
**ANALYSIS DETERMINANTS OF GRDP IN EAST JAVA: APPROACH
INVESTMENT AND EMPLOYMENT**

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Abstract

This study aims to analyze the influence of investment, employment, human development, unemployment, poverty, and minimum wages on Gross Regional Domestic Product (GRDP) of districts/cities in East Java using a panel data regression approach with the best Fixed Effect Model (FEM) based on the Hausman test. The results show that the Human Development Index (HDI) and district minimum wages (Wage) have a positive and significant effect on GRDP, which means that improving the quality of education, health, and living standards as well as increasing community income can increase productivity and consumption, thereby encouraging regional economic growth. Conversely, the open unemployment rate (Unemp) and the number of poor people (Pov) have a negative and significant effect, which indicates that high unemployment reduces people's income and purchasing power, while poverty suppresses aggregate demand and economic participation, thus hampering growth. Meanwhile, foreign direct investment (FDI) and the labor force participation rate (Lab) do not have a significant effect on GRDP, which indicates that uneven foreign investment and low quality and absorption of labor cause these two variables to be unable to provide a real contribution to economic output. This research contributes to filling the gap in previous research by integrating various economic variables in a comprehensive model based on panel data in 38 districts/cities in East Java, so that it can provide a more comprehensive picture of the determinants of GRDP and become the basis for formulating more targeted regional economic development policies.

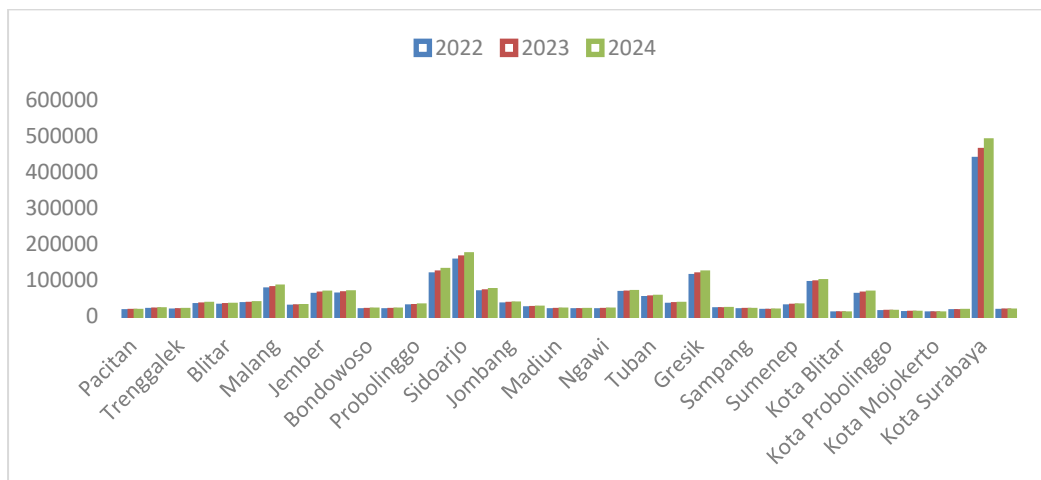
Keywords: GRDP, Unemployment, Investment, Minimum Wage, Labor Force

INTRODUCTION

Economic growth is one of the determinants of future economic development policies. The indicator used to measure economic growth on a national scale is Gross Domestic Product (GDP), while on a regional scale, it can be seen from Gross Regional Domestic Product (GRDP) (Gulo et al., 2023). Observing strong economic growth ensures that public welfare will improve (Izza et al., 2023). Economic growth is a measure of a region's success in maximizing economic performance.

Economic growth can be positive or negative. If economic growth is positive in a given period, it indicates that the economy is moving and growing. In 2024, economic growth in East Java reached 4.93 percent (Badan Pusat Statistik Provinsi Jawa Timur, 2023). However, during the COVID-19 pandemic, economic growth in East Java declined to a negative value of -2.33 percent. The impact of restrictions on community activities contributed to the decline in growth to a negative value. One visible impact is high unemployment. In February 2021, the number of unemployed due to Covid was 260,227 thousand people (Badan Pusat Statistik Provinsi Jawa Timur, 2025).

Graph 1.
GRDP of East Java Province 2022-2024



(Source: Badan Pusat Statistik)

Data on the GRDP of regencies/cities in East Java shows an increasing trend from 2022 to 2024, indicating consistent and stable dynamics. The city of Surabaya dominates revenue absorption, meaning that most of East Java's economic growth is concentrated there. Data on regional revenue absorption over the past three years shows disparities between regions in East Java. Surabaya has outperformed other regions each year. Regions such as Sidoarjo, Gresik, and Malang are in the upper-middle class, while Pacitan, Ngawi, and Trenggalek are in the lower-middle class. High-growth regions such as Surabaya, Gresik, and Sidoarjo are industrial-based, while outlying areas outside industrial areas are typically dominated by agriculture. This pattern indicates a phenomenon of inequality between the central and regional governments.

According to Ma'ruf & Wihastuti (2008), the theory of endogenous economic growth explains that foreign investment and human capital are important factors driving regional economic growth. Other factors influencing economic growth include infrastructure, political stability, bureaucratic systems, and government policies (Widianita et al., 2023). In East Java, besides these factors, another issue hampering economic growth is the persistent inequality among regencies and cities (Syahputri & Fisabilillah, 2022). Endogenous theory does not always have a direct impact on regional economic output. The relationship between the labor market, poverty, and wage policy can be explained using other theories such as human capital theory and Keynesian theory.

Previous research has shown that foreign investment significantly impacts gross regional domestic product (Muryanto et al., 2022), however, research in West Java indicates that foreign investment has no significant effect on gross regional domestic product (Annisa & Sugiharto, 2023). Regarding the human development index variable, this research aligns with research in the Yogyakarta region, which found that the human development index variable negatively impacts gross regional domestic product, supporting the phenomenon of growth without development (Budyanto, 2024). Research by Syahputri & Fisabilillah (2022) which examined the effect of unemployment and minimum wages on gross regional domestic product stated that unemployment had a negative effect on gross regional domestic product, while minimum wages had a positive effect.

This study aims to analyze the influence of investment, employment, and poverty variables using a panel data model to identify differences in characteristics between regions. The panel data regression method was first introduced in 1950 by Howles. Several methods can be used to estimate panel data regression, including common effect, fixed effect, and random effect (Alamsyah et al., 2022). This method was chosen because it is relevant to the characteristics of each region in East Java. Combining time series and cross-sectional data offers an improvement over previous research that focused only on specific regions. Combining employment and poverty variables in a single model, while previous research focused only on poverty or employment.

The characteristics of East Java are a major issue, with unequal income distribution. Policy alignment is needed between district/city governments and provincial governments. Implementing a central-regional policy system could be one solution to address regional income inequality. In addition to aligning regional government policies, it is also necessary to develop supporting infrastructure, especially in underdeveloped areas, to support growth in the industrial sector in each region. The development of the industrial sector can create numerous job opportunities in these areas, absorbing a significant workforce. This solution should be considered by each region to increase revenues within districts/cities and ensure equitable distribution of revenue across the province, eliminating inequality.

Although various previous studies have examined the impact of investment, human development, unemployment, and wages on gross regional domestic product (GDP), research gaps remain that require attention. Several studies have shown inconsistent results, particularly regarding the influence of foreign investment and the human development index on GRDP. Furthermore, most studies focus on specific regions and have not comprehensively examined all districts/cities within a province using a panel data approach.

Previous studies have also tended to examine variables separately, thus failing to capture the relationship between employment and poverty within a single analytical framework.

Therefore, this study seeks to fill this gap by using a panel data approach that combines time series and cross-sectional dimensions across 38 districts/cities in East Java. This study also integrates investment, employment, human development, unemployment, poverty, and wages into a single econometric model. This approach is expected to provide a more comprehensive picture of the determinants of GRDP and capture differences in characteristics across regions. Therefore, the primary contribution of this study is to provide more comprehensive empirical evidence as a basis for formulating more effective and targeted regional economic development policies in East Java.

RESEARCH METHOD

This study uses panel data, a combination of time series data from 2017 to 2024 and cross-sectional data from 38 districts/cities in East Java province. The data in this study uses secondary data from the Central Statistics Agency (BPS) and one data from the Ministry of Investment and Downstreaming (BKPM). The analysis used is multiple regression analysis with the dependent variable being gross regional domestic product (GRDP) and the independent variables in this study are foreign direct investment (FDI), Labor Force Participation Rate (Lab), Human Development Index (HDI), Open Unemployment Rate (Unemp), number of poor people (Pov), and district minimum wage (Wage). An explanation of all variables used is summarized in Table 1.

Table 1.
Operational Definition of Variables

Variable	Definition	Measure	Source
GRDP	Gross Regional Domestic Product	Billion Rupiah	BPS
FDI	Foreign Direct Investment	Billion Rupiah	BKPM
Lab	Labor force participation rate	Percent	BPS
HDI	Human Development Index	Index	BPS
Unemp	Open unemployment rate	Percent	BPS
Pov	Number of poor people	Unit	BPS
Wage	District minimum wage	Rupiah	BPS

The econometric model in this study is as follows:

$$\log GRDP_{it} = \beta + \beta_1 \log FDI_{it} + \beta_2 Lab_{it} + \beta_3 HDI_{it} + \beta_4 Unemp_{it} + \beta_5 \log Pov_{it} + \beta_6 \log Wage_{it} + \varepsilon_{it}$$

The use of natural logarithms (log) for GRDP, FDI, Pov, and Wage variables is done to stabilize data variance, simplify scale differences between variables, and facilitate the interpretation of coefficients in the form of elasticity. With this transformation, the regression coefficient can be understood as the percentage change in GRDP caused by a one percent change in each independent variable. Therefore, the use of logarithmic form allows for a

more proportional and easily interpreted relationship in the analysis of macroeconomic relations between regions.

RESULTS AND DISCUSSION

Table 2. Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.
GRDP	304	44700.18	69725.17
FDI	304	893184.1	3357405
Lab	304	70.9903	3.7708
HDI	304	72.9072	5.1359
Unemp	304	4.5304	1.7135
Pov	304	113.1795	69.4062
Wage	304	2384517	791169.4

(Source: Author, 2026)

Table 2 shows that GRDP and FDI have high standard deviations, indicating inequality in economic output and investment distribution across districts/cities in East Java. Meanwhile, the Lab and HDI variables are relatively stable with small variations, reflecting fairly even labor and human development conditions. The Unemp variable shows moderate differences, while Pov and Wage have quite large variations, indicating differences in poverty levels and minimum wages across regions.

Table 3.
Panel Data Regression Estimation Results

Dependent: logGRDP			
Variable	CEM	FEM	REM
Cons.	-11.8679*** (2.1676)	6.5272*** (0.6395)	4.1814*** (0.7067)
logFDI	0.0153 (0.0145)	0.0004 (0.0013)	0.0015 (0.0015)
Lab	-0.0469*** (0.0093)	0.0006 (0.0011)	0.0007 (0.0014)
HDI	0.0923*** (0.0117)	0.0164*** (0.0040)	0.0134*** (0.0048)
Unemp	-0.0262 (0.0262)	-0.0084*** (0.0022)	-0.0135*** (0.0026)
logPov	0.7262*** (0.0493)	-0.3177*** (0.0493)	-0.0905* (0.0510)
logWage	1.0519*** (0.1753)	0.2633*** (0.0541)	0.3667*** (0.0628)
R ²	0.7308	0.8344	0.8179
F-stat.	118.56	188.93	767.76
Prob. F-stat.	0.0000	0.0000	0.0000

Note: (1) ***sig. level 1%; **sig. level 5%; *sig. level 10%. (2) The first value in each variable is the coefficient value while the second value is the std. err. Value.

(Source: Author, 2026)

Based on the estimation results presented in Table 3, it shows that in general the HDI and logWage variables have a positive and significant effect on logGRDP in all three models (CEM, FEM, and REM), which means that improving the quality of human development and minimum wages encourage regional economic growth. Conversely, the Unemp variable tends to have a negative and significant effect in the FEM and REM models, indicating that increasing unemployment suppresses GRDP. The logPov variable shows different results between models, positive in CEM but negative and significant in FEM and REM, indicating that after considering the effects of regional heterogeneity, poverty has an impact on reducing economic output. Meanwhile, logFDI and Lab do not show a consistent or significant effect in the best models (FEM and REM). The relatively high R^2 value (above 0.80 in FEM and REM) and the significant F-statistic probability indicate that the model has a good ability to explain variations in GRDP.

Table 4.
Hausman Test

Test	Chi-square stat.	df.	Prob.
Value	583.75	6	0.0000

(Source: Author, 2026)

To determine the best model, a Hausman test was conducted which produced a probability value of 0.0000 (<0.05), so H_0 was rejected and the most appropriate model used was the Fixed Effect Model (FEM). Thus, the final interpretation of the study refers to the FEM results, which show that HDI and logWage have a significant positive effect on GRDP, while Unemp and logPov have a significant negative effect, while logFDI and Lab have no significant effect.

Table 5.
Fixed Effect Model Results

Dependent: logGRDP			
Variable	Coeff.	Std. err.	t-stat.
Cons.	6.5272***	0.6395	10.21
logFDI	0.0004	0.0013	0.38
Lab	0.0006	0.0011	0.55
HDI	0.0164***	0.0040	4.05
Unemp	-0.0084***	0.0022	-3.72
logPov	-0.3177***	0.0493	-6.44
logWage	0.2633***	0.0541	4.86
R^2		0.8344	
F-stat.		188.93***	
Asumsi Klasik			

Normalitas	4.41	0.1101
Heteroskedastisitas	1.37	0.2412
Autokorelasi	4.34	0.1312
Multikolinearitas	logFDI: 2.02; Lab: 1.19; HDI: 3.37; Unemp: 1.93; logPov: 2.6; logWage: 2.58	

Note: ***sig. level 1%; **sig. level 5%; *sig. level 10%.

(Source: Author, 2026)

Based on Table 5, estimates using the Fixed Effects Model (FEM) indicate that the model has excellent ability to explain variations in GRDP. This is evident from the R^2 value of 0.8344, meaning that approximately 83.44% of the variation in GRDP can be explained by the independent variables in the model. Furthermore, the F-stat value of 188.93, which is significant at the 1% level, indicates that all variables simultaneously influence GRDP. Thus, the model can be considered appropriate and robust in explaining economic phenomena across districts/cities in East Java.

Partially, the HDI and logWage variables are proven to have a positive and significant effect on GRDP at the 1% significance level. This indicates that improving the quality of human development and increasing the minimum wage can stimulate regional economic growth. Conversely, the Unemp and logPov variables have a negative and significant effect, indicating that increasing unemployment and poverty will depress GRDP. Meanwhile, the logFDI and Lab variables do not show a significant effect on GRDP. This finding indicates that not all economic factors contribute equally to driving regional economic growth.

Based on the classical assumption test, the FEM model used has met the good criteria. The normality test shows a probability of 0.1101 (> 0.05), which means the data is normally distributed. The heteroscedasticity test produces a probability of 0.2412 (> 0.05), so there is no heteroscedasticity problem found. The autocorrelation test also shows a probability of 0.1312 (> 0.05), which means there is no autocorrelation in the model. In addition, the VIF values of all variables are below 10, so it can be concluded that there is no multicollinearity. With these assumptions met, the FEM estimation results can be considered valid and reliable.

Discussion

Based on the best-case model estimation results, foreign direct investment (logFDI) had no effect on gross regional domestic product. One factor contributing to the insignificance of the foreign direct investment variable is the uneven distribution of investment across regions. Foreign direct investment in East Java is concentrated in Surabaya and its surrounding areas, as Surabaya is the industrial center of East Java. This contrasts with other regions, such as Madura, which is known as a less developed region, where foreign investment has received little inflow. This indicates that foreign investment has not been able to optimally drive economic growth (Safitri & Suseno, 2025).

Similar research also found in West Java. According to Annisa & Sugiharto (2023), foreign direct investment had no effect in West Java, not only because investment absorption is uneven across regions but also because foreign investment tends to fluctuate and cannot directly drive long-term economic growth.

The labor force participation rate (LFP) was also found to have no effect on gross regional domestic product. The lack of formal sector employment opportunities results in

suboptimal labor force absorption. According to Rahmadini & Wijaya (2024), the government's suboptimal efforts to absorb labor in East Java and the inadequate quality of human resources are factors contributing to the high poverty rate in East Java.

Adam Smith explained that a nation's prosperity must be in line with the skills of its workforce. The concept of the "Labor Theory of Value" illustrates that the more labor involved in production, the higher the value of the goods produced. The increase in the labor force in East Java is not accompanied by adequate job creation, leading to rising unemployment. Unemployment leads to decreased public consumption and a stagnant economy (Asyari et al., 2024).

The Human Development Index (HDI) was found to have a positive and significant effect on regional gross domestic product. This indicates that improving the quality of human resources through education, health, and a decent standard of living can drive regional economic growth. According to Primandari et al. (2025), better human quality will increase labor productivity, thereby increasing output. This condition confirms that human development is a crucial factor in improving economic performance in East Java.

Endogenous growth theory explains that human capital is a key factor in driving long-term economic growth (Gruzina et al., 2021). Improved education and health quality will enhance individuals' ability to innovate and work more efficiently. Thus, regions with higher HDI levels tend to have greater economic competitiveness. This aligns with conditions in East Java, where an increase in HDI can strengthen the economic structure by increasing productivity and labor quality (Puttitanun & Lerskullawat, 2025).

The open unemployment rate (UNEMP) has a negative and significant effect on regional gross domestic product. This means that the higher the open unemployment rate, the lower the regional gross domestic product. In Keynesian theory, consumption is one indicator of economic growth. This means that household consumption is needed to drive growth in the GRDP in East Java (Hia, 2025). High unemployment means many people are unemployed and have no income, which ultimately prevents them from engaging in consumption activities. The same study in Aceh Province also stated that consumption is one of the factors driving economic growth. According to Utami (2020), high unemployment reduces people's purchasing power, resulting in a slow economy. A slow economy discourages many entrepreneurs from investing.

Other research suggests that unemployment is caused by a lack of available jobs. According to Surya et al. (2021), economic growth is largely driven by the capital-intensive industrial sector. Capital-intensive industrial sectors are those that focus on the use of machinery and technology, thus requiring fewer workers. This lack of labor absorption leads to high unemployment and stunted economic growth. Government policies focused on labor absorption, job creation, and human capital development are needed to meet labor market needs and reduce unemployment (Rohadin et al., 2025).

The number of poor people (logPov) has a negative and significant effect on gross regional domestic product. This means that the higher the number of poor people, the lower the gross regional domestic product. High poverty rates are caused by the low contribution of the community to economic activity. Increases in GRDP are driven by public consumption and labor productivity. If these two factors do not function properly, it will hinder economic growth (Qayyum et al., 2025).

This is in line with Keynesian theory of aggregate demand. The poor tend to engage in limited consumption activities, resulting in low aggregate demand and depressed output (Baqae & Farhi, 2021). The same study also found that the poverty rate in West Java, according to Mirawati & Feriyanto (2023), occurs because many people have low productivity. Consequently, low incomes prevent them from driving consumption. Research in Sumatra suggests that poverty occurs due to regional inequality. High GRDP is concentrated only in certain regencies/cities with capital-intensive industrial sectors, while poor people are predominantly found in rural areas (Silaban et al., 2020).

Furthermore, the district minimum wage (logWage) has a positive and significant effect on gross regional domestic product. This means that when the district minimum wage increases, gross regional domestic product also increases. Minimum wage policy is an important benchmark for driving economic growth. Higher incomes mean increased consumption, which can drive GRDP (Putra & Ridwan, 2025). A factor inhibiting economic growth is the high poverty rate caused by relatively low incomes. According to Sulistiawan (2023), the minimum wage can be an indicator of increasing community income, thereby increasing community contributions to economic activities through consumption.

The same study also suggests that increasing the district minimum wage can stimulate economic growth. According to Pingkan (2025), regional economic activity can be stimulated by increasing the district minimum wage. Increasing the district minimum wage also increases labor productivity, resulting in higher community income. Rising incomes can improve people's standard of living. However, other research suggests that if wage levels fail to reach equilibrium, an imbalance between labor supply and demand will occur, resulting in a reduction in the number of workers employed by companies (Widyawati & Aristyanto, 2025).

CONCLUSION

Based on the research results, it can be concluded that the variables influencing Gross Regional Domestic Product (GRDP) in East Java are the Human Development Index (HDI), the open unemployment rate (Unemp), the number of poor people (Pov), and the district minimum wage (Wage). The best model used was the Fixed Effect Model (FEM) based on the Hausman test. The results show that HDI and Wage have a positive and significant effect on GRDP, indicating that improving the quality of human resources and community income can boost productivity and aggregate demand. Conversely, Unemp and Pov have a negative and significant effect, indicating that high unemployment and poverty reduce purchasing power and community economic participation, thus hampering economic growth. Meanwhile, foreign direct investment (FDI) and the labor force participation rate (Lab) did not have a significant effect, indicating unequal investment distribution and suboptimal labor absorption across various regions.

From a practical perspective, the government needs to improve the quality of human resources through investment in the education and health sectors, and ensure that minimum wage policies align with increased labor productivity. Furthermore, efforts to reduce unemployment and poverty need to be implemented through job creation, particularly in labor-intensive sectors, and regional development outside industrial centers like Surabaya to ensure more equitable economic growth. Strengthening the MSME sector and developing

new industrial estates in underdeveloped areas can also be alternative strategies to improve income equality and economic inclusiveness across regions.

However, this study has several limitations. First, the variables used are limited to specific macroeconomic indicators and do not include other factors such as infrastructure, technology, and institutional quality. Second, the use of secondary data may limit its ability to capture real-world conditions, particularly informal economic activity. Third, the model used does not consider dynamic aspects or the potential for endogeneity between variables. Therefore, future research is recommended to include a broader range of variables, use more complex econometric approaches such as dynamic panels, and consider spatial analysis to obtain a more comprehensive picture of the determinants of regional economic growth.

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