

DETERMINANTS OF OPEN UNEMPLOYMENT RATE IN CENTRAL JAVA PROVINCE 2017-2023

Munita Selvina Putri Sanjaya¹, Lilis Siti Badriah^{2*}, Barokatuminalloh³, Prihono⁴

¹⁻³ Development Economics, Jenderal Soedirman University, Indonesia

⁴ Directorate General of Treasury Central Java, Indonesia

*Email corresponding author: lilis.badriah@unsoed.ac.id

Abstract

The Open Unemployment Rate in Central Java shows significant disparities across its 35 regencies and cities. This study aims to analyze the influence of Total Population, Human Development Index, Regency/City Minimum Wage, Domestic Investment, and Foreign Investment on the Open Unemployment Rate across these regions. Employing a quantitative approach with panel data regression analysis over a seven-year period, the findings reveal that Total Population and Regency/City Minimum Wage have a significant positive effect on the Open Unemployment Rate, while the Human Development Index has a significant negative effect. Conversely, Domestic Investment and Foreign Investment do not significantly affect the unemployment rate. These results suggest that unemployment reduction efforts should prioritize population control, enhancement of human development, and strategic implementation of minimum wage policies. Furthermore, it is important for local governments to evaluate the actual impact of investment inflows on labor absorption to ensure alignment with employment goals and regional economic development.

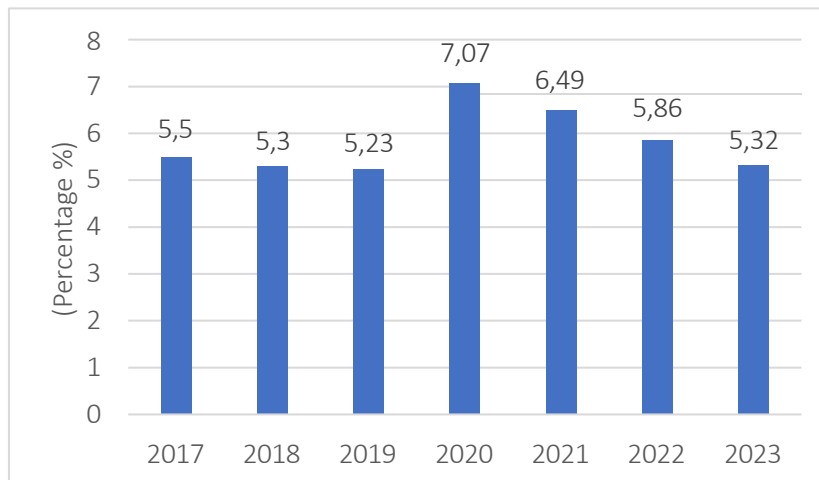
Keywords: Open Unemployment Rate, Total Population, Human Development Index, Minimum Wage, Investment

INTRODUCTION

This Economic development encompasses efforts to enhance economic activities, resulting in improved infrastructure, expanding businesses, enhanced education, and technological advancement (Sukirno, 2015). Employment, especially the unemployment rate, serves as a critical indicator of a country's economic progress. Unemployment remains a significant macroeconomic challenge in both developed and developing countries, including Indonesia. Elevated and volatile unemployment levels disrupt economic stability and exacerbate social inequality, ultimately diminishing the population's quality of life (Priyono & Ismail, 2016). If Indonesia is competent in controlling human resources and can be absorbed in the labor market, then Indonesia will be free from the issue of unemployment. However, on the other hand, if Indonesia cannot utilize existing human resources and cannot be absorbed in the labor market, then Indonesia will always be surrounded by the problem of unemployment (Mulyadi et al., 2024).

According to Sukirno (2013), a high unemployment rate will lead to uneven income distribution and trigger economic inequality. This occurs because unemployed individuals generally have no income, making it difficult for them to meet their living needs. This condition then leads to social and political instability, as the number of impoverished people increases due to high unemployment. Additionally, unemployment reduces national productivity and hinders overall economic growth. This decline in productivity causes a decrease in the people's purchasing power, which further reduces demand for goods and services. Consequently, economic growth becomes constrained. The Open Unemployment Rate (TPT) measures the proportion of the labor force aged 15 years and above who

are unemployed, including those actively seeking work or temporarily without employment (BPS, 2024). Over the last seven years, Indonesia's TPT has fluctuated significantly as shown in Figure 1.



Source: BPS, 2024

Figure 1. Open Unemployment Rate (OUR) in Indonesia (Percent)

In 2020, Indonesia's TPT rose sharply by 1.84 percentage points to 7.07%, primarily due to the economic disruptions caused by the COVID-19 pandemic, which led to widespread layoffs. As the pandemic's effects subsided, the economy gradually recovered, reflected in a decreasing unemployment rate. Based on the large islands in Indonesia, there are different characteristics in terms of unemployment such as variations in the average TPT in each region.

Based on data from BPS (2024) from 2017-2023, the average TPT for Kalimantan Island was 4.95 percent, Java Island 6.47 percent, Sulawesi Island 4.21 percent, Sumatra Island 5.33 percent, and Papua Island 1.57 percent. Java Island, which is the center of the Indonesian economy, dominates the first position with a relatively higher TPT compared to other islands. This is because Java Island has the largest population and workforce in Indonesia, so that competition for jobs is tighter and causes a higher unemployment rate. This condition reflects the challenges faced in absorbing the workforce. During the 2017-2023 period, there was a striking difference in TPT between provinces within Java Island itself. Within Java, notable disparities exist among provinces, as summarized in Table 1.

Table 1. Average Open Unemployment Rate (TPT) in Java Provinces, 2017–2023 (%)

Province	Average Open Unemployment Rate (TPT) in Java Provinces, 2017-2023
Banten	8,73
DKI Jakarta	7,64
West Java	8,65
Central Java	5,23
DI Yogyakarta	3,78
East Java	4,81

Source: BPS, 2024

Based on Table 1, the average Open Unemployment Rate (TPT) in six provinces on the island of Java during the 2017–2023 period indicates that Central Java ranks fourth, with an average rate of 5.23 percent. This figure is relatively higher than the average TPT in East Java and the Special Region of Yogyakarta. At the district/city level, the unemployment rate in Central Java shows considerable variation. According to Statistics Indonesia (2024), 17 districts/cities, or approximately 48.57% of the total in Central Java, recorded an average TPT exceeding the provincial average.

There are many factors that can influence unemployment, the first of which is population size. Malthusian theory posits that population growth tends to exceed food production growth. In employment terms, rapid population increase results in a labor force larger than the available jobs, intensifying competition and raising unemployment rates (Arifin & Firmansyah, 2017). This finding is reinforced by Wulandari & Astuti (2023), who observe that higher numbers of active job seekers correlate with increased unemployment. However, contrary to the findings of Sari & Setyowati (2022), Tumilaar et al., (2022) argued that population size has a negative and insignificant effect on the Open Unemployment Rate (TPT) because a growing population actually makes it easier for companies to obtain labor, despite posing challenges for regional employment.

Human Development Index (IPM) is another crucial factor. New growth theory emphasizes human capital development education and health improvements that enhances labor productivity and work efficiency (Badriah & Arintoko, 2024). A higher HDI signifies better quality human resources, which tends to raise labor demand and reduce unemployment. Mahroji & Nurkhasanah (2019) support this by showing that IPM components increase productivity, thereby increasing labor demand and lowering unemployment. However, Aprilia (2022) research suggests that HDI has no significant effect on TPT because, despite HDI improvements, unemployment can still occur due to imbalances between job growth and labor force size.

Wage levels also impact unemployment. The efficiency wage theory suggests higher wages boost productivity (Mankiw et al., 2012). Regional minimum wages (UMK) set by government policies influence firms' labor hiring decisions. However, increased labor costs from higher wages can reduce employment, as demonstrated by Badriah (2015) and also Fatimah et al., (2023), who found a positive relationship between UMK and unemployment. In contrast, Setiawan et al., (2023) concluded that minimum wages do not affect TPT because, without adequate labor quality, wage hikes do not influence unemployment.

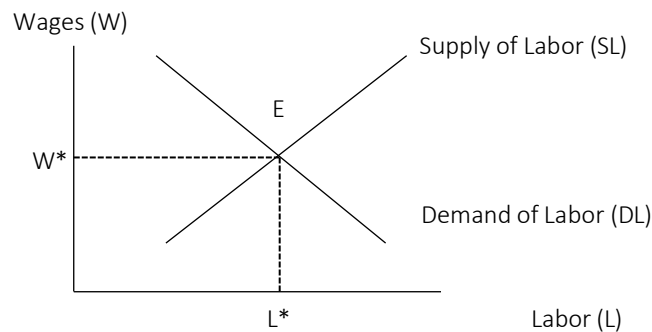
Investment plays a vital role in reducing unemployment. Investment, defined as capital expenditure for production enhancement (Sukirno, 2013), stimulates aggregate demand and expands production capacity, increasing labor absorption per Harrod-Domar theory (Stefanus, 2017). Both Domestic Investment (PMDN) and Foreign Direct Investment (PMA) drive economic growth, infrastructure development, and job creation, reducing unemployment (Badriah & Arintoko, 2024). Muryanto et al., (2022) further confirm that increased investment contributes to greater labor absorption and decreased unemployment. However, Helvira & Putria Rizki (2020) and Susanti et al., (2024) argue that investment has a positive but insignificant effect on TPT because investors prefer capital-intensive sectors, such as industrial firms.

This research is included in the field of Development Economics because it analyzes the factors that affect the Open Unemployment Rate (TPT). This research focuses on 35 districts/cities in Central Java Province. The scope of this research includes the dependent variable, namely the Open Unemployment Rate, and the independent variables are Population, Human Development Index, Minimum Regional Capital Investment, Domestic Direct Investment, and Foreign Direct Investment. The research covers the period 2017-2023, which was chosen to observe economic developments in the last seven years using secondary data obtained from the Central Statistics Agency (BPS), the Investment Coordinating Board (BKPM), and related agencies.

Theoretically, this research is expected to contribute to the development of Development Economics, especially with the discovery of empirical study results related to the Analysis of Determinants of the Open Unemployment Rate in Central Java Province in 2017-2023. Practically, this research is expected to be a consideration in planning policies and strategies to overcome unemployment in Central Java so that the government can further improve people's welfare and create quality economic growth, alongside increasing societal awareness of unemployment's drivers.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

labor market theory is appropriate for use in research because this theory explains the mechanism of interaction between supply and demand for labor in the market.



Source: Filiasari & Setiawan (2021)

Figure 2. Labor Market Equilibrium Curve

Based on figure 2. The interaction between demand and supply of labor creates market equilibrium. Point E is the equilibrium of the labor market, where wages (W^*) and the number of workers (L^*) are balanced, reflecting full employment without unemployment except voluntary (Filiasari & Setiawan, 2021).

Unemployment refers to individuals who do not have a job but are actively seeking employment or are not currently working because they have secured employment but have not yet started working (BPS, 2024). The classical school of thought argues that unemployment arises due to the misallocation of resources and can be resolved through free market mechanisms by emphasizing the supply side of the labor market. In a free market, labor supply is believed to create its own demand, whereby all labor supply will be absorbed by demand, ultimately achieving equilibrium (Setyawan et al., 2021). According to Keynesian theory, unemployment occurs due to insufficient demand for goods and services, which leads to wage rigidity (Setyawan et al., 2021). In other words, in a stagnant economy, declining demand for goods and services reduces company production levels, which in turn decreases the need for labor, leading to rising unemployment. Ideally, a decline in production should be offset by a decrease in wage levels. However, due to wage inflexibility, companies are unable to reduce wages and instead opt to lay off workers. Therefore, this type of unemployment is caused by a deficiency in aggregate demand.

Thomas Malthus argued that population growth tends to outpace the growth of food production. In the context of unemployment, this implies that rapid population growth without a corresponding increase in employment opportunities leads to heightened job competition. The labor force that fails to compete successfully ends up in unemployment (Arifin & Firmansyah, 2017).

According to Adam Smith's Human Capital Theory, investment in education and health is essential to enhancing labor productivity (Todaro & Smith, 2011). The Human Development Index (IPM) is a measuring tool used to compare the level of development success in an area or region in three basic dimensions of development, namely: life expectancy as an indicator of health and longevity, level of education, and a decent standard of living that describes the quality of life (Amalia & Kurnia Sari, 2019). In this context, the Human Capital Theory is relevant to this study, as a high Human Development Index (IPM) reflects high-quality human resources, which are expected to reduce the unemployment rate.

According to Mankiw et al., (2012), the Efficiency Wage Theory posits that firms tend to offer wages above the market-clearing level in order to increase worker productivity. Wages are part of the costs, where wage policies that require employers to pay according to regulations can influence the

company's decision to employ workers, which can ultimately have an impact on the demand for workers (Badriah, 2015). Under this theory, employers are reluctant to reduce wages, as higher wages are believed to enhance employee performance.

Based on the Harrod-Domar theory, investment not only stimulates demand but also expands production capacity and employment absorption. This means that as production capacity grows, more labor is required, assuming "full employment." Investment, therefore, increases the availability of production factors, one of which is labor (Stefanus, 2017). Consequently, investment is expected to have a negative effect on unemployment, as increased investment leads to the creation of new job opportunities and a reduction in unemployment levels.

Based on the theoretical review as explained above, the factors that influence the Open Unemployment Rate (TPT) can be systematically explained in figure 3.

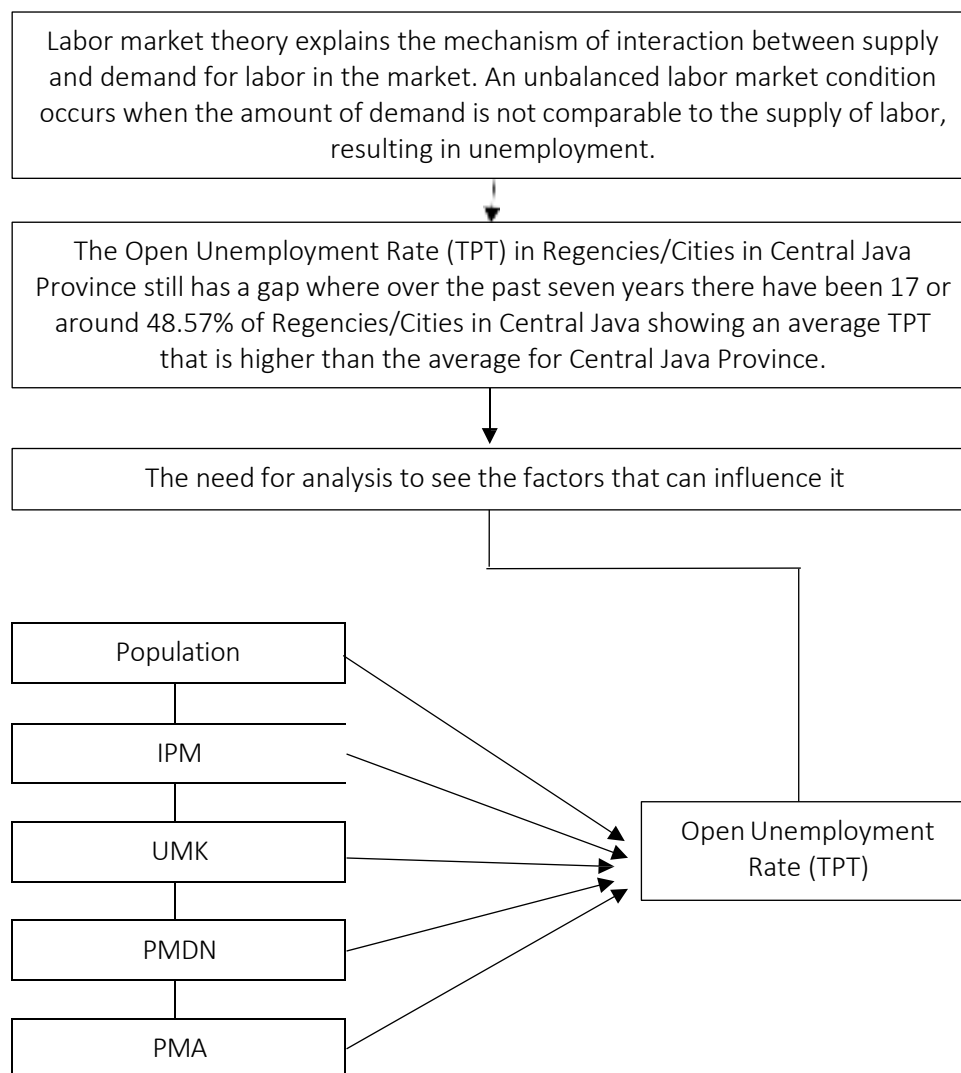


Figure 3. framework of thinking

Based on previous theories and literature used as the basis for the research, the following research hypothesis was obtained:

H₁: Population has a positive effect on the Open Unemployment Rate (TPT)

H₂: IPM has a negative effect on the Open Unemployment Rate (TPT)

H₃: UMK has a positive effect on the Open Unemployment Rate (TPT)

H₄: PMDN has a negative effect on the Open Unemployment Rate (TPT)

H₅: PMA has a negative effect on the Open Unemployment Rate (TPT)

RESEARCH METHODS

This research employs a quantitative approach. The object of this study is the Open Unemployment Rate (TPT) in 35 regencies/municipalities in Central Java Province during the period 2017–2023, analyzed through several variables: population size, Human Development Index (IPM), regional minimum wage (UMK), Domestic Investment (PMDN), and Foreign Direct Investment (PMA). The data used in this research are secondary data, obtained from existing sources. The study utilizes panel data, which combines time series data from 2017 to 2023 and cross-sectional data covering 29 regencies and 6 cities in Central Java Province. The secondary data are primarily sourced from official publications of the Central Bureau of Statistics (BPS) and the Investment Coordinating Board (BKPM), supported by relevant literature. This research applies a panel data regression analysis technique. Panel data regression is a statistical approach that integrates both time series and cross-sectional data.

In panel data regression analysis, three models are commonly employed: Common Effect Model (CEM), Random Effect Model (REM), and Fixed Effect Model (FEM). The most appropriate model is selected based on a series of statistical tests, including the Chow test, the Hausman test, and the Lagrange Multiplier test. Subsequently, classical assumption tests are conducted to ensure the validity of the model, consisting of the normality test, heteroscedasticity test, multicollinearity test, and autocorrelation test. After validating the model, hypothesis testing is performed using the coefficient of determination (R-squared), the F-test, and the t-test.

The panel regression equation used in this study is specified as follows:

$$TPT_{it} = \alpha_{it} + \beta_1 JP_{it} + \beta_2 IPM_{it} + \beta_3 UMK_{it} + \beta_4 PMDN_{it} + \beta_5 PMA_{it} + e_{it} \dots\dots\dots (1)$$

Description:

TPT = Open Unemployment Rate
 α = Intercept
 e = Error term
 $\beta_1, \dots, \beta_5$ = Regression coefficients
 JP = Population size
 IPM = Human Development Index
 UMK = Regional Minimum Wage
 PMDN = Domestic Investment
 PMA = Foreign Direct Investment

RESULTS AND DISCUSSION

This study employs a quantitative method by applying panel data regression analysis. To estimate the panel data regression model, three types of models are considered: the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM). The selection of the most appropriate model involves several diagnostic tests, including the Chow Test, Hausman Test, and Lagrange Multiplier Test. In this study, model selection is specifically conducted using the Chow Test and Hausman Test. The results of these tests are as follows:

1. The Chow Test indicates that the probability value of the Cross-section Chi-square is 0.0000, which is less than 0.05. Thus, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted, indicating that the most appropriate model is the Fixed Effect Model (FEM).
2. The Hausman Test reveals that the probability value of the Cross-section random is 0.0000, which is also less than 0.05. Therefore, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted, confirming that the superior and most suitable model is the Fixed Effect Model (FEM).

Based on the results of the classical assumption tests, this study has met all the necessary requirements for panel data regression analysis. First, in the normality test, the Jarque-Bera value of 2.975787 with a probability (p-value) of 0.225848 (greater than or equal to 0.05) indicates that the residuals in the regression model are normally distributed.

Second, the multicollinearity test results show that all independent variables in the model have a Centered Variance Inflation Factor (VIF) value of 10 or less. This suggests no multicollinearity issues in the regression model, meaning there is no high linear correlation among the independent variables.

Third, in the heteroskedasticity test, the probability value obtained was 0.7351, which is greater than 0.05. Thus, it can be concluded that the regression model does not suffer from heteroskedasticity, indicating that the residual variance is constant.

Fourth, the autocorrelation test was not conducted in this study because the data used was panel data a combination of time series and cross-sectional data. According to Basuki and Prawoto (2017), autocorrelation testing in panel data is considered less relevant or unnecessary, as autocorrelation typically only occurs in pure time series data. Based on the overall test results, it can be concluded that the regression model in this study has fulfilled all the required classical assumptions.

Based on the model specification tests, the Fixed Effect Model (FEM) is determined to be the most appropriate model for this study. The results of the FEM regression analysis are presented in Table 3.

Table 3. Fixed Effect Model Output Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	96.34188	10.91995	8.822554	0.0000
JP	4.67E-06	1.41E-06	3.307296	0.0011
IPM	-1.515559	0.169912	-8.919687	0.0000
UMK	7.38E-06	7.39E-07	9.979975	0.0000
PMDN	2.47E-08	4.12E-08	0.600528	0.5488
PMA	1.44E-09	7.48E-08	0.019235	0.9847
R-squared	0.828499			
Adjusted R-squared	0.795872			
F-statistic	25.39306			
Prob(F-statistic)	0.000000			

Source: Eviews, processed 2025

Based on Table 3, the output of the Fixed Effect Model (FEM) shows a coefficient of determination (R-squared) of 0.828499 or 82.8 percent. This means that the variables population, Human Development Index (IPM), Regency/City Minimum Wage (UMK), Domestic Investment (PMDN), and Foreign Direct Investment (PMA) can explain the variation in the Open Unemployment Rate (TPT) by 82.8 percent, while the remaining 17.2 percent is influenced by other variables not included in this research model.

The estimation results using the Fixed Effect Model (FEM), as presented in Table 3, yield a calculated F-statistic of 25.39306. The critical F-value was determined using the formula $F(\alpha; df1; df2) = F(\alpha; k-1; n-k)$, where k represents the total number of variables in the model and n denotes the sample size. The calculation results in a critical F-value of 2.25 at the 5% significance level. The analysis reveals that the calculated F-statistic (25.39306) significantly exceeds the critical F-value (2.25), with a probability value (p-value) of 0.000000, which is below the $\alpha = 0.05$ threshold. Consequently, the alternative hypothesis (H_1) is accepted, indicating that, collectively, the variables of population size, Human Development Index (HDI), District/City Minimum Wage (UMK), Domestic Investment (PMDN), and Foreign Direct Investment (PMA) exert a statistically significant influence on the Open Unemployment Rate (TPT) in the study area.

These findings provide robust empirical evidence that demographic factors, human resource quality, wage levels, and both domestic and foreign investments play a pivotal role in determining unemployment rates in the examined region. The results underscore the importance of integrated policy approaches that simultaneously address these variables to effectively mitigate unemployment.

The Fixed Effect Model (FEM) is selected as the best and most appropriate regression model to apply. The following is the resulting regression equation based on this model:

$$\hat{TPT} = 96,34 + 4,67JP - 1,51IPM + 7,38UMK + 2,47PMDN + 1,44PMA \dots\dots\dots (2)$$

The regression analysis results indicate that the constant value of 96.34 suggests that if the variables of population size, Human Development Index (IPM), District/City Minimum Wage (UMK), Domestic Investment (PMDN), and Foreign Direct Investment (PMA) are zero or held constant, the Open Unemployment Rate (TPT) is estimated to be 96.34 percent.

The population variable has a regression coefficient of 4.67 and shows a positive and significant effect on the TPT across 35 regencies/cities in Central Java Province during the 2017–2023 period. This implies that an increase of one person in the population contributes to a 4.67 percent rise in the TPT. Based on the Fixed Effect Model (FEM) approach, regions with higher population growth tend to experience higher unemployment rates, as job opportunities do not necessarily increase in tandem with population growth, whether in the formal or informal sector. This finding is consistent with Thomas Malthus' theory, which states that rapid population growth without corresponding job creation will lead to labor surplus and higher unemployment. These results are also supported by previous studies conducted by Sambaulu et al., (2022), David & Engka (2019), and Patima et al. (2022).

Furthermore, IPM has a regression coefficient of -1.51 and is proven to have a negative and significant effect on the TPT. This means that each one-point increase in IPM reduces the TPT by 1.51 percent. This finding is in line with Human Capital Theory, which asserts that investment in education and health improves labor productivity and expands employment opportunities. A higher IPM reflects better human capital quality, making individuals more readily absorbed in both formal and informal labor markets. This result is supported by the findings of Palette et al., (2024), (Mahroji & Nurkhasanah (2019), Helvira & Putra Rizki (2020), Amalia & Kurnia Sari (2019), and Soeharjoto & Oktavia (2021), who also identified a significantly negative relationship between HDI and the OUR. Meanwhile, UMK shows a positive and significant relationship with the TPT, with a regression coefficient of 7.38. This implies that an increase of one rupiah in UMK leads to a 7.38 percent increase in the TPT. This phenomenon can be explained by the efficiency wage theory, which posits that firms tend to pay wages above the market equilibrium level to boost productivity. However, this also increases production costs, prompting firms to reduce their labor force. Consequently, an increase in UMK may lead to higher unemployment. These findings are in accordance with studies conducted by Amalia & Kurnia Sari (2019), Fatimah et al., (2023), Romadhona (2023), Mahendra & Utomo (2023), and Helvira & Putra Rizki (2020), all of which found that UMK has a positive and significant effect on the TPT.

The PMDN variable has a regression coefficient of 2.47 and shows a positive but statistically insignificant effect on the TPT. This indicates that an increase in domestic investment by one million rupiah is estimated to raise the OUR by 2.47 percent, although this effect is not statistically significant. This finding suggests that domestic investment tends to concentrate in already developed regions or capital-intensive sectors, thus contributing little to job creation. These results are in line with the findings of Ghaestiara Putri & Rusdi (2025), Helvira & Putra Rizki (2020), and Susanti et al., (2024).

Finally, PMA also shows a positive but statistically insignificant effect on the TPT, with a regression coefficient of 1.44. Although an increase of one million rupiah in foreign investment is estimated to raise the tpt by 1.44 percent, this effect is not statistically significant. This indicates that the inflow

of foreign direct investment has not yet made an optimal contribution to reducing unemployment, particularly in regions with limited infrastructure and a shortage of skilled labor. As a result, investors tend to invest in more developed areas and in capital-intensive sectors. This finding is supported by the studies of Helvira & Putria Rizki (2020) and Susanti et al., (2024), which found that PMA has an insignificant effect on labor absorption in less developed areas.

CONCLUSION

Based on the results of the analysis, several conclusions can be drawn from this study. Population has a significant positive effect on the open unemployment rate (TPT), indicating that an increase in population tends to raise unemployment levels across the 35 regencies/cities in Central Java Province during the period 2017–2023. Conversely, the Human Development Index (IPM) has a significant negative effect on TPT, suggesting that higher IPM values contribute to a reduction in unemployment. The Regional Minimum Wage (UMK) also shows a significant positive effect on TPT, meaning that increases in UMK are associated with higher unemployment. Meanwhile, Domestic Investment (PMDN) and Foreign Investment (PMA) do not have a significant effect on TPT, implying that fluctuations in investment levels do not necessarily influence unemployment rates. However, when considered simultaneously, Population, IPM, UMK, PMDN, and PMA collectively have a significant effect on TPT.

These findings have several implications for policymaking. The positive impact of population on unemployment highlights the need for population control efforts. Local governments should implement strategies such as strengthening Family Planning (KB) programs and ensuring equitable regional development to manage population growth more effectively. Furthermore, job creation must be prioritized through the development of labor-intensive sectors, the promotion of local entrepreneurship, and the empowerment of village-based economies, so that the working-age population can be absorbed by both formal and informal sectors.

The negative relationship between IPM and TPT emphasizes the importance of improving the quality of human resources in the region. Local governments should focus on expanding access to quality education, particularly vocational and technical education aligned with industry demands, while also providing competency-based job training and improving basic health services to increase the productivity and competitiveness of the labor force.

The finding that UMK increases are associated with higher unemployment suggests the need for wage policies that are tailored to the actual economic conditions of each region and the capacity of businesses. To mitigate the impact of rising wages, local governments should provide support and incentives to micro, small, and medium enterprises (MSMEs) so that they can remain resilient and continue to absorb labor. Additionally, it is essential to enhance training programs aimed at improving labor productivity, ensuring that higher wages are matched by improved workforce quality. Although investment, both domestic and foreign, does not show a significant direct effect on unemployment in this study, theoretically, investment should play a strategic role in generating employment opportunities. The limited impact observed may be due to the concentration of investment in more developed areas and in capital-intensive sectors that do not require large labor inputs.

Therefore, the government must encourage a more equitable distribution of investment and shift its orientation toward labor-intensive industries, particularly in regions with high unemployment rates. This can be supported through incentive policies, infrastructure development, and efforts to improve the quality of local labor so that investment can directly contribute to reducing unemployment.

This study is not without limitations. Data availability posed a challenge, particularly for several variables that were not consistently available for all districts/cities throughout the 2017–2023 period. As a result, the analysis was limited to the available data during that time frame. Additionally, the relatively short research period means that the findings may not fully represent long-term trends or provide a comprehensive view of historical unemployment dynamics in Central Java Province.

BIBLIOGRAPHY

- Amalia, E., & Kurnia Sari, L. (2019). Analisis Spasial Untuk Mengidentifikasi Tingkat Pengangguran Terbuka Berdasarkan Kabupaten/Kota di Pulau Jawa Tahun 2017. *Indonesian Journal of Statistics and Its Applications*, 3(3), 202–215.
- Aprilia, F. (2022). Analisis Pengaruh Indeks Pembangunan Manusia dan Inflasi Terhadap Tingkat Pengangguran Terbuka di Indonesia Periode 1992-2021. *Profit: Jurnal Manajemen, Bisnis Dan Akuntansi*, 1(4).
- Arifin, S., & Firmansyah. (2017). *Pengaruh Tingkat Pendidikan dan Kesempatan Kerja Terhadap Pengangguran di Provinsi Banten*.
- Badan Pusat Statistik. (2024a). *Tingkat Pengangguran Terbuka Menurut Provinsi*. <https://bps.go.id>
- Badan Pusat Statistik. (2024b). *Tingkat Pengangguran Terbuka (TPT) Menurut Kabupaten/Kota di Provinsi Jawa Tengah*. <https://bps.go.id>
- Badriah, L. S., & Arintoko. (2024). The Dynamics Model of Cross-Regional to Enhance Economic Growth: New Empirical Evidence from Indonesia. *Economics - Innovative and Economics Research Journal*, 12(3), 379–395. <https://doi.org/10.2478/eoik-2024-0046>
- Badriah, S. (2015). *Analisis Existing Condition Permintaan dan Penawaran Tenaga Kerja di Indonesia*. www.ilo.org
- David, Y. B., & Engka, D. S. M. (2019). Pengaruh Angkatan Kerja Bekerja dan Jumlah Penduduk Terhadap Pengangguran Di Sulawesi Utara The Effect Of Working Workforce And Total Population Towards Unemployment Rate In North Sulawesi. *Jurnal EMBA*, 7(8), 3389–3398.
- Fatimah, S., Prihadi Utomo, Y., Ilmu Ekonomi Studi Pembangunan, P., & Ekonomi dan Bisnis, F. (2023). Analisis Pengaruh Jumlah Angkatan Kerja, Upah Minimum, Penanaman Modal Dalam Negeri, Proporsi PDRB Sektor Industri, Proporsi PDRB Sektor Jasa Terhadap Tingkat Pengangguran Terbuka di Provinsi JawaTengah. *Jurnal Bisnis Dan Manajemen*, 3(3), 2477–1783.
- Filiari, A., & Setiawan, A. H. (2021). Pengaruh Angkatan Kerja, Upah, PDRB, dan Pendidikan Terhadap Tingkat Pengangguran di Provinsi Banten Tahun 2002-2019. *Diponegoro Journal of Economics*, 10(2).
- Ghaestiara Putri, A., & Rusdi, M. (2025). Analisis Faktor-Faktor Yang Mempengaruhi Tingkat Pengangguran Terbuka di Pulau Sumatera. *Jurnal Darma Agung*, 33(1), 171–180. <https://doi.org/10.46930/ojsuda.v33i1.5376>
- Helvira, R., & Putra Rizki, E. (2020). *Pengaruh Investasi, Upah Minimum, dan IPM Terhadap Tingkat Pengangguran Terbuka di Provinsi Kalimantan Barat*. 1(1), 53–62. <http://ejournal.iainptk.ac.id/index.php/jiseb>
- Julihan Sari, R., & Setyowati, E. (2022). Analysis of the Influence of the Number of Population, Wages, and HDI on Open Unemployment Rate in Central. *Procedia of Social Sciences and Humanities*. <https://pssh.umsida.ac.id>.
- Mahendra, D. B., & Utomo, Y. P. (2023). Analisis Faktor-Faktor Yang Mempengaruhi Tingkat Pengangguran Di Kabupaten/Kota Jawa Tengah 2017-2021. *Jurnal Mirai Management*, 8(2), 329–342.
- Mahroji, D., & Nurkhasanah, L. (2019). Pengaruh Indeks Pembangunan Manusia Terhadap Tingkat Pengangguran di Provinsi Banten. *Jurnal Ekonomi-Qu*, 9(1). <http://jurnal.untirta.ac.id/index.php/>
- Mankiw, N. G., Quah, E., & Wilson, P. (2012). *Pengantar Ekonomi Makro* (Vol. 2). Salemba Empat.
- Mulyadi, A., Siti Badriah, L., & Arifin, A. (2024). Faktor-Faktor yang Mempengaruhi Penyerapan
- Tenaga Kerja Terdidik di Indonesia. *Isoquant: Jurnal Ekonomi, Manajemen Dan Akuntansi*, 8(1), 10–23. <https://studentjournal.umpo.ac.id/index.php/isoquant>
- Muryanto, T. D., Farida, Y., Ulinnuha, N., Khaulasari, H., & Yuliati, D. (2022). Pengaruh Investasi Terhadap Pertumbuhan Ekonomi Jawa Timur. *Jurnal Matematika Integratif*, 18(2), 157.

<https://doi.org/10.24198/jmi.v18.n2.40732.157-166>

- Palette, S., Kalangi, J. B., & Masloman, I. (2024). The Influence of Human Development Index (HDI) and Population on Unemployment Rate in Toraja Regency. *Formosa Journal of Applied Sciences*, 3(9), 3687–3700. <https://doi.org/10.55927/fjas.v3i9.11331>
- Priyono, & Ismail, Z. (2016). Teori Ekonomi. In T. Chandra (Ed.), *TEORI eKONOMI*. Zifatama. https://works.bepress.com/priyono_priyono/66/
- Romadhona, Y. R. (2023). Analisis Pengaruh Pertumbuhan Ekonomi, Upah Minimum, dan Penanaman Modal Dalam Negeri Terhadap Jumlah Pengangguran di DIY (2008-2022). *JER: Jurnal Ekonomi Regional*, 15(2).
- Sambaulu, R. A., Rotinsulu, T. O., & Lopian, A. (2022). Pengaruh Jumlah Penduduk, Upah Minimum dan Inflasi Terhadap Pengangguran di Kota Manado. *Jurnal Berkala Ilmiah Efisiensi*, 22(6), 37–48.
- Setiawan, K., Haikal, M., Wicaksana, A. G., & Dermawan, D. (2023). Analisis Faktor-Faktor Yang Mempengaruhi Tingkat Pengangguran Terbuka di Provinsi Banten 2017-2021. *Jurnal Riset Rumpun Ilmu Ekonomi*, 2(1), 107–120. <https://doi.org/10.55606/jurrie.v2i1.1112>
- Setyawan, A., Suparta, I. W., & Aida, N. (2021). Globalisasi Ekonomi dan Pengangguran: Studi Kasus Indonesia. *Jurnal Ekonomi Bisnis Dan Kewirausahaan*, 10(3), 263. <https://doi.org/10.26418/jebik.v10i3.49278>
- Soeharjoto, & Oktavia, M. R. (2021). Pengaruh Inflasi, Indeks Pembangunan Manusia, Dan Upah Minimum Provinsi Terhadap Pengangguran Di Indonesia. *Jurnal Ecodemica: Jurnal Ekonomi, Manajemen, Dan Bisnis*, 5(2).
- Sukirno, S. (2013). *Makro Ekonomi Teori Pengantar* (3rd ed.). Rajawali Pers.
- Sukirno, S. (2015). *Ekonomi Pembangunan Proses, Masalah, dan Dasar Kebijakan* (2nd ed.). PRENADAMEDIA GROUP.
- Susanti, A., Yohanna, D., Sitorus, A. P., Shaumy, S. N., Stis, M. D., Nurlela, & Ayu, D. (2024). Analisis Dampak Faktor-Faktor yang Mempengaruhi Pengangguran Terbuka di Kota Bogor. *Jurnal Ilmiah Ekonomi Bisnis Dan Akuntansi*, 1(1), 107–113.
- Todaro, M. P., & Smith, S. C. (2011). *Pembangunan Ekonomi* (A. Maulana & N. I. Sallama, Eds.; A. Dharma, Trans.; 11th ed.). Erlangga.
- Tumilaar, TeresaV., Maramis, M. Th. B., & Siwu, H. F. D. (2022). Pengaruh Jumlah Penduduk, Pendidikan, dan Upah Minimum Terhadap Tingkat Pengangguran Terbuka di Kabupaten/Kota Provinsi Kalimantan Timur. *Jurnal Berkala Ilmiah Efisiensi*, 22(5), 61–72.
- Wulandari, D. L., & Astuti, I. P. (2023). Determinan Tingkat Pengangguran di Jawa Tengah. *Jurnal Ekonomi-Qu*, 13(1), 44. <https://doi.org/10.35448/jequ.v13i1.20530>