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Poverty Alleviation Strategies Through Improving Education and Reducing Unemployment in Indonesia

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ABSTRACT

Poverty remains a significant socioeconomic challenge in Indonesia, requiring effective alleviation strategies that extend beyond economic growth to encompass improvements in education and employment opportunities. This study examined the relationships between economic growth, years of schooling, the unemployment rate, and poverty in Indonesia. A quantitative approach was employed using annual time-series data from Statistics Indonesia (Badan Pusat Statistik, BPS) covering the period 2010–2025. The data were analyzed using multiple linear regression estimated through ordinary least squares (OLS), supported by heteroskedasticity and multicollinearity tests. The findings revealed that years of schooling had a statistically significant negative association with the poverty rate, whereas the unemployment rate exhibited a statistically significant positive association. Economic growth showed no statistically significant association with poverty at the 5% significance level. Collectively, the three independent variables were statistically significant in explaining variations in the poverty rate, with the regression model accounting for 95.76% of the observed variation. These findings suggest that economic growth alone may be insufficient to alleviate poverty without equitable distribution of its benefits. Therefore, improving educational attainment and expanding inclusive employment opportunities are essential policy priorities for sustainable poverty reduction in Indonesia.

INTRODUCTION

Poverty remains a persistent socioeconomic challenge affecting millions of households in Indonesia, particularly rural farming communities that often face low incomes, sometimes below IDR 500,000 per month, alongside rising prices of essential commodities such as rice (Anwar et al., 2025). Although data from Statistics Indonesia (Badan Pusat Statistik, BPS) indicate that the national poverty rate has declined to single digits, substantial disparities between urban and rural areas persist (Bedisa, 2026). These conditions suggest that the benefits of economic growth have not been distributed equitably across population groups and regions, highlighting the need for more inclusive poverty alleviation strategies (Faturohim et al., 2023; Shidiqi & Adyun, 2026).

According to Gary Becker's human capital theory, education and training represent essential investments in human capital that enhance workforce skills, productivity, and earning potential, thereby contributing to poverty reduction (Adeline et al., 2024; Delima et al., 2025). This theoretical perspective is supported by empirical studies in Indonesia demonstrating a statistically significant negative relationship between years of schooling and poverty rates (Adam et al., 2022; Ananda & Rachmawati, 2026; Surbakti et al., 2023). Nevertheless, unequal educational access and financial barriers continue to constrain improvements in educational attainment, particularly among economically disadvantaged populations (Purwanti et al., 2025; Ghosh, 2024). From a Keynesian perspective, insufficient aggregate demand may reduce economic output and employment opportunities, contributing to higher unemployment and potentially exacerbating poverty (Rosdiyanto & Sukartini, 2025; Sugiarti & Astuty, 2025). Furthermore, previous research indicates that improvements in the Human Development Index (HDI) are associated with lower poverty rates (Fayza et al., 2025; Pusfita & Musthofa, 2025), whereas unemployment and income inequality may intensify socioeconomic disparities. These findings demonstrate that poverty is a multidimensional challenge shaped by interconnected educational, labor market, and macroeconomic conditions, requiring coordinated policies that expand access to quality education and productive employment.

Previous studies have consistently identified educational attainment as an important factor associated with poverty reduction (Primastuti & Asri, 2025; Solmidawati et al., 2026), while unemployment and income inequality have been associated with higher poverty rates (Utami & Udjianto, 2023). However, some existing studies have relied on relatively short observation periods or examined these determinants independently, limiting their ability to capture longer-term patterns and the combined relationships among key socioeconomic variables. To address these limitations, the present study employed annual national-level data covering 2010–2025 and an integrated econometric model incorporating economic growth, years of schooling, and unemployment as explanatory variables. Specifically, this study aimed to examine the statistical relationships between these three determinants and Indonesia's poverty rate, providing empirical evidence to inform poverty alleviation strategies centered on educational improvement and employment expansion. Drawing on human capital and Keynesian economic theories, the study hypothesized that educational attainment and economic growth would be negatively associated with poverty, whereas unemployment would exhibit a positive association.

The primary contribution of this study lies in providing updated empirical evidence on the simultaneous relationships between economic growth, educational attainment, unemployment, and poverty in Indonesia, while identifying their relative statistical contributions within a unified analytical framework. By integrating educational and labor market perspectives, the study sought to inform poverty alleviation policies that extend beyond economic growth alone. From a practical standpoint, the findings may assist policymakers in prioritizing educational investment, vocational training, workforce development, and inclusive employment creation. Furthermore, this study provides a foundation for future research employing provincial panel data and incorporating additional socioeconomic determinants, particularly income inequality and the Human Development Index, to develop a more comprehensive understanding of poverty dynamics across Indonesia.

METHOD

This study employed a quantitative approach using multiple linear regression to examine the relationships between economic growth, educational attainment, unemployment, and poverty in Indonesia. Annual secondary time-series data covering 2010–2025 were obtained from Statistics Indonesia (Badan Pusat Statistik, 2025a, 2025b, 2026a, 2026b), supplemented by relevant scientific literature.

The dependent variable was the poverty rate (KMS), measured as the percentage of the population living below the national poverty line. The independent variables comprised economic growth (GDP), measured by the annual real gross domestic product growth rate (%); educational attainment (PDK), measured by mean years of schooling (years); and unemployment (PNG), measured by the open unemployment rate (%).

Multiple linear regression was estimated using the ordinary least squares (OLS) method in EViews. The regression model was specified as follows:

$$KMS_t = \beta_0 + \beta_1 GDP_t + \beta_2 PDK_t + \beta_3 PNG_t + \mu_t \quad (1)$$

where \(KMS_t\) represents the poverty rate in year \(t\); \(\beta_0\) is the intercept; \(\beta_1\), \(\beta_2\), and \(\beta_3\) are the regression coefficients; \(GDP_t\) represents the annual economic growth rate; \(PDK_t\) denotes mean years of schooling; \(PNG_t\) represents the open unemployment rate; and \(\mu_t\) is the error term.

The regression model was evaluated using multicollinearity and heteroskedasticity diagnostic tests. Multicollinearity was assessed using the variance inflation factor (VIF), with values below 10 interpreted as indicating no severe multicollinearity. Heteroskedasticity was examined using the Breusch–Pagan–Godfrey test, with p-values greater than 0.05 indicating insufficient evidence to reject the null hypothesis of homoskedasticity.

Individual regression coefficients were evaluated using t-tests, while the joint statistical significance of the independent variables was assessed using an F-test. All hypothesis tests were conducted at a 5% significance level ($p < 0.05$). The coefficient of determination (R^2) was used to assess the proportion of variation in the poverty rate explained by the regression model.

RESULTS AND DISCUSSION

The data were processed and analysed to examine how Indonesia can strengthen poverty alleviation strategies by increasing years of schooling and reducing unemployment. The analysis used multiple linear regression in EViews and followed structured stages—descriptive statistics, classical assumption tests, model estimation, hypothesis testing, and the coefficient of determination—to ensure the results are valid and scientifically interpretable.

Descriptive Statistics

Table 1 summarises the characteristics of the four research variables over the 2010–2025 period. The poverty rate (KMS) averaged 10.40%, with a median of 10.16%, a maximum of 13.33%, and a minimum of 8.25%. Its standard deviation of 1.39 percent and Jarque–Bera probability of 0.7049 indicate moderate variation and a distribution that does not deviate significantly from normality.

Table 1. Descriptive Statistics

Statistic	KMS	GDP	PDK	PNG
Mean	10.39937	4.760625	8.169375	5.948750
Median	10.15500	5.060000	8.135000	5.900000

Statistic	KMS	GDP	PDK	PNG
Maximum	13.33000	6.170000	9.070000	7.480000
Minimum	8.250000	−2.070000	7.460000	4.850000
Std. Dev.	1.388104	1.912637	0.522628	0.791302
Skewness	0.462930	−3.067634	0.172532	0.473591
Kurtosis	2.561747	11.62942	1.713950	2.259892
Jarque–Bera	0.699521	74.73888	1.181996	0.963275
Probability	0.704857	0.000000	0.553774	0.617771
Sum	166.3900	76.17000	130.7100	95.18000
Sum Sq. Dev.	28.90249	54.87269	4.097094	9.392375
Observations	16	16	16	16

Note: KMS = poverty rate (%); GDP = economic growth (%); PDK = mean years of schooling (years); PNG = open unemployment rate (%).

Source: Research data, processed by the authors (2026)

Economic growth (GDP) averaged 4.76%, with a median of 5.06%, a maximum of 6.17%, and a minimum of −2.07%. The minimum value reflects the economic contraction of 2020. Because of this single negative observation, the growth series has a strongly negative skewness (−3.07), a high kurtosis (11.63), and a Jarque–Bera probability of 0.0000. In contrast, growth in the remaining years was relatively stable around its median.

Years of schooling (PDK) has a mean of 8.17 years and an almost identical median of 8.14 years, indicating that the data are fairly evenly distributed. The small standard deviation of 0.52 also indicates limited variation in years of schooling over the period. The unemployment rate (PNG) has a mean of 5.95% and a median of 5.90%; its distribution is fairly symmetrical, with a standard deviation of 0.79, indicating moderate variation.

Overall, years of schooling and the unemployment rate were relatively stable during the observation period, while economic growth fluctuated the most because of the 2020 contraction. In theory, higher economic growth and longer schooling are expected to reduce poverty, whereas higher unemployment tends to increase the poverty rate.

Classical Assumption Tests

Table 2 presents the results of the heteroskedasticity test using the Breusch–Pagan–Godfrey method. The probability of the F-statistic is 0.1383, and the probability of the chi-square (Obs*R-squared) is 0.1265. Both values are greater than 0.05, so we do not reject the null hypothesis of homoskedasticity, meaning the model does not suffer from heteroskedasticity.

Table 2. Heteroskedasticity Test Results

Test statistic	Value	Probability	Value
F-statistic	2.221245	Prob. F(3,12)	0.1383
Obs*R-squared	5.712671	Prob. Chi-Square(3)	0.1265
Scaled explained SS	3.550305	Prob. Chi-Square(3)	0.3143

Source: Research data, processed by the authors (2026)

Therefore, the residual variance in the model is constant (homoskedastic). In the context of this study on poverty alleviation in Indonesia using economic growth, the unemployment

rate, and years of schooling, this result indicates that the model is adequate and its estimates can be relied upon for further discussion.

Table 3. Multicollinearity Test Results

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	8.914801	1395.797	NA
GDP	0.003130	12.78561	1.680475
PDK	0.016150	646.3062	2.470321
PNG	0.025712	144.8257	2.363221

Source: Research data, processed by the authors (2026)

The multicollinearity test uses the centred variance inflation factor (VIF) for each variable because the uncentred VIF is inflated by non-zero variable means. As shown in Table 3, the centred VIF values are 1.680 for GDP, 2.470 for PDK, and 2.363 for PNG. All values are below 10, indicating no multicollinearity in the regression model. In other words, the independent variables—economic growth, years of schooling, and the unemployment rate—are not excessively correlated, so the effect of each variable on poverty can be identified clearly.

Effects of Economic Growth, Years of Schooling, and Unemployment on Poverty

The first step of the analysis was to estimate the multiple linear regression model to determine the effects of economic growth, years of schooling, and the unemployment rate on poverty in Indonesia. Table 4 presents the estimation results.

Table 4. Multiple Linear Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17.46373	2.985766	5.848993	0.0001
GDP	0.117313	0.055943	2.097032	0.0578
PDK	−1.548527	0.248224	−6.238431	0.0000
PNG	0.845162	0.160350	5.270733	0.0002
R-squared	0.957572	Mean dependent var		10.39938
Adjusted R-squared	0.946965	S.D. dependent var		1.388104
S.E. of regression	0.319672	Akaike info criterion		0.769275
Sum squared resid	1.226282	Schwarz criterion		0.962423
Log likelihood	−2.154203	Hannan–Quinn criterion		0.779166
F-statistic	90.27680	Durbin–Watson stat		2.022029
Prob(F-statistic)	0.000000			

Note: Dependent variable = KMS (poverty rate, %); method = ordinary least squares; observations = 16 (2010–2025).

Source: Research data, processed by the authors (2026)

Based on the OLS estimation in Table 4, the multiple linear regression equation is as follows:

$$KMS = 17.4637 + 0.1173GDP - 1.5485PDK + 0.8452PNG \quad (2)$$

The constant of 17.4637 represents the predicted poverty rate when all independent variables are zero. It serves as the baseline of the regression line before accounting for the

effects of economic growth, years of schooling, and the unemployment rate; because zero for these variables lies outside the observed range, the constant should not be interpreted as an actual level of poverty.

The coefficient of economic growth is positive (0.1173), meaning that a one percent increase in economic growth is associated with a 0.117 percent increase in the poverty rate, *ceteris paribus*. This direction does not align with development economics theory, which expects economic growth to reduce poverty. However, the t-test shows that this effect is not significant at the 5% level ($p = 0.0578$) and is only weakly significant at the 10% level. Hence, the effect of economic growth on poverty is not statistically strong. This result suggests that economic growth has not been evenly distributed, so not all segments of society have fully felt its benefits.

Years of schooling have a negative and significant effect on poverty ($p = 0.0000$). Each additional year of schooling is associated with a 1.549 percent decrease in the poverty rate. This indicates that education plays an important role in improving people's skills, productivity, and income, thereby reducing poverty. Among the variables in the model, years of schooling has the strongest statistical effect on poverty, as shown by its largest absolute t-statistic (-6.238). This finding is consistent with human capital theory and with Surbakti et al. (2023), who found that years of schooling significantly reduces poverty in Indonesia.

The unemployment rate has a positive and significant effect on poverty ($p = 0.0002$). A one percent increase in the unemployment rate is associated with a 0.845 percent increase in the poverty rate. Rising unemployment reduces household income, which ultimately increases the number of people living in poverty. This result aligns with the Keynesian view and with Utami and Udjianto (2023), who found that unemployment worsens poverty; unemployment therefore contributes considerably to the poverty rate in Indonesia.

Joint Effect and Explanatory Power of the Model

The F-test was used to determine whether all independent variables jointly affect the dependent variable. The regression yields an F-statistic of 90.27680 with a probability of 0.0000, which is smaller than 0.05. Economic growth, years of schooling, and the unemployment rate therefore simultaneously affect poverty significantly. This result shows that poverty is determined not by a single factor but by a combination of economic growth, years of schooling, and labour market conditions. Economic growth does not necessarily reduce poverty directly if it is not evenly distributed, whereas longer schooling can improve employment opportunities and unemployment tends to worsen poverty. Policies should therefore focus not only on increasing economic growth but also on economic equity, increasing years of schooling, and expanding employment opportunities, so that poverty reduction can be more effective and sustainable.

The R-squared value of 0.9576 indicates that the regression model explains approximately 95.76% of the variation in poverty (KMS) through economic growth (GDP), years of schooling (PDK), and the unemployment rate (PNG). The adjusted R-squared of 0.9470 shows that, after adjusting for the number of independent variables, the explanatory power remains high at 94.70%. Overall, the regression model is reasonably good and reliable in explaining the effects of economic growth, years of schooling, and the unemployment rate on the poverty rate.

Policy Implications for Poverty Alleviation

The results suggest that policies such as increasing years of schooling, job training (the Pre-Employment Card or *Kartu Prakerja*, public vocational training centers or *Balai Latihan Kerja* [BLK], and vocational training), infrastructure development, strengthening micro, small, and medium enterprises (MSMEs), and social assistance programs (the Family Hope Program or *Program Keluarga Harapan* [PKH], the Smart Indonesia Program or *Program Indonesia Pintar* [PIP], food assistance, and the Smart Indonesia and Healthy Indonesia Cards or *Kartu Indonesia Pintar*/*Kartu Indonesia Sehat* [KIP/KIS]) are expected to reduce the poverty rate significantly. These policies work through three main mechanisms: easing the expenditure burden of poor households, increasing income, and reducing pockets of poverty concentrated in underdeveloped regions.

First, social assistance and free education or scholarship programs help ease poor households' spending on children's education, health, and other basic needs. With this assistance, low-income families are no longer forced to withdraw their children from school or sell assets because of financial difficulties. A study of the PKH program shows it reduces poverty by maintaining consumption and children's years of schooling in poor households (Wijianto et al., 2025).

Second, increasing years of schooling and job training help people experiencing poverty acquire skills more relevant to labour market needs. Participants in vocational training and BLK programs generally enter employment more quickly and earn higher incomes than before. The *Kartu Prakerja* program has also shown positive impacts, with some previously unemployed participants finding jobs or starting businesses and average income increasing by approximately 30% among those absorbed into employment. Better schooling and training increase the chances of poor people escaping poverty.

Third, infrastructure development and stronger MSMEs create new economic opportunities in underdeveloped regions. Infrastructure such as roads, bridges, ports, and industrial estates absorbs labor, while MSME empowerment programs help people in villages and small towns become sustainable small-business owners. This is particularly important for reducing pockets of poverty in remote areas that were previously isolated and struggled to access markets.

This study has several limitations. The analysis relies on 16 annual national-level observations, so interpret the model's explanatory power with caution, and note that the results do not capture differences between provinces or between urban and rural areas. Future studies could use provincial panel data and include other determinants, such as income inequality and the Human Development Index.

CONCLUSION

The findings demonstrated that educational attainment and unemployment were significantly associated with poverty in Indonesia, whereas economic growth showed no statistically significant relationship at the 5% significance level. Higher mean years of schooling were associated with lower poverty rates, while higher unemployment rates were associated with increased poverty. Collectively, the three variables explained a substantial proportion of the variation in Indonesia's poverty rate during 2010–2025. These findings suggest that economic growth alone may be insufficient to alleviate poverty without a more

equitable distribution of its benefits. Therefore, poverty alleviation strategies should prioritize equitable access to quality education, human capital development, and the expansion of inclusive employment opportunities to promote sustainable and equitable economic development.

Future research should consider employing provincial panel data to examine regional disparities, including differences between urban and rural areas, and incorporating additional socioeconomic determinants, such as income inequality and the Human Development Index (HDI). Extending the observation period and applying alternative econometric approaches could further strengthen the robustness of the findings. From a policy perspective, investment in education and inclusive job creation should be prioritized as complementary strategies for poverty reduction. These initiatives should be supported by targeted social assistance and vocational training programs designed to alleviate household financial burdens, improve workforce skills and employability, and reduce persistent poverty in economically disadvantaged regions.

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CONFLICT OF INTEREST

The authors declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

GENERATIVE AI STATEMENT

The authors declare that Generative Artificial Intelligence (Generative AI) was used solely to assist with language refinement, grammatical correction, and improvement of manuscript readability. All scientific concepts, interpretations, literature synthesis, analyses, and conclusions were developed by the authors. All AI-assisted content was carefully reviewed, verified, and revised by the authors, who take full responsibility for the accuracy, integrity, and final content of the manuscript.

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