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Competitiveness of Indonesian Tea Products in the European Union Market

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Abstract. This study evaluates the competitiveness of Indonesian tea exports in the European Union (EU) market using Trade Map data from 2005 to 2024. Despite the EU being a premium, expanding import market, Indonesia's export share has severely eroded due to structural challenges and rigidities in adapting to rising sustainability standards. By integrating Revealed Comparative Advantage (RCA) and Constant Market Share Analysis (CMSA), this paper evaluates relative export specialization and decomposes export changes into demand, composition, and competitiveness effects. The RCA results indicate a structural decline, with Indonesia's aggregate comparative advantage falling below unity in 2021 and reaching roughly 0.6 in 2024. CMSA decomposition reveals that this erosion is primarily driven by a weakening competitiveness effect (CMSA 3), critical market mismatches in composition (CMSA 2), and high vulnerability to demand shocks (CMSA 1). At the disaggregated level, only bulk black tea (HS 090240) maintained a comparative advantage in 2024, albeit with extreme volatility, while value-added segments collapsed. These findings imply that restoring export performance requires transitioning from static comparative advantages toward dynamic competitive advantages. Policymakers should implement upstream plantation rejuvenation and downstream quality upgrading, sustainability compliance, and trade diplomacy to reposition Indonesian tea in higher-value EU market segments.

Keywords: Tea exports; Revealed Comparative Advantage (RCA); Constant Market Share Analysis (CMSA); European Union; Export competitiveness

INTRODUCTION

International trade in tea has become a central topic across international economics, agribusiness, and development studies. As one of the most widely consumed beverages globally (FAO, 2022b), tea plays a significant role in shaping trade dynamics, particularly for major producing countries such as China, India, Kenya, Sri Lanka, and Indonesia (Pandey, Sinniah et al. 2021). The complexity of the tea value chain, from plantation production to processing and international distribution, has generated extensive research on how prices, consumer demand, trade policies, and quality standards influence trade flows. Existing literature shows that shifts in global consumption patterns and increasingly stringent food safety standards significantly affect the direction and structure of tea trade(Food and Nations 2022).

Scholarly attention has intensified alongside rising global competition and the proliferation of tariff and non-tariff barriers. Developed markets, particularly the European Union, impose strict requirements related to sustainability, food safety, and carbon emissions. These developments have prompted research examining how producing countries sustain competitiveness under evolving regulatory environments. Empirical studies consistently find that commodity price volatility, environmental change, and technological progress in production systems critically shape export competitiveness (Kosgei, Waiganjo et al. 2019);(Nikonenko, Hanushchyn et al. 2020);(Dekamin, Nabavi-Pelesaraei et al. 2025). Consequently, tea trade must be understood not only in economic terms but also through social, environmental, and political dimensions.

Tea holds longstanding economic importance for Indonesia. Since the colonial period, it has contributed to national income, employment, and rural development(Fazri 2023). Indonesia was historically among the top five global producers and exporters (Kustanti and Widiyanti 2007). However, over the past two decades, the sector has experienced structural decline. Production has decreased, plantation areas have contracted, productivity has stagnated, and export shares have been eroded by competitors such as Kenya, Sri Lanka, India, and China (Nursodik, Santoso et al. 2021). These trends point to systemic constraints affecting production efficiency and international competitiveness.

From the production side, Indonesia faces persistent technical and structural challenges. Productivity remains relatively low compared to competing countries (Nugrahaningrum, Zakaria et al. 2020), reflecting limited adoption of modern cultivation technologies, slow replanting rates, and constrained use of improved varieties (Sita and Aji 2024). Aging plantations reduce both yield and leaf quality. Production costs have also risen due to higher wages, input prices, and processing energy costs (Dekamin, Nabavi-Pelesaraei et al. 2025). Mechanization remains limited, while competitors have adopted more efficient harvesting technologies. In addition, climate variability, particularly changes in rainfall and temperature, has begun to disrupt production patterns (Fatawa, Santosa et al. 2023).

At the industry level, weaknesses in supply chain coordination and innovation further constrain performance (Rafani, Alliance et al. 2023). Downstream production remains dominated by low-value-added bulk black tea (Putro, Aldi et al. 2024), while higher-value segments such as specialty and ready-to-drink tea remain underdeveloped, despite stronger global demand and margins(Research 2024). Weak integration between farmers, processors, and exporters contributes to price volatility and inconsistent raw material quality (Trimo, Fatimah et al. 2017); (Trimo and Hidayat 2019); (Tanuputri and Bai 2022); (Hikmah and Putri 2025). Limited access to finance and market information further restricts quality upgrading (Nurunisa and Baga 2012).

From a trade perspective, Indonesia's export performance has weakened. Over the past fifteen years, exports have stagnated or declined, while competitor countries have expanded their global presence (Nursodik, Santoso et al. 2021). This decline is associated with inconsistent product quality, limited differentiation, and relatively high logistics costs (Nugrahaningrum, Zakaria et al. 2020); (Tanuputri and Bai 2022); (Hakim, Pramudita et al. 2025)

Challenges are more pronounced in the European Union, a key premium market characterized by stringent regulatory requirements. These include traceability, pesticide residue limits, sustainability certification, and broader environmental and social compliance standards (Wolniak and Grebski 2025). European consumers also exhibit strong preferences for organic, fair trade, and environmentally sustainable products (Blowfield 2003); (Bu, Nguyen et al. 2020); (Chiripuci, Popescu et al. 2022). Competing exporters have adapted through certification, innovation, and branding strategies, whereas Indonesia has lagged. This indicates that competitiveness increasingly depends on non-price factors such as quality, sustainability, and compliance.

Global tea trade is also shaped by emerging trends, including digitalization in marketing and heightened environmental awareness (Blowfield 2003); (Food and Nations 2022); (Bermúdez, Voora et al. 2024); (Mokrysz 2024). These shifts require producing countries to adopt strategies that emphasize product diversification and quality upgrading. In this context, competitiveness analysis is essential to assess Indonesia's relative position and identify pathways for market expansion.

This study addresses these issues by examining production constraints, export performance, and competitiveness in the Indonesian tea sector. By applying Revealed Comparative Advantage (RCA) and Constant Market Share Analysis (CMSA), the study provides a structured assessment of Indonesia's competitive position in global markets. The findings aim to inform both academic discourse and policy design, particularly in areas such as plantation rejuvenation, technological adoption, quality improvement, product diversification, and trade policy. Given the sector's role in regional development and its potential for higher value-added exports, understanding these dynamics is critical for revitalizing Indonesia's tea industry.

METHODS

This study employs a quantitative approach using secondary trade data obtained from Trade Map, which provides detailed information on export and import values classified according to the Harmonized System (HS). The analysis focuses on the tea commodity, identified under HS code 0902, and examines export performance at the country level.

The dataset consists of annual export values by country and destination market, together with corresponding global and regional trade values for the same products and periods, covering the years 2006 to 2024. To capture differences in processing type and packaging form, the tea commodity is further divided into four main product categories: HS 090210, representing green tea in packages not exceeding 3 kilograms; HS 090220, representing green tea in packages exceeding 3 kilograms; HS 090230, representing black tea in packages not

exceeding 3 kilograms; and HS 090240, representing black tea in packages exceeding 3 kilograms. The use of internationally standardized trade classifications ensures comparability across countries and over time, while the selected period provides a sufficiently long time horizon to identify structural changes and long-term export performance (Balassa 1965).

This study applies a dual-indicator framework to evaluate trade competitiveness by combining Revealed Comparative Advantage (RCA) and Constant Market Share Analysis (CMSA) (Istudor, Constantin et al. 2022). The integration of these two methods provides a more comprehensive assessment by capturing both structural specialization and dynamic changes in export performance. RCA measures the relative importance of a commodity within a country's total export structure compared with its importance in global trade.

A value greater than one indicates that the country has a revealed comparative advantage in the product, meaning that its export specialization is stronger than the world average. However, RCA alone does not explain the sources of changes in export performance over time. Therefore, CMSA is used to complement the analysis by decomposing changes in export value into several components associated with global demand, export structure, and competitiveness (Verico, 2020).

This decomposition helps distinguish whether export growth is mainly driven by favorable international market conditions, concentration in rapidly growing products or destinations, or improvements in the exporter's own competitive position. By combining RCA and CMSA, the study can differentiate between inherent specialization and dynamic competitiveness. Commodities that simultaneously show strong comparative advantage and positive competitiveness effects are interpreted as having robust positions in international markets, while other combinations may indicate structural strengths, market dependence, or emerging challenges.

This integrated methodological framework supports a systematic and evidence-based interpretation of tea export competitiveness across product categories, countries, and time periods. In addition, the framework enables comparisons between countries with different levels of participation and export scale, because the indicators emphasize relative specialization and changes in market performance rather than relying solely on absolute export values. The results can therefore reveal whether a country maintains a stable competitive position, experiences improvement, or faces deterioration during the observation period. Such information is useful for identifying product segments with stronger development potential and for supporting policy recommendations related to production, value addition, market diversification, export promotion, and strengthening national tea competitiveness in international markets.

RESULTS AND DISCUSSION

Trends in the Value and Volume of European Union Tea Imports

The European Union represents a highly significant consumer region for global tea commodities. As illustrated by the long-term historical trajectory, the total import value of tea under HS Code 0902 has experienced substantial growth over the past two decades. In 2005, the import value was recorded at approximately USD 600 million, as shown in Figure 1. Despite experiencing periodic fluctuations over the years, the import market demonstrated a general upward trend, culminating in a robust recovery in 2024. This trajectory highlights that after reaching a peak of nearly USD 1.17 billion in 2021, total imports faced a consecutive two-year decline, dropping to roughly USD 1.15 billion in 2022 and further down to approximately USD 1.08 billion in 2023. However, the market rebounded strongly in 2024, with total import values rising back to around USD 1.16 billion, approaching the historical peak seen in 2021.

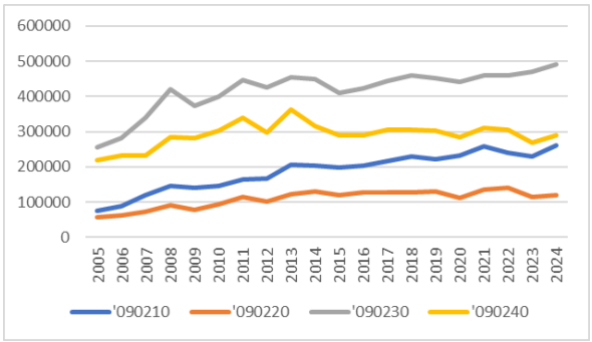

Figure 1. EU Tea Imports by Type (in thousand USD)

A detailed breakdown of EU tea imports by product type is shown in Figure 1. Throughout the 2020-2024 period, fermented black tea and other fermented tea in packages of 3 kg or less (classified under HS Code 090230) consistently

stood out as the most imported category. In 2024, this category accounted for the largest share of imports, valued at approximately USD 490 million, up from around USD 469 million in 2023. The second largest category in 2024 was black tea in packages exceeding 3 kg (HS Code 090240), which reached an import value of roughly USD 290 million, marking a recovery from its 2023 low of nearly USD 268 million, as illustrated in Figure 1. For green tea, packages of 3 kg or less (HS Code 090210) recorded a value of just over USD 261 million in 2024, showing a notable expansion from around USD 230 million in 2023. Meanwhile, green tea in packages exceeding 3 kg (HS Code 090220) remained the smallest import category, registering an import value of nearly USD 120 million in 2024. Collectively, these sub-category trends show that small-packaged teas (both black and green) continue to command a higher market value within the EU27 compared to their bulk-packaged counterparts.

Indonesian Tea Export Performance (RCA) in the EU Market

Although Indonesia has long been recognized as one of the world's major tea exporters, it is important to assess the country's current competitiveness in the global market. In this regard, Revealed Comparative Advantage (RCA) analysis is employed to evaluate Indonesia's relative export specialization in tea products. The RCA index indicates whether a country possesses a comparative advantage in a particular commodity relative to the global average, where a value greater than one indicates a comparative advantage, while a value below one suggests a lack there of.

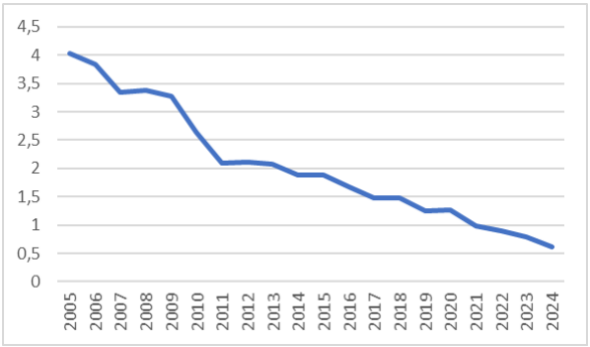

Figure 2. Indonesia's RCA for Tea Products (HS Code 0902) in the EU Market, 2005-2024

The aggregate RCA results indicate that Indonesia's position as a tea-exporting country has experienced a persistent decline over the past two decades. As illustrated in Figure 2, Indonesia's overall tea comparative advantage has undergone a continuous downward trajectory. The magnitude of this decline is particularly notable. Indonesia's aggregate tea RCA decreased from approximately 4.0 in 2005 to around 0.6 in 2024, indicating a substantial erosion of the country's export specialization in tea products. The trajectory highlights that the aggregate RCA index fell to the critical threshold of 1.0 around 2021 and has since remained consistently below one. This downward trend suggests that tea has gradually become less competitive within Indonesia's export structure relative to global trade patterns, pointing to a structural decline rather than a temporary market fluctuation.

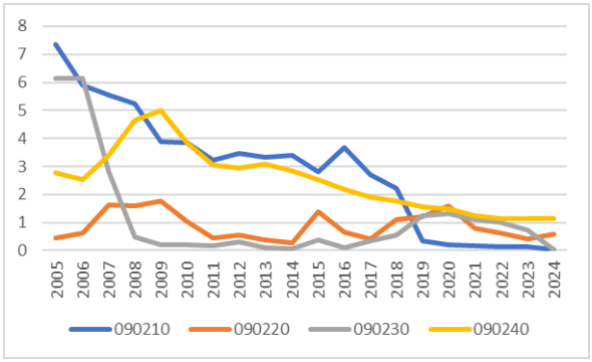

Figure 3. Indonesia's RCA for Tea Products by Type in the EU Market, 2005-2024

A more disaggregated analysis reveals considerable heterogeneity across individual tea product categories. As displayed in Figure 3, the decline in competitiveness is observed across nearly all tea segments exported by Indonesia, with almost all subcategories falling below the comparative advantage threshold by the end of the observation period. Green tea in packages of not more than 3 kilograms (HS 090210), which recorded the highest comparative advantage during the early years of observation, experienced the most pronounced collapse. Its RCA index declined from over 7.0 in 2005 to nearly zero by 2024, indicating a near-complete loss of comparative advantage in this specialty segment. A sharp contraction is also observed in fermented black tea in packages of not more than 3 kilograms (HS 090230). As shown by the grey line in Figure 4, this category started with a strong RCA index of over 6.0 in 2005 but crashed abruptly to below 1.0 by 2007. Despite minor fluctuations in the subsequent years, its RCA index remained close to zero by 2024. Meanwhile, green tea in packages exceeding 3 kilograms (HS 090220) exhibited a

fluctuating trend. It initially rose from around 0.5 in 2005 to a peak of nearly 1.8 in 2009, but eventually fell back into a downward pattern, registering an RCA value of approximately 0.6 by 2024. Among all tea products, only fermented black tea in packages exceeding 3 kilograms (HS 090240) managed to maintain an RCA value above one in 2024, hovering at just over 1.1. Nevertheless, its comparative advantage has weakened considerably compared with earlier periods, particularly relative to its peak of around 5.0 in 2009. The declining trajectory of this sole remaining competitive segment suggests that even Indonesia's historically strongest tea export category is facing severe competitive pressures in global markets.

Indonesian Tea Export Performance (CMSA) in the EU Market

General Growth Factor (CMSA 1)

The general growth factor (CMSA 1) results indicate how changes in overall European Union tea import demand have influenced the volume of Indonesian exports between 2006 and 2024. At the aggregate level shown in Figure 4, a significant decline was observed from 2008 to 2012, characterized by a sharp drop in 2009 to nearly -6,000 before rebounding to over 3,500 by 2011. This sharp contraction in 2009 was likely influenced by global external factors, such as the economic crisis, which reduced overall market demand. Although aggregate export growth contributions showed phases of recovery after 2014, they remained highly volatile and failed to sustain long-term positive momentum.

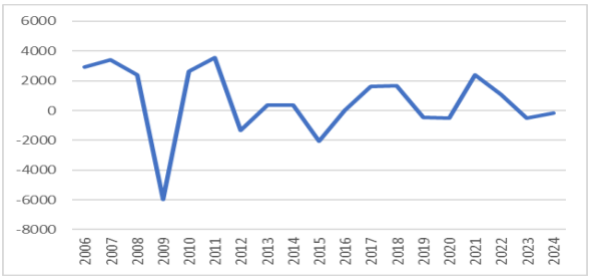

Figure 4. Indonesia's CMSA (General Growth Factor) for Tea Products (HS Code 0902) in the EU Market, 2006-2024

When examined by individual product categories, considerable heterogeneity is observed. Green tea in packages of not more than 3 kilograms (HS 090210) exhibits high volatility; despite notable peaks in 2011 and 2017, where it approached nearly 1,000, it suffered deep contractions in 2009 and 2015 to around -800, indicating highly unstable demand contributions in this segment. Green tea in packages exceeding 3 kilograms (HS 090220) remained close to zero for most periods, with the exception of a dramatic spike in 2021, where it reached approximately 1,400, followed by an immediate contraction in 2023.

The CMSA 1 results demonstrate that Indonesia's tea export performance remains highly vulnerable to external demand fluctuations in the European Union. The lack of sustained positive momentum across almost all product categories suggests that general market growth alone is insufficient to drive long-term export expansion, emphasizing that Indonesia cannot rely solely on natural market expansion to boost its tea export performance.

Market Composition Effect (CMSA 2)

The market composition effect (CMSA 2) captures how well Indonesia's export basket matches the shifting demand patterns across different tea types within the European Union. The aggregate composition effect in Figure 5 shows significant fluctuations over time, particularly between 2007 and 2011. This component experienced sharp increases in 2009 (exceeding 4,000) and 2013 (nearly 3,000), followed by pronounced declines in 2010 and 2014. These patterns indicate strong shifts in tea demand within the European Union, both in terms of product type and evolving consumer preferences.

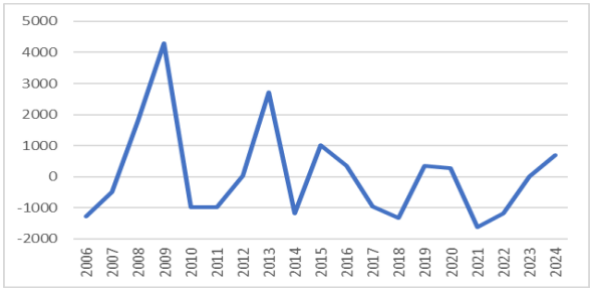

Figure 5. Indonesia's CMSA (Market Composition Effect) for Tea Products (HS Code 0902) in the EU Market, 2006-2024

This instability is highly visible at the disaggregated level. In terms of product composition, black tea in packages exceeding 3 kilograms (HS 090240) does not maintain a stable path; instead, it exhibits the most pronounced fluctuations among all categories, matching the aggregate swings with a massive peak of nearly

4,800 in 2009 and a steep fall to nearly -2,300 in 2014. This highlights that Indonesia's export structure is highly vulnerable to shifting preferences in the bulk black tea market.

In contrast, green tea in packages of not more than 3 kilograms (HS 090210) and green tea in packages exceeding 3 kilograms (HS 090220) show moderate fluctuations. HS 090210 peaked in 2013 at just over 1,000, while HS 090220 reached its highest point in 2019 at around 200 before falling to nearly -500 by 2023. Meanwhile, small-packaged black tea (HS 090230) remained almost entirely flat near zero after its initial drop to nearly -600 in 2006. These patterns suggest that changing consumption trends, such as the increasing global preference for green tea, are met with high volatility in Indonesia's ability to maintain a favorable export composition in the EU market.

Overall, the CMSA 2 analysis reveals a notable structural mismatch between Indonesia's export supply and the shifting demand patterns in the European Union. The extreme volatility in the composition effect, particularly for bulk black tea, indicates that Indonesia has struggled to maintain a stable and favorable export product mix, leaving its export basket highly sensitive to sudden market adjustments and changing consumer preferences.

Competitiveness Effect (CMSA 3)

The competitiveness effect (CMSA 3) represents the changes in Indonesian exports driven purely by relative competitiveness (such as pricing, quality, and supply-side capacity) compared to competing exporters. At the aggregate level in Figure 6, the competitiveness effect reveals profound volatility, with a substantial decline occurring between 2008 and 2014, where it reached its lowest level of nearly -7,000. This decline suggests that during this period, Indonesian tea products were severely less competitive than those of other exporting countries, leading to a substantial loss of market share. During the subsequent period, aggregate competitiveness remained highly unstable. It rebounded sharply in 2015 to roughly 2,400 before immediately dropping back into negative territory. While there was a temporary improvement in 2022, competitiveness declined again in 2023 and 2024, albeit at a lower magnitude than in earlier periods.

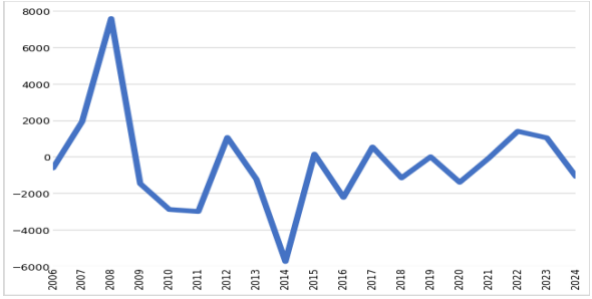

Figure 6. Indonesia's CMSA (Competitiveness Effect) for HS Code 090240 in the EU Market, 2006-2024

At the product level, the CMSA 3 results indicate that bulk black tea (HS 090240) exhibits the most extreme fluctuations in competitiveness, ranging from a peak of nearly 8,000 in 2008 to a deep trough of nearly -6,000 in 2014. This pattern confirms that Indonesian bulk black tea faces intense competitive pressures in the European Union. Green tea (HS 090210) also displayed substantial volatility, peaking at over 4,500 in 2016 but suffering deep competitiveness losses of roughly -4,000 in 2014 and 2018. For green tea in larger packages (HS 090220), competitiveness fluctuated with notable peaks in 2015, 2018, and 2020 (all around 2,000 to 3,000) but dropped to nearly -2,300 in 2016 and 2021. Meanwhile, small-packaged black tea (HS 090230) showed a catastrophic competitiveness loss of nearly -6,000 in 2007-2008 and remained flat near zero thereafter.

The CMSA 3 results point to a persistent and broad-based erosion of relative competitiveness across almost all Indonesian tea segments in the European Union. The severe, negative troughs observed across major categories, especially in bulk black tea and small-packaged tea, reflect critical supply-side bottlenecks, such as stagnating quality standards, high production costs, or pricing inefficiencies, which prevent Indonesia from competing effectively against low-cost or high-quality rivals like Kenya and Sri Lanka.

CONCLUSION

This study aimed to examine the competitiveness of Indonesian tea exports in the European Union market using Revealed Comparative Advantage (RCA) and Constant Market Share Analysis (CMSA). Specifically, it assessed Indonesia's comparative advantage, export performance, and the factors influencing changes in market competitiveness. The findings show that Indonesia's tea competitiveness in the EU market has declined over time. The RCA results indicate that Indonesia's comparative advantage weakened, while the CMSA results show that export performance was affected by unstable demand, product composition mismatch, and declining competitiveness. Among the tea products analyzed, only bulk black tea maintained a limited comparative advantage in 2024.

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