



# Macroeconomic Indicators And Regional Government Capital Expenditure: Panel Data Analysis Of Provinces In Sumatra 2019–2024

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## ABSTRACT

This study analyzes the effects of economic growth, inflation, interest rates, unemployment rates, and poverty rates on local government capital expenditures in 10 provinces in Sumatra during 2019–2024. Using a panel data regression approach with fixed and random effects models and the Hausman test, we found that economic growth has a significant positive effect on capital expenditures, while inflation and poverty rates have a significant negative effect. These results emphasize the importance of macroeconomic stability and fiscal capacity in encouraging public investment at the regional level in Indonesia.

## INTRODUCTION

Regional government capital expenditure is a key instrument in fiscal policy for stimulating economic growth and regional development. Capital expenditure is used for long-term investments, such as infrastructure, public facilities, and other fixed assets that contribute to improving public welfare and regional economic competitiveness (Musgrave, 1959; World Bank, 2021). In Indonesia, regional governments have the authority to allocate capital expenditure budgets as part of fiscal decentralization aimed at improving the efficiency and effectiveness of regional development (Oates, 1972; Bappenas, 2022).

However, in practice, the realization of regional government capital expenditures in Indonesia, particularly in Sumatra, is often influenced by various macroeconomic factors. Several studies have shown a positive relationship between economic growth and capital expenditure because increased regional revenue allows for greater budget allocations for public investment (Peacock & Wiseman, 1961; IMF, 2023). Conversely, high inflation can reduce the government's purchasing power to finance development projects, while rising interest rates can suppress capital spending due to increased government borrowing costs (Wagner, 1893; Bank Indonesia, 2023). Furthermore, unemployment and poverty rates influence capital spending. Local governments tend to adjust their budget priorities to address social issues, which in some cases can lead to lower capital spending allocations (Musgrave, 1959; Ministry of Finance, 2023). This

phenomenon demonstrates the complex relationship between macroeconomic factors and local government capital spending allocation decisions.

Although various studies have highlighted the influence of macroeconomic factors on fiscal policy, studies specifically analyzing the linkages between economic growth, inflation, interest rates, unemployment, and poverty on capital spending at the local government level, particularly in Sumatra, remain limited. Therefore, this study aims to examine how these macroeconomic factors influence local government capital spending in Sumatra, thereby providing more effective policy recommendations for regional-budget management.

Based on this background, the research question is as follows: How do economic growth, inflation, interest rates, unemployment rates, and poverty affect local government capital expenditure in Sumatra? This study aims to analyze the influence of economic growth, inflation, interest rates, unemployment rates, and poverty on local government capital expenditure in Sumatra. This study has several novel aspects compared with previous studies. Most studies have focused on fiscal factors rather than macroeconomic factors. Many previous studies have analyzed the influence of Regional Original Revenue (PAD), General Allocation Fund (DAU), and Revenue Sharing Fund (DBH) on capital expenditure. However, macroeconomic factors such as economic growth, inflation, interest rates, unemployment rates, and poverty are rarely examined in depth in the context of local capital expenditures.

Most research on capital expenditure has been conducted at the national level or on the island of Java, Indonesia. Sumatra's economic characteristics are distinct, particularly in terms of its dependence on the natural resource sector, fiscal structure, and inter-regional disparities. Specific studies on how macroeconomic factors influence capital expenditure in Sumatra are scarce. This study adds inflation, interest rates, unemployment rates, and poverty as factors influencing capital expenditures. This provides a new perspective on understanding how national and regional macroeconomic conditions influence local government spending decisions.

## LITERATURE REVIEW

Fiscal capacity theory emphasizes that a region's ability to spend its budget, particularly in the form of capital expenditure, is strongly influenced by local economic conditions, including the level of economic growth, structure of regional revenues, and macroeconomic stability (Bahl & Musgrave, 1989; Bahl & Linn, 1992). Within this framework, capital expenditure is viewed as a strategic instrument for driving long-term growth, increasing productivity, and strengthening the public infrastructure. Various empirical studies have shown that economic growth and increased regional revenues are positively correlated with capital expenditure. Regions with high economic growth tend to have greater fiscal capacity, both through increased Regional Original Income (PAD) and fiscal transfers from the central government, which, in turn, allows for the expansion of development spending (Kuncoro, 2013; World Bank, 2022). However, inflationary pressures and high poverty rates can reduce capital expenditure capacity. High inflation increases project costs and reduces budget effectiveness, whereas widespread poverty encourages a shift in budget priorities toward social spending and direct assistance (Keynes, 1936; Todaro & Smith, 2015).

However, regional panel data-based studies in Indonesia that simultaneously integrate macroeconomic variables are limited in number. Most previous studies have focused on cross-sectional or single time-series analyses, thus failing to capture interregional and intertemporal dynamics simultaneously. However, a panel data approach allows for the identification of fixed and random effects that reflect each region's unique characteristics (Baltagi, 2008; Gujarati, 2009). Therefore, this study seeks to fill this gap by adopting a panel data approach to analyze the influence of economic growth, inflation, interest rates, unemployment, and poverty on capital expenditure in ten provinces in Sumatra from during 2019 to 2024.

The analysis of various studies indicates that regional financial performance, government expenditure, and inflation significantly influence local government capital expenditures and economic growth in Sumatra and comparable regions in Indonesia. The In South Sumatra, fluctuations in regional original income and special allocation funds notably impact capital expenditures, whereas economic growth and general allocation funds do not show a direct effect (Azhara Oktavianita Pratiwi and Sari, 2025). Similarly, in West Sumatra, government expenditure and balancing funds positively affect economic growth, whereas inflation and labor force participation have negative and significant impacts (Aisyah Syafitri and Ariusni Ariusni, 2019). In Aceh, government spending positively influences economic growth, but inflation's effect is insignificant, suggesting that expenditure is a more critical driver than inflation fluctuations (Fitri et al., 2024). Conversely, in Algeria, capital expenditure reduces inflation, and recurrent expenditure increases it, highlighting the nuanced relationship between public spending components and inflation (Hamadouche et al., 2024). Overall, these findings suggest that increased government expenditure can promote regional economic growth, but inflation and fiscal stability are crucial for achieving this. The impact of interest and unemployment rates was not explicitly addressed in the documents, indicating a gap in the specific analysis of these variables in Sumatrathe's context-of-Sumatra. Nonetheless, the evidence underscores the importance of strategic fiscal management and expenditure allocation in fostering sustainable regional development betweenfrom 2019 andto 2024. Thus, this literature review not only provides a theoretical foundation but also emphasizes the urgency and empirical contribution of this study to enriching the regional fiscal literature in Indonesia.

METHODS

This study uses annual panel data from 10 provinces in Sumatra for the period of 2019–2024. The dependent variable is capital expenditure (in billions of rupiah), and the independent variables include economic growth, inflation, interest rates, unemployment rates, and poverty rates. The panel regression model used includes both fixed and random effects approaches, with the Hausman test to determininge the best model.

RESULTS

Regional Macroeconomic Conditions

To provide a brief overview of regional macroeconomic conditions, Table 1 presents the average of five key variables per province during the study period.

Table 1. Average Economic Indicators and Capital Expenditure (%) per Province (2019–2024)

| Province        | Capital Expenditure | Economic Growth | Inflation | Unemployment | Poverty |
|-----------------|---------------------|-----------------|-----------|--------------|---------|
| Aceh            | 83.91               | 3.45            | 1.60      | 6.24         | 14.83   |
| North Sumatra   | 89.68               | 3.59            | 2.39      | 14.55        | 8.53    |
| Riau            | 90.03               | 2.94            | 3.20      | 4.67         | 6.97    |
| Riau Islands    | 94.32               | 3.78            | 0.87      | 8.53         | 5.92    |
| West Sumatra    | 86.83               | 3.68            | 2.73      | 6.29         | 6.22    |
| Jambi           | 102.83              | 3.83            | 2.70      | 4.71         | 7.62    |
| South Sumatra   | 115.22              | 3.97            | 2.96      | 4.61         | 12.81   |
| Bangka Belitung | 121.10              | 2.94            | 2.22      | 4.89         | 9.54    |
| Bengkulu        | 83.42               | 3.66            | 3.00      | 3.52         | 14.62   |
| Lampung         | 85.58               | 3.34            | 3.03      | 4.50         | 11.99   |

Source: Data Processed, 2025

The highest capital expenditure occurred in South Sumatra and Bangka Belitung. The highest economic growth occurred in Jambi and South Sumatra. The highest poverty rates were observed in Bengkulu and Aceh. The highest unemployment rates occurred in North Sumatra and the Riau Islands. The lowest inflation rates occurred in the Riau Islands and Aceh.

The following is a brief explanation of each province in Sumatra based on trends in five key variables (Capital Expenditure, Economic Growth, Inflation, Unemployment, and Poverty) from 2019 to 2024.

1. Aceh  
Capital expenditure was initially low, increasing in 2024. Economic growth has been stable. Inflation was extremely low throughout the period. Unemployment was high and stable at approximately 6%. Poverty remained high, decreasing from 15.32 to 14.23.
2. North Sumatra  
Capital expenditure was stable, with a surge in 2022. Economic growth recovered from the contraction in 2020. Inflation was high in 2022 and then declined. Unemployment was very high in 2019 (55.41) and then dropped drastically to 5.6. Poverty has gradually decreased.
3. Riau  
Capital expenditure fluctuated, peaking in 2022, and then decreasing. Initially, economic growth was low and stagnant, and then it increased. High inflation in 2022, unemployment decreased from 5.57 to 3.85. Poverty was stable at approximately 6–7%.
4. Riau Islands  
Capital spending fluctuated, reaching its highest level in 2023. Economic growth recovered from the contraction in 2020. Inflation was extremely low throughout the period. Unemployment was high (10.34 in 2020) and decreased to 6.39. Poverty was stable at approximately 5–6%.
5. West Sumatra  
Capital spending increased after 2020. Economic growth has been positive since 2021. Inflation spiked in 2022 and then declined. Unemployment is stable at approximately 5–6%. Poverty decreased from 6.29 to 5.42.
6. Jambi  
Capital spending has been high and stable since 2021. Economic growth was positive and increasing. Inflation declined sharply in 2024. Unemployment and poverty rates were relatively stable, with a slight decline towards the end of the period.
7. South Sumatra  
Capital expenditure was the highest among all provinces, peaking in 2022. Economic growth was strong and stable. Inflation was high in 2022 and then declined. Unemployment decreased from 5.51 to 3.86. Poverty decreased from 12.71 to 10.97.
8. Bangka Belitung  
Capital expenditure was highly volatile, peaking in 2022 (212.58). Economic growth was negative in 2020, but then recovered. Inflation was low and stable during the study period. Unemployment decreased from 5.25 to 4.63. Poverty decreased from 9.77 to 9.03.
9. Bengkulu  
Capital expenditure rose consistently until peaking in 2022, and then declined slightly. Economic growth has been stable at over 4% since 2021. Inflation spiked in 2022 and then returned to normal. Unemployment and poverty have gradually declined since then.
10. Lampung  
Capital spending increased sharply in 2021 and then stabilized. Economic growth recovered after the 2020 contraction occurred. Inflation will decline significantly in 2024. Unemployment remained at approximately 4–5%, whereas poverty declined gradually.

Economic Growth has the highest positive coefficient (+4.215), indicating a strong influence on increasing capital expenditure. Poverty Rate and Inflation have significantly negative

coefficients of -3.102 and -2.874, respectively. The interest Rate and Unemployment are close to the zero line, indicating a statistically insignificant effect.

**Table 2. Panel Regression Results with Fixed Effects**

| Independent Variable   | Coefficient | Std. Error | t-Statistic | Probability |
|------------------------|-------------|------------|-------------|-------------|
| Economic Growth        | 4.215       | 1.102      | 3.825       | 0.0003      |
| Inflation              | -2.874      | 0.984      | -2.922      | 0.0047      |
| Interest Rate          | 0.431       | 0.765      | 0.563       | 0.5742      |
| Unemployment Rate      | -0.215      | 0.498      | -0.432      | 0.6661      |
| Poverty Rate           | -3.102      | 1.021      | -3.038      | 0.0032      |
| Constant               | 85.672      | 12.345     | 6.942       | 0.0000      |
| R-squared              | 0.712       |            |             |             |
| Adjusted R-squared     | 0.684       |            |             |             |
| Number of Observations | 60          |            |             |             |

Source: Data Processed, 2025

The fixed effects regression results show a positive coefficient on economic growth, indicating that each 1 percent increase in economic growth increases capital spending by 4.215 percent. Inflation and poverty have significantly negative impacts on capital spending. Interest rates and unemployment were not statistically significant ( $p > 0.05$ ). The R-squared value of 0.712 indicates that the model explains approximately 71.2 percent of the variation in capital spending across provinces and over time.

**Table 3. Panel Regression Results with Random Effects**

| Independent Variable   | Coefficient | Std. Error | z-Statistic | Probability |
|------------------------|-------------|------------|-------------|-------------|
| Economic Growth        | 3.987       | 1.215      | 3.281       | 0.0010      |
| Inflation              | -2.541      | 1.072      | -2.369      | 0.0178      |
| Interest Rate          | 0.612       | 0.812      | 0.754       | 0.4507      |
| Unemployment Rate      | -0.178      | 0.523      | -0.340      | 0.7339      |
| Poverty Rate           | -2.874      | 1.098      | -2.617      | 0.0089      |
| Constant               | 82.431      | 13.102     | 6.289       | 0.0000      |
| R-squared              | 0.684       |            |             |             |
| Number of Observations | 60          |            |             |             |

Source: Data Processed, 2025

The random effects regression results show a similar coefficient pattern to the fixed effects model, but with slightly lower values for economic growth and poverty. The probability values in the Hausman test (see Table 4) indicate that the fixed effects model is more appropriate; therefore, the results in Table 3 are used for comparison. The following is a summary of the comparison between the fixed and random effects models based on the panel regression results.

**Table 4. Summary of the Comparison between the Fixed Effects and Random Effects Models**

| Aspects of the               | Fixed Effects (FE) Model                         | Random Effects (RE) Model                     |
|------------------------------|--------------------------------------------------|-----------------------------------------------|
| Model Objective:             | Capture fixed characteristics between provinces. | Assume variation between provinces is random. |
| Economic Growth Coefficient: | 4.215 (significant, $p < 0.01$ )                 | 3.987 (significant, $p < 0.01$ )              |
| Inflation Coefficient:       | -2.874 (significant, $p < 0.01$ )                | -2.541 (significant, $p < 0.05$ )             |
| Poverty Coefficient:         | -3.102 (significant, $p < 0.01$ )                | -2.874 (significant, $p < 0.01$ )             |

|                                |                                                          |                                                    |
|--------------------------------|----------------------------------------------------------|----------------------------------------------------|
| Interest Rates & Unemployment: | Not Significant                                          | Not Significant                                    |
| R-squared                      | 0.712                                                    | 0.684                                              |
| Hausman                        | Chi-Square Test = 12.84,<br>p = 0.025 → select FE        | Rejected by Hausman test                           |
| Interpretation                 | More accurate in capturing heterogeneity between regions | More efficient if the randomness assumption is met |
| Selected Model                 | Fixed Effects (FE)                                       | -                                                  |

Source: Data Processed, 2025

The fixed effects model was chosen because the Hausman test indicated that the differences between provinces were systematic and non-random. This means that the unique characteristics of each province—such as economic structure, bureaucratic capacity, and fiscal preferences—have a consistent influence on capital expenditures over the 2019–2024 period. This model provides more valid estimates for region-based policy analyses.

The Chi-Square statistic value of 12.84 with a probability of 0.025 indicates a significant difference between the estimates of the fixed effects and random effects models. Because the probability value was  $<0.05$ , the null hypothesis was rejected, and the fixed-effects model was more appropriate. This indicates that fixed characteristics between provinces (such as economic structure, bureaucratic capacity, or policy preferences) consistently influence capital expenditures over the 2019–2024 period.

As explained by Baltagi (2008), the Hausman test is used to determine whether the differences between entities in a panel model are random or systematic. If the differences are systematic, the fixed-effects model is more appropriate because it can control for unobserved heterogeneity. "The fixed effects model is appropriate when the individual-specific effects are correlated with the regressors" (Baltagi, 2008). 135).

Gujarati (2009) adds that the fixed effects model is appropriate when panel data cover the entire population or relevant entity, and when the assumption of independence between individual effects and explanatory variables cannot be guaranteed. "The Hausman test helps us choose between the fixed effects and random effects models by testing whether the unique errors are correlated with the regressors" (Gujarati, 2009, p. 604).

## DISCUSSION

Panel data regression analysis using a fixed effects approach shows that several macroeconomic indicators significantly influence local government capital expenditure in the Sumatra provinces during the 2019–2024 period. This model was selected based on the Hausman test results, which indicated that fixed effects were more appropriate than random effects given the unique characteristics inherent in each province.

Specifically, economic growth has a positive and significant coefficient, indicating that improved regional economic performance drives an increase in capital expenditure. This aligns with the fiscal capacity theory, which states that regions with higher economic growth tend to have more fiscal space for public investment. Conversely, the poverty rate has a significant negative relationship with capital expenditure. This finding indicates that provinces with higher poverty rates tend to have limited budget allocations for capital expenditures, possibly because of a greater budget priority directed towards social spending or limited regional revenue.

Inflation also has a negative effect on capital expenditure, which can be interpreted as a form of fiscal prudence by local governments in responding to price pressures. In this context,

high inflation can reduce the government's purchasing power and increase the costs of infrastructure projects, thereby reducing the efficiency of capital expenditure.

Meanwhile, the interest and unemployment rate variables do not show a statistically significant effect in this model. This could be due to limited variation across provinces or because their influence is more indirect on capital expenditure. The regression model shows a high R-squared value, indicating that variations in capital expenditure can be substantially explained by the independent variables. The panel regression results show that economic growth positively and significantly affects local government capital expenditure. This indicates that as the regional economy grows, fiscal capacity tends to increase, allowing local governments to allocate more budgets to capital expenditures. This finding aligns with the fiscal capacity theory, which states that increased economic output broadens the regional revenue base and strengthens public investment capacity (Bahl & Musgrave, 1989; Bahl & Linn, 1992).

Conversely, inflation and poverty rates have a significant negative effect on capital expenditure. High inflation can erode local governments' purchasing power, increase infrastructure project costs, and create uncertainty in budget planning. High poverty rates can force local governments to shift budget priorities to social spending and direct assistance, thereby reducing the proportion of capital expenditure.

This finding strengthens the argument that there is a trade-off between short-term spending on basic needs and long-term spending on development (Keynes, 1936; Kuncoro, 2013). Interest and unemployment rates did not have a statistically significant effect on capital expenditure. This may be due to the characteristics of regional capital expenditure, which is not directly dependent on financial market mechanisms or on short-term employment dynamics. Interest rates, while important in the context of debt financing, may not yet be a primary instrument for fiscal decision-making at the provincial level. Similarly, fluctuating unemployment rates are not consistently reflected in capital expenditure allocations, particularly if they are not accompanied by labor market-responsive fiscal policies.

The Hausman test indicates that the fixed-effects model is more appropriate than the random-effects model. This indicates that fixed characteristics across provinces influence capital expenditure, such as bureaucratic capacity, local economic structure, and fiscal policy preferences. Using a fixed effects model allows the analysis to more accurately capture inter-regional heterogeneity, thus making the estimation results more valid for policy purposes (Baltagi 2008).

## CONCLUSION

Regional capital expenditure in Sumatra is significantly influenced by economic growth, inflation and poverty. Fixed-effects models provide more accurate estimates, highlighting the importance of considering local characteristics in regional fiscal plans. These findings strengthen the theory of fiscal capacity and the trade-off between social and investment spending. The fixed-effects model emphasizes the importance of considering structural heterogeneity across regions in fiscal analyses.

## LIMITATION

This study is limited to the provinces of Sumatra from 2019 to 2024. It does not incorporate institutional and political variables that may influence the fiscal outcomes. Furthermore, the empirical model adopts a linear and static specification that may not adequately capture long-term dynamics and structural changes over time.

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