

Analysis of the Impact of Economic Growth, the Human Development Index, the Labor Force, and Domestic Investment on Unemployment in East Java (2023–2025)

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Abstract

Unemployment remained one of the major labor market challenges in East Java Province despite the positive development of various economic indicators. This study aimed to examine the effects of economic growth, the Human Development Index, the labor force, and domestic investment on the unemployment rate in East Java during the 2023–2025 period. The study employed secondary data obtained from Statistics Indonesia, covering 38 regencies and municipalities. Panel data regression analysis was applied, while the most appropriate estimation model was selected through the Chow test and Hausman test, which identified the Fixed Effect Model as the best-fitting model. The findings revealed that all independent variables jointly influenced the unemployment rate. Partially, domestic investment had a negative and statistically significant effect on unemployment, whereas economic growth, the Human Development Index, and the labor force did not show significant effects. The model was able to explain 91.13 percent of the variation in the unemployment rate. These findings indicated that increasing domestic investment contributed to greater labor absorption and had the potential to reduce unemployment in East Java Province.

Keywords: Economic Growth, Human Development Index, Labor Force, Domestic Investment, Unemployment.

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INTRODUCTION

Unemployment is a key macroeconomic indicator that reflects how successful economic development has been in a given region. Economic development is the form of achievement that every area expects and aspires to, because it signals whether the economy is growing and whether people's welfare improves (Wilujeng & Prasetyia, 2024a). According to Sukirno (1994), the unemployment rate describes a condition in which a person who is classified as part of the labor force is looking for work but has not yet obtained a job (Putri Febriani & Febriyastuti Widyawati, 2024). Rising unemployment can worsen the community's economic conditions due to reduced opportunities to earn income. This highlights that the unemployment problem is closely linked to the community's economic welfare and therefore needs to receive attention in regional unemployment policy. Unemployment is an issue that is frequently found in many places in Indonesia, including in the East Java province. For that reason, unemployment is a strategic issue that requires in-depth analysis by considering various factors that influence it.

As one of Indonesia's main centers of economic growth, the East Java province has a fairly complex labor situation. Theoretically, higher economic growth is expected to expand employment opportunities and thereby reduce unemployment. This view is consistent with research findings indicating that economic growth has a negative effect on the unemployment rate, although in some circumstances the effect does not show statistical significance (Nilawati et al., 2024). During the 2023–2025 period, unemployment conditions in East Java tend to fluctuate as a result of the influence of various macroeconomic factors. The unemployment rate in East Java is relatively high, influenced by the size of the population. This situation makes competition for jobs increasingly intense, so that available employment opportunities have not been able to absorb the entire labor force (Putri Febriani & Febriyastuti Widyawati, 2024). Even though economic growth shows a positive trend after economic recovery, the increase has not yet been able to fully absorb the additional labor force that continues to rise every year.

Based on data from the Central Bureau of Statistics (BPS), the labor force participation rate (TPAK) in East Java increased from 71.50% in 2023 to 73.02% in 2024, and again rose to 74.25% in 2025, indicating an increase in the number of people actively participating in the labor market. BPS data also show that the open unemployment rate (TPT) in East Java declined gradually from 4.33% in February 2023 to 3.74% in February 2024, and reached 3.61% in February 2025, which suggests improvements in labor absorption even though challenges in the labor market remain. (Kurniawati et al., 2025) indicates that the characteristics of the local economy and labor conditions have a relationship with the unemployment rate in East Java. The study found that the number of residents has a positive effect on unemployment, while several other labor-related factors show different patterns of relationship.

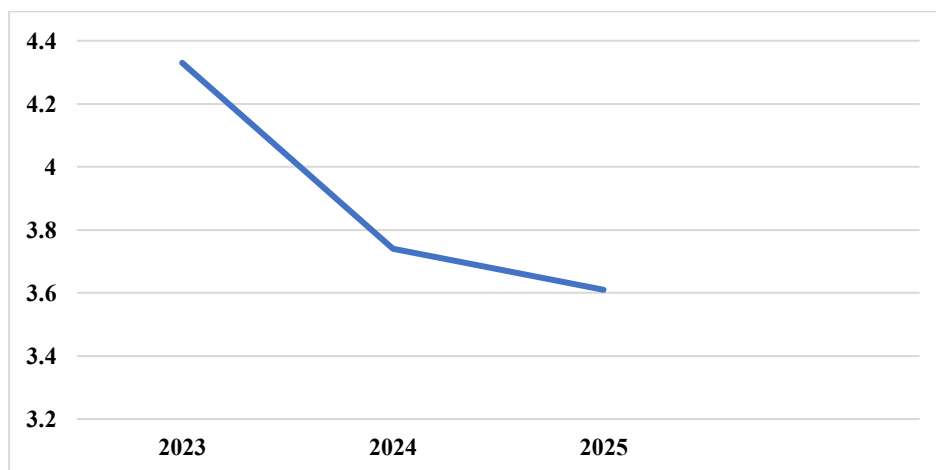


Figure 1. Unemployment Graph for East Java, 2023–2025

Source: Statistics Indonesia (BPS) – East Java

The Human Development Index (HDI) is one of the most important indicators related to unemployment. The HDI reflects human quality through education, health, and decent living standards. As the quality of human resources increases, the community's chances of obtaining employment also increase. The Human Development Index (HDI) has a negative effect on the unemployment rate in East Java. This indicates that improving the quality of human resources through education, health, and decent living standards can raise labor productivity and competitiveness, thereby reducing unemployment (Putri Ani Winata et al., n.d.).

On the other hand, the quality of human resources reflected in the Human Development Index (HDI) indicates improvement, but it has not yet been evenly distributed across all regions. The Human Development Index (HDI) also plays an important role in raising productivity and employment opportunities. (Cortadas-Guasch, 2024) states that improvements in education do not necessarily guarantee a match between workers' competencies and job needs. Such a mismatch can arise when the qualifications or fields of expertise held by workers do not align with the characteristics of the available jobs. These conditions suggest that enhancing the quality of human resources must be accompanied by alignment between workers' competencies and the demands of the labor market in order to support labor absorption. (Arfa Syera I et al., 2023) finds that the HDI has a negative and significant effect on the unemployment rate in the City of Medan, whereas economic growth shows no significant effect. These findings indicate that improvements in human development may be associated with changes in unemployment levels, although the magnitude of the effect can differ depending on the characteristics of the region studied. Other research also shows that education and labor quality significantly affect the reduction of unemployment (Rizkita et al., 1896).

However, the relationship between human development and unemployment does not always produce the same results across every region. Angger Pramono & Setyowati (2024) found that the Human Development Index has no significant effect on unemployment. This suggests that improving human development quality does not necessarily lead directly to lower unemployment if it is not accompanied by the availability of job opportunities that match workers' characteristics. In contrast, Suparman & Muzakir (2023) found that increases in the human development index have a negative and significant effect on the unemployment rate in Indonesia. These differing findings indicate that the relationship between human development and unemployment may be influenced by regional characteristics and differing labor market conditions.

In addition to the HDI, Economic Growth is also a factor that affects the unemployment rate. Theoretically, higher economic growth increases production activity, which in turn encourages the creation of new jobs. However, in practice, economic growth does not always reduce unemployment if such growth is not accompanied by increased labor absorption. Haider et al. (2023) show that the response of employment opportunities to economic growth is relatively lower in developing countries, so higher output growth is not always accompanied by an increase in employment opportunities in the same proportion. Research in the Journal of Development Economic and Social Studies states that economic growth affects unemployment rates, particularly in regions with a high concentration of economic activity such as Java (Wilujeng & Prasetyia, 2024b). This relationship also needs to be examined based on the observation period, because changes in economic activity do not always have the same impact on unemployment in every period. Anwar (2025) shows that economic growth is one of the factors influencing unemployment dynamics in Indonesia, especially in the short term. This indicates that changes in economic growth may require a certain amount of time before they are reflected in changes in labor market conditions.

Another factor that affects unemployment is the labor force. As the number of the labor force increases, the demand for employment opportunities also rises. If employment opportunity growth is lower than labor force growth, unemployment

will increase. An increase in the number of job seekers that is not matched by the expansion of employment opportunities can lead to higher unemployment (Khoirunnisa & Rofiki, n.d.). (Bilenkisi, 2024) indicates that the relationship between the labor force and unemployment is not determined only by the number of workers, but also by job-search behavior and economic uncertainty. Therefore, changes in the labor force need to be understood together with labor-market conditions and job seekers' behavior.

In addition to the labor force, investment also plays an important role in reducing unemployment. Higher investment can encourage growth in the production sector, expand business activities, and create new jobs. The higher the investment coming in, the greater the likelihood of labor absorption, so the unemployment rate can decline (Firmansyah et al., n.d.-a). Empirically, the relationship between domestic investment and unemployment has also been found in research (Ridwan & Sumarni, 2024). This study shows that Domestic Investment in the Form of Penanaman Modal Dalam Negeri (PMDN) has a negative and significant effect on the level of open unemployment in West Sumatra. The results suggest that an increase in domestic investment may be associated with rising economic activity and labor absorption in a given region. (Sari & Hasmarini, 2023) shows that economic growth and domestic investment are factors that affect unemployment levels in regencies/municipalities in Central Java. These findings indicate that changes in regional economic activity and realized investment may be linked to the dynamics of unemployment in a region. (Matsuura & Saito, 2023) further shows that the effect of investment on labor depends on sector characteristics and the skills required. In the Indonesian manufacturing industry, investment can increase demand for skilled labor, but reduce demand for unskilled labor. Thus, the impact of investment on the labor market is influenced by the structure of labor needs and the skills that are available.

Several previous studies have examined the influence of economic growth, the Human Development Index (HDI), the labor force, and investment on unemployment. However, this study differs from earlier research because it uses the latest data for 2023–2025, with a focus on regencies/municipalities in East Java. In addition, this study combines economic growth, the Human Development Index (HDI), the labor force, and domestic investment in a single panel data analysis model using the Fixed Effect Model (FEM) approach. Prior research from IKRAITH_EKONOMIKA also explains that economic growth and the labor force participation rate have a significant effect on the unemployment rate in East Java using a panel data approach. Nevertheless, this study uses a more recent observation period, so it is expected to provide a more up-to-date picture of unemployment conditions after the economic recovery (Firmansyah et al., n.d.-b).

Based on the discussion above, this study aims to analyze the effects of economic growth, the Human Development Index (HDI), the labor force, and domestic investment on the unemployment rate in East Java for 2023–2025, both partially and simultaneously. This study is expected to serve as a consideration for local governments in formulating more effective economic development and employment policies to reduce the unemployment rate in East Java.

METHOD

This study employs a qualitative approach with secondary data in the form of a balanced panel dataset that combines cross-sectional data from 38 regencies/cities in East Java Province and time-series data covering 3 years, namely the 2023–2025 period, resulting in a total of 144 observational units. All data are drawn from official publications of the Central Statistics Agency (BPS) and from the Community Self-Reliance Body (BKM) of East Java Province. The dependent variable is unemployment measured in percentage terms. The independent variables comprise four indicators: (1) economic growth measured in percentage terms; (2) the Human Development Index (HDI) measured in percentage terms; (3) the labor force measured in percentage terms; and (4) investment in the country (PMDN) measured in million rupiahs. The PMDN variable is transformed into natural logarithms (LN) to correct the distribution of data that is not normally distributed and to reduce heteroskedasticity, such that the estimated model takes a log-linear form. The panel data regression equation model used in this study is as follows:

$$UEMP_t = \beta_0 + \beta_1 PE_t + \beta_2 IPM_t + \beta_3 AK_t + \beta_4 LN_PMDN_t + \varepsilon$$

Where:

$UEMP$	= Unemployment (%)
PE	= Economic Growth (%)
IPM	= Human Development Index (%)
AK	= Workforce (%)
$PMDN$	= Domestic Investment (Rp Juta)
ε	= Error term (faktor kesalahan)
β_0	= Constant
$\beta_1 \dots \beta_4$	= Regression coefficient of the independent variable
t	= Year t
ε	= Error term

Panel data model estimation is performed using three methods: Pooled Least Squares (PLS/CEM), the Fixed Effects Model (FEM), and the Random Effects Model (REM). Model selection is conducted in two stages of statistical testing: first, the Chow test is applied to decide between PLS and FEM; second, the Hausman test is used to determine whether FEM or REM should be adopted. If the Chow test indicates that FEM is superior, the Lagrange Multiplier (LM) test is unnecessary. Estimation is carried out in Eviews 12.

To confirm the validity of the estimated model, the study undertakes four classical assumption tests. First, the Normality test is used to check whether the model residuals are normally distributed. Second, the Multicollinearity test is conducted using a correlation matrix among the independent variables, employing a correlation tolerance threshold of < 0.80 . Third, the Heteroskedasticity test is implemented through a regression of the absolute value of the residuals (ε_{it}) on the independent variables; if the variable's probability value is > 0.05 , heteroskedasticity is not present. Fourth, autocorrelation is examined using Durbin–Watson (DW) statistics, where a DW value between -2 and $+2$ signifies the absence of autocorrelation. Hypothesis testing relies on three statistical tests. The partial t-test is used to evaluate the effect of each independent variable on unemployment at a significance level of $\alpha = 5\%$. The simultaneous F-test is used to assess the joint impact of all independent variables on unemployment. Finally, the coefficient of determination (R^2) and the Adjusted R^2 are employed to measure the model's ability to explain variations in unemployment.

RESULT AND DISCUSSION

A. Classical Assumption Testing

1. Normality Test

The purpose of the normality test is to determine whether the residual values produced by the regression model follow a normal distribution. This testing is necessary because a normally distributed residual distribution is one of the core assumptions in regression analysis; it must be satisfied so that the estimation results and statistical testing are reliable. The regression model is considered to be normally distributed when the probability value is greater than the significance level of 0.05.

Table 1. Normality Test Results

Jarque-Bera	4.275773
Probability	0.117904

Source: Data processed using EViews 12, 2026.

The normality test results indicate a Jarque–Bera probability value of 4.275773, which is greater than 0.05; therefore, it can be concluded that the model residuals follow a normal distribution. With the residual normality assumption satisfied, statistical inference using the t-test and the F-test is justifiable.

2. Multicollinearity Test

Multicollinearity testing was conducted using a correlation matrix among the independent variables. The results are presented in Table 2.

Table 2. Multicollinearity Test Results

Variable	PE	IPM	AK	PMDN
PE	1.000000	0.065928	0.011855	0.310467
IPM	0.065928	1.000000	0.023847	0.068628
AK	0.011855	0.023847	1.000000	-0.200307
PMDN	0.310467	0.068628	-0.200307	1.000000

Source: Data processed using EViews 12, 2026.

Based on Table 2, all independent variables show correlation coefficient values of <0.80. This indicates that there is no strong relationship among the independent variables. Therefore, it can be concluded that the independent variables are free from the multicollinearity test.

3. Heteroskedasticity Test

Heteroscedasticity was assessed by regressing the absolute values of the residuals on all independent variables. The results of the test are reported in Table 3.

Table 3. Heteroskedasticity Test Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.078636	0.812705	1.327217	0.1900
PE	0.028079	0.039040	0.719230	0.4751
IPM	1.240005	2.260005	0.550126	0.5845
AK	-2.440005	3.290005	-0.742659	0.4609
PMDN	-0.061456	0.053312	-1.152749	0.2541

Source: Data processed using EViews 12, 2026.

Based on Table 3, each independent variable has a probability value greater than 0.05, indicating that it is free from the heteroscedasticity test. Because the probability values of all independent variables are greater than 0.05, no variables significantly affect the absolute residuals. This suggests that no heteroscedasticity occurs.

4. Autocorrelation Test

The autocorrelation test was carried out using the Durbin–Watson statistic (DW). The basis for decision-making in this test is that, if the Durbin–Watson value falls within the range from -2 to +2, the regression model is considered not to exhibit autocorrelation. Conversely, if the Durbin–Watson value lies outside that range, the model shows indications of autocorrelation.

Tabel 4. Autocorrelation Test Results

R-squared	0.911336
Durbin-Watson stat	2.036175

Source: Data processed using EViews 12, 2026.

The presence of autocorrelation was tested using the Durbin–Watson statistic (DW). Based on the estimation results from the FEM model, the DW value obtained was 2.0361. Because the DW value falls within the range of -2 to +2, it can be concluded that no autocorrelation occurs in the model. Accordingly, there is no serial correlation among the residuals across years in the model.

B. Model Selection and Regression

The first step in panel data analysis is to determine the most appropriate estimation model. The test results are presented in Tables 5 and 6 below.

Table 5. Chow Test Results

Effects Test	Statistic	d.f.	Prob.
Cross-section F	10.500983	(37,54)	0.0000
Cross-section Chi-square	201.939706	37	0.0000

Source: Data processed using EViews 12, 2026.

The Chow test results show a probability value of $0.0000 < 0,05$, indicating that the selected model is the Fixed Effect Model (FEM). The Chow test also reports that the Cross-section F probability and the Chi-square value are $0,0000 < 0,05$, so the Fixed Effect Model (FEM) is more suitable than the Effect Model (CEM). Next, the Hausman test results present a Chi-square value.

Table 6. Hausman Test Results

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	19.341792	4	0.0007

Source: Data processed using EViews 12, 2026.

The Hausman test results indicate a probability value of $0.0007 < 0.05$, so the selected model is the Fixed Effect Model (FEM). The Chow test results show that the Cross-section F and Chi-square probabilities are $0.0000 < 0.05$, implying that the Fixed Effect Model (FEM) is superior to the Common Effect Model (CEM). Furthermore, the Hausman test yields a Chi-square statistic of 19.341793 with a probability of $0.0007 < 0.05$, which means the FEM is more appropriate than the Random Effect Model (REM). Based on these tests, the estimation model used in this study is the Fixed Effect Model (FEM) with fixed effects across regions (Cross-Section Fixed Effect). Therefore, the Lagrange Multiplier test does not need to be conducted.

Table 7. FEM Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.38200	2.288489	4.536617	0.0000
PE	-0.121023	0.109932	-1.100889	0.2758
IPM	-9.960005	6.360005	-1.567041	0.1229
AK	-0.000111	9.270005	-1.202381	0.2345
PMDN	-0.308203	0.150122	-2.053021	0.0449
Effects Specification				
Cross-section fixed (dummy variables)				
Root MSE	0.406643	R-squared		0.911336
Mean dependent var	4.095208	Adjusted R-squared		0.844017
S.D. dependent var	1.372820	S.E. of regression		0.542190
Akaike info criterion	1.913237	Sum squared resid		15.87440
Schwarz criterion	3.035139	Log likelihood		-49.83536
Hannan-Quinn criter.	2.366728	F-statistic		13.53762
Durbin-Watson stat	2.036175	Prob(F-statistic)		0.000000

Source: Data processed using EViews 12, 2026.

C. Discussion

1. The Impact of Economic Growth on the Unemployment Rate

Based on the Fixed Effect Model (FEM) estimation results, the economic growth variable has a coefficient of -0.121023 with a probability value of 0.2758. Because the probability value is greater than 0.05, economic growth has no statistically significant effect on the unemployment level in East Java during the 2023–2025 period.

The lack of statistical significance indicates that the increase in economic activity has not yet been able to generate employment opportunities optimally. This condition may stem from the structure of economic growth being largely supported by sectors with high capital intensity, so that increases in output are not accompanied by increases in labor demand at a large scale.

As a result, the economic growth that occurs does not produce a clear impact on reducing unemployment. These findings are consistent with the study by (Sanitra, 2021), which states that economic growth does not have a significant effect on unemployment. The results suggest that even when the economic growth rate rises, it is not necessarily able to create sufficient employment opportunities. This phenomenon can be explained by the dominance of economic sectors that tend to be capital-intensive, meaning that the increased output generated is not followed by labor needs of comparable magnitude. Therefore, the economic growth observed does not provide a significant contribution to lowering the unemployment rate.

2. The Influence of the Human Development Index (HDI) on the Unemployment Rate

The analysis results indicate that the Human Development Index has a coefficient of -9.960005, with a probability value of 0.1229. These findings suggest that the Human Development Index does not have a statistically significant effect on the unemployment level in East Java Province. In other words, improvements in the quality of human development tend to reduce unemployment, but the relationship is not strong enough to be statistically supported.

The negative relationship identified implies that improving the quality of human resources—through education, health, and higher living standards—can increase workers' productivity. However, these human-quality improvements have

not been fully able to reduce unemployment because there remains a mismatch between workers' competencies and the needs of the labor market. In addition, the limited job opportunities available is another factor contributing to why higher-quality labor has not delivered a significant impact on lowering unemployment.

This study's results are consistent with prior research conducted by (Harati, 2024), which shows that the Human Development Index does not have a statistically significant effect on unemployment levels. This situation indicates that human development improvements reflected in the Human Development Index value have not produced a clear effect on labor absorption. One contributing cause is the gap between workers' skills and qualifications and the labor market needs, which continue to evolve. Moreover, relatively limited growth in job opportunities means that workers with better quality are not fully absorbed into the labor market. As a result, increases in the Human Development Index have not been able to significantly reduce unemployment levels.

3. The Impact of the Labor Force on the Unemployment Rate

The labor force variable yields a coefficient of -0,000111 with a probability value of 0,2345. These results indicate that the labor force has no statistically significant effect on the unemployment rate in East Java Province during the study period. This study's findings align with the research (Wilujeng & Prasetyia, 2024c), which explains that economic growth and the Human Development Index are related to the unemployment rate, although the effect of each variable may differ across regions and study periods.

Theoretically, an increase in the number of workers can potentially raise unemployment if growth in employment opportunities is unable to keep pace with the increase in job seekers. However, the present results show a negative direction of the relationship, suggesting that increases in the labor force can still be offset by the labor market's ability to absorb workers. Accordingly, the growing number of people entering the labor market does not directly lead to an increase in unemployment.

The insignificant effect of the labor force is consistent with the findings of (Wati et al., 2024). These results suggest that an increase in the number of people active in the labor market is not always followed by changes in the unemployment rate. This condition may occur because the additional available workers can still be absorbed by various economic activities that develop in the region. Moreover, the unemployment rate is not determined solely by the size of the labor force; it is also influenced by other factors, such as the availability of employment opportunities, the ability of the business sector to absorb labor, and the prevailing economic conditions. Therefore, the increase in labor has not yet been able to exert a meaningful influence on changes in the unemployment rate in East Java Province during the study period.

4. The Impact of Domestic Investment on the Unemployment Rate

Based on the estimation results, the domestic investment variable measured using the natural logarithm of PMDN has a coefficient of -0.308203 with a probability value of 0.0449. A probability value smaller than 0.05 indicates that domestic investment has a statistically significant effect on the unemployment rate in East Java.

The negative coefficient implies that an increase in domestic investment can reduce unemployment. As larger investment flows into a region, the likelihood of new economic activities emerging—capable of absorbing labor—also increases. Investment encourages business expansion, enhances production capacity, and supports the development of economic sectors that require workers, thereby creating broader employment opportunities.

These findings are consistent with the study by (Ridwan & Sumarni, 2024), which states that PMDN has a significant influence on unemployment. This suggests that higher domestic investment can contribute to a reduction in the number of unemployed persons. This occurs because investment stimulates increased economic activity through business development, improved production capacity, and the opening of new business opportunities that require labor. Rising labor demand, in turn, increases labor absorption across various economic sectors. Accordingly, the higher the value of realized investment, the greater the chance of creating employment opportunities that ultimately help to lower the unemployment rate.

CONCLUSION

Based on the results of a panel data analysis using the Fixed Effect Model (FEM) approach, it can be concluded that economic growth, the Human Development Index (HDI), the labor force, and domestic investment (PMDN) simultaneously exert a statistically significant effect on the unemployment rate in East Java for the years 2023–2025. These findings indicate that changes in the unemployment rate are influenced by a combination of various economic and human-development factors occurring across each district/city in East Java.

Partially, domestic investment (PMDN) has been shown to have a statistically significant impact on the unemployment rate. This suggests that higher levels of investment can stimulate economic activity, expand business capacity, and create new jobs, thereby reducing unemployment. In contrast, the variables economic growth, HDI, and the labor force have a negative relationship with the unemployment rate, although their effects are not statistically significant during the study period.

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