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Analysis Of The Effect Of Population, Gini Ratio And Education On Poverty In Papua Province 2015-2022

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Abstract

This study aims to analyze the effect of population, Gini ratio, and education on the poverty rate in Papua Province during the period 2015-2022. Using the panel data regression method on 29 districts/cities, this study applies the Fixed Effect Model (FEM) approach as the best model based on the Hausman test results. The results of the analysis show that population and education have a negative and significant effect on the poverty rate, while the Gini ratio has a negative but insignificant effect. This finding indicates that improving the quality of human resources through education and productive population growth can reduce the poverty rate in Papua. In contrast, income inequality has not been statistically proven to be a dominant factor in influencing poverty in the region. Therefore, poverty alleviation strategies in Papua need to focus on improving access and quality of education, as well as community-based development that is contextual to local socio-cultural conditions.

Keywords: poverty, population, gini ratio, education, Papua, panel data

INTRODUCTION

Development is a planned process of change that aims to improve the overall welfare of society, not only in terms of the economy, but also access to education, health, and equitable distribution of resources (Todaro & Smith, 2011). One of the main challenges in development is poverty, which is often caused by unequal distribution of resources, low quality of human resources, and inequality between regions (Kuncoro, 2004).

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Poverty is a complex issue that cannot be explained solely from a monetary perspective; rather, it requires an approach that encompasses multidimensional aspects (Merizantaa & Emalia, 2024). The term poor households can refer to basic needs, low levels of education, lack of health, ownership of property, lack of work and decent housing to support survival (Jamil & Mat, 2019). The problem of poverty is still a serious issue in various countries, even in developed countries, poverty remains an important concern. Poverty alleviation is one of the main objectives of a country's development (Sembiring et al., 2023).

Indonesia is one of the developing countries that is still struggling with poverty. This condition is caused by the limitations that local communities have in managing existing resources. Infrastructure limitations, inequality in economic distribution, and low access to education are the roots of these conditions (Sanggrangbano, 2019). Another factor is inequality in the distribution of public spending and uneven economic growth. Limited investment and infrastructure development in certain areas result in economic disparities between regions, making people in remote or less developed areas more vulnerable to poverty (Sukwika, 2018).

In terms of the percentage of poor people in Papua in the last five years according to Regency / City, most of them have decreased, on the contrary, in terms of the number of poor people it has actually increased (Bappeda Provinsi Papua, 2022). Limitations in development due to locations that are difficult to reach, and high rainfall make stakeholders need more time and money in the development process and will certainly slow down economic growth (Shakira et al., 2024).

More attention from the government is needed by Papua Province in alleviating the existing poverty problem. Without the right solution, the population will continue to be on the verge of poverty. An uncontrolled population will support the increasing poverty rate. This view is in line with the theory put forward by Thomas Robert Malthus in *Essay on the Principle of Population* (1798) which argues that population tends to grow exponentially, while the availability of resources, especially food, only increases arithmetically (Athiyah, 2024).

In addition to population, income inequality as measured by the Gini ratio also impacts poverty. It limits access to basic services and worsens the distribution of economic opportunities (Endrawati et al., 2023). A decrease in the gini ratio indicates an improvement in income equality, while an increase in the gini ratio indicates widening inequality. This condition requires efforts from the government to encourage economic equality, one of which is through improving access and quality of education.

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On the other hand, education reflected in the average years of schooling has great potential to reduce poverty through improving the quality of human resources (Sachs, 2005). The human capital theory proposed by Becker (1993) states that skilled and knowledgeable human resources have a greater chance of obtaining jobs with higher incomes, thus reducing poverty and economic inequality (Handayani & Hanifa, 2024).

In an effort to reduce poverty, the education sector plays a very important role. The Indonesian government allocates at least 20% of the national and regional budgets to this sector, as mandated in the 1945 Constitution (Ratih et al., 2023). This policy has contributed to an increase in the education level of the community, including in Papua, which shows a positive trend. This increase is a strategic opportunity to alleviate poverty through the provision of higher quality education capital. One important indicator, the average years of schooling (RLS), has been shown to improve productivity and performance in carrying out work tasks (Ayudia et al., 2024).

Based on this background, this study aims to analyze the effect of population, inequality described by the gini ratio and education on poverty in Papua during the period 2015-2022.

METHODS

This study uses a panel data regression model that combines time series and cross section data to analyze the effect of population, Gini ratio, and education on poverty rates in 29 districts/cities in Papua Province during the 2015-2022 period. There are three main approaches in panel data estimation, namely the Common Effect Model, Fixed Effect Model, and Random Effect Model. The selection of the best model is done through a series of tests, namely the Chow Test (to choose between CEM and FEM), the Hausman Test (between FEM and REM), and the Lagrange Multiplier Test (between CEM and REM).

The regression model used is of the form:

$$PPMit = \beta 0 + \beta 1 JP_{it} + \beta 2 RG_{it} + \beta 3 PD_{it} + \varepsilon it$$

Where PPM is the percentage of poor people, JP the total population, RG the gini ratio, and PD the level of education.

Before estimating the model, a classical assumption test was conducted to ensure there was no violation of the basic assumptions of linear regression, including normality test (using Jarque-Bera), multicollinearity test (using Tolerance), and heteroscedasticity

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test. Furthermore, hypothesis testing is carried out using the t test to see the effect of variables partially, the F test for simultaneous influence, and the coefficient of determination (R^2) test to see how much variation in poverty can be explained by the model. The best model is the one that passes the classical assumption test and has a high significance value in the statistical test.

RESULTS

Testing the best model

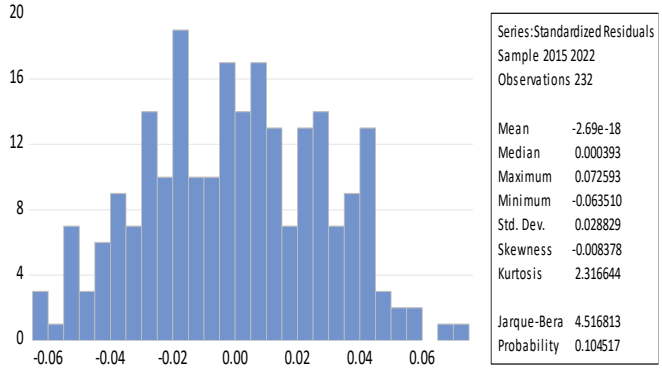
Test Summary	Chi-Sq Statistic	Chi-Sq- df	Prob
Random cross-section	13.771250	3	0.0035

Source: Eviews, data processed

Based on the findings obtained from table 6. the results of the Hausman Test above, it is known that the probability value is 0.0035. That means that the prob value < α = 0.05 explains that the model selected in the Hausman Test is the *Fixed Effect Model.*

Classical assumption test

Normality Test Results



Based on the results of the classical assumption test on the Fixed Effect Model (FEM) model, it is known that the data is normally distributed with a Jarque-Bera probability value of 0.104517 which exceeds the significance limit of 0.05.

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Multicollinearity Test Results

	JP	RG	PD
JP	1.000000	0. 013158	0.036306
RG	0.013158	1.000000	0.504705
PD	0.036306	0. 504705	1.000000

The multicollinearity test also shows that all independent variables have values below the 0.8 threshold, so it can be concluded that there is no multicollinearity relationship between independent variables.

Heteroscedasticity Test Results

Root MSE	0.001239	R-Squared	0.269115
Mean dependent var	-0.460533	Adjusted R-squared	0.155828
S.D. dependent var	0.322778	S.E of regression	0.001334
Sum squared resid	0.000356	F-statistic	2.375510
Durbin-Watson stat	1.667820	Prob(F-statistic)	0.000183

Furthermore, the heteroscedasticity test resulted in a calculated χ^2 value of 0.000178, which is smaller than the χ^2 table of 7.814728, so it can be concluded that there are no symptoms of heteroscedasticity in the model. Thus, the regression model used has met the classical assumptions and is suitable for use in further analysis.

Panel data regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.714143	0.071793	51.73435	0.0000
JP	-0.016189	0.006513	-2.485753	0.0137
RG	-0.033151	0.029976	-1.105920	0.2701
PD	-0.136141	0.017393	-7.827575	0.0000
Effects Specification				

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Cross-section fixed (dummy variables)			
Weighted Statistics			
Root MSE	0.028767	R-squared	0.995373
Mean dependent var	4.162842	Adjusted R-squared	0.994655
S.D. dependent var	1.869805	S.E. of regression	0.030983
Sum squared resid	0.191984	F-statistic	1387.758
Durbin-Watson stat	1.338141	Prob(F-statistic)	0.000000

Fixed Effect Model Estimation Results, the regression equation is obtained as follows: PPMit= 3.714143 - 0.016189 JPit - 0.033151RGit - 0.136141 PDit + εit
The regression results show that if all independent variables do not change, then the percentage of poor people in Papua is 3.71%. Each increase in population size reduces poverty by 0.016%, the Gini ratio reduces poverty by 0.033%, and an increase of one year of education reduces poverty by 0.136%. All coefficients are negative, indicating an inverse relationship between each variable and the poverty rate in Papua.

The t-test results show that the population and education variables have a negative and significant effect on the percentage of poor people in Papua, with a probability value below 0.05 each. In contrast, the Gini ratio variable has a negative but insignificant effect, because the probability value is above 0.05. While the F-statistic test is known that with an F-table of 2.644194 and a probability value of 0.000000 <0.05. So this shows that poverty in Papua is simultaneously influenced by population, gini ratio and education.

DISCUSSION

The Effect of Population on Poverty in Papua

The estimation results of the regression model using the Fixed Effect Model (FEM) approach reveal that the population variable has a negative and significant effect on the poverty rate in Papua Province during the 2015-2022 period, as indicated by the coefficient value of -0.016189. Econometrically, this indicates that every one person increase in population correlates with a 0.016189 percent decrease in the percentage of poor people. This finding substantially rejects the basic assumptions of the initial

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hypothesis and deviates from the classical Malthusian theoretical framework, which places population growth as a threat to resource availability and economic viability.

In the context of Papua, the negative relationship between population and poverty can be explained by the increasing quality of human resources, regional economic transformation, and improvements in basic social infrastructure that enable more inclusive mobility and economic participation, especially in urban areas. In other words, population increase is not merely a structural burden, but can also serve as a catalyst for development if balanced with improved public services, access to education and skills training, and productive job creation.

This finding is in line with the study (Wijayanti et al., 2024) which shows that an increase in population, in the context of well-managed development, can positively contribute to poverty reduction through the creation of larger economies of scale and increased efficiency in local resource utilization. Therefore, in Papua's demographic dynamics, population plays a role as a potential instrument in inclusive growth-based poverty alleviation strategies.

The Effect of Gini Ratio on Poverty in Papua

The panel data regression analysis shows that the Gini ratio has a negative coefficient of -0.033151 on the poverty rate in Papua, although the effect is not statistically significant. This means that numerically there is an indication that an increase in income inequality is correlated with a decrease in poverty, but this relationship is not strong enough to be inferred. This finding challenges the conventional view that generally assumes that income inequality exacerbates poverty, and at the same time rejects the initial hypothesis of the study.

This lack of significance can be interpreted as a reflection of Papua's socio-economic structure, which is not fully represented by formal inequality indicators such as the Gini ratio. Most Papuans still rely on subsistence and informal economic systems, so the income distribution reflected in macro data does not yet comprehensively depict welfare conditions. In addition, the existence of government fiscal interventions, including special autonomy funds and social assistance programs, contribute to maintaining the purchasing power of the poor even though aggregate income inequality remains high.

This finding is reinforced by research (Saleh & Rizkina, 2021), which states that the Gini ratio in the context of regions with strong socio-cultural characteristics is not always an effective predictor of poverty levels. Therefore, in the context of Papua, poverty

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alleviation efforts require a more contextual approach by considering structural and cultural variables, rather than relying solely on formal measures of inequality.

The Effect of Education on Poverty in Papua

The results show that the education variable, proxied by the average years of schooling, has a negative and significant influence on the poverty rate in Papua during the observation period. With a coefficient of -0.136141, this finding indicates that a one-year increase in average years of schooling correlates with a decrease in poverty by 0.136141 percent. Theoretically, this result supports the concept of human capital theory that places education as a fundamental instrument in increasing individual productivity, expanding access to the formal labor market, and encouraging sustainable economic participation.

The significant effect of education on poverty reduction can be explained through two main mechanisms. First, education increases the chances of obtaining higher-paying jobs and strengthens competitiveness in an increasingly complex labor market. Second, education shapes the capacity of individuals to make more rational economic decisions, including in financial management and resource utilization. Thus, education functions not only as a tool for social mobility, but also as a foundation for structural transformation of the local economy.

This result is in line with research Shi & Qamruzzaman, 2022), which states that education has a multiplicative effect on quality of life, health, and economic opportunities. In the context of Papua, improving the education system is crucial as a long-term strategy to break the intergenerational cycle of poverty. Therefore, improving access, quality and relevance of education should be a top priority in the regional development agenda as a form of long-term social investment oriented towards equitable welfare.

Summary

This study shows that population has a negative and significant effect on poverty in Papua, meaning that an increase in population actually reduces the poverty rate, presumably due to support for improving the quality of human resources and economic access. The Gini ratio also has a negative but insignificant effect, suggesting that income inequality is not yet a dominant factor in influencing poverty in Papua. Meanwhile, education is shown to have a negative and significant effect, emphasizing the important role of education in increasing the productivity and competitiveness of individuals to move out of poverty

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Local governments are expected to strengthen the quality development of the population through equitable and quality education, especially in disadvantaged areas. Capacity building through vocational training and local economic empowerment is also important so that the productive population is able to earn a decent income. In addition, poverty alleviation strategies need to prioritize a community-based approach through the development of independent villages that are inclusive, integrative, and in accordance with the socio-cultural conditions of Papua to make population growth positive and productive so that existing inequality will slope further.

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