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Regional Economic Growth Drivers in Java: Poverty, Human Development, and Labor

Muhammad Dimas Prasetyo[1], Aswin Rivai[2]
dimasprasetiyo.dp@gmail.com[1]; aswin.rivai@upnvj.ac.id[2]
Universitas Pembangunan Nasional Veteran Jakarta, Indonesia[1,2]

Abstrak

- **Tujuan:** Penelitian ini bertujuan untuk menganalisis pengaruh Indeks Kedalaman Kemiskinan (IKK), Indeks Pembangunan Manusia (IPM), dan Tingkat Partisipasi Angkatan Kerja (TPAK) terhadap laju Produk Domestik Regional Bruto (PDRB) di enam provinsi Pulau Jawa selama periode 2012-2024. Penelitian ini juga menguji pengaruh simultan ketiga variabel independen tersebut terhadap laju PDRB.
- **Desain/metodologi/pendekatan:** Pendekatan kuantitatif digunakan dengan metode analisis regresi data panel. Sampel mencakup enam provinsi di Pulau Jawa dari tahun 2012 hingga 2024, diolah menggunakan Stata 17. Proses pemilihan model regresi data panel dilakukan melalui Uji Chow dan Uji Lagrange Multiplier. Uji asumsi klasik mencakup uji normalitas, multikolinearitas, heteroskedastisitas, dan autokorelasi.
- **Temuan**: Hasil penelitian menunjukkan bahwa IKK berpengaruh negatif dan signifikan terhadap laju PDRB. IPM tidak berpengaruh signifikan terhadap laju PDRB. Sementara itu, TPAK berpengaruh positif dan signifikan terhadap laju PDRB. Secara simultan, IKK, IPM, dan TPAK terbukti memberikan pengaruh yang signifikan terhadap laju PDRB di Pulau Jawa.
- **Batasan penelitian/dampak:** Penelitian ini memiliki keterbatasan pada jumlah variabel independen yang hanya tiga dan literatur pendukung IKK yang kurang rinci. Ini mengindikasikan bahwa model memiliki daya jelas yang masih terbatas dan variasi PDRB banyak dipengaruhi oleh faktor-faktor di luar model.
- **Implikasi praktis:** Temuan ini menggarisbawahi pentingnya kebijakan yang tidak hanya mengurangi jumlah penduduk miskin tetapi juga kedalaman kemiskinan melalui bantuan sosial yang lebih tepat sasaran. Peningkatan kualitas pendidikan dan kesehatan penting untuk meningkatkan produktivitas tenaga kerja. Selain itu, penciptaan lapangan kerja yang produktif perlu didorong untuk mengoptimalkan partisipasi angkatan kerja.

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• **Keaslian/nilai**: Penelitian ini memberikan kontribusi empiris dalam memahami hubungan IKK, IPM, dan TPAK terhadap laju PDRB di Pulau Jawa selama periode 2012-2024, mengisi keterbatasan penelitian terdahulu. Penggunaan Indeks Kedalaman Kemiskinan sebagai indikator kemiskinan memberikan gambaran yang lebih sensitif terhadap beban ekonomi kelompok miskin.
• **Jenis makalah:** Makalah ini merupakan penelitian empiris kuantitatif yang menggunakan data sekunder dan analisis regresi data panel untuk menguji hubungan antara variabel sosial-ekonomi dan pertumbuhan ekonomi regional di Pulau Jawa. Pendekatan ini menekankan pada pengujian hipotesis secara statistik dan penyajian hasil yang dapat diverifikasi, sehingga memberikan kontribusi nyata terhadap pemahaman empiris mengenai faktor-faktor pendorong pertumbuhan ekonomi di tingkat regional.

Kata Kunci: Indeks Kedalaman Kemiskinan; Indeks Pembangunan Manusia; Tingkat Partisipasi Angkatan Kerja; PDRB; Regresi Data Panel; Pulau Jawa.

Abstract

- ***Purpose:*** *This study aims to analyze the influence of the Poverty Depth Index (PDI), Human Development Index (HDI), and Labor Force Participation Rate (LFPR) on the growth of Gross Regional Domestic Product (GRDP) in six provinces on Java Island from 2012-2024. The study also examines the simultaneous effect of these three independent variables on GRDP growth.*
- ***Design/methodology/approach:*** *A quantitative approach was employed using panel data regression analysis. The sample consists of six provinces in Java Island over the period 2012 to 2024, with data processing conducted using Stata 17. Model selection involved the Chow Test and Lagrange Multiplier Test. Classical assumption tests included normality, multicollinearity, heteroskedasticity, and autocorrelation.*
- ***Findings:*** *The results indicate that the Poverty Depth Index has a significant negative effect on GRDP growth. The Human Development Index has no significant effect on GRDP growth. While the Labor Force Participation Rate has a significant positive effect on GRDP growth. Simultaneously, the three independent variables were found to have a statistically significant joint effect on GRDP growth in Java.*
- ***Research limitations/implications:*** *This study is limited by its inclusion of only three independent variables and less detailed supporting literature for the Poverty Depth Index. This suggests that the model's explanatory power is limited, and GRDP variations are largely influenced by factors outside the model.*
- ***Practical implications:*** *These findings highlight the importance of policies that not only reduce the number of poor but also the depth of poverty through more targeted social assistance. Improving the quality of education and health is crucial for enhancing labor productivity. Furthermore, the creation of productive employment opportunities should be encouraged to optimize labor force participation.*
- ***Originality/value:*** *This research provides empirical contributions to understanding the relationship between the Poverty Depth Index, Human*

Development Index, and Labor Force Participation Rate on GRDP growth in Java Island from 2012-2024, addressing previous research limitations. The use of the Poverty Depth Index offers a more sensitive measure of poverty's economic burden on marginalized groups.

- ***Paper Type:** This article is quantitative empirical research paper that employs secondary data and panel data regression analysis to examine the relationship between socio-economic variables and regional economic growth in Java Island. The approach emphasizes statistical hypothesis testing and the presentation of verifiable results, providing an empirical contribution to understanding the key drivers of regional economic growth.*

***Keywords**: Poverty Depth Index , Human Development Index , Labor Force Participation Rate , GRDP , Panel Data Regression , Java Island.*

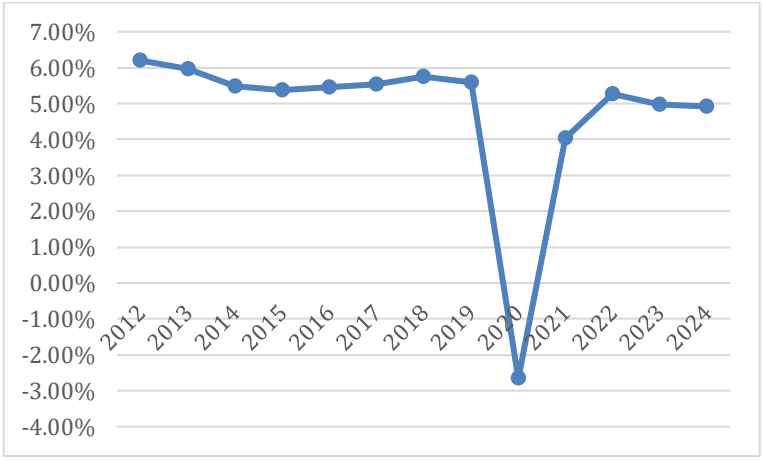
Introduction

Gross Regional Domestic Product (GRDP) is one of the most commonly used key parameters to measure the level of economic growth in a region. GRDP serves as a snapshot of a region's economic performance, as it encompasses all gross value added generated through various economic activities within a specific period. All sectors, from agriculture and manufacturing to the service sector, contribute to GRDP formation. Therefore, GRDP plays a strategic role in assessing regional economic dynamics, formulating development policies, and conducting objective and measurable economic comparisons between regions (Lestari et al., 2021).

The Indonesian economy, particularly in Java, has exhibited dynamics in GRDP values over the past few years. This dynamic is due to the strong influence of social and economic developments. Data from the Badan Pusat Statistik (BPS) shows that Java remains the largest contributor to national GDP, accounting for over 56% of Indonesia's total GDP (BPS, 2025). However, economic growth in Java experienced a slowdown during the 2012-2024 period due to various external and internal factors. In 2019, economic growth remained on a positive trend, exceeding 5%, but slowed in subsequent years due to global economic instability, fluctuating commodity prices, and structural challenges in the domestic economy. Nevertheless, various economic policies, such as increased infrastructure investment and strengthening the industrial sector, are expected to maintain stable economic growth in Java. In 2023 and 2024, the economy began to show a more stable recovery, marked by increased investment, household consumption, and exports of goods and services (Rosyidah et al., 2024).

Figure 1 shows the average Gross Regional Domestic Product (GRDP) growth rate of six provinces in Java from 2012 to 2024. In general, GRDP growth at the beginning of the period, from 2012 to 2019, showed relatively stable and high performance, with growth rates ranging from 5% to 6.5%. However, a sharp decline occurred in 2020, with the average GRDP falling below -2%, marking a significant economic contraction. Afterward, the graph shows a gradual recovery from 2021 to 2024, although growth has not yet fully recovered (BPS, 2025).

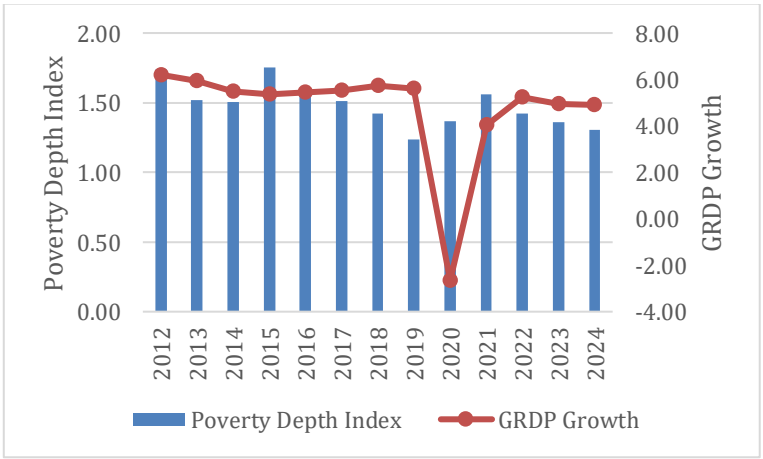
Figure 1. Graph of Average GRDP Growth in Java Island 2012-2024



Source: BPS (2025)

The dynamics of economic growth are influenced by various factors. In Figure 2, Poverty Depth Index (PDI) measures the average gap between the expenditure of the poor and the poverty line. A decline in the PDI generally reflects improvements in welfare. However, data from Java showed an anomaly in 2020, when the GRDP rate plummeted, while the PDI surged. Even in 2021, when the 1 rose, the GRDP rate also increased, contradicting the theory that rising poverty levels should affect economic growth, which should decline (Nairizi, 2023). This is explained by the trickle-down effect theory, which states that economic growth does not automatically trickle down to the poor unless it is based on job creation or increased productivity among the lower classes (Nainggolan, 2020).

Figure 2. Graph of Average Poverty Depth Index Against GRDP Growth

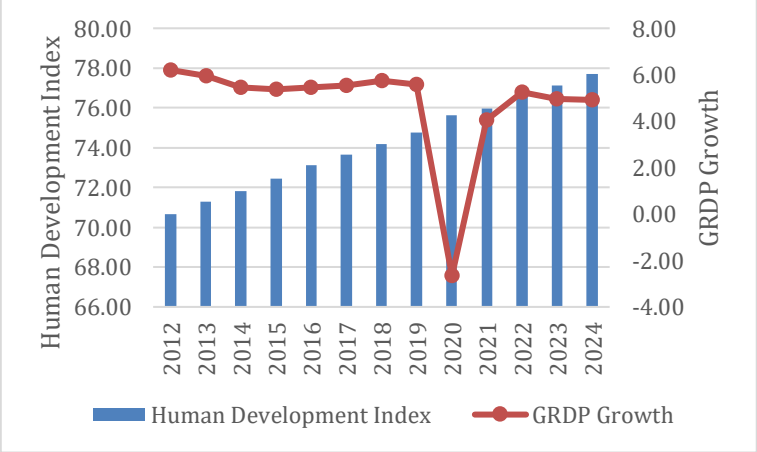


Source: BPS (2025)

As seen in Figure 3, the Human Development Index (HDI) as an indicator of human quality of life, is generally expected to have the potential to experience a positive impact on GRDP. Data show that the HDI in Java has experienced a consistent upward trend from year to year. However, the GRDP rate has shown a

decline and will not return to its previous growth rate until 2024, even though it has returned to a positive direction. This demonstrates that improving quality of life does not always depend entirely on short-term economic performance. This indicates that human development policies can remain effective if supported by consistent commitment and investment regardless of the dynamics of annual economic growth. Improved human development, particularly in education and health, will impact the quality of human capital, driving an increase in the HDI, which is a key asset in driving economic growth in a region (Muqorrobin & Soejoto, 2017).

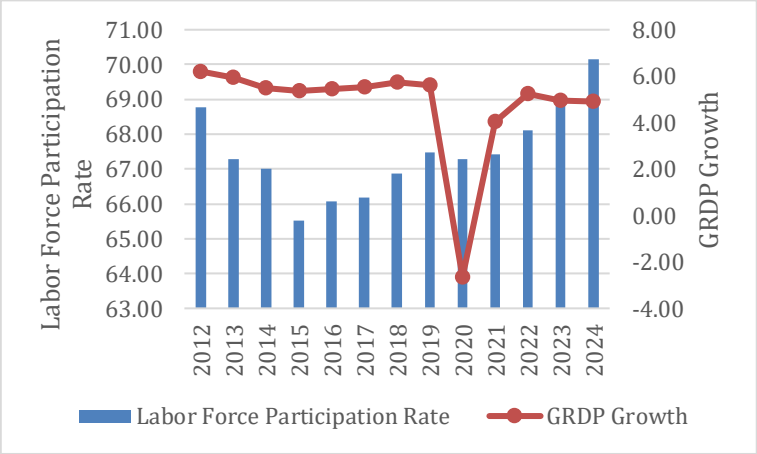
Figure 3. Graph of Average Human Development Index Against GRDP Growth



Source: BPS (2025)

Meanwhile, in Figure 4, the Labor Force Participation Rate (LFPR) is expected to have a positive correlation with GRDP, as high labor force participation will boost production capacity. LFPR data in six provinces on Java Island during the 2012-2024 period shows that all provinces experienced increases or tended to remain stable. However, although the LFPR increased fairly consistently, this increase did not always coincide with an acceleration in GRDP growth (BPS, 2025). This gap indicates that high labor force participation does not automatically drive economic growth, especially if it is not accompanied by productivity and the creation of quality jobs.

Figure 4. Graph of Average Labor Force Participation Rate Against GRDP Growth



Source: BPS (2025)

The average Labor Force Participation Rate (LFPR) and GRDP growth trends in six provinces on Java Island from 2012 to 2024 are shown in Figure 4. The GRDP rate tended to be stable initially, declined significantly, and then rebounded to around 5% by the end of the period. Meanwhile, the LFPR declined until 2016, then increased consistently until 2024. However, the increase in LFPR did not always align with GRDP growth (BPS, 2025), indicating that increased labor force participation does not necessarily boost the economy if it is not accompanied by productivity and quality job creation. Therefore, labor quality and adequate job opportunities are key to achieving optimal economic growth (Novita & Samsuddin, 2024).

Various previous studies have discussed the relationship between poverty, the Human Development Index (HDI), and LFPR with economic growth. However, there are still limitations in understanding how these three variables relate specifically to GRDP in Java Island during the 2012–2024 period. The discrepancy between empirical conditions and theory, as observed in the Poverty Depth Index and GRDP, or the HDI/LFPR which do not immediately have a direct impact on increasing GRDP, requires a more in-depth analysis. Based on the Neoclassical Economic Growth Theory (Solow-Swan) which emphasizes the role of production factors (capital, labor) and technological progress (Veritia et al., 2019), this study is interested in analyzing the influence of the Poverty Depth Index, HDI, and LFPR on the GRDP rate in Java.

Literature review and hypothesis development

Economic Growth

Neoclassical growth theory can be defined as an extension of the ideas of prominent economists, particularly Robert Solow and Trevor Swan, who first proposed the theory in the mid-20th century. This model emphasizes that a country's economic growth depends heavily on increasing the supply of production factors, including capital and labor, as well as on continuous technological progress.

Solow (1957) argued that technological progress plays a more dominant role in driving economic growth than capital accumulation or job growth alone. This finding marked a turning point in how economists assess the role of technology in long-term economic development (Veritia et al., 2019).

The neoclassical growth model assumes that the economy is always at full employment and that resources are optimally utilized. This model emphasizes the efficient use of capital and flexibility in the combination of production factors. In relation to social welfare, this approach is relevant for analyzing the influence of variables such as poverty, the Human Development Index (HDI), and Labor Force Participation Rate (LFPR) on GRDP, as it provides a strong theoretical basis for understanding the contribution of economic and social factors to economic growth and regional welfare (Mulia & Saputra, 2020).

Poverty Depth Index

The Poverty Depth Index is an important indicator for measuring the average expenditure gap of each poor person in a region. This indicator not only shows how many people live below the poverty line but also how far they are economically behind. The Poverty Depth Index (PDI) measures the average expenditure gap between each poor person and the poverty line. The aggregate value of PDI reflects the estimated costs required to alleviate poverty, assuming perfect transfers to the poor without transaction costs and other barriers. The lower the PDI value, the greater the economic potential for optimizing poverty alleviation funds through identifying the characteristics of the poor and targeting more appropriate assistance and programs. A decrease in this index value also indicates that the average expenditure of the poor is moving closer to the poverty line, and the expenditure gap between them is narrowing (Malik, 2022).

The Poverty Depth Index theory also explains that it can be used to measure the average gap between family or individual expenditures and the poverty line. This indicator is an important measure of poverty because it reflects a more in-depth level of community well-being. In addition, the Poverty Depth Index serves as a basis for formulating public policy, allocating resources, and distributing social services. This poverty measure also provides clear criteria for identifying those at risk of being unable to meet their basic consumption needs in a country (Odekon, 2015).

Human Development Index

The Human Development Index (HDI) is an indicator used to measure the success of development in improving the quality of human life. The HDI was introduced by the United Nations Development Programme (UNDP) in 1990 and is based on three basic dimensions: a long and healthy life, knowledge, and a decent standard of living. The HDI not only reflects the level of community welfare but also serves as a parameter for assessing a region's development performance and as a basis for formulating policies such as the allocation of the General Allocation Fund (DAU). The higher the HDI, the better the community's access to education, health, and the economy. The HDI also indicates the extent to which the population enjoys the benefits of development equitably, making it an important indicator in regional development planning and evaluation (Juliarini, 2019). In the context of economic

theory, the concept of human capital is closely related to the development of the Human Development Index. This view was first introduced in 1961 by Theodore W. Schultz, who argued that human capital is one of the main drivers of economic growth. Although the term was introduced in the classical economic era in 1776, recognition of the importance of investing in human resources has grown in recent years. However, investment in the HDI can also contribute to improving or acquiring human capital. Education and training enhance human abilities and skills, thereby increasing productivity (Raihan et al., 2020).

However, several studies have shown that the HDI is not always significant for economic growth or foreign direct investment in developing countries (Desmintari & Aryani, 2022). The exception is foreign investment, which is a major factor contributing to a significant and negative impact on economic growth, meaning that foreign investment does not always increase economic growth but rather decreases it (Desmintari et al., 2023). According to the New Method HDI Booklet published by the Central Bureau of Statistics, the HDI is a composite indicator used to measure human development achievements across three main dimensions: a long and healthy life (measured by life expectancy at birth), knowledge (measured by expected years of schooling and average years of schooling), and a decent standard of living (measured by adjusted per capita expenditure). The latest methodology for calculating the HDI uses a geometric mean, meaning that low achievement in one dimension cannot be offset by high achievement in another, thus requiring balanced attention to all three.

Labor Force Participation Rate

The LFPR represents the balance of the labor force, encompassing the working-age population, both workers and job seekers, and is calculated by dividing the total population within the working-age group. This indicator is typically presented as a percentage, making it easier to assess the proportion of the working-age population actively participating in the labor market. When the LFPR value increases, it reflects an increasing number of working-age residents choosing to participate in economic activities, either through permanent employment or job search. Conversely, if an increase in the number of working-age residents choosing not to work, whether due to continuing education, taking care of the household, or other factors preventing them from seeking employment, the number of people categorized as not in the labor force will also increase. This situation will result in a smaller labor force compared to the total working-age population, ultimately impacting the LFPR value (Hierdawati, 2022).

Badan Pusat Statistik (2020) explains that, the Labor Force Participation Rate is a statistical indicator that measures the proportion of the working-age population actively participating in the labor market. The LFPR value is obtained by dividing the number of the workforce by the total working age population, then converting the result into a percentage.

Research Method

This study uses a quantitative approach with secondary data to analyze the relationship between dependent and independent variables. The dependent variable in this study is the Gross Regional Domestic Product (GRDP) growth rate at constant 2010 prices in six provinces on the island of Java, expressed as a percentage for the period 2012–2024. The three independent variables used are the Poverty Depth Index, the Human Development Index (HDI), and the Labor Force Participation Rate (LFPR), all obtained from BPS.

The study population includes all data related to the Poverty Depth Index, HDI, LFPR, and GRDP growth in Java. Purposive sampling was used to select the sample based on specific criteria relevant to the research objectives (Samsu, 2021). The sample used is annual data from 2012 to 2024. This study also utilizes literature from journals and other scientific sources supporting the topic. Secondary data was collected through documentation and literature review, including official BPS reports and other scientific references, to build a strong theoretical and empirical foundation. Data were analyzed using quantitative descriptive methods and panel data regression, which allows for a combination of time series and cross-sectional data. This method was chosen because it provides greater degrees of freedom and is able to overcome omitted variable bias (Widarjono, 2018). However, panel analysis has challenges such as dependencies between cross-sectional units and limitations of incomplete data (Baltagi, 2021). Data processing was performed using Stata 17 software, with analysis models including Common Effect, Fixed Effect, and Random Effect approaches to more comprehensively examine the relationships between research variables.

Result and discussion

Model Selection Techniques

Before beginning estimation on panel data, the initial step is to determine the most appropriate model for this study. This model selection process involves the Chow Test, the Hausman Test, and the Lagrange Multiplier Test.

1. Chow Test

The purpose of the Chow test is to compare the fit between the Common Effect Model and the Fixed Effect Model. If the probability value is below 0.05, then the Fixed Effect Model is used. While if the value is above 0.05, it indicates that the Common Effect Model is a better fit. The following are the results of the Chow test:

Table 1. Chow Test Results

F (5,69)	2.03
Prob > F	0.0848

Source: Processed data (2025)

Based on Table 1, it was found that the probability value is 0.0848, which means the probability value is > 0.05. Therefore, H0 is accepted based on the results of the Chow test, namely that the Common Effect Model is the selected model.

2. Lagrange Multiplier Test

Because the Chow Test indicates that the Common Effects Model is the best model, the Hausman Test is not necessary. The Lagrange Multiplier Test is used to determine the best model between the Common Effects Model and the Random Effects Model. Model selection is based on the probability value (p-value). If the p-value is > 0.05, then the CEM is more appropriate, while if the p-value is < 0.05, then the REM is the more suitable model.

Table 2. Lagrange Multiplier Test Results

chibar2 (01)	0.00
Prob > chibar2	1.0000

Source: Processed data (2025)

In table 2, the results of the Lagrange Multiplier Test show a chibar2(01) value of 0.00 with a probability of 1.0000 > 0.05, so H0 is accepted and the use of the Common Effect Model is considered more appropriate for use in this study.

Classic Assumption Test Results

In this study, classical assumptions were tested through a series of statistical tests, including normality, multicollinearity, heteroscedasticity, and autocorrelation. These tests aim to ensure that the regression model meets the BLUE (Best Linear Unbiased Estimator) criteria, ensuring statistical reliability of the estimation results.

1. Normality Test

Normality testing is performed to assess whether the data distribution conforms to a normal distribution, a fundamental assumption in statistical analysis. The results of the normality test on the data used in this study are presented below:

Table 3. Normality Test Results

Variabel	Obs	Pr (skewness)	Pr (kurtosis)	Adj chi2 (2)	Prob>chi2
uhat	78	0.0000	0.0000	44.35	0.0000

Source: Processed data (2025)

Based on the results of the normality test shown in Table 3, a probability value of 0.0000 was obtained, which is below the 0.05 significance level. This statistically indicates that the data is not normally distributed. However, referring to the law of large numbers, if the number of samples exceeds 30, the data distribution can still be considered close to normal. With a total of 78 observations

(78 ≥ 30), even though the test results indicate abnormality, the data can still be assumed to meet the assumption of normality.

2. Multicollinearity Test

A multicollinearity test is conducted to determine whether there is a strong linear relationship between the independent variables in a regression model. A model is declared free of multicollinearity if the Variance Inflation Factor (VIF) value for each variable is below 10. Conversely, if the VIF value exceeds 10, it can be concluded that the model contains multicollinearity. The results of the multicollinearity test are presented as follows:

Table 4. Multicollinearity Test Results

Variable	VIF	1/VIF
PDI	2.03	0.493707
HDI	1.95	0.513929
LFPR	1.34	0.746609
Mean VIF	1.77	

Source: Processed data (2025)

The results of the multicollinearity test listed in Table 4 show that the VIF values for all independent variables are below 10. In detail, the PDI variable has a VIF value of 2.03, the HDI of 1.95, and the LFPR of 1.34. In addition, the tolerance value (1/VIF) of each variable is also above the threshold of 0.10, namely 0.493707 for PDI, 0.513929 for HDI, and 0.746609 for LFPR. Based on these findings, it can be concluded that the regression model does not experience multicollinearity problems.

3. Heteroscedasticity Test

The heteroscedasticity test is performed to determine whether the error variance in a regression model is constant (homoscedasticity) or not constant (heteroscedasticity). This test is important for detecting inconsistencies in the residual data distribution. A model is declared free of heteroscedasticity if the probability value (Prob > chi^2) exceeds 0.05. Conversely, if the probability value is less than 0.05, the model is indicated to have heteroscedasticity. The test results are presented as follows:

Table 5. Heteroscedasticity Test Results

chi2(1)	1.65
Prob > chi2	0.1989

Source: Processed data (2025)

Based on Table 5, which presents the results of the Breusch-Pagan Lagrange Multiplier Panel Heteroscedasticity Test, the Lagrange Multiplier value is 1.65 with a probability of 0.1989. Because this probability value is greater than the 5% significance level (0.05), it can be concluded that the model does not experience heteroscedasticity problems.

4. Autocorrelation Test

The autocorrelation test aims to identify whether there is a relationship between residuals from one observation and other observations in the previous period. The presence of autocorrelation can cause bias in the calculation of standard errors, making estimation results and hypothesis testing less reliable. A model is declared free of autocorrelation if the probability value is greater than 0.05. Conversely, if the probability value is less than 0.05, the model is indicated to experience autocorrelation.

Table 6. Autocorrelation Test Results

Wooldridge test for autocorrelation	
F (1,5)	10.141
Prob > F	0.0244

Source: Processed data (2025)

Based on the autocorrelation test results shown in Table 6, a probability value of 0.0244 was obtained, which is below the 0.05 significance level. This finding indicates that the regression model experiences autocorrelation, thus not fully meeting the autocorrelation-free assumption.

Panel Data Regression Model Estimation

Although the model selection results (Chow and Lagrange Multiplier tests) indicate that CEM is the best model, autocorrelation tests on the residuals indicate autocorrelation issues that need to be addressed. To address autocorrelation issues and ensure consistent and efficient standard errors, this study uses the Generalized Least Squares (GLS) regression method with the Parks estimator. The GLS estimator is an asymptotic estimator, so the individual coefficient test statistics are reported as z-statistics. The GLS model estimation results are presented in Table 7.

Table 7. Generalized Least Square Regression Results

GRDP Growth	***Regression Model***					
	Generalized Least Square					
	Coefficient	**Std. err.**	**z**	**P > |z|**	**[95% conf. interval]**	
PDI	-0.3244768	0.0821861	-3.95	0.000	-0.4855586	-0.163395

HDI	-0.036249	0.0234747	-1.54	0.123	-0.0822585	0.0097605
LFPR	0.0446484	0.0138338	3.23	0.001	0.0175346	0.0717622
_CONS	5.265466	2.04156	2.58	0.010	1.264082	9.26685

The resulting panel data regression model equation is:

$$GRDP\ Growth_{it} = 5.2655466 - 0.3244768 PDI_{it} - 0.036249 HDI_{it} + 0.0446484\ LFPR_{it}$$

Coefficient interpretation:

- Constant (5.2655466): Indicates that if the Poverty Depth Index (PDI), Human Development Index (HDI), and Labor Force Participation Rate are zero, the GRDP growth is projected to be 5.26%.
- PDI (-0.3244768): Every 1% increase in PDI will decrease the GRDP growth by 0.32%.
- HDI (-0.036249): Every 1% increase in HDI will decrease the GRDP growth by 0.03%.
- LFPR (0.0446484): Every 1% increase in LFPR will increase the GRDP growth by 0.04%.

Z Test (Partial)

The Z-test in this study is used to test the significance of the influence of each independent variable on the dependent variable partially, using a significance level of $\alpha = 0.05$. The decision-making criteria are based on the p-value ($P > |z|$), where if the p-value $\leq \alpha$, then the variable is declared to have a significant influence on the dependent variable. Based on the results in Table 7, the Poverty Depth Index has a p-value of 0.000 (<0.05) with a regression coefficient of -0.3244768, which indicates that the PDI has a negative and significant effect on the rate of GRDP. Conversely, the Human Development Index (HDI) has a p-value of 0.123 (> 0.05) with a coefficient of -0.036249, which indicates that the effect of the HDI on the rate of GRDP is negative but not statistically significant. Meanwhile, the Labor Force Participation Rate (LFPR) shows a p-value of 0.001 (<0.05) with a positive coefficient of 0.0446484, thus it can be concluded that LFPR has a positive and significant effect on the GRDP rate in Java. This finding indicates that not all socioeconomic variables have a partially significant effect, so it is important to consider other factors that may also influence regional economic growth.

F test (Simultaneous)

The F-test is used to evaluate whether all independent variables together have a significant effect on the dependent variable. The decision criterion is to compare Prob > chi2 with $\alpha = 0.05$. If Prob > chi2 $\leq \alpha$, then the independent variables as a whole have a significant effect.

Table 8. F Test Results

Wald chi2	17.34
Prob > chi2	0.0006

Source: Processed data (2025)

The F-test results show Prob > chi2 of 0.0006 (<0.05). This means that the PDI, HDI, and LFPR collectively have a significant influence on the GRDP rate in Java.

Coefficient of Determination (R-squared)

The R-Squared (R^2) test measures the regression model's ability to explain variations in the dependent variable. The R^2 value indicates the proportion of variation in the dependent variable that can be explained by all independent variables in the model. The R^2 value ranges from 0 to 1, with values closer to 1 indicating a good model's ability to explain variability in the dependent variable. Conversely, a low R^2 value indicates a poor model ability to describe these variations. Therefore, the higher the R^2 and Adjusted R^2 values, the stronger the model's ability to represent the relationship between the independent and dependent variables.

Table 9. Results of the Coefficient of Determination (R-Squared)

Overall	0.0207

Source: Processed data (2025)

In Table 9, the R^2 value is 0.0207 (2.07%). This indicates that the independent variables (PDI, HDI, LFPR) can only explain 2.07% of the variation in GRDP growth. The remaining 97.93% is influenced by other factors outside the research model. Nevertheless, this model remains relevant for identifying the direction and significance of the influence of the studied variables.

Poverty Depth Index and GRDP Growth

The results show that the Poverty Depth Index (PDI) significantly and negatively affects GRDP growth. This outcome is logical because a deeper poverty gap indicates not only the persistence of poverty but also its severity, where the poor are far below the poverty line. In such conditions, their purchasing power remains weak, limiting aggregate demand, while their low productivity reduces the supply side of the economy. This creates a double burden that hinders growth through both consumption and production channels. In fact, the deeper the poverty, the heavier the economic burden borne by local governments, and the lower the economic contribution of the poor, both in terms of consumption and productivity (Utami, 2020).

The increasing number of people falling behind the poverty line results in decreased productivity and economic activity, thus slowing regional economic

growth (Tuga, 2022). Deeper poverty requires the government to allocate more resources to social assistance, thereby reducing fiscal space for infrastructure and productive investment. This study argues that the PDI, compared to population-based poverty, captures this dynamic more effectively. The issue is not simply how many people are poor, but how severely they are excluded from the economy. Therefore, poverty reduction in Java must be at the heart of development policy. Strategies should not be limited to cash transfers but should include sustainable interventions such as skills development, micro-enterprise support, and access to financial services that empower the poor to become economically active.

Human Development Index and GRDP Growth

The Human Development Index (HDI) does not show a significant effect on GRDP growth. At first glance, this appears counterintuitive because human capital theory argues that better education and health should raise productivity and economic output (Raihan et al., 2020). However, the result can be explained by structural mismatches in Java's economy. Education levels may have increased, but the relevance of skills to labor market demands remains low. Similarly, while life expectancy is improving, better health outcomes do not automatically translate into higher productivity if labor absorption in formal sectors remains limited.

Differences caused by the quality of HDI components, such as education and health, which do not fully reflect labor productivity, do not necessarily contribute significantly to economic growth in the study area (Nurlitasari & Khoirudin, 2021). A high level of education does not necessarily produce a competent and competitive workforce, while a high life expectancy does not necessarily reflect health conditions that support economic activity (Akhsan, 2018).

Generally, growth is often driven more by investment and productivity than by human development indicators (Desmintari & Aryani, 2022). This study argues that the HDI is a determinant of long-term growth, rather than a short-term driver. Its contribution may only be visible if improvements in education and health are closely linked to the economic structure, for example, by aligning curricula with industry needs, promoting research and innovation, and ensuring equitable access to quality health care that increases labor productivity.

Labor Force Participation Rate and GRDP Growth

The Labor Force Participation Rate (LFPR) shows a positive and significant effect on GRDP growth. This outcome is consistent with theory: the more people participate in the labor market, the greater the potential for economic output. However, the quality of participation matters. If the additional labor force is absorbed into low-productivity or informal jobs, the effect on growth will be modest. On the other hand, when participation is supported by job creation in productive sectors, the impact becomes stronger (Hierdawati, 2022).

The Labor Force Participation Rate drives growth only if it is accompanied by skills-enhancing education. In Java, the challenge lies not in labor supply, but in labor absorption. The region already has a large working-age population, but without adequate investment in labor-intensive industries and skills-oriented training, increased participation may not fully translate into growth (Syamsuddin et

al., 2021). Therefore, policies should not only focus on increasing the LFPR but also ensure that participation occurs in high-value sectors.

The Simultaneous Influence of PGI, HDI, and LFPR on GRDP Growth

The simultaneous influence of PGI, HDI, and LFPR confirms that growth in Java is inseparable from social dynamics. Poverty, human development, and labor force participation interact with each other to shape economic outcomes. For instance, high LFPR may boost output, but if poverty remains deep, the gains are unevenly distributed. Similarly, human development improvements may raise long-term potential, but their short-term contribution is limited if poverty and job quality issues persist. The combination of labor, capital, and technology, which this study expands on by showing that social indicators also play an important role in growth. (Mulia & Saputra, 2020).

Microeconomic empowerment strengthens growth when combined with access to credit (Setyawati et al., 2025). Meanwhile, addressing regional vulnerabilities such as food security is crucial for sustaining growth (Juliannisa et al., 2025). Policy in Java must adopt an integrated approach by reducing the depth of poverty to lift the poor into productive activities, improving human development to build long-term capacity, and increasing labor absorption to translate participation into real growth.

Conclusions

This study concludes that the Poverty Depth Index has a negative and significant impact on Gross Regional Domestic Product (GRDP) growth in Java. These results indicate that the higher the poverty depth in a province, the lower its economic growth. This finding aligns with development theory, which states that extreme poverty limits the productive capacity of the poor, particularly in terms of consumption, education, and access to economic capital (Malik, 2022). The Poverty Depth Index, as an indicator of expenditure distribution, indicates not only the number of poor people but also how far their economic situation is from the poverty line. Therefore, sustainable poverty reduction must be supported through policies that encourage income redistribution and community-based economic empowerment (Setyawati et al., 2025).

Conversely, the Human Development Index (HDI) did not significantly impact GRDP in Java during the study period. Although the HDI trended upward, this did not necessarily lead to increased economic output. This finding reinforces the view that improving the quality of life through education and health takes time to significantly contribute to economic growth (Desmintari & Aryani, 2022). The Human Development Index (HDI) does reflect aspects of human capital, but not all of these improvements are immediately absorbed by productive sectors. While regional resilience to socio-economic vulnerabilities such as food security can reflect the level of human development and regional inequality (Juliannisa et al., 2025). The discrepancy between HDI growth and GRDP growth may also reflect a mismatch between workforce skills and market needs, or a weak connection between social development and real economic activity.

Meanwhile, the Labor Force Participation Rate (LFPR) shows a positive and significant impact on GRDP growth. This demonstrates that increasing the number of working-age people actively participating in the labor market can boost regional economic output. The LFPR, as an indicator of the direct involvement of the productive-age population in economic activities, is highly relevant to regional production capacity (Hierdawati, 2022). However, it is important to note that the LFPR's positive contribution to economic growth will be optimal if accompanied by high labor productivity and the provision of decent employment. This means that in addition to expanding participation, job quality and labor efficiency must also be improved (Novita & Samsuddin, 2024).

Simultaneously, the three independent variables in this study the Poverty Depth Index, HDI, and LFPR were shown to have a significant impact on GRDP growth in Java. These findings confirm that economic development is inextricably linked to social dynamics such as poverty levels, human resource quality, and labor force participation. This aligns with neoclassical economic growth theory, which states that growth is determined by primary input factors: labor, capital, and technology (Mulia & Saputra, 2020). Therefore, regional development strategies in Java need to synergistically integrate social and economic policies to foster more inclusive, sustainable, and equitable economic growth.

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