

Analysis of the Effect of Economic Growth, Average Years of Schooling, and Regional Minimum Wage on the Open Unemployment Rate in Tuban Regency

Sinta Ayu Vironika¹, Marseto²

^{1,2}Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia

Email: 22011010005@student.upnjatim.ac.id¹, Marseto15@gmail.com²

Abstract

Keywords:

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Open Unemployment Rate.

This study investigates how three key variables regional economic growth, average length of schooling, and regional minimum wage shape the open unemployment rate in Tuban Regency during 2004-2024. Adopting a quantitative framework, multiple linear regression serves as the primary tool for statistical analysis. Data were sourced entirely from official secondary records published by the Central Statistics Agency (BPS) at both the regency and provincial levels. Statistical testing reveals that regional economic growth yields a significance score of 0.234, surpassing the 0.05 threshold, which means it fails to register a statistically meaningful impact on open unemployment. Likewise, the average length of schooling returns a significance value of 0.202 also above 0.05 confirming its lack of decisive influence on unemployment outcomes. By contrast, regional minimum wage policy emerges as the single variable with a statistically significant effect, recording a significance value of 0.028 below the 0.05 threshold. When assessed jointly via simultaneous testing, the three independent variables together do not produce a significant collective effect on the open unemployment rate. The coefficient of determination ($R^2 = 0.316$) indicates that the model accounts for 31.6% of the total variance in unemployment, while the remaining 68.4% is attributable to variables not included in this study.

INTRODUCTION

Unemployment continues to stand as one of the most persistent structural challenges confronting Indonesia's socioeconomic development. The national labor force data consistently demonstrate that a substantial segment of the working-age population remains outside formal productive employment, a situation that has shown notable variation across different periods (Amirudin, 2022). At the regional level, unresolved unemployment contributes to widening welfare gaps, escalating poverty incidence, and growing inequalities in income distribution. According to BPS (2021), open unemployment refers specifically to individuals who lack employment, are currently available for work, and are actively seeking job opportunities.

Unemployment and economic growth share an interconnected relationship; however, the expansion of economic output does not automatically translate into proportional increases in workforce absorption. The structural composition of local economies plays a decisive role in determining whether growth translates into job creation (Restianjani & Widyawati, 2025). Purba et al. (2022) contend that upward movements in economic growth generally reduce unemployment, though inflation dynamics and sectoral capacity to produce jobs can substantially alter this relationship. Hs and Hidayat (2023) further emphasize that unresolved unemployment can serve as a structural impediment to long-term regional development, since labor market improvement is central to broader economic welfare. Within regional planning discourse, Umam

et al. (2023) stress that genuine development progress must be evaluated not solely by output growth indicators, but equally by the extent to which the economy absorbs its labor supply.

Tuban Regency in East Java Province features an economic base dominated by industry, mining and energy extraction, and agricultural production. Over the 2015–2024 period, the regency's economic growth trajectory showed significant oscillations, including a notable contraction in 2020 triggered by the COVID-19 health crisis, followed by a gradual recovery in subsequent years. Despite this recovery, the open unemployment rate has not followed a consistently declining path. This pattern is characteristic of the 'jobless growth' phenomenon, wherein economic output expands without generating commensurate employment opportunities (Akusta, 2025). Theoretical foundations rooted in Okun's Law posit an inverse relationship between economic growth and unemployment levels. Kitov and Kitov (2020) affirm this negative linkage, arguing that sustained output growth should structurally reduce unemployment. Paizal et al. (2023) similarly assert that robust economic growth ought to stimulate job creation and thereby bring down unemployment figures. In practice, however, this mechanism is contingent on the quality of human capital and prevailing labor market conditions.

Beyond economic growth, human resource development constitutes a critical pillar influencing employment prospects. Todaro (2006) identifies health and educational attainment as the core dimensions through which human capital can be measured and evaluated. Arisusanti (2021) notes that the relationship between education and unemployment is not straightforward, since highly educated individuals may face 'educated unemployment' when job vacancies fail to align with their qualifications. Average length of schooling serves as a measurable proxy for workforce educational quality. Grounding this analysis in the Human Capital theory advanced by Gary Becker, education functions as a long-horizon investment that progressively elevates worker productivity and vocational competence. Ningsih and Khairi Pahlevi (2024) confirm that formal educational attainment carries significant implications for labor market outcomes, though the match between graduate qualifications and available positions remains imperfect in many Indonesian regions.

The regional minimum wage policy constitutes a third pivotal determinant of unemployment trends in any given territory. Governments establish minimum wage floors primarily to safeguard workers' economic dignity and to ensure basic needs can be financed (Shafira, 2024). Qalbia et al. (2023) argue that adjustments to minimum wages influence unemployment by simultaneously affecting labor demand and corporate cost structures. Sabil (2026) adds that regional wage policies directly shape the degree to which firms are willing to absorb labor. Nababan and Purba (2023) caution that capital-intensive industrial growth may limit the employment-creating effect of wage increases, making the net impact of minimum wage policy on unemployment inherently ambiguous.

Prior scholarly work on the interplay between economic growth, educational attainment, minimum wages, and unemployment has yielded heterogeneous results, with some studies reporting negative effects of growth and education on unemployment and others reaching contrasting conclusions. These inconsistencies signal an important research gap, particularly regarding Tuban Regency, whose specific combination of economic sectors and demographic characteristics warrants dedicated empirical investigation.

METHODS

This research employs a quantitative methodology grounded in an associative research design. The quantitative approach was chosen to enable rigorous statistical measurement of the magnitude and direction of the relationship between the independent variables and the outcome of interest. The associative design is appropriate here because the study aims to determine whether and to what degree economic growth, average length of schooling, and regional minimum wage are systematically connected to variations in the open unemployment rate.

The research site is Tuban Regency, located within East Java Province. The dataset comprises annual time-series observations spanning from 2015 to 2024, a decade-long window sufficient to capture medium-term structural trends. All data are secondary in character and were compiled from official publications of BPS Tuban Regency, BPS East Java Province, and other verifiable governmental data sources.

In terms of variable specification, OUR serves as the dependent measure, while EG, ALS, and RMW constitute the three independent predictors. Measurement of OUR relies on the proportion of unemployed individuals relative to the total workforce, stated in percentage terms. The EG indicator is constructed from the growth trajectory of constant-price Gross Regional Domestic Product on an annual basis. ALS reflects the average duration of formal schooling attained by residents who have reached 15 years of age or beyond. For RMW, operationalization draws upon the officially legislated annual wage floor designated specifically for Tuban Regency.

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \epsilon$$

Description:

- Y = Open Unemployment Rate
- X₁ = Economic Growth
- X₂ = Average Years of Schooling
- X₃ = Regional Minimum Wage
- β₀ = Constant
- β₁, β₂, β₃ = Regression coefficients
- ε = Error term

RESULTS AND DISCUSSION

Results

Autocorrelation Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin Watson
1	.562 ^a	.316	.195	184.08475	1.906

Table 4.5 presents The Durbin-Watson statistic of 1.906 was obtained from the regression model with k = 3 independent variables and n = 21 observations. Referencing the Durbin-Watson distribution table, the lower bound is dL = 0.998 and the upper bound is dU = 1.676. Since the DW value of 1.906 falls within the range dU < DW < 4-dU, the model is free from autocorrelation problems.

Heteroscedasticity Test

Variable (Y)	Sig (X1)	Sig (X2)	Sig (X3)	Criterion	Description

TPT	0,53	0,4	0,6	0,05	No Heteroscedasticity Detected
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The Spearman rank-correlation test for heteroscedasticity shows that all three predictors Regional Minimum Wage (0.539), Economic Growth (0.400), and Labor Force Size (0.604) record significance values exceeding the 0.05 threshold. Accordingly, the regression residuals do not exhibit patterns of non-constant variance, confirming that the homoscedasticity assumption is satisfied.

Multicollinearity Test

Variable	Tolerance	Criterion	VIF	Criterion	Description
X1	0,77	≥ 0,1	1,287	≤ 10	No Multicollinearity
X2	0,98	≥ 0,1	1,012	≤ 10	No Multicollinearity
X3	0,78	≥ 0,1	1,273	≤ 10	No Multicollinearity

The test results presented above demonstrate that all variables possess tolerance values exceeding 0.1, while none of the VIF values reaches or surpasses the threshold of 10. These findings lead to the conclusion that multicollinearity does not exist among the independent variables in this model. From these three tests, it is clear that the research model does not violate the classical assumptions.

Multiple Linear Regression Test

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	462.014	189.859		2.433	.026
	X1	-.167	.136	-.281	-1.233	.234
	X2	.307	.231	.268	1.328	.202
	X3	.000	.000	-.545	-2.406	.028

a. Dependent Variable: Y

The multiple linear regression analysis conducted in this study produces a regression equation as follows:

$$Y = 462,014 - 0,167X_1 + 0,307X_2 + 0,000X_3$$

Description:

- Y = Open Unemployment Rate
- X₁ = Economic Growth
- X₂ = Average Years of Schooling
- X₃ = Regional Minimum Wage

Interpretation of the regression coefficients proceeds as follows:

- (1) The intercept of 462.014 represents the predicted open unemployment rate when all three independent variables are set to zero simultaneously.
- (2) The coefficient for Economic Growth (-0.167) implies that a one-unit increase in economic growth corresponds to a 0.167-unit decline in open unemployment, assuming the remaining predictors are held constant; however, the associated significance value of 0.234 exceeds 0.05, so this relationship does not reach statistical significance.
- (3) The coefficient for Average Length of Schooling (0.307) suggests that each additional year of average schooling is associated with a 0.307-unit rise in open unemployment when other variables are controlled; yet with a significance value of 0.202 again above 0.05 this coefficient cannot be considered statistically significant.

Hypothesis Testing

1. Coefficient of Determination Test (R^2)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.562a	.316	.195	184.08475

The coefficient of determination (R^2) stands at 0.316, indicating that the three predictors combined account for 31.6% of the overall fluctuation in open unemployment figures documented across the period of analysis. The complementary 68.4% of the variance remains attributable to factors beyond the scope of this model, signaling opportunities for future research to incorporate additional explanatory variables.

2. F-Test (Simultaneous Test)

Model	Df	Mean Square	F
Regression	3	88,609,417	2,615
Residual	17	33,887,195	
Total	20		

The F-statistic derived from the simultaneous significance test equals 2.615. This value falls below the critical threshold, which leads to the conclusion that combined influence of Economic Growth, Average Length of Schooling, and Regional Minimum Wage upon the Open Unemployment Rate within Tuban Regency does not attain statistical significance when all three predictors are evaluated concurrently does not attain statistical significance when all three are evaluated together.

3. t-Test (Partial Test)

Variable	T-count	Sig		T-table
Economic Growth	-1,233	0,234	>	2,110
Average Years of Schooling	1,328	0,202	>	2,110
Regional Minimum Wage	-2,406	0,028	>	2,110

Partial significance testing via the t-test yields the following outcomes: Economic Growth registers a significance value of 0.234 (> 0.05), ruling out any statistically significant partial effect on open unemployment. Average Length of Schooling returns a significance value of 0.202 (> 0.05), similarly indicating the absence of a statistically discernible partial effect. Regional Minimum Wage, however, produces a significance value of 0.028 (< 0.05), confirming that it is the sole variable with a statistically significant individual effect on the open unemployment rate within Tuban Regency.

DISCUSSION

The Effect of Economic Growth on the Open Unemployment Rate

The partial test outcome for Economic Growth t-count of 1.233 and a significance value of 0.234 establishes that this variable does not exert a statistically significant impact on open unemployment in Tuban Regency. Nonetheless, the negative sign of the regression coefficient implies a directional tendency: when economic growth accelerates, unemployment tends to move downward, even if the magnitude of this effect does not cross the conventional threshold of statistical significance.

This directional alignment with Okun's Law framework is theoretically coherent, yet the absence of statistical significance reflects Tuban's particular economic architecture. The regency's output is disproportionately generated by capital-intensive industries most notably large-scale manufacturing, petrochemical refining, and mineral extraction sectors that characteristically demand relatively modest volumes of labor relative to the capital deployed. Consequently, output expansion in these sectors does not translate proportionally into new jobs. Raya and Ratulangi (2024) document a comparable pattern, noting that economic growth exhibits a negative directional association with open unemployment, but the relationship remains statistically weak. The practical implication is that aggregate growth metrics are insufficient to evaluate employment performance when sectoral composition is heavily skewed toward capital-intensive activities.

The Effect of Average Years of Schooling on the Open Unemployment Rate

The partial test for Average Length of Schooling yields a t-count of 1.328 with a significance value of 0.202, indicating the absence of a statistically significant relationship with open unemployment. The positive regression coefficient, though not significant, points toward a counterintuitive tendency: as educational attainment rises, open unemployment moves upward rather than downward.

This paradoxical pattern is interpretable through the lens of structural educated unemployment. In Tuban Regency, growing proportions of school and university graduates enter the labor market possessing credentials that exceed the requirements of the jobs locally available, leading them to defer accepting suboptimal placements while seeking better-matched opportunities. Human Capital theory, in its classical formulation, projects that investment in education raises productivity and thereby facilitates employment; but this projection holds only when the economy generates sufficient numbers of knowledge-intensive positions to absorb educated graduates. Where local labor demand remains concentrated in low-skill activities, as in Tuban, rising educational attainment can paradoxically contribute to open unemployment as graduates lengthen their job search. Prayogo et al. (2025) offer comparable evidence from related contexts, corroborating the view that education-employment relationships are mediated by the structural features of local labor markets.

The Effect of Regional Minimum Wage on the Open Unemployment Rate

Partial testing through the t-test applied to the Regional Minimum Wage variable produces a t-count of -2.406 alongside a significance score of 0.028, falling beneath the 0.05

threshold and thereby establishing that this variable carries a meaningful and directionally negative bearing on open unemployment within Tuban Regency. The downward-pointing coefficient further signals that whenever the minimum wage floor is revised upward, a corresponding contraction in the open unemployment rate tends to follow.

This finding runs contrary to the standard neoclassical prediction that higher minimum wages reduce employer willingness to hire by raising unit labor costs. Instead, the evidence aligns more closely with efficiency wage theory and Keynesian demand-side reasoning. From an efficiency wage perspective, higher wages incentivize workers to perform with greater commitment, improving retention and productivity, which in turn strengthens firms' competitive positions. From a Keynesian perspective, wage increases raise household disposable income, stimulate consumer demand for goods and services, and thereby encourage firms to expand production and hire more workers. Saputra and Salmah (2024) and Astuti (2018) report substantively similar findings, concluding that minimum wage increases exert a significant negative influence on open unemployment, lending additional empirical credibility to the results obtained here.

CONCLUSION

This research investigated both the individual and simultaneous contributions of economic growth, average length of schooling, and regional minimum wage toward shaping open unemployment dynamics in Tuban Regency throughout the 2004–2024 observation window. Findings derived from partial significance testing reveal that regional minimum wage stands as the sole predictor capable of producing a statistically discernible impact, whereby every upward adjustment to the wage floor corresponds to a measurable contraction in open unemployment. Meanwhile, economic growth and average length of schooling fail to demonstrate statistically meaningful individual effects, though both exhibit directional tendencies consistent with theoretical expectations. The simultaneous test further reveals that the three variables together fail to generate a statistically significant collective effect, and the R^2 of 0.316 signals that a majority of unemployment variance approximately 68.4% remains explained by factors outside this model.

These results carry several practical implications. The Tuban Regency government should recalibrate its development strategy toward stimulating labor-intensive economic activities capable of generating meaningful employment at scale, rather than relying solely on growth in capital-intensive sectors. Investments in vocational education and apprenticeship schemes that align graduate competencies with actual labor market requirements are essential for breaking the cycle of educated unemployment. Regional minimum wage policy should be crafted with dual sensitivity to worker welfare and enterprise labor demand, avoiding wage adjustments that could inadvertently suppress hiring among smaller employers. Future research would benefit from expanding the variable set to include dimensions such as investment inflows, inflation dynamics, demographic pressures, and spatial spillover effects, so as to construct a more complete explanatory framework for unemployment in regional contexts like Tuban Regency.

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