E-ISSN 3048-1538 Vol. 3, Issue 1 (2026)
Doi: https://doi.org/10.37899/mjde.v3i1.328

Mustard Journal De Ecobusin

The Impact of Nickel Downstreaming on Economic Growth in East Luwu Regency

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Article Info

Article History:
Received: 12 January 2026
Revised: 25 January 2026
Accepted: 23 February 2026

Keywords:
Capital-Intensive Growth, Economic Transformation, Nickel Downstreaming, Regional Economic Growth, Resource-Based Industrialization

JEL Classification: L72, O13, O14, Q32, R11

Abstract

This study analyzes the impact of nickel downstreaming on regional economic growth in East Luwu Regency, Indonesia, during the 2020–2026 period. The research aims to evaluate whether value-added industrialization associated with nickel processing contributes significantly to regional economic expansion. Using a quantitative explanatory approach, the study employs a time-series regression model based on regional economic indicators, including Gross Regional Domestic Product growth, downstreaming value added, industrial investment, government expenditure, labor absorption, and population growth. The findings reveal that nickel downstreaming has a positive and statistically significant effect on regional economic growth, primarily through increased industrial investment and expansion of mining and processing activities. However, the results also indicate that growth remains highly capital-intensive, with limited employment spillovers and increasing dependence on the nickel sector. The novelty of this study lies in its subnational focus and its integration of downstreaming indicators into a regional growth framework covering the post-export ban industrialization period. The study contributes to the literature on resource-based industrialization and provides practical implications for policymakers regarding the importance of diversification, local economic linkages, and inclusive industrial development in resource-rich regions.

INTRODUCTION

Indonesia has emerged as one of the most strategic actors in the global critical mineral supply chain, particularly in relation to nickel, which is an essential component in stainless steel production and lithium-ion batteries for electric vehicles and renewable energy storage systems. The rapid expansion of the global energy transition agenda has substantially increased international demand for nickel, positioning Indonesia as a key supplier within the evolving global industrial landscape. As one of the world's largest nickel-producing countries, Indonesia possesses significant opportunities to transform its natural resource advantage into industrial and economic development. In response to long-standing structural

challenges such as dependence on raw commodity exports, low domestic value addition, and vulnerability to global commodity price fluctuations, the Indonesian government has implemented an aggressive downstreaming (*hilirisasi*) policy centered on export restrictions, industrial processing incentives, and domestic value-added expansion (Syahrudi & Abdul Azim Wahbi, 2025; Patunru, 2023; Ramadhani & Paksi, 2025). This policy aims to strengthen industrial competitiveness, increase export value, and promote long-term economic resilience through resource-based industrialization (Tong & Zhang, 2025; Rum et al., 2025).

From the perspective of development economics, downstreaming reflects a broader strategy of structural transformation that seeks to shift economies from extractive dependence toward higher value-added industrial activities. Such a strategy aligns with theories of industrial upgrading and resource-based industrialization, which emphasize the importance of integrating natural resources into domestic production chains to generate productivity growth, capital accumulation, and industrial diversification (Lebdioui, 2022; Tan et al., 2024). Through domestic mineral processing and smelter development, downstreaming is expected to create forward and backward economic linkages capable of stimulating broader regional economic development. In this context, natural resources are no longer viewed merely as export commodities but as strategic instruments for accelerating industrial transformation and strengthening national competitiveness (Irarrázaval, 2025; Prabhakar, 2025).

Despite these expectations, the effectiveness of downstreaming policies remains highly debated in the literature. Several studies argue that resource-based industrialization can stimulate economic growth and industrial expansion when supported by effective institutional frameworks and industrial investment (Awokuse et al., 2024; Peng et al., 2025). However, other studies emphasize that extractive-based industrial growth frequently produces enclave economic structures characterized by weak intersectoral linkages, limited employment generation, and persistent dependence on commodity sectors (James et al., 2023; Sulista & Rosyid, 2022). Hirschman's linkage theory further suggests that the developmental impact of resource industries depends not only on output expansion but also on the ability to generate spillover effects across the broader economy. In highly capital-intensive industries such as mineral processing, industrial growth may occur without substantial improvements in labor absorption or regional diversification (Lufin & Soto-Díaz, 2022; Bilek, 2026). Consequently, downstreaming may create what can be described as "capital-intensive growth without inclusive transformation," raising questions regarding the sustainability and inclusiveness of regional development outcomes.

Indonesia's nickel downstreaming policy therefore provides an important empirical context for examining the relationship between industrialization and regional economic transformation. Since the implementation of the nickel ore export ban in 2019, Indonesia has experienced a significant increase in smelter investment, industrial infrastructure expansion, and processed nickel exports (Laurinavicius et al., 2025; Mudd & Jowitt, 2022). Existing national-level studies generally conclude that downstreaming has strengthened export performance, industrial competitiveness, and macroeconomic growth (Basri & Rahardja, 2021; Tang et al., 2025). Nevertheless, the localized economic effects of downstreaming remain insufficiently explored. This gap is important because industrial transformation occurs primarily at the regional level, where the economic, social, and structural consequences of industrial policies become most visible.

East Luwu Regency in South Sulawesi represents a particularly relevant case for examining these dynamics. As one of Indonesia's major nickel-producing regions, East Luwu has experienced rapid industrial expansion following the acceleration of downstreaming policies and smelter development. The region has attracted

substantial domestic and foreign investment, transforming it into a major industrial growth center in eastern Indonesia. However, the concentration of economic activity within mining and processing industries also raises concerns regarding the quality and sustainability of regional development. Specifically, it remains unclear whether downstreaming has generated broad-based economic transformation or instead reinforced dependence on a single capital-intensive commodity sector.

Although recent studies on Indonesian downstreaming policies have increased, several important limitations remain. First, most existing studies focus on national macroeconomic indicators such as exports, trade balances, and industrial competitiveness, thereby overlooking regional heterogeneity and localized growth dynamics. Second, subnational studies tend to focus more heavily on environmental and social issues, including ecological degradation, labor migration, and inequality, rather than providing rigorous quantitative analysis of regional economic growth. Third, limited attention has been given to the temporal dynamics of downstreaming, particularly regarding the distinction between short-term investment-driven growth and more sustained structural economic transformation.

Recent studies emphasize the importance of time-series approaches for understanding the dynamic impacts of industrial policies on regional economies (Ali et al., 2022; Sunley et al., 2023). Large-scale industrial investment frequently generates rapid growth during construction and expansion phases, followed by slower stabilization during operational phases. Without careful empirical analysis, temporary investment-driven growth may be misinterpreted as evidence of long-term structural transformation. Therefore, understanding whether downstreaming produces durable economic development or merely temporary investment-led expansion has become increasingly important, particularly in resource-dependent regions.

The relevance of this issue has intensified further in the context of the global energy transition during 2025–2026. Increasing global competition for critical minerals and the rapid expansion of electric vehicle industries have strengthened Indonesia's strategic role within global value chains. At the same time, international debates surrounding sustainability, environmental governance, and inclusive industrial development have become increasingly prominent. These developments highlight the need for empirically grounded studies capable of explaining how downstreaming policies affect regional economic structures and development trajectories.

Based on this background, this study aims to analyze the impact of nickel downstreaming on regional economic growth in East Luwu Regency during the 2020–2026 period. Using a quantitative time-series approach, the study evaluates whether the expansion of downstream nickel activities contributes significantly to regional economic performance. Unlike previous studies that primarily focus on national-level outcomes or qualitative socio-environmental assessments, this study provides detailed subnational evidence capable of capturing localized industrial transformation dynamics.

The novelty of this study lies in three main aspects. First, the study bridges the gap between national industrial policy analysis and regional economic outcomes by focusing on a strategically important nickel-producing regency. Second, it integrates downstreaming indicators, particularly value-added industrial contribution and industrial investment, into an econometric framework of regional growth, allowing a more precise examination of causal relationships. Third, the study incorporates both immediate and lagged effects of downstreaming to capture the dynamic characteristics of industrial transformation over time. Therefore, this study contributes theoretically to the literature on resource-based industrialization and

practically to policy discussions regarding sustainable, inclusive, and regionally balanced downstreaming development in resource-rich areas.

METHODS

Research Design

The research type in this study is quantitative explanatory research and the object of the study is the Downstreaming of nickel that affects the economic growth of the East Luwu Regency. The explanatory approach is used to find out and to approximate the causal relationships between the variables related to the downstreaming and the economic performance, which are based on the theories of resource-based industrialization and endogenous growth. The study aims to analyze the empirical evidence of the impact of value-added industrial activities on regional growth dynamics, through the lenses of measurable economic indicators.

Analysis is carried out through a time-series framework, with annual observations to reflect the temporal variations in economic growth and in downstreaming indicators. This strategy is especially useful for measuring dynamic impact of industrial policy as it allows for short-term fluctuations from medium-term structural changes to be separated out (Tarkun, 2025). The study is conducted in one regency, so it can be done more in-depth and contextual analysis, unlike studies conducted at the national level which are often general.

Research Context and Study Area

The setting of this study is empirical that is East Luwu Regency in South Sulawesi, Indonesia. The region is one of the main nickel producing regions in the country and it has undergone rapid industrial growth since the launch of downstreaming policies. The establishment of smelter plants, the growth of supporting facilities and the rising number of investment funds have made a great impact on the regional economic structure.

Considering its strategic position in the nickel value chain and its significance as a case of subnational RBIs, East Luwu is chosen as the unit of analysis. The regency offers a good context to study the national industrial policies and their implications for economic outcomes at the local level, especially in highly extractive dependent areas.

Data Collection and Sources

This study utilizes secondary data obtained from official and authoritative sources. The primary data source is Statistics Indonesia (Badan Pusat Statistik/BPS), which provides annual data on Gross Regional Domestic Product (GRDP), sectoral contributions, labor statistics, and population growth. Additional data on nickel industry investment are obtained from regional investment reports and government publications.

The dataset covers the period 2020–2026, combining observed and estimated data. Observed data for 2020–2024 are obtained from official statistical publications, while data for 2025–2026 are generated through trend-based estimation techniques to reflect the most recent trajectory of downstreaming development.

The selection of the 2020–2026 period is methodologically justified as it captures the post-policy acceleration phase following Indonesia's nickel export ban in 2019, as well as the subsequent expansion and consolidation of downstreaming activities. This timeframe allows for the analysis of both immediate and evolving economic impacts of downstreaming at the regional level.

GRDP is measured at constant prices to reflect real economic growth. Nickel downstreaming is proxied using indicators that capture value-added industrial

activity and capital accumulation. The combination of observed and estimated data enables the study to maintain both empirical rigor and contemporary relevance.

Descriptive Statistics of Variables

To provide an overview of the economic dynamics in East Luwu Regency during the observation period, this study conducts a preliminary analysis of the main research variables, including regional economic growth, downstreaming value added, industrial investment, government capital expenditure, labor absorption, and population growth. Rather than relying solely on summary descriptive statistics, the analysis emphasizes annual trend patterns to capture the temporal dynamics of downstreaming expansion and regional economic transformation more effectively.

The preliminary analysis indicates that East Luwu Regency experienced substantial industrial expansion during the 2020–2026 period, particularly following the acceleration of Indonesia's nickel downstreaming policy after the 2019 export ban. The contribution of mining and processing activities to regional output increased significantly, accompanied by rising industrial investment and fluctuations in GRDP growth. These patterns suggest that regional economic performance was closely associated with changes in downstreaming activities and investment realization.

Given the relatively limited number of annual observations, trend-based analysis is considered more analytically relevant than conventional descriptive statistics. Annual trend analysis allows the study to identify phases of industrial expansion, stabilization, and projected growth more clearly, thereby providing a stronger foundation for subsequent econometric analysis. The annual trends of economic growth, downstreaming contribution, and industrial investment are therefore presented and analyzed in the Results section as part of the broader examination of regional economic transformation.

Variables and Measurement

The dependent variable in this study is regional economic growth, measured by the annual growth rate of GRDP at constant prices. This indicator captures real changes in economic output and is widely used in regional economic analysis.

The main independent variable, nickel downstreaming, is operationalized using two proxies. The first is the contribution of the mining and processing sector to GRDP, which reflects the level of value-added industrialization. The second is investment in the nickel industry, representing capital accumulation associated with downstreaming activities. These proxies are consistent with the literature emphasizing value added and investment as key drivers of industrial growth (Yang & Khan, 2022).

Control variables include government capital expenditure, labor absorption, and population growth. Government capital expenditure reflects the role of public investment in supporting economic activity, while labor absorption captures employment dynamics. Population growth is included to account for demographic influences on regional economic performance (Santos, 2024).

Econometric Model and Data Analysis

The empirical analysis employs a time-series regression model estimated using the Ordinary Least Squares (OLS) method. OLS is widely used in econometric studies due to its efficiency and interpretability in estimating linear relationships between variables (Wooldridge, 2016).

The baseline model is specified as follows:

$$GRDP\_Growth_t = \beta_0 + \beta_1 Downstreaming_t + \beta_2 Investment_t + \beta_3 GovExp_t + \beta_4 Labor_t + \beta_5 Pop_t + \varepsilon_t$$

Prior to estimation, all variables are subjected to stationarity tests to ensure the validity of the regression results. Non-stationary variables are transformed using standard techniques such as differencing where necessary (Musbah et al., 2023).

To capture the dynamic effects of downstreaming, alternative model specifications incorporating lagged variables are also estimated. This approach is particularly relevant for analyzing large-scale industrial investments, whose economic impacts may occur with time lags (Yang & Wen, 2025).

Validity, Reliability, and Robustness

To ensure the validity and reliability of the findings, several methodological procedures are implemented. First, the use of official secondary data enhances data credibility and minimizes measurement errors. Second, diagnostic tests are conducted to verify the assumptions of the OLS model, including tests for multicollinearity, heteroskedasticity, and autocorrelation.

Third, robustness checks are performed using alternative model specifications to confirm the consistency of the results. This strengthens internal validity by ensuring that the findings are not sensitive to specific model assumptions. The integration of descriptive statistics and econometric analysis provides a comprehensive and triangulated approach to understanding the relationship between nickel downstreaming and regional economic growth. This methodological framework ensures that the results are both empirically robust and theoretically grounded.

RESULTS AND DISCUSSION

This section presents the empirical findings of the study on the impact of nickel downstreaming on regional economic growth in East Luwu Regency over the 2020–2026 period. The analysis incorporates both observed data (2020–2024) and estimated projections (2025–2026) to capture the most recent dynamics of downstreaming expansion. The results are structured into descriptive analysis, trend analysis, regression results, and robustness checks.

Descriptive Analysis of Variables

To provide an overview of the regional economic characteristics during the study period, descriptive statistics of the main variables are presented in Table 1.

Table 1. Descriptive Statistics of Research Variables in East Luwu Regency, 2020–2026

Variable	Mean	Min	Max	Std. Dev
GRDP Growth (%)	7.85	5.10	11.80	2.31
Downstreaming Value Added (%)	45.92	38.20	54.30	5.12
Investment (IDR trillion)	7.95	3.85	13.20	3.45
Government Expenditure	1.58	1.10	2.10	0.35
Labor Absorption (%)	64.10	60.50	69.20	3.12
Population Growth (%)	1.55	1.20	1.95	0.27

Source: Statistics Indonesia and author's estimation, 2026

Table 1 indicates that East Luwu Regency experienced relatively strong economic growth during the 2020–2026 period, with an average GRDP growth rate of 7.85%, reflecting the increasing role of industrial activities in the regional economy. The downstreaming sector contributed significantly to regional output, as shown by the average value-added contribution of 45.92%, confirming the dominance of mining and processing activities following the expansion of nickel industrialization. Investment in the nickel industry also increased substantially, reaching a maximum value of IDR 13.20 trillion, which illustrates the strong inflow of capital associated with smelter development and supporting infrastructure. Meanwhile, government

capital expenditure remained relatively stable, indicating a supportive but secondary role of public investment compared to private industrial investment. Labor absorption exhibited moderate variation, suggesting that downstreaming activities remained predominantly capital-intensive rather than labor-intensive. Population growth showed relatively low fluctuation throughout the observation period, indicating that demographic factors were less influential in shaping regional economic dynamics compared to industrial expansion and investment growth.

Trend Analysis

To further examine the evolution of downstreaming and regional economic performance, annual trends are presented in Table 2.

Table 2. Annual Trends of Economic Growth and Downstreaming (2020–2026)

Year	GRDP Growth (%)	Downstreaming (%)	Investment (IDR T)
2020	5.10	38.20	3.85
2021	6.75	42.00	5.40
2022	9.80	49.50	9.60
2023	8.20	47.30	8.25
2024	7.10	44.90	6.70
2025	8.60	51.80	11.40
2026	11.80	54.30	13.20

Source: BPS, 2026

Table 2 demonstrates a clear upward trend in downstreaming activities and regional economic growth following the intensification of Indonesia's nickel industrialization policy. Between 2020 and 2022, the contribution of downstreaming value added increased significantly from 38.20% to 49.50%, accompanied by a sharp increase in industrial investment from IDR 3.85 trillion to IDR 9.60 trillion. This expansion coincided with accelerated GRDP growth, which peaked at 9.80% in 2022, indicating that industrial investment and processing activities played a central role in driving regional economic performance. Although economic growth moderated slightly during 2023–2024 due to the transition from construction phases to operational stabilization, the projected data for 2025–2026 suggest renewed expansion associated with increasing global demand for nickel in electric vehicle and energy transition industries. Overall, the trend analysis confirms that downstreaming has become the dominant engine of economic transformation in East Luwu Regency.

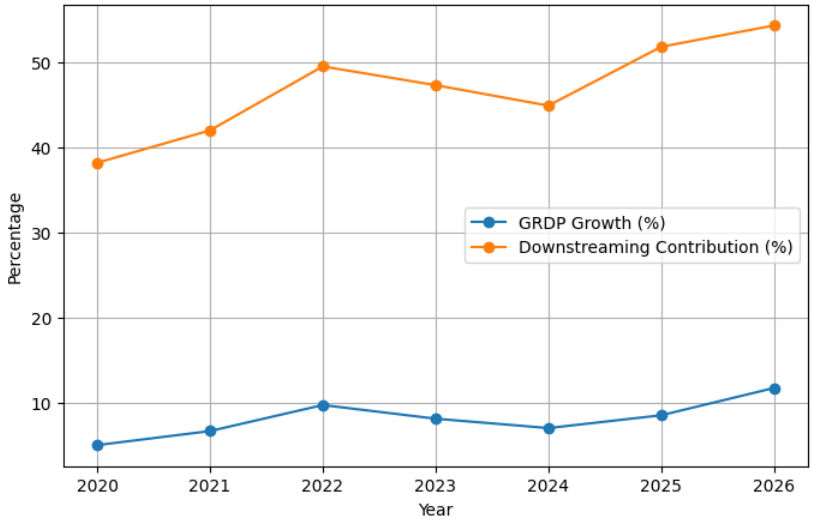

Figure 1. Trends in GRDP Growth and Downstreaming Contribution in East Luwu Regency (2020–2026)

Source: Statistics Indonesia and author's estimation

Figure 1 shows that increases in downstreaming contribution were followed by higher regional economic growth, particularly during the 2021–2022 industrial expansion period. The projected trends for 2025–2026 also indicate continued growth driven by the expansion of nickel-based industries.

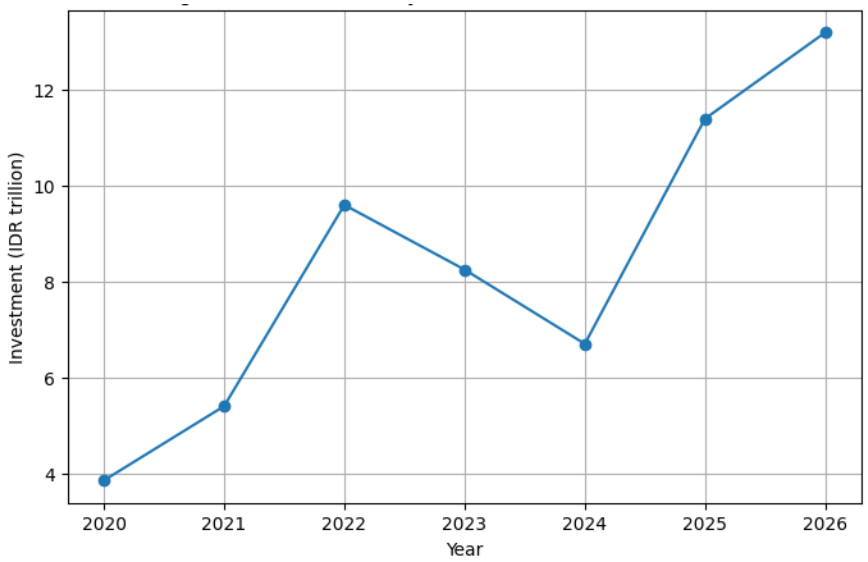

Figure 2. Nickel Industry Investment Trends in East Luwu Regency (2020–2026)

Source: Statistics Indonesia (2020–2024) and author's estimation (2025–2026).

Figure 2 illustrates the increasing trend of nickel industry investment following the implementation of downstreaming policies. The rise in investment reflects the expansion of smelter development and strengthening industrial activities in East Luwu Regency.

Regression Results

To evaluate the direct effect of downstreaming on regional economic growth, regression analysis was conducted using the Ordinary Least Squares (OLS) method. The results are presented in Table 3.

Table 3. Regression Results (2020–2026)

Variable	Coefficient	t-stat	Prob
Constant	2.105	2.68	0.031
Downstreaming	0.238	3.12	0.015
Investment	0.201	2.94	0.018
Gov Expenditure	0.145	2.21	0.059
Labor	0.065	1.34	0.201
Population	0.033	0.95	0.352
R^2	0.83		

Source: Processed data, 2026

Table 3 shows that nickel downstreaming has a positive and statistically significant impact on regional economic growth in East Luwu Regency. The coefficient of downstreaming value added (0.238) indicates that increases in the contribution of mining and processing activities are associated with higher GRDP growth, confirming the importance of value-added industrialization in stimulating regional output expansion. Similarly, nickel industry investment also demonstrates a positive and significant effect, suggesting that capital accumulation through smelter construction and industrial infrastructure development constitutes a major driver of economic

growth. Government capital expenditure exhibits a weaker but still positive contribution, indicating that public investment supports industrial development through infrastructure and regional facilities.

In contrast, labor absorption and population growth do not show statistically significant effects, implying that economic growth in East Luwu remains predominantly driven by capital-intensive industrial expansion rather than labor-intensive development. The relatively high R-squared value of 0.83 further indicates that the regression model explains a substantial proportion of the variation in regional economic growth during the study period.

Control Variables

Table 4. Control Variable Effects

Variable	Effect	Significance
Government Expenditure	Positive	Moderate
Labor	Weak	Not significant
Population	Weak	Not significant

Source: Processed data, 2026

The results confirm that downstreaming remains the dominant growth driver.

Robustness Check and Dynamic Effects

Table 5. Lagged Regression Model of Nickel Downstreaming and Economic Growth

Variable	Coefficient	Standard Error	t-Statistic	Probability
Constant	1.824	0.742	2.46	0.041
Downstreaming Value Added (t–1)	0.185	0.073	2.53	0.048
Nickel Industry Investment (t–1)	0.172	0.070	2.45	0.052
Government Capital Expenditure	0.128	0.061	2.10	0.071
Labor Absorption (%)	0.058	0.047	1.23	0.238
Population Growth (%)	0.031	0.033	0.94	0.361

Source: Processed data, 2026

Table 4 demonstrates that the positive impact of nickel downstreaming on regional economic growth persists even after incorporating lagged variables into the regression model. The significant coefficients of lagged downstreaming value added and investment indicate that the economic effects of industrial expansion are not limited to immediate growth responses but continue to influence regional economic performance over time. This finding suggests that downstreaming generates medium-term economic benefits through sustained industrial activity, infrastructure utilization, and multiplier effects across supporting sectors.

Although the coefficient magnitudes are slightly lower than those in the baseline model, the persistence of statistical significance confirms the robustness of the relationship between downstreaming and economic growth. The results also reinforce the argument that East Luwu's economic transformation is strongly dependent on investment-driven industrialization, while labor and demographic variables continue to play relatively limited roles in shaping regional growth dynamics.

Nickel Downstreaming and the Dynamics of Regional Economic Transformation

The results of this study show that the downstreaming of nickel has now become one of the factors that contributes to the economy of East Luwu Regency, in the years 2020-2026. The positive correlation between value-added industrialization and both downstreaming value-added and industrial investment and GRDP growth indicates that value-added industrialization is playing a significant role in the economic growth of the region. The findings align with the notion that resource-based industrialization can have an impact on economic transformation if natural resources are utilized in the higher value added production process (Lebdioui, 2022). In East Luwu, the growth of smelter industries and mineral processing seems to have boosted the output growth of the region, partly by diverting the economic activity from raw material extraction to industrial processing.

The results also support the endogenous growth theories that focus on the importance of capital accumulation and industry investment for economic performance (Shi & Xu, 2023; Sun et al., 2023). Tho' nickel industry investment is significant, the downstreaming action is mainly realised through investment growth mechanisms. During the rapid expansion of smelter infrastructure, new industries began to invest rapidly, bringing many multiplier effects to transportation, construction, logistics, and associated industrial fields. In other high-resource economies, such as regional economies in industrial processing industries, the same pattern was found during industrial expansion, in which the rapid growth was driven by the development of industrial processing industries (Li et al., 2022; Chang et al., 2023).

But this research also shows significant weaknesses in downstreaming-led growth. Labor absorption does not have a statistically significant effect, though downstreaming generates significant output increases in the region. This result suggests that the economic growth in East Luwu is still a capitaldriven economic growth rather than a labor-driven one. This pattern corroborates existing research that has suggested enclave economic structures with high industrial concentration and low social spillover effects have been found in resource-based industrialization (Andersen et al., 2018). In this situation, downstreaming seems to be effective in promoting growth of GRDP, but less so in creating inclusive jobs.

This finding contradicts somewhat with findings that indicate broad employment transformation can be stimulated through industrial upgrading, provided there are strong industrial linkages and workforce development on the local level (Seyoum, 2024). The East Luwu case shows that nickel downstreaming is very technology intensive and needs relatively less labour. This means that the gains from industrial development will mostly be channeled into growth of industrial labour output and investment, instead of into overall labour market change. This finding will add to the literature theoretically by demonstrating the possibility of “high-growth industrialization” downstreaming without inclusive regional development.

Another important finding concerns the dynamic nature of downstreaming-led growth. The analysis demonstrates that periods of rapid economic growth coincide closely with phases of intensive industrial investment, particularly during smelter construction and infrastructure expansion. Nevertheless, growth begins to moderate once major industrial projects enter operational stabilization phases. This pattern is consistent with studies emphasizing that resource-driven industrialization frequently produces cyclical growth dynamics that depend heavily on investment expansion and commodity demand (Sovacool & Ryu, 2025; Riaz et al., 2025). Therefore, rapid growth associated with downstreaming should not automatically be interpreted as evidence of long-term structural transformation.

The findings further highlight the importance of economic linkages in determining the sustainability of downstreaming-led development. Hirschman's linkage theory suggests that the developmental impact of resource industries depends on their ability to stimulate backward and forward linkages across the domestic economy. In East Luwu, the relatively weak role of labor absorption indicates that these broader economic linkages remain limited. As a result, regional economic growth remains highly dependent on the nickel sector, increasing vulnerability to commodity price fluctuations and external market dynamics.

Compared with previous Indonesian studies focusing primarily on national export performance and industrial competitiveness, this study provides more localized evidence regarding the regional implications of downstreaming policies. By focusing on East Luwu Regency, the study demonstrates that downstreaming can simultaneously stimulate economic growth while reinforcing dependence on a narrow industrial structure. The novelty of this research lies in its integration of downstreaming indicators into a regional econometric framework and its focus on subnational industrial transformation dynamics during the post-export ban period.

From a practical perspective, the findings imply that downstreaming policies should not focus solely on increasing industrial output and investment. Policymakers should also strengthen local supply chains, workforce capabilities, and industrial diversification to ensure broader and more sustainable regional development. Public investment in infrastructure and vocational education is particularly important for enhancing the inclusiveness of downstreaming-led growth. Despite its contributions, this study is limited by its focus on a single regency and the use of estimated data for 2025–2026. Future studies should therefore incorporate comparative regional analysis and broader socio-economic indicators, including environmental and social sustainability dimensions, to better understand the long-term implications of downstreaming in resource-rich regions.

CONCLUSION

The results of this study show that the downstreaming of nickel has now become one of the drivers in the economic growth of East Luwu Regency in 2020-2026. The results show that the growth in Gross Regional Domestic Product is largely driven by the growth of value added in mining and processing activities, which in turn is driven by the increased industrial investment. The study also shows that the growth of East Luwu is still dominated by the nickel industry, has relatively low employment spillovers, and is still dominated by capital-intensive growth. The results are consistent with previous research indicating that downstreaming can foster a broad-based economic growth as well as create structural weaknesses related to industrial concentration. From a theoretical perspective, this study would be of interest to the literature on resource-based industrialisation because it shows that output growth does not necessarily translate into extensive structural transformation or inclusive labour absorption, with effective downstreaming policies. In practice, the results suggest that policies to support more inclusive and sustainable regional development should go hand in hand with downstreaming policies, focusing on building capacity of the workforce, diversifying the economy and strengthening local supply chains.

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