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23-24 September 2025

SUBMISSION FORM
FULL PAPER

Title	**Analysis of the Effects of Education Level, Average Wages, Employment Opportunities, and Economic Growth on Educated Unemployment in West Sumatra, 2017–2023**
Conference's topic	Human Resource Management
Corresponding Author	Name: Akmal Yusuf Email: 002akmalyusuf@gmail.com Institution: Universitas Bung Hatta Faculty: Fakultas Ekonomi dan Bisnis Status: Students (S1) **Do not translate the name of University/ Institution in English*
Contact	Email: 002akmalyusuf@gmail.com Mobile Phone/ WA: 082173545919

Other authors

Name	University	Email	Mobile Phone
Erni Febrina Harahap	**Universitas Bung Hatta**	ernifebrinaharahap@bunghatta.ac.id	**081363103057**

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Analysis of the Effects of Education Level, Average Wages, Employment Opportunities, and Economic Growth on Educated Unemployment in West Sumatra, 2017–2023

Akmal Yusuf[*a], Erni Febrina Harahap[b]

[a,b,] *Program Studi Ekonomi Pembangunan, Fakultas Ekonomi dan Bisnis Universitas Bung Hatta, Indonesia*

Corespondent Author email: 002akmalyusuf@gmail.com, ernifebrinaharahap@bunghatta.ac.id

ABSTRACT

This study analyzes the influence of education level, average wages, employment opportunities, and economic growth on educated unemployment in West Sumatra from 2017 to 2023. The quantitative method used panel data combining time series and cross-sectional data of 19 districts/cities, analyzed using a Fixed Effect regression model. Results indicate that all independent variables significantly affect educated unemployment jointly, with an R-squared of 96.82%. Partially, education level and employment opportunities have significant positive effects, while economic growth has a significant negative effect. Average wages have a positive but not significant effect. These findings indicate a mismatch between educational attainment and labor market needs in the region, highlighting the need for enhanced graduate skill development and policies that steer economic growth toward creating jobs suitable for educated workers. This study provides a basis for regional government policy recommendations to reduce educated unemployment and improve labor absorption in West Sumatra.

Keywords: educated unemployment, education level, average wage, employment opportunities, economic growth

INTRODUCTION

Educated unemployment is one of the major issues faced by Indonesia, including West Sumatra. Although education is believed to be the key to improving living standards, in reality, a higher level of education does not guarantee protection from unemployment. This phenomenon reflects a mismatch between educational output and labor market demands.

Data from BPS indicate that educated unemployment in West Sumatra fluctuated during the period 2017–2023, with the highest rate consistently occurring in Padang City. The high level of educated unemployment has significant economic and social impacts, as it represents the loss of contributions from educated human resources in productive activities.

Several factors influence educated unemployment, including the level of education, average wages, employment opportunities, and economic growth. Previous studies show varying results: education can expand job opportunities but also intensify competition; wages are negatively correlated with unemployment; employment opportunities increase labor absorption; while economic growth is generally negatively related to unemployment (Okun's Law).

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Based on the table below, it can be seen that educated unemployment in West Sumatra experienced fluctuations each year. In 2017, the lowest educated unemployment was in Padang Panjang City with 1,279 people, while the highest was in Padang City with 39,844 people. In 2018, the lowest educated unemployment was in Mentawai Islands Regency with 1,038 people, and the highest was in Padang City with 41,831 people. In 2019, the lowest educated unemployment was in Padang Panjang City with 1,177 people, and the highest was in Padang City with 39,523 people. In 2020, the lowest educated unemployment was in Padang Panjang City with 1,994 people, and the highest was in Padang City with 65,014 people. In 2021, the lowest educated unemployment was in Padang Panjang City with 1,299 people, and the highest was in Padang City with 64,234 people. In 2022, the lowest educated unemployment was in Mentawai Islands Regency with 716 people, and the highest was in Padang City with 56,163 people. In 2023, the lowest educated unemployment was in Mentawai Islands Regency with 1,086 people, and the highest was in Padang City with 57,333 people.

Figure 1.1
Educated Unemployment Rate in West Sumatra, 2017–2023

Many factors influence the high unemployment rate, one of which is the level of education. In a study by Fitri (2016), it is stated that the level of education has a significant impact on educated unemployment because the higher a person's educational attainment, the greater the opportunities to obtain employment and the wider the job opportunities available for the labor force, thereby reducing educated unemployment.

This study aims to analyze the effects of these variables on educated unemployment in West Sumatra during the period 2017–2023 and to provide policy recommendations for local governments.

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LITERATUR REVIEW AND HYPOTHESES

Level of Education

Education is one of the key factors in economic development because it serves to improve the quality of human resources. According to Widiansyah et al. (2017), education is viewed as an investment that provides long-term benefits. However, Safitri & Endang (2024) found that the level of education has a positive and significant effect on educated unemployment in East Java. This is consistent with Anjarwati & Juliprijanto (2021), who stated that the higher the level of education, the more intense the competition in the labor market, which may potentially increase unemployment.

H1: The level of education has a positive effect on educated unemployment.

Average Wage

Wages are compensation received by workers for the services they provide, both physical and non-physical Sumarsono (2003). Higher wages can increase workers' interest in working, thereby reducing unemployment. The study by Febiana Putri (2015) showed that wages have a significant negative effect on educated unemployment in Indonesia. Similar results were found by Depi & Hardiani (2020), who stated that an increase in wages can reduce educated unemployment.

H2: The average wage has a negative effect on educated unemployment.

Employment Opportunities

Employment opportunities reflect the labor force absorption capacity in economic activities (Keynes, 1986). The wider the employment opportunities, the lower the unemployment rate. Sutomo & Susanti (1999) explained that an increase in employment opportunities encourages the absorption of skilled labor. The study by Wulandary & Woyanti (2023) in West Java also found that formal sector employment opportunities have a significant negative effect on educated unemployment.

H3: Employment opportunities have a negative effect on educated unemployment.

Economic Growth

Economic growth is the increase in the capacity to produce goods and services within an economy Manurung & Rahardja (2008). According to Okun's Law, there is a negative relationship between economic growth and the unemployment rate. Hardiani (2020) found that economic growth has a negative effect on educated unemployment in Muaro Jambi Regency. This is consistent with the study by Sherty Veronika & Mafruhat (2022), which showed that economic growth can reduce educated unemployment in West Java.

H4: Economic growth has a negative effect on educated unemployment.

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METHOD, DATA, AND ANALYSIS

his study employs a quantitative approach using panel data regression to analyze the influence of education level, average wage, employment opportunities, and economic growth on educated unemployment in West Sumatra during the 2017–2023 period. The data used are secondary annual data obtained from official publications of the Central Bureau of Statistics (BPS) of West Sumatra Province and other relevant sources. The variables analyzed include educated unemployment as the dependent variable, and education level, average wage, employment opportunities, and economic growth as the independent variables.

The analysis was conducted through classical assumption tests to ensure model validity, followed by the Chow and Hausman tests to determine the most appropriate model among the Common Effect Model (CEM), Fixed Effect Model (FEM), or Random Effect Model (REM). Panel data regression estimation was then applied to examine the effects of the independent variables both simultaneously and partially, with hypothesis testing carried out using the F-test, t-test, and the coefficient of determination (R^2). All data processing was performed using EViews 13.

Panel data regression analysis is a regression analysis tool in which data are collected individually (cross-section) and observed over a certain period of time (time series). The panel regression equation used in this study is as follows:

$$Y = \beta_0 + \beta_1 Tpd_{it} + \beta_2 RU_{it} + \beta_3 KK_{it} + \beta_4 PE_{it} + \mu$$

Description:
Y	= Educated Unemployment
B_0	= Constant, when all independent variables are equal to 0
$\beta_1 \beta_2 \beta_3 \beta_4$	= Regression Coefficient
Tpd	= Education Level
RU	= Average Wage
KK	= Employment Opportunities
PE	= Economic Growth
i	= Cross-sectional data, consisting of 19 regencies/cities in West Sumatra
t	= Time series data, covering the years 2017–2023
μ	= *Error term of observation i at time t*

RESULT AND DISCUSSION

Chow Test

According to Gujarati (2004), the Chow test is conducted to determine whether the common effect or fixed effect is the most appropriate for use as an analytical tool in panel data estimation. In performing the Chow test, each variable is first regressed using either the common effect model or the fixed effect model. The hypothesis tested in the Chow test is as follows:

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Table 1. Chow Test

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	121.522601	(18,88)	0.0000
Cross-section Chi-square	361.036083	18	0.0000

Based on the results of the Chow test, the probability value obtained is 0.0000. The probability value is less than $\alpha = 0.05$ therefore, the use of the common effect model is not appropriate, and it is better to use the fixed effect model. However, to confirm this decision, the Hausman test should be conducted first.

Hausman Test

According to Winarno Wahyu Wing (2017), the Hausman test is used to determine which method random effect or fixed effect should be applied in panel data modeling. The hypothesis used in the Hausman test is as follows:

Table 2. Hausman Test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	9.566954	4	0.0484

Based on the results of the Hausman test, the probability value obtained is 0.0484, which is less than $\alpha = 0.05$ therefore, it can be concluded that the better panel regression effect is the Fixed Effect model.

According to Gujarati (2004), if the results of the Chow and Hausman tests indicate that the Fixed Effect Model (FEM) is the selected model, then the results are considered final, and there is no need to perform the Lagrange Multiplier (LM) test. Based on the results of the Chow and Hausman tests that have been conducted, it can be concluded that the best model is the Fixed Effect Model (FEM).

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Table 3. Fixed Effect Model Estimation Results

Dependent Variable: LTPT
Method: Panel Least Squares
Date: 07/03/25   Time: 22:47
Sample: 2017 2023
Periods included: 6
Cross-sections included: 19
Total panel (unbalanced) observations: 111

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-647.8440	220.0713	-2.943792	0.0041
LTPD	3.449507	1.399259	2.465238	0.0156
LRU	0.262688	0.246656	1.064999	0.2898
LKK	44.97146	16.24441	2.768427	0.0069
LPE	-0.267819	0.086345	-3.101721	0.0026

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.968231	Mean dependent var	8.613496
Adjusted R-squared	0.960289	S.D. dependent var	0.924739
S.E. of regression	0.184279	Akaike info criterion	-0.362516
Sum squared resid	2.988355	Schwarz criterion	0.198918
Log likelihood	43.11962	Hannan-Quinn criter.	-0.134758
F-statistic	121.9095	Durbin-Watson stat	1.314406
Prob(F-statistic)	0.000000		

It can be seen that each independent variable has a regression coefficient, which can be used to construct a panel data regression model as follows:

TPT = -647.8440 + 3.449507 TPD + 0.262688 RU + 44.97146 KK - 0.267819 PE + e
P-value =   (0.0156)   (0.2898)   (0.0069)   (0.0026)
F-statistic   = 0.000000
R-squared   = 0,968231

Based on the table, the results of the partial significance test are as follows:
1. Education Level has a positive regression coefficient of 3.449507 with a probability value of $0.0156 < \alpha = 0.05$. Therefore, it can be concluded that Education Level has a positive and significant effect on Educated Unemployment. Based on the coefficient value of 3.449507, this means that if the average years of schooling (Education Level) increase by 1%, the number of Educated Unemployed will increase by 3.449507 percent, assuming other variables remain constant.
2. Average Wage has a positive regression coefficient of 0.262688 with a probability value of $0.2898 > \alpha = 0.05$. Therefore, it can be concluded that Average Wage has a positive but not significant effect on Educated Unemployment. This positive coefficient simply means that every 1% increase in average wages has the potential to increase the number of Educated Unemployed by approximately 0.262688 percent, assuming other variables remain constant.
3. Employment Opportunities has a positive regression coefficient of 44.97146 with a probability value of $0.0069 < \alpha = 0.05$. Therefore, it can be concluded that Employment Opportunities has a positive and significant effect on Educated Unemployment. Based on the coefficient value of 44.97146, this means that if Employment Opportunities increase by 1%, the number of Educated Unemployed will increase by 44.97146 percent, assuming other variables remain constant.
4. Economic Growth has a negative regression coefficient of -0.267819 with a probability value of $0.0026 < \alpha = 0.05$. Therefore, it can be concluded that Economic Growth has a negative and significant effect on Educated Unemployment. Based on the coefficient value of -0.267819, this means that if Economic

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Growth increases by 1%, the number of Educated Unemployed will decrease by 0.267819 percent, assuming other variables remain constant.

CONCLUSION

Based on the results and discussion of this study, which employed the Fixed Effect Model (FEM), the following conclusions can be drawn:

1. Education Level has a positive and significant effect on Educated Unemployment. This indicates that an increase in the average years of schooling tends to raise the number of educated unemployed, assuming other variables remain constant.

2. Average Wage shows a positive but insignificant effect on Educated Unemployment, suggesting that wage increases do not have a statistically meaningful impact on the number of educated unemployed within the context of this study.

3. Employment Opportunities have a positive and significant effect on Educated Unemployment. This finding implies that an increase in employment opportunities is associated with a rise in educated unemployment in the observed regions, highlighting potential mismatches between job openings and the skillsets of the educated workforce.

4. Economic Growth exhibits a negative and significant effect on Educated Unemployment, indicating that higher economic growth can contribute to reducing educated unemployment, assuming other variables remain constant.

The model's explanatory power demonstrates that variations in educated unemployment are largely accounted for by education level, average wage, employment opportunities, and economic growth, while the remaining variation is influenced by other factors outside the model.

Based on these findings, several recommendations are proposed:
- For policymakers, targeted strategies to develop sectors with high absorption capacity for educated labor are essential. Enhancing education quality, vocational training, and workforce development programs can help align skills with market demand.
- For future researchers, this study can serve as a reference for further investigations, particularly in exploring additional variables such as technological advancement, labor market policies, and sectoral innovation, to provide a more comprehensive understanding of educated unemployment.

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ACKNOWLEDGMENT

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