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Analysis of The Population Size on Economic Growth in Sragen Regency for The Years 2011 – 2021

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Abstract

Economic growth refers to the continuous transformation of a country's economic conditions towards a better level over a specific period. This change occurs when the level of economic activity increases beyond previous achievements, where economic growth refers to the long-term increase in output per capita. The research method used is descriptive, aiming to analyze the relationship between the population size and economic growth in Sragen Regency. A secondary data analysis approach is used to examine the relationship between independent and dependent variables in the studied area without field data collection, relying instead on secondary data as the primary source of information. The objectives of the research are to analyze the population size in relation to economic growth in Sragen Regency, and to analyze the impact of population growth on economic growth in Sragen Regency. The results of the study on the population size and its effect on economic growth in Sragen Regency are as follows: The increase in population has a positive and significant contribution to economic development in the region, indicating that economic growth in Sragen Regency will be driven by an increase in the population size. However, the increase in population density has a significant negative impact on economic growth in the region, suggesting that a surge in population density will lead to a slowdown in economic growth in the area.

Keywords: population size; economic growth; Sragen Regency.

1. Introduction

As a developing country, Indonesia ranks fourth in the world in terms of population, which contributes to various economic issues in the country. Although Indonesia has significant human resource potential to be developed, it often faces specific challenges, particularly in the labor sector, such as issues related to unemployment. A high unemployment rate in a region can lead to detrimental consequences, including economic instability, obstacles to economic growth, a decline in community welfare, and the potential emergence of socio-economic issues, ultimately resulting in poverty.

Economic growth reflects the extent to which economic activities generate an increase in community income over a specific period. Economic activity is the process of utilizing production factors to generate output, which in turn creates a flow of compensation for the production factors owned by the community. With economic growth, it is expected that the income of the community, as the owners of production factors, will also increase. A country is considered to be experiencing economic growth when its economic conditions improve compared to the previous period. One important macroeconomic indicator for assessing the economic condition of a region over a specific period is Gross Regional Domestic Product (GRDP). (Mouren et al., 2022).

The economic growth of a country refers to its increased capacity to provide goods and services for its population. The issue of economic growth is a challenge faced not only by Indonesia, but also by countries around the world. This issue continues to be a central topic of discussion, which can include fluctuations or instability in economic growth, slowdowns in growth, or the inability to meet expected growth targets. Economic growth refers to the increase in a country's production capacity, reflected in the rise of national income, which is measured through indicators such as Gross Domestic Product (GDP). The Solow growth model, according to Mankiw, illustrates how production factors such as capital, labor, and technological development interact within an economy. (Idris, 2021).

Economic growth refers to the ongoing transformation of a country's economic conditions towards a better level over a specified period. This change occurs when the level of economic activity exceeds previous achievements. There is a difference between economic growth and economic development, where economic growth refers to the continuous increase in per capita output over the long term. (Yunianto, 2021).

Population variables have an impact on economic growth, particularly through population growth and population density. Population growth has the potential to drive economic growth by expanding markets, which in turn enhances specialization within the economy and increases the level of economic activity. However, population density can impact the living standards of the community. Efforts to improve quality of life may face greater challenges, which can lead to social, economic, welfare, and security issues, as well as concerns regarding land, clean water, and food availability. One of the most evident impacts is environmental degradation, considering that all human needs are fulfilled by the surrounding environment. Therefore, existing resources are utilized to meet various human needs, including the need for food, shelter, clean water, clean air, and other necessities. (Yunianto, 2021).

The success of economic development is measured by the increase in real income over the long term, without a corresponding rise in the number of people living in poverty or a widening income disparity. However, poverty is a long-term issue that requires urgent solutions, both at the national and regional levels. (Alisha, 2021).

Economic growth is a factor influencing the population size in Sragen Regency, and the economic growth there from 2011 to 2021 has been affected by population growth and population density. This contrasts with research findings that indicate that population size has a positive impact on capital expenditure, suggesting that the higher the population in a region, the greater the capital spending in that area. The ability of the population to influence economic conditions will result in its dominance in the market, which in turn will enhance the level of economic specialization. As a result, economic growth will increase due to this specialization. However, at every stage of development, there are three fundamental choices: living a healthy and long life, gaining knowledge through education, and having access to various essential resources as efforts to achieve a decent standard of living. (Mendrofa et al, 2022).

Economic growth is one of the indicators of a region's progress. When economic growth shows a positive and significant trend, it reflects a strong level of development in that area. Moreover, economic growth also reflects the level of welfare in the region. With high economic growth, the region can be considered advanced in various aspects. This will encourage the sustainability and development of economic activities in the area (Dharma, 2021).

Granting autonomy to regions has a significant impact on economic growth in an area, as it gives local governments the ability to manage their own finances and implement policies that can influence the development of the region. Economic growth encourages local governments to take an active role in economic development by managing available resources and forming partnerships with the community to create new job opportunities, which in turn affects the development of economic activities in the region. The process of economic development is marked by increased productivity and per capita income, which ultimately raises the level of welfare in the region (Datu & Pingkan, 2021).

Regression analysis examines the relationship between variables represented in a mathematical equation that reflects the functional relationship among them. When a functional relationship is found between one predictor variable and one criterion variable, this is called simple (single) regression analysis. However, when the functional relationship involves more than one variable, it is referred to as simple linear regression analysis. (Nazori & Agnisa, 2018)

The population of Sragen Regency in 2021 was 983,641 people, while in 2020, the population was 976,951 people, with an annual population growth rate from 2020 to 2021 of 0.68%. Meanwhile, the population growth rate of Sragen Regency over the past ten years, from 2010 to 2020, was 13.83%. With an area of 941.5 square kilometers, the population density of Sragen Regency is 1,045 people per square kilometer. The analysis unit is at the sub-district level.

2. Research Methods

This research employs a descriptive quantitative method with a secondary data analysis approach. The quantitative method aims to obtain numerical results to demonstrate the regression analysis study. The descriptive method in this research is used to analyze the relationship between the population size and the economic growth of Sragen Regency. Meanwhile, the secondary data analysis approach is a method conducted without fieldwork, relying instead on secondary data as the primary source. The objective is to analyze the relationship between the independent and dependent variables in the observed location. The data collected are already available in related institutions in the form of documents, such as from the Central Bureau of Statistics and the Department of Labor of Sragen Regency.

To obtain data, the research employs a literature review method. This involves searching for data from literature, references, lecture materials, and secondary data sources such as the Central Bureau of Statistics of Sragen Regency. Additionally, supporting data is also gathered through internet searches. Once the data is collected, the next steps include processing, classification, and evaluation of the data.

In this research, we utilized the Simple Linear Regression method with multiple variables. We used data on population size and economic growth, which is measured based on the Gross Regional Domestic Product (GRDP) at current prices according to business sectors. Regression analysis was employed to evaluate the extent of the impact of variable X (population size) on variable Y (economic growth). We conducted multiple regression analysis to explain the relationship between several independent variables (in this case, population size) and one dependent variable (economic growth). This study focuses on the relationship between population size and economic growth in Sragen Regency. The method used is Multiple Linear Regression with multiple variables. The data used includes population size and economic growth, measured through GRDP at current prices by business sectors. The regression analysis aims to assess the extent to which variable X (population size) affects variable Y (economic growth). By analyzing GRDP and population size data, we attempt to model the relationship between the two to understand whether population growth contributes to economic growth in the region. The formulation we used is as follows:

The regression formula is: $y=\boldsymbol{\beta}\ x + \alpha$
Where:
Y = Economic Growth
β = Regression Coefficient
X = Population Size
α = Constant

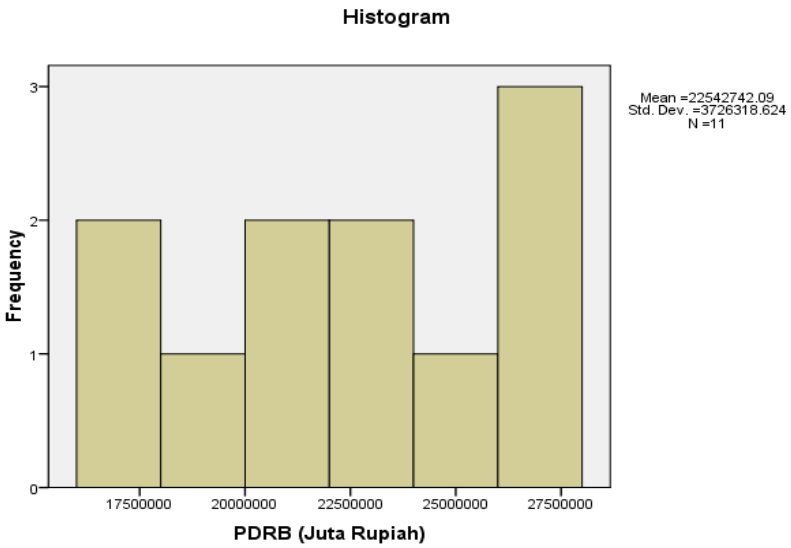

Figure 1. Histogram PDRB

3. Results and Discussion

3.1. Data Normality Test Smirnova

The normality test is conducted to examine whether, in a regression model, it is important to check if the dependent and independent variables have a distribution that approximates normality. This assessment is necessary to determine the quality of the constructed regression model, as the observed variables are expected to have a normal or near-normal distribution. This evaluation is crucial for verifying whether the research data follows a normal distribution pattern.

Table 1. Test Of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
GDRP (Million Rupiah)	.139	11	.200*	.937	11	.483
Population	.382	11	0.000	.678	11	0.000

a. Lilliefors Significance Correction

This is a lower bound of the true significance

H0 = Normal

Ha = Abnormal

If p-value (sig.) > 0.05, then accept Ho

If p-value (sig.) < 0.05, then accept Ha

The calculated GRDP results show that the data is normally distributed.

Table 2. Correlations

		GDRP (Million Rupiah)	Population
GDRP (Million Rupiah)	Pearson Correlation	1	.716*
	Sig. (2-tailed)		.013
	N	11	11

Correlation is significant at the 0.05 level (2-tailed).

Guidelines for interpreting correlation coefficients without considering the direction of the relationship (Sugiyono, 2017).

Table 3. Correlation Coefficients without Considering the Direction of the Relationship

Cofficoent Interval	**Level of Relationship**
0.00 - 0.199	Very Low
0.20 - 0.399	Low
0.40 - 0.599	Moderate
0.60 - 0.799	Strong
0.80 - 1.000	Very Strong

According to the expert Sugiyono, a correlation value of 0.716 is classified as strong and indicates a positive value, suggesting a direct relationship. (If the population increases, then the GRDP value also increases).

Table 4. Coefficient

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistic	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-3.199E7	1.775E7		-1.802	.105		
			.716			1.000	1.000
Population	60.749	19.753		3.075	.013		

b. Dependent Variable : GDRB (Million Rupiah)

The regression formula is y=60.749x+(−3.199)y = 60.749x + (-3.199)y=60.749x+(−3.199) or Population = 60.749 × (GRDP) - 3.199. The influence of the population on GRDP is direct, as indicated by the positive regression coefficient.

Table 5. Model Summary[b]

Model	R	R Square	Adjusted Square	Std. Error of the Estimate
1	.716	.512	.458	32318.782

a. Predictors: (Constant), GDRB (Million Rupiah)

b. Dependent Variable : Population

R-squared (Determination Value)

Based on the table above, the correlation coefficient is obtained as (R = 0.716). The coefficient of determination (R^2 = 0.512 = 51.2%), which means that 51.2% of the GRDP is influenced by the population, while the remaining 48.8% is influenced by other variables besides the population.

Table 6. Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistic		
		B	Std. Error	Beta			Tolerance	0)	VIF
1	(Constant)	-3.199E7	1.775E7		-1.802	.105	1.000	1)	1.000
	Population	60.749	19.753	.716	3.075	.013			

Testing for Non-Multicollinearity Assumption (Myers, 1990 in Field, 2009) if the largest variance inflation factor (VIF) value is greater than 10, it indicates the presence of multicollinearity. From the table above, the VIF value is 1, which means there is no multicollinearity present.

The results of the simple linear regression analysis show that the constant has a positive value of 3.199, indicating a positive influence between the population and economic growth. This means that the increase in economic growth in Sragen Regency is influenced by the increase in both population size and population density. The regression coefficient for the population variable is 60.749, indicating that the high population growth significantly impacts economic growth in Sragen. The regression analysis states that population growth positively and significantly contributes to economic growth in the area. Specifically, a 1% increase in population growth will result in a 60.749% increase in economic growth.

Based on the calculations above, it can be seen that the correlation coefficient is (R = 0.716) and the coefficient of determination (R^2 = 0.512 = 51.2%), which means that 51.2% of the GRDP is influenced by the population, while the remaining 48.8% is influenced by other variables besides the population. The regression formula is \(y = 60.749x + (-3.199) \) or **Population on GRDP is direct, as indicated by the positive regression coefficient.

Sragen Regency continues to experience an annual increase in population. Population growth significantly impacts various aspects, including per capita income, living standards, agricultural development, employment, labor force, and capital formation. The population size can also provide a rough indication of a country's economic progress when related to per capita income growth. In the context of economic development, Smith states that population growth can stimulate economic development by expanding markets through an increased population size, which in turn enhances the quality of economic activities.

The evolution of specialization and division of labor can accelerate economic development by increasing productivity and fostering technological advancements. However, in Sragen Regency, the pattern of population distribution tends to cluster in areas close to the city. This pattern is not conducive to equitable development across the region. The uneven distribution of the population also impacts the population density levels in Sragen Regency. For example, Masaran District, which has the highest population, experiences an annual increase in population due to its proximity to other regencies and the presence of various industries in the

area. This uneven population distribution leads to disparities in population density among the districts in Sragen, which also varies in area size.

4. Conclusion

The results of the study on the impact of population size on economic growth in Sragen Regency are as follows: An increase in population has a positive and significant contribution to economic development in the region, indicating that economic growth in Sragen Regency will be driven by an increase in population size. However, the increase in population density has a significantly adverse effect on economic growth in the area, suggesting that a surge in population density will lead to a slowdown in economic growth in the region. This research can be developed by examining the effect of GRDP on poverty levels and quality of life improvements using sub-districts to see long-term effects and strengthen statistical results. In addition, an analysis of the efficient use of natural and human resources can be used to assess economic growth in line with the principles of sustainable development. Due to the limited number of independent variables in this study, it does not consider other factors that can affect economic growth. The results of the negative effect of population density have not been quantitatively calculated either by regression analysis. Qualitative analysis can enrich the research results, for example interviews with local traders and consumers.

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Author Contributions

Conceptualization: David Muhammad Rafi, Umrotun; **methodology**: David Muhammad Rafi, Basyar Ihsan Arijuddin; **investigation**: David Muhammad Rafi; **writing—original draft preparation**: David Muhammad Rafi; **writing—review and editing**: Basyar Ihsan Arijuddin; **visualization**: David Muhammad Rafi. All authors have read and agreed to the published version of the manuscript.

Conflict of interest

All authors declare that they have no conflicts of interest.

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