

Determinants of Unemployment Rate in West Java: Analysis of Regency/City Panel Data in 2018-2024

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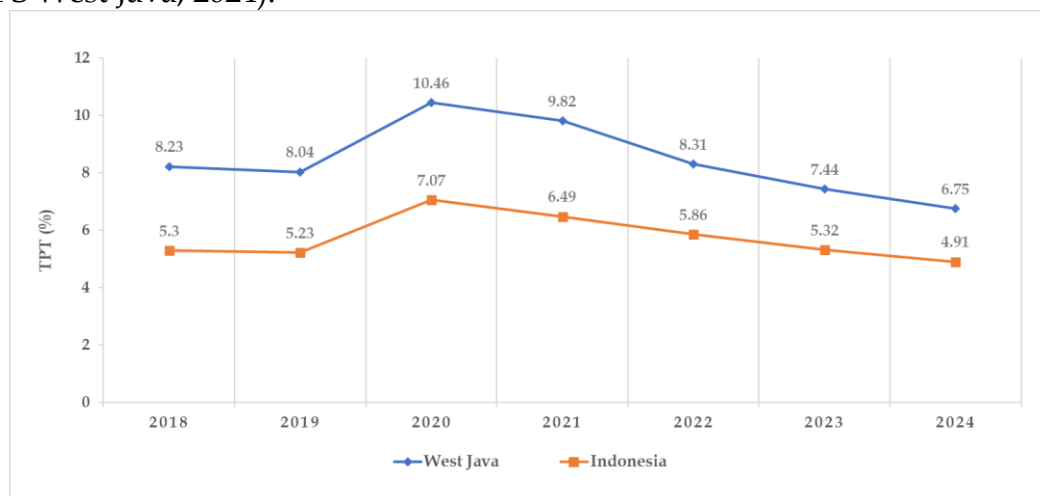
ABSTRACT

This study examines the determinants of the open unemployment rate in 27 districts/cities in West Java for the 2018-2024. Using panel data regression with the Fixed Effect Model, analyzing the influence of economic growth, the Human Development Index, the Labor Force Participation Rate, and the number of people on unemployment. The results showed economic growth (coefficient -0.309; $p < 0.005$), HDI (coefficient -0.432; $p < 0.005$), and TPAK (coefficient -0.087; $p < 0.05$) a significant negative effect on unemployment, while the population was insignificant ($p = 0.057$). The model explains 86.05% variation in unemployment change. The findings indicate that the decline in unemployment in West Java is more determined by the quality of human resources and economic strength than demographic factors, emphasizing the importance of inclusive growth strategies.

INTRODUCTION

Unemployment is a crucial indicator that reflects the economic condition of a region and the level of community welfare. The International Labour Organization report notes that although the global unemployment rate fell from 6.9 percent in 2020 to 5.8 percent in 2022 post-COVID-19 pandemic, the number of global unemployed is predicted to increase to 211 million people in 2023-2024 (Sodergren *et al.*, 2023). In Indonesia, the national Open Unemployment Rate (TPT) experienced a surge during the pandemic of 5.23 percent in 2019, up 7.07 percent in 2020, then gradually decreased to 4.91 percent in 2024 (BPS, 2025). However, structural problems remain entrenched, especially in densely populated provinces such as West Java which consistently record the highest TPT in Indonesia.

West Java, with a population of 50.3 million people by 2024, faces complex employment challenges. BPS data shows that in 2018, the open unemployment rate in West Java reached 8.23 percent, then decreased to 8.04 percent in 2019. However, due to the outbreak of the COVID-19 pandemic in Indonesia, in West Java Province itself, the open unemployment rate rose significantly to 10.46 percent in 2020, which had an impact on economic conditions and workers in the West Java region (Khayati & Setyowati, 2024). The pandemic worsened the situation with TPT jumping to 10.46 percent in 2020, and although it dropped to 6.75 percent in 2024, the figure is still above the national average of 4.91 percent (BPS West Java, 2024).



Source : Central Statistics Agency, 2025 (data processed)

Figure 1. Graph of the Open Unemployment Rate (TPT) of West Java and Indonesia in 2018-2024

In figure 1. Stating that the unemployment rate in West Java has always been higher than the national average from 2018 to 2024. The increase in TPT in 2020 indicates the influence of the pandemic on the job market, while the subsequent decline indicates an imperfect economic recovery. The difference in trends between West Java and the national shows structural problems in job creation in the regions.

This phenomenon states that there is a gap between the increase in the labor force and the creation of jobs, which cannot be explained by just one

economic factor. West Java's relatively good economic growth of 4.95% in 2024 does not automatically reduce unemployment, indicating the phenomenon of *jobless growth*. Meanwhile, the increase in the Human Development Index from 71.30 in 2018 to 74.43 in 2024, the stagnant Labor Force Participation Rate of 63-68 percent in 2018-2024, and demographic pressure add to the complexity of the problem (BPS West Java, 2025).

Previous research has examined the factors that cause unemployment and shown mixed and inconclusive results. (Aulia *et al.*, 2024) found that HDI, education, and economic growth have a significant effect on West Java's unemployment in 2018-2023, but have not included variables in the population and labor force participation rate. Research (Anggraini *et al.*, 2023) proves that economic growth has a negative effect on unemployment in Jambi Province, while (Sutrisno & Arifin, 2023) found that HDI and poverty actually increase the TPT of districts/cities in Bali. (Lestari *et al.*, 2024) emphasizes the importance of population and labor force participation in explaining urban unemployment fluctuations. (Fahmi *et al.*, 2023) through a panel analysis on 10 Sumatra islands found a large contribution of HDI and economic growth in reducing unemployment. However, most of the research is still limited to the national/interprovincial scope, so this study fills this gap with specific analysis at the district/city level of West Java using a panel data approach. Therefore, this study simultaneously examined the variables of Economic Growth, HDI, TPAK, and Population in the context of inter-district/city panel data.

This study aims to analyze the influence of economic growth, HDI, TPAK, and population on the unemployment rate in 27 districts/cities in West Java for the 2018-2024 period which shows before-during-and after covid-19. The benefit of the research is to fill the empirical gap with a multidimensional approach that integrates economic, social, and demographic factors simultaneously at the district/city level and enriches the literature on regional unemployment determinants in provinces with the highest socioeconomic and demographic complexity in Indonesia.

LITERATURE REVIEW

Open Unemployment Rate

Unemployment can be interpreted as a situation where a person does not have a job, but is trying to find a job or prepare for a new business (Azzahra *et al.*, 2024). According to the Central Statistics Agency, unemployment includes people who are not working and are looking for a job, or are preparing for a new venture, or feel that it is impossible to get a job, or have been hired but have not started it. The government plays a crucial role in addressing the problem of the unemployment rate. Based on the Job Creation Law Number 11 of 2020, job creation efforts are regulated to absorb labor in Indonesia widely in the midst of fierce global competition (Khoerunnisa *et al.*, 2024)

Sukirno (2006) classifies the types of unemployment based on two dimensions, namely: (1). The classification of unemployment according to its cause includes: frictional unemployment, cyclical unemployment, structural unemployment, and technological unemployment. (2). The classification of

unemployment according to its characteristics includes: open unemployment, hidden unemployment, seasonal unemployment, and part-time unemployment (Azzahra et al., 2024).

As quoted by Farmer (2023), John Maynard Keynes in his book *The General Theory of Employment, Interest, and Money* states that imbalances in the labor market cannot always be overcome through free market mechanisms. Keynes explained that unemployment is often not caused by the labor supply factor, but rather by the lack of total demand in the economy (Rusydan & Wijaya, 2024). In this case, an increase in labor force can lead to a decrease in wage rates, which in turn reduces people's purchasing power to buy goods. This decrease in purchasing power is detrimental to producers, so they are less efficient in absorbing labor. Therefore, this theory highlights the importance of government intervention to maintain total demand, create jobs, and address the unemployment problem.

Economic Growth

Economic growth occurs when a country's economic condition improves compared to the previous period. Sukirno (2011) stated that "economic growth means the progress of economic activities that increase the production of goods and services in society, so that people's welfare increases" (Mouren et al., 2022). BPS assesses the economic progress of a region through its economic growth rate. Samuelson & Nordhaus (2004) in (Abiarta, 2022) mention the causes that can affect economic growth, which include: (1) human resources (labor supply, education, discipline, motivation); (2) natural resources (soil, minerals, fuel, environmental quality); (3) capital formation (machinery, factory, road); and (4) technology (science, engineering, management, entrepreneurship).

Usually, economic growth is negatively related to unemployment. Research (Shafira et al., 2020) shows that rising economic growth can reduce unemployment. The faster the economy grows, the greater the chance of new jobs emerging. (Toruan et al., 2025) highlight that if growth depends on the heavy sectors of capital and technology, employment may not increase, resulting in the phenomenon of jobless growth. (Haider et al., 2023) said that in many developing countries, economic growth is less effective in creating jobs than developed countries, despite the high growth rate, which indicates jobless growth.

The relationship between economic growth and unemployment shows a strong correlation between growth rates and declining unemployment. Okun's Law explains the inverse relationship between unemployment and economic growth. Okun's Law shows a negative relationship between the unemployment rate and the real Gross Domestic Product (Suryono et al., 2020). Previous research by (Ardian et al., 2022) shows that rising economic growth does not necessarily reduce the open unemployment rate in Indonesia. However, another study by (Septiana & Asmara, 2024) gave different results, where economic growth had a negative and significant effect on the unemployment rate in Sidoarjo Regency from 2014-2023.

Human Development Index

The Human Development Index (HDI) is an index that includes education, health, and per capita income that is closely related to the quality of a country's human resources. In an era of globalization and fierce economic competition, increasing HDI is key to global competitiveness and providing a better life for people (Simbolon et al., 2023).

The United Nation Development Programme (UNDP Indonesia) in (Mahroji & Nurkhasanah, 2019) states that HDI indicators include: (1) Longevity: this can be measured by life expectancy at birth (life expectancy) and infant mortality per thousand population. (2) Educational Achievement: can be measured by the literacy rate of the population aged 15 years and above (adult literacy rate) and the average length of school of the population aged 25 years and above (mean years of schooling). (3) Access to Resource: can be measured by real GDP per capita based on purchasing power parity (PPP) in dollars and labor force participation rates.

Increasing HDI must start from improving the quality of human resources (Oktaviani et al., 2025). HDI affects unemployment. High HDI indicates an increase in education, health, and purchasing power, which makes the workforce more competitive and easy to enter the formal job market. Research (Rahmawati et al., 2024) shows that an increase in HDI can reduce the Open Unemployment Rate. Building good human resources will help reduce unemployment. Human capital theory emphasizes the importance of investing in human capital to increase productivity. Investment through education and training will increase work productivity. HDI is the main benchmark in the development model of a country or region. HDI contributes greatly to the management of regional development and is an important part of policy planning (Khumaerah, 2023). Previous research by (Soekapdjo & Oktavia, 2021) shows that HDI affects unemployment in Indonesia negatively and significantly. In line with that, (Damayanti et al., 2025) stated that the human development index in Tarakan City affects TPT negatively and significantly.

Labor Force Participation Rate

The Central Statistics Agency explains TPAK as a percentage of the total labor force to the number of working-age population (15 years and older). The higher the TPAK, the greater the labor supply for the production of goods and services. TPAK is used to see residents who are actively working or looking for work (Aini et al., 2022). Research (Handani & Suhariato, 2025) states that the main indicator of the labor force is the Labor Force Participation Rate. TPAK is an important condition that shows how active the working-age population is in the labor market. This level provides an overview of the potential of the workforce that the economy uses. The human capital theory of Gary Becker and Jacob Mincer emphasizes the importance of investing in education and training to increase individual productivity. This investment can contribute greatly to economic growth (Abidin et al., 2024).

TPAK is a measure of the proportion of the working-age population that is active in the labor market and is a key factor in driving development (Izzah &

Budiantara, 2020). High TPAK means that many people enter the job market. If the economy can absorb new workers, unemployment will fall. But if not, a high TPAK can actually increase open unemployment. Research (Basuki, 2024) states that the informal sector in Indonesia functions as a buffer, where many new workers are not directly unemployed, but enter informal jobs with low productivity. This makes unemployment data not always accurate. Previous research by (Lestari & Nilasari, 2025) shows that TPAK affects TPT negatively and significantly.

Population

Residents are all people who live in the territory of the Unitary State of the Republic of Indonesia for 1 year or more, or those who stay for less than 1 year but intend to stay for 1 year or more (BPS, 2022). The number of people is a group of people who live in a certain area of the country for a certain period and meet the requirements (Sondakh et al., 2024). The population was calculated through the population census (Rumbiak et al., 2023).

Population growth increases the number of labor force that needs to be absorbed by the labor market. If the increase in population is not balanced by employment, unemployment will rise. In line with research (Oktaviani et al., 2025) which states that one of the effects of rapid population growth is greater job needs. However, job creation does not always keep pace with the growth of the labor force. Therefore, it is important for West Java to manage the demographic bonus by investing in labor-intensive sectors and improving the quality of human resources. Previous research by (Siregar & Suharianto, 2023) the results of long-term model estimation showed that the number of people affects unemployment negatively and significantly, meaning that every increase in the number of people will reduce unemployment.

With reference to the previous review, the conceptual framework for this study is:

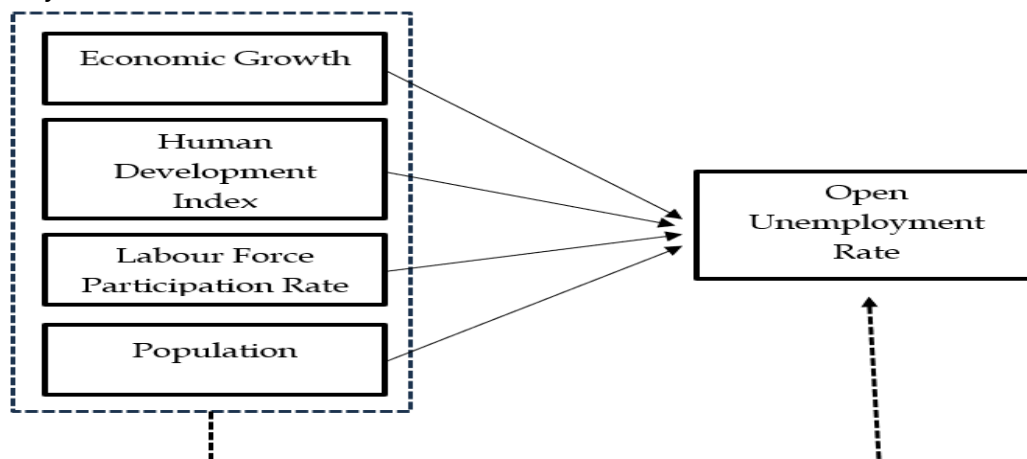


Figure 2. Conceptual Framework

In the above conceptual framework, it can be explained that the rate of economic growth, the human development index, the participation rate of the labor force and also the number of population can affect the open unemployment rate both simultaneously and partially.

METHODOLOGY

Research Design

This study uses a quantitative approach with panel data regression to analyze the influence of economic growth, HDI, TPAK, and population on TPT in West Java. The panel data was chosen because it combines time and regional variations, thus illustrating the dynamics of district/city unemployment during 2018–2024. The study included one dependent variable and four independent variables with coverage of 27 districts/cities. During this period, West Java's TPT fluctuated from 8.23 percent in 2018, increased by 10.46 percent in 2020, then decreased to 6.75 percent in 2024 (BPS, 2025), and produced 189 observations to reveal patterns of unemployment in various economic conditions.

Operational Variables and Definitions

1. The Open Unemployment Rate (TPT) as a bound variable, measured as a percentage of the number of unemployed in the labor force in West Java districts/cities with a unit of percent
2. Economic growth, which is measured through the growth rate of Gross Regional Domestic Product (GDP) based on constant prices in each of West Java districts/cities with a percentage
3. The Human Development Index, which assesses human development achievements based on quality of life, on a scale of 0-100
4. The Labor Force Participation Rate is measured as a percentage of the number of labor force (working population plus unemployed) to the number of working-age population (15 years and above) in West Java districts/cities with a percentage unit
5. The number of population, the total population of West Java per year expressed in units of million people and transformed into natural logarithms (Ln) to reduce data heterogeneity

Data Collection

The research data was obtained through documentation techniques from official secondary sources, namely the publication of the National Central Statistics Agency (BPS) and the Central Statistics Agency of West Java Province. The data includes TPT, constant price GDP growth, HDI, TPAK, and the number of people per district/city, which are compiled in a time series and panel format for the 2018–2024 period. The validity of the data is guaranteed because all information comes from government statistical institutions with standard methodologies.

Data Analysis

The analysis was carried out using panel data regression with the help of EViews 10 software and Microsoft Excel. The selection of the best model is through the Chow Test (comparing CEM with Fixed Effect Model), Hausman Test (comparing Fixed Effect Model with Random Effect Model).

The regression model equation is

$$TPT_{it} = \alpha + \beta_1 PE_{it} + \beta_2 IP_{it} + \beta_3 TPAK_{it} + \beta_4 Ln_JP_{it} + e_{it}$$

where:

- TPT = open unemployment rate
- α = intercept
- $\beta_1, \beta_2, \beta_3, \beta_4$ = the regression coefficient of each independent variable
- PE = economic growth
- HDI = human development index
- TPAK = Labor Force Participation Rate
- $\ln_JP$ = natural logarithm of population
- i = cross section
- t = time series
- ε = error term

Hypothesis testing is carried out at a significance level of 5% with a two-way hypothesis so that each independent variable is assumed to have the potential to affect TPT, the possibility of positive or negative influences according to empirical conditions. The t-test is used to assess the influence of each variable, where H_1 is accepted if $t\text{-counts} > t\text{-table}$ and $p\text{-value} < 0.05$. The F test assesses the influence of independent variables simultaneously, with similar criteria. Meanwhile, the determinant coefficient (R^2) to measure how much variation of the dependent variable can be explained by the independent variable, where R^2 is close to 1 indicates an effective model. The interpretation of the regression results focused on the direction of the coefficient and the significance of the influence of each variable on TPT.

Classic Assumption Test

Before interpreting the results, a classical assumption test was carried out to ensure that the regression model met the *criteria of the Best Linear Unbiased Estimator (BLUE)*. The residual normality test uses the *Jarque-Bera test*, with a p-value of > 0.05 which indicates a normal distribution. The multicollinearity test was carried out through correlation between variables with a correlation value of < 0.80 . The heteroscedasticity test was performed with the Glejser Test, where the p-value > 0.05 indicates a homogeneous residual variance. For FEM, the potential heteroscedasticity is overcome by applying *robust standard error*.

RESEARCH RESULTS

Best Model Selection

The analysis begins by determining the most appropriate panel data regression model.

Table 1. Chow Test Results

Effects Test	Statistic	d.f	Prob.
Cross-section F	18.755757	(26,157)	0.0000
Cross-section Chi-square	266.955170	26	0.0000

The Chow test was conducted to compare the Common Effect Model with the Fixed Effect Model. The results show that the Cross-section F prob value is 0.0000, smaller than 0.05, so FEM is chosen as the better model.

Table 2. Hausman Test Results

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f	Prob.
Cross-section random	54.256510	5	0.0000

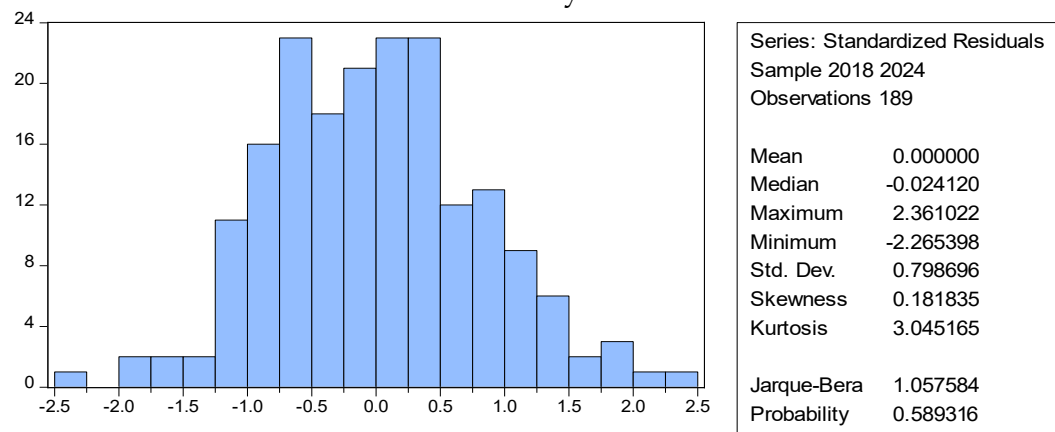
Next, Uji Hausman compares the Fixed Effect Model with the Random Effect Model. The test results showed a random Cross-section prob value of 0.0000, smaller than 0.05, confirming that the Fixed Effect Model was the best choice for this study.

Classic Assumption Test

Before the interpretation of the regression results, a classical assumption test is carried out to ensure that the model meets the BLUE criteria and that the estimation results are reliable.

Normality Test

Table 3. Normality Test Results



The normality test used Jarque-Bera with a prob value of 1.057584, greater than 0.05, indicating normal distributed residuals.

Multicollinearity Test

Table 4. Multicollinearity Test Results

	PE	HDI	TPAK	LN_JP
PE	1.000000	0.082188	0.058325	-0.025533
HDI	0.082188	1.000000	-0.193618	-0.091610
TPAK	0.058325	-0.193618	1.000000	-0.088491
LN_JP	-0.025533	-0.091610	-0.088491	1.000000

The multicollinearity test was carried out by looking at the correlation values between independent variables. The test results showed that all independent variables had a correlation value below 0.80.

Heterokedasticity Test

Table 5. Heterokedasticity Test Results (Glejser Test)

variabel	prob	Conditions	information
PE	0.1615	> 0.05	Passing the heterokedastist test
HDI	0.7837	> 0.05	Passing the heterokedastist test
TPAK	0.3520	> 0.05	Passing the heterokedastist test
LN_JP	0.9138	> 0.05	Passing the heterokedastist test

The heteroscedasticity test with the Glejser Test showed that all variables had a prob above 0.05 that of homogeneous residual variance.

Analisis Regresi Data Panel (Fixed Effect Model)

Table 6. Fixed Effect Model Regression Results

Variabel	Coefficient	Std. Error	t-Statistic	Prob.	Adjusted R-squared	Prob(F-statistic)
C	54.82163	6.267814	8.746531	0.0000	0.860538	0.000000
PE	-0.309623	0.026492	-11.68743	0.0000		
HDI	-0.432097	0.087084	-4.961826	0.0000		
TPAK	-0.087899	0.035427	-2.481089	0.0141		
LN_JP	-1.163987	0.606971	-1.917699	0.0570		

The results of the F test show that all independent variables simultaneously have a significant effect on TPT in West Java during 2018–2024. It is reinforced by an R-squared value of 0.860538, which means that 86.05% of TPT variations can be explained by the model, while the rest are influenced by other factors outside of the study. The results of the t-test, Economic Growth (coefficient -0.309623; $p=0.0000$) has a significant negative effect on TPT. Every 1 percent increase in economic growth lowers unemployment by 0.31 percent, according to Okun's Law. Human Development Index (coefficient -0.432097; $p=0.0000$) has a significant negative effect on TPT. A one-point increase in HDI reduced unemployment by 0.43 percent, confirming the importance of the quality of human resources. Labor Force Participation Rate (coefficient -0.087899; $p=0.0141$) has a significant negative effect on TPT, showing that the labor market is able to absorb the labor force effectively. Meanwhile, the number of population (coefficient -1.163987; $p=0.0570$) is not significant, indicating that population growth does not directly affect unemployment. These findings prove that the reduction of unemployment in West Java is driven more by the quality of human resources and local economic strength, not just demographic aspects. Regional economic capacity, inter-regional labor movements, and the role of the informal sector in absorbing workers are explanations for why population size does not significantly affect the unemployment rate.

DISCUSSION

The Effect of Economic Growth on Open Unemployment Rates

The results of the study show that economic growth is negatively related to the unemployment rate in West Java, in line with Okun's Law which explains that increased output drives the demand for labor. Growth supported by the manufacturing, trade, and services sectors also created a multiplier effect on the provision of jobs. These findings are in line with studies (Anggraini et al., 2023) and (Septiana & Asmara, 2024) which also found a significant negative effect of economic growth on unemployment.

However, economic growth is not always able to reduce unemployment proportionally, especially when dominated by capital-intensive sectors that do not absorb labor, as explained (Toruan et al., 2025) and (Haider et al., 2023). Therefore, local governments need to ensure inclusive economic growth through strengthening labor-intensive sectors such as MSMEs, tourism, and creative industries in order to create more job opportunities.

The Effect of the Human Development Index on Open Unemployment Rate

HDI has a significant negative effect on unemployment, reinforcing the theory of human capital that improving the quality of education, health, and living standards makes the workforce more competitive in the job market. Improvements in the education dimension increase the ability to access formal employment, while better health and living standards encourage productivity and expand access to information and work mobility. These findings are in line with research (Soekapdjo & Oktavia, 2021) and (Damayanti et al., 2025) which showed that increasing HDI is able to reduce unemployment. In the context of West Java, increasing HDI not only reduces unemployment but also improves the quality of work, reduces underemployment, and encourages structural transformation of the economy towards higher value-added sectors.

The Effect of Labor Force Participation Rates on Open Unemployment Rates

TPAK has a negative effect on TPT, showing that the West Java job market is able to absorb the new workforce effectively. These findings, in line with (Lestari & Nilasari, 2025), reflect strong economic capacity as well as sector diversification that allows for wider labor absorption. The high TPAK also shows public confidence in job opportunities, while the informal sector acts as a buffer when excess labor appears. In terms of policy, it is important to maintain the capacity of the labor market through a conducive investment climate, infrastructure development, and expansion of skills training programs so that the increase in labor force participation is followed by adequate employment opportunities.

The Effect of Population on Open Unemployment Rate

The insignificance of the population to unemployment shows that population growth in West Java does not automatically add to the pressure on the job market. This emphasizes that the relationship between demographics and employment is influenced by the quality of human resources, economic

structure, and the capacity of regions to provide jobs. With the support of good education and health, population growth can actually become a source of productive labor.

High labor mobility and the role of the informal sector also help balance the absorption of labor between regions, so that population growth does not directly increase TPT. These findings are in line with (Runturambi et al., 2024) and (Siregar & Suhariato, 2023) which show that population size does not always have a significant impact when regional economies are able to accommodate workers.

The implication is that reducing unemployment is more effectively achieved through improving the quality of human resources and strengthening productive sectors. Skill development, expansion of formal work, and strengthening of MSMEs are strategic steps so that population growth can be processed into economic potential. Overall, these findings confirm that the quality of the workforce and economic strength are much more decisive than the size of the population.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Research on the determinants of unemployment in West Java for the 2018-2024 period has yielded several important findings. Simultaneously, economic growth, the Human Development Index, the Labor Force Participation Rate, and the number of population significantly affect the dynamics of unemployment with the model's ability reaching 86, 05 percent. Partially, economic growth has been shown to reduce unemployment according to Okun's Law, where the expansion of economic activity creates new job opportunities. The Human Development Index shows a crucial role in reducing unemployment through improving the quality of human resources that are more competitive in the job market. The increased labor force participation rate actually lowers unemployment, indicating the effectiveness of regional labor market absorption. Meanwhile, the number of people did not show a significant influence, indicating that the quality factor is more determinant than the quantity of the population in explaining the phenomenon of unemployment. These findings affirm the importance of investing in human development and strengthening inclusive economic structures as the main strategies in overcoming unemployment in West Java.

Recommendations

Local governments need to encourage inclusive economic growth through labor-intensive sectors such as MSMEs, tourism, and creative industries. Increasing HDI can be strengthened by vocational education that meets industry needs, expansion of health services, and workforce improvement and certification programs. Coordination between districts/cities and infrastructure development that supports mobility and economic connectivity is also important to expand employment opportunities and reduce unemployment evenly.

ADVANCED RESEARCH

The research can then be expanded by extending the observation period and adding variables such as inflation, UMR, investment, and industrial structure to make the model more comprehensive. Alternative methods such as spatial econometrics or quantile regression can also be used to capture differences between regions and between levels of unemployment. Analysis based on age, gender, and education can provide a more detailed picture of job market segmentation. In addition, the study of the quality of work including the informal sector, underemployment, and the transition to formal employment is important to understand employment dynamics more comprehensively.

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