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Dynamics of Economic Growth on The Island of Sumatra Before and After The Covid-19 Pandemic: Panel Data Analysis

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Abstract: This study aims to analyze the influence of inflation, investment, and government spending on economic growth on the island of Sumatra during the period 2017–2023. Using the panel data regression method, this study combines interprovincial and intertemporal data variations to obtain a more comprehensive picture of economic dynamics before and after the COVID-19 pandemic. The results of the analysis show that simultaneously the three variables have a significant influence on regional economic growth. Partially, investment has proven to have a positive and significant influence so that it is the main factor driving economic growth, especially in the post-pandemic recovery phase. Inflation also shows a positive and significant influence, which indicates that price stability is able to support regional economic activity. Meanwhile, government spending has a positive but insignificant effect, so the effectiveness of regional fiscal allocation still needs to be improved in order to be able to have a stronger economic impact. Overall, these findings confirm that creating a conducive investment climate and improving the quality of government spending are key to encouraging sustainable economic growth on the island of Sumatra.

***Keywords*:** *Economic Growth, Investment, Inflation, Government Spending, Panel Data.*

INTRODUCTION

Economic growth is the main indicator in assessing the success of a region's development because it reflects an increase in production activities, community income, and economic welfare. Indonesia's economy was relatively stable before the COVID-19 pandemic, with average growth above 5% per year supported by investment, household consumption, and government spending (Central Statistics Agency, 2020). However, the COVID-19 pandemic in 2020 caused a national economic contraction of -2.07 percent and had a significant impact on regional economies, including the island of Sumatra (Bank Indonesia, 2023).

The island of Sumatra plays an important role in the national economy and contributes significantly to the Gross Domestic Product (GDP), especially through the agriculture, plantation, mining, processing industry, and trade sectors. On the contrary, the COVID-19 pandemic stopped economic growth in almost all Sumatra provinces. This is characterized by a decline in Gross Regional Domestic Product (GDP), a decline in investment, and inflationary pressures due to supply chain disruptions and restrictions on economic activity (Khoirudin, 2022).

In addition, the World Bank report states that the pandemic slowed down the region's economic recovery due to a decline in production and mobility activities (World Bank, 2023). In the post-pandemic economic recovery process, inflation, investment, and government spending are macroeconomic factors that play an important role in determining the pace of regional economic

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growth. Uncontrolled inflation can cause economic uncertainty and reduce people's purchasing power (Mankiw, 2019). However, according to research by Harahap and Tanjung (2023), a relatively stable inflation rate tends not to have a significant impact on a region's economic growth. As described in Solow's theory of growth, investment, both domestic and foreign, serves as a source of capital formation that increases production and job creation (Todaro & Smith, 2020). Empirically, Hapsari and Prakoso (2018) and Sodik and Nuryadin (2004) prove that investment has a positive and significant impact on regional economic growth.

On the other hand, government spending functions as a fiscal policy instrument that can encourage economic growth through an increase in aggregate demand, especially when allocated to productive sectors (Putri et al., 2018). However, the effectiveness of government spending is highly dependent on the quality and composition of public spending. Capital expenditure has a greater impact on economic growth than routine expenditure, according to research by Widiastuti and Sutrischastini (2022). This result is in line with Harahap et al. (2025) who stated that the dominance of operational spending can cause government spending to have no significant impact on regional economic growth. Based on these conditions, this study uses a panel data regression approach to see how inflation, investment, and government spending impact economic growth across Sumatra Island provinces before and after the COVID-19 pandemic.

LITERATURE REVIEW

Inflation to Economic Growth

Inflation is a condition of increasing the prices of goods and services in general and continuously in an economy (Harahap et al., 2023). According to Bank Indonesia (2020), inflation reflects an imbalance between aggregate demand and supply. In macroeconomic theory, the relationship between inflation and economic growth is ambiguous and depends on the rate of inflation itself. Keynesian theory states that moderate inflation can drive economic growth because it reflects an increase in aggregate demand followed by increased production and labor absorption (Todaro & Smith, 2012). However, high and uncontrolled inflation actually reduces people's purchasing power, increases production costs, and creates economic uncertainty that can hinder investment and growth (Harahap et al., 2023). In the context of the COVID-19 pandemic, inflation in many regions tends to be controlled due to weak public demand. However, in the post-pandemic period, inflationary pressures increased as the economy recovered, energy prices increased, and supply disruptions. Therefore, inflation is an important variable in explaining the variation in economic growth on the island of Sumatra before and after the pandemic. Based on previous research that explains inflation and economic growth, the first hypothesis in this study is:

H1: Inflation has a positive and significant effect on the economic growth of the island of Sumatra.

Investment in Economic Growth

Investment is one of the main drivers of economic growth. According to Harrod-Domar's theory, investment not only creates aggregate demand, but also increases production capacity through capital formation (Arsyad, 2019). In neoclassical growth theory (Solow, 1956), investment plays a role in the accumulation of physical capital which is an important factor in increasing long-term output. Although economic growth in the long term is influenced by technological advancements, investment remains an important prerequisite for accelerating the growth process (Zaharani & Nasir, 2025). Thus, Investment plays a crucial role in increasing national output and labor productivity. Investment will increase the amount of capital goods that drive economic growth or national output (Wau et al., 2022).

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During the COVID-19 pandemic, investment realization experienced a slowdown due to economic uncertainty and a decline in business activity. However, in the post-pandemic period, increased investment is the key to economic recovery on the island of Sumatra. Based on previous research that explains investment and economic growth, the second hypothesis in this study is:

H2: Investment has a positive and significant effect on the economic growth of the island of Sumatra.

Local Government Expenditure on Economic Growth

Government spending is a fiscal policy instrument that has a strategic role in encouraging economic growth, especially during economic slowdowns (Widiaty & Nugroho, 2020). According to Keynes' theory, increased government spending can increase aggregate demand and drive economic activity through a multiplier effect (Todaro & Smith, 2012). Government spending allocated to infrastructure, education, health, and social protection not only drives short-term economic growth, but also strengthens the foundations of long-term growth (Rohadin & Nurcahyo, 2019). In the context of the COVID-19 pandemic, the role of government spending has become increasingly important as a tool for economic stabilization to contain economic contraction and maintain people's purchasing power. On the island of Sumatra, local government spending plays a major role in supporting economic recovery through capital expenditure and social spending (Herita & Yuhendri, 2023). After the pandemic, the effectiveness and quality of government spending are the determining factors for the success of recovery and acceleration of regional economic growth. Based on previous research that explains government spending and economic growth, the third hypothesis in this study is:

H3: Government expenditure has a positive effect on the economic growth of the island of Sumatra.

METHODOLOGY

This study uses a quantitative approach by utilizing secondary data that is panel, namely a combination of cross-section and time series data. The research objects cover ten provinces on the island of Sumatra, namely Aceh, North Sumatra, West Sumatra, South Sumatra, Riau, Riau Islands, Jambi, Bengkulu, Bangka Belitung, and Lampung, with an observation period of 2017–2023. The use of panel data allows for a more comprehensive analysis because it is able to capture the dynamics of differences between provinces as well as changes between times simultaneously (Wau et al., 2022).

The variables analyzed in this study consist of economic growth as a dependent variable, which is proxied with the Gross Regional Domestic Product (GDP) on a constant price basis, as well as inflation, investment, and local government expenditure as independent variables. The operational definition and measurement indicators of each variable are presented briefly in Table 1.

Variable	Definition	Indicator
Economic Growth	Improving regional economic performance that reflects the region's ability to generate added value in a sustainable manner	GDP on a constant price basis (million rupiah)
Inflation	An increase in the price of goods and services in general that reflects the level of price stability in an area	Consumer Price Index (percent)
Investment	Investment aimed at increasing production capacity and encouraging economic activity	Realization of investment (million rupiah)
Government Spending	Local government spending used to support development activities and public services	Realization of regional expenditure (million rupiah)

Table 1. Variable Operational Definition

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Data Analysis Methods

The panel data regression model in this study is estimated using three approaches, namely the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM). The CEM approach assumes that the characteristics between provinces and time are homogeneous, so the model is estimated using the Ordinary Least Square (OLS) method. The FEM approach accommodates differences in fixed characteristics between provinces through intersect differences, whereas REM assumes that differences between provinces are random and part of the error component (Madany et al., 2022).

In general, the panel data regression model used in this study is formulated as follows:

$$PDRB_{it} = \alpha + \beta_1 Inflasi_{it} + \beta_2 Inflasi_{it} + \beta_3 Pengeluaran\ Pemerintah_{it} + \varepsilon_{it}$$

with *i* denoting the province and *t* denoting the observation time period.

From the three estimation approaches, the most suitable model was then selected through a series of model selection tests. The Chow test is used to determine the best model between the Common Effect Model and the Fixed Effect Model. Next, the Hausman test is used to choose between the Fixed Effect Model and the Random Effect Model. In addition, the Breusch–Pagan Lagrange Multiplier test was used to compare the Common Effect Model and the Random Effect Model (Wau et al., 2022).

Based on the results of the model selection test, it was found that the Fixed Effect Model is the most suitable approach to be used in this study. Therefore, the estimation of the relationship between inflation, investment, and government spending on economic growth on the island of Sumatra is then carried out using the Fixed Effect Model.

To ensure the validity of statistical inferences, parameter significance testing is carried out through simultaneous tests (F test) and partial tests (t tests). If violations of classical assumptions are found, especially heteroscedasticity and autocorrelation, estimates are carried out using robust standard errors so that the estimation results remain consistent and can be interpreted validly (Harahap et al., 2025).

Panel Data Regression Analysis

Data panel is an analysis method that combines cross-section data and time data. In the data panel, each unit *cross-section* observed in the same individual but in different time periods (Indrasetianingsih & Wasik, 2020). In general, the equation of the panel data regression model is as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \varepsilon_{it} \qquad (1)$$

with,

Y_{it} = the value of the individual bound variable to-*i* for the fourth period.*t*
i = units cross section (1,2,3, N)
t = units time series (1,2,3, T)
β_0 = intercept
β_k = coaphysin slope for all units
X_k = predictor variable for the unit cross section to-*i* Time period*t*
ε_{it} = components error in the observation unit*i* Time period*t*

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Panel Data Regression Model

In panel data regression analysis, there are three main approaches (Madany et al., 2022)

a. Random *Effect Model*
   In this model, differences in characteristics between individuals and time are considered part of the *error* component. Total errors are separated into two, i.e. individual errors and combined errors.
b. Fixed *Effect Model*
   This approach assumes the slope of the free variable is the same for each unit, but the intercept value varies. The *intercept* differences is usually represented by a dummy, so this method is also called *the Least Square Dummy Variable* (LSDV).
c. *Common Effect Model*
   In this model, *the intercept* and free variable slope are assumed to be the same for both cross *section* and *time series units.*

Panel Data Regression Model Selection

The purpose of selecting the panel data regression estimation model is to determine which of the three regression models (*Common Effect Model, Fixed Effect Model, and Random Effect Model*) is the most acceptable and appropriate. The following tests are then performed to determine which panel data regression estimation model is optimal:

a. Chow Test
   The Chow *test* is used to determine whether the right model is a *Fixed Effect Model* (FEM) or *a Common Effect Model* (CEM). According to Baltagi (2005), the testing steps are carried out by formulating the following hypotheses:

   H0 : all values α1 = α2 = αn = 0 → the model used is *Common Effect Model.*
   H1 : there is at least one 0 with $\alpha i \neq i$ = 1, 2, *n* →the model used is *the Fixed Effect Model.*
   To test this hypothesis, test statistics in the form of the F Test are used

$$F_{hitung} = \frac{(RSS_1 - RSS_2)/(N-1)}{RSS_2/(NT-N-K)}$$

   With,
   N : number of individuals (data *cross section*)
   T : the number of time periods (data *time series*)
   K : number of explanatory variables
   RSS_1 : *residual sum of squares* Results of the Estimation *Common Effect Model*
   RSS_2 : *residual sum of squares* Results of the Estimation *Fixed Effect Model*

   If the value or , then H0 is rejected, which means that $Chow > F_{(n-1),(nT-n-K)} p - value < \alpha$ *the fixed effect* model is best. When the selected model is *a fixed effect*, it is followed by *the Hausman* test.

b. Hausman Test
   The Hausman test aims to find out whether there is a relationship between the *error component* of the model (*composite error*) and one or more independent variables. According to Baltagi (2005), the testing procedure is carried out by establishing the following hypotheses:

   H0 : No correlation $((X_{it}, \varepsilon_{it}) = 0$*random effect model)*
   H1 : korelasi $((X_{it}, \varepsilon_{it}) \neq 0$*fixed effect model)*

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To test this hypothesis, the Chi-Square test with the Wald test criteria was used as the tester's statistic.

$$W = (\hat{\beta}_{MET} - \hat{\beta}_{MEA})'\left[var\,(\hat{\beta}_{MET} - \hat{\beta}_{MEA})\right]^{-1}(\hat{\beta}_{MET} - \hat{\beta}_{MEA})$$

With,

$\hat{\beta}_{MET}$: Slope Estimation Vector *Fixed Effect Model*

$\hat{\beta}_{MEA}$: Slope Estimation Vector *Random Effect Model*

c. Uji Breusch-Pagan

The Breusch-Pagan test is used to determine whether or not there is an influence of the effect of time, individual effects, or both. The hypothesis used in the Breusch-Pagan test can be formulated as follows:

H_0 : $\sigma_e^2 = 0$*(common effect model)*

H1 is at least present $\sigma_e^2 \neq 0$*(random effect model)*

$$LM = \frac{NT}{2(T-1)}\left[\frac{\sum_{i=1}^{N}[T\bar{e}]^2}{\sum_{i=1}^{N}\sum_{t=1}^{T}e_{it}^2} - 1\right]^2$$

With,

T : number of units *time series*

N : number of units *cross section*

e_{it} : residual in the second unit.i and the time of$t$

Parameter Significance Testing

The parameter significance test is used to find out whether the regression coefficient obtained is statistically significant or not. The regression coefficient is considered significant if the value is different from zero. If the regression coefficient is equal to zero, then there is sufficient evidence that the predictor variable has an effect on the response variable. For this reason, each regression coefficient needs to be tested with two approaches, namely the F Test (overall test) and the T Test (partial test) (Alamsyah et al., 2022).

a. F Test (Overall Test)

This F test is used to assess whether all predictor variables together have an influence on the response variable. The hypothesis formulation used in this test is as follows:

H0: $\beta_1 = \beta_2 = \beta_3 = \beta_n = 0$

H1: with $\beta_k \neq 0$ k = 1, 2, n

The statistics of the F test are as follows:

$$F_{hitung} = \frac{R^2/(N+K-1)}{(1-R^2)/(NK-N-K)}$$

If it is greater than , then the null hypothesis (H$F_{hitung}F_{tabel0}$) is rejected. This shows that the overall predictor variable affects the response variable, and vice versa.

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b. **Partial Test (t-test)**

The t-test is used to find out whether each individual predictor variable has a significant influence on the response variable. The hypotheses used in this test are as follows:

H0: $\beta_k = 0$
H1: $\beta_k \neq 0$

The t-test equation is as follows:

$$t = \frac{b_k}{s.e(b_k)}$$

The test criterion used is that if the value of H₀ is rejected. This means that each predictor variable has an individual influence on the response variable. Conversely, if t counts less than t of the table, then H₀ $|t_{hitung}| > t_{tabel\left(ta_{/2},n-k\right)}$ is not rejected.

RESULTS AND DISCUSSION

Descriptive Statistical Analysis

Descriptive statistical analysis aims to provide an overview of the characteristics of the research data, such as the average value, standard deviation, minimum, maximum, and number of observations of each variable. The results of the analysis are presented in the following table.

Statistics	GDP (Million Rp)	Inflation (%)	Investment	Government Spending
Average	362,89	2,97	9.706,69	7.753,57
Minimum	60,66	1,08	296,50	2.177,86
Maximum	1.050,99	7,43	48.243,30	18.709,34
Number of Observations	70	70	70	70

Table 2. Descriptive Statistical Analysis

Based on the results of descriptive statistics, the average provincial GDP on the island of Sumatra during the observation period was recorded at 362.89 million rupiah, with a minimum value of 60.66 million rupiah and a maximum of 1,050.99 million rupiah. The large standard deviation value shows that there is a difference in the level of economic activity between provinces. Inflation averaged 2.97 percent, indicating that price stability was relatively maintained before and after the Covid-19 pandemic. Meanwhile, government investment and expenditure show considerable variation between regions, reflecting differences in fiscal capacity and economic attractiveness of each province.

These results show that the Covid-19 pandemic has had a different impact on economic growth on the island of Sumatra. Provinces with higher levels of government investment and expenditure tend to have larger GDPs. This variation between regions indicates that the dynamics of economic growth on the island of Sumatra are not homogeneous, so further analysis is needed using panel data regression to see the influence of each variable on economic growth before and after the Covid-19 pandemic.

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Panel Data Regression Model Results

Variable	Pooled OLS	Fixed Effect Model (FEM)	Random Effect Model (REM)
Inflation	4.4511	11.3088**	12.5511**
	(0.732)	(0.018)	(0.012)
Investment	0.0208***	0.0081***	0.0089***
	(0.000)	(0.000)	(0.000)
Government Spending	0.0164***	0.0122	0.0177***
	(0.000)	(0.107)	(0.005)
Konstanta	20.6320	155.8924**	101.9077
R-squared	0.7301	0.7004	0.6726
Observations	70	70	70
Number of Provinces	10	10	10
Notes: * significant at the 10% level; **significant at the 5% level;*** significant at the 1% level			

Table 3. Static Panel Data Regression Estimation Results

Based on the results of the static panel data regression estimate presented in Table 3, three model approaches were used, namely Pooled OLS, Fixed Effect Model (FEM), and Random Effect Model (REM). The selection of the best model shows that the Fixed Effect Model (FEM) is the most suitable model to analyze the dynamics of economic growth on the island of Sumatra before and after the COVID-19 pandemic, which is shown by the results of individual effects tests with a probability value of 0.000.

The results of the FEM estimate show that simultaneously the variables of inflation, investment, and government spending have a significant effect on economic growth. Partially, inflation and investment have a positive and significant effect on GDP on the island of Sumatra. These findings indicate that increased investment plays an important role in boosting regional economic activity, while inflation during the observation period remains at a level that could drive economic growth.

Meanwhile, government spending showed a positive but insignificant influence, indicating that local government spending has not been fully effective in driving economic growth. Overall, these results confirm that investment is the main factor of economic growth on the island of Sumatra, especially in the context of economic recovery after the COVID-19 pandemic.

Model Selection Test

Test Criteria	Chow Test	Hausman Test	Uji Breusch-Pagan
Statistical Value	65,90	16,25	79,67
P-value	0,0000	0,0010	0,0000
Verdict	Fixed Effect	Fixed Effect	Random Effect

Table 4. Model Selection Results

The results of the model estimation presented in Table 3 were then selected by one of the best models through the model specification test, with the test results shown in Table 4. Based on the Chow test, a statistical value of 65.90 with a p-value of 0.0000 was obtained. Because the p-value is smaller than the significance level of 1 percent, the null hypothesis is rejected (Widarjono, 2018). Thus, the fixed effect model is more appropriate to use than the common effect model.

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Furthermore, the results of the Hausman test showed a statistical value of 16.25 with a p-value of 0.0010. The p-value is smaller than the significance level of 5 percent, so the zero hypothesis is rejected (Widarjono, 2018). This indicates that the fixed effect model is more suitable than the random effect model. Because the results of the Chow test and the Hausman test show consistent results, it can be concluded that the fixed effect model is the best model used in this study.

Classic Assumption Test

Test Type	Method	Statistical Value	P-value	Verdict
Normality	Skewness–Kurtosis (sktest)	$\chi^2 = 6.10$	0,0474	Abnormal
Heteroskedastisitas	Modified Wald	681,46	0,0000	There is heteroscedasticity
Autocorrelation	Breusch–Pagan LM (xttest2)	$x^2 = 78,884$	0,0013	There is an autocorrelation
Multikolinearitas	VIF (Variance Inflation Factor)	Mean VIF = 1,11	–	No multicollinearity

Table 5. Table Results of Classical Assumption Test Results (Fixed Effect Model)

Based on the results of the residual normality test using the Skewness and Kurtosis Test, a probability value of 0.0474 was obtained, which was smaller than the significance level of 5 percent. This indicates that the residual is not normally distributed. However, in the analysis of panel data, violations of the assumption of normality are not crucial in panel data analysis, especially in relatively large samples, and therefore do not invalidate the estimation results.

The results of the heteroscedasticity test using the Modified Wald Test method showed a probability value of 0.0000, which indicates the presence of heteroscedasticity in the model. This condition shows that the variance of error between cross-section units is not constant, so it has the potential to cause the estimation to be inefficient if no adjustment is made to the estimation method.

Furthermore, the autocorrelation test using the Breusch–Pagan LM Test yielded a probability value of 0.0013, which means that there is an autocorrelation in the residual between time periods. This shows that errors in one period correlate with other periods in a single unit of observation.

Meanwhile, the results of the multicollinearity test based on the Variance Inflation Factor value showed that all independent variables had a VIF value below 10 with an average of 1.11. Thus, it can be concluded that there is no problem of multicollinearity in the model.

To overcome the identified heteroscedasticity and autocorrelation problems, this study uses Fixed Effect Model estimation with robust standard error. The use of this method ensures that the results of the coefficient estimation remain consistent and can be interpreted validly despite violations of some classical assumptions.

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Panel Data Regression Results (Fixed Effect – Robust)

Variable	Coefficient	Robust Std. Error	Probability
Inflation	11,3088**	4,0475	0,021
Investment	0,0081***	0,0013	0,000
Government Spending	0,0122	0,0101	0,257
Konstanta	155,8924*	83,8546	0,096
R-squared (Within)	0,5791	-	-
Test Statistics	F = 24.48	-	0,0001
Notes: * significant at the 10% level; **significant at the 5% level;*** significant at the 1% level			

Table 6. Panel Data Regression Results

The results of the Fixed Effect estimation with robust standard error are used as the final results of the study to ensure that the conclusions drawn remain valid even though the model violates classical assumptions. Based on previous tests, it was found that there is heteroscedasticity and autocorrelation in the Fixed Effect model, so that standard estimates without correction have the potential to produce biased error standard values. Therefore, the implementation of a robust standard error aims to improve the error standard, test statistical value, and parameter significance level without changing the regression coefficient value. Thus, the results of robust estimation provide more reliable statistical inference and can be used as the main basis for discussion and conclusion of the study.

DISCUSSION

Based on the results of the panel's data estimates, there is empirical evidence that macroeconomic variables such as inflation and investment have an important role in the dynamics of economic growth in the provinces of Sumatra before and after the COVID-19 pandemic. Inflation in the moderate range does not seem to hamper economic activity, but is positively associated with GDP. This is in line with the findings of several studies that show a positive relationship between inflation at a certain level and economic growth, as long as inflation does not reach a level that undermines price stability and market confidence (static panel data evidence) (Cili & Alkhaliq, 2022).

Investment is also seen as the main driver of regional economic growth in Sumatra. These results are consistent with the literature showing the significance of investment to increasing economic output, both in national and regional contexts. For example, a study examining the influence of investment on Indonesia's economic growth found that investment contributes positively to encouraging production capacity expansion and long-term growth (Zaharani & Nasir, 2025). Under the conditions of uncertainty due to the pandemic, investment remains a crucial variable in supporting economic recovery.

Meanwhile, the government spending variable does not show a significant influence on economic growth in this model. These findings differ from some of the literature that generally states that government spending can support growth through strengthening aggregate demand and the provision of public infrastructure. However, these differences may reflect the characteristics of local government spending in Sumatra that is more routine or not fully allocated to productive spending that encourages long-term growth, as can also be seen in several case studies at the provincial level (Sijabat, 2023).

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Overall, the results of the classical assumption test show a violation of heteroscedasticity and autocorrelation in the Fixed Effect model, so the final estimate is carried out with a robust standard error to ensure that the test statistics and coefficient confidence intervals remain valid. This robust approach is important because violations of classical assumptions can result in inaccurate standard errors if left unaddressed, but robust standard errors are able to address these issues so that results remain inferentially reliable.

These findings reflect the dynamics of economic growth on the island of Sumatra which is not uniform between provinces and the period before and after the pandemic. Reliance on investment and the moderate effects of inflation support economic recovery, while the role of government spending needs to be directed to be more effective in driving growth. The results of this study underscore the importance of policies that stimulate investment and maintain macroeconomic stability as part of post-pandemic recovery strategies.

CONCLUSION

Based on the results of the panel data regression analysis, the model used in this study is the most suitable model based on the results of the model specification test. The selected model has met the goodness of fit criteria and is able to explain the variation in economic growth between provinces on the island of Sumatra during the 2017–2023 period. The use of the panel data approach is considered appropriate because it can capture differences in characteristics between provinces as well as the dynamics of changes in economic conditions before and after the COVID-19 pandemic.

The results of the estimates show that inflation, investment, and government spending have a role in influencing regional economic growth on the island of Sumatra. Fluctuating inflation affects the stability of economic growth, especially through its impact on purchasing power and production activities. Investment contributes to encouraging economic growth through increased capital formation and regional production capacity. Meanwhile, local government spending has not shown a statistically significant effect on regional economic output, indicating that its role as a fiscal stimulus depends strongly on the quality and allocation of public expenditure, particularly toward productive sectors and infrastructure development.

Overall, the findings of this study confirm that the success of the recovery and sustainability of economic growth on the island of Sumatra is greatly influenced by the synergy between price stability, increased investment, and the effectiveness of local government spending. Therefore, local governments are expected to maintain inflation control, create a conducive investment climate, and optimize public spending allocation to be more productive. Further research is suggested to include additional variables as well as a longer observation period to deepen the analysis of regional economic growth determinants.

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https://doi.org/10.14421/bie.2025.042-02

References

Abdillah, R., & Primitasari, D. (2023). Pengaruh pengeluaran pemerintah sektor pendidikan, sektor kesehatan, dan infrastruktur terhadap pertumbuhan ekonomi di wilayah Indonesia bagian timur. *Jurnal Ilmu Ekonomi, 7*(1), 45–58. https://doi.org/10.22219/jie.v7i03.28265

Alamsyah, I. F., Esra, R., Awalia, S., & Nohe, D. A. (2022). Analisis regresi data panel untuk mengetahui faktor yang memengaruhi jumlah penduduk miskin di Kalimantan Timur. *Prosiding Seminar Nasional Matematika, Statistika, dan Aplikasinya*, II, 254.

Arsyad, L. (2019). *Ekonomi pembangunan* (Edisi ke-6). UPP STIM YKPN.

Badan Pusat Statistik. (2020). *Pertumbuhan ekonomi Indonesia triwulan IV 2019*. BPS. https://www.bps.go.id

Baltagi, B. H. (2005). *Econometric analysis of panel data* (3rd ed.). John Wiley & Sons.

Bank Indonesia. (2020). *Inflasi*. https://www.bi.go.id/id/fungsi-utama/moneter/inflasi/default.aspx

Bank Indonesia. (2023). *Laporan perekonomian Indonesia 2023*. BI. https://www.bi.go.id

Cili, M. R., & Alkhaliq, B. (2022). Economic growth and inflation: Evidence from Indonesia. *Signifikan: Jurnal Ilmu Ekonomi, 11*(1), 145–160. https://doi.org/10.15408/sjie.v11i1.19848

Gujarati, D. N., & Porter, D. C. (2012). *Basic econometrics* (5th ed.). McGraw-Hill Education.

Hapsari, M., & Prakoso, A. (2018). Penanaman modal dan pertumbuhan ekonomi tingkat provinsi di Indonesia. *Jurnal Ekonomi dan Bisnis, 21*(1), 33–50. https://doi.org/10.24914/jeb.v19i2.554

Harahap, A. R., & Tanjung, A. F. (2023). Analisis tingkat inflasi terhadap investasi dalam meningkatkan pertumbuhan ekonomi di Sumatera Utara. *Jurnal Edueco, 6*(1), 1–10. https://doi.org/10.36277/edueco.v6i1.154

Harahap, R., Syahidin, A., Jalil, M. A., & Ramadhan, M. (2025). Pengaruh inflasi dan pengeluaran pemerintah terhadap pertumbuhan ekonomi. *EMT: Indonesia Journal for the Economics, Management and Technology, 9*(3), 935–944. https://doi.org/10.35870/emt.v9i3.4259

Herita, M. F., & Yuhendri, L. V. (2023). Pengeluaran pemerintah, investasi, dan pertumbuhan ekonomi Provinsi Bengkulu tahun 2016–2021. *Jurnal Ekonomi & Pendidikan, 20*(1), 105–116. https://doi.org/10.21831/jep.v20i1.60310

Indrasetianingsih, A., & Wasik, T. K. (2020). Model regresi data panel untuk mengetahui faktor yang memengaruhi tingkat kemiskinan di Pulau Madura. *Jurnal Gaussian, 9*(3), 355–363. https://ejournal3.undip.ac.id/index.php/gaussian/

Khoirudin, A. (2022). Analisis dampak pandemi COVID-19 terhadap perekonomian Provinsi Sumatera Selatan. *Iqtishaduna: Jurnal Ekonomi dan Keuangan Islam, 6*(1). https://doi.org/10.53888/iqtishaduna.v6i1.426

Madany, N., Ruliana, & Rais, Z. (2022). Regresi data panel dan aplikasinya dalam kinerja keuangan terhadap pertumbuhan laba perusahaan IDX LQ45 Bursa Efek Indonesia. *Variansi: Journal of Statistics and Its Application on Teaching and Research, 4*(2), 79–94. https://doi.org/10.35580/variansiunm28

Mankiw, N. G. (2019). *Principles of economics* (9th ed.). Cengage Learning.

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https://doi.org/10.14421/bie.2025.042-02

Putri, R. P., Heriberta, H., & Emilia, E. (2018). Pengaruh inflasi, investasi asing langsung, dan pengeluaran pemerintah terhadap pertumbuhan ekonomi Indonesia. *Jurnal Paradigma Ekonomika*, *13*(2), 95–104. https://doi.org/10.22437/paradigma.v13i2.6625

Rohadin, R., & Nurcahyo, A. (2019). Pengaruh pengeluaran pemerintah dan pertumbuhan ekonomi terhadap tingkat kemiskinan di Kota Cirebon tahun 2011–2018. *Cendekia Jaya*, *1*(2), 111–127.

Sijabat, R. (2023). Do productive government expenditures affect economic growth? Evidence from provincial governments across Indonesia. *Jurnal Studi Pemerintahan*, *8*(1). https://doi.org/10.18196/jgp.8149

Sodik, J., & Nuryadin, D. (2004). Investasi dan pertumbuhan ekonomi regional. *Jurnal Ekonomi Pembangunan: Kajian Masalah Ekonomi dan Pembangunan*, *9*(2), 141–154. https://doi.org/10.20885/ejem.v10i2.599

Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, *70*(1), 65–94.

Todaro, M. P., & Smith, S. C. (2012). *Economic development* (11th ed.). Pearson.

Todaro, M. P., & Smith, S. C. (2020). *Economic development* (13th ed.). Pearson.

Wau, T., Sarah, U. M., Pritanti, D., Ramadhani, Y., & Ikhsan, M. S. (2022). Determinan pertumbuhan ekonomi negara ASEAN: Model data panel. *Jurnal Samudra Ekonomi dan Bisnis*, *13*(2), 163–176. https://doi.org/10.33059/jseb.v13i2.5205

Widiastuti, D., & Sutrischastini, A. (2022). Dampak belanja pemerintah daerah terhadap pertumbuhan ekonomi daerah. *Jurnal Kajian Bisnis*, *30*(1), 13–26. https://doi.org/10.32477/jkb.v30i2.394

Widiaty, E., & Nugroho, A. P. (2020). Pertumbuhan ekonomi Indonesia perspektif ekonomi Islam: Peran inflasi, pengeluaran pemerintah, hutang luar negeri, dan pembiayaan syariah. *Jurnal Ilmiah Ekonomi Islam*, *6*(2), 223–238. https://doi.org/10.29040/jiei.v6i2.1043

World Bank. (2023). *Indonesia economic prospects*. World Bank. https://www.worldbank.org

Zaharani, A. Z., & Nasir, M. (2025). Pengaruh investasi dan inflasi terhadap pertumbuhan ekonomi Indonesia. *Jurnal Transformasi Administrasi*, *15*(1), 1–14. https://doi.org/10.56196/jta.v15i01.423

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