



The Influence of Population, Open Unemployment Rate and Gross Regional Domestic Product Growth Rate on the Number of Poor People in Sumatra Island in 2016-2023

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ABSTRACT

This study aims to see how much influence the population, TPT, and GRDP have on the poverty rate in Sumatra Island. This study applies the panel data regression method with a coverage area of ten provinces in Sumatra Island during the period 2016 to 2023. The REM model was chosen as the most appropriate approach. The results of the study show that the three variables have a positive and significant influence on the poverty rate in the region.

INTRODUCTION

Poverty is a multidimensional issue that continues to be a major concern in development in Indonesia. As one of the islands with a large population and significant economic potential, Sumatra Island faces complex challenges related to high poverty rates. Based on data from BPS, although the national poverty rate shows a gradual decline, several provinces in Sumatra still experience quite high poverty rates. This shows the existence of various specific factors that influence the dynamics of poverty in the Sumatra Island region.

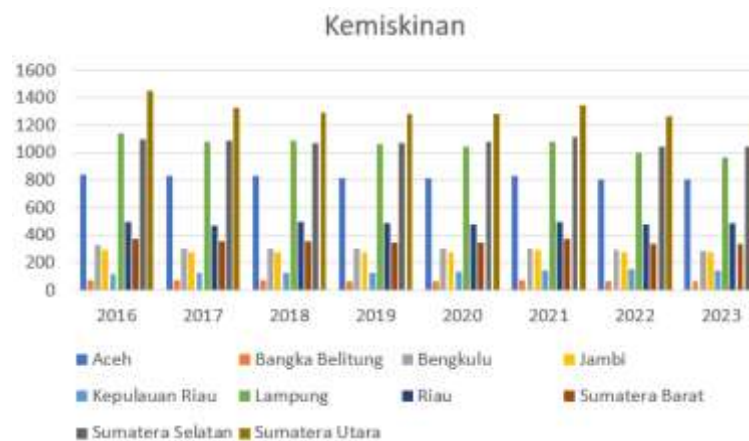


Figure 1. Poverty Graph on Sumatra Island 2016-2023

Population is one of the main determinants of poverty levels. Ongoing population growth puts significant pressure on the availability of resources and the capacity of public services. Population growth, if not balanced by increased employment opportunities and access to education and basic services, can increase people's vulnerability to poverty. In addition, TPT also significantly affects poverty rates. High unemployment rates reflect people's limited access to decent work, thus limiting their ability to meet basic needs.

Another factor that is no less important is the GRDP growth rate. This indicator plays a major role in assessing regional economic conditions. The GRDP growth rate reflects the economic capacity to create jobs, increase people's income, and reduce social disparities. However, although several provinces in Sumatra have high GRDP growth rates due to the contribution of sectors such as plantations, mining, and industry, the benefits are often uneven. This inequality can worsen poverty in some areas.

The relationship between population, open unemployment rate, and GRDP growth rate is a significant factor in explaining the dynamics of poverty in Sumatra Island in the period 2016 to 2023. This period was marked by significant challenges, including the global economic downturn and the effects of the COVID-19 pandemic which worsened the social and economic situation of the community. On the other hand, the government has made various efforts such as programs to overcome poverty, including social assistance and infrastructure investment, although their effectiveness still needs to be studied further.

This study aims to analyze the influence of population, TPT, and GRDP growth rate on poverty rates in the Sumatra Island region in the period 2016 to

2023. This study uses a quantitative approach by utilizing secondary data sourced from BPS and other official sources. The results of the study are expected to provide empirical insights that can support more effective policy research in reducing poverty rates in Sumatra Island.

In addition, this study is also expected to be able to identify differences in poverty patterns between provinces in Sumatra, thus allowing for a more specific approach in policy implementation. By understanding the interaction between population, TPT and GRDP growth rate, this study seeks to contribute to inclusive and sustainable development efforts on the island of Sumatra.

LITERATURE REVIEW

Poverty is a common problem that occurs due to limitations in meeting basic needs such as food, education and health. The high poverty rate is influenced by various factors, including population, TPT and GRDP growth rate. These three variables play an important role in determining the dynamics of poverty, especially in Sumatra Island.

Population and Poverty

A large population can be a challenge in the social and economic development of a region. Malthusian theory states that population growth that exceeds the rate of economic growth can cause excessive pressure on natural resources, hinder income equality, and worsen poverty rates (Todaro & Smith, 2020). Sumatra Island is one of the regions with significant population growth. Based on the BPS report (2023), the population of Sumatra continues to increase every year, especially in provinces such as North Sumatra, Riau, and Lampung. High population growth can cause a surge in the need for jobs, education, and health services, which if not met, can increase the number of poor people. Here are some theories and empirical findings regarding the influence of population on poverty levels:

- a. Research by Hafiz et al., (2022) in West Sumatra shows that population has a significant positive impact on poverty in the area. A significant increase in population without being accompanied by improvements in the quality of human resources has the potential to cause a spike in poverty rates.
- b. Research by Damanik et al., (2020) in North Sumatra found that population had a significant positive impact on poverty levels in the area. This study confirms that population growth is often followed by increased poverty, because not all residents have adequate jobs and income.
- c. Research by Mahsunah et al., (2019) in East Java Province indicates that population does not have a significant effect on poverty rates. The study suggests that other variables, such as education and unemployment rates, have a more dominant contribution in determining poverty conditions in the region.
- d. Research by Mita et al. (2020) in the Riau Islands region shows that the variables of population and unemployment rate do not have a significant

effect on poverty in the area. The results of this study provide an indication that poverty is influenced by various complex factors.

Open Unemployment Rate and Poverty

TPT represents the proportion of the workforce that is unemployed and actively seeking employment opportunities. A high TPT indicates a lack of available employment opportunities, which ultimately contributes to high poverty rates. According to classical economic theory, unemployment can occur when the population increases, then workers' skills do not match the needs of the labor market, causing an imbalance between the supply and demand of labor and ultimately increasing poverty (Krugman, 2019). Here are some theories and empirical findings regarding the effect of TPT on poverty:

- a. Research by Damanik, Sidauruk, et al. (2022) in North Sumatra found a positive relationship between TPT and poverty in the region. Every 1% increase in TPT has the potential to significantly increase the number of poor people. This situation becomes even more complex when people are affected by policies during the COVID-19 pandemic which results in reduced activity in various business sectors. in Sumatra, which ultimately worsens unemployment and poverty rates in the area.
- b. Research by Rahmawati et al. (2022) in Aceh Province found that the open unemployment rate had a significant positive effect on the poverty rate in the province throughout the period 2013 to 2022. This means that an increase in the TPT tends to be followed by an increase in poverty. Their research provides an indication that the more unemployed, the more poor people there are.
- c. Research by Putra and Kurniawan (2022) in Lampung Province revealed that TPT did not have a significant effect on economic growth in the province, which indirectly affected the poverty rate. This provides an indication that the relationship between unemployment and poverty can be influenced by various other factors.

GRDP Growth Rate and Poverty

The GRDP growth rate is a key indicator that describes the level of economic growth in a region. According to Kuznets' theory, the rate of economic growth can initially increase income inequality, but in the long term the rate of economic growth can help reduce poverty rates by expanding job creation and increasing people's income. However, the uneven distribution of GRDP can worsen inequality and poverty (Todaro & Smith, 2020). Based on the BPS report (2023), several provinces in Sumatra such as Riau and South Sumatra have high GRDP, supported by the industrial and mining sectors. A more detailed explanation of the relationship between the GRDP growth rate and poverty rates is presented in the following section :

- a. Research by Dimas et al. (2024) in Kalimantan concluded that the increase in the GRDP growth rate did not have a significant impact on reducing poverty levels. His research shows that the increase in the GRDP growth rate does not have a direct impact on reducing poverty if the distribution of benefits is uneven. For example, rural areas often do

not feel the impact of the growth of the industrial sector concentrated in urban areas.

- b. Research by Manangkalangi et al., 2020 indicates that an increase in the GRDP growth rate has a negative and significant impact on the poverty rate in West Kalimantan in the period 2017 to 2022. Every 1% increase in the GRDP growth rate correlates with a decrease in the poverty rate of around 0.48%. This provides an indication that economic growth reflected in the GRDP growth rate can help reduce poverty rates if there is better development and distribution equality.
- c. Research by Segoro & Pou (2019) in Bantul Regency indicated that the rate of GRDP growth did not have a significant effect on the percentage of poverty in the area. Although the rate of GRDP growth increased, the poverty rate did not experience a significant decline. This is due to inequality in income distribution and lack of access for the majority of the population to the benefits of economic growth.
- d. Research by Suardana et al., 2022 shows that the growth rate of GRDP per capita does not have a significant effect on reducing poverty levels in the Bali Province. Although the growth rate of GRDP per capita increases, this does not always have an effect on reducing poverty because other factors, such as uneven development and high unemployment rates, have a greater impact on poverty.

Interaction between Population Number, TPT, and GRDP Growth Rate Against Poverty

Poverty in Sumatra cannot be explained by looking at just one variable. The relationship between population, TPT, and GRDP growth rate influence each other. Sinaga's research (2024) shows that the high population and TPT without being balanced by inclusive GRDP growth causes an increase in poverty. On the other hand, equitable economic growth, accompanied by population growth control and reduction of TPT, can significantly reduce poverty rates. In this context, the role of the government in creating policies that support job creation, improving the quality of education, and equitable economic distribution is very important. to reduce poverty rates on Sumatra Island.

METHODOLOGY

This study uses a quantitative descriptive method that utilizes secondary data with a panel data approach. This study involved ten provinces in the Sumatra Island region consisting of Aceh, Bangka Belitung, Bengkulu, Jambi, Riau Islands, Lampung, Riau, West Sumatra, South Sumatra, and North Sumatra in the period 2016 to 2023. The data obtained include population, open unemployment rate, GRDP growth rate, and the number of poor people, which are taken from BPS and other official sources. This study uses panel data regression analysis to evaluate the effect of population (X1), open unemployment rate (X2), and GRDP growth rate (X3) on the number of poor people (Y) in the Sumatra Island region. The analysis was carried out using Microsoft Excel 2021 and Eviews 12. The model applied in this finding is:

$$Y_{it} = \alpha_0 + \alpha_1 X_{1it} + \alpha_2 X_{2it} + \alpha_3 X_{3it} + \epsilon_{it}$$

Information :

- Y_{it} : Number of Poor People
- X_{1it} : Total Population
- X_{2it} : TPT
- X_{3it} : GDRP Growth Rate
- α₀ : Constant
- α₁, α₂, α₃ : Coefficient
- i : Cross Section Data of 10 Provinces in Sumatra
- t : Time Series Data 8 Years
- ε_{it} : Error

The selection of the most appropriate model among CEM, FEM, and REM is carried out through a series of tests, including the Chow Test, Hausman Test, and LM Test.

RESEARCH RESULT

The three types of tests used, namely the Chow Test, the Hausman Test, and the LM Test, produced probability values for each model below 0.05. These results indicate that the most suitable model appropriate for use in this study is REM. Furthermore, classical assumption tests need to be carried out, which include multicollinearity tests and heteroscedasticity tests (Napitupulu et al., 2021).

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	11630.78	24.33204	NA
JP	3.30E-05	3.284158	1.012399
TPT	249.7870	15.95700	1.137281
PDRB	112.5485	4.314947	1.126960

Figure 2. Multicollinearity Test

After conducting the Multicollinearity Test, the correlation coefficient value between JP, TPT, and GRDP was 10.00. This study provides an indication that the model used does not experience multicollinearity problems, so it can be declared to have passed the test (Napitupulu et al., 2021).

Heteroskedasticity Test: Glejser
Null hypothesis: Homoskedasticity

F-statistic	2.304118	Prob. F(3,76)	0.0836
Obs*R-squared	6.669553	Prob. Chi-Square(3)	0.0832
Scaled explained SS	4.588214	Prob. Chi-Square(3)	0.2046

Figure 3. Heteroscedasticity Test

The results of the Heteroscedasticity Test show that the obs R-squared probability value is 0.0832 ± 0.10. Based on these results, it can be concluded that the data used in this finding has successfully passed the heteroscedasticity test (Napitupulu et al., 2021).

After that, hypothesis testing was carried out to analyze the influence of the three independent variables on the dependent variable.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	299.5173	88.84655	3.371175	0.0013
JP	0.022208	0.003006	7.387346	0.0000
TPT	6.006512	3.138038	1.914098	0.0604
PDRB	3.740472	1.084952	3.447591	0.0010

Figure 4. T test

Each independent variable has its own influence on the dependent variable partially, the details are as follows:

1. In the JP variable, the calculated t obtained is 7.387346 t table is 1.7 and the resulting probability value is 0.0000 0.10. Thus, HO is rejected and Ha is accepted. These results indicate that the JP variable has an influence on the poverty rate.
2. In the TPT variable, the calculated t obtained is 1.914098 t table is 1.7 with a probability of 0.0604 0.10. These results indicate that Ho is rejected and Ha is accepted. Thus, it can be concluded that the TPT variable has an influence on the poverty variable.
3. In the GRDP variable, the calculated t value obtained is 3.447591 > t table, which is 1.7 with a probability of 0.0010 0.10. This means that Ho is rejected and Ha is accepted, which means that the GRDP variable has an effect on the poverty variable.

F-statistic	18.20569
Prob(F-statistic)	0.000000

Figure 5. F Test

The calculated F value of 18.20596 exceeds the F table value of 1.340812. The probability obtained is 0.0000 < significance 0.10. Therefore, HO is rejected and Ha is accepted. This means that the variables JP, TPT, and GRDP have an influence on the poverty variable.

R-squared	0.476518
Adjusted R-squared	0.450344

Figure 6. Test Coefficient of Determination (R2)

After the R2 test was conducted, the Adjusted R-square value was obtained at 0.450344 or 45.0344%. This determination coefficient means that the JP, TPT, and GRDP variables have an influence of 45.0344% on the poverty variable. The remaining influential variables come from various other factors outside the model used in this study.

Based on the results of the data processing above, the following regression results were obtained :

$$\text{KM} - 299.517259369 + 0.0222076652271\text{JP} + 6.00651241916\text{TPT} + 3.74047183337\text{GRDP}$$

Explanation:

1. The constant value obtained is 299.5173. This means that if the value of the JP, TPT, and GRDP variables is 0, then the KM variable will be 299.5173 thousand people.
2. The regression coefficient for the JP variable is positive 0.022208. This means that if other variables remain constant, an increase of one thousand people in the JP variable will cause an increase in the number of poor people by 22,208 thousand people.
3. The regression coefficient for the TPT variable is positive 6.006512. This means that if other variables remain constant and the TPT increases by one thousand people, then the number of poor people is estimated to increase by 6,007 thousand people.
4. The regression coefficient for the GRDP variable is positive 3.740472. This means that if other variables remain constant and GRDP increases by one thousand people, then the number of poor people will increase by 3,740 thousand people.

DISCUSSION

The Influence of Population on Poverty Levels in Sumatra Island 2016-2023

Based on the results of the data test, it is known that the population has a positive influence with a coefficient of 0.022208. This means that if the population increases by a thousand people, the poverty rate is estimated to increase by around 22,208 thousand people. This influence is significant because the recorded probability value is $0.0000 < 0.10$. This provides an indication that an increase in the population has the potential to contribute to an increase in poverty rates in the Sumatra Island region. This is also in line with the Malthusian theory, which states that population growth that unbalanced with economic growth will increase pressure on natural resources, hinder income distribution, and worsen poverty.

Research conducted by Hafiz et al. (2022) supports this finding. In his research, he provides an indication that population growth has a significant influence on poverty rates in West Sumatra. This study reveals that population growth that is not followed by improvements in the quality of human resources can potentially increase poverty rates. Research by Damanik et al. (2020) in North Sumatra Province shows that the population variable has a positive and significant influence on poverty rates, in line with the results of this study. His research states that an increase in population is often followed by an increase in the number of poor people, because not all individuals have equal jobs and income.

The Influence of the Open Unemployment Rate on the Poverty Rate in Sumatra Island 2016-2023

Based on the results of the data test, it is known that TPT has a positive effect with a coefficient value of 6.006512. If TPT increases by 1%, the poverty rate will increase by around 6,007 thousand people. This effect is also

significant, with a probability value of $0.0604 < 0.10$. It can be concluded that high TPT will be directly related to an increase in the number of poor people. The increase in TPT reflects the increasing number of individuals who are unemployed or still looking for work, which ultimately contributes to an increase in the number of poor people in the Sumatra Island region.

The results of this study are supported by classical economic theory which states that unemployment can arise due to a population surge, where the skills of the workforce do not match market needs. The imbalance between supply and demand for labor ultimately worsens the poverty rate. This is supported by research by Damanik and Sidauruk (2022), their research shows a positive relationship between TPT and poverty in North Sumatra. They found that every 1% increase in TPT has the potential to cause a significant increase in the number of poor people. This condition is further exacerbated by the COVID-19 pandemic, many business sectors in Sumatra experienced a decline in activity and increased unemployment and poverty rates at that time. The results of research by Rahmawati & Sari (2022) show that TPT has a positive and significant effect on the number of poor people in Aceh Province during the period 2013 to 2022. This finding provides an indication that an increase in TPT is usually accompanied by an increase in the number of poor people. The higher the unemployment rate, the greater the number of individuals experiencing poverty.

The Influence of GRDP Growth Rate on Poverty Levels in Sumatra Island 2016-2023

The results of the data test indicate that the GRDP growth rate has a positive effect with a coefficient of 3.740472. This means that an increase in the GRDP growth rate of 1 percent is estimated to cause an increase in the number of poor people by around 3,740 thousand people. This effect is significant, with a probability value of $0.0010 < 0.10$. So, it can be concluded that an increase in the GRDP growth rate will be followed by an increase in poverty on the island of Sumatra in 2016-2023. This shows that although the GRDP growth rate increases, it does not always contribute to reducing poverty rates.

The GRDP growth rate reflects the income of a region that shows the economic capacity to improve people's welfare. Ideally, an increase in GRDP growth should be able to reduce poverty rates, but the opposite can also happen if the increase in the GRDP growth rate is accompanied by inequality in income distribution. Therefore, the GRDP growth rate does not always have a positive impact on reducing poverty. This study proves that an increase in the GRDP growth rate can actually cause an increase in poverty.

Segoro & Pou's (2019) research supports this finding, their research shows that in Bantul Regency, there is no significant relationship between the GRDP growth rate and the poverty rate. Although the GRDP growth rate has increased, the poverty rate has not shown a significant decrease, which is caused by inequality in income distribution and lack of access for the majority of the population to the benefits of economic growth. Suardana et al. (2022) concluded that the GRDP growth rate per capita did not have a significant effect on reducing the poverty rate in Bali Province. Although the GRDP

growth rate in Bali has increased, this does not always have implications for reducing poverty, because other factors such as income inequality, development, and high unemployment rates have a greater impact on poverty in the area.

CONCLUSION AND RECOMMENDATIONS

The results of the study indicate that the population variable has a positive and significant effect on the number of poor people in the Sumatra region in the period 2016 to 2023. An increase in population tends to be followed by an increase in the number of poor people. The TPT variable is also proven to have a positive and significant effect on the number of poor people on Sumatra Island during the same period. The greater the open unemployment, the greater the number of poor people in the area. The increase in the GRDP growth rate also makes a positive and significant contribution to the increase in the number of poor people on Sumatra Island during the period 2016 to 2023. The increase in the GRDP growth rate is correlated with the increase in poverty rates in the region.

ADVANCED RESEARCH

Based on these findings, future research is recommended to further explore structural factors and economic distribution patterns that may explain why GRDP growth is positively correlated with rising poverty levels. This suggests the possibility of unequal distribution of economic growth benefits, where economic development is not evenly experienced across all segments of society. Subsequent studies could also incorporate mediating variables such as the Gini index, the quality of local government social spending, and access of the poor to education and healthcare services. Furthermore, the use of dynamic panel data or spatial econometrics approaches is encouraged to capture spatial effects and time dynamics more comprehensively across regions in Sumatra.

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