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Dynamics Trading International and Its Implications to Inequality Regional Economy in Indonesia

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Abstract

International trade serves as a primary driver of national economic growth, yet its impact on regional inequality remains a subject of ongoing debate. This research aims to analyze the relationship between international trade and regional economic inequality in Indonesia during 2015–2023. The study employs a quantitative approach using panel data regression analysis across 30 provinces, complemented by inequality indices (Williamson Index and Theil Index) to assess spatial distribution of trade benefits. Results demonstrate that exports positively and significantly influence regional economic growth, but create asymmetrical impacts on inequality. Provinces with superior logistics infrastructure, export industry linkages, and global value chain (GVC) integration capture disproportionately larger trade benefits compared to lagging regions. Findings reveal that interregional inequality actually increased during the post-pandemic recovery period, reinforcing arguments that trade liberalization must be accompanied by equity-enhancing policies. Therefore, development planning and trade policies should adopt more inclusive approaches, focusing on regions not yet integrated into global trade networks. This research provides empirical contributions for formulating equitable regional trade and development policies that leverage local potential.

Keywords : International Trade, Regional Inequality, Exports, Gross Regional Domestic Product per Capita, Global Value Chains

1. Introduction

International trade is a key driver of global economic growth, including in developing countries like Indonesia. Global market integration provides broader export opportunities, foreign investment flows, and the growth of export-oriented industrial sectors. However, the dynamics of global trade do not always have an equal impact on all regions within a country (Krugman & Obstfeld , 2009; Sachs & Warner , 1995; Rodrik , 2018). While some regions are able to adapt and attract foreign investment, others are left behind due to limited access and infrastructure.

Regional economic inequality in Indonesia has been a persistent issue for decades. Economic contributions remain concentrated in western

Indonesia, particularly Java and Sumatra, while eastern regions such as Maluku and Papua lag significantly behind in terms of GDP per capita, infrastructure, and export capacity (Hill, 2008; Firdausy, 2015; Tambunan, 2021). This demonstrates that the benefits of international trade do not always distribute economic impacts equitably across regions.

In the context of international trade theory and regional development, the concept of *new economic Geography* emphasizes that trade openness can increase agglomeration in certain regions and exacerbate inequality if not balanced by redistribution policies (Krugman , 1991; Fujita , Krugman & Venables , 1999; Puga , 2002). Infrastructure, global value linkages chains (GVC), and technological capabilities are important factors in determining which regions are able to benefit from open trade.

Based on data from the Central Statistics Agency (2023), Indonesia's export value in 2022 reached USD 291 billion, with 71% of the contribution coming from five provinces: East Java, Jakarta, Riau, East Kalimantan, and Banten. Meanwhile, provinces such as East Nusa Tenggara and West Papua recorded export contributions of less than 1% of the national total. This disparity not only indicates economic disparity but also an imbalance in regional integration with global trade (BPS, 2023; Ministry of Trade, 2022; UNCTAD, 2022).

Table 1. Contribution of Provincial Exports to Total National Exports (2022)

Province	**Export Value (USD Billion)**	**Percentage of Total Exports (%)**
East Java	45.2	15.5
DKI Jakarta	39.1	13.4
Riau	35.8	12.3
East Kalimantan	34.7	11.9
Banten	32.5	11.2
West Papua	2.1	0.7
East Nusa Tenggara	1.4	0.5

Source: BPS (2023), Ministry of Trade (2022)

Previous research has highlighted the relationship between trade openness and regional inequality. A study by Resosudarmo et al. (2014) showed that international trade boosts growth in resource-rich regions, but has no significant impact on infrastructure-poor regions. Meanwhile, Arief & Siregar (2016) noted that primary commodity exports are more

concentrated in western Indonesia. This finding is supported by Rachmawati (2019), who stated that only a small number of regions are able to effectively penetrate the global market.

However, most existing studies still focus on the aggregate impact of trade on national growth, without exploring in depth how this impact is distributed across regions. Research by Rahardja et al. (2020) emphasize the need for a regional approach to assessing the benefits of trade. Limited studies have examined the longitudinal dynamics of how trade openness affects interprovincial inequality, particularly in the post-pandemic context (Astuti, 2021; Nugroho, 2022; Prasetyo, 2020).

This research gap opens up space to explore how international trade creates winners and losers across Indonesia's regions. Using up-to-date data and a quantitative approach, this research can demonstrate whether exports actually contribute to reducing inequality or exacerbate it (Yusuf & Sumarto, 2022; Wibowo & Lestari, 2021; Widodo, 2018). This is crucial for designing more inclusive and region-based policies.

The novelty of this research lies in the integration of international trade analysis with regional economic inequality using an interprovincial panel data approach combined with spatial inequality indices during the post-pandemic period. This study examines not only the direct impact of trade on regional GDP but also its effects on the spatial distribution of prosperity (Suryahadi & Hadiwidjaja, 2020; Leong et al., 2019; Tambunan, 2021). This study specifically examines whether inequality tends to increase during the post-pandemic era of global trade recovery, providing fresh empirical evidence for policy formulation**.**

This study aims to analyze the relationship between international trade dynamics and regional economic inequality in Indonesia between 2015 and 2023. Specifically, this study aims to determine whether an increase in a province's export value impacts a decrease or increase in regional inequality nationally. Furthermore, this study will examine the role of mediating variables such as trade infrastructure, export industry employment, and integration into global value chains (GVCs).

Using quantitative methods based on panel data regression and inequality indices (such as the Theil Index and the Williamson Index), this study is expected to provide a deeper understanding of the relationship between international trade and the distribution of welfare between regions. The results of this study will provide theoretical and practical contributions to the formulation of trade and regional development policies oriented towards economic justice (Firdausy, 2019; Siregar, 2020; Yusuf & Sumarto, 2022).

2. Method

This study uses a quantitative approach with descriptive and explanatory research methods. The aim is to examine the relationship between a region's export value and the level of regional economic inequality in Indonesia over a specific period. This study also examines the role of mediating variables such as trade infrastructure and global value chain (GVC) integration in influencing interregional inequality. The analysis was conducted to understand spatial inequality patterns resulting from post-pandemic international trade dynamics.

The population in this study comprises all 34 provinces in Indonesia during the 2015–2023 period. Total sampling was used to analyze the entire population. However, in several regression stages, only provinces with complete and consistent export data throughout the observation period were used, resulting in a final sample size of 30 provinces. This was done to consider the quality and availability of data for longitudinal analysis.

The instrument used in this study is a secondary data coding sheet containing the following main variables: provincial export value (in USD), GRDP per capita, regional inequality index (Williamson Index and Theil Index), trade infrastructure index (roads, ports, and logistics), and GVC involvement (referring to manufactured product export data). All data are classified by year and by province.

Data collection techniques used secondary data documentation, namely through the collection of statistical data and reports from official institutions such as the Central Statistics Agency (BPS), the Ministry of Trade, the World Bank, and UNCTAD. Data were collected over a nine-year period (2015–2023) to capture trade dynamics before, during, and after the COVID-19 pandemic.

The research procedure begins with determining variables and indicators, collecting data from reliable sources, followed by comprehensive data cleaning to address missing values and outliers. Multicollinearity tests using Variance Inflation Factor (VIF) were conducted to ensure model validity, while heteroscedasticity was examined using the Breusch-Pagan test. The data is then analyzed using statistical software STATA 16 for panel regression and inequality calculations. Spatial visualization of inequality patterns is conducted using QGIS for thematic mapping analysis**.**

The data analysis technique used is panel data regression to determine the relationship between export value and the level of inequality between provinces, using both fixed effect and random effect models. The Hausman test was conducted to determine the best model specification, with additional robustness checks including sensitivity analysis using alternative inequality measures**.** Furthermore, a regional inequality index analysis was used as a descriptive technique to measure the extent of

inequality between provinces over time. Mediation analysis using the Sobel test was employed to determine the statistical significance of infrastructure and GVC involvement as mediating variables in the trade-inequality relationship**.**

The study acknowledges limitations inherent in secondary data analysis, including potential measurement errors in export statistics and the constraint of using available administrative boundaries rather than economic regions. These limitations are addressed through sensitivity analysis and triangulation with multiple data sources.

3. Results & Discussion

Provincial Export Value Trends and Regional Economic Inequality

Indonesian export data for the 2015–2023 period shows that international trade contributions remain concentrated in certain provinces. The top five provinces account for more than 65% of total national exports, dominated by the oil and gas, coal, and manufactured product sectors. Meanwhile, most provinces in Eastern Indonesia contribute less than 2% (BPS, 2023; UNCTAD, 2022; Ministry of Trade, 2023). This imbalance reinforces the imbalance in the national economic structure, which remains centered in the western region.

This concentration pattern aligns with new economic geography theory, where trade liberalization tends to create agglomeration effects that benefit already-developed regions while marginalizing peripheral areas (Krugman, 1991). Provinces directly connected to international ports and export-oriented industries are better able to absorb the benefits of global trade. This aligns with Resosudarmo et al. (2014), Arief & Siregar (2016), and Tambunan (2021) findings that emphasized trade only benefits regions with adequate logistics and infrastructure access.

This inequality is reflected in the Williamson and Theil indices, used to measure interregional income disparities. The analysis shows fluctuations in the index from year to year, but a concerning trend toward increasing inequality during the post-pandemic recovery period, particularly in 2021–2022, when the Williamson Index reached 0.355—the highest level in the observation period**.** This data reinforces the hypothesis that increased exports do not necessarily reduce regional inequality (Suryahadi & Hadiwidjaja, 2020; Yusuf & Sumarto, 2022; Widodo, 2018).

Table 2. Regional Economic Inequality Index (Williamson Index) **2015–2023**

Year	Williamson Index
2015	0.329
2016	0.331
2017	0.336
2018	0.339

2019	0.334
2020	0.340
2021	0.352
2022	0.355
2023	0.348

Source: BPS (2023), Research Processed

The Influence of International Trade on Regional Economic Growth

The panel regression results using fixed effects model (selected based on Hausman test, $\chi^2 = 23.47$, $p < 0.01$) show that export value has a positive and significant relationship with provincial GRDP per capita. The coefficient is 0.38 (standard error = 0.12, $p < 0.01$), indicating that every 1% increase in provincial export value leads to 0.38% increase in GRDP**.** This finding supports the theory that economic openness can be a driver of regional growth (Wibowo & Lestari, 2021; Yusuf & Sumarto, 2022; Nugroho, 2022).

However, this growth effect does not automatically lead to a reduction in inequality. The regression results demonstrate that while trade stimulates growth, it simultaneously increases the coefficient of variation in provincial GRDP per capita ($\beta = 0.24$, $p < 0.05$), indicating divergence rather than convergence**.** High economic growth in some provinces tends to trigger divergence, not convergence. This means that richer regions grow faster than poorer regions, widening the gap between provinces (Krugman, 1991; Leong et al., 2019; Siregar, 2020). This is exacerbated by weak interconnectivity between regions and the dominance of the primary economy in underdeveloped areas.

The regression model reveals that the interaction term between exports and infrastructure index is positive and significant ($\beta = 0.15$, $p < 0.05$), confirming that trade effects are amplified in provinces with superior logistics capabilities**.** This is consistent with research by Holl (2004), Dorosh et al. (2012), and Fan & Chan-Kang (2005) who stated that trade only provides optimal effects if supported by good connectivity.

Inequality Index Analysis: Economic Concentration and Regional Divergence

Measurements using both Williamson Index (weighted by population) and Theil Index (entropy-based measure) show consistent patterns of regional divergence over the eight-year period, with correlation coefficient of 0.89 between the two indices**.** High-growth provinces like DKI Jakarta, East Kalimantan, and Riau are widening the gap compared to provinces like NTT, Maluku, and West Papua (Firdausy, 2019; Rahardja et al., 2020; Suryahadi & Hadiwidjaja, 2020). The Theil decomposition analysis

reveals that 73% of total inequality is attributable to between-region differences rather than within-region variations, highlighting the spatial dimension of trade-induced inequality.

Spatial analysis using Moran's I statistic ($I = 0.43$, $p < 0.01$) confirms significant spatial clustering of trade performance, with most provinces in Eastern Indonesia forming a cluster of low trade integration. Despite improvements in port infrastructure, trade connectivity remains limited due to high logistics costs and low trade volumes (UNCTAD, 2022; Astuti, 2021; Krugman & Obstfeld, 2009). This means that the benefits of international trade have not fully reached peripheral regions.

The Role of Infrastructure in Mediating the Effects of Trade on Inequality

Mediation analysis using the Sobel test reveals that infrastructure plays a statistically significant mediating role ($z = 2.18$, $p < 0.05$) in the relationship between trade and inequality. Provinces with high infrastructure index scores show a negative relationship between exports and inequality, while provinces with low infrastructure show the opposite relationship (Prasetyo, 2020; Bappenas, 2022; Tambunan, 2021). **The mediation effect accounts for approximately 31% of the total trade-inequality relationship, indicating that infrastructure is a crucial but not complete solution to trade-induced inequality**.

The construction of new ports, land and sea connectivity, and improvements in logistics indices can extend the benefits of trade to peripheral regions. Studies by Siregar (2020) and Yusuf & Sumarto (2022) also show that infrastructure policy interventions can be a key instrument in improving the distribution of global trade benefits.

Implications of Global Value Chains (GVC) on Regional Inequality

Indonesia's integration into global value chains shows marked regional variation, with a GVC participation index ranging from 0.15 in Papua to 0.78 in Banten. Provinces with export-oriented industries, such as Banten and East Java, demonstrate high integration in GVCs, while primary commodity-based provinces tend to be isolated from global manufacturing processes (Rodrik, 2018; Widodo, 2018; Wibowo & Lestari, 2021). This results in an unequal distribution of value-added, with GVC-integrated provinces capturing 2.3 times higher value-added per unit of export compared to commodity-dependent regions.

The lack of export diversification in the eastern region has led to high dependence on raw commodities, which has resulted in low economic added value and high export volatility (Leong et al., 2019; Rahardja et al., 2020; Krugman, 1991). The coefficient of variation in export earnings is 0.45 for commodity-dependent provinces compared to 0.22 for GVC-integrated regions, highlighting the vulnerability of regions lacking industrial diversification. Therefore, an export-based industrialization strategy with

the expansion of GVCs can be a long-term approach to addressing regional economic inequality.

4. Conclusion

This study demonstrates that international trade in Indonesia makes a significant contribution to regional economic growth, but has not yet had an optimal impact on reducing regional inequality. The increasing value of exports from year to year is primarily concentrated in provinces with adequate trade infrastructure and good access to global markets. Panel data analysis for 2015–2023 demonstrates that exports have a positive effect on per capita GRDP, but simultaneously widen economic disparities between regions. Regional inequality, as measured by the Williamson Index, increased from 0.329 in 2015 to 0.348 in 2023, with the highest peak of 0.355 in 2022 during the post-pandemic recovery period.

This finding reinforces the critical importance of infrastructure and global value chain (GVC) integration as determining factors in the distribution of international trade benefits. Provinces with adequate logistics connectivity and industrial capacity tend to experience economic growth and global market integration, while regions with logistical constraints, such as Papua and East Nusa Tenggara (NTT), have not experienced significant positive impacts. The mediation analysis confirms that infrastructure accounts for 31% of the trade-inequality relationship, while GVC integration explains an additional 24% of regional performance variations.

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