Formosa Journal of Multidisciplinary Research (FJMR)
Vol. 4 No. 11, 2025: 5333-5344

Provincial Economic Growth in Sulawesi Island: Demographic and Social Perspectives

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A R T I C L E I N F O
Keywords: Economic Growth, Unemployment, Human Development Index, Poverty, Population

Received : 16, October
Revised : 30, October
Accepted: 19, November

A B S T R A C T
This study aims to analyze the influence of the open unemployment rate, the human development index (HDI), population size, and poverty percentage on economic growth in the provinces of Sulawesi Island during the period 2020–2024. The type of data used is panel data, which is a combination of five years of time series data and cross-sectional data from six provinces on the island of Sulawesi. The analysis was conducted using the multiple linear regression method with SPSS software. The research results indicate that the open unemployment rate variable has a negative and significant effect on economic growth, meaning that an increase in unemployment will decrease the rate of economic growth in the Sulawesi region. Meanwhile, the variables of HDI, population, and poverty percentage have a negative but insignificant effect on economic growth. This indicates that improvements in human quality, population dynamics, and poverty reduction have not yet had a tangible impact on short-term economic growth in the Sulawesi Islands region.

INTRODUCTION

Economic growth is one of the main indicators that reflects the success of a region's development. Through high and sustainable economic growth, the government can improve public welfare, expand employment opportunities, and reduce poverty levels. Sulawesi Island is one of the strategic regions in Eastern Indonesia with significant and diverse economic potential, spanning agriculture, mining, processing industries, and services and trade. However, this potential has not been fully reflected in even economic growth rates across provinces. There is a significant economic disparity between provinces with a strong industrial base, such as Central Sulawesi or Southeast Sulawesi, and other provinces that still rely on the primary sector.

Studies in East Java show that open unemployment and poverty reduce economic growth, while the Human Development Index (HDI) and the number of the productive-age population drive growth. (Primandhana & Wahed, 2021; Fajriah, 2021). (Primandhana & Wahed, 2021; Fajriah, 2021). Meanwhile, in Central Java Province, poverty and unemployment have a negative impact, while HDI has a positive impact on economic growth. (Safii & Huda, 2025). (Safii & Huda, 2025). Sulawesi Island is one of Indonesia's strategic regions with significant economic potential through the agricultural, mining, fisheries, and service sectors. However, despite its abundant natural resource potential, the rate of inter-provincial economic growth in Sulawesi still shows significant differences. The following economic growth conditions between provinces can be seen in Figure 1.

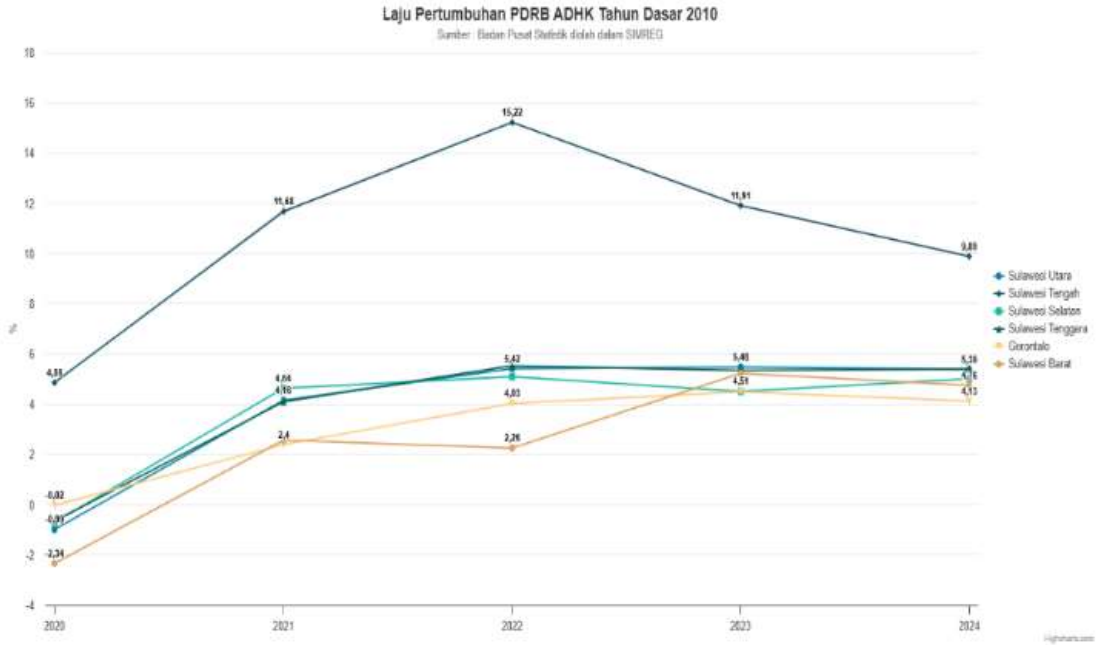

Figure 1. Economic Growth of Provinces on Sulawesi Island, 2020-2024
Data Source: Simreg Bappenas 2025.

Economic growth in the Sulawesi Island region during the 2020–2024 period shows a dynamic pattern and reflects the post-COVID-19 pandemic recovery process. In 2020, all provinces experienced economic contraction with negative growth rates ranging from -0.02% to -2.34%, caused by weakened

production and consumption activities due to social restrictions. However, since 2021, the economy has begun to recover with positive growth ranging from 2.4% to 11.68%, indicating a recovery in key sectors such as manufacturing, mining, and trade. Furthermore, during the 2022–2024 period, economic growth in Sulawesi continued to improve and stabilize. 2022 marked a peak in acceleration, with several provinces recording growth above 10%, followed by more stable performance in 2023–2024, ranging from 4% to 9%.

Additionally, Sulawesi plays a crucial role in the national supply chain and the export of key commodities such as nickel, cocoa, and seafood. The dynamics of economic growth in this region have a direct impact on national economic performance, especially in the context of downstreaming natural resources and developing eastern Indonesia. By examining economic growth on Sulawesi Island, researchers can provide an empirical overview of the effectiveness of regional development, identify structural barriers, and formulate data-driven policy recommendations to promote inclusive and sustainable growth.

One of the main factors of concern is the open unemployment rate. High unemployment reflects the less-than-optimal absorption of productive labor into economic activities. According to Okun's Law, there is a negative relationship between the unemployment rate and economic growth, where an increase in unemployment will lower the rate of output growth. In the context of Sulawesi Island, fluctuations in the unemployment rate indicate differences in each province's ability to create job opportunities and efficiently manage its human resources. Besides unemployment, the Human Development Index (HDI) is also an important factor influencing economic growth. The HDI describes the quality of human life in terms of education, health, and a decent standard of living. Increased HDI should have a positive impact on labor productivity and drive economic growth. However, in some cases, an increase in HDI is not always accompanied by a rise in economic output, especially if the region's economic structure still relies on low-productivity sectors. This is relevant to study in the Sulawesi region, which is transitioning from a resource-based economy to a value-added economy.

Population size and the poverty rate are also important factors in explaining the dynamics of economic growth. Population growth that is not matched by job creation can put pressure on resources and economic infrastructure. Meanwhile, high poverty rates can reduce people's purchasing power and hinder capital accumulation and investment. Therefore, it is important to understand how the interaction between these socioeconomic variables affects economic performance at the provincial level. The negative effect of poverty on economic growth is stronger in countries or regions with high poverty rates. A 10% decrease in the poverty rate can increase per capita GDP growth by 0.5–1.2% per year. (Marrero & Serven, 2018; Asongu & Eita, 2023). Research in Indonesia and ASEAN countries shows that poverty significantly slows economic growth, making poverty reduction efforts key to sustainable development. (Safii & Huda, 2025; Pratomo et al., 2024; Sutanto et al., 2024).

Cross-country and regional studies consistently show that poverty has a negative and significant impact on economic growth. High poverty levels reduce productivity, hinder investment, widen social gaps, and limit people's purchasing power, thereby slowing down the rate of economic growth. Based on the description, this research was conducted to analyze the influence of the open unemployment rate, HDI, population size, and poverty percentage on economic growth in the provinces of Sulawesi Island during the 2020–2024 period. This study is expected to provide empirical understanding of the factors contributing to variations in economic growth among provinces in the Sulawesi region.

Problem Formulation

Based on the background description, it can be seen that economic growth in the provinces of Sulawesi Island still shows considerable variation, despite having relatively high resource potential and development opportunities. These differences are believed to be influenced by several economic and social factors, such as the open unemployment rate, the quality of human resources, population size, and the poverty rate. However, the relationship between these variables and economic growth is not yet fully clear empirically.

Therefore, this research is formulated in the form of the following research questions:

1. How does the open unemployment rate affect economic growth in the provinces of Sulawesi Island during the period 2020–2024?
2. How does the Human Development Index (HDI) influence economic growth in the provinces of Sulawesi Island during the period 2020–2024?
3. How does population size influence economic growth in the provinces of Sulawesi Island from 2020 to 2024?
4. How does the poverty rate affect economic growth in the provinces of Sulawesi Island from 2020 to 2024?

LITERATURE REVIEW

The economic growth of a region is fundamentally influenced by various interconnected factors, both from the production side and the well-being of the community. From the perspective of neoclassical growth theory (Solow, 1956), economic output growth is largely determined by the availability of factors of production such as labor, capital, and technology. Therefore, variables such as unemployment, human resource quality, population size, and poverty have a logical connection to the economic growth performance of a region.

First, the open unemployment rate has a negative relationship with economic growth because unemployment reflects the underutilization of labor resources, meaning that labor is not being used optimally in the production process. The higher the unemployment rate, the less labor force is producing output, leading to a decline in economic growth. This aligns with Okun's Law, which states that there is a negative relationship between the unemployment rate and the rate of growth of gross domestic product.

Second, the Human Development Index (HDI) describes the quality of human resources from the aspects of education, health, and living standards. In

human capital theory, proposed by Schultz (1961) and Becker (1993) in Sopan Adrianto (2022). (2022). Improving human quality increases labor productivity, fosters innovation, and accelerates the process of economic growth. Thus, the higher the IPM, the greater the expected contribution of labor to regional output formation. Studies in Yogyakarta found that education had a positive impact, but health components and per capita expenditure showed a negative and significant impact on economic growth. This can happen in regions with an aging population or a high healthcare burden, so healthcare spending doesn't directly drive economic growth. (Budiyanto, 2024). (Budiyanto, 2024). Impulse response analysis in ASEAN shows that the economic growth response to changes in IPM components (particularly health) can be positive or negative and tends to fluctuate in the short term but is consistently positive in the long run. (Selvia & Idris, 2022).

Third, population size has a complex relationship with economic growth. On one hand, population growth can be an economic potential because it provides labor and expands the domestic market. However, if population growth is not matched by an increase in employment opportunities and productivity, it will put pressure on economic resources and hinder growth. In the context of Sulawesi Island, the continuously increasing population demands development policies that can balance production capacity and labor absorption. Fourth, the poverty rate is also closely related to economic growth. According to economic development theories as proposed by Todaro & Smith, high poverty can hinder growth thru low purchasing power of the population, minimal savings, and limited access to education and healthcare. This condition reduces the accumulation of human capital and productive investment, leading to slow economic growth. Conversely, a decrease in poverty levels can boost aggregate demand and expand economic activity.

METHODOLOGY

Types and Research Approaches

The type and approach used in this study is a quantitative approach, by collecting, analyzing, and interpreting the findings in the form of statistical results obtained.

Data Sources and Collection Techniques

The data source in this study is data obtained from relevant government agencies, namely Simreg Bappenas. The data collected will then be compiled into a single panel tabulation model.

Operational Definition of Variables

a. Economic growth is an increase in the production capacity of a region, measured by the growth rate of Gross Regional Domestic Product (GRDP) at constant 2010 prices. (ADHK). This value is expressed as a percentage (%) and indicates the change in economic output from year to year.
b. Population is the total number of people residing in a province within a one-year period, reflecting the potential labor force and consumer market in that

area. In an economic context, a large population can be a development asset when balanced with increased productivity. Measured by looking at the population in terms of number of people.

c. The Open Unemployment Rate is the percentage of the labor force that is unemployed but actively seeking work, relative to the total labor force. This variable reflects the efficiency of the labor market in a region. Measured in percentage units.
d. The IPM describes human development achievements across three main dimensions: health (long and healthy life), education (knowledge), and a decent standard of living. A high HDI indicates better quality of human resources. Measured in percentage units.
e. The poverty rate indicates the percentage of the population living below the poverty line, which means those whose per capita monthly expenditure is below the minimum needs value. This variable reflects the economic well-being of society. Measured in percentage units.

Data Analysis Techniques

The analysis technique in this study uses panel data multiple linear regression testing on quantitative data to examine the significance test values (t, F) and the coefficient of determination (R^2) using a panel data model (time series and cross-section) for 6 provinces from 2020-2024. The statistical testing tool used is SPSS version 26. Multiple linear regression analysis is used with regression correlation to determine the final dependent variable using the equation below:

$$\mathbf{Y = f + (X_1, X_2, X_3)}$$

$$\mathbf{LnY = f + (LnX_{1it}, X_{2it}, X_{3it}, X_{4it})}$$

Where:
X_1 = Population
X_2 = Open unemployment rate
X_3 = Human Development Index
X_4 = Poverty
Y = Economic Growth

RESEARCH RESULT AND DISCUSSION

Table 1. Data Regression Analysis

Research Variables	Coefficient	t-statistic	Sig.
Population(X_1)	2.396E-7	1.199	.242
Open Employment Rate (X_2)	-1.385	-2.765	.011
HDI (X_3)	-.010	-.249	.805
Poverty (X_4)	-.247	-1.220	.234
C	913.021	1.955	.062
F-statistic = 2.022 (F-Sig) = 0.122			
*) Significant at α = 5%; R^2 = 0.244 N = 130			

The results of the panel data regression analysis, which included 130 observations, showed that the model used had an R^2 value of 0.244, meaning that approximately 24.4% of the variation in economic growth in the provinces of Sulawesi Island during the period 2020–2024 could be explained by the independent variables consisting of population (X_1), open unemployment rate (X_2), Human Development Index (X_3), and poverty rate (X_4). Meanwhile, the remaining 75.6% is explained by other factors outside the scope of this research model. The simultaneous test (F-test) yielded an F-statistic value of 2.022 with a significance level of 0.122, indicating that the four independent variables collectively did not significantly influence economic growth at a 95% confidence level.

Partially, the t-test results show that the open unemployment rate (TPT) variable has a negative and significant effect on economic growth with a coefficient value of -1.385, a t-statistic value of -2.765, and a significance level of $0.011 < 0.05$. This indicates that rising unemployment tends to lower the rate of economic growth on Sulawesi Island, consistent with Okun's law, which states a negative relationship between unemployment and economic output. Meanwhile, the variables of population size, Human Development Index (HDI), and poverty rate show a negative but insignificant influence on economic growth, with significance values of 0.242, 0.805, and 0.234, respectively. This finding indicates that empirically, improvements in population quality, poverty reduction, and changes in population size during the study period have not yet been able to have a real impact on economic growth in the Sulawesi region.

The Influence of the Open Unemployment Rate on Economic Growth

The analysis results show that the open unemployment rate variable has a negative and significant effect on economic growth. This indicates that an increase in the open unemployment rate will lower the rate of economic growth. This finding aligns with Okun's Law, proposed by Arthur Okun (1962), which explains the negative relationship between the unemployment rate and economic growth. In general, Okun's law research has modified it by including additional or lagged variables or by using other functional forms and techniques for estimation. This modification is an attempt to improve relevance to the case being studied, but it has deviated from the essence of Okun's problem and does not utilize the information contained in Okun's original formulation (Pelaez, 2025).

The Influence of the Human Development Index (HDI) on Economic Growth

The Human Development Index (HDI) variable has a negative but insignificant coefficient with respect to economic growth. This result indicates that the increase in HDI has not had a significant impact on economic growth during the study period. Theoretically, the HDI describes the quality of human resources through three main dimensions: education, health, and a decent standard of living. Improving human quality should increase labor productivity and drive economic growth. However, the insignificant empirical results indicate that the impact of HDI on economic growth is a long-run effect, not immediately visible in the short term. Some studies have found that the Human Development

Index (HDI) variable has a negative and non-significant coefficient with respect to economic growth, particularly at the provincial or district level in Indonesia and other developing countries. For example, in Papua, the HDI does not significantly affect economic growth. (Ulyati et al., 2024). (Ulyati et al., 2024). In Central Kalimantan and Yogyakarta, components of the IPM, such as the health index, also show negative and non-significant effects. (Amelia, 2022; Ari et al., 2020). (Amelia, 2022; Ari et al., 2020). Studies in Africa and Asia also reported a non-significant negative coefficient between the human development index and economic growth. (Maiga, 2023; Olofin, 2020).

The Influence of Population Size on Economic Growth

The test results show that Population Size has a negative and insignificant effect on economic growth. This means that the increase in population has not yet been able to become a real driver of economic growth during the study period. Theoretically, the relationship between population size and economic growth is bidirectional. According to Malthus' theory and modern population growth according to Todaro in (Meyer, 2017), population growth can provide potential labor for economic development. However, if the increase in population is not matched by an increase in employment opportunities and productivity, it will put pressure on economic resources and slow down growth. Some studies have found that population size or population growth has a negative and insignificant coefficient on economic growth, especially in developing countries or at specific regional levels. For example, in Indonesia during the period 2017–2022, the labor variable (as a proxy for population size) had a negative and non-significant effect on economic growth. (Swastika et al., 2024). Cross-country studies also show that in many developing countries, the relationship between population size and economic growth tends to be negative or insignificant (Frick & Rodríguez-Pose, 2016; Feng, 2020; Zhao et al., 2018).

The Influence of Poverty Percentage on Economic Growth

The poverty percentage variable also shows a negative and non-significant influence on economic growth. This negative direction aligns with economic development theory, which states that high levels of poverty can suppress the rate of growth thru mechanisms such as low purchasing power among the population, limited savings, and minimal investment in human capital, according to Todaro in (Meyer, 2017). However, the insignificance of this influence indicates that empirically, the poverty rate in the research area of Sulawesi Island has not yet become a major determinant of economic growth changes. Some studies have found that the poverty percentage variable has a negative and insignificant coefficient on economic growth, especially after including control variables such as population growth and employment. For example, in Vietnam, after adding the variables of population growth and employment, the poverty coefficient became negative and insignificant. (Zhu et al., 2022). This can happen for several reasons, including:

1. The impact of poverty reduction on economic growth is long-term and indirect.

2. Government programs in the social sector and direct assistance may have reduced the negative effects of poverty on economic activity.
3. The variation in poverty levels across time and regions is not large enough to significantly explain fluctuations in economic growth.

CONCLUSIONS AND RECOMMENDATIONS

Overall, the results of this study indicate that the Open Unemployment Rate is the only variable that has a significant impact on economic growth, while the variables of HDI, population size, and poverty have not shown a significant effect.

This finding has several policy implications:

1. Reducing the unemployment rate needs to be a top priority in regional economic development strategies, especially thru the creation of productive jobs and the improvement of workforce skills.
2. Improving the quality of human resources (HDI) must continue sustainably so that its impact on growth can be seen in the long term.
3. Population growth needs to be balanced with population policies and equal employment opportunities to avoid putting pressure on economic resources.
4. Poverty alleviation programs need to be directed toward increasing the productivity of poor communities, not just focusing on consumption, in order to contribute to economic growth.

ADVANCED RESEARCH

Future research should advance this study by integrating spatial econometric models and dynamic panel approaches to capture interprovincial spillover effects and temporal persistence in Sulawesi's economic growth patterns. Incorporating variables such as industrial structure transformation, infrastructure index, digital connectivity, regional investment flows, and environmental pressures would enable deeper identification of structural constraints that traditional regression models fail to detect. Moreover, future studies could employ machine-learning–based predictive analytics to map nonlinear interactions between unemployment, human capital, demographic change, and poverty, allowing policymakers to anticipate growth trajectories under various development scenarios. Longitudinal microdata and multilevel analysis are also essential to uncover how household-level socioeconomic improvements translate into macroeconomic performance across provinces in Sulawesi.

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