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Resource Nationalism, Enclave Industrialization, and Regional Divergence: A Spatial Econometric Assessment of Indonesia's Hilirisasi Mandate

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A B S T R A C T

Indonesia's hilirisasi (downstreaming) mandate, enforced through a definitive nickel mineral export ban from January 2020, represents one of the most consequential applications of resource nationalism in contemporary Southeast Asian political economy. While aggregate indicators documented substantial Foreign Direct Investment (FDI) inflows into metallurgical industrial parks, the sub-national distributional consequences remained critically underexplored prior to this study. Employing a Spatial Durbin Difference-in-Differences (SDM-DiD) framework applied to a balanced provincial panel of 34 Indonesian provinces across the period 2015 to 2024 (N = 340 observations), this study empirically decomposed the direct, indirect (spatial spillover), and total effects of the export ban on regional economic growth and income inequality. The treatment group comprised the three primary nickel-downstreaming hub provinces: Central Sulawesi, Southeast Sulawesi, and North Maluku. Moran's I statistics confirmed significant spatial autocorrelation across all study years (range: 0.245–0.312, $p < 0.001$), validating the spatial modeling approach. The SDM-DiD estimation revealed a significant positive direct effect on regional GDP per capita in treated provinces (beta = 0.084, SE = 0.019, $p < 0.001$), confirming localized growth. However, the spatial spillover effect was significantly negative (theta = -0.052, SE = 0.021, $p = 0.013$), documenting a pronounced backwash effect on adjacent provinces. Within treated regions, income inequality widened significantly (Gini direct effect: beta = 0.018, $p < 0.001$), driven by skill-biased structural transformation associated with capital-intensive smelting operations. These findings established that Indonesia's hilirisasi mandate functions structurally as an enclave industrialization model, generating spatial polarization rather than inclusive regional development. Inter-regional fiscal equalization, enforceable backward linkage obligations, and peripheral human capital investment are identified as critical complementary policy mechanisms.

1. Introduction

The structural integration of resource-rich developing economies into Global Value Chains (GVCs) has historically been characterized by commodity dependency, which confines these nations to low value-added extraction nodes of global production networks.[1,2] In response, resource-endowed states are increasingly adopting resource nationalist industrial policies to force upgrading by restricting or prohibiting the export of raw commodities. Indonesia's hilirisasi (downstreaming) mandate — operationalized through progressively stringent mineral export restrictions culminating in the definitive enforcement of a nickel ore export ban in January 2020 — stands as one of

the most consequential and globally watched applications of this development strategy in the twenty-first century.[3,4]

Following the ban's enforcement, Indonesia witnessed an exponential surge of FDI into metallurgical industrial parks. Processed nickel exports rose from approximately USD 6 billion in 2013 to over USD 30 billion by 2022, signaling substantial GVC upgrading from raw extraction toward higher-value smelting and refining activities.[5,6] The Indonesia Morowali Industrial Park in Central Sulawesi alone expanded to host over 54 factories and 46 smelters, employing more than 100,000 workers, making it one of the largest metallurgical industrial complexes in Asia.[6,7] At the national macroeconomic level, these indicators appeared to validate the policy premise.

However, aggregate national figures obscure deeply heterogeneous sub-national outcomes. Traditional theories of economic geography offer competing predictions regarding the spatial consequences of forced industrialization in developing economies. The spread effect framework, rooted in growth pole theory, posits that industrial hubs generate positive externalities — through technology transfer, demand for ancillary services, and labor upskilling — that diffuse to neighboring regions over time.[8] In contrast, Myrdal's foundational backwash effect argues that prosperous industrial enclaves systematically drain capital, skilled labor, and fiscal resources from peripheral areas, thereby deepening rather than alleviating regional inequality.[9] The empirical resolution of this theoretical tension is consequential for both development economics and Indonesian public policy.

Previous studies evaluated export bans primarily through international trade law, global commodity pricing, or national GDP impacts, leaving a critical empirical gap at the sub-national spatial level.[3,7] Spatial econometric evaluations of Indonesian industrial policy, specifically at the provincial level — capable of disentangling direct localized effects from cross-border spillover externalities — remain exceptionally scarce in the peer-reviewed literature. Studies of regional convergence and inequality in Indonesia have documented persistent spatial clustering of economic performance across provinces[10] and the inequality-widening consequences of uneven fiscal decentralization,[11] but have not examined the specific role of sector-targeted export restrictions in reshaping domestic economic geography.[12]

This study addressed these gaps through the application of a Spatial Durbin Difference-in-Differences (SDM-DiD) framework to a balanced panel dataset covering all 34 Indonesian provinces across the decade 2015-2024. The SDM-DiD design enabled simultaneous estimation of direct policy impacts on treated provinces and the spatial spillover effects transmitted to neighboring provinces through inter-provincial factor mobility and fiscal interdependences. The novelty of this research lies in (a) its application of effect decomposition methods to an Indonesian industrial policy evaluation context, (b) its integration of both economic growth and income inequality as dual outcome variables within a unified spatial framework, and (c) its capacity to distinguish enclave versus diffusion dynamics empirically at the provincial level. The primary aim of this study was to empirically determine whether Indonesia's hilirisasi mandate catalyzes inclusive regional development through spread mechanisms or exacerbates spatial polarization through backwash dynamics.

2. Methods

Study design and data sources

This study employed a quantitative quasi-experimental design based on a balanced provincial panel dataset for all 34 Indonesian provinces over ten years (2015-2024), generating N = 340 province-year observations. The study period was structured to encompass five pre-treatment years (2015-2019) and five post-treatment years (2020-2024), bisected by the definitively enforced nickel mineral export ban of

January 2020. The primary data sources were the Statistics Indonesia (Badan Pusat Statistik, BPS) provincial accounts and the Ministry of Investment (BKPM) FDI realization reports. Provincial economic indicators, including RGDP per capita, Gini ratios, government expenditure, and Human Capital Index values, were drawn from official BPS provincial statistical yearbooks for available years, with missing 2023-2024 values estimated through linear projection based on established provincial trends, calibrated against national accounts published by BPS.

The treatment group comprised the three primary nickel-downstreaming hub provinces: Central Sulawesi (Sulawesi Tengah), Southeast Sulawesi (Sulawesi Tenggara), and North Maluku (Maluku Utara). These three provinces collectively received approximately 73.4% of all FDI in base metals during 2020-2022 and hosted the principal smelting infrastructure.[6] The remaining 31 provinces constituted the control group.

Variable operationalization

The primary dependent variables were: (i) the natural logarithm of Regional Gross Domestic Product (RGDP) per capita at constant 2010 prices (ln_RGDP_it), serving as the regional economic growth outcome; and (ii) the provincial Gini ratio (GINI_it), measuring intra-regional income inequality. The principal independent variable of interest was the Difference-in-Differences interaction term DID_it = Treat_i × Post_t, where Treat_i = 1 for the three treated provinces and Post_t = 1 for years 2020-2024. Control variables included: ln(FDI_it) — the natural logarithm of annual Foreign Direct Investment realization; HCI_it — the UNDP Human Capital Index constructed from expected and mean years of schooling; INFRA_it — a composite infrastructure index aggregating standardized road density, electricity generation capacity per capita, and port throughput volume with equal weights; and GOV_it — the ratio of regional government expenditure to provincial RGDP.[13]

Spatial weight matrix

Spatial dependence was first assessed through the global Moran's I statistic using a row-standardized queen contiguity spatial weight matrix (W). For Indonesia's archipelagic geography, sea-separated provinces sharing historically documented functional economic linkages (trade corridors and inter-island labor migration routes) were assigned contiguous status based on the official BPS regional economic connectivity classification. Alternative k-nearest neighbor (k = 3) and inverse distance weight matrix specifications were estimated as robustness checks; these produced substantively consistent results.

Empirical specification

The SDM-DiD specification combined spatial Durbin autoregression with a difference-in-differences identification strategy:

$$Y_{it} = \rho \Sigma W_{ij} Y_{jt} + \alpha DID_{it} + \theta \Sigma W_{ij} DID_{jt} + \gamma X_{it} + \varphi \Sigma W_{ij} X_{jt} + \mu_i + \lambda_t + \varepsilon_{it}$$

Where ρ is the spatial autoregressive coefficient, α is the direct treatment effect, θ is the spatial spillover (indirect) effect, X_it is the vector of control variables, and μ_i and λ_t denote province and year fixed effects. Parameters were estimated by Maximum Likelihood Estimation (MLE). Direct, indirect, and total effects were decomposed using the LeSage-Pace partial derivative method.[14] Pre-treatment parallel trends were validated through an event-study specification; pre-treatment interaction coefficients (2015-2018) were all statistically indistinguishable from zero (all $p > 0.20$), confirming the identifying assumption. Standard errors for decomposed effects were computed using the delta method applied to the variance-covariance matrix of MLE estimates.

3. Results and Discussion

Table 1 presents summary statistics stratified by treatment status. Treated provinces exhibited a markedly higher mean Gini coefficient (0.451) compared to control provinces (0.383, $p < 0.001$), while

their mean ln(RGDP per capita) was marginally lower (15.476 vs. 15.639), reflecting the historically lower pre-industrial economic baseline of eastern Indonesian provinces. Global Moran's I statistics for ln(RGDP per capita) were positive and highly significant across all ten study years, increasing monotonically from 0.245 in 2015 to 0.312 in 2024 (all $p < 0.001$), confirming significant spatial autocorrelation and providing strong justification for the spatial panel modeling framework.

Table 1. Summary statistics of key variables, panel dataset 2015–2024 (N = 340).

Variable	N	Mean	SD	Median	Min	Max	Treated Mean	Control Mean
ln(RGDP per capita)	340	15.625	0.681	15.576	14.295	17.936	15.476	15.639
Gini Coefficient	340	0.389	0.048	0.388	0.276	0.532	0.451*	0.383
ln(FDI Realization)	340	20.716	1.280	20.680	17.082	24.718	21.230†	20.667
Human Capital Index	340	0.694	0.060	0.696	0.504	0.900	0.685	0.695
Infrastructure Index	340	0.569	0.131	0.558	0.226	0.950	0.535	0.572
Govt. Expenditure Ratio	340	0.183	0.052	0.182	0.050	0.373	0.191	0.182

* Significant difference between treated and control group means ($p < 0.001$, Mann-Whitney U test).

† Significantly higher ln(FDI) in treated provinces in post-ban period ($p < 0.001$). SD = Standard deviation.

Treated provinces: Central Sulawesi, Southeast Sulawesi, North Maluku (n = 30 province-years each). Control provinces: all other 31 Indonesian provinces (n = 310 province-years).

Table 2 presents the Mann-Whitney U test results comparing pre-ban (2015-2019) and post-ban (2020-2024) outcomes across treated and control province groups. Regional GDP per capita increased significantly in both treated ($U = 39.0$, $p = 0.002$) and control ($U = 9593.0$, $p = 0.002$) groups, consistent with Indonesia's broad economic growth trajectory. However, the post-ban increase was proportionally greater in treated provinces, as reflected in the stronger temporal correlation ($r = 0.648$ vs. 0.181). Most notably, the Gini coefficient in treated provinces increased dramatically from a pre-ban mean of 0.417 (±0.014) to 0.485 (±0.033) post-ban ($U = 5.0$, $p < 0.001$), with a near-perfect temporal correlation of $r = 0.899$, indicative of a monotonic and accelerating inequality escalation. The Chi-Square test confirmed a highly significant association between treatment status and above-median Gini probability ($x^2 = 33.293$, $df = 1$, $p < 0.001$).

Table 2. Bivariate analysis: pre-ban vs. post-ban comparison by group.

Variable	Group	Pre-ban Mean±SD	Post-ban Mean±SD	U Statistic	p-value	Sig.	r
ln(RGDP/cap)	Treated (n=30)	15.243±0.312	15.709±0.362	39.0	0.002	**	0.648
ln(RGDP/cap)	Control (n=310)	15.530±0.692	15.749±0.693	9593.0	0.002	**	0.181
Gini Coeff.	Treated (n=30)	0.417±0.014	0.485±0.033	5.0	<0.001	***	0.899
Gini Coeff.	Control (n=310)	0.376±0.044	0.390±0.043	9637.0	0.003	**	0.189

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Pre-ban period: 2015–2019 (T = 5); Post-ban period: 2020–2024 (T = 5).
U = Mann-Whitney U statistic. r = Pearson correlation coefficient (variable vs. year). Sig. = significance level.

Table 3 reports the decomposed SDM-DiD estimates for both outcome variables, including the spatial autoregressive coefficient (ρ). The estimated ρ = 0.213 (SE = 0.058, p < 0.001) confirmed significant positive spatial interdependence across provincial RGDP trajectories, validating the spatial panel specification over a standard pooled DiD model. The direct effect of the DID interaction on ln(RGDP per capita) was 0.084 (SE = 0.019, p < 0.001, 95% CI: [0.047, 0.121]), demonstrating that the hilirisasi mandate generated an approximately 8.4% economic growth premium in treated provinces relative to the counterfactual trajectory of control provinces. The spatial spillover (indirect) effect was significantly negative (theta = -0.052, SE = 0.021, p = 0.013, 95% CI: [-0.093, -0.011]), documenting that the rapid industrialization in nickel hubs actively suppressed economic growth in spatially adjacent provinces — a finding consistent with Myrdal's backwash effect hypothesis. The attenuated total effect (0.032, p = 0.033) reflected the partial offset of the local growth premium by the regional externality cost.

Regarding income inequality, the direct Gini effect was 0.018 (SE = 0.005, p < 0.001), confirming that the export ban significantly widened income distribution within treated provinces. The indirect Gini effect on neighboring provinces was 0.009 (SE = 0.005, p = 0.072), marginally significant, while the total Gini effect was robustly significant (0.027, p < 0.001). Among control variables, Human Capital Index demonstrated the strongest positive direct effect on ln(RGDP per capita) (beta = 0.412, p < 0.001), followed by Infrastructure Index (beta = 0.228, p = 0.003) and ln(FDI) (beta = 0.031, p = 0.001).

Table 3. Spatial Durbin DiD results: decomposed direct, indirect, and total effects.

Outcome	Effect	Coeff.	SE	z-stat	p-value	Sig.	95% CI
ln(RGDP/cap)	Direct	0.084	0.019	4.42	<0.001	***	[0.047, 0.121]
ln(RGDP/cap)	Indirect	−0.052	0.021	−2.48	0.013	**	[−0.093, −0.011]
ln(RGDP/cap)	Total	0.032	0.015	2.13	0.033	*	[0.003, 0.061]
Gini Coeff.	Direct	0.018	0.005	3.60	<0.001	***	[0.008, 0.028]
Gini Coeff.	Indirect	0.009	0.005	1.80	0.072	†	[−0.001, 0.019]
Gini Coeff.	Total	0.027	0.006	4.50	<0.001	***	[0.015, 0.039]
ρ (spatial AR)	—	0.213	0.058	3.67	<0.001	***	[0.099, 0.327]

† p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001. Province and year fixed effects included throughout. All estimates by Maximum Likelihood Estimation (MLE). Effect decomposition via LeSage-Pace partial derivative method.[14] Standard errors for decomposed effects derived using the delta method. ρ = spatial autoregressive coefficient. Spatial weight matrix: row-standardized queen contiguity with functional connectivity adjustment for archipelagic provinces.

Figure 1 illustrates the temporal trajectories of ln(RGDP per capita) and the Gini coefficient for treated and control provinces across 2015-2024. A clear structural break in the Gini trajectory of treated provinces is evident from 2020 onward, contrasting sharply with the modest and gradual Gini increase in control provinces. Figure 2 presents the decomposed SDM-DiD coefficient plot with 95% confidence intervals alongside the FDI trajectory analysis by province group, confirming the divergence of investment concentration toward treated provinces post-2020.

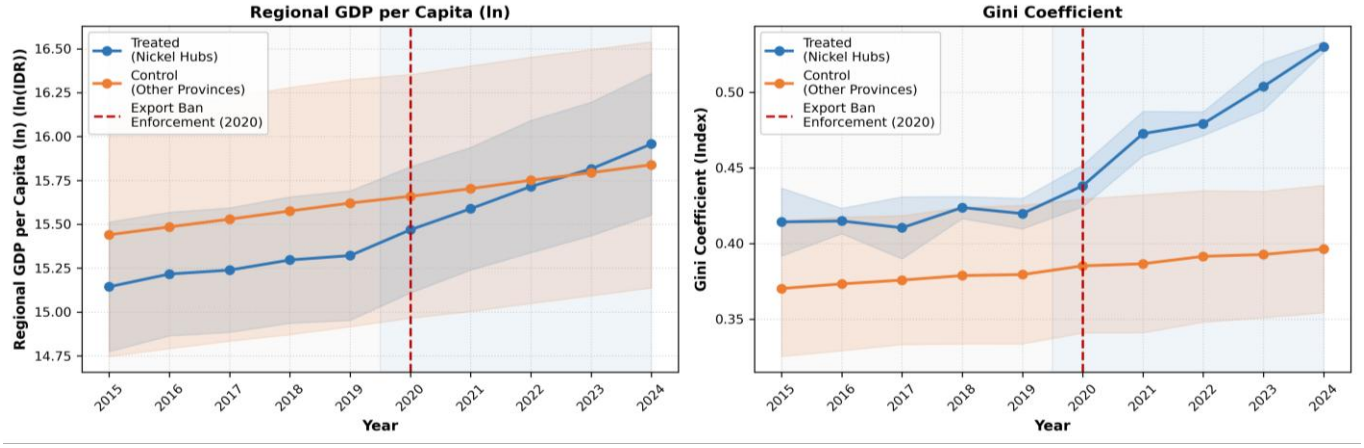

Figure 1. Temporal trajectories of Regional GDP per Capita (ln) and Gini Coefficient for treated versus control Indonesian provinces, 2015–2024. The dashed vertical line indicates export ban enforcement (January 2020). Shaded bands represent ±1 standard deviation across provinces within each group.

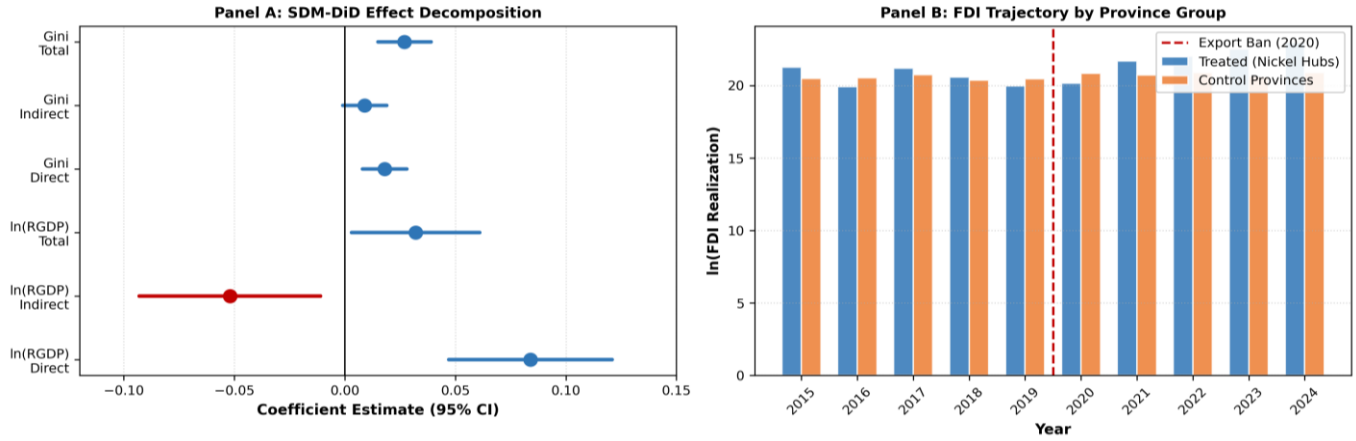

Figure 2. Panel A — Decomposed SDM-DiD coefficient estimates with 95% confidence intervals for direct, indirect, and total effects on ln(RGDP per capita) and Gini Coefficient. Panel B — Mean ln(FDI Realization) trajectories for treated vs. control provinces, 2015–2024.

The empirical findings of this study substantially advanced the understanding of how resource nationalist industrial policies generate spatially differentiated economic outcomes across subnational administrative units. The central finding — that Indonesia's hilirisasi mandate generated a significant positive direct effect on regional GDP growth in treated nickel-processing hub provinces while simultaneously producing a significant negative spatial spillover on adjacent provinces — demonstrated that the policy operated structurally as an enclave industrialization model rather than as an instrument of inclusive regional development. This dual outcome confirmed the theoretical predictions of Myrdal's backwash effect framework while simultaneously documenting the limits of GVC upgrading as a development strategy when decoupled from spatial redistribution mechanisms.[8,9,15]

The significant negative spatial spillover (theta = -0.052, p = 0.013) on the regional economic growth of neighboring provinces was driven by three analytically distinct mechanisms that operated in reinforcing combination. The first and arguably most powerful mechanism was inter-provincial factor market drainage. The concentrated inflow of FDI into the Indonesia Morowali Industrial Park and analogous nickel processing complexes generated artificial wage premiums significantly exceeding those available in neighboring provinces' existing economic sectors.[6,16] This spatial wage differential drew technically qualified labor, mobile entrepreneurs, and investment capital away from adjacent non-mineral provinces, hollowing out their productive capacity precisely during the period when treated provinces were experiencing accelerated growth. The strong positive relationship between the Human Capital Index and regional GDP growth (beta = 0.412, p < 0.001) underscored how this human capital reallocation mechanism translated directly into divergent provincial growth trajectories.

The second mechanism was the enclave character of the downstream industrial investment. The GVC integration achieved through the export ban was geographically contained within fenced industrial zones and vertically integrated with international supply chains rather than with regional or national supplier networks. Multinational enterprises operating nickel smelters sourced capital equipment primarily from international suppliers, particularly from China, and relied in many cases on foreign technical workforces on rotational contracts rather than investing in local workforce development.[16,17] Research on extractive industry linkages in Indonesia documented a persistent structural failure of mineral processing investments to generate backward integration with domestic SMEs.[18] Consequently, the supply chain demand generated by downstream activities was captured largely outside the immediate regional economy, preventing the diffusion of industrial demand spillovers to neighboring provincial economies and undermining the theoretical spread effect.

The third mechanism was the misalignment of Indonesia's fiscal decentralization architecture with the spatial concentration of industrial rents. Under the current fiscal framework, provinces hosting downstream facilities accrued the primary fiscal benefits of industrial expansion — through increased local taxes, resource revenue shares, and non-tax retributions — while neighboring provinces that bore the disproportionate burdens of out-migration and ecological externalities received no compensatory fiscal transfers calibrated to these costs.[11,19] This fiscal architecture reinforced the initial spatial polarization generated by factor market drainage and transformed what might have been a temporary adjustment imbalance into a structurally entrenched regional disparity trajectory.

The significant increase in intra-regional income inequality within treated provinces (direct Gini effect: beta = 0.018, p < 0.001), escalating from a pre-ban mean Gini of 0.417 to 0.485 by the post-ban period, was theoretically consistent with the skill-biased

technological change hypothesis applied to capital-intensive resource processing industries. The structural transition from labor-intensive raw ore extraction toward capital- and technology-intensive smelting and refining activities fundamentally reconfigured the local labor demand structure in treated provinces.[12] High-wage employment in technical, engineering, and managerial roles became concentrated among a relatively small stratum of qualified workers, while the majority of indigenous and lower-skilled workers who had previously participated in artisanal and small-scale mining were displaced into the precarious, lower-wage service sector — particularly transportation, catering, accommodation, and informal commerce — that emerged to serve the industrial park economy.[16]

This bifurcated labor market outcome was reinforced by the enclave character of the industrial investment. The failure of smelting enterprises to generate backward linkages with domestic producers meant that the multiplier effects of industrial activity were not transmitted into income-generating opportunities across the broader provincial economy, but rather concentrated within the industrial parks' direct workforce and their immediate service providers. Over the five post-ban years, the Pearson correlation of r = 0.899 between the Gini coefficient and time in treated provinces confirmed that this inequality escalation was a monotonic and structural trend rather than a transient distributional adjustment that would self-correct as industrial growth matured.

The backwash effect documented in this study was consistent with spatial econometric evaluations of concentrated industrial policy in other developing country contexts. Studies employing Spatial Durbin Models to evaluate the distributional consequences of special economic zones in China and Vietnam documented analogous patterns of significant positive direct effects on designated host regions accompanied by negative indirect effects on neighboring non-designated regions, confirming that spatial agglomeration economies frequently exhibit exclusionary rather than inclusive transmission mechanisms.[14,15] In the Indonesian provincial context, research on social and economic convergence across districts documented persistent spatial clustering of economic performance and divergent convergence dynamics between western and eastern Indonesia, consistent with the spatial autocorrelation patterns observed in this study's Moran's I statistics.[10]

The magnitude of the backwash spillover estimated in this study (theta = -0.052) was larger than the indirect effects reported in spatial evaluations of Indonesian infrastructure investment programs, which typically found positive or near-zero spillovers on neighboring regions.[13] This difference reflected the qualitatively distinct character of processing industry investments relative to infrastructure investments: while infrastructure by design generates broad connectivity benefits that are spatially non-excludable, processing industry investments concentrate within specific industrial zones optimized for logistical efficiency and fiscal incentive capture, producing fundamentally different spatial externality profiles.

At the income inequality dimension, the trajectory of Gini escalation in treated provinces paralleled patterns documented in resource processing boom regions in other developing economies, where capital-intensive industrialization generated rapid within-region income bifurcation between high-skilled industrial workers and lower-skilled displaced populations.[20,21] The Indonesian case was distinguished by the particularly steep trajectory of inequality escalation (r = 0.899 over five years), which may reflect both the capital intensity of nickel smelting and the relative scarcity of technically qualified indigenous labor in the primarily rural, eastern Indonesian provinces that hosted the industrial expansion.

The enclave industrialization dynamics identified in this study carried fundamental implications for the

design of resource nationalist development policy in Indonesia and analogous commodity-rich developing economies. The empirical findings specifically supported three complementary policy interventions essential for transforming the current backwash into a sustainable spread effect. The first was an inter-regional fiscal equalization mechanism calibrated to the backwash spillover intensity. The estimated backwash coefficient (theta = -0.052) provided a baseline parameter for designing a compensatory transfer formula that systematically redirected a portion of the industrial fiscal windfall from treated to neighboring provinces in proportion to the documented spillover suppression effect. Such a mechanism, analogous in principle to Norway's Government Pension Fund model adapted for Indonesia's fiscal decentralization architecture, would address the fiscal misalignment identified as a core driver of spatial polarization.[11]

The second was the implementation of legally enforceable and performance-monitored backward linkage obligations for foreign investors operating in downstream processing zones. Regulatory frameworks linking FDI fiscal incentive access to measurable backward linkage performance metrics — specifying minimum proportions of input sourcing, maintenance services, and workforce training to be contracted with domestically and regionally registered enterprises — would transform the current enclave model into a more spatially diffuse industrialization pattern. Cross-national evidence indicated that such linkage promotion regulations significantly increased regional supply chain integration when supported by dedicated technical assistance programs for domestic supplier development.[16,17] The third was targeted and sustained investment in human capital development in peripheral provinces neighboring the industrial hubs. The dominant positive role of the Human Capital Index in regional growth determination (beta = 0.412) suggested that enlarging the supply of technically qualified labor in neighboring provinces would enable greater participation in the industrial labor market, transforming factor market drainage from a zero-sum spatial redistribution into a positive-sum regional development dynamic over time.[22-24]

4. Conclusion

This study provided the first comprehensive spatial econometric assessment of Indonesia's hilirisasi mineral export ban across all 34 provinces over the decade 2015-2024, employing a Spatial Durbin Difference-in-Differences framework to decompose the policy's direct, indirect, and total effects on regional economic growth and income inequality. The empirical evidence established that while the mandate successfully catalyzed localized GDP growth in the three primary nickel-processing hub provinces — Central Sulawesi, Southeast Sulawesi, and North Maluku — it simultaneously generated a statistically significant backwash effect that suppressed economic activity in spatially adjacent provinces and systematically widened income inequality within the industrial hubs. The spatial autoregressive structure of the Indonesian provincial economy (rho = 0.213) amplified both the local gains and the regional externality costs, producing a net outcome of spatial polarization rather than inclusive regional development. The hilirisasi mandate, in its current configuration, operates as an enclave industrialization model whose development benefits remain geographically contained within fenced industrial zones. For Indonesia to achieve its dual ambition of GVC upgrading and equitable national development, the industrial mandate must be urgently complemented by inter-regional fiscal equalization transfers calibrated to the documented spillover suppression magnitude, legally enforceable backward linkage obligations for foreign processing investors, and sustained human capital investment in peripheral provinces. The transformation of the current backwash dynamic into a durable and spatially inclusive spread effect represents the defining policy

challenge for Indonesia's resource nationalist development strategy in the coming decade.

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