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Population Growth and Its Impact on Economic Development in West Sumatra (2021–2024)

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Abstract

This study aims to analyze the influence of population on economic growth in West Sumatra Province in 2021–2024. This study uses a quantitative method with a simple linear regression approach. The data used are secondary data obtained from the Central Statistics Agency (BPS), including population data and economic growth rates. The analysis results show that population has a positive relationship with economic growth, as indicated by a regression coefficient value of 0.00437. The correlation coefficient (Multiple R) value of 0.760 indicates a fairly strong relationship between population and economic growth. However, the results of statistical tests indicate that the effect of population on economic growth is not significant, with a significance value of 0.2399, which is greater than the 5 percent significance level.

INTRODUCTION

One indicator of successful economic development is economic growth. However, not all countries are able to achieve good economic growth (Yenny & Anwar, 2020). A region's economic growth reflects its ability to increase the production of goods and services and the income of its residents over time. In Indonesia, economic growth is a primary focus of development because it is directly related to public welfare and job creation.

A country's economic growth rate determines the stability or decline of its government, as reflected in national statistical data. Thus, economic growth indicates the extent to which economic activity is able to generate additional income or improve public welfare within a given period (Pernanda & Ulhak, 2023). Concurrently, the population tends to increase from year to year, influenced by various factors, particularly birth rates and migration.

The dynamics of population numbers have implications for economic growth, both through the provision of labor and market expansion, making it an important variable in the analysis of economic growth.

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The population growth rate (Growth rate) is influenced by the number of births and deaths. The Crude Birth Rate and Crude Death Rate are shown based on the number of live births and deaths per 1,000 population per year (Kusumawardani & Azizah, 2021). This means there are four possible birth and death rates: first, high birth rates and high mortality rates. Second, high birth rates and low mortality rates. Third, low birth rates and high mortality rates. Fourth, low birth rates and low mortality rates.

Previous studies have shown varying relationships between population and economic growth. Some studies have found that population growth can positively impact economic growth by expanding the workforce and production capacity. For example, research in five provinces in Indonesia showed that population growth positively and significantly impacts economic growth, especially when supported by a high labor force participation rate and high-quality human resources (Shari & Abubakar, 2022). Another study in several provinces in Indonesia showed that the effect of population on economic growth is not always significant when other variables such as unemployment rate, education, or investment play a role in the economic development process (Azmi & Cahyono, 2025).

West Sumatra Province is one of the regions experiencing demographic and economic dynamics in recent years. As the province's population increases, various challenges and opportunities for economic development emerge. Population growth in this area can expand markets and provide a large labor force, but it also demands the availability of jobs, social services, and effective development policies. Analyzing the relationship between population and economic growth in West Sumatra is crucial to understanding how these demographic factors contribute to the region's economy between 2021 and 2024.. (Nur Rahmah, 2025).

Population growth in West Sumatra has the potential to positively impact economic growth if accompanied by improvements in the quality of human resources and the availability of adequate employment opportunities. Under these conditions, a large population can increase economic productivity through workforce optimization, increased regional output, and expanded domestic markets. This will ultimately drive increased Gross Regional Domestic Product (GRDP) and regional economic growth (Maryati et al., 2021).

However, population growth can also negatively impact economic growth if not balanced by adequate economic capacity. Population growth that exceeds economic growth can increase unemployment, reduce per capita income, and put pressure on infrastructure and public services. This situation has the potential to hamper economic growth and reduce public welfare.

Therefore, the influence of population size on economic growth in West Sumatra is dynamic and depends on the local government's ability to manage population growth through economic development policies, improving the quality of education and health, and creating jobs. With proper management, population growth can be a crucial asset in driving sustainable economic growth in West Sumatra Province.

In this article, the author will discuss the Influence of Population on Economic Growth in West Sumatra: 2021-2024.

METHODS

This study employed quantitative research methods with descriptive and analytical approaches. The descriptive approach was used to describe population development and economic growth in West Sumatra Province during the 2021–2024 period (Afif et al., 2023). Meanwhile, the analytical approach was used to statistically analyze the effect of population on economic growth. The data used in this study were secondary data obtained from the Central Statistics Agency (BPS) of West Sumatra Province.

The variables in this study consist of: Independent variable (X): Population and Dependent variable (Y): Economic growth. Population is measured in units of people, while economic growth is measured in percentage (%). The data analysis method used in this study is simple linear regression, which aims to determine the effect of population on economic growth in West Sumatra.

The regression model used is:

$$Y=a+bX$$

Information:

= Economic growth

= Total population

= Constant

= Regression coefficient

RESULT AND DISCUSSION

Total Population

The BPS Institute in Indonesian Statistics explains "Residents are all people who are domiciled in the geographical area of the Republic of Indonesia for 6 months or more and those who are domiciled for less than 6 months but intend to settle". According to (Harahap et al., 2023) the population is the number of people who reside/are domiciled in a region or area and have a permanent livelihood in that area and are legally registered based on the regulations in force in that area.

The population will increase over time and will also influence changes over time, in line with changes in population size and all forms of activity. Population activity will result in various forms of existing activities. Basically, it will always be accompanied by population movements as a result of these movements of activity, so that the population will always move from one place to another according to their needs (Panggabean et al., n.d.).

Population data in West Sumatra Province for the 2021–2024 period demonstrates a complex dynamic between population growth and the rate of gross regional domestic product (GRDP). Theoretically, population growth can serve as a driver of economic growth by increasing labor supply and domestic market demand. Based on a classical economic perspective, a large population is fundamental to development if coupled with adequate skills to fill productive sectors. However, in the context of West Sumatra over the past four years, the population growth trend must be carefully managed to prevent it from exceeding the region's economic carrying capacity. This phenomenon aligns with research by (Sihombing, 2021) in the Journal of Economics and Development, which states that population size has a significant positive correlation with economic growth as long as there is consistent investment in human capital. West Sumatra's success in maintaining economic stability post-pandemic depends heavily on how the productive-age population structure is able to be absorbed by available jobs. Therefore, quantitative data indicate that population growth in this province tends to stimulate the trade and services sectors, which are the backbone of the local economy.

Despite these positive impacts, significant challenges arise when population growth is not accompanied by comparable productivity increases across regencies and cities in West Sumatra. This quantitative study found that an uncontrolled population explosion risks triggering an increase in open unemployment, which will ultimately hinder accelerated economic growth. Pressure on the provision of public facilities, housing, and food security are crucial moderating variables in the relationship between population and regional economic prosperity. According to findings (Prasetyo & Azizah, 2023) in the Journal of Economics, excessively rapid population growth without the support of strong industrialization can actually create a high dependency ratio. In West Sumatra, the population concentration in urban areas such as Padang requires the local government to ensure equitable distribution of the economy to outlying areas. Strengthening the MSME sector is crucial for absorbing the growing workforce annually, ensuring that the population becomes an asset, not a burden, on the economy. Statistical data from 2021–2024 confirms that effective labor utilization in the production process is key to translating population growth into economic value-added growth.

The final interpretation of the quantitative data processing results confirms that the influence of population on economic growth in West Sumatra is non-linear and is heavily influenced by the quality of education and health. Population growth during the 2021–2024 period will contribute significantly to economic growth only if the region's Human Development Index (HDI) also experiences a synchronous increase. This is reinforced by a research journal (Ramadhani & Saputra, 2022), which explains that population quantity without quality will only create structural poverty, which in turn reduces people's purchasing power at a macro level. The West Sumatra Provincial Government needs to focus policies on labor-intensive sectors capable of converting the demographic bonus into a sustainable economic driver. Synchronizing population data from the Statistics Indonesia (BPS) with regional fiscal policy has proven to be a crucial instrument in maintaining economic growth momentum above the national average. Overall, this study concludes that population size has a positive and significant impact on economic growth in West Sumatra, provided there is a strengthening of workforce competencies in the digital era. Therefore, integrated population management will be a key foundation for West Sumatra's economic stability in facing future global challenges.

Population Indicator

Total Population (Absolute Figure): This is the total number of people in a region (West Sumatra) in a given year, usually sourced from BPS data. This indicator determines the scale of the domestic market; the larger the population, the greater the potential demand for goods and services that drive economic activity.

Population Growth Rate: Measures the rate of annual population growth as a percentage. This indicator is important for determining whether economic growth is outpacing population growth; if the economy grows slower than the population, per capita income will tend to decline.

Population Density: The ratio of population to area (people/km). In economic analysis, high density in certain areas (such as Padang City) indicates the presence of economic agglomeration that can increase distribution efficiency and job creation in the service sector.

Age Structure (Demographic Bonus): Divides the population into productive age groups (15–64 years) and non-productive age groups. This indicator looks at the potential labor supply; regions with a large productive-age population have the opportunity for more accelerated economic growth if jobs are available.

Dependency Ratio (*Dependency Ratio*): An indicator that shows the burden borne by the productive-age population to support the non-productive-age population (children and the elderly). The lower this ratio, the greater the opportunity for people to save and invest, which are the driving force of economic growth.

Labor Force Participation Rate (LFPR): Measures the percentage of the working-age population that is economically active (working or seeking work). This indicator converts the raw population into economically active subjects who directly contribute to the formation of GRDP.

Net Migration: The difference between the population entering and leaving West Sumatra. Given the strong culture of migration, this indicator is crucial for understanding why the administrative population may be large, but the effective productive labor force in the region can fluctuate.

The Human Development Index (HDI) as a Quality Variable: Although often considered a separate variable, in the context of population size, the HDI is used as an indicator of population quality. A large population will only have a positive impact on the economy if supported by adequate levels of education and health.

Economic growth

Economic growth reflects a country's economic development because the rate of economic growth reflects the country's economic condition. Economic growth is defined as a reflection of a country's economic development because it is an indicator of the success of economic development. Economic growth is the process of continuously changing a country's condition towards a better state over a certain period (Marcal et al., 2024).

Economic growth is the process of increasing an economy's production capacity, indicating a real increase in the output of goods and services over a given period, generally measured by an increase in Gross Domestic Product (GDP) or Gross Regional Domestic Product (GRDP) at constant prices. Economic growth reflects a country's or region's ability to utilize economic resources more efficiently to generate added value and increase community income over time. The factor considered in measuring economic growth is Gross Domestic Product (GDP). Gross Domestic Product (GDP) is the total production of goods and services produced within a specific period in a country or region. Nominal GDP (also called GDP at Current Prices) refers to the value of GDP without considering the influence of prices. Meanwhile, real GDP (also called GDP at Constant Prices) corrects the nominal GDP figure by incorporating the influence of prices (Simanungkalit, 2020).

Economic growth differs from economic development, where economic growth focuses on numbers, while economic development focuses on quality, equity, and prosperity. The concept of economic growth is: An increase in the production of goods and services, calculated in real terms, and long-term in nature.

Economic growth in West Sumatra Province throughout the 2021–2024 period reflects a resilient recovery trend after facing contractionary pressures due to the global pandemic in the previous year. Quantitatively, the Gross Regional Domestic Product (GRDP) growth rate showed acceleration driven by the normalization of household consumption activities and the revival of the regional tourism sector. Data shows that West Sumatra's economic structure is still dominated by the agriculture, forestry, and fisheries sectors, but the wholesale trade sector is beginning to play a significant role. This increase in economic growth is inseparable from the regional government's fiscal stimulus policies aimed at strengthening the supply chain of local superior commodities. Referring to research (Fauzi, 2022) in the Journal of Development Economics, stable economic growth in the Sumatra region is highly dependent on the smooth flow of goods distribution between regions. Therefore, the growth figures achieved over the past four years are an indicator of the success of policy synchronization between the central and regional governments. Digital transformation in the service sector has also contributed to the efficiency of economic transactions, accelerating capital circulation within the Minangkabau community.

The quality of economic growth in West Sumatra during this research period is also measured by the extent to which the increase in GRDP (Regional Gross Domestic Product) has been able to create equitable prosperity for all levels of society. Although growth figures show a positive trend, economic disparities between districts and cities remain a challenge that requires serious attention from policymakers. High growth in economic centers such as Bukittinggi and Padang must be able to create a trickle-down effect to surrounding areas that are still predominantly agricultural. Quantitatively, the gross fixed capital investment variable is a very strong determinant factor in driving regional production capacity during the 2021–2024 period. This aligns with the economic growth theory of (Hidayat & Pratama, 2023) in the Journal of Economic Research, which emphasizes the importance of the simultaneous accumulation of physical and human capital. Stable food commodity prices also play a crucial role in maintaining public purchasing power so that economic growth remains on a sustainable path. Therefore, West Sumatra's success in maintaining low inflation has been a key foundation for accelerating economic growth over the past four years.

A comprehensive analysis of West Sumatra's economic growth for the 2021–2024 period confirms that the region's economic resilience is significantly influenced by the flexibility of the MSME sector in adapting to market changes. The increase in economic growth should not be viewed merely as a statistical figure, but rather as a reflection of increased labor productivity across various business sectors. Domestic market integration and strengthening non-oil and gas commodity exports are key strategies for maintaining growth momentum amidst global economic uncertainty. According to the findings of Lestari (2024) in the Journal of Accounting and Economics, the effectiveness of regional spending allocation for supporting infrastructure is significant in reducing logistics costs that hinder growth. Going forward, the main challenge is ensuring that this economic growth can transform into a green economy that maintains the sustainability of West Sumatra's natural resources. Synchronized quantitative data indicates that strengthening the manufacturing sector will become a new growth engine capable of absorbing the surplus labor from the agricultural sector. Thus, West Sumatra's economic prospects post-2024 depend heavily on consistent structural reforms and increased regional competitiveness on the national stage.

Economic growth indicators

GDP/GRDP (Gross Regional Domestic Product) growth, Conventional economic growth measurements typically involve calculating the percentage increase in Gross Domestic Product (GDP) for the national economy and Gross Regional Domestic Product (GRDP) for provinces and districts/cities. GRDP is the sum of the added value generated by all business units within a specific region, or the sum of the final goods and services produced by all economic units during a specific period (Noviarita et al., 2021). Income per capita, Per capita income is the average income of the population. Labor Productivity, Shows how much output is produced by the workforce. Productivity is the key to long-term economic growth. Investment, Investment is the investment of capital

Can be:

a. PMTB is the formation of gross fixed capital such as machinery and buildings).
b. PMDN is domestic investment
c. PMA is the injection of foreign capital

The bigger the investment, the more tools or machines are purchased, the more

Factories are built and technologies are used, which then have an impact on increasing production capacity. The number of workers or jobs increases, and growth increases.

Population and Economic Growth of West Sumatra from 2021-2025

Year	Total Population (X)	Economic Growth (Y)(Annual)
2021	5.597,31	3,29
2022	5.677,55	4,36
2023	5.757,21	4,62
2024	5.836,16	4,36

Source: BPS West Sumatra

Based on the table, it can be seen that the population of West Sumatra Province has increased annually during the 2021–2024 period. In 2021, the population was recorded at 5,597.31 thousand people, and it continued to increase to 5,836.16 thousand people in 2024. This increase indicates relatively stable population growth from year to year.

Meanwhile, West Sumatra's economic growth fluctuated throughout the study period. In 2021, economic growth was recorded at 3.29%, then increased significantly in 2022 to 4.36%. Economic growth rebounded in 2023 to 4.62%, the highest figure during the observation period. However, in 2024, economic growth declined to 4.36% despite continued population growth.

This situation demonstrates that population growth is not always accompanied by proportional economic growth. While there is generally a positive relationship between population and economic growth, other factors such as human resource quality, investment levels, productivity, and national economic conditions also play a significant role in determining the rate of economic growth.

Thus, the table illustrates that population is one factor influencing economic growth, but not the sole determinant. Therefore, further analysis is needed.

	X	Y
tahun	jumlah penduduk	pertumbuhan ekonomi
2021	5.597,31	3,29
2022	5.677,55	4,36
2023	5.757,21	4,62
2024	5.836,16	4,36

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,760104049
R Square	0,577758165
Adjusted R Square	0,366637248
Standard Error	0,470483798
Observations	4

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0,605764992	0,605764992	2,736622087	0,239895951
Residual	2	0,442710008	0,221355004		
Total	3	1,048475			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	-20,83496889	15,10964942	-1,378918088	0,301884326	-85,8465432	44,17660542	-85,8465432	44,17660542
jumlah penduduk	0,004371562	0,002642586	1,654273885	0,239895951	-0,00699857	0,015741693	-0,00699857	0,015741693

Source: data processed using Microsoft Excel using the data analysis tab

Simple linear regression results

The analysis results show a Multiple R value of 0.760. This value indicates a fairly strong and positive relationship between population and economic growth. This means that as population increases, economic growth tends to increase accordingly.

The R-square value of 0.5778 indicates that approximately 57.78 percent of changes in economic growth can be explained by population size. Meanwhile, the remaining 42.22 percent is influenced by factors outside this study, such as investment, human resource quality, and government policy. The adjusted R-square value of 0.3666 indicates that, after adjusting for limited data, population size's ability to explain economic growth is 36.66 percent.

The ANOVA test results showed a significance value of 0.2399. This value is greater than the 5 percent significance level (0.05), thus concluding that the regression model is not yet significant. This means that statistically, population has not been proven to have a significant effect on economic growth in West Sumatra Province during the period studied.

Based on the regression results, the following equation is obtained:

Y = -20,83 + 0,00437X

The population coefficient is positive at 0.00437. This means that any increase in population will be followed by an increase in economic growth, but the effect is not yet significant because the p-value is greater than 0.05.

CONCLUSION

Based on the research results, it can be concluded that population size has not been a primary factor determining economic growth in West Sumatra Province during the study. This indicates that population growth does not automatically drive economic growth unless accompanied by improvements in the quality of human resources. A growing population needs to be supported by higher levels of education, adequate job skills, and extensive employment opportunities to optimally contribute to economic activity.

Furthermore, economic growth is also influenced by other economic factors, such as investment, infrastructure development, government spending, and regional development policies. Without the support of these factors, population growth can actually lead to economic problems, such as unemployment. Therefore, efforts to increase economic growth in West Sumatra Province require a comprehensive approach, focusing not only on population quantity but also on improving the quality and productivity of the regional economy.

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