

Received : 12 November 2025

Revised : 08 December 2025

Accepted : 12 December 2025

Analysis of The Implementation of Provincial Minimum Wages and Education Levels on Labor Absorption In The Province of Kalimantan

Ariani^{1*)}; Muh. Irfandy Azis²; Charitin Devi³; Rista Kartika⁴

ariyanitinsee@gmail.com¹; muh.irfandyazis@gmail.com²;

charitin.devi@borneo.ac.id³; ristakartika350@gmail.com⁴

Universitas Borneo Tarakan, Tarakan, Indonesia^{1,2,3,4}

Abstrak

- **Tujuan:** Penelitian ini bertujuan untuk menganalisis pengaruh upah minimum provinsi dan tingkat pendidikan terhadap penyerapan tenaga kerja di Provinsi Kalimantan.
- **Desain/metodologi/pendekatan:** Penelitian menggunakan data sekunder periode 2019–2024 dengan metode regresi data panel. Estimasi dilakukan menggunakan pendekatan *Random Effect Model* (REM) untuk menguji pengaruh variabel independen terhadap penyerapan tenaga kerja.
- **Temuan:** Hasil penelitian menunjukkan bahwa upah minimum provinsi tidak berpengaruh signifikan terhadap penyerapan tenaga kerja sedangkan tingkat pendidikan berpengaruh signifikan terhadap penyerapan tenaga kerja. Secara simultan, upah minimum provinsi dan tingkat pendidikan berpengaruh positif dan signifikan terhadap penyerapan tenaga kerja yang ditunjukkan oleh peningkatan jumlah tenaga kerja yang terserap di Provinsi Kalimantan.
- **Batasan penelitian/dampak:** Penelitian ini terbatas pada periode waktu 2019-2024 dan hanya mencakup wilayah Kalimantan saja, sehingga hasilnya tidak dapat digeneralisasi seluruh wilayah di Indonesia. Studi lanjutan disarankan untuk memperluas variabel dan cakupan daerah agar diperoleh pemahaman yang lebih komprehensif.
- **Implikasi praktis:** Temuan ini menekankan pentingnya penetapan kebijakan upah minimum yang seimbang serta peningkatan kualitas pendidikan dan keterampilan tenaga kerja sebagai strategi untuk memperkuat penyerapan tenaga kerja dan menekan tingkat pengangguran di Provinsi Kalimantan.
- **Keaslian/nilai:** Penelitian ini memberikan kontribusi empiris dengan menganalisis pengaruh upah minimum provinsi dan tingkat pendidikan terhadap penyerapan tenaga kerja menggunakan data panel lintas provinsi di Pulau Kalimantan periode 2019–2024. Studi ini memperkaya literatur mengenai pasar tenaga kerja regional, khususnya pada wilayah berbasis sumber daya alam seperti Kalimantan.
- **Jenis makalah:** Makalah penelitian.

Kata Kunci: *Upah minimum provinsi; tingkat pendidikan; penyerapan tenaga kerja; Provinsi Kalimantan.*



Cite This As: Ariani, Azis, M.I., Devi, C., & Kartika, R. 2025. Analysis of The Implementation of Provincial Minimum Wages and Education Levels on Labor Absorption In The Province of Kalimantan. *Ekonomi dan Bisnis*, 12(2), 182-205. doi.org/10.35590/jeb.v12i2.12803

Abstract

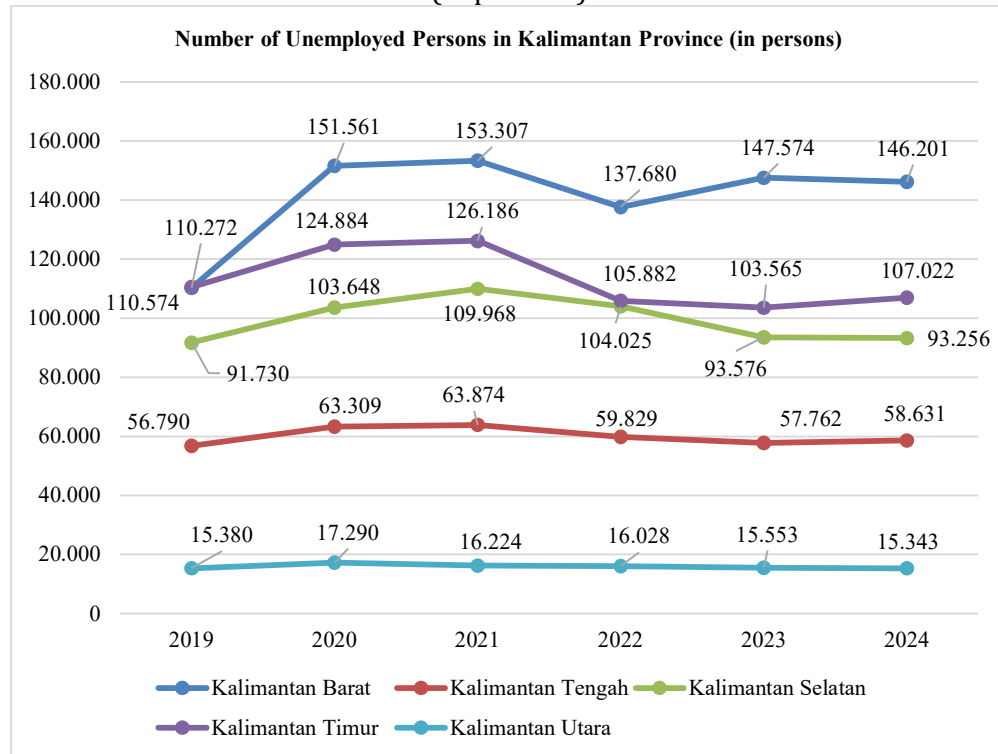
- **Purpose:** *This study aims to analyze the effect of provincial minimum wages and education levels on labor absorption in Kalimantan Province.*
- **Design/methodology/approach:** *The study used secondary data from 2019 to 2024 with a panel data regression method. The estimation was conducted using the Random Effect Model (REM) approach to examine the effect of independent variables on labor absorption.*
- **Findings:** *The results show that the provincial minimum wage does not have a significant effect on labor absorption, while the level of education has a significant effect on labor absorption. Simultaneously, the provincial minimum wage and education levels have a positive and significant effect on labor absorption as indicated by an increase in the number of workers absorbed in Kalimantan Province.*
- **Research limitations/implications:** *This study is limited to the period of 2019-2024 and only covers the Kalimantan region, so the results cannot be generalized to all regions in Indonesia. Further studies are recommended to expand the variables and coverage area in order to obtain a more comprehensive understanding.*
- **Practical implications:** *These findings emphasize the importance of establishing a balanced minimum wage policy and improving the quality of education and workforce skills as strategies to strengthen labor absorption and reduce unemployment rates in Kalimantan Province.*
- **Originality/value:** *This study provides empirical evidence by analyzing the effect of provincial minimum wages and education levels on labor absorption using cross-provincial panel data in Kalimantan from 2019–2024. The study contributes to the literature on regional labor markets, particularly in natural resource-based regions such as Kalimantan.*
- **Paper type:** *Research paper.*

Keywords: *Provincial Minimum Wages; Education Level; Labor Absorption; Kalimantan Province.*

Introduction

A common problem in the Indonesian economy is employment. This can be seen when high labor absorption in a region boosts the economy of that region (Ramadhan & Setyowati, 2023). High labor absorption can lead to unemployment if the population of a region is large and economic growth is uneven (Agustin, 2020). Indonesia consists of many provinces, districts/cities, and smaller regions. Kalimantan is an island with abundant natural resources, including forest products, plantations, gas, petroleum, and coal (Adi, 2018). High unemployment is a problem that occurs in almost all regions of Indonesia, including the island of Kalimantan. The process of development and economic growth in Kalimantan will be hampered by an increase in the number of unemployed. This can be seen in the graph of the number of unemployed by province in Kalimantan as follows:

Figure 1. Number of Unemployed Persons by Province in Kalimantan, 2019-2024
(in persons)

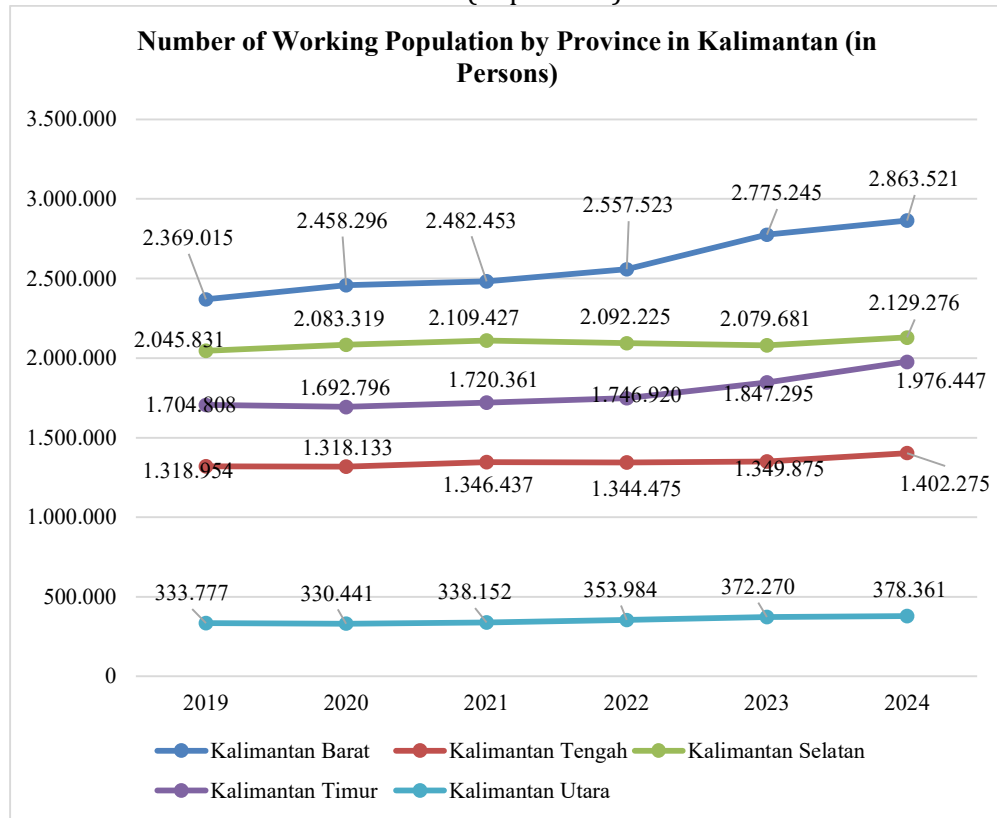


Source: BPS Kalimantan, 2024

The graph above shows that West Kalimantan is the province with the highest number of unemployed persons compared to other provinces. This condition indicates that West Kalimantan faces serious challenges in creating jobs. Meanwhile, the province with the lowest number of unemployed persons is North Kalimantan because the number of unemployed persons in this province is relatively stable at a low level without experiencing a significant increase.

Unemployment occurs because persons do not have jobs, forcing them to reduce their spending on consumption, savings, and investment. As a result, labor absorption has become an important indicator that helps the country's economic development to achieve equitable economic growth. Unemployment occurs not only because of the limited number of available jobs, but also because of the uneven distribution of labor. The relatively high number of workers is not matched by the low quality of the workforce. To overcome this problem, the government must provide quality jobs so that it can improve the standard of living of workers. Inequality will occur if economic growth is not accompanied by an increase in employment opportunities (Agustin, 2020). The following is the number of workers employed by province in Kalimantan.

Figure 2. Number of Working Labor Force by Province in Kalimantan from 2019 to 2024 (in persons)



Source: BPS Kalimantan Labor Force Status, 2024

The graph above shows that the number of working persons on the island of Kalimantan has fluctuated over time. When compared to other provinces, West Kalimantan has the largest population because the region is dominated by the manufacturing, trade, services, and agriculture sectors, as well as the informal sector, which continues to grow. On the other hand, North Kalimantan has the lowest number of workers. This is because North Kalimantan is currently experiencing regional growth as a new province that separated from East Kalimantan in 2012.

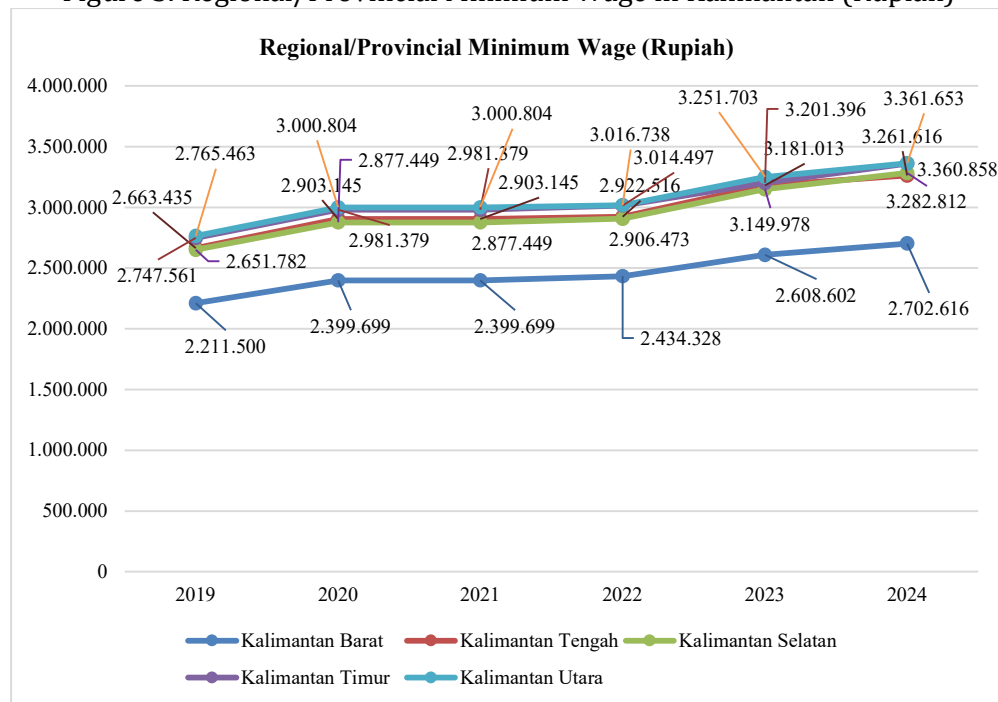
The level of labor absorption in the province of Kalimantan is caused by two dominant factors, namely minimum wages and education levels. Offering high wages will increase the supply of labor. If wages are raised, workers' welfare will improve and their motivation to work will increase, thereby increasing the production of goods and services (Riska, 2012).

According to Castro et al. (2014) in (Windayana & Darsana, 2020) (Agustin, 2020), wage levels can influence economic growth. The government sets a minimum wage that employers must pay workers to ensure that all workers and laborers also enjoy profits. This is done to ensure that it is not only employers who enjoy profits. In employment relationships, it is very important to establish employment agreements in which the rights and obligations between workers/laborers and employers are balanced in providing protection for workers/laborers (M. Bambang

et al., 2016). The minimum wage policy is aimed at achieving a decent standard of living. In addition to providing security, it also ensures that workers/laborers who receive wages can meet their needs (Mukaromah et al., 2023).

The minimum wage policy is a wage system that is widely applied by many countries, especially Indonesia. There are two perspectives: minimum wage is an effort to protect workers so that the value of wages received does not decrease to meet daily needs, and wages are a means of protection for companies to maintain labor productivity. From the company's perspective, wages are costs that are usually used as a benchmark for setting prices (Ariani et al., 2024). In labor relations, labor demand is the relationship between wages and the number of workers that employers want to hire. To find out the development of the minimum wage in Kalimantan province, see Figure 1.3 on the minimum wage in Kalimantan province as follows:

Figure 3. Regional/Provincial Minimum Wage in Kalimantan (Rupiah)



Source: BPS Kalimantan, 2024

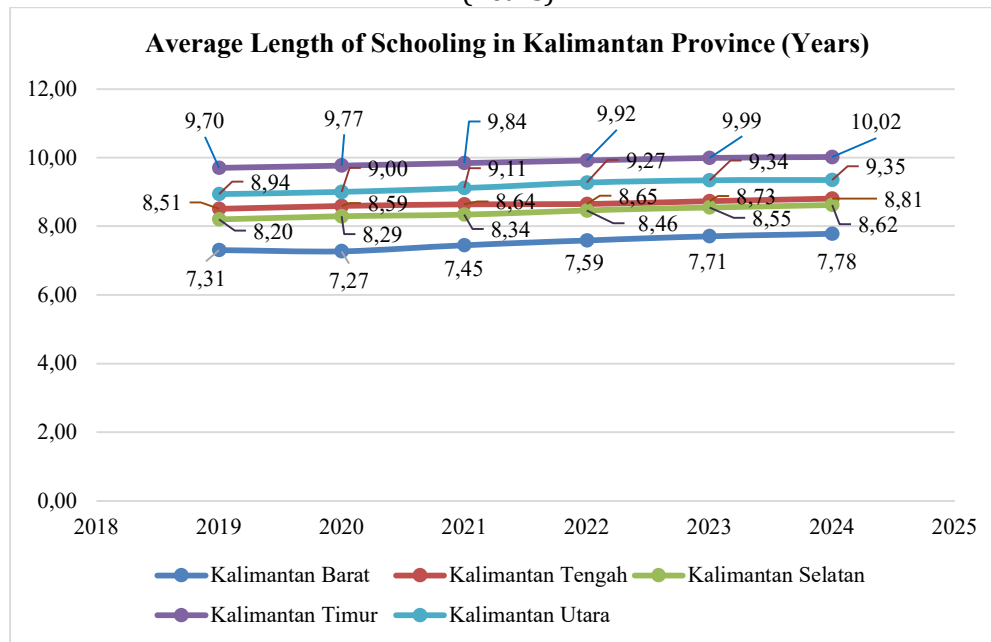
The graph above shows that the minimum wage in Kalimantan varies, with the minimum wage being set by a Governor's Decree in each province in Kalimantan. This indicates a disparity in the UMP level in Kalimantan. The annual increase in the UMP can have an impact on the decline in labor absorption. The number of workers will decrease because with the increase in the UMP, companies will not be able to pay workers and hire workers with good quality and high productivity. Graph 1.2 shows that East Kalimantan is the province with the highest average regional/provincial minimum wage, while West Kalimantan has the lowest average regional/provincial minimum wage. Although the labor force in West Kalimantan is high, the provincial minimum wage is low compared to other provinces.

In addition to minimum wages, education levels can also affect labor absorption. Education is an effort to improve the quality of human resources. Education can improve knowledge and skills in line with the demands of the world of work and shape character (Afrida, 2003). According to Praksono (2020), even though job prospects in the industry are currently limited, persons tend to choose professions that match their expertise because their hopes of getting a good job increase in line with their level of education (Wulandari & Woyanti, 2023).

In general, labor absorption is based on the quality of the workforce, which can be seen from the level of education calculated based on the average length of schooling. Therefore, education is an important component that determines the ability of a developing country to develop new knowledge using advanced technology that can produce a quality workforce (Agustin, 2020).

Average length of education is the number of years a person spends in formal education. The more years spent in education, the higher the average length of education obtained. To identify the average length of schooling in Kalimantan, the following data graph shows the average length of schooling in Kalimantan:

Figure 4. Average Length of Schooling in Kalimantan Province from 2019 to 2024 (Years)



Source: BPS Kalimantan, 2024

The graph above shows that the average length of schooling for Kalimantan residents has continued to increase every year. The phenomenon of society beginning to prioritize education can be seen from 2019 to 2024 in the province of Kalimantan. This indicates an improvement in the quality of human resources. East Kalimantan has the highest average length of schooling in Kalimantan, while West Kalimantan has the lowest average length of schooling in the province of Kalimantan.

The effect of minimum wage and education level on labor absorption is quite controversial. There are conflicting studies on the impact of provincial minimum wages and education levels on labor absorption. Research conducted by Eka Putri, Eni Setyowati, and Imron Rosyadi (Putri et al., 2022) states that the minimum wage has a significant positive effect on labor absorption, while Julia Dwi Budiasih and Kiky Asmara (Julia Dwi Budiasih & Kiky Asmara, 2024) emphasize that average length of schooling (ALS) is not a benchmark but rather experience, ability, and skills possessed by an individual, and that minimum wages have a negative and significant impact on labor absorption because wage increases allow companies to increase productivity and reduce production costs by meeting workers' living needs. Then, research by Eva Agustin (Agustin, 2020) shows that increased education has a positive but insignificant effect on labor absorption, while an increase in the minimum wage affects labor absorption because an increase in the minimum wage can encourage an increase in workers' welfare so that workers are more motivated to enter the labor market. Based on the research that has been conducted, there are different research results regarding provincial minimum wages and education levels in influencing labor absorption.

Research on provincial minimum wages and education levels in relation to labor absorption has been conducted in various regions in Indonesia, such as Central Java, Banten, Mojokerto, Jambi, and South Kalimantan. However, most studies have focused on only one province, and none have comprehensively examined the Kalimantan province. In addition, previous studies have shown varying results, with minimum wage and education level having positive, negative, or insignificant effects on labor absorption. This indicates that the effects of these two variables are contextual and may differ depending on the region studied. Therefore, there is still a lack of research to discuss and analyze the relationship between provincial minimum wages and education levels on labor absorption in the province of Kalimantan.

If the problems in this study are not immediately addressed, they will have negative impacts in both the short and long term. One of the main impacts is high unemployment due to the lack of job opportunities and suboptimal minimum wage policies, which can make it difficult for companies to hire workers at the applicable wages. In addition, the mismatch between education levels and labor market needs can cause many graduates to be unable to find suitable jobs.

This study contributes by: (1) presenting cross-provincial empirical analysis in Kalimantan using panel data from 2019 to 2024; (2) testing the relevance of human capital theory and the wage–employment nexus in the context of natural resource-based regions; and (3) providing regional empirical evidence that can serve as a basis for formulating minimum wage policies and improving the quality of education to encourage labor absorption.

Based on the explanation above, the researcher feels the need to conduct further research by raising this topic through a series of recent tests on the determining factors of labor absorption focusing on the province of Kalimantan. Based on the background of the problem described above, the author is interested in conducting research entitled “Analysis of the Implementation of Provincial Minimum Wages and Education Levels on Labor Absorption in the Province of Kalimantan.”

Literature review and hypothesis development

Labor Absorption

According to Todaro (2003), labor absorption is a situation where there are workers or jobs available to be filled by job seekers or the acceptance of workers to complete tasks as required. The number of workers employed in a particular company is referred to as labor absorption. In the economic sector, labor absorption will have an impact on the production of goods and services in large quantities. Labor absorption is defined as the balance between labor supply and demand, which determines wage equilibrium and labor equilibrium. The number of employees required by a particular organization or company is called labor absorption, while Kuncoro (2002) explains that labor demand will decrease as a result of wage increases. To maintain maximum profits, employers must replace relatively expensive labor with cheaper inputs when wages rise while the prices of other inputs remain constant (Lube et al., 2021).

This study defines labor absorption as the number of persons working in all economic sectors, in this case, the island of Kalimantan. The labor demand and supply markets are interrelated, which can create a balance in wage levels and labor absorption levels. This is referred to as the relationship between labor absorption and labor supply (Agustin, 2020).

Wages

In economics, wages are payments received by workers for various services provided to service providers. Wages can be in the form of money or goods intended to meet the needs of the service provider and their family (Tenah et al., 2019) in (Mukaromah et al., 2023).

David Ricardo (1772-1823) developed the theory of subsistence wages, known as the "iron law," which states that the relationship between labor demand and supply determines wages. There is also an assumption that the population will grow faster if the income of the population is greater than the subsistence level of the rate of food demand. A larger workforce will enter the labor market and seek employment. Wage rates will fall back to the subsistence level when the supply of labor exceeds demand (Lube et al., 2021).

Minimum Wage

Wages according to Government Regulation (PP) 51 of 2023 as an update to PP No. 36 of 2021 and form the legal basis for determining wages in 2024. The minimum wage is the minimum monthly income paid by an employer to an employee as compensation for work or services that they have completed or will complete. It is paid in cash based on an employment agreement between the employer and the worker and includes allowances for workers and their families. The minimum wage can be set regionally according to Government Regulation No. 8/1981, which stipulates that the minimum wage consists of a basic wage and fixed allowances. However, government regulations clearly state that only basic wages that include allowances cause regular conflicts between employers and workers, regardless of the worker's attendance rate or output, such as allowances based on seniority and family allowances (Pratomo et al., 2011).

In classical and neoclassical theory, minimum wages set above the equilibrium level of the labor market have the potential to increase production costs and reduce labor demand, thereby reducing labor absorption. Conversely, wage efficiency theory explains that higher wages can increase productivity and reduce labor turnover, which under certain conditions can actually increase labor absorption. These differing theoretical approaches explain why the impact of minimum wages on labor absorption is contextual and varies between regions.

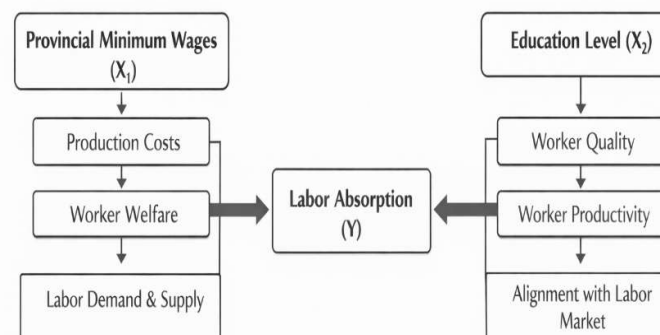
Level of Education

In economics, human capital refers to the knowledge and skills acquired by workers through education, which, when improved, can increase worker productivity (Todaro and Smith 2011). Increased employment opportunities come from higher levels of education, which can reduce unemployment (Suhendra and Wicaksono 2016) in (Pasuria & Triwahyuningtyas, 2022).

According to Gregory (2006) in (Ganie, 2017), education is the most important human capital for achieving a country's long-term economic success. Furthermore, education can be defined as a planned effort to produce high-quality individuals who continue to develop their potential and can compete in today's era of global competition. According to Tirtarahardja and Sulo (1994), education is defined as the activity of educating students to have the basic skills to work. This relates to the issue of workforce preparation. Education reflects the quality or achievement of a citizen's formal education. The higher a person's level of education, the more productive they are at work (Agustin, 2020).

The human capital theory states that education improves the skills and productivity of the workforce, thereby increasing employment opportunities and encouraging greater labor absorption. However, an increase in education levels that is not matched by the creation of appropriate jobs can lead to educated unemployment. This condition is relevant in Kalimantan, where the economic structure is still dominated by the primary sector (Pasuria & Triwahyuningtyas, 2022).

Figure 5. Conceptual Framework



This study is based on the assumption that labor absorption reflects the ability of a regional economy to create employment opportunities. In the context of Kalimantan, labor absorption is influenced by both government wage policy and

human capital quality. Therefore, this research focuses on two main explanatory variables: Provincial Minimum Wages and Education Level.

The conceptual framework explains how these two variables affect labor absorption through different economic mechanisms, both individually and simultaneously. Provincial minimum wages are determined by the government to ensure a minimum standard of living for workers. Changes in minimum wages influence labor absorption through two main channels: (1) From the employer's perspective, an increase in minimum wages raises production costs. Higher labor costs may encourage firms to reduce labor demand, delay new hiring, or increase efficiency by substituting labor with technology; (2) From the worker's perspective, higher minimum wages improve worker welfare and increase motivation to participate in the labor market. This condition can increase the supply of labor. Because minimum wages simultaneously affect labor demand and labor supply, their overall impact on labor absorption is not always direct or significant. The effect depends on the economic structure and the capacity of firms to adjust to wage increases. Education level, measured by average years of schooling, represents the quality of human capital. Higher education improves workers' knowledge, skills, and adaptability to technological and structural changes in the economy. When considered together, provincial minimum wages and education levels play complementary roles in shaping labor absorption: (1) Minimum wages ensure economic feasibility and welfare for workers; (2) Education ensures quality and productivity of the workforce. The interaction of these two factors creates a labor market where workers are both economically viable and technically competent, thereby improving the capacity of the labor market to absorb labor. This explains why, even if minimum wages do not have a significant partial effect, both variables can jointly influence labor absorption.

Hipotesis

Hypotheses lead to the verification of truth and short-term solutions to a problem. However, hypotheses are speculative in nature (Rahmah & Juliannisa, 2022). Based on the discussion in the background, a hypothesis will be identified and tested using a basic theoretical framework, resulting in the following hypotheses:

- H1: Provincial minimum wage has a negative/positive effect on labor absorption in Kalimantan.
- H2: Education levels wage has a negative/positive effect on labor absorption in Kalimantan.
- H3: Provincial minimum wage and education levels has a negative/positive effect on labor absorption in Kalimantan.

Research Method

Scope

The population in this study is the entire workforce in Kalimantan Island (West Kalimantan, South Kalimantan, Central Kalimantan, East Kalimantan, and North Kalimantan) from 2019 to 2024. This study aims to analyze the effect of

minimum wage implementation and education level on labor absorption in Kalimantan from 2019 to 2024.

Types and Sources of Research

This study uses a quantitative approach with a panel data model to examine the effect of provincial minimum wages and education levels on labor absorption in Kalimantan Province from 2019 to 2024. Three regression models are used: Common Effects Model (CEM), Fixed Effects Model (FEM), and Random Effects Model (REM). To determine the best model, Chow tests (CEM vs. FEM), Hausman tests (FEM vs. REM), and Lagrange Multiplier tests (CEM vs. REM) were conducted. The test results showed that the REM model was more appropriate than the other two models. The selection of the Random Effects Model (REM) was based on the characteristics of the data and the objectives of the study.

The type of data used in this study is quantitative data in the form of numbers (numerical) that has a specific time range (time series) and is cross-sectional (cross section). The data used is secondary data, which is data obtained by researchers from official and credible institutions such as the Central Statistics Agency (BPS). The data includes information on provincial minimum wages, education levels (average length of schooling), and the number of workers employed in five provinces in Kalimantan during the period 2019–2024.

Analysis Technique

The analysis method used in this study is panel data regression analysis, which combines time series data with cross-sectional data for the period 2019-2024 in five provinces in Kalimantan. Panel data testing can be performed using the F-statistic test, t-statistic test, and coefficient of determination (R²) test. The statistical analysis method known as panel regression is used to simulate the relationship between one or more dependent variables and one or more independent variables in a panel dataset, which is a dataset containing data from a number of individuals or observation units observed over a certain period of time.

Panel data or pooled data is a combination of time series data and cross-sectional data (Baltagi, 2005). The ability to calculate the impact of each individual or to control for individual heterogeneity is the most prominent characteristic of panel data. The constant and residual values of the equation are then influenced by the effect of each individual. To analyze labor absorption influenced by minimum wages and education levels, the following panel data regression model is used:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + e_{it}$$

Figure 6. Regression Model

Where:

- Y : Employment Absorption
- α : Constant
- β_1, β_2 : Coefficients
- X_1 : Provincial Minimum Wage

X_2	: Education
i	: Cross-section Data Kalimantan
t	: Annual Time Series Data
et	: error term

In the selection process using panel data regression, there are various tests, namely the Common Effect Test, Fixed Effect Test, and Random Effect Test. To select the appropriate model to use, there are several tests, namely the Chow Test, Hausman Test, and Lagrange Multiplier Test. The following are three models for calculating equations using panel data in this study:

Model Selection

1. Chow Test

The Chow test is used to determine whether to select a common effect or a fixed effect. The hypotheses in the Chow test are H_0 = common effect, H_1 = fixed effect with the condition that if the cross-section Chi-Square $< \alpha = 0.05$, then H_0 = rejected, H_1 = accepted, and if the cross-section Chi-Square $> \alpha = 0.05$, then H_0 = accepted and H_1 = rejected. If H_0 is accepted, then the fixed effect model is more appropriate than the common effect model.

2. Hausman Test

The Hausman test is used to choose between fixed effects and random effects. The hypotheses in the Hausman test are H_0 = Random Effect, H_1 = Fixed Effect, with the condition that if Cross-Section Chi-Square $< \alpha = 0.05$, then H_0 = rejected, H_1 = accepted, and if Cross-Section Chi-Square $> \alpha = 0.05$, then H_0 = accepted, H_1 = rejected.

The Hausman test occurs when the probability value < 0.05 indicates that H_0 is rejected and H_1 is accepted, meaning that the more appropriate model to use is fixed effect rather than random effect. The FE model is tested for classical assumptions to ensure that the model is valid for analysis. First, a normality test is conducted to see whether the regression residuals are normally distributed. Normality can be detected using the Jarque-Berra test (JB test). The JB test is a normality test based on the kurtosis coefficient and skewness coefficient. In the JB test, normality can be seen from the JB probability value. If the JB probability value is > 0.05 , the data is normally distributed; conversely, if the probability value is < 0.05 , the data is not normally distributed.

3. Lagrange Multiplier Test

The Lagrange Multiplier test is a test used to determine whether to select random effects or common effects. The hypotheses in the Lagrange multiplier test are H_0 = Common Effect, H_1 = Random Effect, with the condition that if Cross-Section Chi-Square $< \alpha = 0.05$, then H_0 = rejected, H_1 = accepted, and if Cross-Section Chi-Square $> \alpha = 0.05$, then H_0 = accepted, H_1 = rejected. If H_1 is accepted, then random effects are more appropriate to use than common effects.

Classical Assumption Test

In books by Ajija et al. (2011:52), Verdeek (2000), Gujarati (2003), Wibisono (2005), and Aulia (2004:27) conclude that panel data also has certain advantages so

that it does not always require complete testing of classical assumption testing such as normality and autocorrelation. However, checking the basic assumptions of regression is still necessary to ensure the validity of the estimation. Therefore, multicollinearity and heteroscedasticity tests must be performed because panel data uses three approaches, namely Common Effect, Fixed Effect, and Random Effect. Common Effect and Fixed Effect generally use the Ordinary Least Squares (OLS) approach. If OLS is used, heteroscedasticity and multicollinearity must be tested, while Random Effect uses the Generalized Least Squares (GLS) approach, which requires testing for normality and multicollinearity.

1. Multicollinearity Test

When the tolerance value ($1/VIF$) > 0.10 and $VIF < 10$, the multicollinearity test shows that there is no multicollinearity. However, if the test result is < 0.10 and $VIF > 10$, this indicates multicollinearity. This shows that many independent variables are closely related to one another. Understanding the findings becomes difficult and the analysis becomes unstable.

2. Heteroscedasticity test

The heteroscedasticity test aims to test the regression model for unequal residual variables from one observation to another. The Breusch-Pagan-Godfrey method is used in this heteroscedasticity test. If the probability value is < 0.05 , then heteroscedasticity occurs, and conversely, if the probability is > 0.05 , then it can be concluded that the model is free from heteroscedasticity problems. If there is no pattern and the graph is randomly scattered, then the data does not show heteroscedasticity.

Hypotesis Test

1. Partial Test (t-Statistics)

The t-statistics test is used to determine the effect of all variables individually, namely the independent variables (free variables) on the dependent variables (bound variables), namely labor absorption. This test is conducted by comparing the calculated t-value with the table t-value. If the calculated t-value is greater than the table t-value, then H_0 is rejected. This indicates that one of the independent variables significantly affects the dependent variable, whereas if the calculated t-value is less than the table t-value, then H_0 is accepted, meaning that one of the independent variables does not significantly affect the dependent variable.

2. Simultaneous Test (F-Statistic)

The F-statistic test is used to determine the effect of all variables simultaneously, namely independent variables (free variables) such as minimum wage and education level on dependent variables (bound variables), namely labor absorption. If the calculated F is greater than the table F, then H_0 is rejected and H_1 is accepted. This indicates that the independent variables have a significant effect on the dependent variable collectively, whereas if $F_{\text{calculated}} < F_{\text{table}}$, then H_0 is accepted and H_1 is rejected, meaning that the independent variables do not have a significant effect on the dependent variable collectively.

3. Determination Coefficient Test (R^2)

The determination coefficient (R^2) is used to determine the extent of influence between independent variables and dependent variables. The coefficient can show the percentage of variation between independent variables that can explain the variation in dependent variables. The R^2 value is between zero and one. The higher the coefficient of determination (R^2) value, the closer the relationship with the dependent variable. This model is considered very good because the R^2 value ranges from 0-1. The higher the model value, the more information the dependent variable provides to predict the variation of the variable.

Result and discussion

Descriptive Statistical Analysis

1. Description of Provincial Minimum Wage Variables

The provincial minimum wage in this study uses annual secondary data with five provinces in Kalimantan from the official website of the Central Statistics Agency of Kalimantan Province from 2019-2024. The unit of indicator of the minimum wage is Rupiah. The following is the data on the provincial minimum wage in Kalimantan, namely:

Table 1. Kalimantan Province Minimum Wage in 2019-2024

Year	Regional/Provincial Minimum Wage (Rupiah)				
	West Kalimantan	Central Kalimantan	South Kalimantan	East Kalimantan	North Kalimantan
2019	2.211.500	2.663.435	2.651.782	2.747.561	2.765.463
2020	2.399.699	2.903.145	2.877.449	2.981.379	3.000.804
2021	2.399.699	2.903.145	2.877.449	2.981.379	3.000.804
2022	2.434.328	2.922.516	2.906.473	3.014.497	3.016.738
2023	2.608.602	3.181.013	3.149.978	3.201.396	3.251.703
2024	2.702.616	3.261.616	3.282.812	3.360.858	3.361.653

Source: Central Statistics Agency of Kalimantan Province (2025)

Based on Table 1, it shows that the minimum wage in Kalimantan Province has increased from year to year. The increase in the minimum wage in this province is expected to continue to increase in line with the development of time which can demand higher income for the welfare of the persons of Kalimantan province.

2. Description of Education Level Variables

Education is an independent variable in this study using data on average school years according to Kalimantan province. Average length of schooling is an indicator that measures the number of years of formal education attended by the

inhabitants of a particular country or region. The following is the average length of Kalimantan provincial schools, namely:

Table 2. Average School Length of Kalimantan Province in 2019-2024

Year	Average School Length (Years)				
	West Kalimantan	Central Kalimantan	South Kalimantan	East Kalimantan	North Kalimantan
2019	7,31	8,51	8,20	9,70	8,94
2020	7,37	8,59	8,29	9,77	9,00
2021	7,45	8,64	8,34	9,84	9,11
2022	7,59	8,65	8,46	9,92	9,27
2023	7,71	8,73	8,55	9,99	9,34
2024	7,78	8,81	8,62	10,02	9,35

Source : Central Statistics Agency of Kalimantan Province (2025)

Based on Table 2, it can be seen that the average length of school tenure in Kalimantan province has increased every year. In the 2019-2024 period, West Kalimantan Province will be the province with the lowest average length of school tenure compared to other provinces. Meanwhile, the province with the highest average length of school tenure is East Kalimantan Province with a figure of 10.02 years.

3. Description of Labor Absorption Variables

The data on labor absorption in this study uses secondary data obtained from the Central Statistics Agency website using data from five provinces in Kalimantan in 2019-2024. Indicators are in the form of the number of persons aged 15 years and above who are working.

Table 3. Number of Working Forces by Kalimantan Province in 2019-2024

Year	Number of Labor Force By Province (in soul)				
	West Kalimantan	Central Kalimantan	South Kalimantan	East Kalimantan	North Kalimantan
2019	2.369.015	1.318.954	2.045.831	1.704.808	333.777
2020	2.458.296	1.318.133	2.083.319	1.692.796	330.441
2021	2.482.453	1.346.437	2.109.427	1.720.361	338.152
2022	2.557.523	1.344.475	2.092.225	1.746.920	353.984
2023	2.775.245	1.349.875	2.079.681	1.847.295	372.270
2024	2.863.521	1.402.275	2.129.276	1.976.447	378.361

Source : Central Statistics Agency of Kalimantan Province (2025)

Based on table 3 which shows that the number of labor force working in Kalimantan Province has fluctuated. West Kalimantan Province is the province with the highest working workforce and is increasing every year. It is different from other provinces. Central Kalimantan Province experienced a decrease in the number of

working labor force in 2022. In addition, the province of South Kalimantan experienced a decline in 2022 and 2023 while East Kalimantan and North Kalimantan experienced a decrease in the number of working labor forces in the same year, namely in 2020.

Panel Data Regression Model Estimation Results

In panel data regression testing, there are several models that need to be tested to select the most suitable model used in this study. The three tests used for model specification are the Chow Test, Hausman Test, and Lagrange Multiplier (LM) Test. The following are the results of the estimation model selection:

1. Chow Test

This study uses the Chow test as the best model selection in conducting the data test. In this model, the model that will be compared is the Common Effect Model (CEM), Fixed Effect Model (FEM) and Random Effect Model (REM). Decision-making by looking at its probability value for the cross-section chi-square. If the value of prob. > 0.05 then the selected model is CEM, but if prob. < 0.05, the selected model is FEM. From the results of the regression based on the fixed effect model, the following statistical chi square values were obtained:

Table 4. Chow Test

Effects Test	Statistics	D.F.	Prob.
Cross-section F	3596.718482	(4,23)	0.0000
Cross-section Chi-square	193.205242	4	0.0000

Source: Data processed by Eviews

Based on the results of the Chow test in table 4, the probability value of Cross Section F is 0.0000 and Chi-Square is 0.0000 < from alpha (α) 0.05 so that H₀ is rejected and H_a is accepted. This means that it can be concluded that in this Chow test, the selected model is the Fixed Effect Model (FEM). Since the FEM model is selected, the test proceeds to the Hausman Test.

2. Hausman Test

The Hausman test aims to find out which model is best between the Fixed Effect Model and the Random Effect Model. The decision-making criteria for this test were to compare the Chi-Square probability value and (α) 0.05 with the hypothesis test. From the results of the Random Effect Model regression, the Chi-Square value was obtained as follows:

Table 5. Hausman Test

Test Summary	Chi-Sq. Statistics	Chi-Sq. D.F.	Prob.
Cross-section random	1.749152	2	0.4170

Source: Data processed by Eviews

Based on the results of the Hausman test in table 5, a Random Cross Section probability value of 0.4170 was obtained from (α) 0.05, then H_a was rejected which means accepting REM and rejecting FEM so that the best recommendation from the test results was the Random Effect Model (REM).

3. Lagrange Multiplier Test

Based on the results of the Lagrange Multiplier test in table 6, the Cross Section probability value of $0.0000 < 0.05$ was obtained, H_0 was rejected and H_a was accepted, so that the best model selected from the test results was the Random Effect Model (REM).

Table 6. Lagrange Multiplier Test

	Cross-section	Time	Both
Breusch-Pagan	64.83913 (0.0000)	1.927639 (0.1650)	66.76677 (0.0000)
Honda	8.052275 (0.0000)	-1.388394 (0.9175)	4.712075 (0.0000)
King-Wu	8.052275 (0.0000)	-1.388394 (0.9175)	5.076215 (0.0000)
Standardized Honda	11.47148 (0.0000)	-1.130778 (0.8709)	3.564573 (0.0002)
Standardized King-Wu	11.47148 (0.0000)	-1.130778 (0.8709)	4.085353 (0.0000)
Gourieroux, et al.	-	-	64.83913 (0.0000)

Source: Data processed by Eviews

Based on the results of the Lagrange Multiplier test in table 6, the Cross Section probability value of $0.0000 < 0.05$ was obtained, H_0 was rejected and H_a was accepted, so that the best model selected from the test results was the Random Effect Model (REM).

Residual Diagnosis

1. Multicollinearity Test

This test was carried out to be able to indicate the correlation between independent variables in the regression model. As for being able to predict it, it can be seen that if the correlation between independent variables is large enough, namely 0.85, then it can be concluded that there is a problem of multicollinearity (Rahmah and Juliannisa 2022). This test is used with the purpose of testing whether a regression model has a correlation between independent variables. A good regression model should have no correlation between independent variables or no correlation problems (Qurata Aqyun, 2023).

Table 7. Multicollinearity Test Results

	X1	X2
X1	1.000000	0.760184
X2	0.760184	1.000000

Source: Data processed by Eviews

Based on the test results in table 7, it can be seen that the correlation coefficient of X1 and X2 is $0.760184 < 0.85$, so it can be concluded that it is free of multicollinearity or passes the multicollinearity test.

2. Heteroscedasticity Test

This test was conducted to test whether there was an unevenness of residual variance in one observation with another. One method to find out the problem can be done through the Glejser Test to regress the residual absolute value with the condition that it is minus H0 if p-value per variable < 0.05 , it can be concluded that there is a heteroscedasticity problem (Rahmah & Juliannisa, 2022).

Table 8. Inter-variable Coefficient Results

	Coefficient	Std. Error	t-Statistic	Prob.
C	96.71883	205.8959	0.469746	0.6423
X1	-0.018892	0.178521	-0.105827	0.9165
X2	-1.116813	8.157733	-0.136902	0.8921

Source: Data processed by Eviews

The provision is to subtract H0 if the p-value of each variable < 0.05 , then the conclusion is that there are symptoms of heteroscedasticity. Based on the test results in the table above, it can be seen that the p-value of each variable > 0.05 then H0, so the conclusion is that there are no symptoms of heteroscedasticity.

Regression Test Results

The regression model used in this study is a panel data regression model with a Random Effect Model estimation approach. Based on the calculation using the Eviews 12 program, the following results were obtained:

Table 9. Results of REM Regression Test

Dependent Variable: Y				
Method: Panel EGLS (Cross-section random effects)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1043.239	235.1288	4.436884	0.0001
X1	0.110566	0.204017	0.541946	0.5923
X2	23.37180	9.321761	2.507230	0.0185
Effects Specification			S.D.	Rho
Cross-section random			93.68073	0.9990
Idiosyncratic random			2.919196	0.0010
Weighted Statistics				
Root MSE	2.756497	R-squared		0.675485
Mean dependent var	17.95745	Adjusted R-squared		0.651447
S.D. dependent var	4.921548	S.E. of regression		2.905603
Sum squared resid	227.9484	F-statistic		28.10052
Durbin-Watson stat	0.758282	Prob(F-statistic)		0.000000
Unweighted Statistics				
R-squared	-0.303342	Mean dependent var		1411.700
Sum squared resid	196299.3	Durbin-Watson stat		0.000881

Source: Data processed by Eviews

Table shows the regression test results for the research model using the Random Effect Model (REM) conducted with independent and dependent variables. Based on the regression test results with the REM Model, a panel data linear regression equation is obtained, namely:

$$Y_{it} = 1.043,239 + 0,111 X_{1it} + 23,372X_{1it} + \varepsilon$$

Figure 7. Panel Data Linear Regression Analysis

The following is an analysis of the regression equation

1. Constant (α) = 1.043,239
The constant value indicates that when all independent variables (X and X_2) are zero, the mean value of the dependent variable (Y) is 1.043,239 units.
2. Coefficient of X , (β_1) = 0.111
Every 1 unit increase in variable X_1 will increase variable Y by 0.111 units, assuming all other variables remain constant (*ceteris paribus*).
The relationship between X and Y is positive.
3. Coefficient of X , (β_2) = 23.372
Every 1-unit increase in variable X will increase variable Y by 23.372 units, assuming other variables remain constant (*ceteris paribus*).
The relationship between X and Y is positive and has a greater influence than X_1 .

Statistical Test

This test consists of F test, t test, and coefficient of determination (R^2), with regression estimation using REM as follows:

1. F test

The F test is used for testing independent variables together which is carried out to see the influence of individual independent variables on the dependent variables. To determine whether the independent variable has a significant or no effect on the bound variable, a probability of 5% or 0.05 is used. Here are the results of the F (simultaneous) test:

Table 10. F Test Results

F-count	F Table	Probability (F Statistic)
28.10052	3.354131	0.000000

Source: Data processed by Eviews

Based on the test results in table 10 which shows that the F value is calculated as $28.10052 > F$ of the table is 3.354131 and the sig value. $0.000000 < 0.05$, then H_0 is rejected and H_a is accepted, meaning that the UMP and education variables have an effect on the absorption of labor in Kalimantan.

2. T test

The t test is used to test whether the regression coefficient of an independent variable is significant individually or in groups and to determine the significance of the effect of the independent variable on the dependent variable. The t test results of this study can be seen in Table 11.

Table 11. t-test results

	Coefficient	Std. Error	t-Statistic	Prob.
C	1043.239	235.1288	4.436884	0.0001
X1	0.110566	0.204017	0.541946	0.5923
X2	23.37180	9.321761	2.507230	0.0185

Source: Data processed by Eviews

The influence of independent variables on dependent variables is partially as follows:

1. The results of the t-test on the UMP variable (X1) were obtained with a calculated t-value of $0.541946 < t$ table of 2.048407 and a sig. value of $0.5923 > 0.05$, then H_a was rejected and H_0 was accepted, meaning that the UMP variable had no effect on labor absorption.
2. The results of the t-test on the education variable (X2) were obtained with a calculated t-value of $2.507230 > t$ table of 2.048407 and a sig. value of $0.0185 < 0.05$, then H_a was accepted and H_0 was rejected, meaning that the education variable had an effect on labor absorption.

3. Coefficient of Determination (R²)

The Coefficient of Determination (R^2) indicates that the independent variable can almost completely explain the variation in the dependent variable. The following is the Regression Coefficient (R^2) which can be seen in Table 12.

Table 12. Coefficient of Determination (Adjusted R²)

Root MSE	2.756497	R-squared	0.675485
Mean dependent var	17.95745	Adjusted R-squared	0.651447
S.D. dependent var	4.921548	S.E. of regression	2.905603
Sum squared resid	227.9484	F-statistic	28.10052
Durbin-Watson stat	0.758282	Prob(F-statistic)	0.000000
Unweighted Statistics			
R-squared	-0.303342	Mean dependent var	1411.700
Sum squared resid	196299.3	Durbin-Watson stat	0.000881

Source: Data processed by Eviews

In Table 12, the R-Squared value was 0.675485 or 67.54%. The value of the determination coefficient showed that the independent variable consisting of UMP and education was able to explain the labor absorption variable in Kalimantan by 67.54%, while the remaining 32.46% was explained by other variables that were not included in this research model.

Discussion

1. The Effect of the Provincial Minimum Wage on Labor Absorption

Based on the results of the Random Effect Model conducted in this study, the coefficient value for the minimum wage variable is 0.111 and the t-value is $> t\text{-table}$ ($0.541946 < 2.048407$), so the minimum wage has no effect on labor absorption in the province of Kalimantan in 2019-2024. The results of this study are in line with the research literature which states that the minimum wage does not have a significant effect on labor absorption (Syuli Mamoto, Daisy S.M. Engka, 2023). This is in line with the efficiency wage theory proposed by Mankiw (2013), which states that wages do not have an impact on a decline in labor absorption because higher wages lead to a better quality of life for workers, meaning that employees with higher wages can consume more nutrients and become healthier and more productive. By paying employees higher wages, companies can attract a larger pool of candidates for employment. When the minimum wage increases, it causes labor absorption to decline.

However, the results of this study also contradict other researchers' literature, which explains that an increase in the minimum wage can encourage increased labor absorption because workers will be more motivated to enter the labor market and companies will be encouraged to retain and increase the number of employees. Conversely, if the minimum wage decreases, labor absorption tends to decline due to the low attractiveness of the labor market and the potential lack of interest among workers to work at lower wage levels (Rahayu, 2020).

2. The Effect of Education Level on Labor Absorption

Based on the results of the Random Effect Model conducted in this study, the coefficient value for the education level variable is 23.372 and the t-value is $> t\text{-table}$ ($2.507230 > 2.048407$), indicating that education level has a significant effect on labor absorption in Kalimantan province in 2019-2024. The positive and significant relationship between education level and labor absorption shows that the higher the level of education an individual has completed, the greater the opportunity to be absorbed into the workforce. This is due to the increase in skills, knowledge, and competencies possessed by workers in line with their level of education, enabling them to meet the needs and qualifications of the job market. Conversely, if the education level of the workforce is relatively low, labor absorption also tends to decline due to limitations in competence and competitiveness. These findings are in line with the initial research hypothesis and are supported by human capital theory, which emphasizes that education is a form of human resource investment that can increase productivity, workforce quality, and employment opportunities.

This study is in line with the results of literature research which explains that the level of education has a positive coefficient and affects labor absorption. The higher the level of education completed by individuals, the better the quality of human resources produced. The level of education can be an important indicator in assessing the potential of human resources in a province (Rahayu, 2020). By improving the quality of human resources, work productivity can increase, regional competitiveness can be strengthened, and a significant contribution can be made to the improvement and growth of the economy in a province.

3. The Effect of the Provincial Minimum Wage and Education Level on Labor Absorption

Based on the results of the Random Effect Model conducted in this study, the calculated F value was $28.10052 >$ the table F value of 3.354131 and the probability value was $0.000000 < 0.05$, so minimum wage and education level had a significant effect on labor absorption in Kalimantan province in 2019-2024. The increase in minimum wage and education level, which together have a significant effect on labor absorption, will have a very positive impact on the regional economy as it can increase productivity because the absorbed labor has better motivation and quality. In addition, the unemployment rate can be reduced, thereby improving the overall welfare of the community and strengthening regional competitiveness due to the availability of competent and qualified workers with guaranteed decent wages. These conditions will contribute significantly to economic growth and improve the quality of life of the community (Damayanti, 2024).

Conclusions

Based on the results of panel data regression estimation using the Random Effect Model (REM), this study concludes that provincial minimum wages and education levels simultaneously have a significant effect on labor absorption in Kalimantan Province for the period 2019–2024. Partially, the provincial minimum wage does not have a significant effect on labor absorption, indicating that minimum wage increases do not directly affect the labor market's ability to absorb labor. Meanwhile, the level of education has a positive effect on labor absorption, indicating that the higher the average length of schooling of the population, the greater their chances of obtaining employment. These results are in line with human capital theory, which emphasizes the importance of improving the quality of education in order to increase labor productivity and competitiveness. Overall, this study confirms that minimum wage policies and improvements in the quality of education need to be harmonized in order to expand employment opportunities and promote inclusive and sustainable economic growth in Kalimantan.

References

- Adi, L. (2018). Pertumbuhan Ekonomi Dan Penyerapan Tenaga Kerja Di Pulau Kalimantan. *Develop*, 2(1). <https://doi.org/10.25139/dev.v2i1.958>
- Agustin, E. (2020). Pengaruh Tingkat Pendidikan Dan UMK Terhadap Penyerapan Tenaga Kerja DI Kabupaten Mojokerto Tahun 2014-2018. *Jurnal Inovasi Peneltian*, 1(7). [https://sirusa.bps.go.id/sirusa/index.php/indikator/572#:~:text=Rata-rata Lama Sekolah \(RLS,penduduk dalam menjalani pendidikan formal.&text=Artinya%2C secara rata-rata penduduk,atau hampir menamatkan kelas VIII.](https://sirusa.bps.go.id/sirusa/index.php/indikator/572#:~:text=Rata-rata Lama Sekolah (RLS,penduduk dalam menjalani pendidikan formal.&text=Artinya%2C secara rata-rata penduduk,atau hampir menamatkan kelas VIII.)
- Ariani, Pratomo, D. S., Ekawaty, M., & Kaluge, D. (2024). Absorption of Formal and Informal Sector Workers Through the Minimum Wage: Studies in Indonesia. *Ikonomicheski Izsledvania*, 33(3), 128–143.

- Damayanti, E. (2024). ANALISIS PENGARUH UPAH MINIMUM DAN TINGKAT PENDIDIKAN TERHADAP PENYERAPAN TENAGA KERJA DI PULAU JAWA. 3(4), 1057–1078.
- Julia Dwi Budiasih, & Kiky Asmara. (2024). Pengaruh Pendidikan, Umk, Dan Pdrb Terhadap Penyerapan Tenaga Kerja Di Provinsi Banten Tahun 2012 – 2021. JEMSI (Jurnal Ekonomi, Manajemen, dan Akuntansi), 10(2), 826–836. <https://doi.org/10.35870/jemsi.v10i2.2054>
- Lube, F., Kalangi, J. B., & Tolosang, K. D. (2021). Analisis Pengaruh Upah Minimum Dan Pdrb Terhadap Penyerapan Tenaga Kerja Di Kota Bitung. Jurnal Berkala Ilmiah Efisiensi, 21(03), 25–36.
- M. Bambang, S., Suradi, & Sonhaji. (2016). Faktor-Faktor Yang Mempengaruhi Besaran Upah Minimum Di Jawa Tengah Melalui Suatu Analisis Komparasi (Studi Kasus Kota Semarang Dan Kabupaten Demak). Diponegoro Law Journal, 5(3), 1–13.
- Mukaromah, L., Hanifatuzzahra, Z., Nasrullah, A., Latifah, T. M., Purwaningsih, V. T., & Suparta, I. W. (2023). Pengaruh Indeks Pembangunan Manusia, Tingkat Upah Minimum, Dan Tingkat Pengangguran Terhadap Pertumbuhan Ekonomi Indonesia Tahun 2022. Analisis, 13(2), 228–245. <https://doi.org/10.37478/als.v13i2.2874>
- Pasuria, S., & Triwahyuningtyas, N. (2022). Pengaruh Angkatan Kerja, Pendidikan, Upah Minimum, Dan Produk Domestik Bruto Terhadap Pengangguran Di Indonesia. SIBATIK JOURNAL: Jurnal Ilmiah Bidang Sosial, Ekonomi, Budaya, Teknologi, dan Pendidikan, 1(6), 795–808. <https://doi.org/10.54443/sibatik.v1i6.94>
- Pratomo, D. S., Mahardika, P., & Saputra, A. (2011). 108-242-1-Pb. Journal of Indonesian Applied Economics, 05, 269–284.
- Putri, E., Setyowati, E., & Rosyadi, I. (2022). Pengaruh Produk Domestik Bruto (PDRB), Upah Minimum Kota/ Kabupaten (UMK), dan Indeks Perkembangan Manusia (IPM) Terhadap Penyerapan Tenaga Kerja di Provinsi Jawa Tengah Tahun 2016-2019. Ekonomis: Journal of Economics and Business, 6(2), 651. <https://doi.org/10.33087/ekonomis.v6i2.594>
- Qurata Aqyun, S. S. (2023). Pengaruh PDRB, Tingkat Pendidikan dan Upah Minimum Terhadap Penyerapan Tenaga Kerja di Provinsi Kalimantan Selatan Tahun 2016 – 2020. Nucl. Phys., 13(1), 104–116.
- Rahayu, Y. (2020). PENGARUH UPAH DAN TINGKAT PENDIDIKAN TERHADAP PENYERAPAN TENAGA KERJA DI PROVINSI JAMBI Tahun 2010-2019. Journal Development, 8(2), 114–128. <https://doi.org/10.53978/jd.v8i2.155>
- Rahmah, A. M., & Juliannisa, I. A. (2022). Pengaruh Tingkat Pendidikan, Upah Minimum, Dan PDRB Terhadap Penyerapan Tenaga Kerja Di Kabupate/Kota Provinsi Jawa Barat. Ikraith-Ekonomika, 5(3), 246–254. <https://doi.org/10.37817/ikraith-ekonomika.v5i3.2460>
- Ramadhan, B. A., & Setyowati, E. (2023). Analisis Pengaruh Populasi Penduduk, Upah Minimum, Pertumbuhan Ekonomi, Dan Indeks Pembangunan Manusia Terhadap Tingkat Partisipasi Angkatan Kerja Provinsi Banten Tahun 2017-2021. Primanomics : Jurnal Ekonomi & Bisnis, 21(3), 82–89. <https://doi.org/10.31253/pe.v21i3.2065>

- Riska. (2012). Pengaruh Upah Minimum dan Angka Partisipasi Kasar Terhadap Penyerapan Tenaga Kerja Di Pulau Kalimantan. *Curvanomic*, 1–33.
- Syuli Mamoto, Daisy S.M. Engka, I. P. F. R. (2023). Pengaruh Upah Minimum Provinsi Dan Tingkat Pendidikan Terhadap Penyerapan Tenaga Kerja Di Sulawesi Utara Tahun 2003-2018. *Jurnal Berkala Ilmiah Efisiensi*, 23 No. 8(8), 41–43.
- Wulandari, D., & Woyanti, N. (2023). Pengaruh Pendidikan, Upah Minimum, dan Kesempatan Kerja Sektor Formal Terhadap Pengangguran Terdidik di Provinsi Jawa Barat (2017-2021). *BISECER (Business Economic Entrepreneurship)*, 6(2), 90. <https://doi.org/10.61689/bisecer.v6i2.434>