

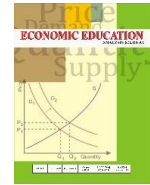


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Analysis of Factors Affecting Employment Absorption in Micro and Small-Scale Industries Across 34 Provinces in Indonesia

Muhammad Iqbal Mohar Harahap✉, Fitrawaty, Muhammad Fitri Rahmadana

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Magister of Economics, Faculty of Economics, State University of Medan, (Medan) (Indonesia)

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Abstract

The micro and small-scale industry (MSI) sector constitutes a key driver of employment in Indonesia; however, its labor absorption capacity varies across regions. This study examines the determinants of employment absorption in MSI across 34 provinces using panel data regression. The model includes production value, investment, wages, and the number of business units as explanatory variables. The results indicate that investment and the number of business units have a positive and statistically significant effect on employment absorption, while wages show a negative and significant relationship. In contrast, production value is not statistically significant. These findings suggest that output expansion in the MSI sector is not consistently associated with increased labor absorption. However, this condition should be interpreted cautiously and does not necessarily imply structural jobless growth. From a theoretical perspective, the findings reveal a partial inconsistency with conventional labor demand theory, particularly regarding the expected positive relationship between output and labor demand. This may reflect structural characteristics of MSI, such as low productivity and heterogeneous production conditions. Policy implications should remain aligned with the empirical results, emphasizing investment promotion and business expansion to improve employment absorption.

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✉Correspondance Address:

Email: iqbalmohar@unimed.ac.id

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INTRODUCTION

In recent decades, the manufacturing sector has played a central role in driving economic growth in both developed and developing countries. Its importance lies not only in its contribution to output, but also in its capacity to generate structural transformation, increase productivity, and create linkages with other sectors that stimulate broader economic activity. As highlighted by Wan et al. (2022), industrialization through manufacturing remains a key pathway for achieving sustainable growth and improving welfare in developing economies.

However, this role is becoming increasingly complex due to structural changes in technology and labor markets. Advances in automation and digitalization have improved production efficiency, yet they simultaneously alter the relationship between output and labor demand. Rather than automatically increasing employment, higher productivity may reduce the need for labor, particularly in routine and labor-intensive activities. Güven (2024) emphasizes that labor-saving technological change can suppress domestic labor demand when not accompanied by sufficient expansion in

output or export demand. Similarly, OECD (2025) notes that productivity gains allow firms to produce more with fewer workers, while Cruz (2023) shows that productivity improvements can both stimulate and substitute labor. These findings suggest that the linkage between industrial growth and employment is no longer linear, but conditional and context-dependent.

This complexity cannot be adequately explained by a single theoretical framework. labor demand theory Borjas (2016) predicts that labor demand is influenced by wages and output, where higher wages tend to reduce employment. Meanwhile, production theory, particularly the Cobb-Douglas framework, emphasizes the role of inputs such as labor, capital, and technology in determining output (Baley & Veldkamp, 2025). At the same time, endogenous growth perspectives underline the importance of productivity and innovation. However, these theories may not fully capture the dynamics of micro and small-scale industries, where production structures are less efficient, capital is limited, and technological adoption is uneven across regions. As a result, the expected positive relationship between output and labor absorption may weaken or even fail to materialize.

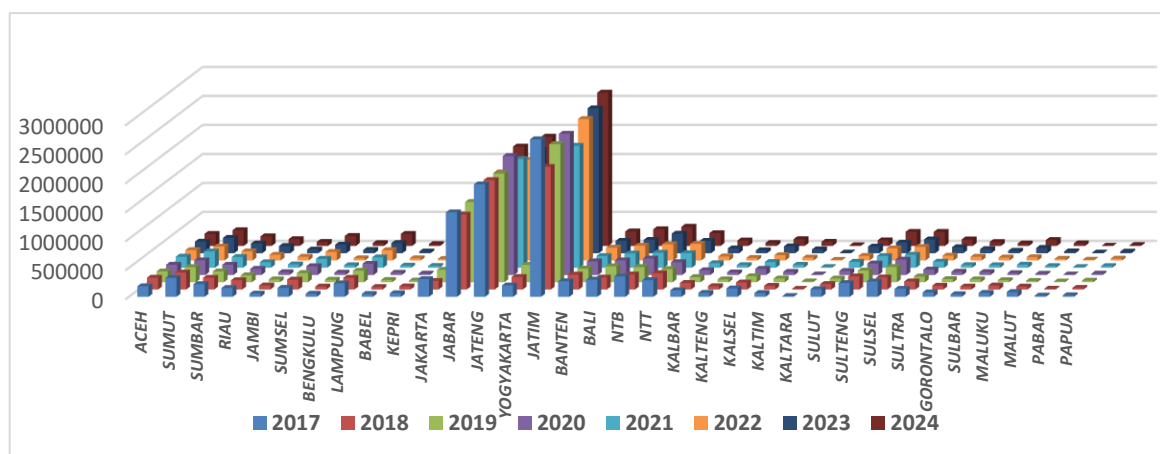


Figure 1. Development of the Number of Micro and Small Scale Industrial Workers in Indonesia in 2017-2024

Source: Central Statistical Agency, 2026

In Indonesia, this issue becomes particularly relevant in the context of micro and small-scale industries (MSI), which are often regarded as labor-intensive and central to employment creation. Despite their significant role in absorbing labor (Central Statistics Agency, 2023); (Central Statistics Agency, 2024) the capacity of MSI to generate employment is not uniform across provinces. These disparities indicate that labor absorption is shaped not only by general labor market conditions but also by structural characteristics of the industrial sector at the regional level. Factors such as limited capital, varying productivity levels, and differences in industrial structure may influence how MSI respond to changes in wages, not always follow standard theoretical predictions due to informality and resource constraints.

Despite extensive discussion in previous studies, the relationship between production, wages, and employment remains empirically inconsistent. Some studies find that output growth increases labor demand, while others highlight the role of efficiency gains and technological

Therefore, this study aims to analyze the determinants of employment absorption in MSI across Indonesian provinces by focusing on wages, production value, investment, and the number of business units. By using panel data, this research seeks to explain not only whether these factors influence employment, but also why their effects may differ across regions. In doing so, the study contributes to a better understanding of the changing

production, and investment.

From a theoretical perspective, several variables are expected to influence labor absorption. Wages, for instance, play a dual role. From the demand side, higher wages increase production costs and may lead firms to reduce labor usage (Mankiw, 2021). From the supply side, labor decisions reflect a trade-off between work and leisure, where individuals respond to wage incentives (Becker, 2024). In the Indonesian context, wages are institutionally defined under Law No. 6 of the Year (2023) in conjunction with Law No. 13 of 2003, emphasizing their formal role in employment relationships. However, in micro and small industries, wage adjustments may

substitution in weakening this relationship. These inconsistencies are rarely explained in terms of structural differences across sectors and regions, particularly in the MSI context. Consequently, there remains an unresolved issue regarding how key economic variables interact to determine employment absorption in micro and small industries.

relationship between industrial growth and labor absorption, particularly in the context of structural transformation and regional inequality in developing economies. Based on the above narrative and reviewed from the labor demand side, it indicates that wages have a negative influence on labor absorption. However, not all UMR increases are followed by a decrease in labor absorption. This can be seen from the following Figure 2:

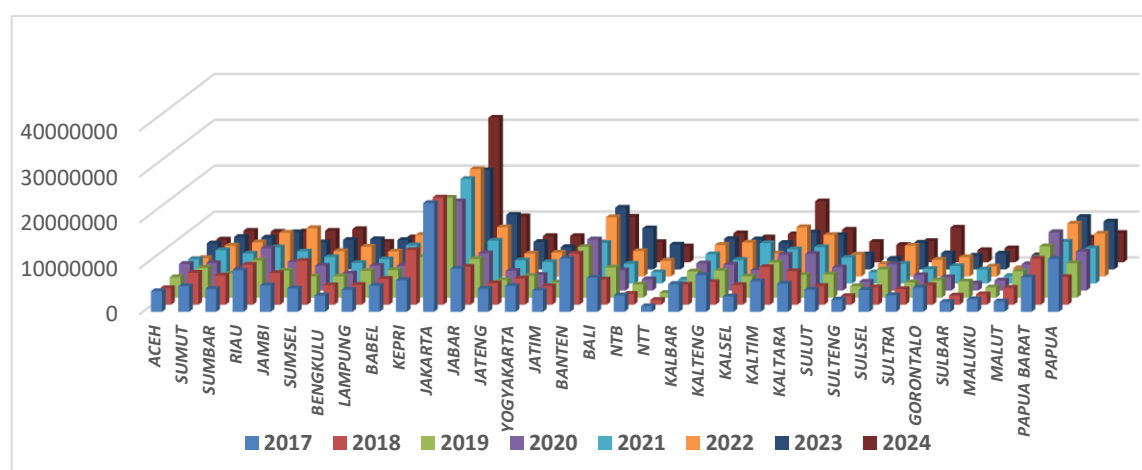


Figure 2. Development of Micro and Small Scale Industrial Labor Wages in Indonesia in 2017-2024
Source: Central Statistical Agency, 2026

The development of wages in micro and small-scale industries (MSI) across provinces reflects significant structural heterogeneity in labor markets and industrial capacity. Variations in wage levels are closely related to differences in productivity, cost structures, and regional economic conditions. More importantly, the empirical pattern suggests that wage dynamics do not consistently move in line with changes in employment, indicating that the relationship between wages and labor absorption is neither linear nor solely determined by conventional labor market mechanisms. In several cases, rising wages coexist with increasing employment, suggesting that wage increases may also signal expanding economic activity rather than purely higher labor costs.

From a theoretical perspective, this condition challenges the conventional prediction of labor demand theory, which posits that higher wages lead firms to reduce labor demand due to increased production costs (Mankiw, 2021). While this argument remains valid in a competitive and efficiency-driven production structure, it may not fully apply to MSI, where labor markets are often informal, production processes are less capital-intensive, and firms are highly

adaptive. On the supply side, labor decisions are influenced by income incentives and the trade-off between work and leisure (Becker, 2024), but in small-scale industries, these dynamics are frequently shaped by necessity-driven employment rather than purely rational optimization. This implies that wage adjustments in MSI may reflect broader economic expansion or structural constraints, rather than acting solely as a cost factor that suppresses employment.

Empirically, previous studies provide inconsistent findings regarding the effect of wages on labor absorption. Research by Lyu et al. (2025) finds a negative and significant relationship, consistent with theoretical expectations. In contrast, Ningrum & Nurhayati (2021), Diah (2021) and Soca & Woyanti (2021) report a positive and significant effect, suggesting that higher wages may coincide with increased labor demand in certain contexts. These conflicting results indicate that the wage employment relationship is highly context-dependent, influenced by differences in industrial structure, regional development, and methodological approaches. Therefore, rather than merely identifying a “gap research,” the key unresolved issue lies in explaining why such divergent relationships emerge,

particularly within the MSI sector across regions in Indonesia.

Beyond wages, the capacity of firms to generate economic value also plays a crucial role in shaping labor demand. Added value reflects the increase in economic worth resulting from production processes such as transformation, transportation, and storage (Fina & Syahril, 2023). From a labor demand perspective, higher added value may indicate business expansion and increased production capacity, which can stimulate labor absorption. However, this relationship is not unconditional. As highlighted by Romer (1990), increases in added value driven by innovation can promote industrial expansion and job creation, yet when such increases stem from technological efficiency, they may reduce the need for labor. Similarly,

productivity improvements can encourage firms to expand output, but they may also lead to labor-saving adjustments Kornieieva et al. (2022).

These arguments suggest that the relationship between added value and labor absorption is inherently ambiguous. While increases in added value are often associated with higher employment, this outcome depends on whether growth is driven by expansionary or efficiency-enhancing mechanisms. Consequently, understanding labor absorption in MSI requires a more nuanced analytical approach that considers the interaction between wages, productivity, and structural characteristics of the industry, rather than relying on simplified theoretical expectations. This can be observed, one of which is in Prov. West Sumatra with the following view:

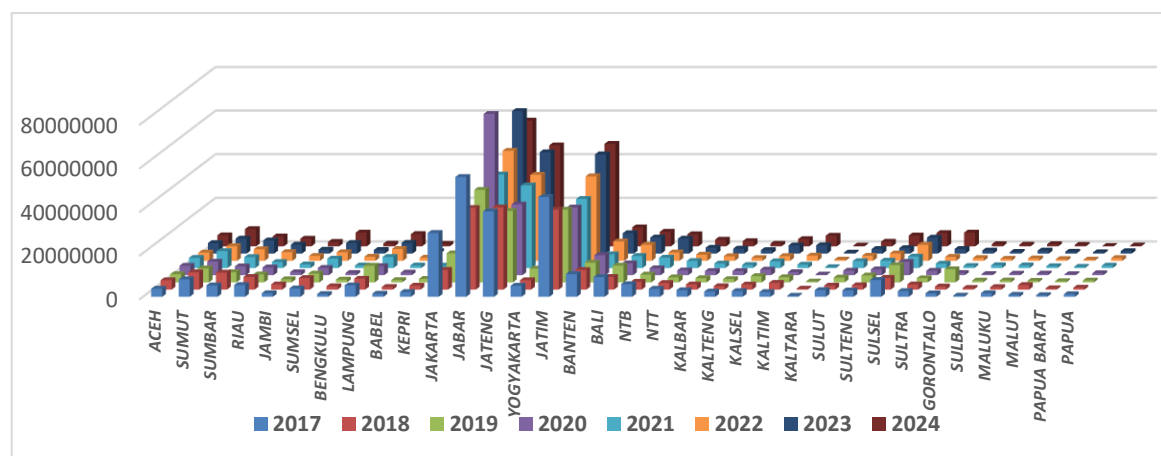


Figure 3. Development of Added Value of Micro and Small Scale Industrial Workforce in Indonesia in 2017-2024

Source: Central Statistical Agency, 2026

The development of added value in micro and small-scale industries (MSI) reflects substantial heterogeneity in production capacity, efficiency levels, and the ability of firms to generate higher economic output across regions. From an industrial economic perspective, increases in added value are generally associated with the expansion of production

activities, which in turn are expected to stimulate labor absorption. However, empirical patterns indicate that this relationship is not always linear. In many cases, growth in added value may arise from efficiency improvements, technological adjustments, or optimization of production processes, which do not necessarily require proportional increases

in labor input.

This condition highlights an important limitation in conventional expectations that link higher economic output directly to increased labor demand. While added value growth can reflect business expansion, it may also indicate structural changes in production that are more capital- or technology-intensive. As a result, the effect of added value on labor absorption becomes conditional on the underlying source of growth. When driven by expansionary mechanisms, such as increased production scale or market demand, added value tends to encourage job creation. Conversely, when driven by efficiency gains or technological adoption, it may reduce labor intensity, thereby weakening its impact on employment. This argument is consistent with Romer (1990), who emphasizes that innovation-driven growth can simultaneously generate expansion and labor substitution effects, as well as Kornieieva et al. (2022), who highlight the dual role of productivity improvements in shaping labor demand.

Empirical findings on the relationship between added value and labor absorption also remain inconclusive. Rashid (2022) finds that added value has a positive and significant effect on employment, supporting the expansion hypothesis. In contrast, Lithuania (2023) reports no significant effect, indicating that increased economic value does not always translate into higher labor demand. This ambiguity is further supported by Szymczak (2024), who shows that participation in Global Value Chains (GVCs) produces mixed effects on employment, depending on industrial structure, technological intensity, and the distribution of value across production

networks. These inconsistencies suggest that the relationship between added value and labor absorption is highly context-dependent and cannot be generalized without considering structural characteristics of the MSI sector.

In addition to added value, the dynamics of industrial output growth represent another key factor influencing labor demand. Production value growth reflects the expansion of total output generated by the industrial sector through the utilization of production factors such as labor and capital (Lehmann & Zarges, 2025). From the perspective of endogenous growth theory, technological progress and human capital accumulation play a central role in driving productivity and employment Tarumingkeng (2024). However, similar to added value, the impact of output growth on labor absorption depends on the nature of that growth. When output expansion is driven by labor-intensive activities, employment is likely to increase. In contrast, when growth is supported by capital deepening or technological efficiency, the resulting labor demand may be limited.

Therefore, while increases in industrial production value are often theoretically associated with higher labor absorption, this relationship should not be assumed to hold universally. Instead, it is necessary to examine empirically whether output growth in MSI is accompanied by proportional increases in labor demand, or whether it reflects structural transformations that weaken the linkage between production expansion and employment. This can be seen from the following Figure 4:

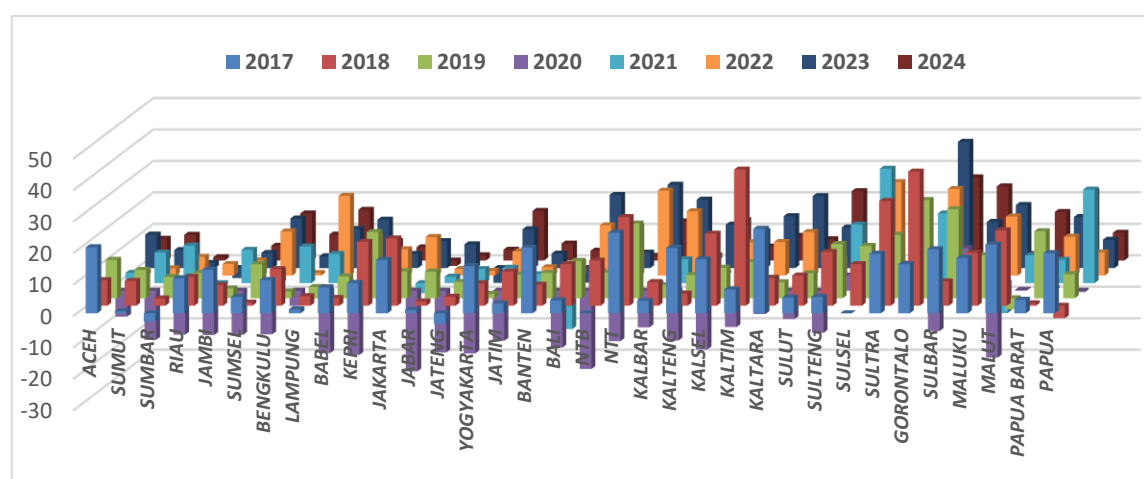


Figure 4. Development of Micro and Small Scale Industrial Production Value Growth in Indonesia in 2017-2024

Source: Central Statistical Agency, 2026

Based on Figure 4, the development of the growth of the production value of micro and small industries (SMEs) in Indonesia during the 2017-2024 period shows very volatile dynamics between provinces. These variations reflect the sensitivity of the IMK sector to changes in economic conditions, business adaptation capacity, and differences in industrial structures in each region. Theoretically, the increase in production value should drive labor demand through the expansion of the scale of the business. However, in practice, the relationship does not always take place proportionally, especially when output growth is achieved through the efficiency of the production process and the utilization of technology.

The most obvious turmoil occurred in 2020, when the majority of provinces experienced a contraction in production growth as a result of the pandemic. DKI Jakarta recorded the deepest decline of -25.64 percent, followed by Bali at -24.89 percent, and Central Java at -19.93 percent. However, in the same period, some regions still showed relative resilience, such as West Sulawesi which continued to grow by 13.50 percent. This condition confirms that the impact of the crisis is not uniform, but depends on the

regional economic structure and the flexibility of the business sector in adjusting its operational models.

In the recovery phase, a number of provinces showed a significant surge in growth. Gorontalo is the region with the most outstanding performance, with growth reaching 42.65 percent in 2018 and again recording 40.12 percent in 2023. Meanwhile, South Sulawesi experienced a surge of 36.36 percent in 2021, which shows the acceleration of post-pandemic production expansion. However, this increase in production growth is not always followed by an increase in the labor force in equal proportions. This phenomenon indicates that most SMEs are able to increase output through digital transformation, the use of business applications, and operational efficiency without the need to significantly increase the number of workers. These findings are in line with Savitri & Riofita (2025) which emphasized that the acceleration of technological adaptation during the pandemic allows business actors to increase productivity even though labor absorption is relatively limited. Thus, the growth of industrial production value in the IMK sector does not solely reflect the expansion of employment opportunities,

but also changes in production patterns towards a more efficient and technology-based business model.

It turns out that in addition to the data gap, there are other problems, namely *Gap Research* between the value of industrial production and the absorption of labor. Research that examines the value of industrial production on labor absorption has been researched before, such as Soca & Woyanti (2021) which concludes that the value of industrial production has a positive and significant influence on labor absorption. However, this is contrary to the results of the research Ningrum & Nurhayati (2021), Nugrahaeni & Handayani (2021), and Dewi & Syaifullah (2022) which actually states that the value of industrial production has no effect on the absorption of labor. Of course, this gap research is an interesting study to further examine the value of industrial production on the absorption of micro and small-scale industrial labor in all provinces in Indonesia.

In contrast to previous research which generally focused on specific regions or large-scale industrial sectors, this study analyzed the influence of wages, added value, and production value growth on labor absorption in micro and small industries in all Indonesian provinces during the period 2017-2024 using a panel data approach. This approach allows the identification of variations between regions as well as dynamics between times, thus providing a more comprehensive picture of the determinants of IMK labor absorption in Indonesia.

METHOD

This study employs a quantitative approach using panel data regression to analyze the determinants of labor

absorption in micro and small industries (MSI) across provinces in Indonesia. The use of panel data is particularly appropriate in this context as it allows for the simultaneous examination of cross-sectional (inter-provincial) variation and time-series dynamics over the 2017–2024 period. Compared to pure cross-sectional or time-series approaches, panel data regression provides several advantages, including the ability to control for unobserved heterogeneity across provinces and to capture temporal adjustments in labor absorption behavior.

The dataset consists of secondary data obtained from the Central Statistics Agency, covering 34 provinces over eight years, resulting in 272 balanced panel observations. The dependent variable is the number of MSI workers (measured in persons). The independent variables include: (1) labor wages, measured in rupiah; (2) industrial added value, measured in rupiah; and (3) production value growth, expressed as a percentage. All monetary variables are expressed in nominal terms based on available official data. To reduce scale disparities across provinces and to enable elasticity interpretation, selected variables are transformed into natural logarithmic form, except for production growth which remains in percentage form.

The empirical model is specified as follows:

$$JTKIMK = \beta_0 + \beta_1 UTKIMK + \beta_2 NTIMK + \beta_3 PPIMK \dots \dots \dots (1)$$

$$JTKIMK_{it} = \beta_0 + \beta_1 \text{Log}UTKIMK_{it} + \beta_2 \text{NLog}NTIMK_{it} + \beta_3 PPIMK_{it} \dots \dots \dots (2)$$

Where:

JTKIMK= Total Micro and Small Industry Workforce (Soul)

LOGUTKIMK = Wages of Micro

and Small Industry Workers (Rupiah)

LOGNTIMK = Value Added of
Micro and Small Industries (Rupiah)

PPIMK = Micro and Small
Industrial Production Growth (Percent)

ε = *Stochastic Term Error*

β_0 = Constant

β_1 = Labor Wage

Coefficient

β_2 = Industrial Added

Value Coefficient

β_3 = Production Value

Growth Coefficient

Model selection is conducted using the Chow test, Hausman test, and Lagrange Multiplier test to determine the most appropriate specification among the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). These procedures ensure that both individual heterogeneity and stochastic assumptions are properly addressed.

To ensure the reliability of the estimates, a series of diagnostic tests are conducted. Multicollinearity is examined using the Variance Inflation Factor (VIF). In addition, panel-specific diagnostic tests are applied, including tests for heteroscedasticity, autocorrelation (serial correlation), and cross-sectional dependence, which are critical in provincial panel datasets. To address potential heteroscedasticity and autocorrelation, the model is estimated using robust standard errors, which are more appropriate than conventional methods such as the Glejser test in panel

data contexts.

Hypothesis testing is conducted using the t-test for partial effects and the F-test for joint significance, with a significance level of 5 percent. The goodness-of-fit of the model is evaluated using the adjusted coefficient of determination (Adjusted R²). Finally, this study acknowledges the potential issue of endogeneity, particularly the possibility of reverse causality between wages and labor absorption. While this study does not explicitly employ instrumental variable techniques, this limitation is recognized and discussed in the interpretation of results.

RESULTS AND DISCUSSION

In order to provide an overview of the characteristics of each variable studied, descriptive statistical analysis was applied. This analysis includes data center measures such as averages (*red*) and *median*, the size of the spread such as the standard deviation along with the maximum and minimum values, as well as the form of data distribution determined by the slope coefficient (*Skewness*) and shrinkage (*Kurtosis*). The purpose of descriptive statistics is to understand the patterns and distributions of data as a first step before conducting more complex inferential analyses (Gujarati & Porter, 2021). All descriptive statistical results for all variables in this study are presented in Table 1.

Table 1. Descriptive Statistical Test Results

	JTKIMK	UTKIMK	NTIMK	PPIMK
Red	287690,7	6280875	7102318	7,31
Median	120304,0	5662678	3047111	7,00
Maximum	2716163	31526758	73981692	43,30
Minimum	3297,00	684343,4	223950,0	-25,64
Std. Dev.	530764,1	3991172	12220883	11,48
Skewness	3,05	2,63	3,00	-0,04

Kurtosis	11,31	13,48	11,75	3,90
Jarque-Bera	1206,46	1560,74	1277,10	9,27
Probability	0,00	0,00	0,00	0,00
Sum	78251882	1,71	1,93	1989,05
Sum Sq. Dev.	7,63	4,32	4,05	35720,78
Observations	272	272	272	272

Source: Research data, 2026

Based on the results of descriptive statistics in Table 1, all research variables had a total of 272 observations. The IMK workforce variable (JTKIMK) shows an average value of 287,690.7 people, with a range between 3,297 and 2,716,163 people. The labor wage variable (UTKIMK) has an average of 6,280,875, with a minimum value of 684,343.4 and a maximum of 31,526,758. Meanwhile, the added value of IMK (NTIMK) was recorded to have an average of 7,102,318, with a range of 223,950 to 73,981,692. The production growth variable (PPIMK) has an average of 7.31 percent, with a minimum value of -25.64 percent and a maximum value of 43.30 percent. The wide range of data for each variable shows heterogeneity between provinces and observation periods.

In terms of distribution, most variables have a positive skewness value, which indicates that the data distribution tends to be skewed to the right. The kurtosis value that is above 3 in all variables indicates a leptokurtic distribution, which has a more pointed distribution peak than the normal distribution. The results of the *Jarque-Bera* test showed a probability below 0.05 for all variables, so statistically the data was not normally distributed. However, in the regression analysis of panel data with a large number of observations, this condition does not constitute a substantive constraint to the validity of the model estimates.

Table 2. Best Model Selection Results

Testing Stage	Compared Models	Statistical Value	Probability	Selected Models
Chow Test	Common Effect vs Fixed Effect	Chi-square = 220.93	0,00	Fixed Effect
Hausman Test	Random Effect vs Fixed Effect	Chi-square = 156.00	0,00	Fixed Effect

Source: Research data, 2026

The results of the panel model test show that the best model used in this study is the *Fixed Effect Model* (FEM). Classical assumption testing is carried out through multicollinearity and heteroscedasticity tests. The results of the

multicollinearity test showed that the entire correlation coefficient between independent variables was below 0.9 so that the model was declared free from multicollinearity problems.

Table 3. Multicollinearity Test Results

	LOG(UTKIMK)	LOG(NTIMK)	PPIMKIMK
LOG(UTKIMK)	1	0,19	-0,15
LOG(NTIMK)	0,19	1	-0,18

PPIMK	-0,15	-0,18	1
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Source: Research data, 2026

Meanwhile, the heteroscedasticity model does not experience test through residual graphs showed a heteroscedasticity. stable residual spread and did not form a specific pattern. This indicates that the

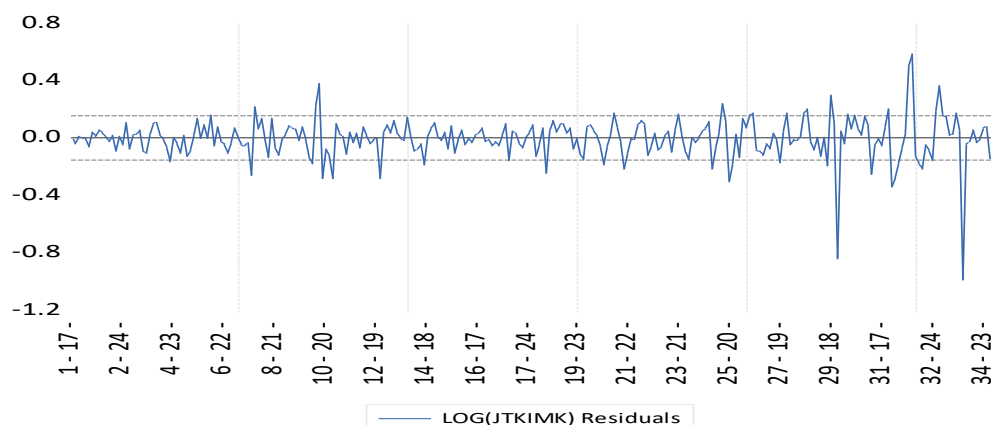


Figure 5. Heteroscedasticity Test Results
Source: Research data, 2026

Thus, the research model has met the classical assumptions required in panel data regression analysis, especially related to multicollinearity and heteroscedasticity. With the fulfillment of these assumptions,

the model is considered valid and suitable for further analysis, so that the results of the estimates obtained can be interpreted appropriately in explaining the relationship between research variables.

Table 4. FEM Model Hypothesis Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9,76	0,77	12,53	0,00
LOG(UTKIMK)	-0,36	0,05	-7,15	0,00
LOG(NTIMK)	0,50	0,04	12,01	0,00
PPIMK	0,00	0,00	0,95	0,34
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0,98	Mean dependent var		11,69
Adjusted R-squared	0,98	S.D. dependent var		1,23
S.E. of regression	0,15	Akaike info criterion		-0,78
Sum squared resid	5,510	Schwarz criterion		-0,29
Log likelihood	144,34	Hannan-Quinn crister.		-0,59
F-statistic	483,25	Durbin-Watson stat		1,68
Prob(F-statistic)	0,00			

Source: Research data, 2026

$$\begin{aligned} \text{Log}(JTKIMK)_{it} = & 9,76 - \\ & 0,36 \text{Log}(UTKIMK)_{it} + \\ & 0,50 \text{Log}(NTIMK)_{it} + \\ & 0,0008 \text{Log}(PPIMK)_{it} \dots\dots\dots \\ & \dots\dots\dots (1) \end{aligned}$$

Based on the results of the panel data regression estimation, an overview of the direction and magnitude of the influence of each independent variable on the absorption of IMK labor is obtained as follows:

1. The regression results showed that a constant of 9.76 indicated the rate of absorption of IMK labor when all

independent variables were considered fixed.

2. The labor wage variable has a coefficient of -0.36, which means that a 1 percent wage increase will reduce labor absorption by 0.36 percent.
3. On the other hand, industrial added value has a coefficient of 0.50, so an increase of 1 percent will increase labor absorption by 0.50 percent.
4. Meanwhile, production growth has a coefficient of 0.08, which shows a very small positive influence on labor absorption.

Table 5. Cross Section Fixed Effects-Individual Effect

No	Province	Effect
1	Aceh	0,26
2	North Sumatra	0,48
3	West Sumatra	0,21
4	Riau	0,05
5	Jambi	-0,32
6	South Sumatra	0,14
7	Bengkulu	-0,55
8	Lampung	0,22
9	Bangka Belitung Province	-0,56
10	Riau Province	-0,61
11	Dki Jakarta	0,32
12	West Java	1,29
13	Central Java	1,45
14	In Yogyakarta	0,44
15	East Java	1,62
16	Banten	0,43
17	Bali	0,39
18	West Nusa Tenggara	0,52
19	East Nusa Tenggara	0,14
20	West Kalimantan	-0,07
21	Central Kalimantan	-0,45
22	South Kalimantan	-0,02
23	East Kalimantan	-0,39
24	North Kalimantan	-1,18
25	North Sulawesi	-0,16
26	Central Sulawesi	0,30
27	South Sulawesi	0,31
28	Southeast Sulawesi	-0,10

No	Province	Effect
29	Gorontalo	-0,42
30	West Sulawesi	-0,50
31	Maluku	-0,55
32	North Maluku	-0,67
33	West Papua	-1,27
34	Papua	-0,74

Source: Research data, 2026

Based on the *Fixed Effect Model* estimates, each province has a different interception value, which reflects the region's specific characteristics in influencing the absorption of IMK labor. These differences show that although the variables of labor wages, industrial value-added, and production growth have the same direction of influence, the structural conditions of each province still contribute differently to the rate of labor absorption.

In general, the results of the estimates show the variation in effects between provinces as follows:

1. *The highest effect* is owned by East Java Province with a value of 1.62
2. *The lowest effect* was owned by West Papua Province with a value of -1.27
3. Model intercept range is about 8.49 to 11.38

These findings reveal that there is an imbalance in the absorption capacity of IMK workers between regions in Indonesia. East Java is the province with the best performance because it has a large, diverse, and integrated micro and small industry base with a wide supply chain. This condition encourages the creation of high and sustainable jobs. West Papua showed the lowest performance due to limited number of business units, small industrial scale, and infrastructure constraints, access to capital, and market integration. Thus, the effectiveness of IMK labor absorption is not only determined by macroeconomic variables, but also greatly influenced by structural conditions and industrial capacity in each province.

Hypothesis tests show strong results both partially and simultaneously.

1. Labor wages have a t-value of $-7.15 > t$ table 1.65 with a probability of $0.00 < 0.05$, so that it has a negative and significant effect on the absorption of IMK labor.
2. The added value of IMK has a calculated t value of $12.01 > t$ table 1.65 with a probability of $0.00 < 0.05$, so it has a positive and significant effect.
3. IMK production growth has a t-value of $0.95 < t$ table 1.65 with a probability of $0.34 > 0.05$, so it has a positive but insignificant effect.

Simultaneously, F was obtained as a calculation of $483.25 > F$ as a table of 2.63 with a probability of $0.00 < 0.05$, which means that all independent variables together had a significant effect on the absorption of IMK labor. An *Adjusted R²* value of 0.98 indicates that the model is able to explain 98.46% of the variation in IMK labor absorption, while the remaining 1.54% is influenced by other factors outside the study.

The empirical results indicate a statistically significant negative association between wages in micro and small industries (MSIs) and labor absorption. This finding suggests that, within the observed data, higher wage levels tend to be accompanied by lower levels of employment in the MSI sector. Rather than implying a strictly causal relationship, this pattern reflects the cost-sensitive nature of micro and small firms, which generally operate under tight

financial constraints. In such conditions, increases in labor costs may encourage firms to adjust their labor demand through hiring restraint, workforce rationalization, or substitution toward more efficient production methods. This interpretation is consistent with the neoclassical labor demand framework, where firms adjust employment based on the comparison between wages and the value of the marginal product of labor (VMPL).

However, the observed relationship should not be interpreted solely through a cost-minimization perspective. Wage dynamics may also capture broader structural factors, including regional labor market conditions, productivity differentials, and institutional wage-setting mechanisms. In this context, the negative association may partly reflect heterogeneity across provinces rather than a uniform behavioral response of firms. Empirical evidence supports this nuanced interpretation. Wati & Juanda (2024) find a significant relationship between wages and employment in Indonesia's manufacturing sector using panel data, while Lauter (2024) shows that labor-intensive industries in developing countries are particularly sensitive to wage increases, often responding through partial technological substitution. At the firm level, Abate & Sheferaw (2023) document a negative correlation between wages and labor demand in competitive markets. Conversely, findings by Senuk (2024) at the provincial level and Syafitri et al. (2024) highlight that wage increases may also improve worker welfare, indicating the presence of policy trade-offs between employment quantity and job quality. These mixed results suggest that wage effects on labor absorption are context-dependent and mediated by productivity, institutional arrangements, and sectoral characteristics.

The second key finding shows that industrial added value has a positive and statistically significant association with

labor absorption. This result indicates that provinces with higher value-added generation in the MSI sector tend to exhibit greater employment capacity. From an economic perspective, this relationship may reflect the role of value creation in expanding business scale and market reach. Firms that are able to enhance the value of their products through innovation, differentiation, or improved production processes are more likely to experience revenue growth, which can support the expansion of production activities and, consequently, labor demand.

Nevertheless, this relationship should not be interpreted as purely linear. Increases in value added may also arise from efficiency improvements, technological upgrading, or capital deepening, which do not necessarily translate into proportional job creation. Therefore, the positive association observed in this study likely reflects a combination of expansion effects and structural characteristics of the MSI sector, which remains relatively labor-intensive compared to large-scale industries. This interpretation aligns with Athukorala & Patunru (2022), who demonstrate that increases in domestic value-added exports contribute to employment growth in Indonesian manufacturing, particularly through integration into global value chains (GVCs). Similarly, Esquivias et al. (2023) highlight that participation of SMEs in GVCs can simultaneously enhance value creation and labor absorption, despite structural constraints. These findings suggest that value-added growth can support employment, especially when it is driven by market expansion rather than purely efficiency-enhancing technological change.

In contrast, the effect of production value growth on labor absorption is found to be statistically insignificant. This result indicates that increases in output do not

necessarily correspond to proportional increases in employment within the MSI sector. One possible explanation lies in the changing nature of production processes, where firms increasingly rely on efficiency improvements, better utilization of existing labor, and incremental technological adoption to expand output. In such cases, production growth may be achieved without substantial increases in labor input.

This finding is consistent with Pramusinto & Daerobi (2020), who document a negative relationship between efficiency improvements and labor absorption in Indonesia's manufacturing sector. It also resonates with broader evidence on technological change and labor demand. Autor et al. (2024) show that automation can increase productivity while simultaneously reducing labor intensity at the sectoral level, particularly for low-skilled workers. Cross-country evidence further suggests that technological adoption tends to shift labor demand toward more skilled workers, while limiting the expansion of total employment. Within this context, the insignificance of production growth may reflect a transitional dynamic in which output expansion is increasingly decoupled from labor absorption. However, given the observational nature of the data, this result should be interpreted cautiously and not as definitive evidence of structural "jobless growth," but rather as an indication of evolving production patterns in the MSI sector.

Taken together, the three explanatory variables wages, added value, and production growth jointly contribute to explaining variations in labor absorption across provinces. The high adjusted R^2 suggests that the model captures a substantial proportion of the observed variation, although this should not be interpreted as proof of causal completeness. Instead, it indicates that the selected variables are relevant correlates of

labor absorption within the MSI context.

Among these variables, added value emerges as the most consistent positive correlate, suggesting that strategies focused on enhancing product quality, innovation, and market expansion may be more effective in supporting employment than relying solely on output growth. This finding is consistent with Nurillaev & Hiwatari (2025), who show that high-growth firms in developing countries play a significant role in job creation, particularly when growth is driven by innovation. Similarly, Izquierdo (2024) finds that firms engaging in product upgrading exhibit higher net employment creation compared to those relying on conventional output expansion. These results reinforce the importance of structural transformation toward higher value-added activities in promoting sustainable employment growth.

The Fixed Effect estimation further reveals substantial heterogeneity across provinces, indicating that regional structural factors play an important role in shaping labor absorption dynamics. Provinces such as East Java exhibit stronger employment capacity, while regions such as West Papua show relatively weaker outcomes. These differences likely reflect variations in industrial concentration, infrastructure availability, access to capital, labor quality, and integration into supply chains. This interpretation is supported by Mendez & Siregar (2023), who identify significant spatial disparities and persistence in regional labor market outcomes in Indonesia.

Overall, the findings highlight that labor absorption in the MSI sector is not determined by a single factor, but rather by the interaction between cost conditions, value creation capacity, technological change, and regional structural characteristics. Therefore, policy approaches aimed at increasing employment should not focus solely on

wage regulation or output expansion, but also consider strategies that enhance productivity, support value-added activities, and address regional disparities in economic development.

CONCLUSION

This study examines the determinants of labor absorption in the micro and small manufacturing industry (IMK) sector in Indonesia using panel data regression. The empirical findings indicate that several explanatory variables have a statistically significant relationship with labor absorption, although the magnitude and direction of these effects vary across variables. In particular, industrial value added shows a positive association with labor absorption, suggesting that increases in production capacity and economic output tend to be followed by higher labor demand within the IMK sector.

However, these findings should be interpreted with caution. The model employed in this study includes a limited set of explanatory variables, and therefore does not fully capture the broader structural, institutional, and regional factors that may influence labor absorption dynamics. Consequently, it would be inappropriate to interpret any single variable, including industrial value added, as the sole or dominant driver of IMK sector development.

From an academic perspective, this study contributes to the literature by providing empirical evidence on the relationship between selected economic variables and labor absorption in Indonesia's micro and small industries, using a panel data approach. The findings highlight the importance of considering production-related indicators when analyzing employment dynamics in small-scale industrial sectors.

In terms of practical implications, the results suggest that policies aimed at enhancing productivity and supporting

production activities in the IMK sector may contribute to employment growth. Nevertheless, broader policy recommendations such as industrial downstreaming, supply chain integration, and structural transformation should be approached carefully, as these aspects extend beyond the specific variables examined in this study.

Finally, this study acknowledges several limitations. Panel data regression, while useful for identifying statistical associations, does not fully establish causal relationships. In addition, regional heterogeneity across provinces in Indonesia may lead to variations in structural conditions that are not entirely captured in the model. Future research is therefore encouraged to incorporate additional variables, explore more comprehensive modeling approaches, and consider regional-specific analyses to better understand the complexity of labor absorption in the IMK sector.

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