

DETERMINANTS OF OPEN UNEMPLOYMENT RATE IN CENTRAL JAVA: ECONOMIC GROWTH, MINIMUM WAGE, LABOR FORCE PARTICIPATION, AND DOMESTIC INVESTMENT

Adinda Dwi Nur Solihati¹, Arif Andri Wibowo^{1*}, Dijan Rahajuni¹, Sidiq Juniarso²

¹Development Economics, Jenderal Soedirman University, Indonesia

²Directorate General of Treasury Central Java, Indonesia

*Email corresponding author: arif.andri.wibowo@unsoed.ac.id

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Abstract

This study aims to analyze the effect of economic growth, district/city minimum wages, labor force participation rate, and domestic investment on the open unemployment rate across 35 regencies/cities in the Central Java province during the period 2018 – 2024. The background of this study is based on the fluctuating condition of the open unemployment rate and the existence of disparities in labor absorption across regions. This study employs a quantitative descriptive approach using panel data regression analysis processed with EViews 13 software. Model selection was conducted through the Chow test and Hausman test, which identified the Fixed Effect Model (FEM) as the most appropriate estimation technique. The data used are secondary data obtained from the Central Bureau of Statistics (BPS). The results show that economic growth has a negative and significant effect on the open unemployment rate. In contrast, the minimum wage has a positive and significant effect on the open unemployment rate. The labor force participation rate does not have a significant effect on the open unemployment rate. Meanwhile, domestic investment has a negative and significant effect on the open unemployment rate. Therefore, policies are needed to promote inclusive economic growth, establish appropriate minimum wage levels, and optimize investment and labor force participation to reduce the open unemployment rate.

Keywords: open unemployment rate, economic growth, minimum wage, labor force participation rate, domestic investment

INTRODUCTION

Economic development is a process aimed at improving the welfare of society through the expansion of employment opportunities, the reduction of poverty, and the narrowing of income inequality. The success of development is reflected in the economy's ability to absorb the labor force. However, various labor market issues persist in this process, one of which is unemployment. Unemployment is generally measured using the Open Unemployment Rate (TPT). The Central Bureau of Statistics (2021) defines the TPT as the percentage of the unemployed - that is, residents who are not working but are actively seeking employment, preparing to start a business, or have not yet started working despite having a job, relative to the total labor force. In other words, the TPT reflects the proportion of the labor force that has not yet been absorbed by the labor market. High unemployment rates can lead to social and economic impacts, such as a decline in public welfare, increased poverty, high crime rates, and social inequality.

The issue of unemployment is becoming increasingly critical as Indonesia's population continues to grow. According to data from the Central Bureau of Statistics (2025), Indonesia's

population has reached 284 million. This population growth has been accompanied by an increase in the labor force seeking employment opportunities. Consequently, job creation has become a major challenge in economic development. Indonesia's labor market conditions during the 2018 – 2024 period showed fluctuating dynamics. The open unemployment rate rose sharply from 5,32 percent in 2019 to 7,07 percent in 2020 due to the Covid-10 pandemic. As the economy recovered, the unemployment rate fell again to 4,91 percent in 2024. Nevertheless, the number of unemployed people reached approximately 7,47 million, indicating that labor absorption remains a challenge.

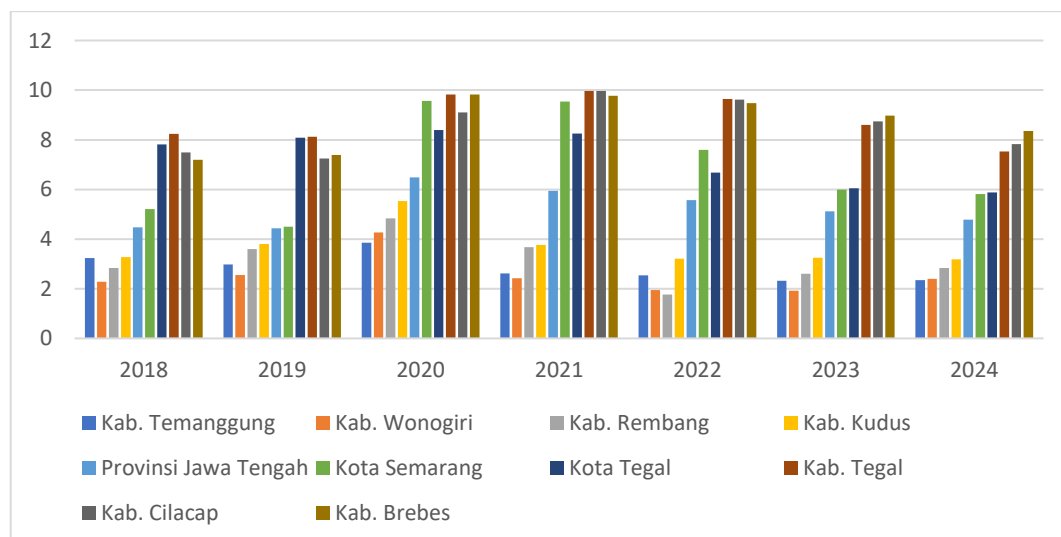
This phenomenon is also evident at the regional level, including in Central Java, which is one of the most populous provinces on the island of Java. According to data from the Central Bureau of Statistics (2025), Central Java's population stands at 37,892,300, lower than West Java's 50,345,200 and East Java's 41,814,500. Nevertheless, Central Java has an unemployment rate of 4,78 percent, higher than East Java's (4,19 percent). This situation indicates that labor absorption in Central Java is not yet optimal compared to several other provinces on the island of Java.

Table 1. Development of the Open Unemployment Rate in Central Java Province, 2018-2024

Year	Number of Unemployed Persons (People)	Open Unemployment Rate (Percent)
2018	815.083	4,47
2019	818.726	4,44
2020	1.214.342	6,48
2021	1.128.223	5,95
2022	1.084.475	5,57
2023	1.080.260	5,13
2024	1.047.451	4,78

Source: Central Bureau of Statistics (2025)

The trend in the unemployment rate in Central Java during the 2018 -2024 period mirrors the national trend. In 2019, the unemployment rate reached a low of 4,44 percent. It then rose sharply to 6,48 percent in 2020 due to the Covid-19 pandemic. Although showing a trend of improvement, the number of unemployment people in Central Java still exceeds one million. This indicates that labor market issues still require attention.



Source: Central Bureau of Statistic-Central Java Province (2025)

Figure 1. Trends in the Open Unemployment Rate of Selected Regencies/Municipalities and the Central Java Province Average, 2018-2024 (Percent)

Figure 1 shows that the unemployment rate in selected districts and cities fluctuated. In general, all regions experienced an increase in the unemployment rate from 2019 to 2020 as a result of the Covid-19 pandemic, which led to a slowdown in economic activity and a reduction in job opportunities. As the economy recovered, the unemployment rate in most regions declined again from 2022 to 2024. Brebes Regency, Tegal regency, and Tegal City were the regions that consistently recorded higher unemployment rates compared to the average for Central Java Province. In 2024, Brebes Regency had the highest unemployment rate, at 8,35 percent, followed by Tegal regency at 7,53 percent. Conversely, Temanggung Regency, Wonogiri Regency, and Rembang Regency had relatively lower unemployment rates. These differences indicate that unemployment issues are not evenly distributed, necessitating further analysis of the factors influencing unemployment rates.

Regional development in Central Java Province is guided by Regional Regulation No. 5 of 2019 on the Regional Medium Term Development Plan (RPJMD) for 2018 – 2023. In line with this, the Central Java Provincial Government has undertaken various efforts to address labor market issues, such as optimizing Vocational Training Center (BLK), vocational schools, providing industrial zones, and strengthening community entrepreneurship (DJPb Kanwil Jawa Tengah, 2024). Nevertheless, high unemployment remains a challenge in regional development.

The open unemployment rate is influenced by various factors, one of which is economic growth, as measured by the growth rate of real GDP. Mankiw (2010), explains that economic growth plays a role in improving public welfare and expanding employment opportunities. Additionally, minimum wage policies also have the potential to influence the unemployment rate. Wage increases can improve workers well-being, but on the other hand, they can suppress labor demand due to rising production costs, consequently, firms tend to reduce their demand for labor to maintain efficiency.

Another factor is the labor force participation rate (TPAK), which reflects the proportion of the working-age population actively participating in the labor market (Salsabila et al., 2024). An increase in the labor force that is not matched by the availability of jobs has the potential to increase unemployment. Furthermore, investment also plays a crucial role in driving economic growth by increasing production capacity and creating new job opportunities (Todaro & Smith, 2020). Therefore, economic growth, the minimum wage, the labor force participation rate, and investment are relevant factors for analysis.

This study contributes to the use of the Domestic Investment (PMDN) variable as one of the determinants of the unemployment rate. Furthermore, previous studies have yielded inconsistent findings. For example, Permadi & Chrystanto (2021) found that the minimum wage has a negative and significant effect on the open unemployment rate. However, Amalia et al. (2024) demonstrated a positive and significant effect. Therefore, this study is important to analyze the effects of economic growth, the minimum wage, the labor force participation rate, and domestic investment on the open unemployment rate in the regencies and cities of Central Java Province. The research results are expected to provide an overview of the factors influencing unemployment at the regional level and serve as a basis for formulating more effective economic development and labor policies.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Keynesian Economic Theory

Keynesian economic theory, as proposed by John Maynard Keynes explains that unemployment is not solely caused by an excess supply of labor, but is rather influenced by low aggregate demand (Farmer, 2023). Weak aggregate demand reduced income and economic activity, prompting firms to cut back on production and postpone hiring. This situation can ultimately lead to higher unemployment rates. Therefore, Keynes emphasized the importance of

the government's role in the economy through fiscal and monetary policies, which are expected to boost aggregate demand by stimulating consumption and investment.

Open Unemployment Rate

The open unemployment rate is the percentage of unemployment individuals relative to the total labor force and is used to measure the proportion of the labor force that has not yet been absorbed into the labor market (Central Bureau of Statistics, 2021). The open unemployment rate serves as a benchmark for assessing the economy's success in creating job opportunities for the public. The higher the open unemployment rate, the larger the number of people in the labor force who have not yet found employment (Utomo & Prajanti, 2022).

Economic Growth

Economic growth is generally measured by changes in regional gross domestic product (GDRP) at the regional level (Tangke, 2023). GDRP is defined as the total value of final goods and services produced by all economic units in a region over a specific period of time (Central Bureau of Statistic-Central Java Province, 2024). In this study, Gross Domestic Regional Product at Constant Prices (ADHK) is used to assess real economic growth without the influence of price (Tangke, 2023). According to Okun's Law, there is a negative relationship between economic growth and the unemployment rate, such as a 2 – 3 percent increase in real GDP tends to be accompanied by a roughly 1 percent decrease in the unemployment rate, and vice versa (Zunaida & Robertus, 2024). Increased production activity and demand for labor can expand employment opportunities (Astari et al., 2019). This is supported by the research of Shofyuddin & Primandhana (2025), who found a negative and significant effect of the economic growth variable on the open unemployment rate. Therefore, the following hypothesis is formulated.

H₁ : Economic Growth has a negative effect on the Open Unemployment Rate.

District/City Minimum Wage

The minimum wage is a policy aimed at protecting workers and maintaining a decent standard of living. According to Government Regulation No. 78 of 2015, the minimum wage is the lowest wage level established, consisting of the base wage with or without fixed allowances. In the Theory of Wage Rigidity, wages cannot adjust flexibly to balance the supply and demand for labor (Faizah & Woyanti, 2023). When the minimum wage is set above the market equilibrium, the supply of labor will exceed demand. Consequently, not the entire labor force can be absorbed, and unemployment may rise. This statement aligns with the findings of Rusydan & Wijaya (2024), which indicate that the minimum wage has a positive and significant effect on the open unemployment rate. Thus, the following hypothesis is formulated.

H₂ : The District/City Minimum Wage has a positive effect on the Open Unemployment Rate.

Labor Force Participation Rate

According to the Central Bureau of Statistics (2021), the labor force includes the working-age population (aged 15 and older), whether they are employed or actively seeking employment. The labor force participation rate is an indicator used to measure the proportion of the working-age population that is economically active. According to labor Supply Theory, an increase in the labor force will increase the supply of labor in the labor market. If this is not balanced by the availability of sufficient job opportunities, it will lead to an excess supply of labor, which has the potential to drive an increase in the number of open unemployment (Irnando et al., 2024). This aligns with the research by Apriani et al. (2025), which states that the labor force participation rate has a positive and significant effect on the open unemployment rate.

H₃ : The Labor Force Participation Rate has a positive effect on the Open Unemployment Rate.

Domestic Investment

Investment refers to expenditures made to acquire various factors of production, such as machinery, land, buildings, and labor, which are used in the production of goods and services (Qamariyah et al., 2022). In this study, the focus is on Domestic Investment (PMDN). PMDN refers to investment made by domestic investors to operate businesses within Indonesia using capital sourced from within the country. The Harrod – Domar Theory, explains that investment plays a role in increasing production capacity by expanding the stock of capital while simultaneously stimulating aggregate demand in the economy. An increase in investment expands economic activity and boosts labor demand, thereby increasing labor absorption and reducing the unemployment rate (Qamariyah et al., 2022). A study by Ramadhani & Ananda (2024), indicates that there is a significant negative effect of the investment variable on the open unemployment rate.

H₄ : Domestic Investment has a negative effect on the Open Unemployment Rate.

RESEARCH METHODS

This study employs a quantitative approach using descriptive methods (Qamariyah et al., 2022). The subject of this study is the open unemployment rate in 35 regencies/cities in Central Java Province for the period 2018 – 2024. The independent variables used include economic growth, the district/city minimum wage, the labor force participation rate, and domestic investment.

The data used are secondary data obtained from official sources, primarily the Central Bureau of Statistics (BPS). Data collection was conducted through a literature review and the data were subsequently analyzed using panel data regression, which combines cross-sectional data from 35 regencies/cities with time-series data spanning the years 2018 to 2024 (Gujarati & Porter, 2009). Data processing and analysis were performed using EViews 13 software.

The panel data regression analysis began with selecting the best model among three options, the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). Model selection was conducted through a series of tests, including the Chow test and Hausman test. Next, classical assumption tests were conducted to ensure the validity of the model, including the Normality test, Multicollinearity test, and Heteroscedasticity test. After the model was found to meet the assumptions, statistical tests were conducted, including the Coefficient of Determination, the F-test, and the t-test. Finally, to identify the variables that most significantly influence TPT, an elasticity test was performed.

The panel data regression model used in this study is systematically formulated in the following equation.

$$\ln TPT_{it} = \alpha + \beta_1 \ln PE_{it} + \beta_2 \ln UMK_{it} + \beta_3 \ln TPAK_{it} + \beta_4 \ln PMDN_{it} + e_{it}$$

Notes:

<i>TPT</i>	: Open Unemployment Rate
<i>PE</i>	: Economic Growth
<i>UMK</i>	: District/City Minimum Wage
<i>TPAK</i>	: Labor Force Participation Rate
<i>PMDN</i>	: Domestic investment
α	: Constant
$\beta_1, \beta_2, \beta_3, \beta_4$	: Regression Coefficient
<i>e</i>	: Error Term
<i>i</i>	: regencies/cities in Central Java (cross section)
<i>t</i>	: 2018 – 2024 (time series)

RESULT AND DISCUSSION

Result

1. Based on the results of the Chow test, the probability value for the Cross-section Chi-square test is 0,0000 ($\leq 0,05$). Therefore, the selected model is the Fixed effect Model. Consequently, the analysis proceeds to the Hausman test to determine the most appropriate model between the FEM and REM.
2. The results of the Hausman test show that the probability value for the Cross-sectional random model is 0,0001 ($\leq 0,05$). Thus, the most appropriate model approach used in this study is the Fixed Effect Model (FEM). Consequently, the Lagrange Multiplier test is not necessary.
3. Selected Regression Model

After conducting the Chow test and Hausman test, the results indicate that the Fixed Effect Model is the most appropriate approach for this study.

Table 2. Results of Panel Data Model Selection (Fixed Effects Model)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1,139488	2,338149	-0,487346	0,6265
Ln_PE	-0,411958	0,083368	-4,941433	0,0000
Ln_UMK	0,426294	0,187899	2,268746	0,0243
Ln_TPAK	-0,571003	0,482028	-1,184584	0,2375
Ln_PMDN	-0,031803	0,016027	-1,984424	0,0485
R-squared	0,741608			
Adjusted R-squared	0,693943			
F-statistic	15.55888			
Prob(F-statistic)	0,000000			

Source: EViews 13 (2026)

The panel data regression equation estimated using the *Fixed Effect Model* can be expressed as follows.

$$\ln TPT_{it} = -1,139488 - 0,411958 \ln PE_{it} + 0,426294 \ln UMK_{it} - 0,571003 \ln TPAK_{it} - 0,031803 \ln PMDN_{it}$$

4. Test of Classical Assumptions

Based on the results of the test of classical assumptions, the regression model passed the Normality test with Jarque-Bera probability value of 0,258122 ($\geq 0,05$). Therefore, it can be concluded that the residuals are normally distributed. Second, the regression model also passed the Multicollinearity test, showing no signs of multicollinearity, with Variance Inflation Factor (VIF) for each variable below 10, PE (1,131388), UMK (1,893436), TPAK (1,537586), and PMDN (1,330277). Finally, the regression model also passed the Heteroscedasticity test, with probability values for each variable greater than 0,05. Namely, PE (0,5314), UMK (0,1074), TPAK (0,7151), and PMDN (0,4603). Therefore, it can be

concluded that there is no evidence of heteroscedasticity or that the residual variance is constant.

5. Statistical Tests

a. Coefficient of Determination

Based on Table 2, the Adjusted R-squared value is 0,693943 or 69,3943 percent. These results indicate that the open unemployment rate can be explained by the independent variables, comprising economic growth, the district/city minimum wage, labor force participation rate, and domestic investment to the extent 69,3943 percent. The remaining 30,6057 percent can be attributed to other variables not included in the research model.

b. F - Test

In Table 2, the probability value of the F-statistic is 0,000000 which is less than 0,05 ($< 0,05$). Therefore, H_0 is rejected and H_1 is accepted, it can be concluded that economic growth, the district/city minimum wage, the labor force participation rate, and domestic investment collectively have a significant effect on the open unemployment rate.

c. t - Test

Based on Table 2 (Selected Regression Model), a partial test using the t-test yielded the following results.

- 1) The regression coefficient for the economic growth variable $-0,411958$. Thus, a 1 percent increase in economic growth results in a 0,411958 percent decrease in the open unemployment rate. Meanwhile, the probability value for economic growth is $0,0000 < 0,05$. Therefore, H_0 is rejected and H_1 is accepted, meaning that economic growth has a negative and significant effect on the open unemployment rate.
- 2) The regression coefficient for the the district/city minimum wage variable is 0,426294. Thus, every 1 percent increase in the district/city minimum wage will increase the number of unemployed 0,426294 percent. Meanwhile, the probability value for the district/city minimum wage is $0,0243 < 0,05$. Therefore, H_0 is rejected and H_2 is accepted, meaning that the district/city minimum wage has a significant positive effect on the open unemployment rate.
- 3) The regression coefficient for the labor force participation rate variable is $-0,571003$. Thus, every 1 percent increase in the labor force participation rate reduces the number of unemployed by $-0,571003$ percent. Meanwhile, the probability value for the labor force participation rate is $0,2375 > 0,05$. Therefore, H_3 is rejected and H_0 is accepted, meaning that the labor force participation rate does not have a significant effect on the open unemployment rate.
- 4) The regression coefficient for the domestic investment (PMDN) variable is $-0,031803$. Thus, every 1 percent increase in domestic investment (PMDN) results in a decrease in the open unemployment rate of $-0,031803$ percent. Meanwhile, the probability value for domestic investment (PMDN) is $0,0485 < 0,05$. Therefore, H_0 is rejected and H_4 is accepted, meaning that domestic investment (PMDN) has a negative and significant effect on the open unemployment rate.

6. Elasticity Test

Table 3. Elasticity Test

Variable	Coefficient	Rata-Rata X	Rata-Rata Y	Elasticity
Ln_PE	-0,411958	1,564571	1,565755	-0,411646
Ln_UMK	0,426294	14,50184	1,565755	3,948285
Ln_TPAK	-0,571003	4,257592	1,565755	-
Ln_PMDN	-0,031803	12,61412	1,565755	-0,256213

Source: *EViews 13* (2026)

The results of the panel data regression analysis indicate that the labor force participation rate does not affect the open unemployment rate. Therefore, the elasticity of TPAK was not calculated. Based on Table 5, the district/city minimum wage variable has an elasticity value of 3,948285 (> 1), indicating that this variable is elastic and has the greatest influence on TPT. This means that every 1 percent increase in the minimum wage will increase TPT by 3,948285 percent. Thus, the district/city minimum wage is the most dominant variable influencing TPT compared to other variables.

Discussion

The results of the study indicate that economic growth has a significant negative effect on the open unemployment rate. This reflects the fact that increased economic activity, as indicated by a rise in GDRP, drives the expansion of production and labor absorption. With the growth of key sectors such as manufacturing, trade, and agriculture, labor demand will increase, thereby reducing unemployment. This finding aligns with Okun's Law, which states that economic growth has a negative effect on unemployment. Furthermore, it is supported by various previous studies that show similar results, such as those by Shofyuddin & Primandhana (2025), Saputra et al. (2025), and Ramadhani & Ananda (2024).

The results of the study indicate that the regional minimum wage has a positive and significant effect on the open unemployment rate. This occurs because wage increases encourage companies to implement cost saving measures, such as limiting hiring, which ultimately raises the open unemployment rate. This finding aligns with the Wage Rigidity Theory, which states that inflexible wages can cause imbalances in the labor market and increase unemployment (Faizah & Woyanti, 2023). This is also supported by studies by Lestari & Nilasari (2025), Rusydan & Wijaya (2024), and Amalia et al. (2024), which state that wage increases tend to raise unemployment rates.

The results of the study indicate that the labor force participation rate does not have a significant effect on the open unemployment rate. Theoretically, an increase in the TPAK can expand the labor supply and potentially raise unemployment if it is not balanced by the availability of jobs. However, these findings suggest that changes in the TPAK do not directly influence the TPT. This indicates that population participation in the labor market is not a determining factor in the level of the TPT. These results are consistent with studies Rusydan & Wijaya (2024), Amalia et al. (2024), Faizah & Woyanti (2023), and Simbolon et al. (2023), which found that TPAK does not have a significant effect on TPT.

The results of the study show that domestic investment has a significant negative effect on the open unemployment rate. This finding indicates that an increase in domestic investment can reduce the unemployment rate because investment plays a role in capital formation, increasing production capacity, and creating new jobs. Increased economic activity and labor demand will boost labor absorption, thereby reducing unemployment. These findings are consistent with the Harrod – Domar theory, which emphasizes the role of investment in increasing output and labor absorption. They are also supported by studies by Ramadhani & Ananda (2024), Sinulingga (2021) and Wulandari & Marwan (2019), which state that domestic investment has a significant negative effect on the open unemployment rate.

The results of the elasticity calculations show that the minimum wage is the most dominant variable influencing the open unemployment rate. This indicates that changes in the minimum wage have a significant impact on labor market dynamics. Wage increases prompt companies to reduce working hours or postpone hiring to maintain cost efficiently. This phenomenon aligns with the theory of wage rigidity, which explains that setting wages above the market equilibrium level can reduce labor demand, thereby potentially increasing unemployment.

CONCLUSION

1. Economic growth has a significant negative effect on the open unemployment rate, meaning that an increase in regional GDP can boost labor absorption. Therefore, local governments need to promote labor intensive economic growth in order to create more jobs.
2. The regional minimum wage has a significant positive effect on the open unemployment rate, indicating that an increase in the minimum wage can suppress labor recruitment. Thus, the setting of the regional minimum wage must consider productivity and the business sector's capacity to ensure a balance between worker welfare and labor absorption.
3. The labor force participation rate does not have a significant effect on the open unemployment rate, this finding suggests that changes in the LFPR have not yet directly influenced unemployment levels. Therefore, an increase in the TPAK must be balanced with job creation and improvements in human resource quality to ensure the labor force is optimally absorbed.
4. Domestic investment has a negative and significant effect on the open unemployment rate, meaning that increased investment can create jobs and reduce unemployment through the expansion of production activities. Consequently, the government needs to strengthen the investment climate through streamlined permitting processes, infrastructure provision, and regulatory certainty.
5. The regional minimum wage is the most dominant variable influencing the open unemployment rate, this indicates that minimum wage policy must be a primary focus, with rates set in accordance with local economic conditions to avoid hindering labor absorption.

This study has limitations, namely that it has not been able to capture non-quantitative aspects such as social, cultural, and behavioral factors among job seekers. Furthermore, this study does not specifically examine the *Covid-19* pandemic as an external factor that may have influenced the dynamics of open unemployment in Central Java Province.

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