Original Article

e-ISSN: 2775-5037
p-ISSN: 2614-3917

Original Article

The Effect of Population Size, Minimum Wage, and Gross Regional Domestic Product (GRDP) on Unemployment in East Java Province

Mohamad Fathur Rohman[1]✉, Mochammad Heru Widodo[2], Muhamad Muliono[3]
[1,2,3]Universitas Darul 'Ulum, Jombang, Jawa Timur, Indonesia
Correspondence Author: rohmanfathur105@gmail.com✉

Abstract:

This study aims to examine the effect of population size, minimum wage, and Gross Regional Domestic Product (GRDP) on the open unemployment rate in East Java Province. This research is an explanatory study that explains the relationships among variables. It seeks to analyze the influence of independent variables on the dependent variable through hypothesis testing using statistical analysis. The study employs time series data over a ten-year period from 2015 to 2024. Using a quantitative approach, multiple linear regression analysis is applied to determine the effect of the independent variables on the dependent variable. The results indicate that, partially, population size has a positive and significant effect on the open unemployment rate, the minimum wage has no significant effect on the open unemployment rate, and Gross Regional Domestic Product has a negative and significant effect on the open unemployment rate. Simultaneously, population size, minimum wage, and Gross Regional Domestic Product jointly affect the open unemployment rate in East Java Province during the period 2015–2024.

Submited : 02 March 2026
Revised : 06 March 2026
Acceptance : 12 March 2026
Publish Online : 13 March 2026

Keywords: Unemployment, Population Size, Minimum Wage, PDRB.

Introduction

National development aims to realize the ideals of the Indonesian nation as stated in the Preamble of the 1945 Constitution, particularly in improving public welfare and enhancing quality of life. One of the fundamental pillars of national development is economic development, which is strongly influenced by the quality and effective utilization of human resources. Indonesia's large population—recorded at 281.6 million in 2024 by Badan Pusat Statistik (BPS)—represents both a strategic potential and a structural challenge. On the one hand, a large population may stimulate economic growth through increased aggregate consumption; on the other hand, it may contribute to rising unemployment if job creation does not adequately absorb labor force growth.

Unemployment constitutes a significant labor market issue, including in East Java Province. Data from the provincial statistics office indicate that the open unemployment

rate fluctuated during the 2015–2024 period. Between 2015 and 2019, unemployment exhibited a declining trend; however, it increased sharply in 2020 due to the economic impact of the COVID-19 pandemic. During the 2021–2024 period, the unemployment rate gradually decreased in line with regional economic recovery.

Several macroeconomic indicators are theoretically and empirically associated with the open unemployment rate, including population size, provincial minimum wage, and Gross Regional Domestic Product (GRDP). The population of East Java has consistently increased over time, potentially stimulating economic growth through higher consumption. Nevertheless, without proportional job creation, population growth may exacerbate unemployment pressures.

Minimum wage policy also influences labor market conditions, as it may affect labor productivity and firms' employment decisions. From a Keynesian perspective, wage increases are considered capable of enhancing workers' income and purchasing power. Higher purchasing power subsequently stimulates aggregate demand, which may positively affect economic growth and employment expansion, as articulated by John Maynard Keynes (1936).

The relationship between Gross Regional Domestic Product and unemployment is commonly explained by Okun's Law. According to N. Gregory Mankiw (2006), Okun's Law describes an inverse relationship between unemployment and economic output growth measured by Gross Domestic Product (GDP). Economic expansion is generally accompanied by declining unemployment, whereas economic slowdown tends to increase unemployment levels.

Furthermore, classical population theory proposed by Thomas Robert Malthus argues that population growth, if left unchecked, increases geometrically (1, 2, 4, 8, 16, 32, ...), while food

production grows arithmetically (1, 2, 3, 4, 5, ...). In the context of regional development, rapid population growth without adequate economic capacity may contribute to higher unemployment rates.

Based on these theoretical and empirical considerations, examining the influence of population size, provincial minimum wage, and GRDP on the open unemployment rate in East Java Province is highly relevant. This study aims to provide a comprehensive empirical analysis of these relationships and contribute to the development of more effective labor market policies.

Methods

This study employs a quantitative research approach utilizing secondary time-series data covering the period 2015–2024. Quantitative research relies on numerical data analyzed using statistical techniques to examine relationships among variables (Rahayu, 2019).

The analytical method applied in this study is multiple linear regression analysis. Statistical estimation was conducted using SPSS (Statistical Product and Service Solutions) version 27 to evaluate both partial and simultaneous effects of the independent variables on the dependent variable. The objects of this study consist of population size, provincial minimum wage, and Gross Regional Domestic Product. The subject of the study is the open unemployment rate. Operational Definition of Variables are as follows:

1. Population

Population refers to individuals who reside in a particular area for one year or

more, or for less than one year but intend to settle in that area. In this study, the indicator used is the total population in East Java Province within a specific period.

2. Minimum Wage

Minimum Wage is the lowest monthly wage determined annually by the governor, consisting of basic salary and fixed allowances, serving as a safety net to ensure that workers can meet a decent standard of living.

3. Gross Regional Domestic Product (GRDP)

Gross Regional Domestic Product (GRDP) refers to the total value of goods and services produced within a regional area of a country as a result of economic activities during a specific period, without considering whether the factors of production are owned by local residents or not.

4. Open Unemployment Rate

Unemployment refers to a condition in which individuals of working age who are part of the labor force do not have a job, are actively seeking employment, and are willing to work but have not yet obtained employment.

Data Collection Techniques, data collection methods refer to the procedures used to obtain data in research, whether primary or secondary data. In this study, the data used are secondary data. The data collection techniques employed are as follows:

1. Documentation Method

The documentation method is a data collection technique in which the researcher collects data by copying or downloading existing secondary data that have already been published on official and reliable websites, such as Statistics Indonesia (BPS).

2. Literature Review Method

The literature review method is a data collection technique that involves analyzing various reference sources to obtain information relevant to the study. This method includes gathering information from existing sources such as scientific journals, books, and other relevant academic references. The collected data were subsequently tabulated and prepared for statistical analysis.

Table 1. Tabulation of Data on the Open Unemployment Rate (Y), Population (X1), Provincial Minimum Wage (X2), and Gross Regional Domestic Product(X3).

Year	Y	X_1	X_2	X_3
2015	4.47	38.847.561	1,000,000	1,691,477.1
2016	4.21	39.075.152	1,273,490	1,855,738.4
2017	4.00	39.292.971	1,388,000	2,012,918.0
2018	3.91	39.501.000	1,508,895	2,189,823.6
2019	3.82	39.698.631	1,630,059	2,352,425.2
2020	5.84	40.665.696	1,768,777	2,299,807.6
2021	5.74	40.878.789	1,868,777	2,454,792.0
2022	5.49	41.149.974	1,891,567	2,731,423.6
2023	4.88	41.527.930	2,040,244	2,953,546.9
2024	4.19	41.814.500	2,165,244	3,168,295.5

Sources: Statistics Indonesia, East Java Province (BPS East Java) 2026

After the data were tabulated, they were transformed into natural logarithmic (Ln) form to standardize the measurement units across variables and to improve the normality of the data distribution prior to statistical testing. The following table presents the transformed Ln data:

Table 2. Natural Logarithm (Ln) Transformation of Open Unemployment Rate (LN_Y), Population (LN_X1), Provincial Minimum Wage (LN_X2), and Gross Regional Domestic Product (LN_X3).

Year	LN_Y	LN_X_1	LN_X_2	LN_X_3
2015	1.50	17.48	13.82	14.34
2016	1.44	17.48	14.06	14.43
2017	1.39	17.49	14.14	14.52
2018	1.36	17.49	14.23	14.60
2019	1.34	17.50	14.30	14.67
2020	1.76	17.52	14.39	14.65
2021	1.75	17.53	14.44	14.71
2022	1.70	17.53	14.45	14.82
2023	1.59	17.54	14.53	14.90
2024	1.43	17.55	14.59	14.97

Results

Analysis Results and Discussion

Multiple Linear Regression Test Results

The multiple linear regression analysis aims to examine the influence among variables, or more specifically, to determine the extent to which the independent variables—Population (X1), Minimum Wage (X2), and Gross Regional Domestic Product (GRDP) (X3)—affect the Open Unemployment Rate (Y) in East Java Province. The following table presents the results of the multiple linear regression analysis:

Table 3. Multiple Linear Regression Test Results.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-241.922	49.511		-4.886	.003
	LN_X1	15.461	3.147	2.556	4.912	.003
	LN_X2	.586	.407	.857	1.443	.199
	LN_X3	-2.432	.544	-2.981	-4.469	.004

a. Dependent Variable: LN_Y

Source: Output IBM SPSS (v.25), 2026.

The multiple linear regression analysis aims to examine the influence among

variables, or more specifically, to determine the extent to which the independent variables—Population (X1), Minimum Wage (X2), and Gross Regional Domestic Product (GRDP) (X3)—affect the Open Unemployment Rate (Y) in East Java Province. The following table presents the results of the multiple linear regression analysis: From the table 3.10 above, the regression values are obtained as follows

1. Constant (α) : -241.922
2. Population (LN_X1) : 15.461
3. Minimum Wage (LN_X2) : 0.586
4. GRDP (LN_X3) : -2.432

These results are then incorporated into the multiple linear regression equation, producing the following model:

$Y = \alpha + \beta 1\ X1 + \beta 2\ X2 + \beta 3\ X3 + e$

$Y = -241{,}922 + 15.461X1 + 0.586X2 - 2.432X3 + e$

The multiple linear regression equation can be interpreted as follows:

1. The constant coefficient of -241.922 indicates that if Population (LN_X1), Minimum Wage (LN_X2), and GRDP (LN_X3) are equal to zero or held constant, the Open Unemployment Rate (LN_Y) would be -241.922.
2. The regression coefficient for Population (LN_X1) of 15.461 implies that a 1% increase in Population, while holding the other independent variables constant, will result in an increase of 15.461 in the Open Unemployment Rate in East Java Province.
3. The regression coefficient for Minimum Wage (LN_X2) of 0.586 indicates that a 1% increase in Minimum Wage, with other independent variables held constant, will lead to an increase of 0.586 in the Open Unemployment Rate in East Java Province.
4. The regression coefficient for GRDP (LN_X3) of -2.432, which is negative, indicates that a 1% increase in GRDP, while keeping other independent variables constant, will result in a decrease of 2.432 in the Open Unemployment Rate in East Java Province.

Hypothesis Testing and Discussion

Partial Test (t-Test)

The t-test is conducted to determine the effect of each independent variable individually or partially on the dependent variable. The decision criteria for the t-test are as follows:

1. If the significance value is greater than 0.05 (> 0.05), H is accepted and H1 is rejected; conversely, if the significance value is less than 0.05 (< 0.05), H is rejected and H1 is accepted.
2. If the calculated t-value (t_h) is less than the t-table value (t_t), H0 is accepted and H1 is rejected; conversely, if $t_h > t_t$, H1 is rejected and H1 is accepted.

The following table presents the results of the partial or t-test:

Table 4. Partial t-Test Results (t-Test).

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-241.922	49.511		-4.886	.003
	LN_X1	15.461	3.147	2.556	4.912	.003
	LN_X2	.586	.407	.857	1.443	.199
	LN_X3	-2.432	.544	-2.981	-4.469	.004

a. Dependent Variable: LN_Y

Source: Output IBM SPSS (v.25), 2026.

Based on Table 4, the results of the t-test can be explained as follows:

1. Population (LN_X1)

   From the analysis in Table 3.11, the significance value for the Population variable (LN_X1) is 0.003, which is less than 0.05 (0.003 < 0.05). This indicates that H0 is rejected and H1 is accepted. Therefore, the Population variable has a significant effect on the Open Unemployment Rate in East Java Province.

2. Provincial Minimum Wage (LN_X2)

   The significance value for the Minimum Wage variable (LN_X2) is 0.199, which is greater than 0.05 (0.199 > 0.05). This indicates that H1 is accepted and H1 is rejected. Consequently, the Minimum Wage variable does not have a significant effect on the Open Unemployment Rate in East Java Province.

3. Gross Regional Domestic Product (LN_X3)

   The significance value for the GRDP variable (LN_X3) is 0.004, which is less than 0.05 (0.004 < 0.05). This indicates that H1 is rejected and H1 is accepted. Therefore, the GRDP variable has a significant effect on the Open Unemployment Rate in East Java Province.

Meanwhile, based on the t-table calculation with 3 independent variables and a 10-year sample, the t-table value is calculated as follows:

$$df = n-k-1 = 10-3-1 = 6$$

The t-table value at a 5% significance level is 2.447. Based on this, the results for each variable are as follows:

1. Population (LN_X1)

   The calculated t-value for Population (LN_X1) is 4.912, which is greater than 2.447 (4.912 > 2.447). Thus, H1 is rejected and H1 is accepted, indicating that Population has a significant positive effect on the Open Unemployment Rate in East Java Province.

2. Provincial Minimum Wage (LN_X2)

   The calculated t-value for Minimum Wage (LN_X2) is 1.443, which is less than 2.447 (1.443 < 2.447). Hence, H1 is accepted and H1 is rejected, indicating that Minimum Wage does not have a significant effect on the Open Unemployment Rate in East Java Province.

3. Gross Regional Domestic Product (LN_X3)

   The calculated t-value for GRDP (LN_X3) is 4.669, which is greater than 2.447 (4.669 > 2.447). Thus, H1 is rejected and H1 is accepted, indicating that GRDP has a significant effect on the Open Unemployment Rate in East Java Province. The

negative sign of the t-value implies that GRDP has a negative or inverse relationship with the Open Unemployment Rate.

Simultaneous Test (F-Test)

The F-test is conducted to determine whether the independent variables collectively, or simultaneously, have a significant effect on the dependent variable. The decision criteria for the F- test are as follows:

1. If the significance value is greater than 0.05 ($p > 0.05$), the null hypothesis (H_0) is accepted and the alternative hypothesis (H_1) is rejected. Conversely, if the significance value is less than 0.05 ($p < 0.05$), H_1 is rejected and H_1 is accepted.
2. If the calculated F-value (F-count) is less than the F-table value (F-count < F-table), H_0 is accepted and H_1 is rejected. Conversely, if F-count > F-table, H_0 is rejected and H_1 is accepted.

This test allows researchers to assess whether the independent variables, when considered together, have a statistically significant influence on the dependent variable.

Table 5. Simultaneous Test Results (F-Test).

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.204	3	.068	11.787	.006[b]
	Residual	.035	6	.006		
	Total	.239	9			

a. Dependent Variable: LN_Y

b. Predictors: (Constant), LN_X3, LN_X1, LN_X2

Source: Output IBM SPSS (v.25), 2026.

Based on Table 5, the F-test results show a significance value of 0.006, which is less than 0.05 (0.006 < 0.05). This indicates that H_0 is rejected and H_1 is accepted. Therefore, it can be concluded that the independent variables—Population (LN_X1), Minimum Wage (LN_X2), and Gross Regional Domestic Product (LN_X3)—simultaneously have a significant effect on the Open Unemployment Rate in East Java Province.

Regarding the calculated F-value, based on Table 3.12, the F-count is 11.787. With 3 independent variables and a sample of 10 years, the degrees of freedom are calculated as follows:

- $df_1 = k = 3$
- $df_2 = n - k - 1 = 10 - 3 - 1 = 6$

The F-table value at a 0.05 significance level is 4.76. Since the F-count is greater than the F- table value (11.787 > 4.76), the decision criterion confirms that H is rejected and H_1 is accepted. Hence, the independent variables Population (LN_X1), Minimum Wage (LN_X2), and Gross Regional Domestic Product (LN_X3) simultaneously exert a significant effect on the Open Unemployment Rate in East Java Province.

Determination Coefficient Test (R^2)

The determination coefficient test aims to measure the magnitude or proportion of the influence of the independent variables on the dependent variable. The coefficient of

determination ranges between 0 and 1. The closer the value of the coefficient is to 1, the stronger the proportion of the influence of the independent variables on the dependent variable. The following are the results of the data analysis for the determination coefficient test.

Table 6. Results of the Coefficient of Determination (R^2) Test.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.925[a]	.855	.782	.07596

a. Predictors: (Constant), LN_X3, LN_X1, LN_X2

Source: Output IBM SPSS (v.25), 2026.

Based on Table 6, the coefficient of determination is represented by the Adjusted R Square (R^2) value of 0.782. This indicates that the independent variables—population, minimum wage, and gross regional domestic product (GRDP)—collectively explain 78.2% of the variation in the dependent variable, which is the open unemployment rate. The remaining 21.8% is explained by other variables outside the scope of this study.

The Effect of Population on the Open Unemployment Rate

Based on the regression analysis, the population variable (X1) has a significant positive effect on the open unemployment rate (Y) in East Java Province, with a significance value of 0.003, which is less than 0.05 (0.003 < 0.05), and a t-statistic of +4.912, which is greater than the t-table value of 2.447 (4.912 > 2.447). This indicates that population has a significant positive effect on the open unemployment rate in East Java Province. The results suggest that an increase in population tends to lead to an increase in unemployment.

These findings are consistent with Malthusian theory. Malthus argued that if population growth is left uncontrolled, it will increase rapidly following a geometric progression (1, 2, 4, 8, 16, etc.), whereas the growth of subsistence resources, goods, and means of production only increases slowly in an arithmetic progression (1, 2, 3, 4, 5, etc.). In this context, employment opportunities— part of the economic means and resources—grow more slowly than population. When the population increases rapidly, the labor force entering the job market also increases. However, if job creation does not keep pace with population growth, part of the labor force remains unemployed, resulting in an increase in open unemployment.

The Effect of Provincial Minimum Wage on the Open Unemployment Rate

The regression analysis indicates that the provincial minimum wage variable (X2) does not have a significant effect on the open unemployment rate (Y) in East Java Province, with a significance value of 0.199, which is greater than 0.05 (0.199 > 0.05), and a t-statistic of +1.443, which is smaller than the t-table value of 2.447 (1.443 < 2.447). Therefore, it can be concluded that the provincial minimum wage does not significantly affect the open unemployment rate in East Java Province.

This finding does not align with the Keynesian perspective, which posits that an increase in wages has the potential to raise workers' incomes, thereby increasing purchasing power. Higher purchasing power is expected to stimulate aggregate demand, which can positively affect economic growth and expand employment opportunities,

ultimately reducing open unemployment.

Based on the regression estimation, the natural logarithm of the minimum wage (LN_X2) has a coefficient of 0.586. This coefficient indicates a positive relationship, meaning that an increase in the minimum wage tends to be followed by an increase in the open unemployment rate in East Java Province. In the log-linear model, this coefficient implies that a 1 percent increase in the minimum wage is associated with a 0.586 percent increase in the open unemployment rate, assuming other variables remain constant.

However, the t-test results indicate that the effect of minimum wage on the open unemployment rate is not statistically significant, as evidenced by a significance value of 0.199 (>0.05) and a t-statistic of 1.443 (< 2.447). This suggests that while the regression coefficient is positive, the effect is not strong enough to conclude that the minimum wage significantly influences open unemployment in East Java Province. The lack of statistical significance indicates that the positive relationship is merely a tendency rather than a substantive effect. Consequently, the regression coefficient of 0.586 cannot serve as a definitive basis for concluding that minimum wage increases impact open unemployment.

The Effect of Gross Regional Domestic Product on the Open Unemployment Rate

The regression results show that the gross regional domestic product (GRDP) variable (X3) has a significant negative effect on the open unemployment rate (Y) in East Java Province, with a significance value of 0.004, which is less than 0.05 (0.004 < 0.05), and a t-statistic of 4.469, which is greater than the t-table value of 2.447 (4.469 > 2.447). This indicates that GRDP has a significant negative effect on open unemployment. Thus, an increase in GRDP is associated with a reduction in the open unemployment rate in East Java Province.

The negative regression coefficient indicates an inverse relationship between GRDP and open unemployment. This means that an increase in economic activity, reflected in higher GRDP, stimulates production capacity, business expansion, and the creation of new jobs, thereby absorbing labor and reducing unemployment. Conversely, a decrease in GRDP can slow economic activity and reduce employment opportunities.

These results are consistent with Okun's Law, which states that there is a negative relationship between output growth and unemployment. When GRDP increases, economic growth absorbs more labor, resulting in a decrease in the open unemployment rate. Therefore, GRDP plays a critical role in determining open unemployment in East Java Province.

Conclusion

Based on the results of this study, the following conclusions can be drawn:

1. Population (X1) has a positive and significant partial effect on the open unemployment rate in East Java Province during 2015–2024.
2. Minimum wage (X2) has no significant partial effect on the open unemployment rate in East Java Province during 2015–2024.
3. Gross Regional Domestic Product (X3) has a negative and significant partial effect on the open unemployment rate in East Java Province during 2015–2024.
4. Population, minimum wage, and GRDP simultaneously influence the open

unemployment rate in East Java Province during 2015–2024.

Limitations of the research in this study, only secondary data from Statistics Indonesia (BPS) and other official sources were used, so the research results depend on the quality and timeliness of the available data. In addition, the variables analyzed are limited to Population, Minimum Wage, and GRDP, while other factors that may influence the unemployment rate, such as investment, education, or government policies, were not included in the model. Furthermore, the regression analysis used may still be affected by multicollinearity and autocorrelation, even though corrective measures have been applied, so the interpretation of the results has limitations in fully explaining the relationships among the variables.

Suggestion

Based on the findings of this study, the following recommendations are proposed:

1. For The government is expected to formulate integrated and sustainable policies to address unemployment. Efforts should include promoting regional economic growth through investment and the development of productive sectors capable of absorbing a substantial labor force, ensuring that increases in GRDP are accompanied by expanded employment opportunities. Additionally, the government should regulate population growth and improve human capital quality through education and vocational training to align with labor market needs.
2. For Future studies on similar topics are recommended to include a broader range of variables and utilize more recent data to enhance the accuracy and relevance of research findings.

References

Biro Adminstrasi Pembangunan Setda Provinsi Jawa Timur. https://ro-admpembangunan.jatimprov.go.id/visi-misi. diakses 2 Januari 2026 pukul 20.55.

BPK (Perwakilan Provinsi Jawa Timur). https://jatim.bpk.go.id/provinsi-jawa-timur/ diakses 2 Januari 2026 pukul 20.49.

BPS Provinsi Jawa Timur,2020. Produk Domestik Regional Bruto 2015-2019. Surabaya: BPS Provinsi Jawa Timur.

BPS Provinsi Jawa Timur,2020. Produk Domestik Regional Bruto 2020-2024. Surabaya: BPS Provinsi Jawa Timur.

BPS Provinsi Jawa Timur. (2016). Jawa Timur Dalam Angka 2016. BPS Provinsi Jawa Timur. (2017). Jawa Timur Dalam Angka 2017. BPS Provinsi Jawa Timur. (2018). Jawa Timur Dalam Angka 2018. BPS Provinsi Jawa Timur. (2019). Jawa Timur Dalam Angka 2019. BPS Provinsi Jawa Timur. (2020). Jawa Timur Dalam Angka 2020. BPS Provinsi Jawa Timur. (2021). Jawa Timur Dalam Angka 2021. BPS Provinsi Jawa Timur. (2022). Jawa Timur Dalam Angka 2022. BPS Provinsi Jawa Timur. (2023). Jawa Timur Dalam Angka 2023. BPS Provinsi Jawa Timur. (2024). Jawa Timur Dalam Angka 2024. BPS Provinsi Jawa Timur. (2025). Jawa Timur Dalam Angka 2025.

BPS Kota Malang. (2015). Upah Minimum Kabupaten Kota (UMK) dan Provinsi (UMP) di Jawa Timur (Rupiah (Rp.)), 2015.

BPS Kota Malang. (2016). Upah Minimum Kabupaten Kota (UMK) dan Provinsi (UMP) di Jawa Timur (Rupiah (Rp.)), 2016.

BPS Kota Malang. (2017). Upah Minimum Kabupaten Kota (UMK) dan Provinsi (UMP) di Jawa Timur (Rupiah (Rp.)), 2017.

BPS Kota Malang. (2018). Upah Minimum Kabupaten Kota (UMK) dan Provinsi (UMP) di Jawa Timur (Rupiah (Rp.)), 2018.

BPS Kota Malang. (2019). Upah Minimum Kabupaten Kota (UMK) dan Provinsi (UMP)

di Jawa Timur (Rupiah (Rp.)), 2019.
BPS Kota Malang. (2020). Upah Minimum Kabupaten Kota (UMK) dan Provinsi (UMP) di Jawa Timur (Rupiah (Rp.)), 2020.
BPS Kota Malang. (2021). Upah Minimum Kabupaten Kota (UMK) dan Provinsi (UMP) di Jawa Timur (Rupiah (Rp.)), 2021.
BPS Kota Malang. (2022). Upah Minimum Kabupaten Kota (UMK) dan Provinsi (UMP) di Jawa Timur (Rupiah (Rp.)), 2022.
BPS Kota Malang. (2023). Upah Minimum Kabupaten Kota (UMK) dan Provinsi (UMP) di Jawa Timur (Rupiah (Rp.)), 2023.
BPS Kota Malang. (2024). Upah Minimum Kabupaten Kota (UMK) dan Provinsi (UMP) di Jawa Timur (Rupiah (Rp.)), 2024.
Dinas Pertanian dan Ketahanan Pangan Jawa Timur 2026 https://pertanian.jatimprov.go.id/. Diakses 2 Januari 2026 pukul 20.50.
Frisnoiry, S., Sihotang, H.M.W., Indri, N. & Munthe, T. (2024). “Analisis Permasalahan Pengangguran Di Indonesia,” pp. 365–374.