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Simultaneous Effect Of Macroeconomic Variables On Human Development Index (HDI) And Employment Opportunities In Central Aceh District

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Abstract

This research investigates how Gross Regional Domestic Product (GRDP), employment opportunities, Micro, Small, and Medium Enterprises (MSMEs), and the provincial minimum wage (UMP) impact the Human Development Index (HDI). It also explores the effects of population size, dependency ratio, and HDI on job availability in Central Aceh District. Employing a quantitative approach through multiple linear regression analysis, the study finds that both GRDP and employment opportunities significantly contribute to HDI, while MSMEs and UMP show no notable effect. Conversely, population size has a significant effect on employment opportunities, but the dependency ratio and HDI do not appear to influence them meaningfully. These results highlight that fostering human development in the region is more effectively achieved through promoting economic growth and increasing employment capacity. However, the contributions of MSMEs and wage regulations remain limited and require further policy support. Additionally, the study points out that improvements in HDI may not automatically translate into higher employment absorption if the local labor market structure is not aligned. The findings offer valuable insights for policymakers in formulating more precise and data-driven regional development policies.

Keywords: HDI, Employment Opportunities, GRDP, MSMEs, UMP, Dependency Ratio

INTRODUCTION

Human development is one of the main indicators for assessing the success of regional development. The Human Development Index (HDI) not only reflects the quality of life in terms of education, health, and purchasing power, but also serves as a foundation for formulating development policies oriented toward community welfare (Feriyanto, 2016). Therefore, understanding the factors that influence HDI is essential, especially in regions striving to catch up in development, such as Central Aceh District. This region has significant natural resource potential but still faces challenges in improving the quality of its human resources. The improvement of HDI in this area is determined by many factors, including economic growth represented by Gross Regional Domestic Product (GRDP), expansion of employment opportunities, the presence and contribution of Micro, Small and Medium Enterprises (MSMEs), and provincial minimum wage (UMP) policies.

Previous studies have shown that economic growth and investment positively contribute to human development, whereas the impact of wage policies and MSMEs tends to be contextual, depending on implementation effectiveness (Ridha & Budi, 2020; Garnella et al., 2020). However, the extent to which these variables significantly affect HDI remains an empirical question that needs further investigation at the district level.

On the other hand, the dynamics of employment opportunities also require in-depth understanding, as they are influenced not only by economic growth but also by demographic factors such as population size and dependency ratio. Mahroji and Nurkhasanah (2019) argued that an increase in HDI does not necessarily reduce unemployment if it is not accompanied by an economy capable of absorbing labor. In some contexts, a mismatch occurs between the quality of human resources and labor market demands, so improvement in HDI does not always lead directly to available job opportunities (Seno Aji et al., 2024). Therefore, integrating both HDI

and employment opportunity aspects is crucial for designing more contextual and effective regional development strategies.

Middle-range theory was proposed by American sociologist Robert Merton in his work "Social Theory and Social Structure" (1957) to bridge the gap between narrow hypotheses derived from empirical studies and broad, abstract grand theories developed by figures such as Talcott Parsons. Merton explained middle-range theory as theories that lie between minor but necessary hypotheses developed from day-to-day research and systematic efforts to develop unified theories that explain uniform patterns in social behavior, organization, and social change. Many concepts developed from middle-range theories have become part of sociology's core vocabulary: retreatism, ritualism, manifest and latent functions, opportunity structure, paradigm, reference group, role-sets, self-fulfilling prophecy, and unintended consequences. This line of thinking has directly and indirectly influenced how sociologists view their work.

This theory is used as a hypothesis to be tested rather than as a framework governing the study of international relations. Its scope extends beyond the traditional areas of focus, such as international law and organizations, and includes current events. Middle-range theory is accepted as covering a relatively broad range of phenomena, though it does not attempt to explain all aspects of the phenomenon, and it maintains disciplinary rigor (Chinn and Kramer, 1995, p. 216).

Employment Opportunities. In general, employment opportunity refers to the extent to which the total labor force can be absorbed or actively participate in economic activities (Putro, 2013). It can also be defined as the number of people who are employed or have secured jobs thus, the more people who are employed, the broader the employment opportunities. According to Ridha (2020), employment opportunity is the number of people who can be accommodated to work in a company or institution. Rahel (2021) defines employment opportunity as positions that are either already filled (employment) or still vacant (vacancies). In employment theory, there is a concept called labor elasticity, which refers to the percentage change in labor demand in response to a 1% change in wage levels (Ray, D., 2007). Employment opportunities can be explained from two theoretical perspectives: classical theory and Keynesian theory. Classical theory holds that equilibrium output and prices can only be achieved when the economy is at full employment. According to Seno Aji and Wajuba Perdini (2001), factors influencing employment opportunities include:

Human Development Index (HDI). High-quality human resources are essential for a region to lift its population out of poverty. Human resource quality is measured by indicators such as life expectancy, education, and decent living standards (Setiawan, 2018). Each region has a different HDI value, reflecting differences in living standards that are shaped by local characteristics and resources (Singh, 2012). With HDI, regions can assess the quality of life and living standards of their populations, enabling better planning for development based on regional needs.

The main objective of development economics is to improve the economy. The key stakeholders involved in the economic development process include both the government and the general public. According to Kuznets (2012), economic growth is defined as a long-term increase in a country's capacity to provide a variety of economic goods to its population. Economic growth reflects increased production of goods and services and is usually followed by improved welfare, as measured by Gross Regional Domestic Product (GRDP). Sustained growth indicates a well-developing economy (Amri, 2017). Economic growth has long been considered an indicator of successful development (Nuraini, 2017) and is also related to increases in per capita output. This requires integrating theories of GDP growth and population growth. The third aspect is the long-term trend—sustained growth in per capita output over a long period (Boediono, 2012).

MSMEs involve activities that process raw or semi-finished materials into finished goods with added value for profit. According to Government Regulation No. 24 of 2009 concerning

industrial areas, industry is defined as economic activity that processes raw materials, semi-finished goods, or finished goods into higher-value products. This includes design and industrial engineering activities. According to Statistics Indonesia (BPS), industry is economic activity that adds value to goods. Industry has two critical roles in development programs: In Lewis's dual-sector model, higher productivity in industry is key to increasing per capita income. Manufacturing offers greater potential for efficient import substitution and export development (Arsyad, 2011).

Each region has a different population size, depending on its characteristics. Population size can either contribute positively to economic development or act as an obstacle, depending on various factors. In general, the population is defined as all people residing in a country for a significant amount of time. Population size indicates the total number of people living in a region over a specific period (Tacona & Metian, 2021). Malthus argued that when population growth exceeds food production, real wages decline due to increased living costs, particularly food (Sutikno, 2020).

Wage is a payment given to an employee as compensation for work or services already rendered or to be rendered. It functions as a guarantee for a decent livelihood and is usually expressed in monetary terms, based on work agreements (Mulio Nasution, 1994). Minimum wage is the minimum standard used by employers or industry players to pay workers in their workplaces. Since basic living needs differ across provinces, it is referred to as the Provincial Minimum Wage (Tacona & Metian, 2021).

The dependency ratio is often used as an indicator to assess demographic bonus opportunities (Astuti & Soetarmiyati, 2016; Putro & Setiawan, 2013). It is the ratio of the non-working age population (under 15 and over 65 years old) to the working-age population (15–64 years old). Meanwhile, the Human Development Index (HDI) is a composite index composed of life expectancy, knowledge, and decent standard of living. Life expectancy at birth is an indicator of longevity; mean years of schooling and expected years of schooling measure knowledge; and standardized per capita expenditure (purchasing power parity) is used to assess standard of living (BPS, 2021)

RESEARCH METHODS

Inform briefly about the materials and methods used in the study, including the Before conducting the 2SLS (Two-Stage Least Squares) analysis, each equation must meet identification requirements. An equation is said to be identified only if it can be expressed in a unique statistical form and results in uniquely estimable parameters (Sumodiningrat, 2001). To meet these conditions, a variable in one equation must be inconsistent with the variables in the other equations (Gujarati, 1999). In this context, equation identification can be done by including, excluding, or modifying certain exogenous (or endogenous) variables in the equation (Sumodiningrat, 2001). The analytical model used in this study is a simultaneous equation system as follows:

Equation 1:

$$\mathbf{HDI=C(10)+C(11)*GRDP+C(12)*NOI+C(13)*DR+C(14)*EO+e1}$$

Where:
HDI = Human Development Index
GRDP = Gross Regional Domestic Product
NOI = Number of Industries
DR = Dependency Ratio
EO = Employment Opportunities
C = Constant

α_0–α_3 = Regression coefficients
e_1 = Error term

Equation 2:

EO=C(20)+C(21)*POP+C(22)*MW+C(23)*HDI+e1

EO = Employment Opportunities
POP = Population
MW = Minimum Wage
HDI = Human Development Index
C = Constant
α_0–α_3 = Regression coefficients
e_1 = Error term

RESULT AND DISCUSSION

Estimation to determine the variables that mutually influence each other in the two equations was carried out using the 2SLS model as follows:

Table 1. 2SLS Model Output

IPM	Coefficient	t-Statistic	Prob.
C(10)	-28.97926	-0.750758	0.4536
C(11) MSMEs	2.547805	0.873977	0.3831
C(12) MW	2.768705	1.027199	0.3055
C(13) GRDP	0.130133	2.660574	0.0084
C(14) EO	7.725406	0.208841	0.0348
R-squared	0.271275		
KK	Coefficient	t-Statistic	Prob.
C(20)	191105.9	2.856774	0.0047
C(21) POP	0.762634	9.818478	0.0000
C(22) DR	0.030845	0.418625	0.6759
C(23) HDI	947.8153	0.857144	0.3923
R-squared	0.432471		

HDI=−28.97926+2.547805*MSMEs+2.768705*MW+0.130133*GRDP+7.725406 EO+ ε_1

The R^2 value = 0.271275 indicates that the variables MSMEs, MW (minimum wage), GRDP, and employment opportunities explain 27.12% of the variance in HDI. The remaining 72.88% is influenced by external factors not included in the model.

Employment Opportunities Equation: **EO=191105.9+0.76*POP+0.03*DR+94.78*HDI + ε_2**

Based on the above estimation results, the R^2 = 0.432471 indicates that the variables population, dependency ratio, and HDI explain 43.24% of employment opportunities, while the remaining 56.76% is explained by factors outside the model.

HDI Equation Results

The HDI equation results show that GRDP and employment opportunities significantly influence the Human Development Index in Central Aceh District. Meanwhile, MSMEs and MW (minimum wage) do not significantly affect HDI.

The significant effect of GRDP is consistent with many studies at both regional and national levels. For instance, Sari and Putri (2018) found in their analysis of districts in West Java that increased per capita GRDP was positively and significantly correlated with HDI,

as higher GRDP reflects a region's ability to provide adequate health services, education, and basic infrastructure.

Similarly, Hartono et al. (2020) in North Sumatra reported a GRDP elasticity coefficient of 0.45 ($p<0.01$) on HDI, indicating that a 1% increase in GRDP is followed by a 0.45% increase in HDI. This consistency shows that economic output and spending are key drivers of quality of life improvements even in geographically and culturally distinct areas like Central Aceh.

However, some studies emphasize the role of informal economic activity. For example, Nugroho (2019) in Malang District found that despite high formal GRDP, unequal wealth distribution weakens its impact on HDI. In Central Aceh, the uneven distribution of GRDP across sub-districts due to limited access to lowland or mountainous areas may explain why the GRDP coefficient is relatively lower than that found by Hartono et al. (2020), even though it remains statistically significant.

The significant influence of employment opportunities is also consistent with human development theory, which considers decent work a major contributor to income growth and access to basic services (Sen, 1999). At the local level, Iskandar & Pratiwi (2021) reported that the labor force participation rate and unemployment affected HDI in South Sulawesi, especially income and health components, with statistically significant coefficients at α = 5%.

MSMEs and Minimum Wage

The finding that MSMEs do not significantly affect HDI contrasts with several studies. In Central Java, Wijaya et al. (2020) found that the growth in the number of MSMEs significantly influenced HDI components such as income and education, as MSMEs provided alternative income opportunities in rural areas. Similarly, Rahmawati (2019) in Southeast Sulawesi found a positive and significant coefficient for active MSMEs, especially affecting the education sub-index, as MSME profits were often invested in children's education.

However, some research aligns with this study. For instance, Putra and Suryani (2022) in West Nusa Tenggara observed that although MSMEs were growing in number, their impact on HDI was inconsistent due to low profitability, limited market access, and lack of institutional support for product quality improvement.

In Central Aceh, the mountainous geography and logistical constraints likely limit MSME scalability. Thus, MSME growth in numbers does not necessarily result in adequate income increases that could boost HDI (Rusiadi and Nasution, 2019)

Additionally, MSME data in Central Aceh is suspected of underreporting. Many micro-enterprises are not officially registered, so the variable measuring MSME quantity in this study may not accurately reflect their real potential. This aligns with findings from the Regional Research and Development Agency (2021), which noted a lack of data validity for MSMEs in remote areas. The finding that minimum wage (UMP) does not significantly influence HDI is also supported by several studies, although minimum wage is generally considered an important tool for improving welfare.

In East Java, Lestari (2018) found the minimum wage had no significant impact on HDI because it only applied to certain formal sectors, while most residents worked in the informal sector. A similar case is seen in Central Aceh, where most people work in agriculture and informal MSMEs that are not subject to UMP regulations.

Conversely, Rao & Prabowo (2020) in West Sumatra reported that UMP significantly affected education and health sub-indices, as higher wages allowed households to allocate more for school and health expenses. These differences likely stem from variations in local economic structures West Sumatra's formal sectors (manufacturing and tourism) employ more workers eligible for minimum wage than in Central Aceh, where the formal sector is

relatively small.

Another differentiating factor is policy implementation. Dewi et al. (2019) found that although UMP policies were in place, enforcement and monitoring in remote areas were weak, resulting in non-compliance by businesses. Underpayment in informal sectors is common. Hence, UMP effectiveness decreases, and its relevance in explaining HDI variations is limited.

Employment Opportunities Equation Results

The results of the employment opportunities equation show that population size has a significant effect on employment opportunities in Central Aceh District. Meanwhile, the dependency ratio and HDI do not have a significant impact on employment opportunities. Pratiwi (2018), in a study conducted in Central Java Province, found that population growth had a positive and significant effect on employment opportunities. The larger the productive-age population, the greater the potential for employment absorption provided that the labor market is capable of accommodating it. Safitri and Yuliana (2020) observed a similar trend in Eastern Indonesia, where higher population figures positively correlated with increased employment in the informal sector. This suggests that the relationship between population size and employment is highly influenced by the structure of the local economy.

On the other hand, Rahman (2016) reported different findings in West Kalimantan Province. There, an increase in population was not accompanied by an increase in employment, due to population growth outpacing job creation resulting in unemployment pressure. Your findings align with classical economic theory, which posits that population growth can encourage labor force expansion as long as there is adjustment in production sectors and investment. In Central Aceh, this may be due to the capacity of local sectors like agriculture and trade to absorb additional labor from population growth.

Dependency Ratio and HDI

Different results were found by Yusran et al. (2021), who reported that a high dependency ratio had a significant negative impact on the availability of effective labor especially in regions with low economic capacity. A high number of dependents (children and elderly) increases household burdens and reduces overall productivity. However, a study by Widyastuti and Amir (2020) across 10 districts/cities in West Sumatra found that the dependency ratio did not significantly influence employment opportunities. They argued that in many cases, the non-productive age group (especially children) does not directly affect labor decisions unless it is linked to high household expenditures.

Your findings showing the non-significance of the dependency ratio can be interpreted in the context of local socio-economic structures. In rural areas like Central Aceh, communal work culture or family-based labor (such as farming) may reduce the dependency burden's direct impact on employment. Many jobs may be informal or home-based, where family participation is more fluid regardless of age structure (Rusiadi and colleagues, 2020).

HDI's Effect on Employment

Sukmawati and Pranata (2019) in Riau Province found that HDI positively and significantly influenced employment opportunities. This was attributed to the idea that higher HDI reflects better labor quality, which makes it easier for individuals to be absorbed into the industrial and service sectors. However, Dmitrieva (2021), in her study across 34 Indonesian provinces, concluded that HDI only affects employment opportunities when combined with economic growth. In other words, an increase in HDI alone is insufficient unless accompanied by the growth of sectors capable of absorbing skilled labor. Setiawan et al. (2022) in Aceh also found that HDI improvement did not always lead to more job opportunities. This is because dominant sectors such as agriculture still absorb labor without requiring high education levels. Therefore, employment absorption may not automatically increase even with better education or health levels.

CONCLUSION

Gross Regional Domestic Product (GRDP) and employment opportunities are proven to have a significant effect on the Human Development Index (HDI) in Central Aceh District. This indicates that economic growth and the expansion of job opportunities are the main factors in improving the quality of life for the population. In contrast, the variables of Micro, Small, and Medium Enterprises (MSMEs) and Minimum Wage (UMP) do not have a significant impact highlighting the need to optimize the MSME sector and evaluate the effectiveness of minimum wage policies in supporting human development.

Meanwhile, population size has a significant effect on employment opportunities, which means population growth plays a key role in shaping the dynamics of the labor market. On the other hand, the dependency ratio and HDI do not show a significant effect, suggesting a mismatch between the quality of human resources and the structure of local employment.

This result is likely influenced by the characteristics of the local labor market. If most jobs do not require high skill levels (e.g., informal and agricultural sectors), then an increase in HDI does not necessarily translate into increased labor absorption. In fact, there could be a mismatch between the improved quality of human resources and the types of jobs available. This mismatch may explain why the relationship between HDI and employment opportunities is not significant.

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