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Indonesian Exports of Coconut Oil and Palm Oil Competitiveness in China

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Abstract: This research aims to evaluate the export competitiveness of Indonesian palm oil and coconut oil in the Chinese market from 2014 to 2023 by employing the Revealed Comparative Advantage (RCA), Export Product Dynamics (EPD), and X-Model methodologies. The analysis reveals that both commodities possess strong comparative advantages (RCA > 1), yet are categorized as falling stars and retreats. These results offer a comprehensive understanding of the competitive positioning of Indonesian palm oil and coconut oil in China and serve as a foundation for developing more focused and effective export enhancement strategies in the future. (*Abstract*)

Keywords: *Competitiveness , RCA, EPD, X-Model, Exports.*

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I. INTRODUCTION

Competitiveness serves as a vital factor in strengthening a nation's standing in the global export arena, especially within the context of an increasingly competitive and evolving trade landscape (Bernardini et al., 2014; Suandana & Ilmas, 2022). For Indonesia, coconut oil and palm oil product play an important role in generating foreign exchange. This role is particularly prominent in trade relations with China, which have been supported and enhanced by the ASEAN-China Free Trade Agreement (ACFTA), facilitating greater market access and trade flows between the two countries (Nurwulandari et al., 2019; Iwasaki & Urata, 2025).

Even though the total value of trade between Indonesia and China shows an increasing trend (Ministry of Trade, 2024), Indonesian commodities face challenges in the form of price fluctuations, global trade policies and competition from other exporting countries in the Chinese market (Kumar & Chattopadhyay, 2024). Power competition is measured using the indicator Revealed Comparative Advantage (RCA), which is used to evaluate comparative superiority empirically evaluates a country's relative export strength by comparing the proportion of a specific product in its total exports to the corresponding share of that product in global trade. (Suandana & Ilmas, 2022; French, 2017).

However, the study academics analysing the power competition export commodity Indonesian plantations in the Chinese market are still limited. Therefore, this important research has been conducted to provide a comprehensive description of Indonesia's competitive position and to formulate strategies for increasing sustainable competitive power based on empirical data and analysis.

II. RESEARCH METHODE

This study uses a quantitative descriptive approach to analyse power competition in the export of commodities from Indonesian plantations to China. The analysis focuses on oil palm (HS151190) and coconut oil (HS151319). The deep data study was obtained from various sources, such as the World Integrated Trade Solution (WITS), UN COMTRADE and Trademap, which provide export data in the four-digit Harmonized System (HS) classification system. Data processing and analysis were carried out with the help of Microsoft Excel 2021 software.

- *Power Competition is Measured through Three main Methods:*

- *Revealed Comparative Advantage (RCA)*

The RCA value reflects the level of competitiveness of a particular commodity in the global market. A value exceeding 1 signifies that the commodity demonstrates a strong competitive advantage and outperforms the world average, whereas a value below 1 indicates a relative disadvantage or weaker competitive position internationally.

$$\text{RCA} = \frac{Xij/Xt}{Wij/Wt}$$

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Where:

RCA : Level of competitiveness of Indonesian plantation commodities to China
Xij : Value of Indonesian plantation commodity exports to China (USD)
X t : Total export value of Indonesia to China (USD)
W i *j* : Value of world plantation commodity exports to China (USD)
Wt : Total world export value to China (USD)
t : Year t (t = 2014, 2015, …., 2023)

- *Export Product Dynamics (EPD)*

The method under discussion involves the allocation of position power in accordance with the following four categories: rising star, falling star, lost opportunity and retreat.

The calculation of the expected progeny difference (EPD) is mathematically derived as follows:

X : Growth in Export Market Share

$$\frac{\sum_{t=1}^{t}\left(\left(\frac{X_{ij}}{W_{ij}}\right)_t x\ 100\% - \left(\frac{X_{ij}}{W_{ij}}\right)_{t-1} x\ 100\%\right)}{T}$$

Y : Product Market Share Growth

$$\frac{\sum_{t=1}^{t}\left(\left(\frac{X_{aj}}{W_{aj}}\right)_t x\ 100\% - \left(\frac{X_{aj}}{W_{aj}}\right)_{t-1} x\ 100\%\right)}{T}$$

Information:

Xij : Value of Indonesian plantation commodity exports to China (USD)
W i *j* : Value of world plantation commodity exports to China (USD)
X aj : Total export value of Indonesia to China (USD)
W aj : Total world export value to China (USD)
t : Year t (t = 2014, 2015, …., 2023)
T : Number of years of analysis

- *X-Model Potential Export Product*

The X-Model is predicated on the integration of results from RCA and EPD analysis for the purpose of market segmentation and the identification of potential export opportunities. The model is characterised by the allocation of commodities across four distinct clusters. These clusters are designated as follows: the 'optimistic' cluster, the 'potential' cluster, the 'less market potential' cluster, and the 'not potential' cluster.

Table 1 Potential Market Clustering of X-Model

RCA	EPD	Market Development
RCA > 1	*Rising star*	Optimistic
	Lost opportunity	Potential
	Falling star	Potential
	Retreat	Less Potential
RCA < 1	*Rising star*	Potential
	Lost opportunity	Less Potential
	Falling star	Less Potential
	Retreat	Not Potential

III. RESULT AND DISCUSSION

➢ *Competitiveness of Indonesian Coconut Oil and Palm Oil to China*

The Revealed Comparative Advantage (RCA) index is an analysis used to measure a country's comparative advantage in a particular commodity (Balassa, 1965; Saphira et al., 2022). In this study, the RCA index is used to evaluate the competitiveness of coconut oil and palm oil in the Chinese export market. An RCA value greater than one indicates that a commodity is exported more intensively than the world average, meaning that the commodity has a high comparative advantage and is very competitive (Hidayati et al., 2024).

Table 2 RCA value of Indonesian Plantation Commodities to China

Year	RCA Palm Oil	RCA Coconut Oil
2014	0.68	0.11
2015	0.96	1.69
2016	0.99	1.70
2017	0.96	1.48
2018	1.03	1.68
2019	1.17	1.82
2020	1.05	1.37
2021	1.06	1.30
2022	1.07	1.03

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2023	1.24	1.20
Average	**1,025**	**1,341**

Source: Processed from Trade Map 2025

The results of the RCA calculation performed during the period 2014–2023 the average RCA value of palm oil is 1.025, indicating high competitiveness, especially since 2018, when the value has remained at the top position. The average RCA value of coconut oil was recorded at 1.341, indicating a consistent increase in product competitiveness since 2015. This development shows that the position of commodities in the global export market is strengthening, especially in relation to China (Levianto, 2024). It is clear that both commodities show good performance potential, despite fluctuations in time experience during the initial observation period.

This shows Indonesia's success in consolidating its position in the Chinese export market, a development that is in line with the increasing global demand for these products. The results of the RCA analysis show that Indonesian plantations, which are an important component of the economy, show advantages in terms of strength and potential to continue to grow in the Chinese market.

- *Dynamics of Indonesian Plantation Commodity Exports to China*

The present study employs the Export Product Dynamic (EPD) to assess the evolution of competitive strength and export commodity competitiveness in the global market (Widodo, 2010; Saphira et al., 2022). The EPD approach focuses on two primary indicators: the growth rate of Indonesia's export market share and the overall growth of the product's market share in the destination country (Levianto, 2024). The classification of Power competition commodities is possible through the adoption of a four- category approach, which is as follows: rising star, falling star, lost opportunity, and retreat. Each of these categories is representative of a combination of strength, competitiveness, and market pull (Kong et al., 2025).

Table 3 Results of EPD *(Export Product Dynamics) analysis* of Indonesian plantation commodity exports to China

Plantation Commodities	Growth Export Market Share	Growth Product Market Share	EPD
Palm oil	0.0298	-0.0024	*Falling Star*
Coconut oil	-0.0179	-0.5864	*Retreat*

Source : Processed from Trade Map 2025

The analysis results during the period 2014–2023 indicate that Indonesian palm oil falls into the falling star category, with a Growth Export Market Share of 0.0298 and a Growth Product Market Share of -0.0024. This suggests that although Indonesia has experienced a slight increase in its export market share, the overall demand for palm oil in China has declined. Despite this, Indonesia maintains the capacity to sustain a competitive position in the global market (Hidayati et al., 2024; Rafani, 2024).

In contrast, coconut oil shows a Growth Export Market Share of -0.0179 and a Growth Product Market Share of -0.5864, placing it in the retreat category. The negative growth in export market share reflects deteriorating market conditions for coconut oil, highlighting significant challenges related to structural factors such as product quality, pricing, and intensifying global competition (Riyani et al., 2018; Asmara et al., 2024).

- *Clustering Potential for Development of Indonesian Plantation Export Markets to China*

The analysis of potential export markets and the development of Indonesian plantations to China is conducted using the X-Model approach. This approach integrates two key indicators: Revealed Comparative Advantage (RCA), which is a measure of size, and Power Competitiveness, which is a measure of market growth (Widodo, 2010; Saphira et al., 2022). The methodology employed in this study involves the strategic allocation of each commodity to one of four market development categories, namely: optimistic, potential, less potential, and non-potential (Levianto, 2024). The primary objective of the implementation of the X-Model is to facilitate the formulation of policy directives that are more export-oriented and data-driven, with a view to enhancing the efficacy of power competition and expanding commodity markets. This objective is particularly pertinent to Indonesian plantations, with a specific focus on the Chinese market (Kong et al., 2025).

Table 4 Results of X-Model Estimation of Indonesian Export Commodities to the Chinese Market

Plantation Commodities	RCA	EPD	X-Model
Palm oil	1,025	*Falling Star*	Potential
Coconut oil	1,341	*Retreat*	Less Potential

Source : Processed from Trade Map 2025

The results of the Model-X analysis of palm oil are classified in the potential market development category, as indicated by the high RCA value. However, the EPD categorizes it as a Falling Star. Although the performance of Power Competition is relatively strong in terms of exports, market dynamics have been observed to show a marked downward trend, an anticipated development (Hidayati et al., 2024; Rafani, 2024). It is imperative that relevant

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development strategies are implemented to ensure continued innovation progress in the palm oil sector. Such strategies should include the introduction of environmentally sustainable bioenergy products, as well as market-oriented products. Furthermore, there is a need to improve supply chain sustainability to ensure that it is in line with the increasing preferences of the Chinese market. It is essential to be selective in terms of environmental issues and standards on an international scale.

In contrast, the palm oil sector is characterized by underdeveloped market potential. This is due to a combination of weakening RCA and declining EPD (Riyani et al., 2018; Fariz et al., 2023). This presents a number of challenges, including but not limited to: increased competition from producing countries, declining demand, lack of innovation in products. To address the challenges posed by the current situation, the recommended strategies include a range of initiatives, including strengthening branding and identity, optimizing product improvement efficiency, logistics and supply chain management, and exploring non-traditional markets that show higher demand. In relation to the broader context, the use of clustering provides a basis for policy formulation and development of export strategies, with these strategies being based on real potential. Consequently, this approach allows for the measurement and sustainability of development exports.

IV. CONCLUSION

The results of the integration of RCA, EPD, and Model-X analysis show that each Indonesian plantation commodity has different competitiveness characteristics and market development potential. Palm oil is proven to have significant development potential even though it is categorized with an RCA value > 1 and a Falling Star position. This emphasizes the importance of innovation and a more targeted restructuring of marketing strategies. On the other hand, coconut oil, which also has an RCA value > 1 but is in the Retreat position, shows very limited market development potential. Therefore, a comprehensive evaluation of export barriers and efforts to increase competitiveness are very crucial to ensure the sustainability of exports of these commodities in the Chinese market.

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