DETERMINANT OF POVERTY RATES IN INDONESIA: A PANEL DATA REGRESSION ANALYSIS

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ABSTRACT

Poverty is a deeply complex and multidimensional phenomenon that has become a central concern for the Indonesian government. According to data from the Central Statistics Agency (BPS), the poverty rate in Indonesia increased significantly from 9.41% in 2019 to 9.78% in 2020, and further rose to 10.14% in 2021. This study aims to examine the key determinants influencing poverty rates in Indonesia, with the ultimate goal of formulating effective policy interventions to alleviate poverty. Employing a quantitative research approach using panel data regression, the study utilises secondary data from BPS spanning the period of 2019 to 2023. The dependent variable is the poverty rate, while the independent variables include economic growth, literacy rate, average years of schooling, open unemployment rate, and the Human Development Index (HDI). The findings reveal that increases in HDI, economic growth, literacy levels, and the open unemployment rate are associated with reductions in poverty. Interestingly, an increase in the average years of schooling correlates with a rise in poverty levels, presenting a paradox that warrants further investigation.

***Keywords**:* Poverty, Economic growth, Unemployment, Literacy rate, HDI.
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I. INTRODUCTION

Indonesia is among the developing countries with a large population, yet it continues to grapple with the persistent and multifaceted challenge of poverty. The 1998 Asian financial crisis marked a turning point, triggering a significant surge in poverty rates as the rupiah depreciated by up to 85% and food prices soared. As a result, approximately 22.5 million individuals fell below the poverty line, and 45% of the population became vulnerable to falling into poverty (Idrus & Rosida, 2020). Although the poverty rate declined to 9.41% in 2019, it increased once again due to the COVID-19 pandemic, reaching 10.14% by 2022, according to Indonesia's Central Statistics Agency. The pandemic led to an economic contraction of 2.07% and directly affected 29.12 million working-age people who lost their jobs.

This situation has not only contributed to rising poverty levels but also intensified income disparities and widened gaps between regions and social groups across the country. Tambunan (2021) highlights that around 66% of Indonesia's total poverty gap stems from structural inequalities, including limited access to quality education, healthcare, infrastructure, and sustainable economic opportunities, particularly in remote and rural areas. The majority of impoverished communities reside in rural regions that depend heavily on the informal sector and low-productivity subsistence agriculture. This inequality goes beyond economic disparity; it reflects long-standing inequities in human development that adversely affect the quality of human capital and limit opportunities for social mobility. Although numerous government intervention programs—such as *PNPM Mandiri Perdesaan*, *Bantuan Langsung Tunai Desa*, and basic infrastructure projects—have been implemented in recent years, statistics reveal that rural poverty rates remain consistently higher than those in urban areas. This underscores the limitations of top-down, uniform development models in addressing deeply rooted structural issues that are shaped by local socio-cultural dynamics and human resource constraints. Hence, poverty reduction in rural areas requires adaptive, community-driven, and comprehensive strategies that go beyond economic interventions and incorporate social and institutional dimensions (Purwono et al., 2021).

In the broader global development agenda, Indonesia's poverty reduction efforts are closely aligned with the Sustainable Development Goals (SDGs) (United Nations, 2015), particularly SDG 1 (No Poverty), which aims to eradicate poverty in all its forms. However, achieving this target is closely linked to other SDGs, including SDG 4 (Quality Education), SDG 8 (Decent Work and Economic Growth), and SDG 10 (Reduced Inequalities). Persistent poverty in Indonesia, especially in rural and less developed regions, highlights that poverty is not merely an income issue, but also a reflection of unequal access to education, employment opportunities, and human development outcomes. Therefore, examining key development indicators such as economic growth, literacy rates, average years of schooling, unemployment, and the Human Development Index (HDI) is crucial to understanding how far Indonesia has progressed toward inclusive development and how effectively SDG targets can be translated into measurable outcomes across provinces.

Poverty is a multidimensional issue shaped by economic performance, education, employment, and overall human development. Addressing it effectively requires an integrated framework supported by empirical analysis, using indicators such as literacy rates, average years of schooling, unemployment figures, and the Human Development Index (HDI). This study aims to investigate the relationship between poverty and several critical development variables: Gross Domestic Product (GDP) as a reflection of national economic capacity; literacy rates and average years of schooling as indicators of individuals' potential for economic and civic participation; and the HDI, which encompasses progress in education, health, and income. These variables were selected for their strong, interdependent correlations with poverty trends in Indonesia, both in the short and long term, and for their role in shaping a population's capacity to escape the poverty trap sustainably (Fatkhu Rokhim, 2023; Nurrahman, 2024; Suparman & Muzakir, 2023).

Education, for instance, plays a vital role in determining household welfare by enhancing access to decent employment, promoting informed decision-making, and strengthening resilience in the face of global economic shifts. Research by Arsani et al. (2020) shows that higher education yields the highest income returns, with college graduates earning, on average, 72.7% more than those who completed only primary education. This finding illustrates how advanced educational attainment unlocks broader economic opportunities and strengthens individuals' bargaining power in the labour market. Nevertheless, geographical disparities, uneven educational infrastructure, and low digital literacy—especially in rural and eastern Indonesia—continue to hinder equitable access to quality education. Low literacy rates and limited years of schooling perpetuate intergenerational cycles of poverty, particularly among households lacking the resources or awareness to support children's educational attainment (Oktaviani & Hartono, 2022). Cultural norms, gender roles, and economic pressures, such as early marriage and the need for child labour, further exacerbate these conditions by deprioritising formal education. Therefore, without targeted policy reforms to enhance both access and quality of education—especially at the secondary and tertiary levels—poverty eradication efforts will remain fragmented and unsustainable (Atmaja, 2023).

HDI serves as a composite measure encompassing education, health, and standard of living (proxied by purchasing power). Beyond quantifying the quality of life, the HDI acts as a diagnostic tool for identifying social inequality and structural poverty. Suparman & Muzakir (2023) argue that a higher HDI is associated with a greater likelihood of escaping long-term poverty, owing to improved access to educational resources, healthcare services, and economic means. However, HDI achievements in Indonesia remain uneven, especially between urban and rural areas and across different regions—most notably between western and eastern parts of the country. These disparities reflect enduring challenges, such as insufficient infrastructure, unequal budget allocation, and a lack of locally tailored policy strategies that respond to the specific characteristics of marginalised communities

(Purwono et al., 2021). Furthermore, limited purchasing power in underdeveloped regions intensifies the poverty trap, as communities struggle to afford basic necessities or invest in their long-term well-being. Accordingly, equitable HDI advancement must be central to Indonesia's national poverty alleviation agenda—not only as a measure of development success but as a key input for sustainable economic transformation.

While previous studies have explored poverty determinants such as income, unemployment, and education in isolation, many have overlooked their structural and interconnected nature. Much of the existing literature also tends to focus on the pre-pandemic period or relies on limited data. Notably, there is a dearth of empirical studies that simultaneously analyse the impact of GDP, literacy rates, average years of schooling, and HDI on poverty levels in the post-pandemic recovery context (2019–2023). This study addresses that gap by employing an integrative quantitative methodology to assess the interactive effects of these key indicators across Indonesian regions. The findings aim to offer a more holistic understanding of poverty dynamics, thereby informing the formulation of targeted, evidence-based policies that support more effective and sustainable poverty reduction strategies.

Against this backdrop, and with poverty remaining one of the most pressing development challenges in Indonesia, this research seeks to explore whether the aspiration of a poverty-free Indonesia is a mere ideal or a tangible goal. Titled "Indonesia Free from Poverty: Dream or Reality? An In-depth Analysis of Influencing Factors (2019–2023)," this study applies rigorous empirical analysis to assess the interplay of socio-economic variables that drive poverty trends during the specified period. The ultimate goal is to provide policymakers with valuable insights and recommendations for building an inclusive and resilient society.

II. LITERATURE REVIEW

Poverty in Indonesia persists as a highly complex and multidimensional phenomenon, shaped by structural inequalities and socioeconomic disparities. A foundational theoretical framework for understanding poverty is the 'vicious circle of poverty,' articulated by Nurkse in 1953, which posits that poverty is a cyclical condition marked by low income, limited savings, minimal investment, and low productivity. This cycle cannot be broken without substantial structural intervention (Nurkse, 1971; Wibowo, et al 2021). Despite Indonesia having sustained economic growth over recent decades, the distribution of benefits has been uneven, especially in excluding the marginalised population in rural areas and those dependent on the informal sector and subsistence agriculture (Safitri, et al 2024).

Although economic growth is frequently used as a primary indicator of development progress, it is ineffective in reducing poverty rates unless accompanied by improvements in human development. Empirical studies reveal that economic growth does not correlate positively with well-being. For instance, Hera, et al (2024)

found that in East Nusa Tenggara indicate that economic growth and unemployment had a significant negative correlation with HDI, whereas poverty has a significant negative correlation. This underscores the need for people-centred development rather than relying solely on macroeconomic growth.

The HDI, as a multidimensional measure of well-being, has become a more comprehensive metric than income alone. It encompasses dimensions of education, health, and standard of living, which collectively influence an individual's ability to escape poverty. Various studies, such as those by Firmansyah, et al (2023) in Sumatra and Suci, et al (2023) in Yogyakarta, confirms that improvements in HDI are significantly associated with poverty reduction, while economic growth and unemployment exhibit weak or inconsistent effects.

In the realm of education, literacy and cognitive skills are crucial variables in poverty alleviation strategies. Cognitive literacy has been proven to reduce the probability of being poor (Firmansyah, et al 2023). Education not only enhances an individual's labour market but also builds resilience in navigating socioeconomic changes. However, disparities in access to and quality of education remain serious challenges, particularly in eastern Indonesia and rural areas that still face limitations in educational infrastructure and low levels of digital literacy (Hera, et al 2024; Hasan, 2021). Such disparities contribute to the intergenerational reproduction of poverty.

Unemployment is another factor linked to poverty, though the relationship in Indonesia is complex. Several studies show that open unemployment does not always correspond to higher poverty, due to the informal sector and social protection programs absorbing much of the labour force (Safitri, et al 2024). Nonetheless, unemployment remains a critical concern, particularly among higher education graduates who face a mismatch between their skills and labour market demands. In this context, the education system must be aligning with labor market dynamics, and a culture of entrepreneurship should be fostering as an alternative avenue for employment (Firmansyah, et al 2023; Prasetyoningrum, et al 2018).

Regional disparities further complicate poverty alleviation strategies in Indonesia. Inequality between western and eastern regions, as well as between urban and rural areas, is evident in various indicators such as HDI, poverty levels, and access to basic services (Ali, et al (2024). Studies in East Nusa Tenggara, East Kalimantan, and other regions reveal that uneven investment in infrastructure, health, and education amplifies these disparities. Therefore, development policies that are sensitive to local social, economic, and geographic contexts are essential (Batari, et al 2023; Nakyah, et al 2024).

Public expenditure serves as a strategic instrument for enhancing human development and poverty reduction. Increases in regional government spending, particularly in education, health, and basic infrastructure, correlate positively with improvements in HDI and reductions in poverty (Safitri, et al 2024). Well-designed fiscal interventions not only expand access to essential services but also create an enabling environment for the economic participation of vulnerable groups.

Collaboration among government entities, the private sector, and civil society is necessary to expand the coverage and effectiveness of poverty alleviation programs (Firmansyah, et al 2023).

Moreover, social protection initiatives such as cash transfers, health insurance, and education subsidies play a significant role in enhancing the resilience of poor communities against economic shocks. These measures help reduce household expenditure burdens and enable the accumulation of human capital through investments in education and health (Ali, et al 2024; Batari, et al 2023). However, gaps in coverage and effectiveness remain, particularly in remote and underdeveloped regions (Nakyah, et al 2024).

The COVID-19 pandemic has provided critical lessons about the vulnerability of Indonesia's economic and social structures to external shocks. The pandemic significantly increased poverty and unemployment rates, particularly in the informal sector, which was the hardest hit (Hera, et al 2024). Policies aimed at strengthening social safety nets, accelerating digital transformation in education, and investing in human development are crucial for building future resilience (Hasan, 2021; Resmarani, et al 2023).

Although numerous studies have attempted to identify the determinants of poverty in Indonesia, most research remains fragmented both spatially and in terms of the variables analysed. Many studies focus only on one or two indicators and are often limited to specific regions. Moreover, comprehensive studies covering the post-2019 period and exploring the interaction of variables such as education, literacy, HDI, and unemployment simultaneously are still scarce (Hannan, et al 2023; Hitayah, et al 2024). This study seeks to address this gap through a more holistic and nationally representative approach.

Specifically, this study aims to simultaneously examine the influence of variables including average years of schooling, literacy, HDI, unemployment, and economic growth on poverty levels in Indonesia during the 2019–2023 period. This focus is essential, given the limitations of previous studies in integrating these factors holistically. By utilising the latest data and a comprehensive quantitative approach, this research is expected to provide a more complete picture of the determinants of poverty in Indonesia. In addition, the study seeks to identify spatial and temporal patterns in the interaction among these variables in recent structural shocks. The findings aim to inform the formulation of more effective, evidence-based poverty alleviation policies.

In summary, poverty alleviation in Indonesia requires an integrated and sustainable approach. The evidence shows that economic growth alone is insufficient without parallel investments in human development, strengthening education and health systems, and expanding social protection. Furthermore, regional disparities highlight the importance of context-sensitive policies and effective cross-sectoral collaboration. This multidimensional approach has proven more effective at

addressing the structural challenges of poverty. Therefore, achieving a poverty-free Indonesia requires an essential approach to addressing the entrenched structural roots of poverty and promoting equitable development.

III. METHODOLOGY

Data Source

This study adopts a quantitative research design and uses secondary data from Indonesia's Central Statistics Agency for 2019 to 2023, encompassing 34 provinces. The data used is a panel that combines time-series and cross-sectional data. To determine significant factors based on repeated observations of an object over different periods of time. The use of panel regression data allows for a more comprehensive analysis, as it captures variations in data across provinces and changes over time simultaneously. In line with the guidance provided by Hsiao, et al (2019) which emphasises the importance of selecting models that match the characteristics of the data to obtain reliable and valid estimation results.

This study relies on several official government publications from BPS because they are credible for statistical analysis. The data included socio-economic variables, namely: poverty rate (Y) as the dependent variable, and economic growth (X1), literacy rate (X2), average length of schooling (X3), unemployment rate (X4), and human development index (X5) as independent variables. 170 data observations have been selected to ensure that there are no extreme or missing values that could affect the validity of the estimation results. This approach is similar to study by Mirtawati, et al (2022) who also utilised panel data to analyse the determinants of poverty in Indonesia.

Analysis Method

This study employs panel data regression analysis. The estimation uses the Common Effect Model (CEM), which assumes that there are no special differences between individual-specific or time-specific effects, so that all units of analysis (provinces) are treated as homogeneous in their responses to the explanatory variables. Model estimation is performed using the Ordinary Least Squares (OLS) method, as an effective general approach in producing unbiased, consistent, and efficient parameter estimation in classical linear models (Gujarati, et al 2009). However, only multicollinearity and heteroscedasticity as suggested by Iqbal (2015) to ensure that there is no high linear relationship between independent variables and there is no variance inhomogeneity in the residual model, which is considered sufficient as the basis for the feasibility of the model.

Mathematically, the panel regression model is specified as follows:

$$Y_{it} = \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + u_{it}$$

The model represents the relationship between dependent variables and independent variables that are assumed to affect them. With the notation '*i*' refers to the unit of analysis, namely the province, while 't' refers to the time period (year). The

regression coefficient of 'β_0' to 'β_5' shows the magnitude of the influence of each independent variable on the dependent variable. For example, 'β_1' measures how much change in poverty levels is caused by changes in economic growth, assuming other variables remain constant. Meanwhile, the 'ui' component is an error term that reflects other factors not included in the model but that still affect the poverty level, which is assumed to be constant during the observation period.

IV. RESULTS AND ANALYSIS

Based on the descriptive statistics presented in Table 1, several key insights can be drawn: (1) The average poverty rate across Indonesian provinces stood at 10.395% with a substantial range from 3.47% to 27.53%. Indicating notable disparities in poverty levels across regions. Economic growth exhibited high variability, averaging 3.766%. But reaching a minimum of -15.74%, reflecting the economic contraction due to the Covid-19 pandemic in 2020. (2) The literacy rate was relatively high, with an average of 96.52%, although the minimum value of 77.90%. Suggest that some provinces still struggle with basic educational attainment. (3) The average years of schooling was 9.151 years, indicating that the population typically completes education up to junior or early high school level. (4) The unemployment rate averaged 5.164%, with a wide range of 1.57% to 10.95%, reflecting diverse labour market conditions in different provinces. (5) The HDI recorded an average value of 71.602%, signifying moderate human development, yet disparities remain, with values ranging from 60.44% to 80.46%. The statistics provide a foundational understanding of the socioeconomic landscape in Indonesia during the study period and help contextualise the relationships further explored in the regression analysis.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Poverty Rate (Y)	170	10.395	5.334	3.47	27.53
Economic growth (X1)	170	3.766	4.193	-15.74	22.94
Literacy rate (X2)	170	96.52	3.922	77.9	99.81
Average length of school (X3)	170	9.151	.827	6.85	11.42
Unemployment rate (X4)	170	5.164	1.757	1.57	10.95
Human development index (X5)	170	71.602	3.902	60.44	82.46

To determine the influence of the selected independent variables on poverty levels in Indonesia, a panel data regression using the CEM with OLS was conducted. The regression results are presented in the table below:

Table 2. Linear regression

Y	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]
X1	-0.12	0.068	-1.78	0.077*	-0.254	0.013
X2	-0.638	0.091	-6.97	0.000***	-0.818	-0.457
X3	3.711	0.544	6.83	0.000***	2.638	4.785
X4	-0.454	0.186	-2.44	0.016**	-0.820	-0.087
X5	-1.048	0.095	-11.08	0.000***	-1.235	-0.861
Constant	115.818	7.755	14.94	0.000***	100.506	131.13
Mean dependent var		10.395	SD dependent var			5.334
R-squared		0.605	Number of obs			170
F-test		50.288	Prob > F			0.000
Akaike crit. (AIC)		904.647	Bayesian crit. (BIC)			923.462

**** p<.01, ** p<.05, * p<.1*

Based on the regression analysis, an interesting relationship was found for each variable, revealing the complex dynamics of poverty in Indonesia. This analysis model has fairly good clarity, with a determination coefficient (R^2) of 0.605, indicating that 60.5% of the variation in poverty level can be explained by these variables. With its constant value of 115.818. This shows that all independent variables (economic growth, literacy rate, average length of schooling, open unemployment rate, and human development index) are considered constant, and the poverty rate is estimated at 115,818.

The regression results show that economic growth has a coefficient of -0.120, indicating a negative relationship. This means that if the economic growth rate increases by 1 per cent, it will reduce the poverty rate by 0.12 per cent. This is in line with research Wibowo, et al (2021) that economic growth has a negative and significant impact on poverty at the Indonesian provincial level in 2011-2018. And it is also strengthened by research Istiqomah, et al (2024) which states that inclusive economic growth can significantly reduce poverty rates, especially when encouraged by income equity policies. Therefore, encouraging economic growth can be one of the solutions to poverty alleviation.

In addition, the results of the literacy level also showed negative results with a coefficient value of -0.638. This means that if there is an increase in literacy level by one percent, it will reduce the poverty rate by 0.638 percent, in accordance with Firmansyah, et al (2023) that good literacy increases access to advanced education and better employment, thereby significantly reducing the risk of poverty. And a very interesting finding appeared in the variable of average school age, which showed a positive relationship with a coefficient value of 3.711, which means that an increase in the average length of school actually increases poverty. This can be due to the mismatch between formal education and the needs

of the labor market. This is supported by the statement of Kamil, et al (2023) that the average length of school in several provinces such as West Nusa Tenggara does not have a significant effect on reducing poverty due to inappropriate employment.

Another finding is in the variable open unemployment rate which shows a negative relationship with a coefficient value of -0.454 which means that if there is an increase of one percent, it will reduce the poverty rate by 0.454 percent. This result in theory seems contradictory because unemployment is generally considered the cause of the increase in poverty. However, this is still acceptable because it is supported by Sihotang, et al (2025) also found that an increase in unemployment is followed by a decrease in poverty, this phenomenon can occur because it may be that unemployed individuals come from the informal sector who are looking for work in the formal sector with higher incomes, which ultimately reduces poverty rates. The same finding by Rahmaningtyas, at al (2023) also shows that increasing unemployment cannot directly increase poverty, because it can be influenced by several factors such as labor mobility between sectors and social assistance programs. Furthermore, the Human Development Index (HDI) shows a negative influence on poverty with a coefficient value of -0.048 which indicates that improving the quality of life can reduce poverty even though the effect is not significant. Supported by Endrawati, et al (2023) who also proves that HDI is negatively correlated with poverty levels in Indonesia, so that by improving the quality of public services, it can reduce poverty levels.

V. CONCLUSION AND RECOMMENDATION

According to this study's findings, variables such as HDI, economic growth, literacy rate, and the unemployment rate have a significant negative influence on poverty rates, indicating that improvements in these indicators will reduce poverty. In contrast, the average length of school shows a significant positive impact on poverty, suggesting that an increase in the average length of school, not accompanied by unemployment, can contribute to higher poverty rates. Therefore, poverty alleviation requires multidimensional interventions, such as improving the quality of education, health, and the job market. These results provide policymakers with an overview of the quality of growth and the equitable distribution of development benefits. With an effective approach, the goal of sustainable development can be achieved to reduce poverty.

Based on these results, several integrated policies are proposed to address poverty. First, the government should encourage economic growth by streamlining investment regulatory procedures and expediting project licensing, as well as increasing investment in infrastructure, which is expected to create new jobs. Second, expand literacy and basic education programs, especially in remote and disadvantaged areas, by conducting awareness campaigns on the importance of

literacy and by providing incentives for community participation in literacy empowerment programs. Third, to overcome the challenge of average school age, the government is expected to align the educational curriculum with the needs of the job market to reduce the gap between education and the world of work, improve the quality of education and strengthen the relationship between educational institutions and industry to ensure graduates are ready for work, and encourage entrepreneurship among college graduates to create new job opportunities. And the last one focuses on improving the quality of health and education, as well as improving living standards. With better health programs, wider access to education, and increased community income, it can help raise HDI by implementing education and skills-training programs to build skills and workforce capacity, which is expected to be a solution for sustainable poverty alleviation.

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