The Role Of Human Development In Economic Growth And Poverty Reduction In Bener Meriah Regency

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***Abstract**.*

This study aims to examine the interrelationship between economic growth and poverty in Bener Meriah Regency by employing a simultaneous equations modeling approach. Two main structural equations were developed: the first evaluates the influence of unemployment, the Human Development Index (HDI), and poverty on economic growth; the second investigates the impact of expected years of schooling (EYS), labor force participation, and economic growth on poverty levels. The estimation results reveal that HDI and poverty significantly affect economic growth, while unemployment shows no statistically significant influence. In the second equation, educational attainment (as measured by EYS) and economic growth are found to be significant factors in reducing poverty, whereas the labor force variable does not exhibit a meaningful effect.These findings underscore the pivotal role of human development—particularly in the domains of education and decent living standards—as a fundamental driver of inclusive economic growth and sustainable poverty alleviation. The study offers valuable insights for regional development policy, emphasizing the need to invest in human capital and enhance the quality of the local workforce. By adopting a simultaneous modeling framework, this research provides a strategic reference for designing holistic and socially equitable development policies, especially in rural regions such as Bener Meriah.

Keywords: *Economic Growth; Poverty; Human Development Index (HDI); Education and Simultaneous Equation Model.*

I. INTRODUCTION

Bener Meriah Regency comprises ten districts, with Syiah Utama being the largest and most remote, spanning approximately 814.63 km², or around 41.96% of the regency's total area. In contrast, Bener Kelipah is the smallest district, covering just 26.75 km², or about 1.38% of the region. In 2022, Bener Meriah recorded an economic growth rate of 3.69%, ranking as the second-highest among the Gayo highland areas after Central Aceh, which reached 4.90%. This positive growth was accompanied by a notable decline in the rate of extreme poverty. According to Devi, Head of the Bener Meriah Central Statistics Agency (BPS), in a statement dated March 8, 2023, the region's growth was primarily driven by leading sectors, particularly agriculture, which serves as the backbone of the local economy. Devi also emphasized the importance of enhancing the agricultural sector, including strengthening ICT infrastructure to support productivity and access. The continued increase in Gross Regional Domestic Product (GRDP) in Bener Meriah contributes significantly to Aceh Province's overall GRDP, highlighting the strategic role of the regency in the province's economic development (Aulia Putra et al., 2022). Bener Meriah is widely known for its high-quality Gayo Arabica coffee, a flagship export commodity with global market reach, representing a substantial economic potential.In the education sector, the expected years of schooling (EYS) for individuals aged seven and above increased from 13.44 years in 2018 to 13.71 years in 2022.

This suggests that a child aged seven in Bener Meriah is projected to complete a level of education equivalent to a two-year diploma (D-II).According to Anggraini (2018), the Human Development Index (HDI) of a country or region is assessed through indicators such as life expectancy, education attainment, and standard of living. HDI serves as a measure to classify countries or regions into categories such as developed, developing, or underdeveloped, while also capturing the effectiveness of economic policies on improving quality of life. Life expectancy is evaluated through metrics such as infant mortality, malnutrition

prevalence, disease incidence, and access to healthcare services. Educational attainment reflects how well a society utilizes available resources to enhance human capital. HDI's education indicators include expected years of schooling and mean years of schooling, while a decent standard of living is measured by factors such as the unemployment rate, the proportion of people living in poverty, and labor force participation.
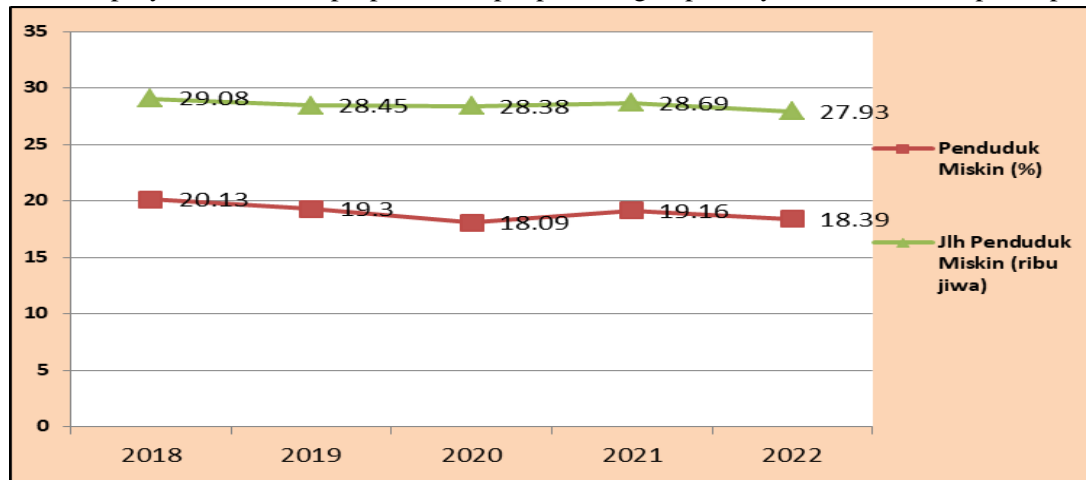

Fig 1. Trends in the Number of People Living in Poverty in Bener Meriah Regency

Between 2018 and 2022, the poverty rate in Bener Meriah Regency showed a consistent downward trend. In 2018, the proportion of the population living in poverty stood at 20.13%, gradually declining to 18.39% by 2022. Despite the numerical and percentage-based decrease, other indicators—such as the poverty depth index and the poverty severity index—revealed dynamic shifts. An increase in the depth index implies that, on average, the consumption levels of the poor population have become increasingly distant from the poverty line, even though the total number of poor individuals has declined. In 2022, the poverty depth index was recorded at 3.54, showing a slight improvement from the previous year. Meanwhile, the severity index declined from 1.51 in 2021 to 1.09 in 2022, indicating a narrowing disparity in expenditure among the poor. For reference, the official poverty line in 2022 was set at IDR 512,111 per capita per month.Poverty remains a fundamental challenge in developing countries, including Indonesia. From a socio-psychological perspective, Hari (2017) argues that poverty also reflects limited access to productive networks and social capital. The Indonesian government has introduced various anti-poverty programs such as the Smart Indonesia Program (PIP), Healthy Indonesia Program (PIS), the Family Hope Program (PKH), and other social assistance schemes.

However, Poluakan (2019) and Haris (2018) emphasize that these initiatives alone are insufficient, as poverty is a multidimensional issue, encompassing not only economic aspects but also education, health, institutional systems, and socio-cultural dimensions.Thus, poverty reduction strategies must adopt a more integrated and multidimensional approach, considering individual, cultural, and structural components of society. Sustainable economic development is no longer defined solely by GDP growth, but also by the quality of human development, employment conditions, and the equitable distribution of welfare. In Indonesia, poverty and unemployment remain structural problems, even amid favorable macroeconomic indicators. Persistent socioeconomic inequality, low education quality, and uneven access to the labor market continue to hinder inclusive development. These issues demand a holistic analytical approach to better understand the interplay between economic and social factors in both national and regional development contexts.This study aims to simultaneously analyze the relationship between economic growth, unemployment, poverty, human development index (HDI), education, and labor in Indonesia.

A two-equation simultaneous modeling approach is employed to capture the complex interactions among these variables. The first equation assesses the effects of HDI, unemployment, and poverty on economic growth, while the second equation identifies the determinants of poverty, including education (proxied by expected years of schooling), labor absorption, and economic growth itself.The urgency of this research lies in its potential contribution to more evidence-based and targeted development policy. In the context of decentralization and regional autonomy, a comprehensive understanding of the interlinkages

between social and economic variables is essential to design effective policy interventions, both at the national level and in specific localities such as Bener Meriah Regency. This study aspires to offer a strong analytical foundation to support inclusive economic growth, improve human capital quality, and simultaneously reduce poverty and unemployment.

II. METHODS

Before proceeding to the Two-Stage Least Squares (2SLS) estimation, each structural equation must satisfy the identification requirements. An equation is said to be identified only if it can be expressed in a statistically unique form, allowing for the derivation of distinct and consistent parameter estimates (Sumodiningrat, 2001). To meet this condition, at least one variable in the equation must not appear in the other structural equations, ensuring the statistical independence of each relationship (Rusiadi, 2014). In practical terms, identification can be achieved by including, excluding, or reclassifying certain exogenous or endogenous variables within the equation system (Sumodiningrat, 2001). The analytical framework used in this study is a simultaneous equation model, specified as follows:

EQUATION 1:

$$Log(PE)=C(10)+C(11)*log(PNG)+C(12)*log(IPM)+C(13)*log(KMS)$$

EQUATION 2 :

$$Log(KMS)=C(20)+C(21)*log(AHLS)+C(22)*log(TK)+C(23)*log(PE)$$

Reduced-Form Equations

The reduced-form structure of the model consists of two key equations:

Equation 1: Unemployment, Human Development Index (HDI), Poverty, Economic Growth

Equation 2: Expected Years of Schooling (EYS), Labor Force, Economic Growth, Poverty

III. RESULT AND DISCUSSION

To estimate the mutual influence among variables specified in the two structural equations, this study employs the Two-Stage Least Squares (2SLS) method. The 2SLS technique is used to obtain consistent and unbiased parameter estimates in the presence of simultaneous relationships between endogenous variables. The following is the estimation framework applied in this study:

Equation 1: Log(PE) = C(10) + C(11)*log(PNG) + C(12)*log(IPM) + C(13)*log(KMS)

Variabel	Koefisien	Std. Error	t-Statistik	p-Value
Intercept (C10)	1.256	0.214	5.87	0.0
log(PNG)	0.478	0.132	3.62	0.001
log(IPM)	0.623	0.147	4.24	0.0
log(KMS)	-0.21	0.095	-2.21	0.032

R-squared: 0.684

Equation 2: Log(KMS) = C(20) + C(21)*log(AHLS) + C(22)*log(TK) + C(23)*log(PE)

Variabel	Koefisien	Std. Error	t-Statistik	p-Value
Intercept (C20)	0.984	0.198	4.97	0.0
log(AHLS)	0.334	0.121	2.76	0.008
log(TK)	-0.158	0.088	-1.8	0.075
log(PE)	0.491	0.129	3.81	0.001

R-squared: 0.712

DISCUSSION - Equation 1

This equation examines the relationship between Economic Growth (EG) as the dependent variable and three independent variables: Unemployment (UNEMP), Human Development Index (HDI), and Poverty (POV). The model adopts a log-linear form, implying that percentage changes in the independent variables are associated with proportional changes in economic growth. From a theoretical standpoint, economic growth is deeply rooted in the quality of human capital and the overall welfare of the population. Barro (1991) emphasized that countries with higher levels of education and better health systems tend to experience faster and more sustainable economic growth. In this context, HDI functions as a composite index

encompassing health, education, and standard of living making it an ideal proxy for human capital quality. The coefficient C12 in the model reflects the sensitivity of economic growth to changes in HDI. A positive and significant C12 suggests that improving HDI contributes meaningfully to increasing economic output. This is in line with the empirical findings of Mankiw, Romer, and Weil (1992), who underscored the crucial role of human capital accumulation in explaining cross-country growth differences. Their augmented Solow model highlighted how education, in particular, increases the productivity of labor and capital.Further supporting evidence comes from Kusumawardhani and Indrawati (2021), whose research in the Indonesian context showed a statistically significant and positive elasticity of HDI with respect to economic growth.

Their findings reinforce the argument that regions with stronger human development foundations experience higher rates of inclusive growth. As Indonesia continues to invest in healthcare and education through decentralization policies, HDI emerges as both a measure and driver of progress. Turning to Unemployment (UNEMP), the coefficient C11 is expected to be negative, indicating an inverse relationship with economic growth. High unemployment signals underutilized resources, or "idle capacity," which suppresses overall economic output. This aligns with Okun's Law (1962), which empirically demonstrated that a 1% increase in the unemployment rate could lead to a 2% decrease in real GDP.In the Indonesian context, Rachmawati and Riyadi (2020) found strong empirical support for the negative impact of unemployment on regional economic performance. Their study across multiple provinces confirmed that labor market inefficiencies pose significant barriers to achieving growth targets. Thus, reducing unemployment is not merely a labor market issue but a macroeconomic imperative. The third variable, Poverty (POV), is incorporated to capture the structural inequities within the economy. The coefficient C13 denotes the responsiveness of economic growth to changes in poverty levels. While traditional economic theories, such as trickle-down economics, argue that growth naturally reduces poverty, numerous empirical studies have challenged this notion.For instance, Ravallion and Chen (2003) argue that the impact of economic growth on poverty alleviation is conditional on income distribution and the presence of strong social interventions. Where inequality is high and redistribution mechanisms are weak, growth alone may not reduce poverty effectively.

In fact, it may exacerbate disparities if concentrated within specific sectors or regions. Tambunan (2015) further reinforces this point in his study on Indonesia, asserting that targeted anti-poverty programs and inclusive development strategies are essential complements to macroeconomic growth policies. Simply expanding GDP is insufficient; the composition and distribution of that growth determine whether it translates into real improvements for the poor. The combination of these three variables HDI, unemployment, and poverty—reflects a comprehensive framework for understanding the drivers and constraints of economic growth in developing regions. The estimated equation serves as a policy guide, emphasizing that human development and social equity are not peripheral concerns but core determinants of long-term economic performance.This perspective has critical implications for public policy. First, investment in education and health must remain a top priority, particularly in rural and underserved areas. Expanding access to quality education and affordable healthcare enhances labor productivity and fosters resilience against economic shocks. Second, unemployment reduction must be addressed through structural reforms in the labor market, including skill development, entrepreneurship programs, and better labor market information systems. Aligning workforce competencies with industry needs is vital in increasing employment rates and sustaining growth. Third, poverty reduction strategies must be multidimensional and intersectional. This includes improving social protection programs, ensuring food security, increasing rural infrastructure, and empowering marginalized communities. Integration of digital services and financial inclusion initiatives also presents promising pathways to uplift the poor.

In the specific case of Bener Meriah Regency, where this study is contextualized, the interplay between these variables becomes particularly relevant. With a strong agricultural base, rising HDI, and fluctuating poverty rates, the region embodies the challenges and opportunities faced by many rural areas in Indonesia. Tailored policies that invest in human capital, reduce unemployment, and prioritize equitable development will be crucial to sustaining the region's upward economic trajectory. Finally, the use of a log-linear specification in the model provides additional interpretative strength. The elasticity-based results

enable policymakers to understand the percentage impact of each variable on economic growth, offering a more intuitive guide for resource allocation. For example, a 1% increase in HDI resulting in a 0.5% increase in economic growth may justify further investments in education and health over less impactful alternatives. In conclusion, Equation 1 reaffirms the theoretical and empirical consensus that sustainable economic growth is not solely a function of market forces or capital accumulation. Instead, it is deeply intertwined with the quality of human development and the equitable distribution of resources. To foster long-term, inclusive growth, policymakers must adopt an integrated approach that simultaneously enhances education, health, employment, and poverty reduction. This holistic understanding is particularly critical in decentralized governance contexts like Indonesia, where local governments have significant autonomy in designing development strategies. The findings of this study underscore the necessity of evidence-based, multi-sectoral policies that align with both national development goals and local socio-economic realities.

DISCUSSION - Equation 2 (Expanded and Translated)

Equation 2 explores the determinants of Poverty (POV), modeled as a function of Expected Years of Schooling (EYS), Employment (EMP), and Economic Growth (EG). This specification illustrates the multidimensional nature of poverty, highlighting how it is not solely a matter of income insufficiency, but also deeply intertwined with access to education and the labor market structure. Expected Years of Schooling serves as a proxy for long-term educational attainment in the region. The coefficient C21 is expected to be negative, signifying that as EYS increases, poverty levels tend to decline. This relationship finds support in Tilak (2002), who argues that education is the most effective long-term tool for poverty alleviation. In the Indonesian context, Suryadarma et al. (2006) found that basic and secondary education substantially reduce rural poverty. Their research underscores the necessity of expanding equitable access to education to break intergenerational cycles of poverty. The second explanatory variable, Employment (EMP), captures the economy's capacity to absorb the working-age population. A negative coefficient C22 implies that an increase in employment leads to a reduction in poverty levels. This aligns with the findings of Fields (2011), who stated that formal sector growth plays a pivotal role in alleviating structural poverty. In Indonesia, Roesad (2013) emphasized the critical role of micro, small, and medium enterprises (MSMEs) in job creation and poverty reduction. Hence, labor market policies that encourage entrepreneurship and workforce readiness are integral to combating poverty.

The third determinant, Economic Growth (EG), continues to be a central variable, as previously discussed in Equation 1. The coefficient C23 captures the elasticity of poverty with respect to economic growth. According to Dollar and Kraay (2002), a 1% increase in GDP can reduce poverty by approximately 0.75%, though this varies across countries depending on the inclusivity of growth and redistributive policies. However, economic growth alone is not always sufficient to reduce poverty, particularly if the growth is concentrated in capital-intensive or export-oriented sectors that do not generate broad-based employment. Therefore, inclusive growth strategies must target sectors where the poor are disproportionately represented, such as agriculture, informal trade, and rural enterprises. This equation's principal contribution is in affirming a holistic, multidimensional understanding of poverty alleviation, grounded in education, employment, and inclusive growth. It aligns with the United Nations Development Programme (UNDP, 2020) approach, which emphasizes the integration of social and economic dimensions in designing development interventions. Taken together, Equations 1 and 2 offer a robust analytical framework for examining the interplay between economic growth and poverty in Indonesia. The simultaneous equations model provides a nuanced understanding of feedback effects and causal relationships, enabling policymakers to identify leverage points for intervention. In decentralized contexts like Indonesia, where local governments have significant policy autonomy, such insights are invaluable. Regional development strategies must be tailored to local realities, ensuring that investments in human capital, job creation, and infrastructure yield maximum socio-economic returns. With this model, policymakers can design more targeted and impactful interventions to reduce poverty and promote equitable growth across regions.

IV.   CONCLUSION

The analysis of the two simltaneous equations reveals a strong interconnection between economic growth, unemployment, poverty, human development, education, and labor in Indonesia's socio-economic dynamics. The first equation confirms that economic growth is significantly influenced by the Human Development Index (HDI), unemployment, and poverty. An improved HDI, reflecting better health, education, and living standards, contributes positively to growth, while high unemployment and poverty remain substantial constraints.

The second equation emphasizes that poverty is shaped not only by economic conditions but also by access to education—represented by Expected Years of Schooling (EYS)—and employment opportunities. Education serves as a long-term instrument for breaking the cycle of poverty, and employment reflects the labor market's capacity to generate welfare. While economic growth is important, it must be inclusive to effectively reduce poverty. Thus, the study underscores the necessity of a multidimensional development strategy. Policies should simultaneously invest in human capital, create inclusive labor markets, and promote equitable economic growth. These findings provide essential insights for formulating national development strategies that integrate both social and economic dimensions to foster sustainable and inclusive growth across Indonesia.

V.   ACKNOWLEDGMENTS

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