

The Dualism of the Indonesian Labor Market: Between Investment, Wages, and Education Level

Arjuna Wahyu Permana Ajie¹  , Muhammad Anas²


Ekonomi Pembangunan, Universitas Muhammadiyah Surakarta

Abstract

Labor absorption is a key indicator for assessing an economy's ability to optimally absorb labor and distribute income in order to improve public welfare and reduce poverty rates. This study aims to estimate the effects of education level (average years of schooling), minimum wage, domestic investment (DDI), and foreign investment (FDI) on formal and informal labor absorption in Indonesia from 2019 to 2024 using panel data regression with a Fixed Effects Model (FEM) approach. The regression results in Model 1 indicate that average years of schooling has a positive effect and the minimum wage has a negative effect on formal labor absorption, while domestic investment and foreign investment do not have a significant effect on formal labor absorption. Meanwhile, in Model 2, it was found that average years of schooling has a negative effect, minimum wage and foreign investment have a positive effect, while domestic investment has no significant effect on informal labor absorption. Therefore, the government is expected to formulate policies focused on improving the quality of education and workforce skills, controlling minimum wage increases in a proportionate manner, and encouraging labor-intensive investment to expand employment in the formal sector in Indonesia.

Keywords: *formal labor absorption, informal labor absorption, average years of schooling, minimum wage, domestic investment, foreign investment, Fixed Effects Model*

Copyright (c) 2022 Arjuna Wahyu Permana Ajie

 Corresponding author :

Email Address : b300220178@student.ums.ac.id

INTRODUCTION

The workforce is a key asset in a country's economic development because it serves as the driving force behind production activities. The productivity generated by the workforce adds value to a company and contributes directly to national economic growth. As a key asset in development, the availability of a productive workforce not only drives the economy but also serves as a means for individuals to meet their basic needs. This aligns with the assertion that, in addition to being a factor of production, high labor absorption also plays a crucial role in income distribution aimed at improving public welfare and reducing poverty rates (Tanjung et al., 2024).

However, the rapid and continuous growth in the labor force is not always accompanied by an adequate supply of jobs, which can lead to unemployment. The imbalance between the continuously growing labor force and the labor market's capacity to absorb them results in a portion of the workforce not being optimally absorbed into the productive sector. This situation means that unemployment remains a major challenge for the economy, as it serves as an indicator of human resource wastage that can hinder economic growth (Wijayanti & Mufarrah, 2024).

Table 1
Number of Formal and Informal Workers (Persons) and Open Unemployment Rate (OUR, %) in Indonesia 2019-2024

Year	Number of Workers		OUR
	Formal	Informal	
2019	5.680.683	7.194.844	5,23
2020	5.077.794	7.767.624	7,07
2021	5.314.099	7.790.953	6,49
2022	5.505.223	8.024.448	5,86
2023	5.718.565	8.266.675	5,32
2024	6.082.196	8.593.181	4,91

Source: Central Statistics Agency (BPS), processed

Note: *) The number of formal and informal workers is calculated by multiplying the percentage of formal and informal workers by the number of labor force

Table 1 shows that Indonesia's labor market experienced significant fluctuations in 2020 due to the impact of COVID-19, with the number of formal-sector workers dropping sharply while the unemployment rate surged to 7.07%. This decline in the number of formal-sector workers indicates massive cost-cutting by formal companies, which drove workers to shift to the informal sector to ensure their survival. Although conditions began to improve in 2024 with the unemployment rate dropping to 4.91%, the dominance of informal workers numbering over 8.5 million indicates that labor market absorption in Indonesia remains dominated by jobs with low social security coverage and unstable income (Faruddin & Djamaluddin, 2025).

One of the fundamental factors influencing labor market absorption capacity is the level of education, which is expected to enhance workers' skills and competitiveness, making them more easily absorbed by the labor market. A high level of education reflects more productive human capital, so companies tend to be more interested in recruiting workers with a good educational background. Increasing the average length of schooling is considered a strategic step to equip the workforce with the skills needed by industry (Budiasih & Asmara, 2024).

Table 2
Average Years of Schooling (AYS, Years) in Indonesia 2019-2024

Year	AYS
2019	8,34
2020	8,48
2021	8,54
2022	8,69
2023	8,77
2024	8,85

Source: BPS

The data in Table 2 shows a steady annual increase in the Average Years of Schooling (AYS) in Indonesia, from 8.34 years in 2019 to 8.85 years in 2024. However, this increase has not yet been able to guarantee ease of labor absorption in the formal sector. When viewed by educational level, the figure of 8.85 years indicates that, on average, the Indonesian population has only completed elementary school. This low level of

educational attainment is a major obstacle, given that most job openings in the formal sector currently require a minimum qualification of a high school or vocational high school diploma. Consequently, the majority of workers with only an elementary school diploma struggle to meet corporate hiring standards and are forced into the informal sector. On the other hand, unemployment remains high due to a mismatch between the skills taught in educational institutions and the actual needs of the industrial world (Rohadin & Nurcahyo, 2020). This highlights the importance of aligning the education sector with the needs of the labor market.

In addition to education, the minimum wage is also a key factor that can influence labor absorption. The minimum wage aims to ensure a decent standard of living for workers; however, from an employer's perspective, significant wage increases lead to higher operational costs for companies, which may ultimately cause them to reduce their demand for labor and pursue cost-saving measures (Wijayanti & Mufarrah, 2024).

Table 3
Average Minimum Wage (MW, Rupiah) in Indonesia 2019-2024

Year	MW
2019	2.455.662
2020	2.672.371
2021	2.687.723
2022	2.729.463
2023	2.923.309
2024	3.125.999

Source: BPS

Table 3 shows that the average minimum wage in Indonesia has risen over the past five years, reaching Rp3.12 million in 2024. This increase has significantly impacted the labor market, where higher minimum wages have been found to negatively affect employment in the formal sector but positively impact the growth of the workforce in the informal sector (Faruddin & Djamaluddin, 2025). This phenomenon occurs because companies in the formal sector tend to cut costs by limiting hiring or adopting technology when minimum wages rise. As a result, workers not absorbed by the formal sector are forced to shift to the informal sector to survive, given that the informal sector is far more accessible for labor absorption and employers are free to set wages based on mutual agreement without having to follow government wage standards (Faruddin & Djamaluddin, 2025).

Investment, whether through domestic investment (DDI) or foreign investment (FDI), is a key driver of job creation. An increase in investment flows is expected to expand production capacity and create demand for new labor. However, investment does not always have a positive correlation with labor absorption if the investment capital is allocated for the use of advanced machinery that can actually replace human labor (Rohadin & Nurcahyo, 2020).

Table 4
Data on Domestic Investment (DDI, Billions IDR) and Foreign Investment (FDI, Millions USD) in Indonesia 2019-2024

Year	Investment	
	FDI	DDI
2019	28.209	386.498
2020	28.666	413.536
2021	31.093	447.064
2022	45.605	552.769
2023	50.268	674.923
2024	60.014	814.018

Source: BPS

Table 4 shows a trend of rapidly increasing investment, reaching USD 60 billion in foreign direct investment (FDI) and IDR 814.02 billion in domestic investment (DDI) by 2024. However, the main challenge of this investment is to ensure that the investment flow is labor-intensive so that it can absorb a large number of local workers. If incoming investments are more capital-intensive and tend to rely on high technology, then the increase in investment value cannot have a significant impact on reducing the national unemployment rate (Wijayanti & Mufarrah, 2024).

Based on the above discussion, it is evident that, overall, labor absorption in Indonesia is complexly influenced by the interaction between human capital quality, wage increases, and investment dynamics. This study aims to estimate the effects of education, wages, and investment on formal and informal labor absorption in Indonesia during the 2019-2024 period.

LITERATURE REVIEW

Iksan et al. (2020) used panel data regression with the Fixed Effects Model (FEM) to estimate the effects of the provincial minimum wage, investment, and provincial GRDP on labor absorption in Indonesia from 2013 to 2017. The results of this study indicate that provincial minimum wages and GRDP have a positive effect on labor absorption, whereas investment has no effect on labor absorption. The minimum wage was also found to have a positive effect on labor absorption, consistent with the findings of Rahmah & Julianisa (2020), who stated that education levels and the minimum wage had a positive effect on labor absorption in districts/cities in West Java Province from 2015 to 2020, while GRDP had no effect.

Furthermore, Asmara et al. (2024) also found results consistent with those of Rahmah & Julianisa (2020), indicating that the provincial minimum wage had a positive effect on labor absorption in Indonesia from 2015 to 2020. Furthermore, the control variables of education and regional GDP also have a positive effect on labor absorption. Meanwhile, Ruslan & Pratomo (2025) found that GDP does not affect labor absorption, but the minimum wage and average years of schooling have a positive effect on labor absorption in districts/cities in East Java Province from 2017 to 2020. The finding that average years of schooling has a positive effect was also reported by Rohadin & Nurcahyo (2020), who found that average years of schooling had a positive effect and

investment had a negative effect on labor absorption in Cirebon Regency from 2013 to 2018.

However, Wijayanti & Mufarrah (2024) obtained different results, finding that GRDP and investment had a positive effect, while the minimum wage had a negative effect, and the average years of schooling had no effect on labor absorption in Central Java from 2018 to 2022. These findings are consistent with those of Faza & Khusaini (2024), who found that the minimum wage had a negative effect and age had a positive effect, while average years of schooling had no effect on labor absorption in East Java from 2017 to 2021.

Pratama & Anis (2022) used panel data regression with the FEM approach to examine the effects of domestic investment (DDI), foreign investment (FDI), and average years of schooling on labor absorption in Indonesia from 2010 to 2019. They found that DDI, FDI, and average years of schooling have a positive effect on labor absorption. This finding supports the findings of Rachman et al. (2022), who stated that DDI and FDI have a positive effect on sectoral labor absorption in Southeast Sulawesi Province from 2013 to 2020.

However, Sulaiman et al. (2026) found different results, showing that FDI had no effect on labor absorption, whereas the human development index and domestic investment had a positive effect on labor absorption in the Sulawesi region from 2016 to 2024. Meanwhile, Putra et al. (2022) found that FDI had a negative effect and the minimum wage had a positive effect, while domestic investment had no effect on labor absorption in Indonesia from 1990 to 2019. This finding that domestic investment has no effect is consistent with the findings of Kawasaki (2024), who found that provincial minimum wages, FDI, and GDP have a positive effect, while domestic investment has no effect on labor absorption in Central Java Province from 2017 to 2022.

Desanta & Aisyah (2025) used panel data regression with the FEM approach to examine the effects of the open unemployment rate (OUR), average years of schooling (AYS), provincial GRDP, regional minimum wage (RMW), and poverty rate on labor absorption in the informal sector in Indonesia from 2019 to 2023. It was found that the open unemployment rate, poverty rate, and minimum wage have a positive effect on labor absorption, while GRDP has a negative effect. Meanwhile, average years of schooling has no effect on informal labor absorption. This finding of a positive effect of the minimum wage aligns with the findings of Prima et al. (2026), who found that the provincial minimum wage and GRDP have a positive effect on labor absorption, while investment has no effect on labor absorption on the island of Sulawesi from 2012 to 2021.

Furthermore, the findings of Faruddin & Djamaluddin (2025) also indicate that the minimum wage had a positive effect on informal employment and a negative effect on formal employment in Indonesia from 2010 to 2023. However, Na'im & Anas (2025) found different results, where average years of schooling had a negative effect and wages had a positive effect on labor absorption in the formal sector in Indonesia from 2018 to 2023, whereas for labor absorption in the informal sector, average years of schooling had a positive effect and wages had a negative effect.

This study differs from previous studies in three main aspects. First, this study uses two dependent variables simultaneously namely, the number of formal workers and the number of informal workers, thereby enabling a direct comparison of the impact of each independent variable on both labor sectors within a single estimation framework. Second, this study combines four independent variables simultaneously

into a single model: educational attainment (average years of schooling), minimum wage, domestic investment (DDI), and foreign investment (FDI). This combination has not been extensively tested in the Indonesian labor literature, particularly when distinguishing between the formal and informal sectors as dependent variables. Third, this study uses panel data from 34 Indonesian provinces for the years 2019–2024, covering the period affected by the COVID-19 pandemic and the post-pandemic recovery, thereby providing a more relevant picture of the dynamics of formal and informal employment in Indonesia under fluctuating economic conditions.

RESEARCH AND METHODOLOGY

This study is a quantitative study using secondary data obtained from the Central Statistics Agency (BPS) for the years 2019–2024. The data used in this study is a combination of cross-sectional and time-series data. In this study, the cross-sectional data covers 34 provinces in Indonesia, while the time-series data spans the years 2019–2024. The econometric equations used to estimate the effects of education level, minimum wage, and domestic and foreign investment on the number of formal and informal workers are as follows:

$$\text{LogFW} = \beta_0 + \beta_1 \text{AYS}_{it} + \beta_2 \text{LogMW}_{it} + \beta_3 \text{LogDDI}_{it} + \beta_4 \text{LogFDI}_{it} + \varepsilon_{it} \quad (1)$$

$$\text{LogIW} = \gamma_0 + \gamma_1 \text{AYS}_{it} + \gamma_2 \text{LogMW}_{it} + \gamma_3 \text{LogDDI}_{it} + \gamma_4 \text{LogFDI}_{it} + v_{it} \quad (2)$$

Where:

<i>FW</i>	: Number of formal workers (people)
<i>IW</i>	: Number of informal workers (people)
β_0	: Constants in Equation (1)
γ_0	: Constants in Equation (2)
$\beta_1, \beta_2, \beta_3, \beta_4$: Coefficients in Equation (1)
$\gamma_1, \gamma_2, \gamma_3, \gamma_4$: Coefficients in Equation (2)
<i>AYS</i>	: Average years of schooling (years)
<i>MW</i>	: Minimum wage (rupiah)
<i>DDI</i>	: Domestic investment (billion rupiah)
<i>FDI</i>	: Foreign investment (million USD)
<i>i</i>	: Cross-section (34 provinces in Indonesia)
<i>t</i>	: Time series (2019–2024)
ε	: Residual of Equation (1)
<i>v</i>	: Residual of Equation (2)

Panel data regression uses three estimation methods: the Common Effects Model (CEM), the Fixed Effects Model (FEM), and the Random Effects Model (REM). The best model is selected using the Chow test and the Hausman test. The best model will be used to estimate the effect of the independent variables on the dependent variable.

The model existence test or *F*-test is conducted to determine whether the independent variables collectively influence the dependent variable. In Equations (1) and (2), H_0 in the *F*-test states that $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$, and $\gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = 0$ which means that education level, minimum wage, and domestic and foreign investment collectively do not affect formal and informal employment in Indonesia. H_0 is rejected if the probability of the *F*-statistic is $< \alpha$.

A *t*-test must be conducted to determine whether the independent variables individually influence the dependent variable. H_0 states that β_i and $\gamma_i = 0$ ($i = 1-4$), meaning that educational level, minimum wage, and domestic and foreign investment individually do not affect formal and informal labor absorption. The H_A states that $\beta_2 < 0$, meaning that the minimum wage has a negative effect on formal labor absorption, while $\beta_j > 0$ ($j = 1, 3, 4$), meaning that education level and domestic and foreign investment individually have a positive effect on formal labor absorption. H_A indicates that $\gamma_1 < 0$, meaning that education level has a negative effect on informal labor absorption, and there are $\gamma_k > 0$ ($k = 2, 3, 4$), meaning that minimum wage and domestic and foreign investment have a positive effect on informal labor absorption.

RESULT AND DISCUSSION

Estimations in the panel data regression model were conducted using three approaches: the Common Effects Model (CEM), the Fixed Effects Model (FEM), and the Random Effects Model (REM). These three approaches were used to capture the dynamics of the relationships between variables in the panel data structure, taking into account both time-series and cross-sectional aspects simultaneously. The estimation results from these three models are presented in Table 5.

Table 5
Regression Results: Model 1 and Model 2

Variable	Coefficient Model 1			Coefficient Model 2		
	CEM	FEM	REM	CEM	FEM	REM
C	11,890	15,917	14,791	17,911	5,336	6,652
AYS	0,158	0,281	0,240	-0,107	-0,075	-0,078
Log(MW)	0,113	-0,202	-0,106	-0,058	0,747	0,659
Log(DDI)	0,070	0,015	0,023	-0,024	0,007	0,010
Log(FDI)	-0,015	-0,006	-0,009	-0,003	0,012	0,010
Chow Test	Prob. <i>F</i> = 0,000			Prob. <i>F</i> = 0,000		
Hausman Test	Prob. χ^2 = 0,019			Prob. χ^2 = 0,000		

After obtaining the regression results for CEM, FEM, and REM, two tests must be conducted to determine which model is best suited for estimating the panel data. First, the Chow test is performed to determine the best model between CEM and FEM.

Second, the Hausman test is performed to determine the best model between REM and FEM.

The decision rule in the Chow test is that if the probability of the F -statistic is $< \alpha$, then H_0 is rejected, meaning that FEM is the best model to use rather than CEM. Meanwhile, the decision rule in the Hausman test is that if the probability of χ^2 is $< \alpha$, then H_0 is rejected, so FEM is the more appropriate model to use than REM.

The results of the Chow test for both models, as shown in Table 5, indicate that the probability value of the cross-section F statistic is 0.000, which means it is less than $\alpha = 0.05$. Thus, H_0 is rejected, and the appropriate model for both is the Fixed Effects Model (FEM).

Furthermore, based on the results of the Hausman test for both models, the probability values of χ^2 are 0.019 and 0.000, respectively, which means they are less than $\alpha = 0.05$. Therefore, H_0 is rejected, and the FEM is established as the best model to use for interpreting Model 1 and Model 2.

Table 6
Regression Results: FEM Model 1 and Model 2

Variable	Coefficient Model 1	Coefficient Model 2
C	5,336 (0,000)*	15,917 (0,000)*
AYS	0,281 (0,000)*	-0,075 (0,000)*
$Log(MW)$	-0,202 (0,078)**	0,745 (0,000)*
$Log(DDI)$	0,023 (0,229)	0,007 (0,244)
$Log(FDI)$	-0,009 (0,437)	0,012 (0,005)*
R^2	0,943	0,972
Prob.F	0,000	0,000

Note: The numbers in parentheses represent the probability of the t -statistic

* Significant at α 0.05

** Significant at α 0.1

The next test is the F -test, which aims to determine the combined effect of all independent variables on the dependent variable. Table 6 shows that Models 1 and 2 have an F -statistic probability value of 0.000 (less than $\alpha = 0.01$), so H_0 is rejected. This means that, simultaneously, average years of schooling, minimum wage, and domestic and foreign investment have a significant effect on both formal and informal labor absorption.

The coefficient of determination (R^2) in Model 1 is 0.943; this indicates that 94.3% of the variation in formal labor absorption can be explained by variations in average years of schooling, minimum wage, and domestic and foreign investment. Meanwhile, the remaining 5.7% is explained by other factors outside the model. In Model 2, an R^2 value of 0.972 indicates that 97.2% of the variation in informal labor absorption can be

explained by variations in average years of schooling, minimum wage, and domestic and foreign investment, while the remaining 2.8% is influenced by other factors outside the model.

Next, a *t*-test was conducted to measure the partial effect of each independent variable on the dependent variable. The test was performed by comparing the probability value of the *t*-statistic with the significance level *a*. The results of the *t*-test for both models using FEM are summarized in Table 7.

Table 7
Results of the *t*-Test

Variable	Model 1			Model 2		
	Coefficient	Prob. <i>t</i>	Conclusion	Coefficient	Prob. <i>t</i>	Conclusion
<i>AYS</i>	0,281	0,000	β_1 significant at <i>a</i> 0,01	-0,075	0,000	β_1 significant at <i>a</i> 0,01
<i>LogMW</i>	-0,202	0,078	β_2 significant at <i>a</i> 0,1	0,747	0,000	β_2 significant at <i>a</i> 0,1
<i>LogDDI</i>	0,015	0,229	β_3 not significant	0,007	0,244	β_3 not significant
<i>LogFDI</i>	-0,006	0,437	β_4 not significant	0,012	0,005	β_4 significant at <i>a</i> 0,1

Table 7 shows that in Model 1, average years of schooling has a positive effect on formal employment, while the minimum wage has a negative effect; however, domestic and foreign investment do not have a significant effect on formal employment. In Model 2, the minimum wage and foreign investment have a positive effect on informal employment, while average years of schooling has a negative effect. Meanwhile, domestic investment does not have a significant effect on informal labor absorption.

More specifically, in Model 1, the coefficient for average years of schooling (*AYS*) of 0.281 indicates that a one-year increase in average years of schooling is predicted to increase formal labor absorption by 28.1%. The coefficient for the minimum wage (*MW*) of -0.202 indicates that a one percent increase in the minimum wage is expected to reduce formal employment by 0.20%.

Model 2 yielded results that contrasted with those of Model 1. In Model 2, the coefficient for average years of schooling (*AYS*) was negative, at -0.075; this indicates that a one-year increase in average years of schooling is predicted to reduce informal labor absorption by 7.5%. The minimum wage (*MW*) coefficient of 0.747 indicates that a one-percent increase in the minimum wage is estimated to increase informal labor absorption by 0.75%. Furthermore, the foreign investment (*FDI*) coefficient of 0.012 indicates that a one-percent increase in foreign investment is estimated to increase informal labor absorption by 0.01%.

Based on the regression results, it was found that the average years of schooling (AYS) has a positive and significant effect on formal labor market participation in Indonesia from 2019 to 2024, meaning that the longer a person stays in school, the greater their chances of being absorbed into the formal sector. Higher education equips workers with the knowledge and skills needed to meet the requirements of the formal job market. This finding aligns with Rahmah & Julianisa (2020), who state that rising levels of public education directly contribute to improved human resource quality, thereby making the workforce more competitive and capable of competing in the formal sector, which has stricter qualification standards compared to the informal sector. The results of this study also support the findings of Pratama & Anis (2022), which show that individuals with higher levels of education tend to be able to optimize their knowledge to improve performance, which ultimately helps drive job creation in the formal sector, as well as the findings of Ruslan & Pratomo (2025), which indicate that the higher the average length of education attained by workers, the greater their chances of securing employment in the formal sector.

Nevertheless, Na'im & Anas (2025) note that a high level of education does not always correlate directly with increased formal employment, due to a mismatch between the qualifications of the educated workforce and the availability of suitable formal jobs, so that when available formal jobs are limited, highly educated individuals tend to reject jobs they consider not commensurate with their expectations, whether in terms of income or job status.

Conversely, in Model 2, it was found that average years of schooling has a negative effect on employment in the informal sector, meaning that the higher a person's level of education, the less likely they are to work in the informal sector. This is understandable because workers with higher education generally possess qualifications that meet the standards of the formal sector, so they tend to seek formal jobs that better align with their educational background and do not choose the informal sector as their primary option. This finding aligns with Faza & Khusaini (2024), who state that the informal sector fundamentally does not consider education a significant qualification factor, as there are no specific requirements regarding educational level or work experience to enter this sector; thus, higher education does not provide meaningful added value in the informal sector. This situation is certainly different from the formal sector, which faces stiffer competition because it requires more specific qualifications, such as the highest level of education attained and relevant work experience; consequently, the higher a person's education level, the greater their tendency to leave the informal sector and transition to the formal sector, which better aligns with their competencies.

However, these findings do not support those of Na'im & Anas (2025), which indicate that some highly educated workers actually choose or are driven to work in the informal sector, either as freelancers or as selfemployed entrepreneurs. This phenomenon reflects a mismatch between the competencies possessed by graduates of formal education and the actual needs of the labor market; consequently, when the formal job market cannot accommodate all available educated workers, the informal sector becomes an unavoidable alternative.

Furthermore, the regression of the minimum wage in Model 1 indicates a significant negative effect on formal employment, meaning that every increase in the minimum

wage tends to reduce the number of workers employed in the formal sector. This is understandable because when the minimum wage is raised, firms must bear a greater burden of production costs; thus, as a rational response, firms tend to reduce the number of workers employed to maintain operational efficiency and business sustainability. This situation ultimately leads to a narrowing of employment opportunities in the formal sector, as explained by Wijayanti & Mufarrah (2024). In line with this, Faruddin & Djamaluddin (2025) state that the pressure resulting from minimum wage increases drives formal companies to reduce their workforce, particularly for low-skilled workers who are considered less capable of providing added value commensurate with the wages they must be paid, so that many workers are ultimately forced to shift from the formal sector to the informal sector.

However, some previous studies, such as those by Iksan et al. (2020), Rahmah & Julianisa (2020), and Asmara et al. (2024), have actually found a positive effect of the minimum wage on labor absorption, arguing that wage increases can drive demand for more skilled and productive labor, while simultaneously boosting consumer purchasing power, which in turn stimulates increased corporate production and ultimately expands labor absorption in the formal sector.

The opposite result was found in Model 2, where the minimum wage actually had a positive effect on employment in the informal sector, meaning that an increase in the minimum wage does not always encourage workers to enter the formal sector but rather increases the number of workers employed in the informal sector. This phenomenon can be explained by the findings of Desanta & Aisyah (2025), who revealed that the rising burden of labor costs due to minimum wage increases prompts many business operators, particularly SMEs, to avoid the regulatory obligations inherent in the formal sector. In other words, minimum wage increases indirectly expand the scope of the informal sector as an alternative for workers who cannot be accommodated in the formal sector. However, this finding differs from the results of the study by Na'im & Anas (2025), who instead found a negative relationship: when wages in the informal sector rise, informal business operators tend to reduce the number of workers they employ as a means of cutting production costs, resulting in a decline in labor absorption in this sector.

In the subsequent regression results, it was found that domestic investment in both models did not have a significant effect on employment, either in the formal or informal sectors. This finding can be understood through the explanation by Prima et al. (2026), who state that most of the investment flowing into Indonesia is capital-intensive, particularly in the processing and manufacturing sectors, which rely more on the use of advanced technology and machinery than on human labor; thus, even though the value of investment continues to rise, its impact on labor absorption remains insignificant. This is reinforced by the findings of Putra et al. (2022), who also found similar results, where current investment activities tend to prioritize the use of capital-based machinery in their production processes, so that domestic investment does not necessarily correlate directly with an increase in the number of workers absorbed.

However, this finding is inconsistent with the results of a study by Pratama & Anis (2022), who argue that investment activities essentially open up opportunities for the public to develop economic activities and create new jobs, which in turn can increase national income and welfare. In line with this, Rachman et al. (2022) also found that investments that drive the broader expansion of production activities will ultimately require more labor to support company operations and meet increased market demand.

Furthermore, the results of the foreign investment regression in Model 1 indicate that foreign investment does not have a significant effect on formal employment. This finding can be understood through the explanation provided by Sulaiman et al. (2026), who found that foreign investment tends to be capital-intensive and oriented toward specific sectors such as mining, energy, and high-tech industries, and thus does not directly drive an increase in labor utilization. Additionally, skill mismatches between the workforce and the needs of industries funded by foreign investment are also suspected to be a factor hindering the optimization of labor absorption. In other words, incoming investment is dominated by capital-intensive characteristics rather than labor-intensive ones, so its impact on labor absorption is very limited. In line with this, Rohadin & Nurcahyo (2020) also found similar results, where investments that do not consider local labor factors and do not adopt a labor-intensive approach have the potential to create new problems that could disrupt the sustainability of development in a region or the country as a whole. However, this finding is inconsistent with the results of a study by Pratama & Anis (2022), who argue that investment essentially plays a role in facilitating the creation of new capital goods that directly absorb additional factors of production; thus, investment should be able to create new jobs and expand employment opportunities for the available labor force.

Differences in results were found in Model 2, where foreign investment actually had a positive effect on informal employment. This finding can be explained by the perspective of Rachman et al. (2022), who state that foreign direct investment (FDI) is essentially a form of expenditure to purchase production goods to increase the capacity to produce goods and services in an economy; thus, when foreign investment enters and is used for productive activities, a region's potential output increases, and long-term economic growth also rises. Thus, foreign investment plays a crucial role in determining the level of output and income in a region, which indirectly helps create job opportunities, including in the informal sector, which has long served as the main pillar of the labor force. This is supported by the findings of Kawasaki (2024), which also reached similar conclusions: the economy's capacity to produce goods and services can be enhanced through the inflow of foreign investment. This is because, in addition to contributing to economic expansion and increased local revenue, foreign investment also facilitates the transfer of new knowledge and technology from developed to developing countries, thereby helping to expand employment across various sectors, including the informal sector. However, these findings do not align with the views of Sulaiman et al. (2026), who explain that capital-intensive foreign investment concentrated in the mining, energy, and high-tech industries prioritizes the use of machinery over labor, thereby significantly limiting its impact on labor absorption.

CONCLUSION

Labor absorption is a key indicator for assessing an economy's ability to optimally absorb labor and distribute income in order to improve public welfare and reduce poverty rates. The objective of this study is to determine the direction and magnitude of the influence of education level (average years of schooling), minimum wage, domestic investment (DDI), and foreign investment (FDI) on the number of formal and informal workers in Indonesia from 2019 to 2024. To achieve this research objective, a panel data regression was conducted using the Fixed Effects Model (FEM) as the selected model based on the Chow Test and the Hausman Test.

The regression results indicate that in Model 1 (formal labor force), average years of schooling has a positive effect and the minimum wage has a negative effect on formal labor force absorption, while domestic investment and foreign investment do not have a significant effect on formal labor force absorption in Indonesia from 2019 to 2024. Meanwhile, in Model 2 (informal labor), average years of schooling has a negative effect, minimum wage and foreign investment have a positive effect, while domestic investment has no significant effect on informal labor absorption in Indonesia from 2019 to 2024.

Based on the research findings, the government is expected to prioritize policies aimed at improving the quality of the workforce by expanding access to and improving the quality of education, as well as aligning educational curricula with industry needs so that more workers can meet the qualifications required by the formal sector. In addition, minimum wage levels should be set proportionally, taking into account companies' financial capacity, so as not to lead to job cuts in the formal sector. The government also needs to encourage labor-intensive investment, particularly foreign investment with the potential to create new jobs, and optimize business facilitation policies so that domestic investment can contribute to expanding labor absorption in both the formal and informal sectors.

REFERENCES

- Asmara, G. D., Saleh, R., & Asmara, G. J. (2024). Pengaruh upah minimum terhadap penyerapan tenaga kerja di Indonesia tahun 2015-2020. *Journal of Advances in Accounting, Economics, and Management*, 1(3), 1-11. <https://doi.org/10.47134/aaem.v1i3.218>
- Budiasih, J. D., & Asmara, K. (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>
- Desanta, A. P., & Aisyah, S. (2025). Exploring the employment of the informal sector in indonesia and the factors that influence it. *Majapahit Journal of Islamic Finance and Management (MJIFM)*, 5(1), 398-420. <https://doi.org/10.31538/mjifm.v5i1.383>
- Faruddin, H. E., & Djamaluddin, S. (2025). Pengaruh upah minimum provinsi terhadap pekerja formal dan informal di Indonesia. *Jurnal LOCUS: Penelitian Dan Pengabdian*, 4(6), 2898-2917. <https://doi.org/10.58344/locus.v4i6.4122>
- Faza, L. D. R., & Khusaini, M. (2024). Pengaruh upah minimum, tingkat pendidikan dan usia terhadap penyerapan tenaga kerja di Jawa Timur tahun 2017-2021. *Journal of Development Economic and Social Studies*, 3(4), 1154-1165. <https://doi.org/10.21776/jdess.2024.03.4.14>
- Iksan, S. A. N., Arifin, Z., & Suliswanto, M. S. W. (2020). Pengaruh upah minimum provinsi, investasi, dan PDRB terhadap penyerapan tenaga kerja di Indonesia. *Jurnal Ilmu Ekonomi (Jie)*, 4(1), 42-55. <https://doi.org/10.22219/jie.v4i1.9482>
- Kawasaki, P. (2024). Analisis penyerapan tenaga kerja di Provinsi Jawa Tengah. *Economics, Finance, and Business Review*, 1(1), 47-58. <https://doi.org/10.20885/efbr.vol1.iss1.art5>
- Na'im, A., & Anas, M. (2025). Pengaruh modal manusia dan upah terhadap penyerapan tenaga kerja di Indonesia. *Sukowaskita: Media Informasi Penelitian Dan Pengembangan*, 1(2), 75-90. <https://jurnal.sukoharjokab.go.id/sukowaskita/article/view/19>
- Pratama, I. A., & Anis, A. (2022). Pengaruh penanaman modal asing dan penanaman modal dalam negeri terhadap penyerapan tenaga kerja di Kabupaten Berau 2005-2019. *JKEP: Jurnal Kajian Ekonomi Dan Pembangunan*, 4(3), 37-42. <https://ejournal.unp.ac.id/students/index.php/epb/article/view/13766>
- Prima, Julianisa, I. A., & Amintara, D. N. (2026). Pengaruh investasi, tingkat upah minimum, dan PDRB terhadap penyerapan tenaga kerja di Pulau Sulawesi. *Jurnal Ikraith-Ekonomika*, 9(1), 1460-1470. <https://doi.org/10.37817/ikraith-ekonomika.v9i1.6422>
- Putra, F. W., Ariani, N., & Nofrian, F. (2022). Analisis relevansi penanaman modal asing, modal

- dalam negeri dan upah minimum terhadap penyerapan tenaga kerja di Indonesia 1990-2019. *Jurnal Indonesia Sosial Sains*, 3(4), 708–719. <https://doi.org/10.36418/jiss.v3i4.571>
- Rachman, A., Muthalib, A. A., Rosnawintang, & Harafah, L. (2022). Pengaruh penanaman modal dalam negeri dan penanaman modal asing terhadap penyerapan tenaga kerja sektoral di Provinsi Sulawesi Tenggara. *Jurnal Progres Ekonomi Pembangunan (JPEP)*, 7(2), 156–164. <https://doi.org/10.33772/jpep.v7i2.22541>
- Rahmah, A. M., & Julianisa, I. A. (2020). Pengaruh tingkat pendidikan, upah minimum, dan PDRB terhadap penyerapan tenaga kerja di kabupaten/kota provinsi jawa barat. *Jurnal Ikraith-Ekonomika*, 5(3), 246–254. <https://doi.org/10.37817/ikraith-ekonomika.v5i3.2460>
- Rohadin, & Nurcahyo, A. (2020). Pengaruh investasi dan rata-rata lama sekolah terhadap penyerapan tenaga kerja di Kabupaten Cirebon tahun 2013-2018. *Jurnal Cendekia Jaya*, 2(2), 114–132. <https://doi.org/10.47685/cendekia-jaya.v2i2.77>
- Ruslan, W. D. A. P., & Pratomo, D. S. (2025). The effect of GRDP, minimum wages, and education on workforce absorption in regencies and cities in East Java. *JDESS (Journal of Development Economic and Social Studies)*, 4(1), 91–109. <https://doi.org/10.21776/jdess.2025.04.1.08>
- Sulaiman, M. M., Tope, P., Parinding, K. A., Pembonan, L., Ichwan, M., & Mubayyin, M. A. (2026). The effect of human development index, domestic investment (PMDN), and foreign direct investment (PMA) on labor absorption in the Sulawesi Region, 2016-2024. *International Journal of Health, Economics, and Social Sciences (IJHESS)*, 8(2), 1606–1612. <https://jurnal.unismuhpalu.ac.id/index.php/IJHESS/article/view/10920>
- Tanjung, P. S., Sambodo, H., & Rosiana, M. (2024). Faktor - faktor yang memengaruhi kesempatan kerja di Indonesia. *EkuiInomi: Jurnal Ekonomi Pembangunan*, 6(2), 150–158. <https://doi.org/10.36985/r818n720>
- Wijayanti, D., & Mufarrah, R. (2024). Analisis dampak PDRB, investasi, rata-rata lama sekolah dan upah minimum terhadap kesempatan kerja: Sebuah studi empiris di Jawa Tengah tahun 2018-2022. *Jurnal Aplikasi Bisnis*, 21(1), 553–560. <https://doi.org/10.20885/jabis.vol21.iss1.art6>