Indonesian Journal of Multidisciplinary Sciences (IJoMS)
Vol. 5 No. 1 2026, 321-334
E-ISSN: 2963-7635 | P-ISSN: 2986-2426
Publisher: CV. Era Digital Nusantara

Analysis of the Effect of the Gini Ratio, Unemployment Rate, and Population Size on Economic Growth in North Sumatra Province

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ARTICLE INFO

Article History
Submission : 01-05-2026
Received : 04-05-2026
Revised : 20-05-2026
Accepted : 22-05-2026

Keywords
Gini Ratio
Poverty Rate
Population
Economic Growth

DOI:
10.59066/ijoms.v5i1.2348

ABSTRACT

The purpose of this study is to examine whether the Gini ratio, unemployment rate, and population size have a significant effect on economic growth in North Sumatra Province during the period 2015–2024, both simultaneously and partially. This research was conducted using secondary/quantitative data published on the website of the Badan Pusat Statistik (BPS) of North Sumatra Province. The study aims to analyze both the simultaneous and partial effects in the relationship between the independent variables (X) and the dependent variable (Y). The results show that simultaneously, the Gini ratio, unemployment rate, and population size have a significant effect on economic growth in North Sumatra Province. Partially, the unemployment rate has a negative and significant effect on economic growth, while the Gini ratio and population size have positive but insignificant effects on economic growth in North Sumatra Province. This study is expected to contribute to public literature, serve as a reference for future research, and provide considerations for the government in policy decision-making.

Introduction

In examining the economy of North Sumatra Province, the dynamics of economic growth rates have fluctuated over the past ten years. Economic growth in North Sumatra Province cannot yet be considered optimal due to various factors that hinder the achievement of optimal economic growth. These factors are related to several issues, including economic inequality within society, an uncontrolled population size with suboptimal human resource capacity, and high levels of unemployment. To achieve optimal economic growth, the existing challenges in its implementation must be addressed. Unequal distribution of economic growth, low PRDB in regional and low quality of human resources in certain areas remain major concerns for the local government.

One of the indicators used to measure economic or income inequality within a region is the Gini ratio. A high Gini ratio, approaching a value of 1, indicates severe economic inequality within a region, which may subsequently affect economic and social stability. The severity of economic and social inequality can lead to high poverty rates, social jealousy, inequality in access to opportunities, and increased criminal activity. Based on the study by Suhendi *et al*. (2024), the Gini ratio, along with other variables such as the Human Development Index and the unemployment rate, has a simultaneous significant effect on poverty levels. This indicates that greater income inequality within a region can have a significant impact on community welfare.

The government must pursue policies to minimize the Gini ratio by providing subsidies to improve the living standards of underprivileged communities, controlling inflation to enhance purchasing power, increasing regional investment, improving the quality of human resources, and implementing agrarian reform to improve livelihoods, particularly in the agricultural sector. However, in practice, the implementation of these measures faces various obstacles due to the dynamic economic and social conditions that often present diverse and complex challenges within a region.

The Gini Ratio in North Sumatra Province has shown a positive and relatively stable trend over the past ten years. This can be observed from the continuous decline in the Gini Ratio, reaching a level below 0.3 in 2024, and when compared with the national Gini Ratio as of September 2024, which stood at 0.381 (https://www.bps.go.id/; BPS, 2025), it indicates that the Gini Ratio in North Sumatra Province is generally better than the national level. Nevertheless, fluctuations in the Gini Ratio in North Sumatra Province may still occur in line with ongoing economic and social dynamics within society.

The relationship between high unemployment rates in a region and economic growth can be assumed to be mutually interrelated, forming a cyclical relationship. High unemployment reduces people’s purchasing power, thereby hindering economic growth, while constrained economic growth can lead to declining investment levels and a limited creation of new job opportunities, causing unemployment to remain high. In a regional economy, this condition may result in persistent problems that hinder long-term economic growth.

In efforts to enhance economic growth within a region, factors such as income or economic inequality, unemployment rates, and population size are considered to have a significant influence. Income or economic inequality in a region can lead to economic and social stability issues, which may result in declining investment, reduced per capita income, and ultimately hinder human development on a large scale, thereby increasing the potential for social conflict and higher crime rates. On the other hand, income inequality can also serve as a challenge that encourages communities to innovate and improve productivity in order to raise living standards and achieve regional prosperity. Income inequality is therefore not always considered to have negative impacts, as the presence of wealthier groups may continue to expand their businesses and capital within the region, leading to increased investment, job creation, and economic growth.

High unemployment rates in a region are considered to have an influence on economic growth. A high level of unemployment indicates that the regional economy is not growing properly, as a large portion of the labor force is not absorbed by the labor market. Population growth is also regarded as a factor affecting economic growth. Population growth that is not accompanied by a strong and stable economy in a region can lead to various economic, social, and even environmental conflicts, such as land conversion for settlements and agriculture through deforestation, which may result in environmental pollution. On the other hand, population growth accompanied by good economic and social stability can contribute positively to regional development, including the expansion of employment opportunities, effective community empowerment in developing advanced human resources, and industrial growth.

In continuing this study, several research problems have been identified, including the occurrence of income and economic inequality across various regions that may affect economic growth, high levels of unemployment in different areas that influence economic growth, and uncontrolled population growth that has not yet been optimally managed, which affects economic growth and regional economic stability. The researcher has also defined the scope of the study by determining the variables to be examined, namely the independent variables of the Gini Ratio, unemployment rate, and population size, as well as the dependent variable of economic growth.

In developing this study, the author refers to previous research to support the analysis. According to Martadinata (2022), population size has a positive and significant effect on economic growth. Lidyawati *et al*. (2019) state that the unemployment rate has a negative and significant effect on economic growth and, together with other variables such as the number of people living in poverty, has a positive and significant effect on economic growth. Based on the study by Dwi Yunianto (2021), population growth is shown to have a positive and significant impact on economic growth. Selamet Rahmadi (2019) explains that income inequality and poverty have a negative effect on economic growth. Yuniarti et al. (2020) state that the unemployment rate significantly affects economic growth. The study by Nanda Fitri Yenny *et al*. (2020) explains that population size contributes to an increase in economic growth by 9.38%. Furthermore, Budi Darma *et al*. (2021) show that population size has a partial effect on economic growth, with an adjusted R-squared value of 70.8%. Therefore, based on the importance of the aforementioned studies, the author conducted this research to examine the relationship between the effects of the independent variables (X) on the dependent variable (Y), both simultaneously and partially.

Method

The researcher employs a quantitative or associative approach in conducting this study. The quantitative approach uses quantitative data, namely data in nominal form or research data that are converted into numerical values (Sugiyono, 2015). According to Suhendi *et al*. (2025), quantitative research requires the formulation of hypotheses as preliminary assumptions to be tested through data collection and analysis methods. Based on this approach, the researcher examines the effects of the Gini ratio, unemployment rate, and population size on economic growth in North Sumatra Province. This study uses secondary time-series data for the period 2015–2024 published by the Badan Pusat statistik (BPS) of North Sumatra Province. The research is conducted by processing data using multiple linear regression analysis with the assistance of the SPSS application. The purpose of multiple linear regression analysis is to determine the influence of independent variables on the dependent variable. The multiple linear regression analysis is conducted both simultaneously and partially to examine whether the Gini ratio, unemployment rate, and population size have an effect on economic growth in North Sumatra Province. The analysis includes the coefficient of determination test, the F-test, and the t-test, which are preceded by classical assumption tests, including tests for data normality, multicollinearity, heteroscedasticity, and autocorrelation.

Results and Discussion

Descriptive Statistics

Table 1. Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
GINI Ratio	10	,297	,336	,31540	,009652
Tingkat Pengangguran	10	5,410	6,910	6,00100	,512737
Jumlah Penduduk	10	13937797,000	15588525,000	14701084,60000	549564,754454
Pertumbuhan Ekonomi	10	-1,069	5,217	4,20820	2,014072
Valid N (listwise)	10				

Based on the descriptive statistical data above, the following can be explained:can be explained:

- The Gini ratio has a sample size of 10, with the lowest and highest values ranging from 0.297 to 0.336, a mean value of 0.31540, and a standard deviation of 0.00965.
- The unemployment rate has a sample size of 10, with the lowest and highest values ranging from 5.410 to 6.910, a mean value of 6.00100, and a standard deviation of 0.512737.
- Population size has a sample size of 10, with the lowest and highest values ranging from 13,937,797 to 15,588,525, a mean value of 14,701,084, and a standard deviation of 549,564.754454.
- Economic growth has a sample size of 10, with the lowest and highest values ranging from −1.069 to 5.217, a mean value of 4.20820, and a standard deviation of 2.014072.

From the observation of the data description, it can be concluded that the data distribution does not exhibit extreme outliers, as the standard deviation values are not greater than the mean values.

Data Normality Test

Table 2. Data Normality Test

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		10
Normal Parameters[a,b]	Mean	,0000000
	Std. Deviation	1,06521777
Most Extreme Differences	Absolute	,212
	Positive	,136
	Negative	-,212
Test Statistic		,212
Asymp. Sig. (2-tailed)[c]		,200[d]

d. This is a lower bound of the true significance.

The data normality test is a stage within the classical assumption tests. Based on the results presented in the One-Sample Kolmogorov–Smirnov (K–S) Test table above, the Asymp. Sig. (2-tailed) value is 0.200, which is greater than 0.05. This indicates that the normality test shows the data are normally distributed.

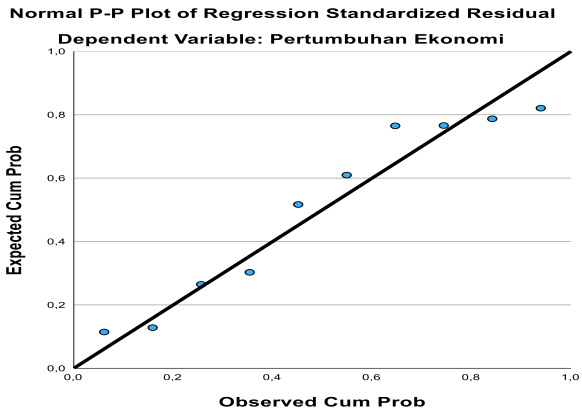

Figure 1. Normality Test Graph

Next, the Normal P–P Plot of Regression was observed. Based on the figure above, it can be seen that the data points are distributed around the diagonal line, indicating that the data are normally distributed. The fulfillment of this test suggests that the hypothesis testing can be appropriately continued.

Multicollinearity Test

Table 3. Multicollinearity Test

Coefficients[a]

Model		Collinearity Statistics Tolerance	VIF
1	(Constant)		
	GINI Ratio	,154	6,510
	Tingkat Pengangguran	,565	1,769
	Jumlah Penduduk	,189	5,289

The next analysis conducted by the researcher was the multicollinearity test. Based on the results, it was found that the Gini ratio variable had a tolerance value of 0.154 > 0.10 and a VIF value of 6.51 < 10, indicating that multicollinearity did not occur in the Gini ratio independent variable. For the unemployment rate variable, the tolerance value was 0.565 > 0.10 and the VIF value was 1.769 < 10, which means that there was no multicollinearity in the unemployment rate variable. Meanwhile, the population variable showed a tolerance value of 0.189 > 0.10 and a VIF value of 5.289 < 10, indicating that this variable did not experience multicollinearity.

Based on the test results, it can be concluded that all three independent variables are free from multicollinearity, allowing the analysis to proceed to the next stage.

Heteroscedasticity Test

The next classical assumption test is the heteroscedasticity test. In this test, the scatterplot shows that the data are evenly distributed both below and above the zero value on the Y-axis. Therefore, it can be concluded that there is no heteroscedasticity problem in this study.

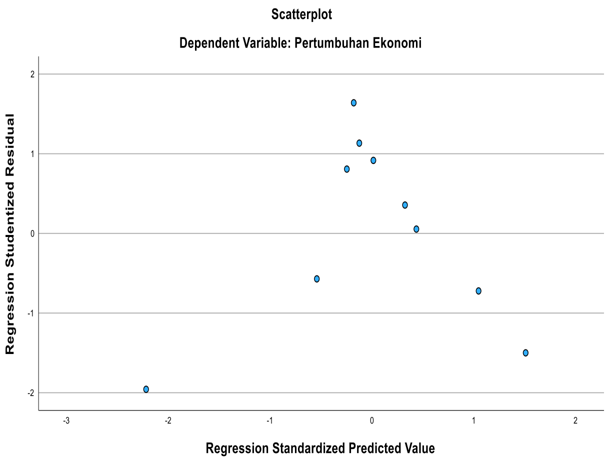

Figure 2. Heteroscedasticity Test Graph

Autocorrelation Test

Table 4. Autocorrelation Test

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,849[a]	,720	,580	1,304620	,724

a. Predictors: (Constant), Jumlah Penduduk, Tingkat Pengangguran, GINI Ratio
b. Dependent Variable: Pertumbuhan Ekonomi

The result of the study shows a Durbin–Watson (DW) value of 0.724. Therefore, to determine whether autocorrelation occurs, the Santoso–Singgih approach can be applied, in which the criterion states that the DW value must lie between −2 and 2. Based on the research results, the DW value falls within this range, namely −2 < 0.724 < 2, indicating that there is no autocorrelation in this study. Consequently, the analysis can be continued to the next stage. Based on the data processing results above, it can be concluded that the data collected by the researcher for both the independent (X) and dependent (Y) variables satisfy the classical assumption tests and are suitable for use in subsequent analyses.

Multiple Linear Regression Analysis

The multiple linear regression analysis in the study on the effect of the Gini ratio, unemployment rate, and population on economic growth in North Sumatra Province can be seen in the model below.

Table 5. Results of Regression Analysis

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-77,952	57,489		-1,356	,224
	GINI Ratio	226,589	114,962	1,086	1,971	,096
	Tingkat Pengangguran	-4,333	1,128	-1,103	-3,842	,009
	Jumlah Penduduk	2,496E-6	,000	,681	1,372	,219

Based on the data table above, the regression equation for economic growth can be formulated as follows:

$Y = -77.952 + 226{,}589X1 - 4{,}333X2 + 0{,}000002496X3 + \varepsilon$

In the model above, it can be seen that the Gini ratio has a coefficient with a positive effect on economic growth, the unemployment rate has a coefficient with a negative effect on economic growth, and population has a coefficient with a positive effect on economic growth. The discussion regarding the significance of the effects of the independent variables on the dependent variable, both simultaneously and partially, will be further examined through the F-test and t-test.

Coefficient of Determination Test

Table 6. Coefficient of Determination Test

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,849[a]	,720	,580	1,304620

a. Predictors: (Constant), Jumlah Penduduk, Tingkat Pengangguran, GINI Ratio
b. Dependent Variable: Pertumbuhan Ekonomi

Based on the test results above, it is known that the adjusted R-squared value is 0.58 or 58%, indicating that the explanatory power of the Gini ratio, unemployment rate, and population on economic growth is 58%, while the remaining 42% is influenced by other variables not examined in this study.

F-Test

Table 7. F-Test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26,296	3	8,765	5,150	,043[b]
	Residual	10,212	6	1,702		
	Total	36,508	9			

a. Dependent Variable: Pertumbuhan Ekonomi
b. Predictors: (Constant), Jumlah Penduduk, Tingkat Pengangguran, GINI Ratio

In the F-test, it can be observed that the calculated F value is greater than the F table value, namely 5.150 > 4.757, indicating that collectively the independent variables—consisting of the Gini ratio, unemployment rate, and population—have a significant effect on economic growth. This is further supported by the F-test significance value of 0.043, which is smaller than the threshold (sig. = 0.05). The test also shows that the regression model has a good ability to explain the relationship between the independent and dependent variables.

T-Test

Table 8. T-Test

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-77,952	57,489		-1,356	,224
	GINI Ratio	226,589	114,962	1,086	1,971	,096
	Tingkat Pengangguran	-4,333	1,128	-1,103	-3,842	,009
	Jumlah Penduduk	2,496E-6	,000	,681	1,372	,219

Based on the results of the T-test above, the T table value is 2.44691. The observations indicate that the Gini ratio has a calculated t value of 1.971, which is smaller than the T table value (1.971 < 2.44691), with a significance of 0.096, which is greater than the threshold (sig. = 0.05). This means that, partially, the Gini ratio has a positive effect but does not have a significant impact on economic growth.

The unemployment rate has a calculated t value of -3.842, which is greater in absolute terms than the T table value (3.842 > 2.44691), with a significance of 0.009, which is smaller than the threshold (sig. = 0.05). Thus, partially, the unemployment rate has a negative and significant effect on economic growth.

Meanwhile, the population variable has a calculated t value of 1.372, which is smaller than the T table value (1.372 < 2.44691), with a significance of 0.219, which is greater than the threshold (sig. = 0.05). Therefore, partially, population has a positive but not significant effect on economic growth.

Based on the observations from the T-test, it can be concluded that among the three independent variables tested, only the unemployment rate has a significant effect on economic growth in North Sumatra Province.

Discusion

1. The Effect of the Gini Ratio on Economic Growth

Based on the previous T-test results, it was found that the Gini ratio has an insignificant effect on economic growth partially because the calculated t value is less than the T table value and the significance level is greater than 0.05 (1.971 < 2.44691 and significance 0.096 > 0.05). The observation also showed that the Gini ratio has a positive effect on economic growth. Therefore, although it has a positive effect on economic growth, the Gini ratio does not have a significant impact on economic growth in North Sumatra Province during the period 2015–2024.

The Gini ratio can have a positive effect on economic growth due to the role of high-income individuals who drive the amount of investment in a region, which affects job availability and, consequently, economic growth. However, based on the results above, this effect is not significant because the significance level exceeds 5%. According to Suhendi et al. (2024), the role in improving welfare and regional economic development can also be influenced by variables other than the Gini ratio, and there is a need to strengthen accessibility within a region.

Based on the observations of previous researchers, Krisandi (2024) stated that although the Gini ratio has a positive effect on economic growth, government policies to address income inequality must be designed more effectively so that the benefits of economic growth can be more widely felt by society. In line with the positive effect observed, Hutasoit (2024) explained that the positive impact of the Gini ratio may be due to the higher saving ratio of wealthy individuals compared to that of those with limited economic resources, so that an increase in the aggregate saving rate follows an increase in investment, which can serve as capital for development to drive economic growth.

Anggraini (2023) suggested that income inequality may have a positive influence on economic growth. This effect occurs because of the increased savings and investment by high-income groups.

2. The Effect of the Unemployment Rate on Economic Growth

The partial effect of the unemployment rate on economic growth in this study is negative and significant. This can be seen from the T-test results, where the calculated t value is greater than the T table value, with a significance level below $\alpha = 0.05$ (3.842 > 2.44691 and significance 0.009 < 0.05). In this study, the unemployment rate is the only independent variable (X) that has a significant partial effect on economic growth in North Sumatra Province during the period 2015–2024.

In the economic dynamics of North Sumatra Province, a high unemployment rate can have negative effects, such as increasing poverty, the potential for social conflict among communities, and even economic instability at the national level. Darman (2013) explains, based on Okun in Samuelson (2005), that a decline in PDB/GNP affects unemployment, where a 2% decrease in PDB/GNP can lead to a 1% increase in unemployment. According to Mankiw (2007), the dynamics of real PDB/GNP can be expressed as 3% minus twice the unemployment rate, meaning that if unemployment rises by approximately 1%, economic growth will decrease by 2%, and if unemployment falls by 1%, economic growth will increase by 2%.

Observations from previous studies show results that align with this research. According to Putri (2016), the unemployment rate has a negative and significant effect on economic growth, which is consistent with the findings of this study. Unemployment in the community can affect the quantity of goods and services produced in a region and, consequently, impact economic growth.

Another study that supports these findings is Salsabila (2021), which also reported a significant negative relationship between the unemployment rate and economic growth. The study explains that unemployment in society can reduce purchasing power, lower consumption, decrease production, and ultimately lead to a decline in economic growth. Based on Septiatin (2016), unemployment has a significant effect on economic growth. However, the increase in economic growth is often experienced only by a small segment of society, so the distribution of income does not become more equitable, and this is not accompanied by a reduction in unemployment.

3. The Effect of Population on Economic Growth

The observations show that, partially, the population has a positive but not significant effect on economic growth. This is because the T table value is greater than the calculated t value, and the significance level is above 5% (2.44691 > 1.372 and significance 0.219 > 0.05). Therefore, it can be concluded that an increase in population in a community may contribute to economic growth in North Sumatra Province during the period 2015–2024, although not significantly.

A population with maintained quality and productivity can act as a driving force for economic growth within the context of Development Economics (Suhendi, 2017). A qualified population can also influence economic growth according to the demographic bonus theory. The Human Capital theory emphasizes that unemployment can decrease when economic growth increases due to a higher number of quality individuals within the productive age range. Therefore, it can be said that population contributes to regional economic growth when linked to improvements in human capital quality within the productive age group.

Based on previous studies, the size of a population in a region does not necessarily affect economic growth, as the main focus in enhancing growth is not population size but rather infrastructure and sectoral development that drive PRDB (Yenny, 2020). According to Purnamasari (2024), a large population can stimulate a bigger market potential, providing opportunities for business expansion to reach more consumers. This, in turn, can encourage investment and increase employment opportunities. Effendy (2021) also found that population has a positive but not significant effect on economic growth, meaning that variations in population size may be associated with changes in economic growth, but not significantly. These findings are consistent with the results of this study.

4. The Effect of the Gini Ratio, Unemployment Rate, and Population on Economic Growth in North Sumatra Province

Based on the results of the F-test, it was found that collectively the Gini ratio, unemployment rate, and population have a significant effect on economic growth in North Sumatra Province during the period 2015–2024. This can be seen from the comparison of the calculated F value with the F table value, where the F value is greater than the F table value (5.150 > 4.757) with a significance level below 5% (0.043).

The observations in this study also show that the adjusted R-squared value is 58%, indicating that the combination of all independent variables is able to explain the phenomenon of economic growth to a fairly high degree. Therefore, this study is considered reliable and robust enough to serve as a reference for the practical benefits of the research.

The results of this study support previously established theories. According to Kuznets' theory, income inequality may occur in the early stages of development but tends to decrease in the later stages. In the economic dynamics of a region, differences in income distribution can occur within society.

In Classical and Neoclassical Economic theories, economic growth can be influenced by a combination of capital, labor, specialization, and technology. A population with high-quality human capital can foster a competent workforce, thereby promoting economic growth. According to Suhendi (2017), the population must be productively empowered to prevent development failures in a region. In the context of Okun's law, there is a relationship between unemployment and economic growth, where an increase in unemployment in a region can weaken economic growth.

The findings of this study are consistent with the research conducted by Anggraini (2023), which states that the open unemployment rate, Gini ratio, and other variables have a significant effect on economic growth. Based on Hutasoit (2024), the Gini ratio, unemployment, and other variables collectively influence the rate of economic growth. According to Berliana (2026), unemployment and the Gini ratio have a significant effect on economic growth.

Conclusion

The results of this study indicate that collectively, the independent variables-Gini ratio, unemployment rate, and population-have a significant effect on economic growth in North Sumatra Province during the period 2015–2024. Partially, only the unemployment rate has a negative and significant effect on economic growth in North Sumatra Province during the same period. The combined explanatory power of the three variables on economic growth, as indicated by the adjusted R-squared value, is 58%, which is relatively high. From this study, it can be concluded that issues related to labor productivity remain a primary factor influencing economic growth.

Based on the findings, it is recommended that the government, as the policymaker, actively work to reduce unemployment, which is a critical issue affecting economic growth.

In addition, the government should also actively empower the population to develop a qualified workforce that can be absorbed into the labor market and help reduce income inequality in society. These measures are strategic steps to support regional development.

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