

Comparative Study of Economic Growth, Poverty Rate and Unemployment Rate in Sumatra

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DOI: <https://doi.org/10.61688/ajpbs.v6i1.406>

Article History

Received	Revised	Accepted	Published
30 April 2025	20 May 2025	31 May 2025	30 June 2025

ABSTRACT

This study aims to determine and analyse the effects of capital expenditure, education, investment, and net exports on economic growth, poverty rates, and unemployment rates in Sumatra from 2019 to 2023 using panel data regression. The comparative analysis shows interprovincial variation in capital expenditure, education, investment, net exports, economic growth, poverty, and unemployment. Capital expenditure in North Sumatra and Riau grew steadily, while educational attainment increased across provinces but remained uneven. PMDN investment was highest in Riau, while Lampung recorded the highest investment growth. Riau recorded the highest net exports, with substantial volatility across several provinces. Economic growth recovered after the pandemic, with Jambi recording the highest average growth rate. Poverty rates generally declined, although interprovincial disparities remained. The regression results indicate that capital expenditure, education, investment, and net exports have positive and significant effects on economic growth and negative and significant effects on poverty. Capital expenditure, education, and net exports have negative and significant effects on unemployment, whereas investment has no significant effect on unemployment. These findings provide evidence for more targeted provincial development policies in Sumatra.

Keywords: *capital expenditure, education, investment, net exports, economic growth, poverty rate, unemployment rate*

How to Cite

Utari, T. W., Tan, S., & Mustika, C. (2025). Comparative study of economic growth, poverty rate, and unemployment rate in Sumatra. The Asian Journal of Professional and Business Studies, 6(1), 74–86. DOI: <https://doi.org/10.61688/ajpbs.v6i1.406>

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1. INTRODUCTION

Sumatra is a strategically important part of Indonesia, comprising several provinces with significant economic potential. The region is rich in natural resources, including oil, gas, coal, and palm oil. Economic growth in Sumatra has varied across provinces in recent years. Provinces such as Riau and South Sumatra tend to experience higher growth rates because of the industrial and mining sectors. Meanwhile, provinces such as Aceh and Bengkulu face challenges in increasing economic growth. Differences in economic structure and regional policies also affect each region's growth rate (Todaro & Smith, 2013). Additionally, investment, infrastructure, and regional political stability also play significant roles. Therefore, comparative studies are essential to identify each province's potential and challenges. This way, policymakers can implement appropriate development policies aligned with regional characteristics (Mankiw, 2013). This study will compare economic growth, poverty rates, and unemployment rates in several provinces in Sumatra.

Economic growth is a key indicator for assessing a region's progress (Ernawati, 2024). Riau Province, for example, has recorded strong economic growth over the last five years, especially in the oil and gas sector and the processing industry. In contrast, Aceh experienced slower growth because of low private-sector contributions and heavy reliance on special autonomy funds. North Sumatra, which includes major cities like Medan, shows stable growth because of its strong service and trade sectors. However, southern provinces such as Lampung and Bengkulu still face obstacles to industrialisation. High economic growth does not necessarily mean an equitable distribution of welfare, especially if it is not accompanied by an equitable distribution of income. Therefore, analyses of economic growth must be accompanied by evaluations of poverty and unemployment rates. By understanding the relationship among these three variables, development policies will become more effective and targeted. Comparisons between provinces help identify the factors that drive stronger growth. Furthermore, learning from successful provinces can be applied to other regions that are still lagging.

Sumatra's poverty rate shows significant inequality between provinces (Astuti & Mispiyanti, 2019). Provinces such as West Sumatra and the Riau Islands have relatively low poverty rates compared with Aceh and Bengkulu. Several factors, including education quality, access to healthcare services, and employment opportunities, contribute to these differences. Provinces with industrial centres and urban areas tend to have lower poverty rates (Kuncoro, 2012), whereas provinces with a dominant agricultural sector and limited access to infrastructure tend to face greater poverty challenges (Adawiyah, 2020). Local governments therefore need data-driven interventions, particularly in rural areas (Prawoto, 2021), together with longer-term development policies that complement short-term social assistance and community empowerment (Yunanto, 2015). This study compares poverty rates across provinces during 2019–2023 to assess their trends alongside economic growth and unemployment.

Unemployment is another challenge closely linked to economic growth and poverty. In several provinces of Sumatra, the unemployment rate remains relatively high, particularly among high school and college graduates. North Sumatra and Riau, for example, despite experiencing good economic growth, still face relatively high unemployment rates. This indicates a mismatch between the labour market's needs and the workforce's competence. In contrast, provinces such as Jambi and West Sumatra have lower unemployment rates, although their economic growth is not as rapid as Riau's. This condition can occur due to the high level of the informal sector and family farming, which absorb a significant amount of labour. The government's main challenge is to improve the quality of vocational education and job training. In addition, the government needs an investment climate to encourage job creation. The study will also highlight how unemployment impacts poverty rates in each region. That way, the resulting analysis can provide more comprehensive recommendations.

Based on the description above, the research problems are formulated as follows: (1) How do capital expenditure, education, investment, net exports, economic growth, poverty rates, and unemployment rates compare across provinces in Sumatra during 2019–2023? (2) How do capital expenditure, education, investment, and net exports affect economic growth, poverty rates, and unemployment rates in Sumatra during 2019–2023?

Based on previous research, economic growth is influenced by capital expenditure, education, investment and net exports. Pangestu (2019) found that capital expenditure has a positive and significant impact on economic growth. Hanifah et al. (2023) also found that education has a positive and significant effect on economic growth. Furthermore, Apriliansah (2024) found that investment has a positive and significant effect on economic growth. Meanwhile, research conducted by Permatasari et al. (2024) shows that net exports have a positive and significant effect on economic growth.

Several previous studies have also suggested that capital expenditure, education, investment, and net exports influence poverty levels. Amami and Asmara (2022) found that capital expenditure significantly affects poverty. Ayu and Faisal

(2021) reported a significant relationship between education and poverty. Maulani Nisa et al. (2023) found that investment significantly affects poverty, while Adisti (2010) examined the relationship between exports and poverty.

Furthermore, previous studies have found that capital expenditure, education, investment, and net exports are related to unemployment outcomes. Fahira et al. (2023) found that capital expenditure significantly affects unemployment. Johar (2023) reported a significant relationship between educational attainment and open unemployment. Hidayah and Aji (2022) examined the effect of investment on unemployment, while Pramesti (2023) found that export development is associated with unemployment outcomes.

These macroeconomic conditions and the mixed findings reported in previous studies motivate a comparative assessment of Sumatra. Accordingly, this study examines the influence of capital expenditure, education, investment, and net exports on economic growth, poverty rates, and unemployment rates across provinces in Sumatra.

The objectives of this study are (1) to identify and analyse differences in capital expenditure, education, investment, net exports, economic growth, poverty rates, and unemployment rates across provinces in Sumatra during 2019–2023; and (2) to analyse the influence of capital expenditure, education, investment, and net exports on economic growth, poverty rates, and unemployment rates in Sumatra during 2019–2023.

2. LITERATURE REVIEW

2.1 Economic Growth

Regional economic growth refers to an increase in real production activities, in the form of goods and services, over a given period (Todaro & Smith, 2013). Accordingly, regional economic growth can be assessed through changes in regional output from one year to the next. Greater regional autonomy may also support more efficient allocation of local resources for public services and development priorities.

2.2 Poverty

According to Haughton & Khandker (2012), poverty is often linked to inequality and vulnerability, as individuals not considered poor can become impoverished at any time due to financial crises or declines in agricultural product prices. Vulnerability is a key dimension of well-being because it affects everyone's behaviour regarding investment, production patterns, appropriate strategies, and perceptions of their situation.

2.3 Unemployment

Unemployment refers to individuals in the labour force who are not working and are actively seeking employment or preparing to enter work (Prawoto, 2021).

2.4 Capital Expenditure

Dewi (2006) and Syaiful (2008) stated that capital expenditure is an expenditure made in the context of capital formation, which is like adding fixed assets/inventory that provide benefits for more than one accounting period, including expenditure on maintenance costs that maintain or increase the useful life, increase capacity, and asset quality.

2.5 Education

Tjiptoherijanto (2002) stated that education significantly impacts the community's poverty level. He said that improving community welfare began with improving their quality of life. The factors that affect the quality of society at large include income, education, and health.

2.6 Investment

Investment is also defined as money spent by investors or entrepreneurs to finance productive activities that generate future profits. Investment comes from income and savings, directly or indirectly, made by many parties to increase production and future income. Investment refers to business expansion, spending on new equipment, and increases in inventory (Mankiw, 2013).

2.7 Net Exports

Net exports are the difference between the value of a country's exports and imports (Ibrahim, 2016). Net exports are the value of goods and services exported to other countries minus the value of goods and services imported from other countries (Mankiw, 2013).

3. METHODOLOGY

This study uses a quantitative descriptive approach based on secondary panel data for the 2019–2023 period. Panel data combine time-series observations across periods with cross-sectional observations across provinces. Panel data regression is used to assess the relationships between capital expenditure, education, investment, and net exports and the three dependent variables: economic growth, poverty rate, and unemployment rate.

The panel data regression model is used to find out the results of the research on the research objectives of the influence of capital expenditure, education, investment, and net exports on economic growth, using the following panel data regression equation:

PANEL DATA REGRESSION EQUATIONS

To examine the effect of capital expenditure, education, investment, and net exports on economic growth, the panel data regression equation is:

$$PE_{it} = \beta_0 + \beta_1 BM_{it} + \beta_2 PD_{it} + \beta_3 I_{it} + \beta_4 EN_{it} + \varepsilon_{it}$$

To examine the effect of capital expenditure, education, investment, and net exports on poverty level, the panel data regression equation is:

$$TK_{it} = \beta_0 + \beta_1 BM_{it} + \beta_2 PD_{it} + \beta_3 I_{it} + \beta_4 EN_{it} + \varepsilon_{it}$$

To examine the effect of capital expenditure, education, investment, and net exports on the unemployment rate, the panel data regression equation is:

$$TP_{it} = \beta_0 + \beta_1 BM_{it} + \beta_2 PD_{it} + \beta_3 I_{it} + \beta_4 EN_{it} + \varepsilon_{it}$$

Description of Variables

Variable	Description
β_0	Intercept
β_1 and β_4	Regression Coefficients
ε_{it}	Error Term
PE_{it}	Economic Growth in Province i Period t
TK_{it}	Poverty Rate in Province i Period t
TP_{it}	Unemployment Rate in Province i Period t
BM_{it}	Government Capital Expenditure in Province i Period t
PD_{it}	Education in Province i Period t
I_{it}	Investment in Province i Period t
EN_{it}	Net Exports in Province i Period t

4. FINDINGS AND DISCUSSION

The Influence of Capital Expenditure, Education, Investment, and Net Exports on Economic Growth in Sumatra

Statistical F Test

The Prob(F-statistic) value is $0.000000 < 0.05$; therefore, H_0 is rejected and H_a is accepted. This indicates that capital expenditure, education, investment, and net exports simultaneously have a statistically significant effect on economic growth in the provinces of Sumatra.

Coefficient of Determination (R^2)

The R-squared value is 0.533522, indicating that the independent variables explain 53.35 percent of the variation in economic growth.

Statistical t-test

To test the significance of the influence of capital expenditure, education, investment, and net exports on economic growth in Sumatra provinces, a statistical t-test was used. The t-test assesses the magnitude of each independent variable's influence on the dependent variable at the 95 percent confidence level.

Table 1
Statistical t-values in the REM Method

Variable	t statistic	Prob.	Information
BM	3.460850	0.0012	Significant
PD	2.577839	0.0133	Significant
I	2.930093	0.0053	Significant
EN	3.565423	0.0009	Significant

Source: Data Processing, EViews 09 (2025)

Based on Table 1, the results of the statistical t-test can be explained as follows: It is known that the p-value of capital expenditure is 0.0012, as $p < 0.05$; therefore, H_0 is rejected, and H_1 is accepted. This shows that capital expenditure has a positive and significant effect on economic growth in the provinces of Sumatra. The Prob value of education is 0.0133; since $\text{Prob} < 0.05$, H_0 is rejected and H_a is accepted. This shows that education has a positive and significant effect on economic growth in the provinces of Sumatra. The Prob value for investment is 0.0053; since $\text{Prob} < 0.05$, H_0 is rejected and H_a is accepted. This shows that investment has a positive and significant effect on economic growth in the provinces of Sumatra. The Prob value of net exports is 0.0009; since $\text{Prob} < 0.05$, H_0 is rejected and H_a is accepted. This indicates that net exports have a positive and statistically significant impact on economic growth in the provinces of Sumatra.

The Effect of Capital Expenditure, Education, Investment, and Net Exports on Poverty Levels in Sumatra

Statistical F Test

The Prob value (F statistic) is $0.00000 < 0.05$, so we reject H_0 . H_a is accepted, meaning the combined test shows that capital expenditure, education, investment, and net exports simultaneously have a significant effect on the poverty level in the provinces of Sumatra.

Coefficient of Determination (R^2)

The R-squared value is 0.596486, indicating that the independent variables explain 59.65% of the variation in the poverty level.

Statistical t-test

To test the significance of the influence of capital expenditure, education, investment, and net exports on the poverty level across provinces in Sumatra, a t-test was used. The Statistical t-test helps assess the magnitude of each independent variable's partial influence on the dependent variable at the 95 per cent confidence level.

Table 2
Statistical t-values in the REM Method

Variable	t statistic	Prob.	Information
BM	-7.738765	0.0000	Significant
PD	-2.999512	0.0044	Significant
I	-2.410139	0.0201	Significant
EN	-4.671553	0.0000	Significant

Source: Data Processing, EViews 09 (2025)

Based on Table 2, the results of the statistical t-test can be explained as follows:

The Prob value for capital expenditure is 0.0000; since $\text{Prob} < 0.05$, H_0 is rejected and H_a is accepted. This shows that capital expenditure has a significant negative effect on poverty levels in the provinces of the island of Sumatra. The Prob of education is 0.0044; because $\text{Prob} < 0.05$, H_0 is rejected and H_a is accepted. This indicates that education has a significant negative impact on the poverty rate in the provinces of Sumatra. It is known that the Prob of the investment is 0.0201; because $\text{Prob} < 0.05$, H_0 is rejected and H_a is accepted. This indicates that investment has a significant negative impact on the poverty rate in the provinces of Sumatra. The p-value for net exports is 0.0000; because $p < 0.05$, H_0 is rejected and H_a is accepted. This indicates that net exports have a negative and statistically significant impact on the poverty rate in the provinces of Sumatra.

The Influence of Capital Expenditure, Education, Investment and Net Exports on the Unemployment Rate in Sumatra **Statistical F Test**

It can be seen that the Prob (F-statistic) value of $0.00000 < 0.05$, which means that H_0 is rejected and H_a is accepted, which means that the test together shows that capital expenditure, education, investment, and net exports simultaneously have a significant effect on the unemployment rate in the provinces of Sumatra.

Coefficient of Determination (R^2)

The R-squared value is 0.597809, meaning the independent variables explain 59.78 per cent of the variation in the unemployment rate.

Statistical t-test

To test the significance of the influence of capital expenditure, education, investment, and net exports on the unemployment rate across provinces in Sumatra, we used a t-test. The t-test assesses the partial influence of each independent variable on the dependent variable at a 95 percent confidence level.

Table 3 Statistical t-values in the REM Method

Variable	t statistic	Prob.	Information
BM	-2.528232	0.0150	Significant
PD	-4.570330	0.0000	Significant
I	-1.366249	0.1786	Insignificant
EN	-2.328561	0.0244	Significant

Source: Data Processing, EViews 09 (2025)

Based on Table 3, the results of the statistical t-test can be explained as follows:

It is known that the Prob value of capital expenditure is 0.0150 because the Prob < 0.05, H₀ is rejected, and H_a is accepted. This shows that capital expenditure has a significant negative effect on the unemployment rate in the provinces of the island of Sumatra. The Prob of education is 0.0000; because Prob < 0.05, H₀ is rejected and H_a is accepted. This shows that education has a significant negative effect on the unemployment rate in the provinces of Sumatra. The p-value for investment is 0.1786. Because Prob > 0.05, H₀ is accepted and H_a is rejected. This shows that investment does not have a significant effect on the unemployment rate in the provinces of Sumatra. The p-value for net exports is 0.0244; because it is < 0.05, we reject H₀ and accept H_a. This shows that net exports have a significant negative effect on Sumatra's unemployment rate.

The Influence of Capital Expenditure, Education, Investment and Net Exports on Economic Growth in Sumatra

Based on the study's results, capital expenditure has a positive and significant effect on economic growth in Sumatra. This finding is consistent with Pangestu (2019), who reported a significant relationship between capital expenditure and economic growth. Productive public capital expenditure can strengthen infrastructure, connectivity, and public services, thereby supporting regional economic activity.

Capital expenditure significantly influences economic growth in Sumatra because allocating funds for infrastructure development, such as roads, bridges, ports, and other public facilities, can improve connectivity between regions. Adequate infrastructure facilitates the distribution of goods and services, reduces logistics costs, and attracts private investment. In addition, increased capital expenditure in the education and health sectors helps improve the quality of the human resource base, ultimately boosting labour productivity. The construction sector has also benefited from more development projects, creating new jobs and boosting people's purchasing power. Increasing consumption and investment also encourage regional economic growth. Furthermore, capital expenditure allocated for industrial development and tourism in Sumatra can accelerate economic diversification, reducing dependence on the agricultural and mining sectors. Efficiency in capital expenditure management also determines the extent of its impact on economic growth. If capital expenditure is used inefficiently or wastefully, the positive impact will be less than optimal. Therefore, planning and supervision during budget realisation are essential to ensure that capital expenditure has maximum impact on economic growth.

Based on the study's results, education has a positive and significant effect on economic growth in Sumatra. This finding is consistent with Hanifah et al. (2023), who reported a positive relationship between education and economic growth. Better education can strengthen workforce skills, productivity, innovation, and adaptability to technological change.

Education significantly influences economic growth in Sumatra by improving the quality of human resources, the driving force of development. With better education, the workforce has higher skills and knowledge, so productivity increases and the workforce's competitiveness in the global market strengthens. In addition, good education also encourages innovation and entrepreneurship, which can create new jobs and drive strategic economic sectors. Equitable education throughout Sumatra also helps reduce economic disparities between regions, as people in remote areas have equal opportunities to get better jobs. Furthermore, higher education enables the faster adoption of technology across industrial sectors, including agriculture, manufacturing, and services, thereby enhancing production efficiency and driving economic growth. Additionally, the increase in the average length of schooling in Sumatra contributes to the community's per capita income growth, as individuals with higher education tend to secure better-paying jobs. Education also plays a crucial role in shaping a more critical and adaptive mindset, enabling people to better prepare for global economic changes. Therefore, investment in education, whether by improving teacher quality, school facilities, or curricula aligned with job market needs, is essential to ensure that economic growth in Sumatra is sustainable and inclusive.

Based on the study's results, investment has a positive and significant effect on economic growth in Sumatra. This finding is consistent with Apriliansah (2024), who reported that investment contributes positively to economic growth. Investment can expand production capacity, support infrastructure and business development, and stimulate employment and regional output.

Investment in Sumatra can boost economic growth by increasing production, creating jobs, and driving capital flows across sectors. Investment, both domestic and foreign, contributes to the development of infrastructure, such as roads, ports, and energy, which supports the efficient distribution of goods and services. With adequate infrastructure, production and transportation costs can fall, increasing regional economic competitiveness. Additionally, investments in the industrial,

agricultural, and tourism sectors can encourage economic diversification, reduce dependence on specific sectors, and increase the added value of local products. Investment also plays a crucial role in technology transfer and workforce upskilling, ultimately increasing productivity. With new capital, companies can expand their businesses, create more jobs, and increase people's incomes. Higher incomes also increase public consumption, fostering sustainable economic growth. In addition, investments in the education and health sectors will strengthen the quality of human capital, a major factor in long-term economic growth. However, investment effectiveness depends heavily on government policies that create a conducive investment climate, including legal certainty, ease of licensing, and political and economic stability. Therefore, policies that support investment inflows will greatly determine Sumatra's success in achieving inclusive and sustainable economic growth.

Based on the study's results, net exports have a positive and significant effect on economic growth in Sumatra. These results align with Permatasari et al. (2024), who argue that positive net exports contribute directly to economic growth. When a country increases exports, national revenue increases, which can further encourage investment and consumption. Export-dependent sectors often grow faster than other sectors, improving overall economic performance.

Net exports affect economic growth in Sumatra because they reflect the region's competitiveness in international trade. If exports exceed imports (a trade surplus), regional revenues increase, thereby encouraging economic growth. Sumatra has great export potential, especially in the plantation sector (oil palm, rubber, and coffee) and the mining sector (coal and petroleum). As global demand for Sumatra's export commodities increases, domestic production rises, ultimately creating more jobs and raising incomes. In addition, export surpluses can increase foreign exchange reserves, which help maintain economic stability and the rupiah exchange rate. However, if exports decline or imports exceed exports (a trade deficit), economic growth can be hampered because more money goes out than comes in. Therefore, policies that support increased exports, such as diversifying export products, improving product quality, and improving efficiency in production and distribution, are essential to ensure that net exports contribute positively to economic growth in Sumatra. In addition, commodity price stability in international markets and trade agreements with other countries affect net export performance in driving economic growth.

Based on the study's results, capital expenditure has a significant negative effect on the poverty level in Sumatra. This finding is consistent with Amami and Asmara (2022), who reported a significant relationship between capital expenditure and poverty. Capital expenditure directed toward infrastructure and public services can improve access, support economic activity, and expand employment opportunities for lower-income communities.

Capital expenditure on infrastructure in Sumatra can reduce poverty and create more jobs. Government investment in infrastructure such as roads, bridges, electricity, and other public facilities can improve people's accessibility to basic services, such as education and health, ultimately improving their quality of life. In addition, capital expenditure on education and health facilities can improve human capital, thereby increasing employment opportunities and people's incomes. Infrastructure development also attracts private investment, boosting economic activity and job creation. With more job opportunities, people's incomes increase, so their purchasing power also improves, and poverty rates can be reduced. In addition, capital expenditure allocated to developing productive sectors such as agriculture, industry, and MSMEs can increase community productivity and encourage more inclusive economic growth. However, the effectiveness of capital expenditure in reducing poverty depends heavily on proper policy planning and implementation. If capital expenditure is misdirected or inefficient, its impact on poverty reduction may be less than optimal. Therefore, transparency, supervision, and evaluation of capital expenditure are needed to ensure that people experiencing poverty in Sumatra feel the benefits directly.

Based on the study's results, education has a significant negative effect on the poverty rate in Sumatra. This finding is consistent with Ayu and Faisal (2021), who reported a significant relationship between education and poverty. Improved access to quality education can strengthen skills, employability, productivity, and social mobility, thereby supporting long-term poverty reduction.

The effect of education on the poverty rate in Sumatra can be caused by several factors, namely higher education increases skills and productivity of the workforce, graduates with higher education have a greater chance of entering the formal sector which offers higher job stability and welfare than the informal sector, access to quality education provides entrepreneurial skills that enable individuals to create one's own jobs and reducing dependence on low-wage jobs, education also plays a role in improving financial literacy, so that people can manage their finances better and avoid the snare of poverty, education opens access to various training and skills certification programs that can increase the competitiveness of the

workforce in the job market and an increase in the average length of schooling in an area correlates with more inclusive economic growth, so that more poor people can get out of poverty.

Based on the study's results, investment has a significant negative effect on poverty levels in Sumatra. This finding is consistent with Maulani Nisa et al. (2023), who examined the relationship between investment and poverty. Investment can support productive activity and job creation, thereby increasing income opportunities for lower-income households.

Investment can reduce poverty in Sumatra by encouraging local economic growth, creating jobs, and increasing people's incomes. Investment from domestic business actors, both private companies and the government, is generally directed more towards sectors closely related to the community's socio-economic conditions, such as agriculture, plantations, manufacturing, and MSMEs. As these sectors develop, job opportunities for people experiencing poverty increase, leading to higher incomes and improved purchasing power. In addition, investment often focuses on developing basic infrastructure, such as roads, bridges, electricity, and education and health facilities. This development can increase people's access to better public services, giving them a greater chance of escaping poverty.

Based on the study's results, net exports have a significant negative effect on the poverty level in Sumatra. This finding is broadly consistent with Adisti (2010), who examined the relationship between exports and poverty. Strong export performance can support production, employment, and household income in export-oriented sectors, which may contribute to lower poverty levels.

The effect of net exports on poverty in Sumatra can be explained by the fact that net exports reflect the balance between exports and imports, which can affect economic growth, job creation, and people's incomes. If net exports are positive (a trade surplus), it means exports exceed imports, indicating strong competitiveness in Sumatra's economic sectors, such as plantations (oil palm, rubber, coffee), mining, and fisheries. As global demand for Sumatra's superior products rises, domestic production increases, creating more jobs and raising incomes, especially for workers in the agricultural sector and export-based industries. Export surpluses can also increase the country's foreign exchange receipts, which can ultimately support development and social welfare programs such as infrastructure, education, and health. Better infrastructure increases people's access to markets and public services, which contributes to poverty reduction. In addition, higher export income can increase people's purchasing power and spur growth in the MSME sector, thereby helping reduce poverty. However, if net exports are negative (trade deficit), more money goes out than comes in, which can slow economic growth and hinder job creation. In addition, heavy reliance on imports can make consumer goods more expensive for low-income households.

Based on the study's results, capital expenditure has a significant negative effect on the unemployment rate in Sumatra. This finding is consistent with Fahira et al. (2023), who reported a significant relationship between capital expenditure and unemployment. Productive capital expenditure can support infrastructure development and economic activity, thereby expanding employment opportunities.

Capital expenditure affects the unemployment rate in Sumatra by encouraging job creation, increasing economic activity, and accelerating growth in strategic sectors. Capital expenditure allocated to infrastructure development, such as roads, bridges, ports, and public facilities, will create many job opportunities for local workers, both in the construction sector and in other supporting sectors. As development projects are implemented, labor demand increases, helping reduce the unemployment rate. Capital expenditure directed toward developing industries and productive sectors, such as agriculture, manufacturing, and tourism, can also expand employment opportunities across various regions of Sumatra, especially for young workers and less-educated people. Furthermore, capital expenditure supporting the MSME sector will encourage the growth of small and medium-sized enterprises, which are the largest employers in many regions. With increased investment in infrastructure and productive sectors, private investment is also becoming more attractive, ultimately creating more job opportunities. However, the effectiveness of capital expenditure in reducing unemployment depends heavily on proper planning and implementation. If capital expenditure is not directed to, or is focused only on, projects that require less labor, its impact on reducing unemployment will be limited.

Based on the study's results, education has a significant negative effect on Sumatra's unemployment rate. This finding is consistent with Johar (2023), who reported a significant relationship between educational attainment and open unemployment. Education and skills development can improve workforce employability and reduce mismatches between labour-market requirements and worker competencies.

The effect of education on the unemployment rate in Sumatra can be caused by the existence of vocational education programs and job skills training to help create a workforce that is ready to use and in accordance with the needs of the industrial world, the government and the business world to further increase cooperation in industry-based education, such as internships and research cooperation, which facilitates the transition of graduates to the world of work. More educated people tend to have wider social networks, which can help them access better information and job opportunities. Overall, education helps create a more dynamic and innovative economic ecosystem, encouraging growth in the business sector and labor absorption in Sumatra.

Based on the study's results, investment does not have a significant effect on the unemployment rate in Sumatra. This differs from Hidayah and Aji (2022), who reported a significant relationship between investment and unemployment in Indonesia. In the present context, the absence of a significant effect may reflect the concentration of investment in capital-intensive activities or a weak short-term linkage between investment and local labour absorption.

The lack of effect of investment on the unemployment rate in Sumatra can be caused by the investment that comes in more concentrated in capital-intensive sectors such as mining and large-scale plantations, which require more machinery and technology than human labor, investment is often not followed by an improvement in the quality of the local workforce, so many education graduates in Sumatra do not have the skills that suit the needs of the industry. The weak linkage between investment and the small and medium enterprises (SMEs) sector has led to investment benefits not spreading widely and creating significant jobs, with many investments focusing more on infrastructure development, such as roads and ports, which although important for the economy in the long term, does not necessarily create many jobs for local workers in the short term and lack of incentive for companies to absorb local workers, especially in industries that require specialized skills.

Based on the study's results, net exports have a significant negative effect on Sumatra's unemployment rate. This finding is consistent with Pramesti (2023), who linked export development with unemployment outcomes. Higher export demand can stimulate domestic production and labour demand in export-oriented sectors. In this model, capital expenditure, education, and net exports are significant predictors of unemployment, whereas investment is not statistically significant.

Several key factors drive net exports, which in turn affect Sumatra's unemployment rate. As net exports increase, which means exports are greater than imports, demand for domestic products also increases, driving industrial growth and creating more jobs. Conversely, if net exports decline or run a deficit, export-dependent industries may see production decline, leading to layoffs and higher unemployment. In addition, Sumatra's economic structure, which relies heavily on the plantation, mining, and manufacturing sectors, makes it highly sensitive to fluctuations in international trade. If major commodity prices fall or trade barriers arise, exports may weaken, reducing investment and employment opportunities in related sectors. Thus, net exports play an important role in determining labor market stability in Sumatra.

5. CONCLUSION

Analysis of the factors affecting economic growth, poverty rates, and unemployment rates across the provinces of Sumatra shows that capital expenditure, education, investment, and net exports have positive and significant effects on economic growth. The results also show that capital expenditure, education, investment, and net exports have significant negative effects on the poverty rate. For unemployment, capital expenditure, education, and net exports have significant negative effects, whereas investment has no statistically significant effect.

To increase economic growth in the provinces of Sumatra, local governments need to allocate capital expenditure more effectively and on target, especially in infrastructure development that can encourage community economic activities. Constructing roads, bridges, and other transportation facilities will facilitate the distribution of goods and services, thereby increasing regional competitiveness. In addition, the government needs to strengthen the education sector by improving access to and the quality of education across all regions, especially in remote areas. The government should develop vocational training and education programs to build a skilled workforce aligned with industry needs. Investment regulations should also be streamlined to encourage investors to allocate capital to productive sectors that directly strengthen the local economy. Moreover, increasing net exports requires diversifying into higher-value products and improving the competitiveness of regional commodities to compete effectively in the global market. The government can also encourage the MSME sector to be export-oriented by providing training, mentoring, and access to adequate capital.

To reduce poverty and unemployment, the government must ensure that implemented policies create a wide range of high-quality jobs. Labour-intensive programs can be a short-term solution for absorbing a workforce that lacks specialised skills. In addition, the government, the business world, and educational institutions need to strengthen their synergy, so graduates have skills that align with the job market's needs. Investment in labour-intensive industrial and technology-based sectors must be increased to create more sustainable jobs. Meanwhile, developing the agriculture and fisheries sectors must also be a priority, given the large number of people in Sumatra who depend on these sectors for their livelihoods. The government needs to provide incentives for farmers and fishermen, such as business capital assistance, access to modern technology, and broader market access. With targeted, sustainable policies, the authors hope to achieve strong economic growth while significantly reducing poverty and unemployment.

6. ACKNOWLEDGEMENT

The authors express sincere gratitude to the University of Jambi for the resources and support provided during this study. The authors also appreciate colleagues and peers who offered valuable feedback during the development of the manuscript.

7. CONFLICT OF INTEREST

The authors declare no known competing financial interests or personal relationships that could have appeared to influence the work reported in the paper.

8. AUTHOR CONTRIBUTION STATEMENT

Tita Widya Utari contributed to the conceptualisation, research design, data compilation, analysis, and writing of the original draft.

Syamsurijal Tan contributed to supervision, methodological guidance, validation, and critical review of the manuscript.

Candra Mustika contributed to supervision, validation, critical review, and editing of the final manuscript.

All authors have read and approved the final version of the manuscript.

9. ETHICS STATEMENT

This study used secondary, aggregate data and did not involve direct interaction with human participants or the collection of identifiable personal information. Accordingly, informed consent was not applicable. The data were used solely for academic analysis and reporting.

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