

Realizing Inclusive Economic Growth: Analysis of the Determinants of Income and Poverty Reduction on the Islands of Sumatra and Java

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ABSTRACT

Inclusive growth involves social and economic dimensions, emphasizing participation from all societal segments in development processes and outcomes. This study used panel data comprising time series (2017–2022) and cross sections from 10 provinces in Sumatra and 6 in Java, analyzed using the Ordinary Least Square (OLS) method. The results revealed that 1% significant negative inflation reduced inclusive growth by 0.064%, 1 kilometer of good road infrastructure increased it by 0.061%, and a 1-person increase in the workforce boosted it by 0.065%. Regarding income inclusiveness and poverty reduction, a 1-million-rupiah rise in the agricultural sector's GRDP increased inclusive growth by 0.14%, an additional person in the population contributed 0.99%, and a 1% rise in financial inclusion enhanced it by 0.07%. In Sumatra, the agricultural sector was pivotal for inclusive growth, while in Java, population density was more significant. Across both regions, road infrastructure, workforce, and financial inclusion collectively drove connectivity, productivity, and poverty reduction. This research provides a vital framework for developing area-specific policies that promote inclusive development.

Keywords: Economy, Inclusive Growth, Income, Poverty

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INTRODUCTION

The perspectives regarding the definition of 'inclusive growth' includes various social and economic dimensions. One approach to inclusive growth is broad and also includes non-income dimensions. a more inclusive perspective is based on the idea of participation of all segments of society both in the process and in the results (Aggarwal, 2023). Inclusive development is an alternative development model that has specifically emerged as a response to various negative impacts of development policies, which are considered too focused on economic growth and more in favor of fulfilling the interests of elite groups and at the same time eliminating the bottom-up. Level items such as poor, marginalized and minority groups. The impacts in question include decreasing the quality of human development, increasing poverty rates, and widening social disparities (Yulian, 2002). The results are felt in countries that have changed the economic system. Inclusive economic growth can be seen from the level of people's real income per capita increasing, reducing the poverty rate, increasingly varied business fields, and reducing the unemployment rate (Garwi, 2023). Inclusive growth is growth that can increase community participation, so that all parties receive the same benefits. Inclusive growth provides opportunities for all levels of society to participate in economic activities which are followed by three indicators, namely reducing social inequality and poverty, and increasing labor absorption (Klasen, 2017).

According to Prasetyantoko (2012) inclusive economic development is development for everyone, no matter their background or differences. This is in line with Ali (2007), who stated that inclusive growth is growth that not only creates new economic opportunities, but also ensures equal opportunities for all levels of society, especially the poor. In Indonesia, inclusive growth is measured by the National Development Planning Agency (BAPPENAS). which divides it into 3 main pillars, namely Economic Growth and Development, Income Equity and Poverty Reduction and Expanding Access and Opportunities. The following is the development of the 3 pillars of inclusive growth index on the 2 most advanced and developing islands in Indonesia between the provinces on the islands of Java and Sumatra:

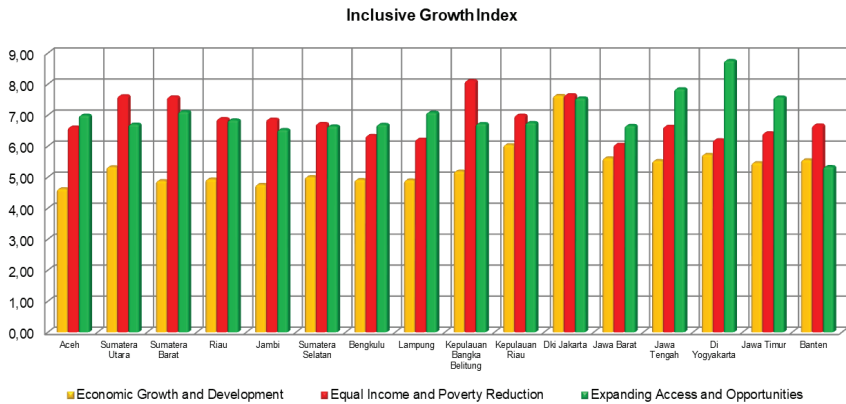


Figure 1: Development of Inclusive Growth in the Provinces of Java and Sumatra in 2017-2021

Source: National Development Planning Agency, composite index of inclusiveness, 2023

The graph above shows the state of the 3 dimensions of inclusive economic growth where on the Economic Growth and Development side the three regions were the highest: DKI Jakarta (7.63): has advanced infrastructure, access to large capital, and is a center of significant economic activity. Riau Islands (6.04): Dynamic industrial area, close to Singapore, strong foreign investment, and a developing manufacturing industry. In Yogyakarta (5.73): The education and tourism sectors were strong, driving local economic growth through services, tourism and education. The three lowest regions: Aceh (4.62): Natural resources were abundant, but challenges with infrastructure and access to markets limited economic growth. Jambi (4.76): The agrarian economy faced the challenges of economic diversification and development of modern infrastructure. West Sumatra (4.88): Challenges in economic modernization and infrastructure development.

Equal Income and Poverty Reduction The three highest regions: Bangka Belitung Islands (8.11): This province had effective social and economic programs in reducing poverty and distributing income. North Sumatra (7.62): Diversified economy and initiatives to improve community welfare. West Sumatra (7.58): Effective social and economic programs reduced income inequality. Three lowest regions: Lampung (6.22): Challenges in reducing poverty and distributing income. In Yogyakarta (6.20): Challenges in income distribution and poverty reduction despite a

strong education sector. West Java (6.05): Significant economic disparities and challenges in reducing poverty in a region with a large population.

Expanding Access and Opportunities Three highest regions: In Yogyakarta (8.76): Well-known universities and strong educational culture, providing broad access to educational and career opportunities. Central Java (7.85): Initiatives to increase access to education, health and economic opportunities. DKI Jakarta (7.55): Economic and government center with broad access to various opportunities in the education, employment and public services sectors. The three lowest regions: Banten (5.34): Challenges of equal distribution of infrastructure and public services, hindering access to opportunities. Jambi (6.53): Development of access to education, health and economic opportunities was still in the development stage. South Sumatra (6.64): Challenges in providing equitable access to various opportunities for the population.

Indonesia itself has actually thought that the economic growth paradigm in the future will not only focus on economic growth, but must pay attention to inclusive development. A development approach that is too growth-oriented has resulted in social exclusion and three major crises, namely: social inequality, poverty and environmental damage, so that a new development paradigm is needed that is more inclusive (Sri Hartati, 2021). The variables used to analyze inclusive growth vary greatly. However, if identified, most of the research used the variables Inflation, Agricultural Sector GRDP, Financial Inclusion, Economic Infrastructure, Fiscal Policy, Human Capital, Land Area, and Labor. Inflation is a situation where prices in general continue to increase (Feather, 1982). One of the variable indicators that had been studied to influence inclusive growth was inflation, which accounted for most of the negative impact of inflation on inclusive economic growth. Negative relationship using endogenous growth models to show how inflation harmed resource allocation and economic growth and that reducing inflation is necessary, but not sufficient to achieve sustainable growth or inclusive growth (Kırışanlı, 2021). There are complex and context-specific relationships between economic factors and poverty. Although lower inflation and lower unemployment can help reduce poverty, it is proven that the negative impact of inflation promotes sustainable development and makes economic growth inclusive, fair, and supported by focused policies (Paul, 2023).

Infrastructure is included in the basic inclusive formulation. It helps achieve the Sustainable Development Goals to reduce economic disparities, poverty levels and open unemployment as well as increase efficiency for a freer flow of goods and services, more attractive for inflows of foreign direct investment (Verico & Qibthiyyah, 2023). Infrastructure consistently shows good performance in these three dimensions of inclusiveness, although it is not immediately visible, the significant positive influence makes it important. Policy implications indicate the need to get the basics of infrastructure development pro-poor and making certain sectors more environmental friendly in an effort to increase inclusiveness (Diwakar, 2023).

Ramos et al. (2013), compiled an inclusive index for 43 developing countries with data from 1996-2006 based on Two indicators, namely: poverty (headcount ratio at US\$ 2 a day PPP), inequality (GINI). The reason is that the development of an inclusive growth framework can be measured from how the results of growth are distributed (poverty and inequality) and how growth changes opportunities for economic participation (employment). Labor is an important factor for inclusive development. Positive results have also been proven in research (Dinda, 2014; Qiu & Zhao, 2019) that the growth rate, Gini ratio, years of schooling, and labor ratio have a positive effect on inclusive economic growth, especially in developed countries. Income gaps, area ratios, density, wages and skills had a positive effect for migrant workers on urban inclusiveness. Meanwhile, sectorally economically (Kristyanto, 2015), The sector driving the realization of inclusive growth is the agricultural-based sector. The agricultural sector can become an inclusive sector that has a positive influence capable of spurring high economic growth while encouraging the expansion of labor absorption. The growth rate of the merchandise sector can reduce unemployment in rural areas in the short term. On the other hand, the growth rate of agriculture, oil, manufacturing and services increases unemployment in rural areas, but it is the non-agricultural manufacturing sector that can help accelerate inclusive growth and reduce poverty (Ezindu et al., 2021).

Inclusive growth and poverty alleviation must be in line and able to be driven evenly by a large population. It can become a development asset as a workforce, so the workforce must be managed well through inclusive and sustainable employment development (Atiyatna et al., 2023). For financial development to interact with complementary policies to promote inclusive

growth, a minimum threshold and positive influence for growth is required. Policies regarding the level of investment required for financial development to encourage growth and fairer income distribution are needed (Ofori et al., 2023). Inclusive growth rate of a province is influenced by the level of government spending, financial inclusion, investment, inflation and trade openness of the province. In particular, increasing government spending on education, financial inclusion, investment, and trade openness will increase inclusive growth by creating equal opportunities, encouraging economic growth, and improving poverty conditions (Az Zahra & Ajija, 2023).

It was important to conduct this research in Sumatra and Java because these two regions were centers of economic growth in Indonesia with diverse characteristics. Sumatra had great potential in the agricultural and natural resource sectors, but faced challenges in infrastructure and economic diversification. Meanwhile, Java with a high population density had a dominant industrial and service sector, but also faced issues of inequality and equity. This study provides insights into how factors such as inflation, road infrastructure, labor, agricultural sector, population density, and financial inclusion affect inclusive growth and poverty reduction. By understanding the role of these variables, data-driven policies can be designed to strengthen connectivity, increase productivity, and create inclusive development in these two strategic regions.

Based on the above background, this research focused on how inflation, road infrastructure, labor influenced inclusive economic growth and development (PIPP) and how economic growth in the agricultural sector, population density, financial inclusion influenced income inclusiveness and poverty reduction (PIPK).

LITERATURE REVIEW

The paradigm of sustainable economic growth prioritizes equality between levels of society in order to expand new economic opportunities (McKinley, 2010). Inclusive economic growth can be said to be a new approach in growth theories (Huang & Quibria, 2013). This is in accordance with the UNDP definition that inclusive economic growth is growth that increases community participation so that the benefits of growth are enjoyed by all

parties. Singh (2017) stated that inclusive economic growth is growth that is able to reduce inequality between the agricultural and non-agricultural sectors. Inclusive growth according to Ramos et al. (2013) was defined as economic growth that not only prioritized output growth as the final goal but also prioritized the impact of economic growth, namely increasing employment opportunities which can maximize participation of all levels of society in supporting economic growth (dimensional participation) so that it will have an impact on reducing levels of inequality and poverty (benefit sharing dimension).

McKinley (2010) and ADB developed a composite index as an indicator that described inclusive growth. The research was conducted in 6 countries, namely Bangladesh, Cambodia, India, Indonesia, the Philippines and Uzbekistan using data from 1990-2006. This inclusive index used indicators (a) growth, productive workforce, economic infrastructure, (b) poverty and income inequality (including gender equality), (c) human capability and (d) social protection. This composite index was based on a scoring method and weighing scheme. The score was made into 3 outcomes, namely unsatisfactory (<4), satisfactory (4-7), and very satisfactory (8-10). Anwar (2016), found that economic growth had not been inclusive. Research results showed that the phenomenon of inclusive growth in reducing poverty, reducing inequality and increasing employment was more common in Western Indonesia. Similar research was also conducted by Kusumaningrum and Yuhan (2019) using the composite index method. The study showed that there were no provinces in Indonesia that had a superior inclusive growth category. Most provinces in Indonesia reached the satisfactory category and there were still two provinces in the unsatisfactory category.

Zheng and Shen (2019) concluded that inclusive growth driven by domestic demand will increase labor market elasticity and workforce structure skills. Inclusive growth will be achieved through the growth of labor-intensive industries and improve the quality of the workforce (Felipe, 2012). Mallik and Chowdhury (2001) found a long-term relationship between inflation and inclusive economic growth and the increase in inflation must remain under government control. Gross Regional Domestic Income (GRDP), employment and increasing community income indirectly through the creation of conducive conditions so that a synergistic relationship between sectors can be formed (Isbah & Iyan, 2016). Financial

inclusion has been widely implemented in Indonesia and other countries. In Indonesia, previous research focused more on the influence of financial inclusion on economic growth (Anwar et al., 2016; Purwiyanta et al., 2020). Infrastructure and government spending had a positive and significant impact on Pakistan's inclusive growth from 1994 to 2017 in the short and long term (Anand et al. 2019).

The literature reveals that high inflation exacerbates inequality, with poorer populations having to reduce consumption during periods of inflation (Krysovatty, 2023). Studies such as those by Baldecci et al. (2008) highlighted a non-linear relationship between inflation and income inequality, suggesting that inequality minimized at an inflation rate of around six percent in the U.S., then increased beyond 13 percent. Financial inclusion also played a crucial role in promoting inclusive growth. It involved maximizing access to and use of financial services, thus reducing financial exclusion (Cámara & Tuesta, 2017; Balkytė & Tvaronavičienė, 2010). Definitions of financial inclusion vary based on socio-economic contexts, but it typically refers to ensuring that people and businesses have access to affordable financial services (Amini & Bianco, 2016).

Empirical studies on the contribution of agriculture to inclusive growth have shown mixed results. Besley and Burgess found that agriculture contributed minimally to poverty alleviation in India, while other studies, such as those by Dixit and Ghosh (2013) and Singh (2017), argued that agriculture played a critical role in poverty reduction in countries like Bangladesh and Vietnam. Timmer (2005) also attributed pro-poor growth in Indonesia to agricultural strategies. The workforce was another key factor influencing economic growth. Defined as individuals aged 15-64, the workforce is essential for production. Solow's theory suggests that the combination of labor and capital used in production determines output levels (Putri, 2018).

Additionally, infrastructure quality is linked to economic growth. Studies by Calderon and Servén (2004), Gibson and Olivia (2009), and others suggested that the quality of road and electricity infrastructure impacted economic performance in rural areas, particularly in Indonesia. There is a complex relationship between infrastructure and growth, as shown in the findings of Lall (1999), Roy et al. (2014), and Shi et al. (2017).

Lastly, research by Bravo-Ortega and Lederman (2005), and DFID (2004), emphasized how population density and productivity impacted poverty levels, indicating that increased productivity can reduce poverty through various mechanisms, such as job creation and changes in real income.

RESEARCH METHODOLOGY

Types of Research and Data Sources

This research took the form of a quantitative descriptive study and the data source used was secondary data. Secondary data is research obtained indirectly. This research analyzed the state of observations of 10 provinces on the island of Sumatra and 6 provinces on the island of Java. All data used in this research were time series data for the 2017-2022 period and cross section data. In the research methodology section, it is important to address the limitations of using secondary data, such as incomplete data, inaccuracies, or limited geographical and temporal coverage. To overcome this, data gaps can be filled using interpolation techniques, which estimate missing values based on existing patterns in the available data. This approach allows for a more comprehensive analysis without the need to collect new primary data. Additionally, the study focused only on two major islands of Indonesia—Java and Sumatra—excluding other regions like Kalimantan, Sulawesi, and Papua.

This limitation ensured a more focused and in-depth analysis, as Java and Sumatra are the most economically developed islands with more complete and reliable data, providing a clearer picture of the socio-economic dynamics in these regions. In this research, secondary data was obtained from official published websites such as: <https://www.bps.go.id/>, <https://inklusif.bappenas.go.id/index> and various websites publishing data in figures in various provinces.

Table 1: Variables, Units and Operational Definitions

No.	Variable	Symbol	Unit	Variable Operational Description
1	Inclusive Growth Index of Economic Growth and Development	PIPP	Percent/ Index (%)	An index that measures high economic growth is one of the absolute requirements for inclusive economic development. Economic growth describes economic activity or fulfilling daily needs in society. This index contains Economic Growth, employment opportunities and economic infrastructure. IPIP was measured in three groups. 1. Scale 1-3 is unsatisfactory 2. Scale 4-7 is satisfactory 3. Scale 8-10 is very satisfactory, (https://inklusif.bappenas.go.id/index).
2	Income Inclusive Growth and Poverty Reduction Index	PIPK	Percent/ Index (%)	Indexes that measure inclusive economic development must ensure economic equality across all levels of society, inequality in terms of income and gender. PIPK was measured in three groups. 1. Scale 1-3 is unsatisfactory 2. Scale 4-7 is satisfactory 3. Scale 8-10 is very satisfactory, (https://inklusif.bappenas.go.id/index).
3	Inflation	INF	Percent (%)	Inflation is the contribution of each commodity that experiences price fluctuations to inflation or deflation that occurs in a city or nationally. The magnitude of the index change (inflation/deflation) that occurs each month is the combined contribution of the types of goods/services that experienced price fluctuations in the month concerned.
4	Economic Growth in the Agriculture, Forestry and Fisheries Sectors	PEP	Percent (%)	The suggested value of the contribution of the growth of the Agriculture, Forestry and Fisheries Sector to the GRDP of a region.
5	Road infrastructure	INF_JLN	Kilo meters	The number of lengths of roads in good condition in each region is included in the feasible and good access categories.

No.	Variable	Symbol	Unit	Variable Operational Description
6	Inclusive Finance	KI	Index (%)	Financial inclusion or financial inclusion is the availability of access to various financial institutions, products and services in accordance with the needs and abilities of the community in order to improve community welfare. Financial inclusion in this study is expressed in the amount of household credit.
7	Population density	KP	Individu/km ²	Population density is a measure used to evaluate how dense or dense a human population is in a particular area. Population density is calculated by dividing the population of an area by the area of that area. Expressed in units such as individuals per square kilometer or individuals per square mile.
8	Labor	TK	Soul	The working age population is the population aged 15 years and over. Every person who is able to do work that produces goods and/or services that are useful for themselves or society in general. The working age population is the population aged 15 years and over.

Note: Ministry of National Development Planning/National Development Planning Agency

Panel Data Analysis Method

Selecting the Best Model for Panel Data

Basically there are four models used in panel data analysis, namely pooled least squares, pooling independent cross sections over times, least square dummy variables (fixed effects), and random effects. These three models can be explained with the following figure:

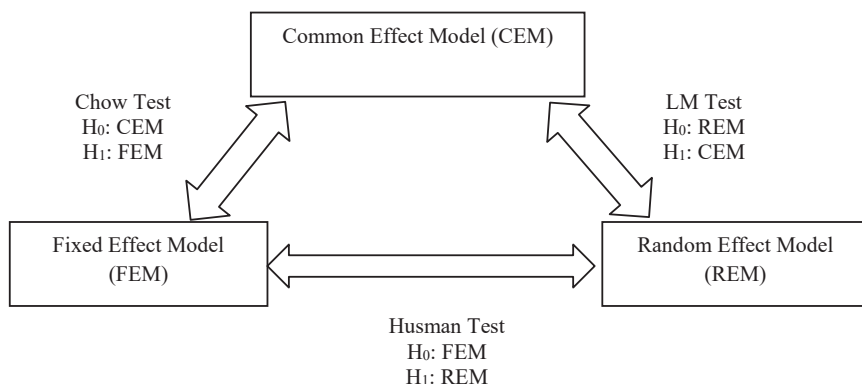


Figure 2: Selection of Panel Data Model

Source: Econometrics book, (Widarjono, 2009)

Pooled Least Square (PLS)

In this model it was assumed that all coefficients were constant across all places and time points. The general model form was as follows:

$$y_{it} = \alpha + X_{it}\beta + U_{it} \quad i=1,...,N \quad t=1,...,T,$$

Where i was country, company, etc. and t was time. The assumption of the model was that the intercepts were all the same and the slope of the coefficient of the variable X was identical for all places.

a) Pooling Cross Sections over Time

This model was a pooled least squares model by adding dummy variables. The model form was as follows:

$$y_{it} = \alpha + X_{it}\beta + D_{time} U_{it} \quad i=1,...,N \quad t=1,...,T,$$

D_{time} showed a time dummy variable which usually started from the second time sequence, for example the second year and the first year as the basis (α).

Chow Test / Fixed Effect

The Chow test was used to find out whether the panel data regression technique with fixed effects (FE) was better than the common effect (CE) panel data regression model by looking at the residual sum squares. This

approach was used to improve LSDV where a large unit cross section will not reduce the degrees of freedom. This fixed effects approach allowed for different intercepts between individuals, but the intercept for each individual did not vary over time. This approach was written with the following equation:

$$Y_{it} = \beta_{0i} + \beta_1 X_{1it} + \beta_2 X_{2it} + \dots + \beta_n X_{nit} + \mu_{1it}$$

Where β_{0i} was the intercept and β_1, β_2 are the slope. The difference in intercept in each cross section unit was carried out by adding subscript i. Even though the intercept differed between countries, the intercept for each country did not differ over time, which was called time invariant. To determine a better approach between Pooled Least Squared/PLS and Fixed Effect Model (FEM), the Chow Test was used with the following hypothesis:

H_0 : *Pooled Least Square (PLS)*

H_1 : *Fixed Effect Model (FEM)*

The basis for rejecting the hypothesis above was to compare the F-statistic calculation with the F-table. Comparison was used if the calculated F result was greater ($>$) than F table then H_0 was rejected, which meant the most appropriate model to use was the Fixed Effect Model. Likewise, if the calculated F was smaller ($<$) than the F table then H_0 was accepted with the model used being Pooled Least Square (Widarjono, 2009). The calculation of F Statistics was obtained from the Chow Test with the formula (Baltagi, 2005):

$$F_{count} = \frac{\frac{SSE_1 - SSE_2}{(n-1)}}{\frac{SSE_2}{(nt-n-k)}} \sim F_{\alpha}(N-1, NT - N - K)$$

Where $[SSE]_1$ was the Sum Square Error of the Pooled Least Squared model, $[SSE]_2$ was the Sum Square Error of the Fixed Effect Model, n was the number of country cross sections), nt was the number of cross sections multiplied by the number of time series, k was the number of variables free. Meanwhile, the F table was obtained from:

$$F\text{-table} = \{ : df(n-1, nt-n-k) \}$$

Where α is the level of significance used (alpha), n was the number of countries (cross section), nt was the number of cross sections times the number of time series, k was the number of independent variables.

Hausman Test / Random Effect

The Hausman test was based on the use of dummy variables in the Hausman method, following the chi-square statistical distribution with a df of k where k was the number of independent variables. If the Hausman statistical value was greater than the critical value then the correct model was the fixed effect model and vice versa. Mathematically, this test was written as follows:

$$W = (\beta_{fe} - \beta_{re})' [V(\beta_{fe}) - V(\beta_{re})]^{-1} (\beta_{fe} - \beta_{re}) \sim \chi^2(k)W$$

Estimate of the actual covariance matrix β_{fe} = estimator from FEM
 β_{re} = estimator from REM. The independent comparison was carried out within the following hypothesis framework: $H_0 : E(\tau_{xit}) = 0$; then the Random Effect Model (REM) was the right model, $H_1 : E(\tau_{xit}) \neq 0$; then the Fixed Effect Model (FEM) was the right model. The Hausman specification approach followed the Chi-Squared distribution.

Classical Assumption Testing

Multicollinearity Test

Detection of multicollinearity can be done by looking at the value of Variance – Inflating Factor (VIF) from the results of regression analysis. If the VIF value is > 10 then there are high multicollinearity symptoms (Widarjono, 2013). The speed of increasing variance or covariance can be seen by the Variance Inflation Factor (VIF), which is defined as:

$$VIF = \frac{1}{(1 - R^2)}$$

As R^2 approaches 1, VIF approaches infinity. This shows that as the range of collinearity increases, the variance of an estimator also increases and at a limit value can become infinity (Gujarati, 2010).

H_0 : $VIF > 10$, there is multicollinearity between independent variables

H_a : $VIF < 10$, there is no multicollinearity between independent variables

Heteroscedasticity Test

A model that is free from heteroscedasticity means that the variance of the error is constant (fixed) or can be said to be homoscedastic (Widarjono, 2013). The way to detect the presence of heteroscedasticity is the White test. The model is said to contain heteroscedasticity if the white statistic ($n \times R^2$) is greater than 2. Another way is to use the GLS Weight Cross-section method available in the EViews program output estimation. The value of Sum Square Resid (SSR) Weighted compared to Sum Square Resid (SSR) Unweighted. If $SSR \text{ weighted} < SSR \text{ Unweighted}$, it can be said that the model is free from heteroscedasticity problems.

Autocorrelation Test

One of the important assumptions in the OLS method related to the disturbance variable is that there is no relationship between one disturbance variable and another disturbance variable (Widarjono, 2013). While autocorrelation is a correlation between members of one observation with other observations at different times. In relation to the OLS method, autocorrelation is a correlation between one disturbance variable and another disturbance variable. So with autocorrelation, the OLS estimator does not produce the Best Linear Unbiased Estimator (BLUE) only the Linear Unbiased Estimator (LUE). There are several methods used to detect autocorrelation problems, namely the Durbin-Watson method, and the Breusch-Godfrey method.

Inclusive Growth Panel Data Estimation Model

The econometric model is used to analyze the influence of the Multiple Linear Regression (OLS) Model and Analysis Tool with panels. The analysis method used time series data from 2017-2022 and a cross section data consisting of 10 provinces on the island of Sumatra, 6 provinces on the island of Java, a total of 16 provinces. The regression model used in this research used 2 models. The first model explained the influence of all independent variables which are thought to influence Inclusive Economic Growth and Economic Development (PIPP). The second model explained the influence of all independent variables which were thought to influence Income Inclusive Economic Growth and Poverty Reduction (PIPK). Panel data regression model with the following equation with the initial model was used:

1. Growth Model of Inclusive Economic Growth Index Economic Growth and Development (PIPP):

$$PIPP_{it} = \beta_0 + \beta_1 INF_{it} + \beta_2 INF_JLN_{it} + \beta_3 TK_{it} + \varepsilon_{it}$$

2. Growth Model of Income Inclusive Economic Growth Index and Poverty Reduction (PIPK):

$$PIPP_{it} = \beta_0 + \beta_4 PEP_{it} + \beta_5 KP_{it} + \beta_3 KI_{it} + \varepsilon_{it}$$

Description:

PIPP	=	Inclusive Growth Economic Growth and Development
PIPK	=	Inclusive Income Growth and Poverty Reduction
INF	=	Inflation
INF_JLN	=	Road infrastructure
TK	=	Labour
PEP	=	Economic Growth in the Agriculture, Forestry and Fisheries Sectors
KP	=	Population density
KI	=	Inclusive Finance
i	=	Observation of 16 Provinces (Cross section)
t	=	Research period 2017-2022 (time series)
β_0	=	Intercept Constant Coefficient which is a scalar
$\beta_1, \beta_2, \beta_3$	=	Regression coefficient or slope slope of each variable
$\beta_4, \beta_5, \beta_6$	=	for inclusive economic growth provinces
ε_{it}	=	Standard error in mathematical models, (Error Term)

RESULTS AND DISCUSSION

Large Multiplier Test Panel Data

The panel data procedure was carried out to find out the best model to be used in analyzing whether the Pooled Least Square (PLS). The fixed effect or Random Effect Model (REM) model was tested using the Chow Test and Hausman Test. The following is a brief summary of the best model in panel data regression in 16 provinces for the 2017-2022 time series:

Table 2: Testing Panel Data Model Estimation

Inclusive Growth Economic Growth and Development					
No.	Test Summary	Chi-Sq. Statistic	Chi-Sq. df	Prob.	Conclusion
1	Fix Effect Model	1769.28404	15.77	0.0000	H0 rejected
2	Random Effect Model	6.60514	3	0.0856	Ha accepted
Inclusive Income Growth and Poverty Reduction					
3	Fix Effect Model	291.784078	15	0.0000	H0 rejected
4	Random Effect Model	18.555169	3	0.0003	Ha rejected

Note: The Source are from Eviews, Critical Value at 0.05.data processed 2024

1. Based on the results of the Fix Effect Test/Cow Test on the Inclusive Growth and Economic Development model, the statistical Chi-square value was obtained $(1769.28404) > \text{Chi-square table } (24.996)$ at $df = 15$ with a probability level of $0.0011 < 0.05$, thus causing H_0 to be rejected. The results of the Random Effect Test/Husman Test obtained a statistical Chi-square value $(6.60514) > \text{Chi-square table } (7.815)$ at $df = 3$ with a probability level of $0.0856 > 0.05$, thus causing H_a to be accepted.
2. Based on the results of the Fix Effect Test/Cow Test on the Income Inclusive Growth and Poverty Reduction model, the statistical Chi-square value was obtained $(291.784078) > \text{Table Chi-square } (24.996)$ at $df = 15$ with a probability level of $0.0000 < 0.05$, so H_0 was rejected. The results of the Random Effect Test/Husman Test obtained a statistical Chi-square value $(18.555169) > \text{Chi-square table } (7.815)$ at $df = 3$ with a probability level of $0.0003 < 0.05$, causing H_0 to be rejected.

Testing Classical Assumptions in Panel Data Models

Multicollinearity Testing

A regression model is said to experience multicollinearity if there is a perfect linear function for some or all of the independent variables in the linear function. Ways to determine whether or not there are symptoms of multicollinearity include looking at the Variance Inflation Factor (VIF) value. If the VIF value is less than 10 then it is stated that multicollinearity did not occur. The following are the test results:

Table 3: Multicollinearity Test Results

Inclusive Growth Economic Growth and Development			
No	Variable	VIF	Conclusion
1	Inflation	1.1506	In the Level of Tolerance
2	Road infrastructure	1.0028	In the Level of Tolerance
3	Labor	1.2390	In the Level of Tolerance
Inclusive Income Growth and Poverty Reduction			
1	Sectoral GRDP	1.0085	In the Level of Tolerance
2	Population density	1.0139	In the Level of Tolerance
3	Financial Inclusion	1.0481	In the Level of Tolerance

Note: The Source are from Eviews, Critical Value at 0.05.data processed 2024

The results of the Multicollinearity level test showed that the Variance Inflation Factor (VIF) value of all independent variables had a value of <10 , and this explained that all variables had values within the tolerance level.

Heteroscedasticity Testing

The White method heteroscedasticity test, which is calculated manually by regressing the squared residuals, aims to test whether in the regression model there is inequality of variance from the residuals of one observation to another.

1. Inclusive Growth Model of Economic Growth and Development with Chisquare Calculation = Total $n * R_{square}$ ($96 * 0.0555 = 5.328$). In the Chi-Square table count ($5.328 < \text{Chi Square Table } (7.815)$ in df of the independent variable = 3 with a 5 percent significance level, thus rejecting H_0 , which meant that there was no heteroscedasticity problem in the equation.
2. Income Inclusive Growth Model and Poverty Reduction with Chisquare Calculation = Total $n * R_{square}$ ($96 * 0.0445 = 4.272$). In the Chi-Square table count ($4.272 < \text{Chi Square Table } (7.815)$ in df of the independent variable = 3 with a 5 percent significance level, thus rejecting H_0 , which meant that there was no heteroscedasticity problem in the equation.

Table 4: Heteroscedasticity Test Results

Inclusive Growth Economic Growth and Development					
No	Independent Variable	Chi-Square Calculate	Chi-Square Table	Result	Conclusion
1	3	5.328	7.815	Reject H0	Heteroscedasticity Free
Inclusive Income Growth and Poverty Reduction					
2	3	4.272	7.815	Reject H0	Heteroscedasticity Free

Note: The Source are from Eviews, Critical Value at 0.05.data processed 2024

Heteroscedasticity detection was carried out and there were problems, but in the results of the multiple linear regression panel data the final calculation model was free from heteroscedasticity problems.

Autocorrelation Testing

The Autocorrelation Test of the Breusch-Godfrey method is calculated manually by regressing the residual obtained from the research equation on the independent variables and the lag of the research residual to obtain the R2 value which is then multiplied by the number of observations.

1. Inclusive Growth Model of Economic Growth and Development with Chisquare Calculation = Total n * Rsquare ($80 \times 0.3181 = 25.448$). In the Chi-Square table count ($25.448 > \text{Chi Square Table } (3.84)$) in humidity autocorrelation -1 with 5 percent significance level, thus rejecting H0 which meant that there was no autocorrelation problem in the equation.
2. Inclusive Growth Model of Income and Poverty Reduction with Chisquare Calculation = Total n * Rsquare ($80 \times 0.0589 = 4.721$). In the Chi-Square table count ($4.721 > \text{Chi Square Table } (3.84)$) in humidity autocorrelation -1 with 5 percent significance level, thus rejecting H0 which meant that there was no autocorrelation problem in the equation.

Table 5: Autocorrelation Test Results

Inclusive Growth Economic Growth and Development					
No	Dependent variable	Chi-Square Calculate	Chi-Square Table	Result	Conclusion
1	1	25.488	3.84	Reject H0	Autocorrelation free with white cross section
Inclusive Income Growth and Poverty Reduction					
2	1	4.721	3.84	Reject H0	Autocorrelation free with white cross section

Note: The Source are from Eviews, Critical Value at 0.05.data processed 2024

Autocorrelation detection was carried out and there were problems, but in the results of the multiple linear regression panel data the final calculation model was free from autocorrelation problems. The step used was to use the coef covariance method to become a white cross section in the options panel so that the regression equation was free from autocorrelation problems (Widarjono, 2013).

Panel Data Regression Estimation Results with Fixed Effect Model

The mathematical model is formed in one equation, multiple linear regression model or ordinary least squares. The results of this regression were to determine the direction of the relationship between the independent variable and the dependent variable and to see in real terms the results of the coefficient magnitudes obtained in terms of seeing the level of increase or decrease mathematically. The following are the results of the Fixed Effect mathematical model:

Table 6: Ordinary Least Square (OLS) Calculation Results in the Fixed Effect Model

Inclusive Growth Economic Growth and Development				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	14.79992	0.097395	151.9578	0.0000
INF	-0.064681	0.017171	-3.766893	0.0003
INF_JLN	0.061757	0.005740	10.75900	0.0000
TK	0.065114	0.009611	6.775258	0.0000
	0.997315	Prob(F-statistic)	0.000000	
F-stat	1588.856	Durbin-Watson stat	0.910816	
Inclusive Income Growth and Poverty Reduction				

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.385631	2.383731	-0.581286	0.5627
PEP	0.140802	0.032279	4.362071	0.0000
KP	0.991555	0.400221	2.477521	0.0154
KI	0.076569	0.025789	2.969003	0.0040
	0.983012	Prob(F-statistic)	0.000000	
F-stat	247.5267	Durbin-Watson stat	1.816041	

Note: The Source are from Eviews, Critical Value at 0.05.data processed 2024.

1. Inclusive Growth Model of Economic Growth and Development:

$$PIPP_{it} = \beta_0 + \beta_1 INF_{it} + \beta_2 INF_JLN_{it} + \beta_3 TK_{it} + \varepsilon_{it}$$

$$PIPP_{it} = 14.79992 - 0.064681inf_{it} + 0.061757INF_JLN_{it} + 0.065114TK_{it}$$

$$[-3.766893] [10.75900] [6.775258]$$

2. Income Inclusive Growth and Poverty Reduction Model:

$$PIPP_{it} = \beta_0 + \beta_4 PEP_{it} + \beta_5 KP_{it} + \beta_3 KI_{it} + \varepsilon_{it}$$

$$PIPP_{it} = -1.385631 + 0.140802PEP_{it} + 0.991555KP_{it} + 0.076569KI_{it}$$

$$[-4.362071] [2.477521] [2.969003]$$

In the Inclusive Growth model, Economic Growth and Development had an R-square value of 0.997315. This explained that 99% of the rise and fall of Inclusive Growth Economic Growth and Development in the provinces of the islands of Sumatra and Java were influenced by Inflation, Road Infrastructure and Labor. The remaining 1% was influenced by other variables not included in the research model. The F statistic measures the quality of the regression model. A very high value (1588.856) indicates that this model has a very good ability to explain data variations. Durbin-Watson stat = 0.910816: The Durbin-Watson statistic tests the presence of autocorrelation (the relationship between residuals at different points in time) in the regression model. A value of 2 indicates no autocorrelation, a value close to 0 indicates positive autocorrelation, and a value close to 4 indicates negative autocorrelation. The value 0.910816 indicates positive autocorrelation in this model.

In the model of Inclusive Income Growth and Poverty Reduction, the R-square value was 0.983012. This explained that 98% of the rise and fall of Inclusive Income Growth and Poverty Reduction in the provinces

of Sumatra and Java islands were influenced by GDP in the Agricultural Sector, Population Density and Financial Inclusion 2 The remaining % was influenced by other variables not included in the research model. The F statistic measures the quality of the regression model. A high value (247.5267) indicates that this model has a very good ability to explain data variations. Durbin-Watson statistics tests the presence of autocorrelation (the relationship between residuals at different time points) in the regression model. A value of 2 indicates no autocorrelation, a value close to 0 indicates positive autocorrelation, and a value close to 4 indicates negative autocorrelation. The value 1.816041 was close to 2, which indicated that the autocorrelation was not very significant and the residuals in this model tended to be independent.

DISCUSSION

Inclusive Growth Economic Growth and Development

Inclusive Growth Economic Growth and Development in 16 Provinces on the Islands of Java and Sumatra were influenced by 3 important variables, namely inflation. Inflation had a negative and significant influence with a coefficient value of -0.064681. Every 1% increase in inflation meant that inclusive growth and economic development will experience a decline of 0.064%. This was with the assumption that other variables were constant *ceteris paribus*. Second, road infrastructure had a positive and significant influence with a coefficient value of 0.061757. For every 1 km improvement in roads in good condition, inclusive growth and economic development increased by 0.061%. This was with the assumption that other variables were constant *ceteris paribus*. Third, labor had a positive and significant influence with a coefficient value of 0.065114. For every 1 increase in labor force, inclusive growth and economic development increased by 0.065% assuming that the other variables were constant *ceteris paribus*.

Higher inflation can reduce people's purchasing power and increase production costs, thus having a negative impact on economic growth. Controlling inflation is very important to maintain economic stability and encourage inclusive growth. inflation and income inequality on the inclusiveness of economic growth. Based on the findings, there was

a negative relationship between inflation and economic growth. The government implemented various strategies and policies, including redistribution policies, social safety nets and price controls to encourage inclusive economic growth (Ali & Asfaw, 2023). Inflationary pressures, careful monitoring and control of the money supply, addressing unemployment through labor and investment market reforms, implementing effective regulatory restrictions to encourage financial inclusion. Controlled inflation provides equal distribution of prices for many communities, thereby influencing inclusive growth (Ali et al., 2023).

Good road infrastructure improves connectivity and logistics efficiency, thus encouraging economic activity and distribution of goods/ services. Investment in road infrastructure is crucial to supporting inclusive economic growth. Government spending on the infrastructure sector and improvements to physical infrastructure in the long term have a positive and significant effect on inclusive growth in reducing poverty and inequality. The findings of this research will direct the government to increase the proportion of the budget allocated to government spending and closely monitor each budget allocation (Bado et al., 2023). Improving infrastructure access increases access to economic and political activities, improves public services and infrastructure in various provinces, and improves leading and potential sectors to catch up on economic disparities between provinces which greatly influence inclusive growth (Aminata et al., 2022).

Increasing the number of workers contributes directly to increasing economic output and productivity. It is important to ensure the availability of skilled labor and support the creation of quality jobs (Purnomo & Istiqomah, 2019). Employment opportunities perfectly mediate the relationship between poverty and inclusive economic growth. The perfect mediation effect means that economic growth will reduce poverty only if economic growth is able to create jobs. These findings imply the importance of inclusive growth that provides poor communities with access to employment and business opportunities. The following is a description between provinces of developments between variables towards inclusive growth in economic development:

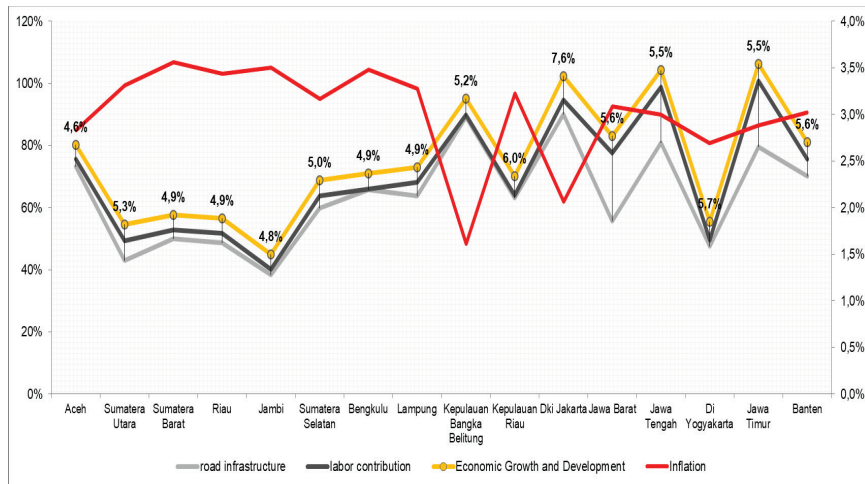


Figure 3: Development of Each Variable in the Provinces on the Islands of Java and Sumatra in Terms of Inclusive Growth of Economic Development

Source: National Development Planning Agency, composite index of inclusiveness, 2023

In general, higher inflation tended to have a negative influence on economic growth. For example, provinces with lower inflation such as DKI Jakarta (2.1%) showed higher economic growth (7.6%). The Bangka Belitung Islands also had low inflation (1.6%) with fairly good economic growth (5.2%). Inflation has a negative impact on overall economic growth and inclusive growth. High inflation will cause high prices of goods and services, so people do not have access to consumption evenly because goods and services are only purchased by certain income groups (Doguwa, 2005). Good road infrastructure tended to support higher economic growth. For example, DKI Jakarta had 90% of roads in good condition and the highest economic growth (7.6%). Provinces such as the Bangka Belitung Islands (89%) and Central Java (81%) also showed that good road infrastructure was correlated with good economic growth. Findings, (Kurniasih, 2020), hypothesis that produces similar findings in all cases (Indonesia, Sumatra, Java-Bali, Kalimantan, Sulawesi-Nusa Tenggara-Papua). Thus, it can be concluded that in Indonesia, decentralization did not have a moderating effect between infrastructure and inclusive economic growth. In conclusion, decentralization had not been important in strengthening the relationship between infrastructure and inclusive economic growth in Indonesia, but infrastructure had a direct influence on inclusive growth in Indonesia.

High labor contribution was also positively correlated with economic growth. West Java (21.9%) and East Java (21.3%) showing high labor contribution and significant economic growth (5.6% and 5.5% respectively). Provinces with low labor contribution such as Bengkulu (0.2%) showed lower economic growth (4.9%). Factors that had a positive impact on inclusive economic growth were labor, household consumption, exports of services/goods, foreign investment, domestic investment, per capita income, and average length of study year. Meanwhile, the negative influence was the level of open unemployment and imports of services/goods. An increase in labor by 2% increased gross regional domestic product, reduced unemployment rate by 3.0%, reduced poverty by 10.7%, and reduced income inequality by 5.5%.

Inclusive Income Growth and Poverty Reduction

Inclusive Income Growth and Poverty Reduction in 16 Provinces on the Islands of Java and Sumatra were influenced by 3 important variables. GRDP in the agricultural sector had a positive and significant influence with a coefficient value of 0.140802. For every increase in GRDP of 1 million rupiah, Inclusive Income Growth and Poverty Reduction increased by 0.14%. This was with the assumption that other variables were constant *ceteris paribus*. Second, population density had a positive and significant influence with a coefficient value of 0.991555, for every 1 % increase in population, income inclusive growth and poverty reduction increased by 0.99%. This was assuming that the other variables were constant *ceteris paribus*. Third, inclusive finance had a positive and significant influence with a value of 0.076569. For every 1% increase in financial inclusion, income inclusive growth and poverty reduction increased by 0.07%. This was with the assumption that the other variables were constant *ceteris paribus*.

The agricultural sector played a key role in supporting inclusive growth, especially in rural areas on the islands of Java and Sumatra. Increasing GRDP from this sector will have a direct impact on increasing people's income and reducing poverty. Local economic development is based on positive externalities, both financial and technological. Groups of companies are grouped because of externalities related to labor supply and demand for goods, and because of the existence of "input-output" externalities between companies from various sectors, especially the

agricultural sector, which is easily accessible to the whole community, so that this sector really helps inclusive economic growth (Olfa, 2024). Economic growth sectors have diverse employment absorption. In theory, increasing unemployment triggers poverty, reduces per capita income, and leads to poverty, because of the large number of unemployed. As poverty increases, growth tends to be inclusive because poverty and inclusion cannot be separated. When the most dominant sector, such as agriculture, is absorbed evenly, agricultural GRDP increases and it increases the inclusiveness of growth (Anita & Udjiyanto, 2024).

High population density can support inclusive economic growth through increased economic interaction, labor availability and greater market opportunities. However, this must also be balanced with adequate infrastructure and public services so as not to cause social problems. An inclusive economy involves reducing inequality and equalizing economic benefits among all population groups. A fair population density shows regional progress in the economy. Population density can influence inclusive growth because it is assumed that the density of a region is due to the density of employment opportunities (Krysovaty et al., 2023). Wider access to financial services allows people to participate in more productive economic activities, obtain loans for businesses, and save for the future. This contributes to inclusive economic growth and helps reduce poverty. The significant influence of financial inclusion growth and inclusive economic growth on poverty proves that important indicators for capital through the financial system and social protection have a broad impact on economic development (Irmanelly et al., 2014). A province's inclusive growth rate is influenced by the level of government spending, financial inclusion, investment, inflation and trade openness of the province. Specifically, financial equity or inclusiveness enhances inclusive growth by creating equal opportunities, encouraging economic growth, and improving conditions of poverty, (Prabowo et al., 2023). The following is a description between provinces of developments between variables towards inclusive growth of inequality and poverty:

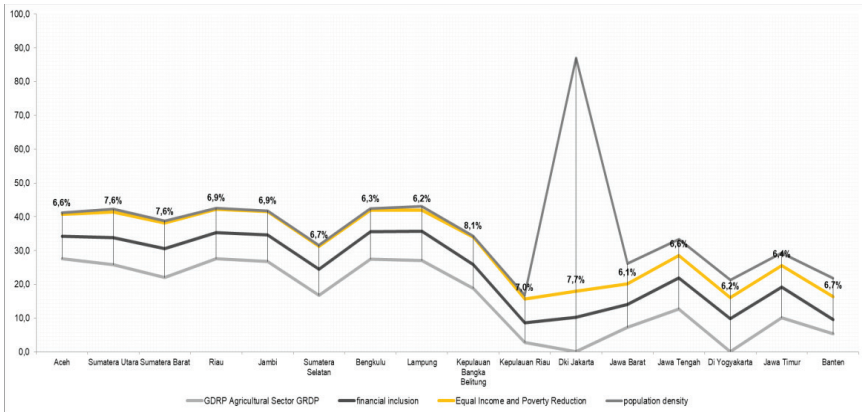


Figure 4: Development of Each Variable in Provinces on The Islands of Java and Sumatra in Terms of Inclusive Growth, Inequality and Poverty

Source: National Development Planning Agency, composite index of inclusiveness, 2023

In general, provinces with high contributions from the agricultural sector such as Aceh (27.6%), Riau (27.6%), and Jambi (26.8%) showed fairly good inclusive growth of 6.6% each, 6.9%, and 6.9%. This confirmed that the agricultural sector played an important role in supporting equal income and poverty reduction. DKI Jakarta had the highest population density (69.0%) and showed inclusive growth of 7.7%. However, very high population densities may require better management to support inclusive growth. Findings, (Yulian, 2002) GRDP had a positive effect on the development inclusiveness index. So if the GRDP value increased from a dominant sector such as agriculture, it will encourage an increase in the value of the development inclusiveness index, which means that variable GRDP had a significant effect on the development inclusiveness index of a region. Provinces with lower population densities such as Lampung (1.1%) and the Riau Islands (1.1%) also showed good inclusive growth of 6.2% and 7.0% respectively, indicating that the effects of population density can vary. Inclusive growth showed that regional economic growth was enjoyed more by residents with low expenditure compared to residents with high expenditure. Population density had an influence on inclusiveness when income became more evenly distributed (Pukuh & Fadlun Widyasthika, 2017).

DKI Jakarta had the highest level of financial inclusion (10.2%) and high inclusive growth (7.7%), indicating a strong positive relationship

between financial inclusion and inclusive growth. Provinces with good financial inclusion such as Central Java (9.2%) and Yogyakarta (9.7%) also showed significant inclusive growth of 6.6% and 6.2% respectively. Biswas, (2023), emphasized that financial inclusion had a positive impact on inclusive economic growth in these countries although the level of impact varied between financial inclusion measures. Therefore, policymakers in these countries must take necessary steps to accelerate financial inclusion activities in order to achieve strong economic growth.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The results showed the factors that influenced inclusive growth in economic development in 16 provinces on the islands of Java and Sumatra. Inflation had a significant negative influence, road infrastructure in good condition had a significant positive influence and labor had a significant positive influence on inclusive growth and development. economy.

Inclusive Income Growth and Poverty Reduction in 16 Provinces on Java and Sumatra, GRDP in the agricultural sector had a significant positive influence, population density had a significant positive influence and financial inclusion had a significant positive influence on Income Inclusive Growth and Poverty Reduction.

Recommendations

The government must implement policies to increase inclusive growth and economic development, on the inflation side. Price control and subsidies: Control the prices of basic necessities and provide subsidies to certain sectors to reduce inflationary pressure on society. Infrastructure Investment: The government should increase investment in the construction and maintenance of road infrastructure, especially in areas with roads in poor condition. Job Creation: Encourage private investment and facilitate small and medium enterprises (SMEs) to create more jobs. Tax incentives and ease of licensing could be a first step.

Policies that must be implemented by the government to increase income growth and reduce poverty, on the side of increasing agricultural GRDP. The government needs to modernize agriculture to increase the productivity of the agricultural sector through modernization and agricultural technology. The government can provide easy access to technology, fertilizer and quality seeds. Manage urbanization well through smart city planning and development of adequate infrastructure to accommodate population growth in large cities. Financial Access: Increasing access to financial services in remote areas through digitalization and expanding the network of financial institutions.

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