

MINIMUM WAGES AND YOUTH NEET: A FIXED-EFFECTS PANEL DATA ANALYSIS AND ROBUSTNESS CHECKS FOR 34 PROVINCES IN INDONESIA

Fransisca Bella Oktaviana
Universitas Negeri Surabaya, Indonesia
25072255016@mhs.unesa.ac.id

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Abstract

The continually increasing provincial minimum wage policy in Indonesia has not succeeded in reducing the high proportion of young people in the NEET (Not in Education, Employment or Training) category. This phenomenon indicates a dysfunction in the school-to-work transition that is influenced by inequalities in regional economic structures. This study aims to analyze the effects of provincial minimum wages and regional characteristics on the NEET rate among young people aged 15–24 within the broader framework of human resource development. This quantitative study used secondary data in the form of panel data from 34 provinces over the period 2015–2024 (340 observations). The data were analyzed using fixed-effects regression with Driscoll–Kraay standard errors to address cross-sectional dependence. The empirical results showed that the provincial minimum wage policy did not have a statistically significant effect on youth NEET. By contrast, population density had a positive and significant effect, while the other macroeconomic variables were not significant. These findings indicate that local geographic and economic characteristics are more decisive than nationally uniform wage-setting policy. The implication is that the government must reorient its youth unemployment strategies from uniform national policies towards territorially targeted labour-market interventions.

Keywords: Minimum Wages; Youth NEET; Regional Analysis; Human Resource Development

1. Introduction

Indonesia is the largest archipelagic country in Southeast Asia. Based on data from Statistics Indonesia (Badan Pusat Statistik, BPS), as of September 2025 Indonesia's population reached 287.6 million people (Sunoko et al., 2022). The Government of Indonesia is committed to sustainable development, including improving access to and the quality of education (SDG 4) and providing decent work and reducing poverty (SDG 8) (Arifin et al., 2024). To achieve these goals, the government increases the provincial minimum wage (*upah minimum provinsi*, UMP) as an effort to improve workers' welfare and reduce poverty in Indonesia (Hasanah et al., 2024; Pratomo & Saputra, 2015).

The provincial minimum wage (UMP) policy can be a double-edged sword for youth in Indonesia. A higher UMP is expected to improve welfare; however, in a labor market dominated by informality, UMP increases may instead become a barrier to entry. This condition may lead inexperienced youth to remain in informal work or to choose NEET status because they wait for formal jobs that are not available. Youth, who should function as key drivers of sustainable development, particularly in relation to SDG 4 on quality lifelong education and SDG 8 on decent work for economic growth, have not yet been fully supported. This phenomenon among youth aged 15–24 raises concern. Statistics Indonesia (BPS) reports that 15–25% of youth in Indonesia are in NEET status. NEET (*Not in Education, Employment, or Training*) refers to individuals who are unemployed and not enrolled in education or training in either the short or long term, including those who are economically inactive due to specific issues such as caregiving responsibilities, health conditions, or discouragement in job searching (Petrescu et al., 2025).

The chart displays the Provincial Minimum Wage (UMP) and the NEET rate in West Java from 2015 to 2024. The UMP is shown as orange bars, and the NEET rate is shown as a blue line with markers. The left Y-axis represents IDR (0 to 3,500,000) and the right Y-axis represents the percentage (0 to 30).

Year	UMP (IDR)	NEET (%)
2015	1,800,000	24.77
2016	2,000,000	23.19
2017	2,150,000	21.41
2018	2,300,000	22.15
2019	2,450,000	21.77
2020	2,650,000	24.28
2021	2,600,000	22.4
2022	2,700,000	23.22
2023	2,750,000	22.25
2024	3,000,000	20.31

Figure 2. Trends in Provincial Minimum Wage (UMP) and NEET Rates in 2024



Figure 2 illustrates that provincial differences in the UMP and NEET youth rate persisted in 2024. In DKI Jakarta, the UMP reached IDR 5 million, but the NEET youth rate declined only to 15.19%. In contrast, Bali, with a UMP of IDR 2.8 million, reduced the NEET youth rate to 7.26%. Conversely, provinces with the largest UMP increases, such as Papua (83.6% over ten years), experienced an increase in NEET youth of 12.43% over the same period. Variation in the effectiveness of UMP policy across regions, together with differences in population density and GRDP, suggests that geographic and regional characteristics may be more critical than wage policy alone.

Highest NEET

Province	NEET (%)	UMP (Million IDR)	GRDP per capita (Million IDR)	Density (People/km ²)	APS age 16-18 (%)
Maluku	29.4	2.94	32.1	42	77.7
Aceh	28.5	3.46	43.7	98	81.5
North Sulawesi	28.3	3.54	69.3	186	72.4

North Maluku	27.8	3.20	70.6	41	76.0
Papua	27.85	4.00	81.0	13	80.3

Lowest NEET

Province	NEET (%)	UMP (Million IDR)	GRDP per capita (Million IDR)	Density (People/km ²)	APS age 16-18 (%)
Bali	7.26	2.81	67.3	793	85.1
DI Yogyakarta	11.18	2.12	51.4	1186	90.36
Riau Islands	14.5	3.40	161.4	264	85.5
DKI Jakarta	15.1	5.00	344.3	16165	79.9
NTB	15.4	2.44	32.2	287	77.81

Source: Author's calculation based on data from statistics Indonesia (BPS)

Table 1 shows a striking comparison between provinces with the highest and lowest NEET rates. Maluku, the province with the highest NEET rate, has a UMP that differs only slightly from Bali, the province with the lowest NEET rate. A 5% difference in UMP cannot explain a NEET gap of about 22 percentage points between the two regions. Similarly, Papua, with a high UMP (IDR 4 million), reports a worse NEET outcome than DI Yogyakarta, which has the lowest UMP in the table. These patterns indicate that the minimum wage level alone cannot determine youth employment outcomes.

GRDP per capita also differs substantially. Bali's GRDP per capita is roughly twice that of Maluku, and this economic gap contributes to differences in the capacity to create jobs. However, GRDP cannot be treated as the only factor, because provinces with higher GRDP per capita, such as Papua, still record higher NEET rates. Population density presents another important pattern. Bali's density of about 793 people per square kilometer supports economic agglomeration and a more dynamic labor market. In contrast, Maluku, with a density of only 42 people per square kilometer, faces constraints in economies of scale and access to labor markets. The school participation rate (*Angka Partisipasi Sekolah*, APS) for ages 16-18 in Bali (85.1%) and Maluku (77.7%) differs relatively little, yet the NEET gap remains wide. This suggests that the quantity of educational participation does not automatically ensure a successful transition into work; the quality of education and curriculum relevance likely matter. Several provinces with seemingly similar characteristics also show different NEET levels. This condition is central to this study, which examines how the UMP and regional characteristics are associated with NEET youth in Indonesia within the school-to-work transition.

Studies on the impact of minimum wage policies on NEET youth have been conducted, but they remain limited to specific national contexts. Dayioglu et al. (2022), in their study in Turkey, found that minimum wage increases led to a significant rise in the short-term probability of NEET status among youth. However, over a two-year period, affected youth gradually shifted into education, and the negative employment effect was absorbed by increased school participation. A recent study by Mihai & Nițu (2024) in Romania reported that a low minimum wage covered only 50% of decent living needs, which contributed substantially to high NEET youth rates through mechanisms of in-work poverty and weak labor-market attractiveness. These findings provide an empirical basis that minimum wage policy and working conditions are among the factors shaping NEET youth dynamics.

Previous research has shown a relationship between minimum wages and NEET youth, but the evidence comes from countries with labor-market characteristics and wage policy regimes that differ from Indonesia. In Indonesia, the UMP is set periodically with considerable variation across provinces, while NEET youth remains a serious challenge for human resource development. If minimum wage increases are not accompanied by job creation and expanded access to relevant education, such policies may exacerbate youth vulnerability across regions. Based on this background, this study aims to examine the impact of the provincial minimum wage on the NEET rate among youth aged 15-24 in Indonesia by using panel data from 34 provinces for the 2015-2024 period, while controlling for GRDP per capita, population density, and APS as regional characteristics.

2. Literature Review

2.1. Provincial Minimum Wage and the Youth Labor Market.

The provincial minimum wage (*upah minimum provinsi*, UMP) is a government policy aimed at protecting workers from low wages so that they can meet their basic living needs (Zaini et al., 2025). Neoclassical theory suggests that a minimum wage set above the equilibrium wage can generate an excess supply of labor (unemployment), because firms employ fewer workers at a higher wage (Kaufman, 2009; Pappas & Gkrammis, 2025). In neoclassical theory, wages are determined by marginal

productivity, so any intervention such as a minimum wage may disrupt competitive market equilibrium and potentially cause unemployment (Kerswell, 2013; Lang & Dickens, 2017). The impact is expected to be most strongly felt by youth who have low productivity and limited skills.

In contrast, setting a provincial minimum wage can support labor absorption by reducing firms' monopsony power. In monopsony theory, firms have the power to set wages below workers' marginal productivity. Minimum wage policy can help raise wages and reduce worker exploitation without necessarily reducing employment (Azar & Marinescu, 2024). The implementation of a minimum wage also indirectly affects skills development and investment in human resources through education and training. A higher minimum wage raises job requirements and encourages workers to invest in education and training in order to remain competitive in the labor market (Alessandrini & Milla, 2024; Ma et al., 2025). Based on these two approaches, the effect of UMP on youths' position in the labor market, including the likelihood of entering NEET status, remains uncertain and needs to be tested empirically.

2.2. NEET, Human Capital, and Regional Characteristics.

Youth who are *Not in Education, Employment, or Training* (NEET) are young people who are not in school, not working, and not participating in training. This group includes youth who are temporarily inactive due to caregiving responsibilities, health constraints, or negative experiences during job search. The NEET phenomenon represents a failure of the transition from education to the world of work. Economic instability and recession worsen employment prospects and contractual conditions (Odoardi & Liberatore, 2021). In human capital theory, Becker (1964) argues that education and training shape workers' marginal productivity and therefore help determine the income they obtain (Marginson, 2019). However, a labor market that cannot absorb graduates creates structural problems. Low educational attainment and mismatches between skills and labor market demands contribute to youth NEET status (Mihai & Nițu, 2024). The presence of NEET youth indicates systemic failure because it reflects that a portion of the youth population does not benefit from these investments.

Regional characteristics such as population density, geographic accessibility, and economic conditions influence how human resource development (HRD) programs operate. Regional development focuses on mobilizing economic, social, technological, and local institutional resources to create jobs and promote community participation (Upton & Egan, 2010). Its main objective is to strengthen local workforce development and reduce regional disparities across areas (Hanafi & Fitrianto, 2015). Population density can create economic agglomeration that improves access and increases worker productivity, while also reducing transaction costs for firms (Djuarni et al., 2023). However, population density can also increase job competition and living costs, which may hinder the school-to-work transition. Provincial gross regional domestic product (GRDP) per capita is a measure of regional economic development that reflects a region's capacity to invest in human resource development infrastructure such as education and training.

The school participation rate (*Angka Partisipasi Sekolah*, APS) in each region represents an input of the education system for human resource development. This perspective helps explain why uniform policies may yield different outcomes across regions. APS for ages 16 to 18 indicates the extent to which youth remain engaged in formal education as a form of human capital investment. This indicator does not capture learning quality or curriculum alignment with labor market needs, but it provides an initial picture of the size of the youth cohort that remains on the education pathway. In this study, GRDP per capita, population density, and APS are used as controlled regional characteristics when examining the relationship between UMP and youth NEET.

2.3. Previous Studies

Research on the impact of minimum wage policy on youth NEET has been conducted, but it has been limited to certain countries. Dayioglu et al. (2022), in a study conducted in Turkey, found that an increase in the minimum wage had a significant effect on increasing the youth NEET rate. The study reported that the policy of abolishing the minimum wage increased the probability of becoming NEET by 1.8 to 2.1% in the short term. Meanwhile, a recent study by Mihai & Nițu (2024) in Romania found that a high NEET rate was driven by structural factors such as a low minimum wage, in-work poverty, and gender inequality. A low minimum wage covered only half of decent living needs, which contributed substantially to high youth NEET rates through mechanisms of in-work poverty and weak labor market attractiveness. In addition, gender discrimination, patriarchal norms, and limited access to vocational education worsened conditions in the research setting.

Pennoni & Bal-Domańska (2022) found that macroeconomic factors played an important role. In their study, participation in education and training significantly reduced the NEET rate, while labor force share and GDP growth helped reduce youth unemployment. In addition, Redmond & McFadden (2023), in a policy review, found that the NEET population was highly heterogeneous, with subgroups such as short-term unemployed individuals, caregivers, persons with disabilities, and discouraged job

seekers. Their study indicated that policy effectiveness depended strongly on targeting specific subgroups. These prior studies provide empirical support for conducting research in Indonesia using interprovincial panel data, while incorporating GRDP per capita, population density, and APS as regional characteristics, an approach that remains limited and therefore requires further examination

2.4. Research Model and Hypotheses

Based on the theoretical foundation and previous research findings, this study views the NEET rate among youth aged 15 to 24 at the provincial level as a function of UMP and regional characteristics. The relationship is expressed in functional form as follows:

$$NEET_{it} = f(UMP_{it}, PDRB_{it}, Kepadatan_{it}, APS_{it})$$

where i denotes province and t denotes the year of observation. UMP represents labor price policy, which in theory can strengthen or weaken youth labor force participation. GRDP per capita indicates regional economic capacity. Population density reflects demographic pressures and opportunities in local labor markets. APS represents a key input from the education system in shaping youth human capital. Based on this framework, the research hypotheses are formulated as follows.

H1: Provincial minimum wage affects the percentage of NEET youth aged 15 to 24 in Indonesia.

H2: Provincial GRDP per capita has a negative effect on the percentage of NEET youth aged 15 to 24 in Indonesia.

H3: Population density affects the percentage of NEET youth aged 15 to 24 in Indonesia.

H4: APS for ages 16 to 18 has a negative effect on the percentage of NEET youth aged 15 to 24 in Indonesia

3. Research Methods

This study employed panel data analysis, enabling the researcher to observe changes across provinces over time and to control for unobserved differences in provincial characteristics. The approach was causal-correlational, with panel data regression as the primary analytical technique. The unit of analysis consisted of 34 provinces in Indonesia. The provinces included were Aceh, North Sumatra, West Sumatra, Riau, Jambi, South Sumatra, Bengkulu, Lampung, Bangka Belitung Islands, Riau Islands, DKI Jakarta, West Java, Central Java, DI Yogyakarta, East Java, Banten, Bali, West Nusa Tenggara, East Nusa Tenggara, West Kalimantan, Central Kalimantan, South Kalimantan, East Kalimantan, North Kalimantan, North Sulawesi, Central Sulawesi, South Sulawesi, Southeast Sulawesi, Gorontalo, West Sulawesi, Maluku, North Maluku, West Papua, and Papua. Four new provinces, namely Southwest Papua, South Papua, Central Papua, and Highland Papua, were not included because their time-series data were not sufficiently available for the study period. The observation period covered 2015 to 2024. This period was selected based on the availability and consistency of official data. The combination of the spatial unit and time period produced a balanced panel with 340 observations. The main data source was publications from Statistics Indonesia (BPS). Supporting data were obtained from the Ministry of Manpower and the Ministry of Education, Culture, Research, and Technology.

This study used one dependent variable, one main independent variable, and three control variables, and it did not include mediating variables. The dependent variable was the youth NEET rate, which measured the percentage of the population aged 15 to 24 who were not in school, not working, and not participating in training. The NEET value was expressed as a percentage.

The main independent variable was the provincial minimum wage (UMP), measured in million rupiah. The study converted UMP into the natural logarithm to stabilize variance and reduce the influence of outliers, using the following formula:

$$\log UMP = \ln \left(\frac{UMP}{1,000,000} \right).$$

The first control variable was gross regional domestic product (GRDP, or $PDRB$) per capita at current prices. GRDP per capita was measured in million rupiah and transformed into the natural logarithm using:

$$\log PDRB = \ln \left(\frac{PDRB}{1,000} \right).$$

The second control variable was population density, measured as the number of people per square kilometer. This variable was also transformed into the natural logarithm using:

$$\log Kepadatan = \ln(kepadatan).$$

The third control variable was the school participation rate (*Angka Partisipasi Sekolah*, APS) for ages 16 to 18, which indicated the percentage of the population aged 16 to 18 who were enrolled in formal education.

Within the model framework, the youth NEET rate served as the dependent variable. The logged UMP served as the main independent variable. GRDP per capita, population density, and APS served as control variables that also contributed to variation in youth NEET across provinces.

Data analysis was conducted using Stata 17 with additional packages for panel data processing. The initial analytical step was to present descriptive statistics to describe the basic characteristics of each variable, including the mean, median, minimum, maximum, and standard deviation.

The empirical model employed was a fixed effects panel regression. The model equation was specified as follows:

$$NEET_{it} = \alpha + \beta_1 \ln(UMP_{it}) + \beta_2 \ln(PDRB_{it}) + \beta_3 \ln(Kepadatan_{it}) + \beta_4 APS_{it} + \mu_i + \varepsilon_{it},$$

where i denotes provinces 1 to 34 and t denotes the observation years from 2015 to 2024. The parameter α is the constant term. The parameters β_1 to β_4 are the regression coefficients for each explanatory variable. The term μ_i represents province fixed effects that capture province-specific unobserved characteristics that are constant over time. The term ε_{it} is the error component.

Model selection was preceded by a series of specification tests. The Chow test compared the common effects model with the fixed effects model. The Hausman test compared the fixed effects model with the random effects model. The Lagrange Multiplier test assessed the feasibility of the random effects model relative to the common effects model. The test results supported the fixed effects model as the most appropriate specification for the data.

This study also conducted classical assumption tests for panel data. Multicollinearity was assessed using the Variance Inflation Factor with a threshold of 10. Heteroskedasticity was examined using the Breusch-Pagan-Godfrey test and graphical inspection. Autocorrelation was tested using the Wooldridge test for panel data. Cross-sectional dependence was tested using the Pesaran CD test. The results indicated heteroskedasticity, autocorrelation, and interprovincial dependence.

Several adjustments were applied to address these violations. Cluster-robust standard errors were used to reduce the influence of heteroskedasticity. Driscoll-Kraay standard errors were used to address heteroskedasticity, autocorrelation, and cross-sectional dependence simultaneously. Based on the specification tests and assumption tests, the main model reported in the results was the fixed effects model with Driscoll-Kraay standard errors. Robustness tests were conducted to assess the stability of the findings under alternative model specifications and approaches to standard error estimation.

4. Results and Discussion

4.1. Descriptive Statistics

Table 2 descriptive statistics for all study variables comprised 340 observations from 34 provinces over the 2015–2024 period. The average youth NEET rate was 21.87%, with a standard deviation of 4.4, indicating substantial variation across provinces. The minimum NEET value was 7.26%, recorded in Bali in 2024, and the maximum value was 35.38, recorded in Maluku in 2023.

The provincial minimum wage (UMP) had an average of IDR 2.45 million, with a standard deviation of 0.6, reflecting regional wage disparities. The minimum UMP was IDR 0.91 million in Central Java in 2015, and the maximum was IDR 5.0 million in DKI Jakarta in 2024.

Table 2. Descriptive Statistics Results

Variable	Mean	Standard Deviation	Minimum	Maximum
NEET (%)	21.87	4.40	7.26	35.38
UMP (Million IDR)	2.44	0.60	0.91	5.00
GRDP per capita (Million IDR)	65.39	51.80	14.80	344.30
Population density (People/km ²)	737.60	2662.40	8	16165
APS age 16–18 (%)	74.60	5.93	61.96	91.17

Source: Author's calculation based on data from statistics Indonesia (BPS)

4.2. Model Selection

Model selection was based on specification tests. The Chow test ($p = 0.0000$) comparing the common effects model and the fixed effects model indicated that the fixed effects model was preferred. The Hausman test ($p = 0.0005$) rejected the null hypothesis, indicating that the fixed effects model was more appropriate than the random effects model. Although the Lagrange Multiplier test is typically used to compare the common effects model and the random effects model, it was not conducted in this study because the earlier tests had already indicated that the fixed effects model was the appropriate specification.

4.3. Classical Assumption Tests

Classical assumption tests were conducted comprehensively. Multicollinearity was assessed using the Variance Inflation Factor (VIF), with the criterion that each variable should have a VIF below 10. The highest VIF was 1.67 for $\log(UMP)$, indicating no serious multicollinearity in the model.

Heteroskedasticity was tested using the Breusch-Pagan-Godfrey test. The results showed a chi-square value of 11.87 with a probability of 0.018, indicating heteroskedasticity. Autocorrelation was tested using the Wooldridge test for panel data, which produced an F-statistic of 23.45 with a probability of 0.000, indicating autocorrelation. Cross-sectional dependence was examined using the Pesaran CD test, which yielded a CD statistic of 8.76 with a probability of 0.000, indicating interprovincial dependence.

4.4. Regression Estimation Results

Table 3 shows panel data regression using the fixed effects model was conducted to test the main and control variables.

Table 3. Regression Estimation Results

Variable	Pooled OLS	Fixed Effects	FE + Cluster	FE + Driscoll-Kraay
log(UMP)	3.723*** (0.958) [0.000]	-2.182 (1.408) [0.122]	-2.182 (2.219) [0.333]	-2.182 (3.477) [0.546]
log(GRDP)	-2.217*** (0.455) [0.000]	0.537 (1.156) [0.643]	0.537 (1.436) [0.711]	0.537 (2.095) [0.804]
log(Density)	-0.462*** (0.136) [0.001]	11.181*** (3.062) [0.000]	11.181** (4.678) [0.023]	11.181** (4.804) [0.045]
APS	-0.263*** (0.035) [0.000]	-0.041 (0.104) [0.692]	-0.041 (0.318) [0.898]	-0.041 (0.082) [0.629]
Constant	49.383*** (2.874) [0.000]	-30.003* (16.154) [0.064]	-30.003 (37.148) [0.425]	-30.003 (28.767) [0.324]
Observations	340	340	340	340
R ² within	–	0.0436	0.0436	0.0436
F-statistic	29.42 [0.000]	3.44 [0.009]	1.83 [0.147]	3.57 [0.052]

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Values in parentheses () are standard errors. Values in brackets [] are p-values.

The final model used Driscoll-Kraay standard errors with lag(1). This model is robust to heteroskedasticity, autocorrelation, and cross-sectional dependence. The use of Driscoll-Kraay standard errors with lag(1) is a strong approach for handling cross-sectional dependence and serial correlation in panel data models, and it was applied to reduce the risk of biased results and to improve model accuracy (Hoechle, 2007). The final regression equation was specified as follows:

$$NEET_{it} = -30.003 - 2.182\log(UMP)_{it} + 0.537\log(GRDP)_{it} + 11.181\log(Density)_{it} - 0.041APS_{it} + \mu_i + \varepsilon_{it}$$

where i represents provinces 1–34, t represents years 2015–2024, μ_i denotes province fixed effects, and ε_{it} is the error term.

4.5. Hypothesis Testing

H1 stated that the provincial minimum wage (UMP) positively affects the percentage of NEET youth aged 15–24 in Indonesia. The coefficient for log(UMP) was -2.182, with a p-value of 0.546, which is greater than 0.05. This result was not statistically significant, and H1 was rejected.

H2 stated that provincial GRDP per capita negatively affects the percentage of NEET youth aged 15–24 in Indonesia. The coefficient for log(GRDP) was 0.537, with a p-value of 0.804, which is greater than 0.05. This result was not statistically significant, and H2 was rejected.

H3 stated that population density negatively affects the percentage of NEET youth aged 15–24 in Indonesia. The coefficient for log(density) was 11.181, with a p-value of 0.045, which is less than 0.05. This result was statistically significant at the 5% level, but the direction of the relationship was positive rather than negative. Therefore, H3 was rejected due to the opposite sign.

H4 stated that APS for ages 16–18 negatively affects the percentage of NEET youth aged 15–24 in Indonesia. The APS coefficient was -0.041, with a p-value of 0.629, which is greater than 0.05. This result was not statistically significant, and H4 was rejected.

4.6. Model Goodness of Fit

The model had an R² within of 0.0436, indicating that the independent variables explained 4.36% of the variation in changes in the NEET rate. The model F-statistic was 3.57 with a p-value of 0.051,

indicating that the model was significant at the 10% level. The rho value was 0.9881, indicating that 98.81% of the variance in the error term originated from province fixed effects.

4.7. Discussion

The findings on the minimum wage are inconsistent with neoclassical economic theory. Neoclassical theory predicts that a minimum wage above market equilibrium reduces labor demand. A decline in demand should increase NEET. In other words, increases or decreases in UMP would not affect increases or decreases in youth NEET. Several factors may explain this non-significant result. Indonesia's informal sector accounts for 60% of the workforce, and the provincial minimum wage policy applies only to the formal sector. In addition, legal enforcement of minimum wage implementation remains weak. Firms may respond to minimum wage increases by reducing working hours or other benefits. Firms may also limit the recruitment of inexperienced young workers rather than terminating existing workers. Youth who are not absorbed into the formal sector may shift to the informal sector or become voluntarily unemployed when expected wages are not met. This situation helps explain why the nominal minimum wage fails to function as an effective instrument for controlling youth NEET rates. Other variables that are likely to influence youth NEET more strongly include the share of informal sector workers in a province and the level of firm compliance with wage policy.

This study indicates that rising economic growth does not automatically translate into inclusion for NEET youth. Although, at the macroeconomic level, GRDP growth is expected to positively affect stability and business sector performance in Indonesia (Rahma et al., 2025), the results suggest an indication of growth without employment expansion. Economic growth across regions varies considerably and depends on the sectors supporting it. In some areas, increases in GRDP are driven by capital-intensive sectors with limited labor absorption. Sectors such as mining create relatively few jobs. This phenomenon occurs in resource-rich provinces such as Papua and East Kalimantan. This imbalance creates a paradox in which resource-rich areas show higher NEET rates because downstream industries are not able to absorb young workers. Other variables that may be more strongly associated with reductions in youth NEET include the share of GRDP originating from labor-intensive sectors such as tourism, services, and light manufacturing.

A 1% increase in population density increased the NEET rate by 11.181%. This finding is contrary to the initial hypothesis, which was based on agglomeration theory. If density increases productivity and employment opportunities, the hypothesis is not supported when density is associated with higher NEET. Rapid urbanization without supporting infrastructure may increase youth unemployment. Job competition becomes more intense when the applicant-to-vacancy ratio exceeds available openings. High living costs may also hinder the school-to-work transition for youth from low-income households. The education system may be insufficiently responsive to local labor market needs. A deeper examination of regional data suggests heterogeneity related to regional economic structure. Bali and DI Yogyakarta show positive deviations, as both provinces have high population density but have managed to keep youth NEET at low levels. This outcome may occur because their economic structures are driven by labor-intensive tourism and education sectors, which can absorb young workers more broadly and flexibly. This condition contrasts with regions such as Maluku or Papua, which have very low population density but record high NEET rates among the 34 provinces. The lack of processing industry centers and dependence on primary sectors may make it difficult for youth in eastern regions to transition from school to formal employment. This evidence reinforces that NEET in Indonesia is strongly influenced by geographic characteristics and local economic structure.

The results also indicate that the quantity of education does not guarantee a successful transition into work. APS measures school participation rather than learning quality. This finding highlights skill mismatch issues in Indonesia's national education system. Curriculum relevance to labor market needs needs to be considered. Indonesia's education system has not fully responded to labor market dynamics. Many youth experience long waiting periods after completing schooling because their credentials do not provide strong competency signals in the labor market. Education investment that focuses only on access without improvements in curriculum quality has been insufficient as a single solution to the NEET problem. This phenomenon is consistent with conditions in other developing contexts such as Thailand, where high participation in general education without strengthening vocational pathways has been shown to lengthen youth job-search waiting periods (Tangtammavut et al., 2025). Other variables that may be more strongly related to NEET include the number of certified vocational school graduates, the availability of vocational training centers, or indices of education quality based on curriculum and other measures

5. Conclusion

This study produced empirical findings that challenge the conventional employment policy paradigm in Indonesia. Using panel data analysis with a fixed effects specification estimated with Driscoll-Kraay standard errors, the study demonstrated that the provincial minimum wage (UMP) did not have a significant impact on reductions in youth NEET (*Not in Education, Employment, or Training*) in Indonesia. Increases in the nominal UMP failed to respond to the complexity of a labor market dominated by the informal sector and to structural rigidities across regions. The panel dataset covered 34 provinces over the 2015–2024 period. The results were reflected in the four research hypotheses that were tested empirically.

The first hypothesis was rejected because the findings indicated that UMP had a non-significant effect on youth NEET. The coefficient was -2.182 with a p-value of 0.546. The non-significant effect of the provincial minimum wage indicated the limitations of a monetary approach. Human resource development required more comprehensive interventions that extended beyond wage policy. Population density constituted an important context for planning school-to-work transition programs. Densely populated areas required different strategies than sparsely populated areas. Education, training, and job placement programs needed to account for regional characteristics.

The second hypothesis was rejected because the findings indicated that GRDP per capita had a non-significant effect on youth NEET. The coefficient was 0.537 with a p-value of 0.804. GRDP per capita suggested that economic growth did not directly create employment opportunities. Human resource development needed to actively generate employment opportunities that aligned with youths' demographic characteristics. Programs needed to bridge the gap between economic growth and labor absorption.

The third hypothesis was rejected because the findings indicated that population density had a positive and statistically significant effect on youth NEET. The coefficient was 11.181 with a p-value of 0.045. A 1% increase in population density increased the NEET rate by 11.181%. This finding indicated that population concentration in urban areas, when not accompanied by mature industrialization, created unhealthy job competition.

The fourth hypothesis was rejected because the findings indicated that APS had a non-significant effect on youth NEET. The APS coefficient was -0.041 with a p-value of 0.629. APS highlighted the limitations of a quantitative approach to education. Human resource development needed to shift from merely increasing school participation toward improving education quality. Curriculum relevance to labor market needs was a key determinant of successful school-to-work transitions.

This study also had limitations in explanatory power. The within R-squared was only 0.0436. Province fixed effects dominated the variation, with rho equal to 0.9881. A closer reading of the results indicated extreme regional heterogeneity. Labor-intensive, service-based regions such as Bali and DI Yogyakarta maintained low NEET rates, in contrast to resource-rich but capital-intensive regions such as Papua, which recorded among the highest NEET rates. Overall, the study concluded that regional factors and local economic structure played a more important and critical role than national wage policy. Unobserved province-specific characteristics determined outcomes more strongly than the policy variables included in the model.

This study offered a new perspective on the theoretical implications of human resource development and neoclassical economics in developing countries. The findings indicated that labor market mechanisms did not operate perfectly, because wage increases were expected to reduce labor demand. In the Indonesian context, institutional factors and regional characteristics distorted this mechanism. Investment in formal education did not ensure a successful school-to-work transition without the support of a responsive employment ecosystem. Future theoretical development should consider labor demand factors alongside labor supply factors. The findings also indicated that wage policy alone was insufficient to create employment opportunities for youth. Future policy approaches should adopt a more holistic design that integrates wage policy with competency development.

The study also provided practical implications for human resource development policy. The government should design HRD policies based on regional characteristics. Vocational training programs should be tailored to local economic potential. Regions with a tourism base will require different programs from regions with an industrial base, and a one-size-fits-all approach has not proven effective. Provincial minimum wage policy should be integrated into a broader HRD policy package. The government can combine wage incentives with skills training programs. The education system should be reformed to improve its relevance to the labor market. Curricula should be responsive to industry needs.

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