

The Influence of Government Expenditure, Domestic Investment, and Sustainable Development on Inclusive Economic Growth in Sumatra Provinces (2019-2023)

Original Article

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Abstract

Inclusive economic growth remains a critical challenge across Sumatra's provinces, where disparities in welfare, infrastructure, and environmental quality persist. Focusing on ten provinces on the island of Sumatra between 2019 and 2023, this research assesses how inclusive economic growth is influenced by government social assistance expenditure, domestic investment (PMDN), and sustainable development (proxied by HDI and IKLH). Employing panel data regression with the Random Effects Model (REM) as the adjudicated specification, the empirical outcomes reveal that, under partial estimation, all independent variables exert a discernible bearing upon inclusive economic growth. Conversely, under simultaneous estimation, solely the Human Development Index (HDI) manifests as a statistically consequential determinant, whilst social assistance expenditure, domestic investment, and the Environmental Quality Index (IKLH) yield no appreciable influence on inclusive economic growth across the provinces under scrutiny. These findings suggest that human capital development plays a more dominant role than fiscal and investment variables in driving inclusive growth. Policymakers in Sumatra should prioritize sustainable human development to reduce inequality and enhance economic participation across provinces.

Keywords: Domestic Investment, Environmental Quality, Human Development Index, Inclusive Economic Growth, Social Assistance Expenditures.

1. Introduction

Indonesia is currently facing problems and challenges both in terms of government policies and the state of the community regarding the current economic conditions. Economic growth is often a benchmark for the welfare of the community and the condition of a country which leads to various aspects of the economy and development in Indonesia. Improving the quality and services of the community is the key to being able to improve the welfare of the community. In addition, inequality between various regions is also seen from the aspects of poverty rate, Gini ratio and unemployment rate which can affect the economy in various regions (Sirega et al., 2023). The 2030 Agenda declares the goal of achieving sustainable development worldwide (Sepang et al., 2025). However, one of the obstacles to achieving this goal is providing inclusive growth for all countries around the world (Meena, 2022).

Inclusive economic growth is economic growth that prioritizes economic equality both in terms of social and environmental aspects (Rezeki et al., 2023). According to UNDP, (2017) inclusive economic growth leads to development and prosperity resulting from the equitable distribution and sustainability of the infrastructure development process in each region or region (Syahputra, 2017). It can be said that economic growth is expected to contribute to



reducing poverty and unemployment, as well as income inequality, so this is called inclusive economic growth.

Inclusive economic growth on the island of Sumatra still faces various challenges that hinder the equitable distribution of people’s welfare. Although a number of provinces, such as North Sumatra, Riau and Lampung, have shown significant economic growth, the benefits of this growth have not been fully felt by the public (Maesyaroh & Kundhani, 2024). Spatial disparities between regions remain conspicuously pronounced, particularly between urban and rural localities. Access to education, employment opportunities, and health services continues to be distributed inequitably across these areas, such that economically marginalised cohorts, notably agrarian workers and artisanal fishing communities, persistently encounter formidable impediments in reaping the dividends of developmental progress. In addition, some investors are more concentrated in sectors that require large capital, such as manufacturing and manufacturing (Jubir et al., 2023). While labor-intensive sectors that can absorb local labor are not yet fully inclusive, therefore economic growth in Sumatra is not fully inclusive because there is still inequality between regions in Sumatra.

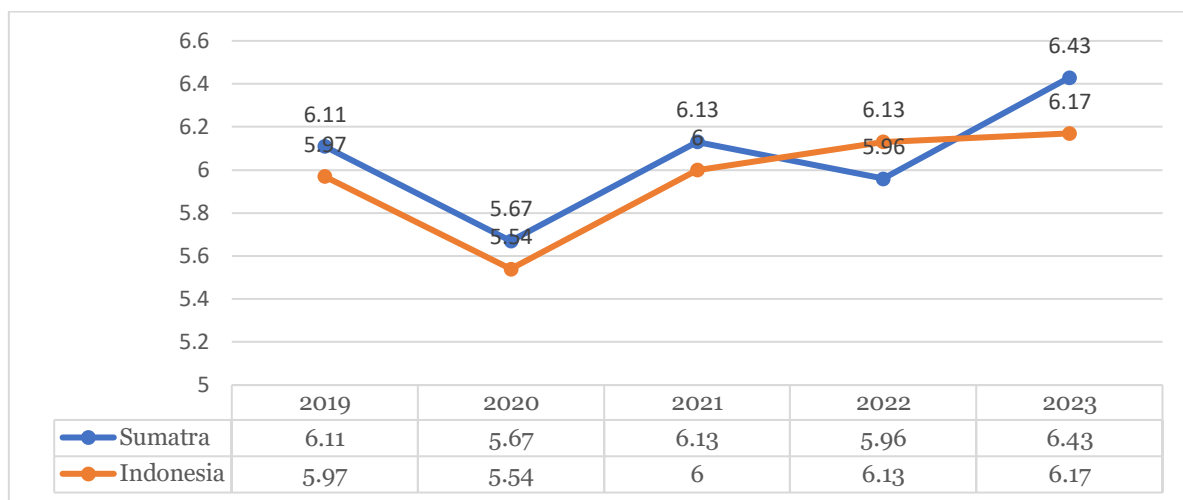


Figure 1. Inclusive Economic Growth Indeks Indonesia and Sumatera
Source: Bappenas, 2025

Based on the five-year period (2019-2023) as in Figure 1, inclusive economic growth on the island of Sumatra in a period of 5 (five) years has experienced fluctuations or changes every year. Based on the data above, the average inclusive economic growth in every year in 5 years, based on the lowest inclusive economic growth rate, which occurred in 2020 at 5.67. This is due to conditions that require every activity to be stopped and hinder in accelerating economic activities. Meanwhile, in 2023, the highest inclusive economic growth is 6.43. This indicates that there is an improvement in access and an increase in economic opportunities, employment and social welfare.

Therefore, to be able to support inclusive growth and development, one of the fiscal policy instruments is government spending as an instrument that can contribute to economic growth (Novikadianty & Natasari, 2023). A cardinal mechanism operates through central government disbursements, as codified within the State Expenditure Budget (APBN), in conjunction with subnational allocations delineated under the Regional Expenditure Budget (APBD). Accordingly, fiscal outlays occupy an indispensable position in catalysing inclusive development, thereby ensuring that the government's welfare-oriented imperatives remain consonant with the benchmarks enshrined in the National Medium-Term Development Plan

(RPJMN) toward the augmentation of both distributional equity and societal well-being (Ilyas & Prasetyia, 2023).

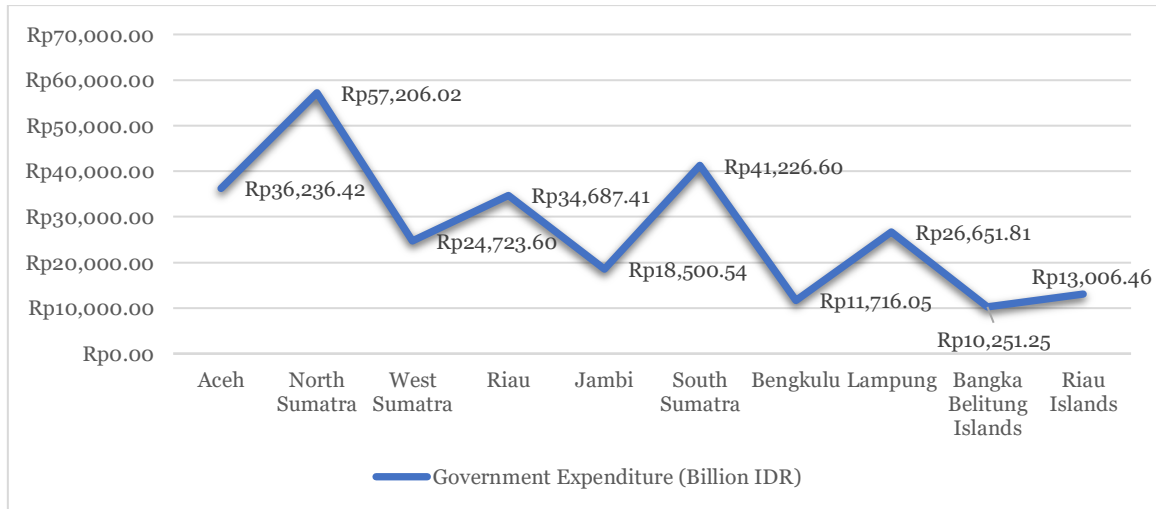


Figure 2. Realization of Government Expenditure (Billion IDR)

Source: Ministry of Finance, 2025

Owing to its critical function in propelling economic growth, investment is frequently designated as the primary engine of growth. Its effects extend to the labor market, where enhanced investment contributes to greater labor absorption, a consequent reduction in the measured open unemployment rate, and a corresponding increase in total output value (Sherly et. al, 2025). Investment originates from two primary sources: the public sector and the private sector. Domestic investment, in particular, generates not only capital accumulation and gross domestic product expansion but also a substantial multiplier effect, attributable to its deep comprehension of local market dynamics and its role in fostering endogenous supply chain development.

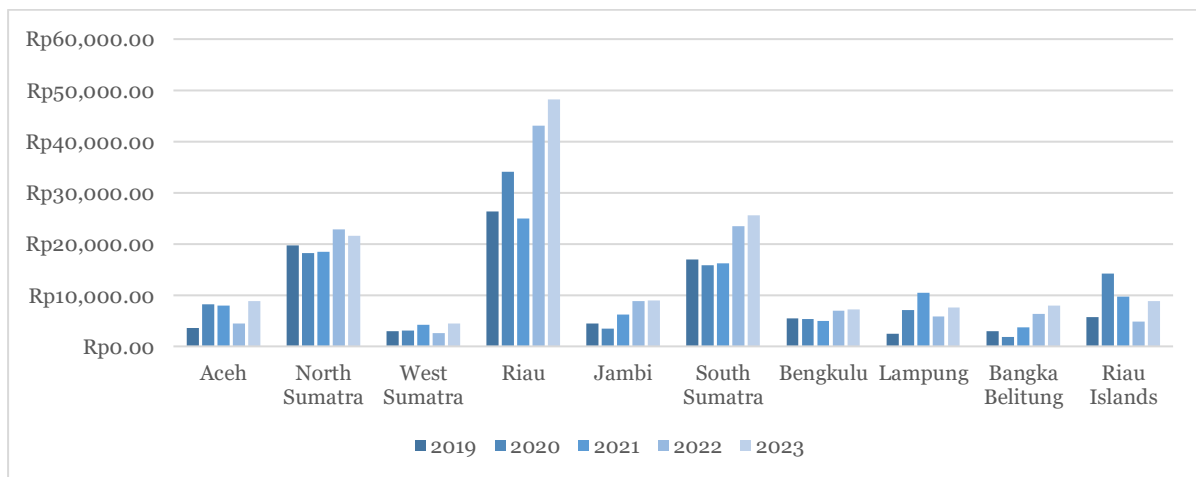


Figure 3. Realization of Domestic Investment (PMDN) (Billion IDR)

Source: Central Statistics Agency, 2025

In sustainable development, activities related to natural resources and human resources are related to each other. Sustainability is used to be able to increase the potential of an area by maintaining long-term aspects that must be considered to be able to maintain the sustainability of the region (Hill et. al, 2013). With the existence of the sustainability aspect, it

is the key to building a society that is not only physically prosperous but has the ability to explore potential and development in the future (Muslim, 2025). This is conveyed in United Nations Development Programme (UNDP) (2017) which in this case is in line with the SDGs which prioritize a transition to inclusive and sustainable growth. This strategy contributes to the goals of the 8 SDGs, namely sustainable development, inclusiveness, addressing inequality, full and productive employment, and adequate employment opportunities for all.

A consistent annual increment in the average Human Development Index (HDI) for the island of Sumatra was recorded over a five-year interval, as documented by BPS statistics. The fundamental drivers of this progressive elevation in HDI are attributable to three core dimensions of human development: namely, gains in public health, the amelioration of material living conditions, and progress within the education sector (Damanik & Lubis, 2022). However, even though there has been an increase in Sumatra, there is still a gap between provinces with the lowest HDI, namely Lampung province of 71.15. This can happen due to the uneven infrastructure and community services in the area.

In the 2019-2023 period based on environmental quality index data on the island of Sumatra, of the ten provinces in Sumatra, the province with the highest average Environmental Quality Index (IKLH) score is Aceh province, which is 76.79. Then followed by the province of West Sumatra of 73.45 and the province of the Riau Islands with an average IKLH of 71.82. This is obtained because of the active role of the community to support and play an active role in protecting the environment in their area such as sustainable tourism development programs and maintaining water and air quality through waste treatment and waste management. Meanwhile, the provinces that have a low average IKLH are Lampung province with 66.48, South Sumatera province with an average of 68.36 and then Jambi province with 69.00. This can be caused by activities and lack of land cover that causes pollution and carbon emissions, coupled with the rapid rate of urbanization causing disruption of water and air quality in the region. This shows that the quality of the environment greatly affects human activities in it because it can affect public health conditions and environmental sustainability in the region. As well as being an important element that supports productivity and human performance for economic improvement.

A synthesis of recent empirical research reveals heterogeneous effects on inclusive economic growth in Indonesia. Purba et al. (2023) demonstrate that inclusive growth responds positively and significantly to PDI, HDI, and government expenditure. In contrast, Herdiyati and Ismail (2022) establish that only government spending retains a positive and significant influence, with investment showing no such effect. Parallel evidence from Safitri (2023) corroborates the significant role of government spending, while indicating that the open unemployment rate (TPT) contributes insignificantly to the inclusive growth process. The aim is to examine the relationship between sustainability and economic inclusivity in the context of sustainable development on the island of Sumatra, with the goal of fostering equitable growth across all segments of society—taking into account not only socioeconomic factors but also environmental sustainability on the island of Sumatra.

2. Literature Review

2.1. Theory of Economic Growth and Development

In general, development economics is a part of economics that evaluates the challenges faced by each developing country to find solutions in overcoming problems so that economic growth can take place better. In this case, it examines the mechanisms that affect the economy, social, and institutions, both government and private. To achieve notable advancements in the

well-being and living conditions of the population. In addition, economic development functions as an optimization and increases the use of limited resources for the survival of the community. Therefore, the development economy emphasizes the importance of the government's role in designing an integrated economy with the support of various parties both domestically and abroad.

According to Mankiw (2009), Economic growth functions as a barometric indicator of a nation's developmental performance and provides a strategic orientation for subsequent policy formulation. A country is considered to experience a growth rate if its income and output increase nationally. The measurement of economic growth is determined through Gross Domestic Product (GDP) which is seen in GDP based on GDP on the basis of Prevailing Prices (Simanungkalit, 2020). Over a prolonged period, per capita output exhibits an upward trajectory. As a fundamental condition for both developmental implementation and the attainment of collective well-being, sustainable economic growth assumes a position of critical necessity.

2.2. Inclusive Economic Development Index (IPEI)

Inclusive economic growth is characterized by its intersectoral nature and its labor-intensive attributes. Therefore, inclusive growth is also referred to as growth that builds various economic sectors which in this case involves various economic frameworks or layers. The next focus is on the results of the growth process. In this context, inclusive growth has principles that support society. In other words, in terms of the results achieved, inclusive economic growth is defined as growth that has the capacity to uplift marginalized groups in the economy (Krisandi et al., 2024). Based on the considerations of these two focuses, inclusive economic growth can be described as a fair and equitable growth of infrastructure and the provision of public goods between each region and at the same time lowering the level of groups that have no influence from the gains of economic growth. The Inclusive Economic Development Index is determined based on 21 indicators and is divided into three interconnected pillars, namely economic growth and development, poverty reduction and income equity, as well as the expansion of access and opportunity.

2.3. Government Expenditure

Keynesian theory leans more toward fiscal policy because, through such policies, the government can influence the economy by allocating funds to projects that generate labor absorption opportunities. In practice, when resources have not been fully utilized, in Keynes' view, government intervention is a necessity where economic conditions have problems and challenges in the process. Therefore, the government has control and responsibility over economic conditions so that it runs according to the direction of policies and circumstances at that time.

2.4. Investment

Harrod-Domar theory strengthens earlier economic statements by synthesizing neoclassical and Keynesian perspectives. The Harrod-Domar growth framework posits that capital accumulation exerts a significant influence on economic growth through two interrelated channels: increasing the economy's productive capacity for goods and services, and simultaneously boosting aggregate demand. Capital formation, therefore, constitutes expenditure with dual macroeconomic functions. Under the condition that a certain quantum of capital investment takes place within a discrete time interval, the economy becomes capable of generating a greater output volume in the following period. Labor contributes to this

process, most notably via enhancements in labor productivity that arise as a favorable reaction to technological advancement (Wahed et al., 2021).

2.5. Human Development Index

The Human Development Index (HDI) is an index that measures the standard of living of humans as seen through the overall life expectancy, literacy level, education, and quality of life. From this, HDI describes the level at which people can take advantage of the results of development as seen from income, health, education and others. The concept of human development emerged as a solution to overcome shortcomings or problems in development by using a complex and comprehensive approach to development. The existence of human development does not only assess financial aspects, but also makes health and education important considerations.

2.6. Environmental quality index

The theory is used as a basis for environmental supervision and as a reference for the government in formulating policies related to environmental development. According to Kuznets' theory, when a country experiences low incomes, the main attention of the government tends to be on efforts to increase income through production and investment, so the environmental aspect is often overlooked. Consequently, the level of pollution and damage to the environment will increase in the early stages of growth, but will decrease as economic growth continues. It can be said that increasing economic growth will have an impact on the decline in environmental quality (Hidayati & Zakianis, 2022) which identifies significant negative impacts on environmental quality.

2.7. Previous Research

Purba et al. (2023) interrogate the determinants of inclusive economic growth in Indonesia, ascertaining that per capita income (PDI), the Human Development Index (HDI), and government expenditure each exert a salutary and statistically consequential bearing upon inclusive growth. Their findings underscore the centrality of human capital cultivation and fiscal intercession as complementary catalysts of equitable economic expansion, furnishing an empirical substratum for the present study's incorporation of both HDI and government social assistance expenditure as principal independent variables.

Herdiyati and Ismail (2022) scrutinise the respective contributions of government disbursements and investment in propelling inclusive economic growth, adjudicating that solely government expenditure retains a salient and affirmative bearing upon inclusive growth, whilst investment yields no statistically discernible effect. This finding introduces a consequential nuance pertaining to the differential efficacy of fiscal and investment variables, and proffers a substantive comparative referent against which the empirical outcomes yielded within the present study's Sumatran provincial purview may be judiciously appraised.

Soleh et al. (2025), in a study titled "Inclusive Growth in Indonesia: An Environmental Sustainability," examine the factors driving environmental sustainability in relation to inclusive economic growth, employing the Poverty-Equivalent Growth Rate (PEGR) as the primary measurement framework. Interrogating data traversing the 2001–2022 interval, the study adjudicates that Indonesia's economic growth over this period was devoid of inclusivity, insofar as the elevated rates of economic expansion recorded were not commensurately accompanied by sufficient environmental sustainability, with burgeoning demographic growth and intensifying economic activities exerting a deleterious bearing upon ecological integrity. These findings accentuate the imperative of assimilating environmental sustainability into the corpus of growth policy, directly undergirding the present study's

incorporation of the Environmental Quality Index (IKLH) as a proxy variable for sustainable development.

3. Methods

A panel data regression framework, combining time-series and cross-sectional observations, constitutes the methodological bedrock of the present inquiry. The temporal dimension encompasses the 2019–2023 interval, whilst the cross-sectional stratum comprises ten provinces dispersed across the Sumatran archipelago. All data were sourced from authoritative governmental repositories, encompassing the Central Statistics Agency (BPS), the Ministry of Finance, and cognate institutional bodies. With respect to variable-specific provenance, government expenditure data were procured from the Directorate General of Fiscal Balance (DJPK) of the Ministry of Finance; domestic investment (PMDN) data were furnished by the Ministry of Investment; whilst the Human Development Index (HDI) and land cover index data were extracted from the Central Statistics Agency (BPS).

3.1. Analysis Method

In accordance with the stages of the oecd, it is to use data transformation on the variables used using the min-max normalization method, so that the data collected has the same level of comparison with the variables used in the study (Pratiwi & Kurniasari, 2023).

$$X' = 10 \left[\frac{X - X_{(min)}}{X_{(max)} - X_{(min)}} \right]$$

$$X'' = -10 \left[\frac{X - X_{(min)}}{X_{(min)} - X_{(min)}} \right] + 10$$

Formula for finding an Inclusive Growth Index:

$$IGI = \sum_{i=1}^n Z_{ij}$$

Description :

- X' : the value of the normalization result of the min-max
- X'' : the value of the normalization result of the min-max
- Min : minimum value of from observation data
- Max : maximal observed data value
- Σ : the total sum of (inequality and economy)
- Z_{ij} : total value of the index calculation

According to Sulaiman (2020), quantitative analysis is carried out by processing data using statistical tools, including inferential and descriptive statistics. Aims to provide a scientific overview and conclusion of data and information about the phenomenon being studied. The tool used to identify processed data is used software software or the Eviews 9 application. The panel data regression model as stated by Sugiyono (2016) is as follows:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \epsilon_{it}$$

Where each variable is filled in using the following ratio:

$$IPEI_{it} = a + \beta_1 PP_{it} + \beta_2 PMDN_{it} + \beta_3 IPM_{it} + \beta_4 IKLH_{it} + e$$

Where:

- IPEI (Y) : Inclusive Economic Growth Index
- $\beta_0, \beta_1, \beta_2, \beta_3$: Independent Variable Regression Coefficient
- PP : Government Expenditure
- PMDN : Domestic Investment
- IPM : Human Development Index
- IKLH : Environmental Quality Index
- e : An Error or Error
- i : Number of Observations

Common Effect Model (CEM) equations:

$$y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \dots + \beta_k X_{kit} + e_{it}$$

Fixed Effect Model (FEM) model configuration:

$$y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \dots + \beta_k X_{kit} + \varepsilon_{it}$$

Random Effect Model (REM) equation form:

$$y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \dots + \beta_k X_{kit} + \mu_{it}$$

Before proceeding with panel data estimation, a model selection procedure constitutes an essential initial phase. The determination of the most suitable specification is preceded by a significance test applied to the chosen estimation method. For the purpose of selecting a well-specified model, a battery of three specification tests is necessary: the Chow Test, the Hausman Test, and the Lagrange Multiplier Test, each contributing to the identification of the most appropriate estimator.

3.2. Classic Assumption Test

Determining whether the estimates derived from panel data regression satisfy the BLUE (Best Linear Unbiased Estimator) properties necessitates the implementation of classical assumption tests. That said, the panel data methodology does not demand exhaustive application of every classical diagnostic. The constituent elements of classical assumption testing include the following.

3.2.1. Normality Test

Employed as a diagnostic procedure, the normality test evaluates whether the data within a regression model are normally distributed. Normal distributions are required for statistical estimation and testing such as t-tests and f-tests, can produce valid conclusions, typically, tests performed are usually done using methods such as Kolmogorov-Smirnov and Shapiro-Wilk, or by looking at normal probability plots and histograms.

3.2.2. Multicollinearity Test

It serves to identify the relationship between independent variables in regression. Regression models that are free from multicollinearity are the optimal model to use. To identify the presence of multicollinearity, it can be analyzed through a correlation matrix between independent variables.

3.2.3. Heteroscedasticity Test

The heteroscedasticity test is administered with the objective of ascertaining whether discernible disparities in variance and residual magnitudes subsist within the regression model across designated observational intervals. If the variance and residual remain the same from one period to the next, then there is homogeneity, and if there is a difference it is called heterogeneity.

3.3. Hypothesis Test

- 1) To assess whether the set of independent variables collectively affects the dependent variable, the F-test (also referred to as the simultaneous test) is utilized. A predetermined significance level of 5 percent is adopted for the alpha probability. When the computed probability value lies beneath this 5 percent criterion, the model is considered valid, reflecting a meaningful simultaneous contribution of the independent variables. This principle holds consistently regardless of the specific application.
- 2) To ascertain whether each independent variable autonomously exerts a statistically consequential bearing upon the dependent variable, the t-test (partial estimation) is deployed. The adjudicatory criterion is predicated upon a juxtaposition between the computed probability value and the stipulated alpha threshold of 0.05. A probability value falling beneath this prescribed demarcation warrants the acceptance of the model, thereby corroborating that the independent variable in question manifests a significant partial influence upon the dependent variable.

4. Results and Discussion

4.1. Research Results

Using a panel data regression framework which merges time-series data (2019–2013) with cross-sectional data (ten provinces on the island of Sumatra) this section analyzes the simultaneous and partial effects of selected determinants on inclusive economic growth. The determinants include government spending on social assistance, domestic investment (PMDN), and sustainable development proxies (HDI and IKLH). The inclusive economic growth index serves as the dependent variable, while government expenditure, social spending, PMDN, HDI, and IKLH function as independent variables. Model specification is guided by a three-stage selection process to identify the best-performing estimation model within the panel data toolkit, consisting sequentially of the Chow Test, the Hausman Test, and the Lagrange Multiplier (LM) Test. The following outlines each stage of the testing procedure.

Table 1. Chow Test Results

Redundant Fixed Effects Tests			
Equation: Untitled			
Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.488602	(9,35)	0.1906
Cross-section Chi-square	15.880826	9	0.0694

Source: Data Processed

According to the Chow test estimation results presented in Table 1, the chi-square probability value falls beneath the stipulated alpha demarcation, whereupon the Fixed Effects Model (FEM) is adjudicated as the preferable specification over the Common Effect Model

(CEM). The ensuing analytical stage necessitates a supplementary diagnostic procedure to juxtapose the Fixed Effects Model (FEM) against the Random Effects Model (REM).

Table 2. Hausman Test Results

Correlated Random Effects - Hausman Test			
Equation: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2.065163	4	0.7238

Source: Data Processed

As documented in Table 2, the estimated probability value surpasses the conventional significance demarcation of 0.05, whereupon the Random Effects Model (REM) is adjudicated as the preferable specification over the Fixed Effects Model (FEM). The analytical trajectory subsequently advances to the Lagrange Multiplier (LM) Test, a diagnostic procedure instituted to ascertain the superior specification between the Random Effects Model (REM) and the Common Effect Model (CEM).

Table 3. Langrange Multiplier Test Results

Lagrange Multiplier Tests for Random Effects			
Null hypotheses: No effects			
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives			
	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	0.526959 (0.4679)	25.24495 (0.0000)	25.77191 (0.0000)
Honda	0.725920 (0.2339)	5.024436 (0.0000)	4.066115 (0.0000)
King-Wu	0.725920 (0.2339)	5.024436 (0.0000)	4.583251 (0.0000)
Standardized Honda	1.400430 (0.0807)	6.500363 (0.0000)	2.206943 (0.0137)
Standardized King-Wu	1.400430 (0.0807)	6.500363 (0.0000)	3.038822 (0.0012)
Gourieroux, et al.	--	--	25.77191 (0.0000)

Source: Data Processed

According to the results estimated in Table 3, the Breusch-Pagan (BP) test yields a probability value that surpasses the 0.05 significance level when evaluated against the stated hypothesis. Consequently, the Random Effects Model (REM) is identified as the most appropriate specification. The analytical process can therefore continue with the following battery of REM estimation tests. The results of the Random Effects Model (REM) estimation are presented in Table 4, which reports the regression coefficients, standard errors, t-statistics, and probability values for each independent variable alongside the overall model fit statistics.

Table 4. Regression Results of Panel Random Effect Model (REM) Data

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.415753	7.195868	0.752620	0.4557
LOG(PPBS)	-0.061600	0.054833	-1.123404	0.2674
LOG(PMDN)	0.010195	0.067919	0.150110	0.8814
IPM	0.001454	0.000363	4.009287	0.0002
LOG(IKLH)	-1.048708	0.894791	-1.172015	0.2475
Effects Specification				
			S.D.	Rho
Cross-section random			0.136283	0.1664
Idiosyncratic random			0.305018	0.8336
Weighted Statistics				
R-squared	0.315253	Mean dependent var	4.313879	
Adjusted R-squared	0.253004	S.D. dependent var	0.370670	
S.E. of regression	0.298182	Sum squared resid	3.912159	
F-statistic	5.064336	Durbin-Watson stat	2.039992	
Prob(F-statistic)	0.001911			

Source: Data Processed

The results obtained from the panel data regression analysis, conducted within the framework of the Random Effects Model (REM), may be elucidated in the subsequent manner. $IPEI = 5.415755342728 - 0.061599733446669LOG(PPBS) + 0.0101952528LOG(PMDN) + 0.00145442308714IPM - 1.0487084581LOG(IKLH)$.

1. The constant value of 5,415 means that there are independent variables of Government Expenditure on Social Spending, PMDN, HDI and IKLH. Then the value of the dependent variable of inclusive economist growth will increase by 5,415.
2. The value of the variable coefficient of government expenditure on social assistance expenditure (PPBS) (X_1) is -0.061, if the variable value of government expenditure on social spending increases by one percent, then the variable of inclusive economic growth will decrease by 0.061.
3. The value of the coefficient of the domestic investment variable (PMDN) (X_2) is 0.010, if the PMDN variable increases by 1 percent, the inclusive economic growth variable will increase by 0.010.
4. The value of the human development ink variable (HDI) (X_3) is 0.0014, if the HDI variable increases by 1 percent, the inclusive economic growth variable will increase by 0.0014.
5. The value of the environmental quality index variable (IKLH) (X_4) is -1,048, if the value of IKLH has increased by 1 percent, then the inclusive economic variable will decrease by 1,048.

4.1.1. Classic Assumption Test

1) Normality Test

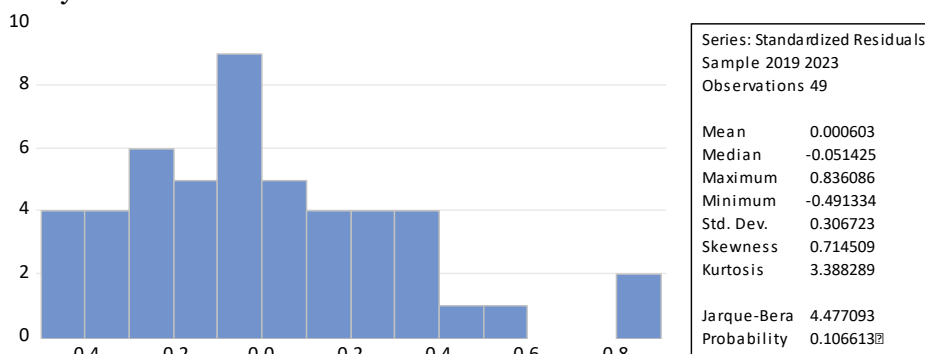


Figure 4. Normality Test Results

The normality test output displayed in Figure 4 yields a probability value greater than the 0.05 (0.106613 > 0.05) significance criterion. This finding leads to the failure to reject the null hypothesis of normality, thereby confirming that the data conform to a Gaussian distribution.

2) Multicollinearity Test Results

Table 5. Multicollinearity Test Results

	PPBS	PMDN	IPM	IKLH
PPBS	1.000000	0.342264	0.048317	0.265183
PMDN	0.342264	1.000000	0.104966	-0.094530
IPM	0.048317	0.104966	1.000000	0.446251
IKLH	0.265183	-0.094530	0.446251	1.000000

The correlation of X < 0.8, then there is no problem of Multicollinearity
 The correlation of X > 0.8, then there is a problem of Multicollinearity

The pairwise correlation matrix presented in Table 5 reveals no evidence of multicollinearity among the explanatory variables, thus affirming that the independent variables do not exhibit linear dependence.

3) Heteroscedasticity Test

Table 6. Heteroscedasticity Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.147218	1.648841	0.089286	0.9293
LOG(PPBS)	-0.004915	0.010513	-0.467482	0.6425
LOG(PMDN)	-0.006148	0.014323	-0.429242	0.6698
IPM	-1.02E-05	7.06E-05	-0.145081	0.8853
LOG(IKLH)	0.009936	0.207169	0.047961	0.9620

Source: Data Processed

To ascertain whether variances and residuals within the regression model exhibit systematic variation across the observation period, a heteroscedasticity diagnostic is employed (see Table 6). The Glejser test serves as the decision-making instrument. According to the criteria governing the Glejser heteroscedasticity test, a probability value exceeding the 0.05 threshold indicates the absence of heteroscedasticity, whereas a probability value falling below $\alpha=0.05$ signals its presence.

4.1.2. Hypothesis Test

Table 7. F Test Results

R-squared	0.315253	Mean dependent var	4.313879
Adjusted R-squared	0.253004	S.D. dependent var	0.370670
S.E. of regression	0.298182	Sum squared resid	3.912159
F-statistic	5.064336	Durbin-Watson stat	2.039992
Prob(F-statistic)	0.001911		

Source: Data Processed

Based on the F-test results presented in Table 7, the F-statistic value of 5.064336 exceeds the F-table value of 2.574 with a probability of 0.0019 < 0.05, indicating that the variables of government social assistance expenditure, domestic investment (PMDN), Human Development Index (HDI), and Environmental Quality Index (IKLH) jointly exert a significant

influence on inclusive economic growth across the provinces of Sumatra, thereby rejecting H_0 and accepting H_a . Next, the results of the partial t-test are reported in Table 8.

Table 8. T Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.415753	7.195868	0.752620	0.4557
LOG(PPBS)	-0.061600	0.054833	-1.123404	0.2674
LOG(PMDN)	0.010195	0.067919	0.150110	0.8814
IPM	0.001454	0.000363	4.009287	0.0002
LOG(IKLH)	-1.048708	0.894791	-1.172015	0.2475

Source: Data Processed

1. The PPBS variable (X_1) produces a t-value of -1.123404, falling beneath the t-table threshold of 2.010635 with a probability of 0.2674 surpassing the 0.05 demarcation, thereby adjudicating that government social assistance expenditure exerts no discernible bearing upon inclusive economic growth across Sumatra's provinces.
2. The PMDN variable (X_2) yields a t-value of 0.150110, likewise subceeding the t-table threshold of 2.010635 with a probability of 0.8814 exceeding the stipulated 0.05 boundary, corroborating that domestic investment exerts no statistically consequential influence upon inclusive economic growth across the region.
3. The HDI variable (X_3) produces a t-value of 4.009287, surpassing the t-table threshold of 2.010635 with a probability of 0.0002 falling beneath the 0.05 demarcation, substantiating that the Human Development Index exerts a positive and statistically significant bearing upon inclusive economic growth across the provinces under scrutiny.
4. The IKLH variable (X_4) yields a t-value of -1.172015, subceeding the t-table threshold of 2.010635 with a probability of 0.2475 surpassing the stipulated 0.05 boundary, thereby ascertaining that the Environmental Quality Index exerts no appreciable influence upon inclusive economic growth across Sumatra's provinces.

4.2. Discussion

4.2.1. The Influence of Government Expenditure on Social Assistance on Inclusive Economic Growth

The government social assistance expenditure variable yields no discernible bearing upon inclusive economic growth, as evidenced by a probability value of 0.2674 surpassing the stipulated 0.05 demarcation. The regression coefficient corroborates this adjudication, registering a magnitude of -0.061600 that further substantiates the absence of any statistically consequential influence upon inclusive economic growth. These empirical findings stand in contradistinction to Todaro's theoretical postulation, which contends that capital accumulation constitutes a consequential catalyst of economic growth, a proposition within which budgetary allocations are subsumed as a constituent element of the broader accumulation framework. Government spending which is included in Social Assistance, Education, Health and other expenditures. In this case, high social assistance spending is not necessarily able to meet inclusive and equitable economic growth. Social assistance spending is sometimes more likely to go in a direction that is not on target. The increase in inclusive economic growth depends on the condition of a country, related to how to manage the budget optimally so that it can be affordable to all levels of society. This is in line with research conducted by Setiawan (2024) which has the same research results where social assistance spending has no effect on inclusive economic growth and community welfare.

4.2.2. The Influence of Domestic Investment (PMDN) on Inclusive Economic Growth

The Domestic Investment (PMDN) variable yields a statistically inconsequential bearing upon inclusive economic growth, as corroborated by a probability value of 0.9413 surpassing the stipulated 0.05 demarcation. The regression coefficient further substantiates this adjudication, registering a magnitude of 0.010195 that denotes an imperceptible and statistically negligible association with inclusive economic growth. One plausible explanatory factor resides in the observation that prevailing investment flows remain disproportionately concentrated within circumscribed sectoral domains, thereby precluding the comprehensive and equitable diffusion of investment benefits across the broader economic landscape. This empirical finding stands in partial contradistinction to neoclassical theoretical precepts, which postulate that capital accumulation and investment are inextricably intertwined with and bear a consequential influence upon the trajectory of economic growth. In this case, if capital increases, it will have an impact on the increase in real value and vice versa, but if the capital owned is increasingly scarce, this can affect the level of economic growth and the lack of investment channeled as a whole. A similar study that has the same opinion was conducted by Basri et al. (2024) which in its research results has no effect on inclusive economic growth. Adeosun et al. (2022) also show that Domestic Investment has a significant effect on Inclusive economic growth.

4.2.3. The Influence of Human Development Index (HDI) on the Inclusive Economic Growth Index

The Human Development Index (HDI) variable manifests a salutary and statistically consequential bearing upon inclusive economic growth, as corroborated by a probability value of 0.0002 falling beneath the stipulated 0.05 demarcation. The regression coefficient further substantiates this adjudication, registering a positive magnitude of 0.001454 that denotes an affirmative and discernible association with inclusive economic growth. The prevailing HDI stratum serves as a reflection of ameliorated living conditions, encompassing dignified standards of subsistence, educational attainment, and healthcare accessibility. The salience of HDI resides in its demonstrable contribution to the augmentation of workforce productivity, engendered through the progressive cultivation of a more erudite and competent human capital endowment across the region. So that overall HDI encourages inclusive economic growth and has an impact and benefits for the entire community. The results of similar research by Martin (2023), Kamran et al. (2023), and Luthan et al. (2025) state that the Human Development Index has a positive and significant influence on inclusive economic growth.

4.2.4. The Influence of Sustainable Development on Inclusive Economic Growth (Environmental Quality Index)

The Environmental Quality Index (IKLH) variable yields no discernible bearing upon inclusive economic growth across Sumatra's provinces, as evidenced by a probability value of 0.2475 surpassing the stipulated 0.05 demarcation. The regression coefficient further corroborates this adjudication, registering a negative magnitude of -1.048708 that denotes a divergent and inversely oriented association between the environmental quality index and inclusive economic growth. This empirical disposition finds theoretical resonance within the Kuznets framework, which postulates that when the income generated by a nation subsists at comparatively modest levels, predominant attention is characteristically channelled toward the augmentation of income through intensified production and investment endeavours, the pursuit of which inevitably engenders deleterious ramifications upon environmental integrity

and ecological sustainability. However, if economic growth has reached a certain point, the quality of the environment will go hand in hand with economic development. Similar research results (Claudia et al., 2024) that the quality of the environment does not have a significant influence on inclusive and equitable economic growth.

5. Conclusion

Based on the empirical findings and subsequent discussion, several conclusions emerge. The average rate of inclusive growth observed across the island of Sumatra during the observation period falls within the moderate category. Government expenditure allocated to social assistance exhibits no statistically significant effect on the inclusive economic growth index, with a negative coefficient indicating that an increase in such spending is associated with a decline in the index. Domestic investment (PMDN) likewise manifests no statistically consequential bearing upon inclusive economic growth, albeit its affirmative coefficient intimates that an appreciable escalation in domestic investment would commensurately correspond to an incremental augmentation in inclusive growth. The Human Development Index (HDI) exerts a salutary and statistically significant influence upon the inclusive economic growth index, substantiating its primacy as the most consequential determinant within the analytical framework. Conversely, the Environmental Quality Index (IKLH) yields no discernible impact upon inclusive economic growth, with its negative coefficient insinuating that ameliorations in environmental quality are paradoxically accompanied by a contraction in the inclusive growth index across Sumatra's provinces.

A consequential recommendation proffered to governmental authorities pertains to the formulation and institutionalisation of longitudinal plans and programmes directed toward the populace, encompassing both direct and indirect modalities of intervention. The overarching imperative of such initiatives resides in the amelioration of educational quality and human resource endowments, alongside the augmentation of productivity and the furtherance of inclusive and equitable economic expansion across the region. With respect to prospective scholarly endeavours, it is earnestly anticipated that subsequent investigations will assimilate supplementary indicators bearing demonstrable relevance to inclusive economic growth, thereby enriching the analytical purview of future inquiry. Furthermore, it is hoped that ensuing research will broaden both the temporal and geographical scope of investigation whilst deploying methodologically diverse approaches, so as to engender more comprehensive and substantively advanced contributions to the evolving corpus of knowledge pertaining to inclusive economic development.

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