bangka Belitung Islands Province related to poverty, unemployment, economic growth, and education level. Because this study used time-series data, no conventional respondent-based sampling procedure was applied. The sample consisted of annual data from 2010 to 2024, using a saturated sampling (total sampling) technique in which all available and relevant data within the study period were included in the analysis. The use of saturated sampling was intended to maximize the information obtained from the available data and minimize potential bias arising from sample selection (Sugiyono, 2013).

Data Collection Methods

This study utilized secondary data obtained from official publications of the Central Statistics Agency (BPS), including poverty statistics, employment statistics, provincial economic growth rates in Indonesia, and educational indicators. All data used in this study were obtained from official institutional sources and had been previously published, thereby providing a reliable basis for academic research and analysis. The analysis employed time-series data; therefore, the econometric model was required to satisfy the relevant classical assumptions to ensure that the estimation results were unbiased, consistent, and efficient.

Data Analysis Methods

The analysis method used in this study refers to the econometric approach as explained by (Gujarati and Porter, 2009) in Basic Econometrics. Econometrics is the application of economic, mathematical, and statistical theories to empirically analyze the quantitative relationships between economic variables. The main purpose of econometric analysis is to estimate the parameters of the economic model, test the economic hypothesis, and infer the causal relationship between variables (Gujarati, Damodar N.; Porter, 2014).

1. Multiple Linear Regression

Multiple linear regression is used when a dependent variable is influenced by more than one independent variable. The multiple regression model allows the effect of each independent variable on the dependent variable to be estimated while controlling for the

effects of the other variables included in the model. The estimation method used in this study was Ordinary Least Squares (OLS). The OLS method estimates regression parameters by minimizing the sum of squared residuals, which represent the differences between the actual and predicted values of the dependent variable. When the classical assumptions are satisfied, the OLS estimator is BLUE (Best Linear Unbiased Estimator), meaning that it is unbiased and has the minimum variance among all linear unbiased estimators (Gujarati, Damodar N.; Porter, 2014).

The regression model used in this study is formulated as follows:

$$Y_t = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Description:Y = Poverty rateX_1 = Open unemployment rateX_2 = Economic growthX_3 = Education levelβ_0 = Constantβ_1–β_3 = Regression coefficientε = Term error reflecting the influence of other variables outside the model

Model estimation is carried out with the help of EViews 12 software, which is used to process time series data, estimate regression parameters, and perform statistical tests efficiently.

2. Classical Assumption Test

The validity of the OLS estimation results is highly dependent on the fulfillment of the classical assumptions of the linear regression model. Therefore, before interpreting the regression results, it is necessary to perform the following classical assumption tests:

Normality Test

The normality test is a statistical procedure used to determine whether the residuals in a regression model are normally distributed. Normality can be assessed graphically using a histogram and a normal probability plot or statistically using the Jarque–Bera test. In the Jarque–Bera test, the null hypothesis states that the residuals are normally distributed. The residuals are considered to satisfy the normality assumption when the probability value (p-value) is greater than 0.05, indicating that the null hypothesis cannot be rejected. Conversely, if the p-value is less than 0.05, the null hypothesis is rejected, indicating that the residuals are not normally distributed (Gujarati, Damodar N.; Porter, 2014).

Multicoloniality Test

The multicollinearity test is used to determine whether strong linear relationships exist among the independent variables in a regression model. Multicollinearity occurs when independent variables are highly correlated, making it difficult to distinguish the individual effect of each independent variable on the dependent variable and potentially reducing the precision of the estimated regression coefficients. Multicollinearity is commonly assessed using the Variance Inflation Factor (VIF), tolerance values, or correlations among the independent variables. A regression model is generally considered free from serious multicollinearity when the VIF values are below 10, the tolerance values are greater than 0.10, and the absolute correlations among the independent variables are not excessively close to 1 (Gujarati, Damodar N.; Porter, 2014).

Heteroscedasticity Test

The heteroscedasticity test aims to find out whether the residual variance in the regression model is constant across all observations. Heteroscedasticity occurs when the residual variance varies, which can cause the estimator OLS to bei tidak efisien and standard error tnot accurate sehso uji t and uji F bei less valid. The test can be done using a Breusch–

Pagan or a White test. Model dassert satisfiesi assumptionsi homoskedastisitas apabila nilai probabilitas (p-value) greater than 0.05, so that the null hypothesis stating the absence of heteroscedasticity is not rejected (Gujarati, Damodar N.; Porter, 2014).

Autocorrelation Test

The autocorrelation test aims to find out if there is a relationship between residuals in different time periods, especially in time series data. Autocorrelation occurs when the remainder of a period correlates with the previous period, causing the OLS estimator to be inefficient and the standard error inaccurate, which results in the invalidity of the t-test and the F-test. The model is declared free of autocorrelation if the Durbin–Watson value is close to 2 or the probability value of the Breusch–Godfrey test is greater than 0.05, so the null hypothesis is not rejected (Gujarati, Damodar N.; Porter, 2014).

3. Hypothesis Testing

Once the model meets the classical assumptions, hypothesis testing is carried out to draw empirical conclusions. Hypothesis testing in linear regression includes the determination coefficient test, the F test, and the t test.

Simultaneous Significance Test (F Test)

The F test is used to test the significance of the regression model simultaneously, i.e. to find out whether all independent variables together have an effect on the dependent variables. With the following decision-making criteria:

1. H0 is accepted, if F counts < F table at a significance of 0.05
2. H0 is rejected, if F calculates > F table at a significance of 0.05

The null hypothesis in the F-test states that all slope coefficients are jointly equal to zero, indicating that the independent variables collectively do not explain variations in the dependent variable. The F-test is used to assess the overall statistical significance of the regression model before interpreting the individual effects of the independent variables. The regression model is considered statistically significant when the probability value (p-value) is less than 0.05; therefore, the null hypothesis is rejected, indicating that the independent variables jointly have a statistically significant effect on the dependent variable (Gujarati, Damodar N.; Porter, 2014).

Partial Test (t-test)

The t-test is used to test the significance of each partially independent variable in a regression model, i.e. to find out whether a variable individually affects the dependent variable assuming the other variable is fixed. With the following decision-making criteria:

1. The study used a significant level of 5% or 0.05
2. Testing criteria

H0 is accepted, if t counts < t table

H0 is subjected, if t counts > t table

The zero hypothesis states that the regression coefficient is equal to zero, so the variable has no effect. The coefficient is declared significant if the probability value (p-value) is less than 0.05, so that the null hypothesis is rejected (Gujarati, Damodar N.; Porter, 2014).

Coefficient of Determination Test (R2)

The coefficient of determination (R^2) is used to measure the proportion of variation in the dependent variable that can be explained by the independent variables included in the

regression model. The R^2 value ranges from 0 to 1, with values closer to 1 indicating that the model explains a greater proportion of the variation in the dependent variable. However, R^2 should not be used to determine statistical significance or establish causal relationships, and there is no universal minimum acceptable value because its interpretation depends on the characteristics of the data and the research context. Therefore, the R^2 value should be interpreted together with the results of the t-test, the F-test, and the consistency of the regression model with relevant economic theory (Gujarati, Damodar N.; Porter, 2014).

RESULTS AND DISCUSSION

Multiple Linear Regression Test

Multiple linear regression is used when a dependent variable is influenced by more than one independent variable. A multiple linear regression model enables researchers to estimate the effect of each independent variable on the dependent variable while controlling for the other independent variables included in the model. The estimation method used in this study was Ordinary Least Squares (OLS). The OLS method estimates regression parameters by minimizing the sum of squared residuals, where the residual represents the difference between the actual and predicted values of the dependent variable. When the classical assumptions are satisfied, the OLS estimator is BLUE (Best Linear Unbiased Estimator), meaning that it is unbiased and has the minimum variance among all linear unbiased estimators (Gujarati, Damodar N.; Porter, 2014).

Table 1. Results of the Double Linear Regression Test of DIY Province

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	46.57847	2.704246	17.22420	0.0000
TPT	0.532062	0.162140	3.281497	0.0073
OR	-0.097952	0.147152	-0.665649	0.5193
TP	-3.768121	0.236656	-15.92236	0.0000
R-squared	0.965615	Mean dependent var		13.45467
Adjusted R-squared	0.956238	S.D. dependent var		1.969789
S.E. of regression	0.412068	Akaike info criterion		1.287922
Sum squared resid	1.867800	Schwarz criterion		1.476735
Log likelihood	-5.659412	Hannan-Quinn crister.		1.285910
F-statistic	102.9705	Durbin-Watson stat		1.605073
Prob(F-statistic)	0.000000			

Source : Eviews 12 data processed, 2026

Based on Table 1, the following multiple linear regression equations are obtained:

$$Y = 46.5787 + 0.532062 - 0.097952 - 3.768121 + e$$

From the regression equation, it can be interpreted that:

1. The constant (C) value of 46.57847 indicates that if the Open Unemployment Rate (TPT), Economic Growth (PE), and Education Level (TP) are all equal to zero, the predicted poverty rate in the Special Region of Yogyakarta Province would be 46.57847%. However, this interpretation should be treated cautiously because a zero value for all independent variables may not be empirically realistic.
2. The coefficient of the Open Unemployment Rate (TPT), which is 0.532062, indicates that a 1 percentage-point increase in the open unemployment rate, holding the other variables constant, is associated with a 0.532062 percentage-point increase in the

poverty rate. This positive relationship indicates that higher unemployment tends to be associated with higher poverty..

3. The coefficient of Economic Growth (PE), which is -0.097952, indicates that a 1 percentage-point increase in economic growth, holding the other variables constant, is associated with a 0.097952 percentage-point decrease in the poverty rate. This negative relationship suggests that stronger economic growth tends to contribute to poverty reduction, although the magnitude of the estimated effect is relatively small.
4. The coefficient of Education Level (TP), which is -3.768121, indicates that a one-year increase in the education indicator, holding the other variables constant, is associated with a 3.768121 percentage-point decrease in the poverty rate. This negative relationship indicates that higher educational attainment tends to be associated with lower poverty, as education can improve human capital, employability, and access to better employment opportunities.

Furthermore, the Adjusted R-squared value of 0.956238 indicates that approximately 95.62% of the variation in the poverty rate in the Special Region of Yogyakarta Province during the 2010–2024 period can be explained by the Open Unemployment Rate, Economic Growth, and Education Level included in the regression model. The remaining 4.38% is explained by other factors not included in the model. In addition, the Prob(F-statistic) value of 0.0000 indicates that the independent variables—Open Unemployment Rate, Economic Growth, and Education Level—are jointly statistically significant in explaining variations in the poverty rate in the Special Region of Yogyakarta Province during the study period.

1. Classical Assumption Test

The classical assumption test is a test that is carried out to ensure that the regression model meets the statistical requirements so that the results of the analysis obtained are valid and reliable. These tests include normality, multicollinearity, heteroscedasticity, and autocorrelation tests. If all assumptions are met, then the regression model is feasible to use for hypothesis testing and drawing research conclusions.

a. Normality Test

The normality test is a statistical test that aims to find out whether the residual in the regression model is normally distributed. The test can be done graphically, such as through histograms and normal probability plots, or statistically using the Jarque–Bera test. In the Jarque–Bera test, the zero hypothesis states that the residual is normally distributed. The model is declared to meet the normality test if the probability value (p-value) is greater than 0.05, so that the null hypothesis is not rejected; Conversely, if the p-value is less than 0.05 then the residual is not normally distributed (Gujarati, Damodar N.; Porter, 2014).

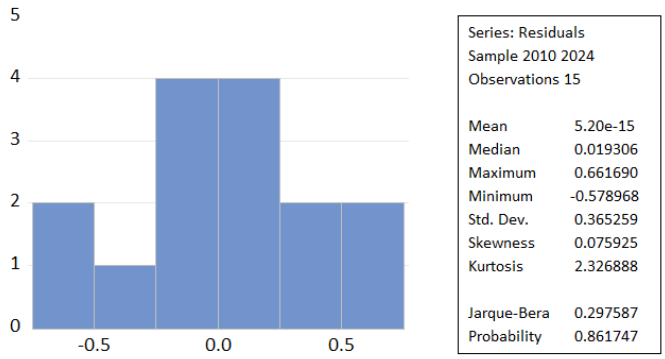

Figure 1. Normality Test of Provincial Norms

Source : Eviews 12 data processed, 2026

Based on the results of the normality test using the Jarque-Bera method, the regression model for Yogyakarta Province shows that the residual data is distributed normally. This is evidenced by the Probability value of 0.7358 (73.58%), which is much greater than the significance level of 0.05 (5%). Because the p-value is above 0.05, the assumption of normality in this study has been met. Thus, this regression model is considered valid and feasible for use in subsequent statistical testing because the data has been evenly distributed and is not collected on one side only.

b. Multicoloniality Test

The multicollinearity test is used to determine whether strong linear relationships exist among the independent variables in a regression model. Multicollinearity occurs when independent variables are highly correlated with one another, making it difficult to distinguish the individual effect of each independent variable on the dependent variable and potentially reducing the precision and stability of the estimated regression coefficients. Multicollinearity is commonly assessed using the Variance Inflation Factor (VIF), tolerance values, or correlations among the independent variables. A regression model is generally considered free from serious multicollinearity when the VIF values are less than 10, the tolerance values are greater than 0.10, and the absolute correlations among the independent variables are not excessively close to 1 (Gujarati, Damodar N.; Porter, 2014)..

Table 2. A Multi-Colonial Test of Yogyakarta Province

Variance Inflation Factors
Date: 04/17/26 **Time:** 17:09
Sample: 2010 2024
Included observations: 15

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	7.312944	646.0197	NA
TPT	0.026289	35.12776	1.274129
PE	0.021654	52.29605	1.232953
TP	0.056006	419.4018	1.067602

Source : Eviews 12 data processed, 2026

Based on the results of the multicollinearity test using the Variance Inflation Factor (VIF) values for the regression model of the Special Region of Yogyakarta Province, no serious multicollinearity was detected among the independent variables. This finding is

supported by the VIF values for the Open Unemployment Rate (1.57), Economic Growth (1.23), and Education Level (1.71), all of which are well below the threshold of 10. Therefore, the independent variables do not exhibit problematic linear relationships with one another, indicating that multicollinearity is unlikely to substantially affect the precision and stability of the estimated regression coefficients. Accordingly, the regression coefficients can be interpreted without serious concerns arising from multicollinearity in explaining variations in poverty in the Special Region of Yogyakarta.

d. Heteroscedasticity test

The heteroscedasticity test is used to determine whether the variance of the residuals in a regression model remains constant across observations. Heteroscedasticity occurs when the residual variance differs across observations, which can make Ordinary Least Squares (OLS) estimators inefficient and produce inaccurate standard errors, thereby reducing the reliability of the t-test and F-test results. Heteroscedasticity can be tested using the Breusch–Pagan test or the White test. The regression model is considered to satisfy the homoscedasticity assumption when the probability value (p-value) is greater than 0.05, indicating that the null hypothesis of no heteroscedasticity cannot be rejected (Gujarati, Damodar N.; Porter, 2014).

Table 3. Uji Heteroskedastisitas Provinsi DIY

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	1.081915	Prob. F(3,11)	0.3969
Obs*R-squared	3.417593	Prob. Chi-Square(3)	0.3316
Scaled explained SS	1.219347	Prob. Chi-Square(3)	0.7484

Heteroskedasticity Test: Breusch-Pagan-Godfrey

Null hypothesis: Homoskedasticity

F-statistic	1.081915	Prob. F(3,11)	0.3969
Obs*R-squared	3.417593	Prob. Chi-Square(3)	0.3316
Scaled explained SS	1.219347	Prob. Chi-Square(3)	0.7484

Source : Eviews 12 data diolah, 2026

Based on the results of the heteroscedasticity test using the Breusch–Pagan–Godfrey method, the regression model for the Special Region of Yogyakarta Province showed no evidence of heteroscedasticity. This result is indicated by the probability value of the ObsR-squared statistic of 0.3817, which is greater than the 0.05 significance level. Therefore, the null hypothesis of no heteroscedasticity cannot be rejected, indicating that the residual variance can be regarded as constant across observations. Thus, the regression model satisfies the homoscedasticity assumption, and heteroscedasticity is unlikely to compromise the efficiency of the OLS estimates or the reliability of the associated standard errors.

e. Autocorrelation Test

The autocorrelation test is used to determine whether residuals are correlated across different time periods, particularly in time-series data. Autocorrelation occurs when the residual in one period is correlated with residuals from previous periods, which can make Ordinary Least Squares (OLS) estimators inefficient and produce inaccurate standard errors, thereby reducing the reliability of the t-test and F-test results. Autocorrelation is commonly tested using the Durbin–Watson test or the Breusch–Godfrey test. A regression model is generally considered free from autocorrelation when the Durbin–Watson statistic is close to 2 or when the probability value (p-value) of the Breusch–Godfrey test is greater than 0.05,

indicating that the null hypothesis of no autocorrelation cannot be rejected (Gujarati, Damodar N.; Porter, 2014).

Table 4. DIY Province Autocorrelation Test

R-squared	**0.965615**	**Mean dependent var**	**13.45467**
Adjusted R-squared	0.956238	**S.D. dependent var**	1.969789
S.E. of regression	0.412068	**Akaike info criterion**	1.287922
Sum squared resid	1.867800	**Schwarz criterion**	1.476735
Log likelihood	-5.659412	**Hannan-Quinn criter.**	1.285910
F-statistic	102.9705	**Durbin-Watson stat**	1.605073
Prob(F-statistic)	0.000000		

Source : Eviews 12 data processed, 2026

Based on the results of the autocorrelation test using the Durbin–Watson (DW) statistic for the regression model of the Special Region of Yogyakarta Province, a DW value of 1.605 was obtained. This value should be compared with the lower (dL) and upper (dU) critical values in the Durbin–Watson table for 15 observations (n = 15), three independent variables (k = 3), and a 5% significance level. Therefore, the presence or absence of first-order autocorrelation should be determined by comparing the DW statistic with the appropriate Durbin–Watson critical bounds. Although the DW value of 1.605 is relatively close to 2, this value alone is insufficient to conclusively establish the absence of autocorrelation. Accordingly, the validity of the regression estimates for the effects of the Open Unemployment Rate, Economic Growth, and Education Level on poverty in the Special Region of Yogyakarta should be assessed after confirming that the DW statistic falls within the appropriate decision region.

Hypothesis Testing

Once the model meets the classical assumptions, hypothesis testing is carried out to draw empirical conclusions. Hypothesis testing in linear regression includes the determination coefficient test, the F test, and the t test.

1. Simultaneous Significance Test (F Test)

The F test is a statistical test used to find out whether all the independent variables in the model together have a significant effect on the dependent variables. In other words, the F test checks whether the regression model created is really feasible to explain the variations that occur in the bound variables.

Table *5*. Results of the F Test of DIY Province

Statistik	Nilai	Statistik	Nilai
R-squared	0.965615	**Mean dependent var**	13.45467
Adjusted R-squared	0.956238	**S.D. dependent var**	1.969789
S.E. of regression	0.412068	**Akaike info criterion**	1.287922
Sum squared resid	1.867800	**Schwarz criterion**	1.476735
Log likelihood	-5.659412	**Hannan-Quinn criter.**	1.285910
F-statistic	102.9705	**Durbin-Watson stat**	1.605073
Prob(F-statistic)	0.000000		

Source : Eviews 12 data processed, 2026

Based on the results of the F test for the regression model of Yogyakarta Province and the F value of the table 3.49. The F-statistic value of 102.9705 > 3.49 and the Prob value (F-statistic) of 0.000000 < 0.05 were obtained. Therefore, it can be concluded that the variables

of open unemployment rate, economic growth and education level together (simultaneously) have a significant effect on the variable poverty level.

2. Partial Test (t-test)

The t-test is a statistical test used to find out whether each independent variable has an individually significant influence on the dependent variable. With this test, we can see whether a variable X actually makes an important contribution in explaining changes in Y when other variables in the model are considered fixed.

Table 6. Results of the Yogyakarta Province t Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	46.57847	2.704246	17.22420	0.0000
TPT	0.532062	0.162140	3.281497	0.0073
PE	-0.097952	0.147152	-0.665649	0.5193
TP	-3.768121	0.236656	-15.92236	0.0000

Source : Eviews 12 data processed, 2026

Based on the results of the t-test for the Special Region of Yogyakarta Province, the Open Unemployment Rate (TPT) had a coefficient of 0.532062, with a t-statistic of 3.281497 and a probability value (p-value) of 0.0073 < 0.05. Therefore, the Open Unemployment Rate had a positive and statistically significant effect on poverty. Economic Growth had a coefficient of -0.097952, with a t-statistic of -0.665649 and a probability value of 0.5193 > 0.05. Therefore, Economic Growth had a negative but statistically insignificant effect on poverty. Education Level had a coefficient of -3.768121, with a t-statistic of -15.92236 and a probability value of 0.0000 < 0.05. Therefore, Education Level had a negative and statistically significant effect on poverty in the Special Region of Yogyakarta Province.

3. Determination Coefficient Test (R2)

The coefficient of determination (R^2) is used to measure the proportion of variation in the dependent variable that can be explained by the independent variables included in a regression model. The R^2 value ranges from 0 to 1, with values closer to 1 indicating that the model explains a greater proportion of the variation in the dependent variable. However, R^2 is not used to test statistical significance or establish causal relationships, nor does it have a universal minimum acceptable value because its interpretation depends on the characteristics of the data and the research context. Therefore, the R^2 value should be interpreted together with the results of the t-test, the F-test, and the consistency of the regression model with relevant economic theory (Gujarati, Damodar N.; Porter, 2014).

Table 7. Results of DIY Determination Coefficient Test

R-squared	**0.965615**	**Mean dependent var**	**13.45467**
Adjusted R-squared	0.956238	**S.D. dependent var**	1.969789
S.E. of regression	0.412068	**Akaike info criterion**	1.287922
Sum squared resid	1.867800	**Schwarz criterion**	1.476735
Log likelihood	-5.659412	**Hannan-Quinn criter.**	1.285910
F-statistic	102.9705	**Durbin-Watson stat**	1.605073
Prob(F-statistic)	0.000000		

Source : Eviews 12 data processed, 2026

Based on the results presented in the regression model for the Special Region of Yogyakarta Province, the Adjusted R-squared value was 0.956238, or 95.62%. This indicates that approximately 95.62% of the variation in the poverty rate can be explained jointly by the

Open Unemployment Rate, Economic Growth, and Education Level included in the model. The remaining 4.38% is attributable to other factors not included in this study. The relatively high Adjusted R-squared value indicates that the model has strong explanatory power in accounting for variations in poverty in the Special Region of Yogyakarta Province.

Effect of Open Unemployment Rate on Poverty

The results of the study showed that the Open Unemployment Rate (TPT) had a statistically significant effect on poverty. The findings for the Special Region of Yogyakarta are consistent with labor market theory, which explains that the interaction between labor supply and labor demand determines employment opportunities and income levels. When the number of individuals seeking employment exceeds the available job opportunities, a portion of the labor force remains unemployed and consequently experiences a loss or reduction in income, which may increase the risk of poverty. These findings are also consistent with previous research indicating that the open unemployment rate significantly affects poverty (Setyanti et al., 2024).

The Effect of Economic Growth on Poverty

The results of the study showed that the Open Unemployment Rate (TPT) had a statistically significant effect on poverty. The findings for the Special Region of Yogyakarta are consistent with labor market theory, which explains that the interaction between labor supply and labor demand determines employment opportunities and income levels. When the number of individuals seeking employment exceeds the available job opportunities, a portion of the labor force remains unemployed and consequently experiences a loss or reduction in income, which may increase the risk of poverty. These findings are also consistent with previous research indicating that the open unemployment rate significantly affects poverty (Setyanti et al., 2024).

Differences in the Influence of Education Level on Poverty

The results of the study show that Education Level has a statistically significant effect on poverty in the Special Region of Yogyakarta, whereas it has no statistically significant effect in the Bangka Belitung Islands Province. This finding is consistent with Human Capital Theory, which views education as an investment that can enhance the quality of human resources, productivity, and earning capacity, thereby contributing to poverty reduction. In the Special Region of Yogyakarta, higher educational attainment is supported by the development of the service, education, and creative economy sectors, which provide opportunities for the utilization of an educated workforce. Therefore, improvements in educational attainment may contribute to poverty reduction by enhancing individuals' productivity and access to better employment and income opportunities. These findings are consistent with previous research indicating that education contributes to poverty reduction by improving the quality of human resources (Joko Susanto and Udjianto, 2019).

CONCLUSION

Based on the results of the multiple linear regression analysis and the discussion, it can be concluded that the Open Unemployment Rate and Education Level had statistically significant effects on poverty, whereas Economic Growth did not have a statistically significant effect. These findings indicate that poverty in the Special Region of Yogyakarta is more closely associated with labor market conditions and the educational attainment of the

population than with economic growth alone. Therefore, poverty alleviation policies should be tailored to regional socioeconomic conditions and characteristics to achieve more effective and sustainable poverty reduction.

Based on the findings of this study, several recommendations are proposed. The Provincial Government of the Special Region of Yogyakarta should prioritize policies aimed at improving the quality and relevance of vocational education and training in line with labor market demands, while also strengthening productive employment creation programs to increase the absorption of skilled workers. In addition, the government should promote more inclusive economic growth by expanding access for low-income communities to economic empowerment programs, employment opportunities, and social protection schemes. Future research is encouraged to broaden the scope of analysis by incorporating additional variables, such as income inequality, investment, and government expenditure, and by extending the observation period to provide a more comprehensive understanding of the determinants of poverty at the regional level.

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