Determinants of Unemployment and Poverty in North Sumatra Province: A 2007–2022 Analysis

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Abstract

This study analyzes the determinants of poverty in North Sumatra Province from 2007 to 2022, focusing on unemployment, population growth, Gross Regional Domestic Product (GRDP), education, and minimum wages. Poverty remains a persistent development challenge in Indonesia, and North Sumatra is among the provinces with a relatively high poverty rate despite experiencing economic growth. Using secondary data from the Central Statistics Agency (BPS), this study applies factor analysis followed by multiple linear regression to identify the most influential variables affecting poverty. The results indicate that four factors—population, GRDP, education level, and minimum wage—form the strongest determinants among the variables tested. Regression results show that population, GRDP, education, and minimum wages significantly affect poverty levels in North Sumatra, whereas the unemployment rate does not show a significant effect during the study period. These findings highlight the crucial role of human capital, economic performance, and labor income policies in alleviating regional poverty. The study provides policy implications for provincial governments to prioritize education expansion, stabilize economic growth, and strengthen wage regulations to improve household welfare.

Keywords: Poverty, Unemployment, Population, GRDP, Education, Minimum Wage

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Introduction

Poverty remains one of the most critical socio-economic challenges faced by developing countries, including Indonesia. Although economic growth has improved in several regions, the benefits are not distributed evenly, leaving certain population groups vulnerable. North Sumatra Province is one of the regions with a relatively high poverty rate, ranking fourth nationally in 2015 and first among the ten provinces on Sumatra Island in 2022 based on official data from the Central Statistics Agency (BPS).

Previous studies suggest that poverty is influenced by various economic and demographic factors such as unemployment, population density, economic growth, and educational attainment. However, the empirical results remain inconclusive, especially at the provincial level. While economic theory suggests that unemployment should be positively associated with poverty, several studies show mixed results, demanding more context-specific analysis.

This study seeks to fill the gap by analyzing the determinants of poverty in North Sumatra over a 16-year period (2007–2022). The scientific novelty lies in combining factor analysis with multiple regression to identify and validate the most relevant variables influencing regional poverty. The objective of this research is to determine how unemployment, population, GRDP, education, and minimum wages affect poverty levels in North Sumatra Province.

Literature Review

2.1 Poverty

Poverty refers to the inability of individuals to meet basic needs such as food, clothing, health, education, and housing. BPS defines poverty based on the Poverty Line, which comprises the Food Poverty Line and Non-Food Poverty Line. Poverty may be categorized into absolute, relative, structural, situational, and cultural poverty. Economic theories emphasize that poverty often results from weak productivity, limited access to education, and low labor income.

2.2 Unemployment

Unemployment is the condition in which individuals in the labor force are willing to work but do not obtain employment. High unemployment is theoretically linked to higher poverty because unemployment reduces income, consumption, and household welfare.

2.3 Population Growth

Population growth affects poverty through labor supply, dependency ratios, and income distribution. Rapid population growth may burden public resources, reduce savings, and limit employment opportunities, thereby increasing poverty tendencies.

2.4 Gross Regional Domestic Product (GRDP)

GRDP reflects regional economic performance and is often associated with improvements in welfare. Higher GRDP per capita typically indicates better income levels and reduced poverty.

2.5 Education

Education enhances productivity, employability, and income prospects. Higher levels of education reduce the likelihood of poverty by enabling individuals to participate in better-paying jobs.

2.6 Maximum Wage

Minimum wage policies aim to protect workers from exploitation and ensure a decent standard of living. However, excessive increases may raise unemployment if firms cannot afford higher labor costs.

Research Methodology

This study employs a quantitative approach using annual time-series data from 2007 to 2022 obtained from the Central Statistics Agency (BPS). The research involves two stages: **[1]** Factor Analysis Used to reduce multicollinearity among variables and identify the strongest latent factors influencing poverty. **[2]** Multiple Linear Regression Analysis, The regression

model estimates the effect of selected variables on poverty in North Sumatra. The model is expressed as:

$$\text{Poverty}t=\beta0+\beta1\text{Population}t+\beta2\text{GRDP}t+\beta3\text{Education}t+\beta4\text{MinimumWage}t+$$
$$\beta5\text{Unemployment}t+et………………………………(1)$$

Results
4.1 Descriptive Overview

Poverty levels in North Sumatra during 2007–2022 demonstrate dynamic fluctuations influenced by economic cycles, demographic pressures, labor market shocks, and policy interventions. The poverty rate reached its highest point at 13.90% in 2007, then gradually declined to 8.75% in 2019, reflecting improvements in education, economic structure, and wage policies. However, the COVID-19 pandemic triggered an upward shift in poverty to 9.01% in 2021 due to mobility restrictions, business closures, food price increases, and rising unemployment. This trend is consistent with national patterns, where pandemic-related shocks temporarily reversed poverty reduction progress.

Alongside poverty fluctuations, unemployment exhibited a decreasing trend from 10.10% in 2007 to 5.41% in 2019, before rising during the pandemic. Population growth remained positive throughout the observed period, except for the 2020 anomaly due to demographic reporting disruptions and pandemic impacts. GRDP showed consistent growth, suggesting structural strengthening of the regional economy. Education indicators, represented by senior secondary enrollment rates (APK SMA/SMK), increased significantly from 71.45% to 97.23%, indicating improvements in human capital capacity. Minimum wages also grew steadily, from IDR 761,000 in 2007 to IDR 2,522,609 in 2022.

These descriptive findings confirm that North Sumatra experienced long-term economic progress, although challenges related to demographic pressure and labor market vulnerability remain persistent.

4.2 Regression Results

The multiple linear regression generated the following model:

$$Y = 911.126 + 0.007X_1 + 0.739X_2 + 0.892X_3 - 0.583X_4 + 0.766X_5 + \varepsilon$$

The coefficients indicate the magnitude and direction of each variable's effect on poverty in North Sumatra from 2007 to 2022. Several findings align with theoretical expectations, while others contradict common economic assumptions, suggesting unique regional dynamics.

4.3 Unemployment (X1)

Unemployment has a *positive effect* on poverty (0.007), meaning an increase in unemployment leads to a slight rise in poverty. Although the coefficient is small, the direction aligns with mainstream economic theory: higher unemployment reduces household income, increases vulnerability, and limits access to basic needs. Similar results were reported by Solikatun et al. (2018), who found that unemployment contributes to rising poverty in developing regions. However, the relatively small coefficient may indicate that a large portion of the unemployed shift into the informal sector, reducing the measurable impact of open unemployment rates.

4.4 Population (X2)

Population has a *strong and positive effect* on poverty (0.739). This finding shows that rapid population growth places additional pressure on public services, job availability, and household resources, thereby increasing poverty levels. This is consistent with studies by Gopal et al. (2021) and Dwi Radila et al. (2021), which emphasize that higher population in developing regions can slow poverty reduction due to higher dependency ratios and limited labor absorption in the formal sector. In North Sumatra, densely populated areas such as Medan and Deli Serdang face intense competition for employment, making population growth a significant driver of poverty.

4.5 GRDP (X3)

Interestingly, GRDP shows a positive coefficient (0.892), meaning that higher GRDP is associated with higher poverty levels. This contradicts traditional economic theory, which expects economic growth to reduce poverty. This outcome suggests several possible explanations:

1. Unequal distribution of economic growth GRDP may increase due to growth in capital-intensive sectors (e.g., manufacturing, plantations, mining) that do not absorb large numbers of workers.
2. Growth not accompanied by social inclusion Studies such as Chairunnisa & Qintharah (2022) note that growth without equitable distribution may worsen income disparities.
3. Urban bias in GRDP contribution Growth concentrated in urban areas may not trickle down to rural populations, who represent most of the poor.
4. Inflationary pressure during growth periods Rising prices may offset the benefits of economic expansion.

This finding is consistent with "growth-without-poverty-reduction" patterns observed in several Indonesian provinces, where GRDP increases but is not accompanied by structural poverty reduction

4.6 Education (X4).

Education has a negative effect on poverty (–0.583), meaning higher educational attainment significantly reduces poverty. This aligns strongly with human capital theory (Becker, 1993) and empirical findings by Sabihi et al. (2021), who argue that education improves employability, productivity, and access to higher-income opportunities. In North Sumatra, the improvement in secondary school enrollment rates (APK SMA/SMK) contributes to strengthening the labor force and facilitating better access to formal employment. The negative coefficient confirms that education is one of the most powerful instruments for long-term poverty reduction.

4.7 Minimum Wage (X5)

Unexpectedly, the minimum wage has a **positive effect** on poverty (0.766). This outcome contradicts the intended purpose of minimum wage policies and requires careful interpretation. Possible explanations include:

1. Higher minimum wages increasing production costs, causing firms to reduce hiring or shift workers to informal jobs.
2. Minimum wage increases triggering price inflation, especially in food and basic needs, which disproportionately affects the poor.
3. Minimum wage increases benefiting only formal-sector workers, while most low-income households remain in the informal economy.
4. Mismatch between minimum wage increases and productivity, leading to job cuts in labor-intensive sectors.

Several empirical studies (e.g., Faried et al., 2018) have shown similar outcomes in Indonesian provinces, where minimum wage hikes did not reduce poverty due to structural labor market constraints. Thus, although minimum wages aim to lift worker income, the regional labor market characteristics may cause adverse effects on poverty.

Table 1. Regression Result

Variable	Significance	Effect
Population	Significant	Positive
GRDP	Significant	Negative
Education	Significant	Negative
Minimum Wage	Significant	Negative
Unemployment	Not Significant	—

Conclusion

This study examined the determinants of poverty in North Sumatra Province from 2007 to 2022 by analyzing the influence of unemployment, population, GRDP, education, and minimum wages using multiple linear regression. The results show that poverty in North

Sumatra is shaped primarily by demographic, structural, and institutional factors rather than short-term labor market dynamics.

The key conclusions are as follows:

1. Unemployment has a positive effect on poverty, although the magnitude is relatively small. This indicates that rising unemployment slightly increases poverty, but its limited influence suggests that many individuals join the informal sector rather than being recorded as openly unemployed.
2. Population has a strong and positive effect on poverty, confirming that rapid population growth intensifies economic pressure, increases dependency ratios, and limits the ability of households and government services to meet basic needs.
3. GRDP has a positive effect on poverty, which contradicts conventional economic theory. This result implies that economic growth in North Sumatra is not inclusive and may be concentrated in capital-intensive sectors that do not directly improve the welfare of low-income populations.
4. Education has a negative effect on poverty, demonstrating that increased educational attainment significantly reduces poverty by enhancing skills, employability, and access to higher-income opportunities.
5. Minimum wages have a positive effect on poverty, suggesting that wage increases may unintentionally raise poverty through higher production costs, inflationary effects, and limited benefits for informal workers who form a substantial portion of the poor.

Overall, the findings show that poverty reduction in North Sumatra requires more than economic growth and wage adjustments. Instead, long-term improvements in human capital and inclusive development are essential.

Recommendations

Based on the empirical results, the following recommendations are proposed:

1. Promote Inclusive and Equitable Economic Growth
   The provincial government should prioritize sectors with high labor absorption—such as agriculture, trade, manufacturing, and MSMEs—to ensure that GRDP growth translates into real welfare improvements for low-income households.
2. Strengthen Population Control and Social Protection Programs
   High population growth contributes significantly to poverty. Strengthening family planning, reproductive health programs, and social protection schemes will help reduce demographic pressure and improve household resilience.
3. Expand Access to Quality Education, Since education strongly reduces poverty, policies must focus on:
   - increasing secondary and vocational school enrollment,
   - improving the quality of teaching and skills training,
   - enhancing access to scholarships for low-income families. Improving human capital is the most effective long-term strategy for reducing poverty.
4. Reform Minimum Wage Policies
   Given that minimum wage increases may raise poverty, wage-setting procedures should be linked to:
   - productivity levels,
   - employment absorption capacity,
   - living cost indices (KHL),
   - and the conditions of the informal sector. Balanced wage policies will protect workers without harming employment opportunities.
5. Strengthen the Formal Labor Market and Reduce Informality
   A significant portion of the poor work in informal jobs that do not benefit from wage policies. The government should promote:
   - formalization incentives for MSMEs,

- job-matching programs,
- skills-based employment centers,
- and industrial expansion in labor-intensive sectors.

6. Improve Economic Data Transparency and Targeted Poverty Programs
   More accurate data on income, employment, and household vulnerability will improve policy targeting. Poverty programs must be directed toward areas with high population density and limited access to education.

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