


Indonesia's New Growth Center: The IMIP Model

Jobless Growth or Structural Transformation? Labor Market Dynamics in Morowali, Indonesia's Nickel-Based Industrialization Hub

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Abstract

This paper examines whether rapid industrialization generates broad-based employment or leads to jobless growth, using the case of Morowali, Indonesia's flagship nickel-processing hub. Over the past decade, Morowali has experienced extraordinary output expansion driven by resource-based industrialization and integration into global value chains. However, its labor market implications remain unclear.

Using a panel dataset covering 2015–2024 and employing a multi-method empirical strategy—including employment elasticity estimation, difference-in-differences analysis, wage modeling, and structural labor assessment—this study provides a comprehensive evaluation of both the quantity and quality of employment.

The results reveal a consistent pattern. First, employment elasticity is low (0.115), indicating weak responsiveness of employment to output growth. Difference-in-differences estimates further show no statistically significant increase in employment relative to the control region. Second, industrialization has a strong and significant impact on labor market structure, increasing the share of formal employment by more than 14 percentage points and contributing to moderate skill upgrading. Third, while wages rise in absolute terms, there is no evidence of accelerated wage growth relative to the control region, suggesting uneven distribution of gains.

Taken together, the findings indicate that Morowali represents a case of high-growth, capital-intensive industrialization characterized not by employment expansion, but by structural labor transformation. This study contributes to the literature by moving beyond the binary distinction between employment boom and jobless growth, highlighting the decoupling between economic growth and multiple dimensions of labor market outcomes.

Keywords: industrialization; jobless growth; employment elasticity; labor market transformation; resource-based industrialization; global value chains; labor formalization; skill upgrading; wage dynamics; Indonesia; Morowali; nickel industry

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I. Introduction

The revival of industrial policy across developing economies has renewed a central question in development economics: does industrialization still generate broad-based employment? Classical theories of structural transformation emphasize that economic development is driven by the reallocation of labor from low-productivity sectors to higher-productivity industrial activities, resulting in simultaneous gains in employment, productivity, and income (Lewis, 1954; Kuznets, 1966; Chenery, 1979). Historical experience—particularly in East Asia—provides strong empirical support for this mechanism, where rapid industrialization was closely associated with large-scale job creation and poverty reduction (World Bank, 2016; McCaig & Pavcnik, 2018).

However, recent evidence suggests that this relationship has weakened. A growing body of literature documents the phenomenon of jobless growth, in which output expansion is no longer accompanied by proportional increases in employment (Kapsos, 2005; Rodrik, 2016; Burgi et al., 2024). Several structural forces underpin this shift. First, technological change and automation reduce labor demand in manufacturing sectors (Autor, 2020; Acemoglu & Restrepo, 2020). Second, integration into global value chains (GVCs) increasingly positions developing economies in capital- and skill-intensive segments of production (Baldwin, 2019; Taglioni & Winkler, 2016). Third, the process of premature deindustrialization implies that developing countries reach peak industrial employment at lower income levels than earlier industrializers (Rodrik, 2016).

Indonesia provides a particularly relevant context to examine these dynamics. Over the past decade, the country has pursued an ambitious strategy of resource-based industrialization, particularly through downstream processing of nickel and other critical minerals. This strategy is intended to increase value-added production, strengthen industrial capabilities, and support structural transformation (World Bank, 2012; Sander & Yoong, 2020). At the same time, it is implicitly expected to generate employment and improve labor market outcomes.

At the forefront of this transformation is Morowali, a district in Central Sulawesi that has rapidly evolved from a peripheral economy into one of Indonesia's most dynamic industrial hubs. Driven by large-scale nickel processing and integration into global electric vehicle supply chains, Morowali has experienced extraordinary output growth.

Yet, whether this transformation translates into inclusive labor market outcomes remains an open empirical question: Has Morowali's industrial expansion translated into an employment expansion, or does it represent a contemporary case of jobless growth?

1.1. Stylized Facts: A Divergence Between Growth and Employment

Initial evidence points to a clear divergence between economic growth and employment expansion. Using 2015 as the base year, Morowali's regional GDP increases dramatically over the period 2015–2024, far outpacing the growth observed in Central Sulawesi. In contrast, employment growth in Morowali remains relatively moderate and does not diverge significantly from the control region.

This pattern suggests that output growth in Morowali is substantially more dynamic than employment growth, indicating weak employment responsiveness to industrial

expansion. Such divergence is consistent with the broader literature on declining employment elasticity in developing economies.

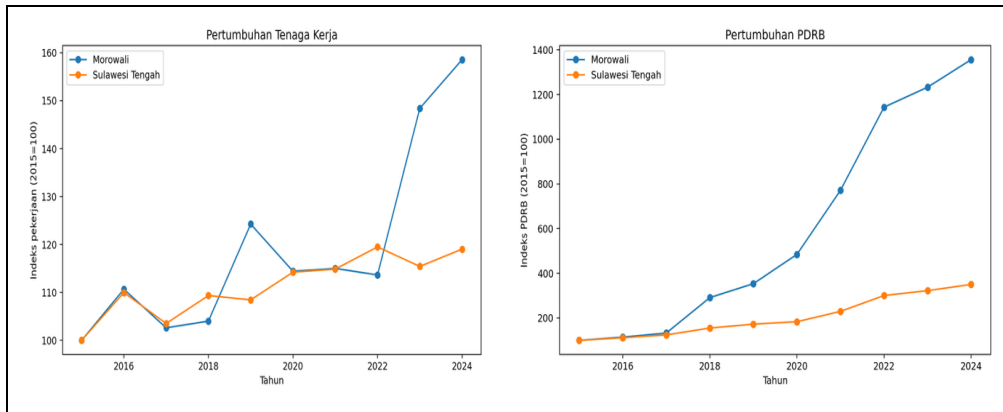


Figure 1. Growth of Employment and Regional GDP (Index 2015 = 100)

Source: Processed by Authors from various publications (Muhyiddin et al., 2026)

1.2. Structural Transformation of Labor Markets

Focusing solely on employment levels, however, risks overlooking important structural changes in the labor market. Industrialization may not generate large numbers of jobs, but it can significantly alter the composition and quality of employment.

Two key patterns emerge. First, the share of formal employment in Morowali increases substantially—from approximately 31 percent to nearly 49 percent—while remaining relatively stable in Central Sulawesi. This indicates a strong process of labor formalization, often associated with industrial sector expansion (La Porta & Shleifer, 2014).

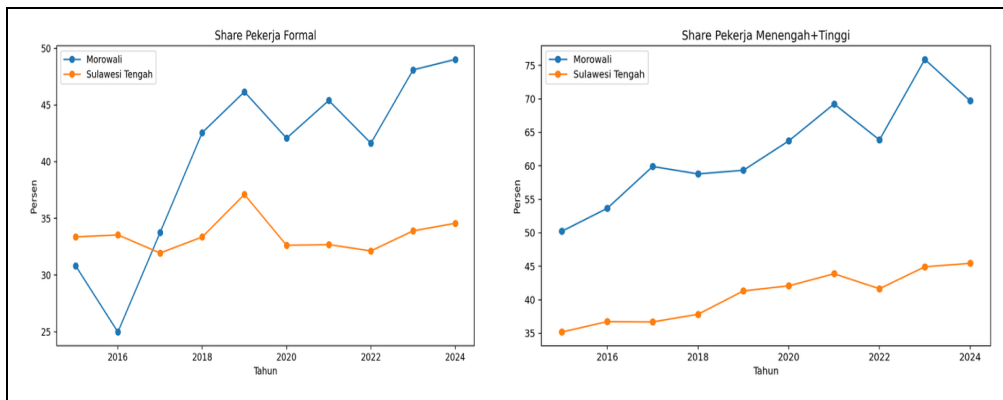


Figure 2. Changes in Labor Market Structure

Source: Processed by Authors from various official datasets (Muhyiddin et al., 2026)

Second, the share of workers with medium and higher levels of education rises markedly, suggesting a process of human capital upgrading. This is consistent with evidence that industrialization—particularly in globally integrated sectors—tends to increase demand for more skilled labor (Goldberg & Pavcnik, 2007).

These findings indicate that industrialization in Morowali is associated not only with economic expansion, but also with qualitative transformations in labor market structure.

1.3. Wage Dynamics and Inclusiveness

Another critical dimension of labor market outcomes is wage dynamics. In theory, industrialization should lead to rising wages through productivity gains and structural transformation (Kuznets, 1966). However, recent studies suggest that wage gains may be uneven, particularly in capital-intensive and globally integrated sectors (Autor, 2020).

In Morowali, minimum wages increase substantially over time, reflecting both economic growth and institutional wage-setting mechanisms. However, the relative gap between Morowali and Central Sulawesi does not widen significantly. This suggests that while industrialization raises absolute wage levels, it does not necessarily generate disproportionate or inclusive wage growth.

This pattern is consistent with the notion of selective labor inclusion, whereby the benefits of industrialization are concentrated among specific segments of the workforce—particularly formal and higher-skilled workers—while others experience more limited gains (World Bank, 2016).

1.4. Research Gap and Contribution

Despite the growing importance of resource-based industrialization—especially in the context of the global energy transition—its labor market implications remain insufficiently understood. Existing studies tend to focus either on macroeconomic outcomes, such as growth and investment, or on sectoral transformation, without providing an integrated analysis of labor market dynamics.

Relatively few studies adopt a multi-dimensional perspective, simultaneously examining employment quantity, labor market structure, skill composition, and wage dynamics. Moreover, empirical evidence at the subnational level remains limited, particularly for rapidly emerging industrial regions such as Morowali.

This paper addresses these gaps by providing a comprehensive empirical analysis of labor market transformation in Morowali. Using a panel dataset covering the period 2015–2024, with Central Sulawesi as a control region, the study combines multiple analytical approaches, including employment elasticity estimation (Kapsos, 2005), difference-in-differences (DiD) analysis, and models of wage and job quality.

1.5. Research Questions and Main Argument

This study is guided by two central research questions:

1. Does industrialization in Morowali lead to significant employment expansion, or does it exhibit characteristics of jobless growth?
2. To what extent is industrialization inclusive in terms of labor market structure, skill upgrading, and wage dynamics?

Building on the stylized facts and empirical analysis, this paper advances the following central argument: Morowali represents a case of high-growth, capital-intensive industrialization characterized by limited employment expansion, but significant labor market restructuring—particularly through formalization and skill upgrading—alongside uneven wage gains.

II. Literature Review

2.1. Industrialization and Employment: From Classical Theory to Contemporary Debate

The relationship between industrialization and employment lies at the core of development economics. Classical structural transformation theory posits that economic development is driven by the reallocation of labor from low-productivity sectors—primarily agriculture—to higher-productivity industrial sectors (Lewis, 1954; Kuznets, 1966; Chenery, 1979). In this framework, industrialization is inherently labor-absorbing, generating large-scale employment while simultaneously raising productivity and incomes.

Historical evidence from East Asia strongly supports this view. Rapid industrialization in economies such as China, South Korea, and Vietnam was accompanied by substantial employment expansion, particularly in labor-intensive manufacturing (World Bank, 2020; McCaig & Pavcnik, 2018). Export-oriented industrialization created millions of jobs, facilitated rural–urban migration, and contributed to sustained poverty reduction.

However, more recent evidence suggests that the employment-generating capacity of industrialization has weakened. The contemporary debate has shifted toward understanding the conditions under which industrialization remains inclusive, and when it leads instead to jobless or job-poor growth.

2.2. Jobless Growth and Declining Employment Elasticity

The concept of jobless growth refers to a situation in which economic output grows without a commensurate increase in employment (Kapsos, 2005). A key empirical measure in this literature is employment elasticity of growth, defined as the percentage change in employment associated with a one percent increase in output.

Cross-country evidence shows that employment elasticity has declined over time, particularly in developing economies (Kapsos, 2005; IMF, 2022). Several explanations have been proposed.

First, technological change and automation reduce labor demand, particularly in manufacturing sectors that were historically labor-intensive (Autor, 2020; Acemoglu & Restrepo, 2020). Second, capital deepening increases output per worker but limits employment expansion. Third, globalization and GVC integration have shifted production toward more specialized and capital-intensive segments, reducing the scope for mass job creation (Baldwin, 2019; Taglioni & Winkler, 2016).

Rodrik (2016) further argues that developing countries are experiencing premature deindustrialization, whereby the share of manufacturing in employment peaks at lower income levels and declines earlier than in historical cases. This implies that industrialization today may generate less employment than in the past, even when output growth is strong.

2.3 Resource-Based Industrialization and Labor Outcomes

While much of the literature focuses on manufacturing-led industrialization, a growing number of countries are pursuing resource-based industrialization, particularly in sectors linked to extractive industries. This model seeks to move beyond raw commodity exports by developing downstream processing and value-added activities (Addison & Roe, 2018).

However, the labor market implications of resource-based industrialization remain contested. On the one hand, downstream processing can generate new industrial jobs and stimulate local economies. On the other hand, these industries are often capital-intensive, limiting their capacity to absorb labor (Cust & Poelhekke, 2015).

Empirical studies of mining regions suggest that the local employment effects of extractive industries are often modest and uneven. While direct employment in mining and processing may be limited, indirect effects—through local demand and supply chains—can generate additional jobs (Aragon & Rud, 2016). This gives rise to the concept of job creation multipliers, which capture the broader employment effects of industrial activity.

However, multiplier effects are highly context-dependent and may be constrained by weak local linkages, limited skills, and institutional capacity. In many cases, resource-based industrialization leads to enclave development, where economic gains are concentrated within specific sectors or regions without broad-based employment benefits.

2.4 Labor Upgrading: Formalization, Skills, and Structural Change

Even when industrialization does not generate substantial employment expansion, it may still transform labor markets through qualitative upgrading. This transformation operates through changes in employment structure, skill composition, and job quality, reflecting a shift from quantity-driven to structure-driven labor outcomes.

One important dimension is labor formalization. The transition from informal to formal employment is generally associated with improved job security, higher wages, and better working conditions (La Porta & Shleifer, 2014). Industrial sectors tend to be more formalized than agriculture and informal services, suggesting that industrialization can contribute to improvements in job quality even in the absence of large-scale job creation. In the Indonesian context, this process is closely linked to policy interventions aimed at strengthening labor market institutions, including social protection and employment services (Muhyiddin et al., 2025).

Another key dimension is skill upgrading. Industrialization—particularly when embedded in global value chains—often increases demand for workers with higher levels of education and technical skills (Goldberg & Pavcnik, 2007; OECD, 2025). This leads to a reallocation of labor toward more skilled occupations, supported by reskilling and training mechanisms. Evidence from Indonesia highlights the importance of active labor market policies, such as job loss insurance and training programs, in facilitating this transition and improving labor market integration (Muhyiddin et al., 2024).

However, these processes may also generate labor market dualism. While formal and skilled workers benefit from improved employment conditions, low-skilled workers may remain excluded or confined to informal activities. This uneven distribution of gains raises concerns about the inclusiveness of industrialization. As argued by Muhyiddin (2025), labor market transformation in Indonesia increasingly reflects a tension between economic growth and the need to ensure that such growth remains socially inclusive and human-centered.

2.5 Wage Dynamics and Distributional Effects

The impact of industrialization on wages is theoretically linked to productivity growth and structural transformation (Kuznets, 1966). In practice, however, wage outcomes

are shaped by a complex interaction between labor demand, institutional frameworks, and bargaining dynamics.

Recent literature shows that industrialization does not necessarily lead to broad-based wage growth. In capital-intensive sectors, productivity gains may not be fully transmitted into wages, particularly for lower-skilled workers (Autor, 2020). Moreover, globalization and participation in global value chains can exert heterogeneous effects on wages, benefiting certain groups while placing downward pressure on others (Goldberg & Pavcnik, 2007).

In developing countries, including Indonesia, wage dynamics are further influenced by institutional factors such as minimum wage policies, labor regulations, and social protection systems. These mechanisms can support wage growth, but their effectiveness depends on how well they are aligned with structural changes in the economy. Empirical evidence from Indonesia suggests that wage improvements often occur alongside, but not necessarily in proportion to, structural transformation, reflecting uneven distributional outcomes across different segments of the labor market (Muhyiddin et al., 2025; Muhyiddin, 2025).

Furthermore, the interaction between industrialization and labor market policy plays a critical role in shaping wage inclusiveness. Policies that support reskilling, job matching, and income protection—such as job loss insurance—can help mitigate inequality and improve the distributional impact of growth (Muhyiddin et al., 2024). Without such interventions, industrialization risks reinforcing existing disparities, particularly in contexts characterized by high informality and skill gaps.

2.6 Empirical Approaches to Labor Market Analysis

To analyze the relationship between industrialization and labor outcomes, the literature employs several empirical approaches.

First, employment elasticity models are used to assess the responsiveness of employment to economic growth (Kapsos, 2005). Second, difference-in-differences (DiD) methods allow for causal inference by comparing treated and control regions over time. Third, wage and job quality models examine the determinants of income and employment structure. Fourth, job creation multipliers capture indirect employment effects through local economic linkages.

While these methods are widely used, most studies apply them in isolation. There is a growing recognition of the need for integrated empirical frameworks that combine multiple approaches to capture the multi-dimensional nature of labor markets.

2.7 Research Gap and Positioning of This Study

Despite the extensive literature on industrialization and labor markets, several gaps remain.

First, the labor market implications of resource-based industrialization are still underexplored, particularly in the context of rapidly expanding global demand for critical minerals.

Second, existing studies often focus on aggregate employment outcomes, with limited attention to structural dimensions such as formalization and skill upgrading.

Third, there is a lack of subnational empirical evidence, especially for emerging industrial regions in developing countries.

This study addresses these gaps by providing a comprehensive analysis of labor market dynamics in Morowali, Indonesia. It adopts a multi-dimensional approach, integrating employment elasticity, DiD estimation, wage modeling, and structural labor analysis within a unified empirical framework.

In doing so, the paper contributes to the literature by demonstrating that:

industrialization in contemporary resource-based economies may generate strong structural transformation in labor markets without corresponding expansion in employment quantity.

This perspective moves beyond the binary distinction between employment boom and jobless growth, offering a more nuanced understanding of how industrialization shapes labor outcomes in the 21st century.

III. Data And Method

3.1. Empirical Strategy

To examine whether industrialization in Morowali generates an employment boom or exhibits characteristics of jobless growth, this study adopts a multi-method empirical strategy tailored to the availability of subnational data. Rather than relying on a single model, the analysis integrates complementary approaches to capture different dimensions of labor market outcomes.

Specifically, five empirical components are employed:

1. Employment elasticity estimation to measure the responsiveness of employment to output growth
2. Difference-in-differences (DiD) analysis to identify the relative impact of industrialization
3. Wage and job quality models to assess income and structural labor changes
4. Job creation multiplier estimation to capture indirect employment effects
5. Descriptive structural analysis of labor composition

This integrated framework allows for a comprehensive and internally consistent assessment of both the quantity and quality of employment

3.2. Data

The analysis uses a balanced panel dataset covering the period 2015–2024, constructed from official Indonesian statistics (BPS). The dataset combines information from: (1) Regional GDP (PDRB) by sector; (2) Employment by education level; (3) Employment by formal vs informal status; and (4) Minimum wage data (UMK/UMP).

The study focuses on two spatial units: (1) Treatment group: Morowali (industrial hub); and (2) Control group: Central Sulawesi (provincial benchmark)

The choice of Central Sulawesi as a control is motivated by its shared macroeconomic and institutional environment, while lacking the same intensity of industrialization as Morowali.

Table 1. Key Variables and Definitions

Variable	Definition	Unit
Total Employment	Number of employed persons	Persons
PDRB Total	Regional GDP	Million Rupiah
Industry Share	Manufacturing share in PDRB	Percent
Formal Share	Share of formal employment	Percent
Skilled Share	Share of medium + high education workers	Percent
Wage	Minimum wage (UMK/UMP)	Rupiah
Treat	Dummy (1 = Morowali)	Binary
Post	Dummy (1 = post-2018)	Binary

Source: Authors's estimation (Muhyiddin, et al., 2026)

3.3. Employment Elasticity Model

To assess the responsiveness of employment to economic growth, the study estimates the following log-linear model:

$$\ln(E_{it}) = \alpha + \beta \ln(Y_{it}) + \gamma X_{it} + \delta D_i + \varepsilon_{it}$$

where:

- E_{it} is total employment
- Y_{it} is total PDRB
- X_{it} includes labor structure variables (formal share, skill composition)
- D_i is a regional dummy (Morowali)

The coefficient β represents employment elasticity. A value below 0.3 is typically interpreted as weak employment responsiveness (Kapsos, 2005).

Two specifications are estimated:

- Baseline model: elasticity without controls
- Extended model: including labor structure variables

This allows us to assess whether structural changes mediate the growth–employment relationship.

3.3. Difference-in-Differences (DiD) Model

To identify the causal impact of industrialization, the study employs a difference-in-differences (DiD) framework using 2018 as the intervention period, reflecting the acceleration of industrial activity in Morowali.

The baseline DiD specification is:

$$Y_{it} = \alpha + \beta_1 Treat_i + \beta_2 Post_t + \beta_3 (Treat_i \times Post_t) + \varepsilon_{it}$$

where:

- $Treat_i = 1$ for Morowali
- $Post_t = 1$ for years ≥ 2018
- β_3 captures the treatment effect of industrialization

The model is estimated separately for:

- Total employment (log)
- Formal employment share
- Skilled labor share
- Wage (log)

This approach allows us to distinguish between:

- aggregate employment effects, and
- structural labor market effects

3.4. Wage and Job Quality Model

To analyze the determinants of wage dynamics and job quality, the study estimates the following model:

$$\ln(W_{it}) = \alpha + \beta_1 IndShare_{it} + \beta_2 Formal_{it} + \beta_3 Skill_{it} + \beta_4 (Treat_i \times Post_t) + \varepsilon_{it}$$

where:

- W_{it} is the minimum wage
- $IndShare_{it}$ captures industrial intensity
- $Formal_{it}$ and $Skill_{it}$ proxy job quality

This model tests whether:

- industrialization raises wages directly
- or operates indirectly through structural labor upgrading

3.6. Job Creation Multiplier

To capture broader employment effects, a reduced-form job creation multiplier is estimated:

$$\Delta E_{it} = \alpha + \beta \Delta \text{IndOutput}_{it} + \varepsilon_{it}$$

where:

- ΔE_{it} is annual employment change
- $\Delta \text{IndOutput}_{it}$ is change in industrial output

The coefficient β approximates the number of jobs associated with an increase in industrial output.

Given data constraints, this should be interpreted as a proxy measure, rather than a full input–output multiplier.

3.7 Structural Labor Analysis

To complement econometric models, the study conducts a descriptive analysis of labor market structure, focusing on: formal vs informal employment, education composition, and wage trends

This approach is essential because: industrialization may affect labor markets more through structural change than through aggregate job creation.

3.8. Identification and Limitations

The identification strategy relies on comparing Morowali with Central Sulawesi over time. While this provides a useful benchmark, several limitations should be acknowledged:

1. Limited number of regions restricts statistical power
2. Potential unobserved heterogeneity between regions
3. Wage data uses minimum wages as a proxy, not actual earnings
4. Multiplier estimation is reduced-form, not structural

Despite these limitations, the combination of methods ensures robust and triangulated findings, consistent with best practices in empirical development research.

IV. Results

4.1. Growth–Employment Disconnect

We begin by examining the relationship between output growth and employment. Figure 1 contrasts the evolution of employment and regional GDP (PDRB) in Morowali and Central Sulawesi over 2015–2024.

The divergence is striking. While Morowali’s GDP expands multiple times over the period, employment growth is far more modest. In contrast, Central Sulawesi shows more parallel movement between output and employment.

This pattern provides initial evidence of a growth–employment disconnect, suggesting that industrialization in Morowali is not strongly labor-absorbing.

4.2. Employment Elasticity: Weak Labor Absorption

To formally assess the responsiveness of employment to growth, Table 2 reports the results of the employment elasticity model.

Table 2. Employment Elasticity Estimates

Variable	Baseline	With Controls
ln(PDRB)	0.115	0.056 (n.s.)
Formal Share	—	0.001 (n.s.)
Skilled Share	—	0.008 (n.s.)
Morowali Dummy	Negative, significant	Negative, significant
Observations	20	20

Notes: Robust standard errors (HC1). $p < 0.01$.

Source: Data processed by Authors (Muhyiddin et al., 2026)

The baseline elasticity of 0.115 indicates that a 1 percent increase in output leads to only a 0.115 percent increase in employment. This is well below the threshold typically associated with labor-intensive growth.

When labor structure variables are included, the elasticity declines further to 0.056 and becomes statistically insignificant. This suggests that employment dynamics are not driven primarily by output growth, but rather by structural factors within the labor market.

4.3. Difference-in-Differences: No Employment Boom

To identify the causal impact of industrialization, we employ a difference-in-differences (DiD) approach using Central Sulawesi as the control region.

Table 3. DiD Estimates – Total Employment

Variable	Coefficient
Treat (Morowali)	-3.324
Post-2018	0.091
Treat × Post	0.083 (n.s.)
Observations	20

Source: Data processed by Authors (Muhyiddin et al., 2026)

The interaction term (Treat × Post) is positive but statistically insignificant. This indicates that, after controlling for general trends, employment growth in Morowali is not significantly higher than in the control region.

This finding is central: despite rapid industrialization, there is no robust evidence of an employment boom.

4.4. Structural Transformation: Strong Formalization

While total employment does not increase significantly, the structure of employment changes dramatically.

Table 4. DiD Estimates – Formal Employment Share

Variable	Coefficient
Treat × Post	14.33
Observations	20

Source: Data processed by Authors (Muhyiddin et al., 2026)

The difference-in-differences (DiD) estimates indicate that industrialization leads to an increase in the share of formal employment by approximately 14.33 percentage points, representing a large and statistically significant effect.

This result is further supported by descriptive evidence. Over the period of analysis, the share of formal employment in Morowali rises substantially from 30.81% to 49.02%, while in Central Sulawesi the increase is relatively modest, from 33.37% to 34.57%.

Taken together, these findings suggest that industrialization is strongly associated with labor formalization, even in the absence of significant expansion in total employment. This implies that the primary labor market effect operates through improvements in the structure and quality of employment, rather than through increases in employment quantity.

4.5. Skill Upgrading: Moderate but Uneven

Table 5. DiD Estimates – Skilled Labor Share

Variable	Coefficient
Treat × Post	4.95 (n.s.)

Source: Data processed by Authors (Muhyiddin et al., 2026)

The difference-in-differences (DiD) estimates reported in Table 5 indicate that the coefficient on the interaction term (Treat × Post) is positive (4.95), but not statistically significant.

This result suggests that, although there is an observable increase in the share of skilled labor following industrialization, the effect cannot be robustly distinguished from underlying trends in the control region. In other words, while industrialization may be associated with skill upgrading, the magnitude and statistical strength of this effect remain limited.

Compared to the strong and significant impact on labor formalization, these findings indicate that the influence of industrialization on human capital composition is more modest and less consistent, pointing to a partial rather than comprehensive process of labor upgrading.

4.6. Wage Dynamics: Absolute Gains, Relative Constraints

Wage levels increase substantially in both regions over the period of analysis. In Morowali, minimum wages rise from approximately Rp1.83 million to Rp3.49 million, while in Central Sulawesi they increase from Rp1.50 million to Rp2.74 million.

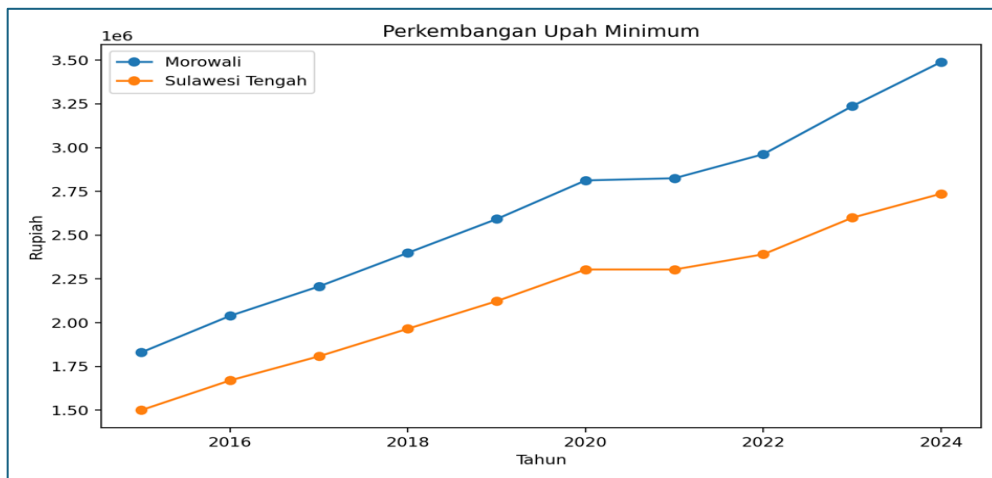


Figure 3. Wage Trends (2015 – 2024)

Source: Data processed by Authors (Muhyiddin et al., 2026)

Table 6. Wage Regression Results

Variable	Coefficient
Industry Share	0.011***
Formal Share	0.004 (n.s.)
Skilled Share	0.010***
Treat × Post	-0.258**
Observations	20

Source: Data processed by Authors (Muhyiddin et al., 2026)

Despite these significant absolute gains, the wage trajectories in the two regions remain broadly parallel. This pattern suggests the absence of a pronounced relative divergence, indicating that industrialization in Morowali does not lead to disproportionately faster wage growth compared to the control region.

The results reveal a nuanced pattern: (1) Industrialization raises wage levels (positive industry share effect); (2) Skill upgrading contributes positively to wages; and (3) However, the DiD interaction is negative and significant, indicating that Morowali does not experience faster wage growth relative to the control region.

This suggests uneven distribution of gains, where industrialization benefits certain groups but does not generate broad-based wage acceleration.

4.7. Industrialization and Labor Structure

To further examine the relationship between industrialization and labor outcomes, Figure 3 plots industrial share against wages and formal employment.

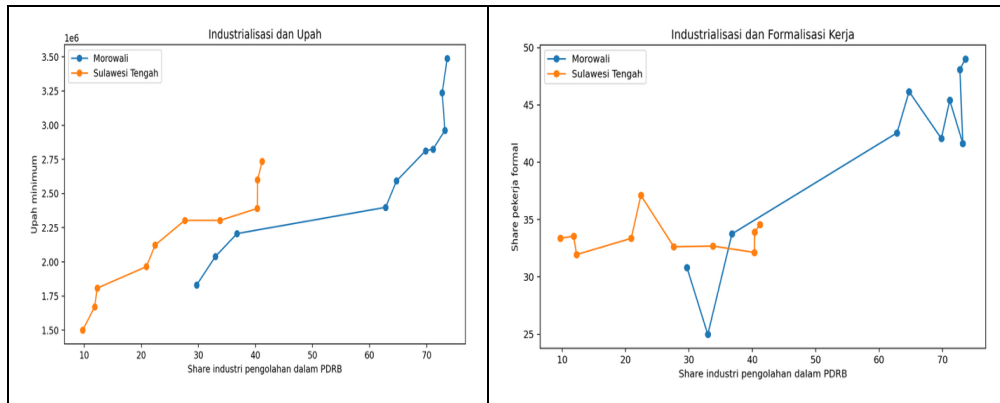


Figure 4. Industrial Share Wages and Formal Employment

Source: Data processed by Authors (Muhyiddin et al., 2026)

The patterns are consistent: (1) Industrialization is strongly associated with formalization; (2) It has a moderate positive relationship with wages; and (3) The relationship with employment quantity is weak.

4.8. Job Creation Multiplier: Limited Spillovers

Table 7. Job Creation Multiplier

Variable	Coefficient
Δ Industry Output	~ 620 jobs (n.s.)
Observations	18

Source: Data processed by Authors (Muhyiddin et al., 2026)

The multiplier estimate suggests that a Rp1 trillion increase in industrial output is associated with approximately 620 additional jobs. However, the estimate is not statistically significant, indicating that employment spillovers are limited and uncertain.

4.9. Synthesis of Findings

Taken together, the empirical results reveal a coherent and multi-dimensional pattern in the labor market dynamics of Morowali's industrialization.

First, in terms of employment quantity, the estimated employment elasticity is low (0.115), indicating limited responsiveness of employment to output growth. This finding is reinforced by the difference-in-differences results, which show no statistically significant

increase in employment relative to the control region. These results collectively point to weak labor absorption, despite substantial economic expansion.

Second, regarding employment structure, industrialization is associated with a pronounced and statistically significant increase in the share of formal employment, amounting to more than 14 percentage points. This is accompanied by evidence of moderate skill upgrading, as reflected in the increasing share of medium- and high-educated workers. These patterns indicate a process of structural transformation within the labor market, characterized by a shift toward more formalized and higher-skilled employment.

Third, with respect to wage outcomes, the analysis shows a clear increase in wage levels over time. However, the absence of a significant relative wage effect in the difference-in-differences framework suggests that wage growth in Morowali does not outpace that of the control region. This implies that the gains from industrialization are unevenly distributed, benefiting certain segments of the workforce more than others.

Overall, the results suggest that the primary impact of industrialization in Morowali lies not in expanding the scale of employment, but in reshaping its composition.

V. Discussion

5.1 Reframing the Debate: Beyond Employment Boom vs. Jobless Growth

The empirical results challenge the conventional dichotomy between *employment boom* and *jobless growth*. Morowali does not fully conform to either category. On the one hand, the absence of a statistically significant DiD effect on total employment and the low employment elasticity (0.115) are consistent with the notion of jobless growth (Kapsos, 2005; Rodrik, 2016). On the other hand, the labor market undergoes substantial transformation, particularly through formalization and skill upgrading.

This suggests that the traditional binary framework is insufficient. Instead, Morowali exemplifies a third pattern: industrialization that transforms the structure of employment without proportionally increasing its quantity.

This finding aligns with recent literature emphasizing the declining employment intensity of growth in developing economies (IMF, 2022; World Bank, 2020). However, it extends the debate by showing that even when employment expansion is limited, industrialization can still have profound effects on how labor is organized and utilized.

5.2 Structural Transformation Without Proportional Labor Returns

A key contribution of this study lies in its integrated analysis of three core dimensions of labor market outcomes. First, employment quantity remains weak, as evidenced by statistically insignificant effects on overall job creation. Second, employment structure exhibits a pronounced shift toward formalization, with an increase of approximately 14.33 percentage points. Third, wage dynamics show positive growth in absolute terms, but do not display significant divergence relative to the control region. This combination reveals a critical insight: industrialization in Morowali produces structural upgrading without proportional labor returns.

This pattern challenges the implicit assumption in classical development theory that structural transformation and employment expansion are tightly coupled (Lewis, 1954;

Kuznets, 1966). Instead, it suggests that under contemporary conditions—characterized by capital intensity and global integration—these processes can diverge.

5.3 Capital Intensity and the Limits of Labor Absorption

The weak employment response observed in Morowali can be understood in light of the capital-intensive nature of resource-based industrialization. Unlike labor-intensive manufacturing sectors, nickel processing and downstream activities rely heavily on large-scale infrastructure, advanced technology, and energy-intensive production processes.

This finding is consistent with studies showing that extractive and resource-based industries generate limited direct employment (Cust & Poelhekke, 2015; Addison & Roe, 2018). While such industries can produce substantial output growth, their capacity to absorb labor remains constrained.

Moreover, integration into global value chains further reinforces this pattern. Firms operating in internationally competitive industries adopt technologies and production standards that prioritize efficiency and scale over labor intensity (Baldwin, 2019; Taglioni & Winkler, 2016). As a result, industrialization becomes growth-enhancing but not necessarily job-intensive.

5.4 Labor Formalization as the Primary Channel of Impact

While employment quantity does not increase significantly, the results show that industrialization has a strong effect on labor formalization. The increase of 14.33 percentage points in formal employment share represents a substantial shift in labor market structure.

This suggests that the primary impact of industrialization in Morowali is not job creation per se, but the transformation of existing employment into more formal and regulated forms. Formal jobs are typically associated with better working conditions, social protection, and income stability (La Porta & Shleifer, 2014).

However, the benefits of formalization may not be evenly distributed. Access to formal employment often depends on skills, education, and networks, potentially reinforcing inequalities within the labor market.

5.5 Wage Dynamics and Selective Inclusion

The wage analysis reveals a nuanced pattern. While industrialization and skill upgrading are positively associated with wage levels, the negative and significant DiD coefficient indicates that Morowali does not experience faster wage growth relative to the control region.

This finding points to a form of selective inclusion, where industrialization benefits certain segments of the workforce—particularly skilled and formal workers—without generating broad-based wage gains.

Several mechanisms may explain this outcome.

First, labor supply effects. Rapid industrial growth attracts migration, increasing the supply of labor and dampening wage pressures. Second, skill-biased demand. Industrial sectors demand specific skills, leading to wage premiums for certain workers while others remain excluded. Third, institutional constraints, such as minimum wage policies and labor market regulations, may limit wage dispersion across regions.

Together, these factors produce a situation in which industrialization raises average wages but does not significantly alter relative wage dynamics.

5.6 Comparison with China and Vietnam

A comparison with East Asian industrializers highlights the distinctive nature of Morowali's experience.

In China, early industrialization was driven by labor-intensive manufacturing, particularly in export-oriented sectors. This process absorbed large numbers of rural workers, contributing to rapid employment growth and rising wages (World Bank, 2020). Similarly, Vietnam's integration into global manufacturing networks—especially in textiles and electronics—generated substantial job creation and facilitated structural transformation (McCaig & Pavcnik, 2018).

Morowali differs from classical industrialization experiences in two fundamental respects.

First, in terms of sectoral composition, industrialization in China and Vietnam has historically been driven by labor-intensive manufacturing sectors, whereas Morowali's development is rooted in resource-based, capital-intensive processing industries, particularly in mineral downstreaming.

Second, regarding the labor demand profile, China and Vietnam have exhibited broad-based demand for low- and medium-skilled labor, facilitating large-scale employment absorption. In contrast, Morowali's industrial structure generates a more selective demand for skilled and formal workers, limiting the scope for widespread labor inclusion.

These differences explain why Morowali's industrialization does not replicate the inclusive employment dynamics observed in East Asia. Instead, it reflects a newer model of industrialization shaped by technological change and global value chains.

5.7 Rethinking Industrial Policy Metrics

The findings have important implications for how industrial success is measured. Traditional indicators—such as GDP growth, export performance, and investment inflows—capture macroeconomic achievements but do not fully reflect labor market outcomes.

In Morowali, these indicators would suggest a highly successful industrialization process. However, the labor evidence reveals a more complex reality: growth is rapid, but job creation is limited; formalization increases, but inclusion is uneven; and wages rise, but not disproportionately.

This suggests the need for a broader evaluation framework incorporating: employment elasticity, labor market structure, skill composition, and wage distribution.

Such a framework provides a more accurate assessment of the inclusiveness of industrialization.

VI. Conclusion and Policy Implications

6.1 Conclusion

This paper set out to examine whether rapid industrialization in Morowali—driven by Indonesia’s nickel downstreaming strategy—has generated an employment boom or reflects a more complex pattern of labor market transformation. Using a panel dataset covering 2015–2024 and combining multiple empirical approaches, the analysis provides a consistent and robust set of findings.

First, the results show that industrialization in Morowali is associated with weak employment expansion. The estimated employment elasticity of 0.115 indicates low responsiveness of employment to output growth, and the difference-in-differences estimates confirm that employment growth in Morowali is not significantly higher than in the control region.

Second, industrialization has a strong and statistically significant impact on labor market structure. The share of formal employment increases by more than 14 percentage points relative to Central Sulawesi, indicating a substantial shift toward more regulated and potentially higher-quality jobs. Skill upgrading is also observed, although its effect is less robust.

Third, wage dynamics reveal a more nuanced pattern. While industrialization and structural upgrading are associated with higher wage levels, there is no evidence of accelerated wage growth relative to the control region. This suggests that the benefits of industrialization are not evenly distributed across the workforce.

Taken together, these findings lead to a clear conclusion: Morowali represents a case of high-growth, capital-intensive industrialization characterized by limited job creation, strong labor formalization, and uneven wage gains.

This pattern challenges the conventional expectation that industrialization automatically delivers broad-based employment and income growth.

6.2 Policy Implications

The results carry important implications for industrial and labor policy, particularly in countries pursuing resource-based industrialization strategies.

1. From Growth-Oriented to Inclusive Industrial Policy

Industrial policy should move beyond a narrow focus on output growth, investment, and exports. While these remain important, they must be complemented by policies that explicitly target employment outcomes and inclusiveness.

2. Strengthening Labor Market Absorption

Given the weak employment response, policies should focus on increasing the labor absorption capacity of industrialization. This includes: promoting labor-intensive downstream activities, supporting small and medium enterprises (SMEs) linked to industrial clusters, and encouraging local supply chain development.

3. Aligning Skills with Industrial Demand

The evidence of skill upgrading underscores the importance of human capital development. Policy efforts should focus on: expanding vocational and technical training, aligning

curricula with industrial needs, and strengthening partnerships between industry and training institutions.

Without such alignment, industrialization risks creating skill mismatches and limiting access to high-quality jobs.

4. Enhancing Wage Inclusiveness

The absence of relative wage acceleration suggests the need for policies that ensure fair distribution of gains. This includes: strengthening wage-setting mechanisms, improving labor standards enforcement, and enhancing worker bargaining power.

5. Managing Labor Mobility

Rapid industrialization attracts labor inflows, which can affect wage dynamics and local labor markets. Effective policy should: facilitate orderly labor mobility, ensure access to housing and public services, and balance local and migrant workforce integration.

Morowali's experience reflects a broader transformation in the nature of industrialization in the 21st century. As economies become more integrated into global value chains and production becomes increasingly capital-intensive, the traditional link between industrial growth and employment is weakening.

Industrialization can generate rapid economic transformation, but without deliberate policy intervention, its benefits may remain uneven and incomplete.

Understanding this evolving relationship is essential for designing development strategies that are not only growth-enhancing, but also inclusive and sustainable.

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