

Determinants of Open Unemployment in Papua and New Autonomous Regions: A Panel Data Analysis

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Abstract

Purpose: This study examines the effects of economic growth, education level, inflation, and labor force participation on the Open Unemployment Rate (OUR) across Papua Province and its three New Autonomous Regions (NARs) Papua Selatan, Papua Tengah, and Papua Pegunungan during the 2017–2024 period.

Research Methodology: This research employed a quantitative approach using panel data regression analysis based on secondary data obtained from BPS (Statistics Indonesia). Model selection was determined through Chow, Hausman, and Lagrange Multiplier tests, resulting in the use of Fixed Effect Model (FEM) and Random Effect Model (REM) specifications. Classical assumption tests included normality, multicollinearity, and heteroscedasticity diagnostics, with robust standard errors applied to heteroscedastic models. Data analysis was conducted using STATA.

Results: Economic growth significantly reduced unemployment in Papua Selatan, Papua Pegunungan, and the pooled model, but was insignificant in Papua and Papua Tengah. Education significantly affected unemployment in all provinces with varying directions, indicating labor market mismatch. Inflation was insignificant, while labor force participation was significant only in Papua Tengah.

Conclusions: Unemployment dynamics in Papua are structurally heterogeneous and require province-specific employment policies emphasizing labor-intensive sector development, vocational education alignment, and informal sector formalization.

Limitations: This study is limited to macroeconomic indicators and secondary panel data at the regency/city level.

Contributions: This study contributes to the literature on regional labor market disparities in post-autonomy Papua by providing empirical evidence on asymmetric unemployment determinants across newly established autonomous regions.

Keywords: *Economic Growth, Education, Inflation, Labor Force Participation, Open Unemployment, Panel Data*

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1. Introduction

Unemployment represents a multidimensional economic challenge with far-reaching consequences for economic growth, social welfare, and political stability across subnational regions (Bloom, McKenna, & Prettnner, 2018; Kristin & Darsana, 2018). Indonesia's national Open Unemployment Rate (OUR) registered 4.91% in 2024, reflecting persistent structural imbalances between labor supply and demand at both the national and subnational levels (BPS, 2024). However, at the provincial level, unemployment dynamics exhibit substantial heterogeneity driven by differences in economic structure, educational attainment, institutional capacity, and geographic accessibility (Kingsley, Abigail, & Asemota, 2026). This heterogeneity obscures aggregate national figures and requires region-specific empirical analysis for effective diagnosis.

Papua Province and its three New Autonomous Regions (NARs) Papua Selatan, Papua Tengah, and Papua Pegunungan—formally established under Indonesian Laws No. 14, 15, and 16 of 2022, present an especially complex and policy-relevant regional labor market context. BPS (2024) data document marked OUR variation: Papua Induk at 4.43%, Papua Selatan at 2.90%, Papua Tengah at 2.01%, and Papua Pegunungan at 1.16%. However, the relatively low OUR figures in Papua Tengah and Papua Pegunungan should not be interpreted as indicators of optimal employment conditions; they primarily reflect the dominance of subsistence agricultural and informal sector activity that absorbs labor without generating formal employment, while remaining partially invisible to conventional unemployment measurement instruments that classify subsistence workers as employed regardless of their productivity or income levels.

Papua's economic growth is primarily driven by capital-intensive mining activity most notably the Grasberg copper and gold complex in Timika, Mimika Regency generating what development economists term 'jobless growth': the phenomenon where high GDP growth does not translate proportionally into local employment absorption because extractive industries employ relatively few local workers relative to the economic value they generate ([Awoa Awoa & Atangana Ondo, 2024](#); [Blesia, Hatcher, & Ratuva, 2026](#)). This structural characteristic severs the conventional Okun's Law relationship between economic growth and unemployment reduction, creating a context in which standard macroeconomic unemployment reduction strategies may be ineffective or even counterproductive if not complemented by structural economic diversification toward labor-intensive sectors.

Educational inequality exacerbates these labor market challenges. Mean Years of Schooling (MYS) data reveal dramatic disparities: Papua Selatan records 12.67 years, while Papua Pegunungan reports only 4.21 years a gap of 8.46 years representing roughly the difference between secondary school completion and functional literacy. Within provinces, disparities are equally stark: Kota Jayapura in Papua Province records MYS exceeding 12 years while Mamberamo Raya records only 6.49 years; in Papua Tengah, Kabupaten Puncak and Intan Jaya record below 4 years while Mimika and Nabire exceed 10 years. These disparities generate divergent human capital endowments that condition both the availability of job-ready workers and the prevalence of skill mismatch the misalignment between educational qualifications and labor market demand that can paradoxically increase unemployment among more educated populations when job markets cannot absorb their competencies ([Riya, Ismail, & Heldayanti, 2024](#)).

Prior macroeconomic unemployment research in the Indonesian context has examined growth, education, inflation, and labor force participation as determinants of ([Ernita, 2025](#); [Kristin & Darsana, 2018](#); [Mulyati, Zulfa, & Warman, 2025](#); [RT Anugrah Fitri Rembulan, Bado, Astuty, & Syafri, 2026](#)). However, these studies predominantly analyze Java or aggregate national panel data, leaving the Papua region with its distinctive combination of geographic fragmentation, ethnic diversity, subsistence economic dominance, and post-colonial institutional complexity theoretically underserved and empirically underanalyzed. The 2022 provincial division into NARs introduces additional analytical dimensions: three new institutional entities are simultaneously building administrative capacity, establishing fiscal systems, and managing labor markets in transition, creating a natural policy experiment in regional economic governance whose early period dynamics warrant systematic quantitative documentation.

This study aims to fill this gap by estimating five separate panel data regression models one for each of the four provinces and one for a pooled control sample of 29 regencies/cities to quantify the effects of economic growth, education level, inflation, and labor force participation on the OUR for the period 2017–2024. The study addresses four research questions: (RQ1) Does economic growth significantly reduce OUR across Papua's provincial units, and where does jobless growth attenuate this relationship? (RQ2) Does the education level significantly affect OUR, and in what direction consistent with human capital theory or indicative of skill mismatch? (RQ3) Does inflation significantly predict OUR in structurally distinctive labor markets? (RQ4) Does labor force participation significantly affect the OUR, and how does the subsistence-informal economy context condition this relationship? Empirically, this study provides the first multi-model panel data analysis of post-divisional NARs unemployment dynamics. Theoretically, it tests the generalizability of Okun's Law and human capital theory in peripheral, resource-extractive, and subsistence-dominant regional economies.

2. Literature Review

2.1 Okun's Law and Economic Growth–Unemployment Nexus

Okun's Law—the empirical regularity relating GDP growth to unemployment reduction was originally estimated to suggest that for every 1 percentage point increase in GDP growth, unemployment declines by approximately 0.5 percentage points ([Astari, Hamzah, & Ratih, 2019](#); [Okun, 1963](#)). The Okun relationship has been extensively validated in developed economies but shows greater variability in developing countries, where the sectoral composition of growth, labor market formalization level, and institutional capacity condition the growth-employment transmission mechanism ([Ball, Furceri, Leigh, & Loungani, 2019](#); [Haider, Jabeen, Rankaduwa, & Shaheen, 2023](#)).

In resource-dependent regional economies, the Okun relationship is particularly susceptible to attenuation through the jobless growth mechanism. Capital-intensive extractive industries generate high value-added output, contributing substantially to regional GDP, while employing relatively few direct workers and generating limited backward and forward linkages to labor-intensive local industries ([Awoa Awoa & Atangana Ondo, 2024](#); [Blesia et al., 2026](#)). The resulting growth-employment disconnect means that standard GDP growth-targeting policies will fail to generate proportional employment gains unless accompanied by deliberate structural diversification toward labor-absorbing sectors. Papua's mining dependence primarily Freeport Indonesia's Grasberg complex, which generates a substantial share of Papua Tengah's GRDP but employs relatively few Papuan workers in formal roles provides a direct real-world illustration of this mechanism.

The Okun relationship is further complicated in regions with large subsistence agricultural sectors, where households classified as employed 'by virtue of subsistence farming activity may possess available labor that would accept formal employment if it became available, creating a latent unemployment or underemployment stock not captured by OUR statistics. Papua Pegunungan's consistently low OUR (0.62%–1.38%) alongside persistently high agricultural subsistence participation illustrates this measurement artifact: the province's low OUR reflects subsistence absorption rather than formal employment adequacy.

2.2 Human Capital Theory and Education–Unemployment Linkages

Human capital theory [Becker \(2002\)](#) and [Schultz \(1961\)](#) posits that investment in education generates productivity-enhancing capabilities that increase individual employment prospects and aggregate economic growth. At the aggregate level, higher educational attainment in the labor force should reduce unemployment by improving worker-job matching quality, increasing labor productivity, and expanding the range of employment opportunities available to workers. This negative education-unemployment relationship is theoretically predicted by labor matching models [Mortensen and Pissarides \(1994\)](#) and empirically documented in multiple developing countries.

However, the education-unemployment relationship can be positive when skill mismatches are prevalent, that is, when the educational credentials and competencies of job seekers do not align with the skill demands of available jobs ([Riya et al., 2024](#)). This mismatch generates 'educated unemployment': graduates of formal educational programs who remain unemployed because their qualifications are either over-specified relative to low-skill local job availability (credential inflation) or mis-specified relative to technical skill requirements (curriculum misalignment). In contexts where local labor markets are dominated by low-skilled informal or agricultural employment, more educated workers may extend their job search duration and reject available low-qualification jobs, generating higher measured unemployment among more educated cohorts.

In Papua's NARs, both education-unemployment relationship directions are theoretically plausible, and the empirical finding of opposite coefficient signs across provinces is theoretically informative. The negative relationship in Papua and Papua Pegunungan suggests that human capital accumulation contributes to employment probability improvement, while the positive relationship in Papua Selatan and Papua Tengah indicates skill mismatch conditions where educational expansion generates graduates whose qualifications exceed the absorptive capacity of local labor markets dominated by informal, extractive, or agricultural employment ([Ohara, Harto, & Maruanaya, 2020](#)).

2.3 Inflation and Unemployment: The Phillips Curve and Its Limits

The Phillips Curve framework posits an inverse short-run relationship between inflation and unemployment: expansionary monetary conditions that stimulate demand growth generate both inflationary pressure and employment growth, creating a negative inflation-unemployment correlation ([Mankiw, 1998](#); [Phillips, 1958](#)). However, stagflationary episodes and the Non-Accelerating Inflation Rate of Unemployment (NAIRU) literature have established that this relationship is conditional, unstable over longer time horizons, and critically dependent on inflation expectations and labor market institutional characteristics ([Friedman, 1968](#); [RT. Anugrah Fitri Rembulan, Bado, Astuty, Syafri, & Irwandi, 2026](#)).

In structurally distinctive regional economies like Papua, the inflation-unemployment relationship is further complicated by the supply-side nature of regional inflation. Papua's inflation particularly in highland provinces like Papua Pegunungan is primarily cost-push inflation driven by logistics costs, geographic isolation, and fuel price pass-through rather than demand-pull inflation, which reflects labor market tightness ([Aginta, 2022](#)). Supply side inflation reduces real wages and consumption purchasing power without necessarily stimulating employment-creating demand expansion, creating conditions under which the standard Phillips Curve mechanism does not operate. The non-significance of inflation across all five provincial models in this study is theoretically consistent with the supply side inflation dominance interpretation ([Soje & Tanko, 2024](#)).

2.4 Labor Force Participation and Unemployment Dynamics

The relationship between Labor Force Participation (LFP) and unemployment is theoretically ambiguous. In the added worker effect, rising unemployment induces secondary household members to enter the labor force, increasing both LFP and measured unemployment simultaneously, producing a positive LFP-OUR correlation. In the discouraged worker effect, persistent unemployment discourages job search, withdraws workers from the labor force, and reduces both LFP and OUR, producing a negative correlation ([Bloom et al., 2018](#); [Muliawan & Hasmarini, 2023](#)). In subsistence economies, a third mechanism operates: subsistence agricultural expansion absorbs labor that would otherwise seek formal employment, producing high LFP and low OUR simultaneously, which is the dominant pattern observed in Papua Pegunungan.

The non-significance of labor force participation in four of five provincial models is theoretically consistent with the subsistence absorption mechanism: in regions where the dominant labor force absorber is subsistence agriculture rather than formal employment, LFP variations do not primarily reflect changes in formal employment market conditions and therefore are not systematically associated with changes in the OUR. Papua Tengah's significant negative LFP coefficient is interpretable through the discouraged worker mechanism: in a province where formal mining employment is concentrated and cyclically volatile, discouraged worker effects may generate a stronger LFP-OUR correlation than is observable in predominantly subsistence provinces ([Suparman, Sutomo, Anwar, & Olilingo, 2024](#)).

3. Methodology

3.1 Data Sources and Sample

This study uses secondary quantitative data sourced from the official publications of Statistics Indonesia [BPS \(2024\)](#), Papua Province, and DOB annual reports for the period 2017–2024. The data encompass all regencies/cities within Papua Province, Papua Selatan, Papua Tengah, and Papua Pegunungan. Five separate panel data models are estimated: Papua Province (n regencies = 13, T = 8, N = 104), Papua Selatan (n = 5, T = 8, N = 40), Papua Tengah (n = 8, T = 8, N = 64), Papua Pegunungan (n = 8, T = 8, N = 64), and a pooled control model covering all 29 regencies/cities (N = 232).

3.2 Variables and Operationalization

Table 1 presents the operationalization of the research variables.

Table 1. Variable operationalization

Sym.	Variables	Measurement	Theoretical Basis	Expected Sign
Y	Open Unemployment Rate (OUR)	% unemployed / labor force	Dependent variable — BPS annual labor surveys	—
X_1	Economic Growth	Annual % GRDP growth (constant prices)	(Astari et al., 2019 ; Okun, 1963)	—
X_2	Education Level	Mean Years of Schooling (MYS) in years	Human Capital Theory — (Becker, 2002)	— / + *
X_3	Inflation	GRDP deflator-based inflation rate (%)	Phillips Curve; (RT. Anugrah Fitri Rembulan et al., 2026)	—
X_4	Labor Force Participation	Labor Force Participation Rate (LFPR) (%)	Added/discouraged worker effects; (Bloom et al., 2018)	±

* The sign depends on the skill mismatch conditions. Source: BPS; authors' compilation.

3.3 Model Specification

The panel data regression model estimated for each provincial unit is as follows:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \varepsilon_{it} \quad (1)$$

where Y is OUR, X_1 is economic growth, X_2 is education level, X_3 is inflation, X_4 is labor force participation rate, α is the intercept, β_1 – β_4 are slope coefficients, i indices' regencies/cities, t indexes years (2017–2024), and ε is the error term.

3.4 Model Selection and Diagnostic Testing

An appropriate estimation model was selected using three sequential specification tests. The Chow Test was applied first, testing the Common Effect Model (CEM) against the Fixed Effect Model (FEM); a significant F-statistic rejects CEM in favor of FEM. Where FEM was preferred, the Hausman Test was conducted to choose between FEM and Random Effect Model (REM); a significant chi-squared statistic favors FEM. Where CEM was not rejected by the Chow Test, the Lagrange Multiplier (LM) test compared CEM against REM.

Classical assumption diagnostics were conducted following model selection: (1) Normality: Shapiro-Wilk test applied to residuals; $p > 0.05$ confirmed normality. (2) Multicollinearity: Variance Inflation Factor (VIF) was computed for all predictors; $VIF < 10$ confirmed the absence of problematic collinearity. (3) Heteroscedasticity: Modified Wald test was applied to each model; $p < 0.05$ indicated heteroscedasticity requiring correction through robust standard errors. Four of the five models exhibited heteroscedasticity and were re-estimated using Huber-White robust standard errors to ensure valid inference. All analyses were conducted using STATA 17.

4. Results and Discussions

4.1 Unemployment Rate Dynamics: Descriptive Overview

OUR dynamics across the four provinces during 2017–2024 reveal heterogeneous trajectories sharing one common pattern: convergent increases during 2020–2021 as COVID-19 pandemic disruptions contracted formal employment, followed by recovery trends of varying speeds and magnitudes. Papua Province recorded the highest and most persistently elevated OUR trajectory (7.32% in 2017 declining to 4.75% in 2024), reflecting the complexity of a labor market characterized by a large formal urban sector in Kota Jayapura, alongside high rural informal employment. Papua Tengah exhibited the most extreme volatility driven by the Grasberg mining complex's production cycle sensitivity with OUR peaking at 5.50% in

2021 before recovering to 2.83% in 2024. Papua Selatan showed moderate OUR trends (1.23%–3.65%), with the 2024 uptick warranting monitoring given the province's transitional institutional status as a newly formed autonomous region with developing administrative and labor market infrastructure. Papua Pegunungan consistently recorded the lowest OUR (0.62%–1.38%) a figure whose apparent favorability primarily reflects near-universal subsistence agricultural absorption rather than formal employment adequacy.

4.2 Economic Growth Dynamics

The economic growth dynamics across the four provinces reflect the structural differences in the sectoral composition and resource dependence (Handayani, Marselina, & Ratih, 2025). Papua Province showed moderate growth (8.51% in 2017) with post-pandemic recovery of 6.20% in 2024. Papua Tengah demonstrated the most extreme volatility: a contraction of –35.74% in 2019 (reflecting Grasberg production disruption) followed by a recovery surge of 36.85% in 2021, normalizing to 2.88% in 2024. This extraordinary volatility is directly attributable to the concentration of Mimika’s mining sector and illustrates the macroeconomic instability risk inherent in single-sector regional economic dependence. Papua Selatan showed consistent post-pandemic recovery with 2024 deceleration reflecting ongoing institutional consolidation as a new autonomous region. Papua Pegunungan, despite recording the highest growth in 2017 (10.52%), shows the slowest post-pandemic recovery (3.88% in 2024), reflecting geographic isolation and infrastructure constraints that inhibit factor mobility and investment attraction.

4.3 Model Selection and Assumption Test Results

Table 2. Panel data model selection results

Province	Selected Model	Heteroscedasticity	Estimation Method
Papua	Fixed Effect Model (FEM)	Yes ($p < 0.05$)	Robust Standard Errors
Papua Selatan	Fixed Effect Model (FEM)	Yes ($p < 0.05$)	Robust Standard Errors
Papua Tengah	Random Effect Model (REM)	No ($p > 0.05$)	GLS Standard Errors
Papua Pegunungan	Fixed Effect Model (FEM)	Yes ($p < 0.05$)	Robust Standard Errors
Pooled Control (29 Reg./Cities)	Fixed Effect Model (FEM)	Yes ($p < 0.05$)	Robust Standard Errors

All models satisfied normality (Shapiro-Wilk $p > 0.05$) and the absence of multicollinearity ($VIF < 10$).

4.4 Panel Data Regression Results

Table 3. Panel data regression results: Coefficients and significance (dependent variable: open unemployment rate)

Province	Economic Growth (X_1)	Education (X_2)	Inflation (X_3)	Labor Force Part. (X_4)	Constant	R ² / Prob>F
Papua	–0.430 (0.271)	–5.089 (0.001) ***	0.017 (0.900)	0.360 (0.635)	15.302 (0.004) ***	0.339 / 0.002
Papua Selatan	–0.176 (0.003) ***	1.235 (0.006) ***	0.230 (0.291)	–0.825 (0.322)	2.492 (0.562)	0.398 / 0.008
Papua Tengah	0.0003 (0.991)	0.459 (0.002) ***	–0.027 (0.833)	–0.057 (0.048) **	4.901 (0.076) *	0.029 / 0.000
Papua Pegunungan	–0.217 (0.004) ***	–1.234 (0.014) **	0.093 (0.314)	–0.830 (0.229)	7.764 (0.061) *	0.344 / 0.004
Pooled 29 Reg./Cities	–0.074 (0.007) ***	–1.073 (0.023) **	0.002 (0.969)	–0.813 (0.122)	8.373 (0.003) ***	0.093 / 0.001

Note: Coefficients with p-values in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$. Source: STATA output (processed by the authors).

4.5 Hypothesis Testing and Discussion

4.5.1 Economic Growth and Open Unemployment (Okun's Law Test)

Economic growth exerts a significant negative effect on OUR in Papua Selatan ($\beta = -0.176$, $p = 0.003$), Papua Pegunungan ($\beta = -0.217$, $p = 0.004$), and the pooled 29-regency model ($\beta = -0.074$, $p = 0.007$), consistent with Okun's law prediction that GDP growth reduces unemployment through increased labor demand. These findings replicate the standard Okun relationship documented by [Astari et al. \(2019\)](#) for Indonesia and corroborate [Suryono, Burda, and Chandra \(2020\)](#) analysis of macroeconomic growth-unemployment linkages in the Indonesian regional context.

The Okun relationship does not hold in Papua Province ($p = 0.271$) and Papua Tengah ($p = 0.991$), where economic growth coefficients are non-significant, a finding that demands a theoretical explanation. In both provinces, economic growth is substantially driven by capital-intensive sectors with limited local employment multipliers: Papua's service and construction sectors primarily employ migrants or capital-intensive methods, while Papua Tengah's economy is dominated by Grasberg mining activities that generate high GRDP contributions but have limited local employment absorption. This jobless growth configuration—documented empirically by [Awoa Awoa and Atangana Ondo \(2024\)](#) for the Papua mining sector and theoretically grounded in the capital-labor substitution literature [Blesia et al. \(2026\)](#) explains why GDP growth does not reduce local OUR in these provinces: the value-added and employment generation functions of the economy are structurally decoupled.

The contrast between significant Okun effects in Papua Selatan and Papua Pegunungan (where economies are less mining-dependent and more structurally diversified) and non-significant effects in Papua and Papua Tengah (where mining and capital-intensive activities dominate) provides direct empirical support for the theoretical proposition that the Okun relationship strength is moderated by sectoral composition and capital intensity. The policy implications are direct: GDP growth-targeting policies will not generate proportional unemployment reductions in Papua and Papua Tengah unless explicitly coupled with structural diversification initiatives that redirect investment toward labor-intensive sectors agriculture, aquaculture, food processing, community tourism, and small-medium manufacturing that generate employment multipliers substantially higher than extractive activities.

4.5.2 Education Level and Open Unemployment (Human Capital vs. Mismatch)

Education level is statistically significant in all five models, but with strikingly different coefficient directions that reveal qualitatively distinct human capital-labor market configurations across provincial contexts. In Papua Province ($\beta = -5.089$, $p = 0.001$) and Papua Pegunungan ($\beta = -1.234$, $p = 0.014$), higher mean years of schooling are associated with lower OUR, consistent with the human capital theory's prediction that education enhances employment probability through productivity improvement and job-matching quality enhancement ([Becker, 2002](#)). These provinces likely feature labor markets where educated workers can access formal employment opportunities that absorb their qualifications, generating a conventional negative human capital-unemployment relationship.

In Papua Selatan ($\beta = 1.235$, $p = 0.006$) and Papua Tengah ($\beta = 0.459$, $p = 0.002$), the positive education coefficient indicates that higher educational attainment is associated with higher OUR, a finding consistent with the skill mismatch theory ([Riya et al., 2024](#)). In these provinces, local labor markets are characterized by job structures that do not absorb educated workers' qualifications: Papua Selatan's nascent formal sector cannot yet generate sufficient skilled employment for its growing educated workforce, while Papua Tengah's labor market is polarized between highly technical mining employment (inaccessible to most local graduates) and low-skill agricultural or informal employment (rejected by educated job seekers on quality grounds). The result is that better-educated workers remain unemployed longer as they search for qualification-matching jobs that are insufficiently available, generating the observed positive relationship between education and unemployment.

This divergence in the education-unemployment relationship across provinces is theoretically significant because it empirically demonstrates that the effect of human capital investment on unemployment depends critically on whether the receiving labor market can productively absorb expanded human capital. Educational expansion without concurrent labor market development—through industrial policy creating skilled employment opportunities, curriculum reform aligning educational content with local skill demands, and vocational training targeting specific industry needs risks generating the paradoxical outcome of increasing educated unemployment rather than reducing total unemployment. These findings corroborate [Riya et al. \(2024\)](#) analysis of education-unemployment dynamics in Java and extend their mismatch framework to the distinctly different Papuan context.

The pooled 29-regency model, which aggregates all regency-level observations across the four provinces, serves as a control specification that tests whether province-level findings hold at a more disaggregated spatial unit of analysis. The pooled model's results are particularly informative because they reflect the average Papuan regency-level relationships rather than province-level aggregates, potentially reducing the distorting effects of province-level outliers (such as Mimika's extreme mining-driven GRDP volatility in Papua Tengah) that can disproportionately influence province-level regressions. The pooled model's significant negative economic growth coefficient ($\beta = -0.074$, $p = 0.007$) and significant negative education coefficient ($\beta = -1.073$, $p = 0.023$) provide a cross-province baseline indicating that, on average, across all Papuan regencies, both growth and education reduce OUR, while the province-specific deviations from this average pattern reveal the structural heterogeneity that differentiates individual provincial labor market dynamics.

The high coefficient magnitude of the education variable in Papua Province ($\beta = -5.089$) warrants specific attention. This large coefficient suggests that each additional year of mean schooling in Papua Province regencies is associated with a 5.09 pp reduction in OUR a substantially larger marginal effect than observed elsewhere. This amplified effect likely reflects Papua Province's bimodal educational distribution: at the lower end, extremely low-education rural and highland regencies with high subsistence employment and minimal formal job seekers; at the upper end, Kota Jayapura with high educational attainment and a more developed formal labor market. The negative relationship between education and OUR across this distribution implies that the transition from very low to moderate educational attainment generates particularly large employment probability improvements in Papua Province, consistent with threshold effects in human capital accumulation, where basic education substantially expands the range of accessible formal employment opportunities in contexts where most competitors for formal jobs lack basic literacy and numeracy.

4.5.3 Inflation and Open Unemployment

Inflation coefficients are insignificant across all five provincial models, with probability values ranging from 0.291 to 0.969. This uniform non-significance indicates that short-term price level fluctuations do not substantially predict OUR variation in Papua's provincial labor markets, a finding consistent with [Putra, Sukiyono, and Purmini \(2021\)](#) and [RT. Anugrah Fitri Rembulan et al. \(2026\)](#), who documented inflation's non-significance in specific Indonesian regional unemployment contexts.

The theoretical explanation is grounded in the supply side nature of regional inflation in Papua. Unlike demand-pull inflation, which reflects labor market tightness and expansionary economic conditions that simultaneously reduce unemployment, Papua's inflation is primarily cost-push, driven by geographic isolation, logistics cost escalation (particularly for highland provinces where air transport is the primary distribution mechanism), and commodity price pass-through. Cost-push inflation in peripheral regions reduces real wages and purchasing power without generating demand expansion that would stimulate labor-absorbing production increases. This structural characteristic breaks the Phillips Curve transmission mechanism, through which inflation would conventionally correlate negatively with unemployment, explaining the empirical non-significance across all models.

4.5.4 Labor Force Participation and Open Unemployment

Labor force participation is statistically significant only in Papua Tengah ($\beta = -0.057$, $p = 0.048$), where higher participation is associated with lower OUR, consistent with the discouraged worker interpretation:

as formal employment conditions improve in Papua Tengah (particularly during mining sector upturns), discouraged workers re-enter the labor force and find employment, reducing the measured OUR. In the remaining four models, labor force participation coefficients are non-significant, reflecting the dominance of subsistence agricultural labor absorption that accommodates high LFPR without generating formal employment and therefore does not systematically predict OUR variation.

Papua Pegunungan's case is particularly illustrative: with LFPR consistently above 85% and OUR below 1.38%, the province simultaneously achieves near-universal labor force participation and near-zero measured unemployment—not because formal employment is universally available but because subsistence agriculture absorbs virtually all economically active individuals regardless of formal employment availability. This configuration renders the LFPR-OUR statistical relationship meaningless in the conventional employment quality sense, as both metrics reflect subsistence absorption rather than formal labor market conditions.

4.5.5 Joint Significance and Model Explanatory Power

All five models achieved joint statistical significance ($\text{Prob} > F < 0.01$), confirming that the four predictor variables collectively provided significant explanatory power for OUR variation in each provincial context. R^2 values range substantially: Papua Selatan records the highest within-model explanatory power ($R^2 = 0.398$), followed by Papua Pegunungan (0.344) and Papua (0.339), with the pooled model (0.093) and Papua Tengah (0.029) recording substantially lower values.

The very low R^2 in Papua Tengah (0.029 or 2.9%) is the most consequential finding in the explanatory power dimension. This near-zero value indicates that the four standard macroeconomic determinants economic growth, education, inflation, and labor force participation collectively explain only a trivial proportion of OUR variation in Papua Tengah's model. This finding, consistent with [Merry, Nugroho, and Tjolli \(2020\)](#) analysis of Papua Barat's subsistence sector dominance, implies that Papua Tengah's unemployment dynamics are primarily driven by factors outside the conventional macroeconomic framework: mining cycle volatility, geographic accessibility constraints, informal sector dynamics, subsistence agricultural conditions, and community-level social factors that are not captured by aggregate statistical series. Future research incorporating mining production indices, commodity price variables, and informal sector proxy measures is likely to generate substantially higher explanatory power for Papua Tengah's OUR.

5. Conclusions

5.1 Conclusion

This study examined the effects of economic growth, education level, inflation, and labor force participation on the Open Unemployment Rate (OUR) across Papua Province, Papua Selatan, Papua Tengah, Papua Pegunungan, and a pooled model of 29 regencies/cities during 2017–2024. The findings reveal significant structural heterogeneity in unemployment dynamics among provinces. Economic growth significantly reduced unemployment in Papua Selatan, Papua Pegunungan, and the pooled model, while showing no significant effect in Papua Province and Papua Tengah, indicating the presence of jobless growth. Education level significantly influenced unemployment across all provinces but with contrasting directions, reflecting differences in labor market conditions and skill mismatches. Inflation did not significantly affect unemployment in any model, whereas labor force participation was significant only in Papua Tengah. Overall, the results demonstrate that unemployment determinants vary considerably across provinces, highlighting the need for region-specific employment and human capital development policies.

5.2 Research Limitations

This study has several limitations. First, the analysis is based on secondary data and macroeconomic indicators, which may not fully capture the complexity of local labor market conditions. Second, the observation period is relatively short, particularly considering the recent establishment of the New Autonomous Regions. Third, several potentially important determinants of unemployment, such as informal sector activities, industrial structure, commodity price fluctuations, and geographic accessibility,

were not included in the model. Finally, the relatively low explanatory power in some provincial models suggests the presence of additional factors beyond those examined in this study.

5.3 Suggestions and Directions for Future Research

Future studies should extend the observation period to capture longer-term post-autonomy dynamics in Papua and its New Autonomous Regions. Researchers are encouraged to incorporate additional variables, such as sectoral employment structure, mining activities, infrastructure development, poverty levels, and labor market quality indicators, to improve model explanatory power. Future research may also employ spatial panel data analysis to examine inter-regional spillover effects and geographic dependencies. Additionally, mixed-method approaches combining quantitative analysis with qualitative field studies could provide deeper insights into the underlying causes of unemployment and labor market disparities across Papua's provinces.

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Author Contributions

TT conceived the study, collected and analyzed the data, and drafted the manuscript. MI contributed to the research design, interpretation of findings, and critical revision of the manuscript. YH supervised the research process, provided methodological guidance, and reviewed the final manuscript. All authors read and approved the final version of the manuscript.

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