

# Competitiveness of Indonesian Processed Pineapples Exports in the Southeast Asia Market

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## ABSTRACT

This study aims to analyze the competitiveness of Indonesian processed pineapple (HS 200820) in the Southeast Asian market using the Revealed Comparative Advantage (RCA) and Trade Specialization Index (TSI) approaches. The study uses secondary data from UN Comtrade covering the period from 2014 to 2023. The results show that Indonesia consistently has a strong comparative advantage in processed pineapple exports, with an average RCA value of 13.07, indicating high international competitiveness. However, after peaking in 2020, the RCA value declined through 2023, reflecting potential challenges such as increased imports of substitute products, rising logistics costs, and shifting global consumer preferences toward climate-conscious products. In addition, the TSI values for Indonesian processed pineapple are consistently close to 1, indicating that Indonesia is a highly specialized exporter in this commodity. Despite some decline in export value and rising imports in the post-pandemic period, the TSI values remained in the export maturity category. These findings confirm that Indonesia's processed pineapple sector is resilient but requires strategic improvements in innovation, sustainability, and market expansion to maintain its leading position in the regional and global markets.

**KEYWORDS:** processed pineapple; competitiveness; RCA; TSI; Southeast Asia

## INTRODUCTION

One of the strategic sectors that can increase foreign exchange and create jobs in Indonesia is the horticulture subsector (Syahrial et al., 2023). Horticultural commodities have a strategic and important role in food balance so that all people need them in sufficient quantities, are safe to consume, have good quality and are affordable (Ruslan, 2021). In addition, the diversity of plants and processed horticultural products can drive the economy and have enormous economic potential both from upstream to downstream (Chasanah et al., 2017). Horticulture has a market potential that continues to increase even though its contribution to GDP in 2021 was only 1.55% (Sabarella et al., 2022). This potential will increase due to the increasing global population growth as well. Based on this, it is necessary to utilize horticulture with an export orientation (Pitaloka, 2020). The Southeast Asian market has quite significant opportunities for exporting processed horticultural products and non-processed products. This is due to the increase in the middle class, population growth, and people's behavior towards the importance of a healthy lifestyle (Mizik et al., 2020).

One of Indonesia's leading commodities is pineapple with a variety of processed products such as juice, sweets, various types of snacks, and cosmetic products made from pineapple (Wiranthi & Mubarok, 2017). Pineapple occupies the fourth highest position as a leading fruit commodity (Rakhmawati & Fesalica, 2024). In 2022, 256.96 thousand tons of pineapple were exported in the form of canned pineapple 224.18 thousand tons, juice 25.5 thousand tons and in fresh form 6.29 tons (Ministry of Agriculture, 2023).

The trade balance of Indonesian processed pineapple products (HS 200820) showed fluctuating dynamics during the period 2015 to 2022. The highest increase in export volume was recorded in 2015 at 14.57 million kilograms, marking significant growth compared to the previous year. During the period 2018 to 2022, the average export growth was recorded at 3.64% per year. However, a

significant decline occurred in 2020 and 2022 by 31.1% and 22.7% respectively compared to the previous year (UN Comtrade, 2025).

The Southeast Asian market has great potential for exporting horticultural products, especially processed pineapple, but there are challenges in market competition with other Southeast Asian countries such as Thailand and the Philippines, which affects trade performance (Lapina, 2016). The competitiveness of Indonesian processed pineapple in the Southeast Asian market faces the challenge of competition with leading processed pineapple exporting countries, so RCA (Revealed Comparative Advantage) analysis and TSI (Trade Specialization Index) analysis are needed. RCA analysis is carried out to determine the value of the comparative advantage of the product by referring to actual trade patterns (Pradipta & Firdaus, 2014). Meanwhile, TSI analysis is used to identify the trade position of certain products in a country in the export cycle (Yudha & Rachmadina, 2023).

Research of Safitri (2019), found that the results of the RCA index showed that Indonesia was superior to the Philippines for pineapple commodities in various countries such as Argentina, the Netherlands, Germany, Spain, and Singapore. Meanwhile, the TSI index shows that Indonesia has a tendency to be a pineapple exporting country. Meanwhile, research of Baskara (2025), shows that Indonesian processed pineapple has a comparative advantage in the Japanese market. TSI analysis states that Indonesia deserves to be an exporter of processed pineapple in the international market.

Although several previous studies have discussed the competitiveness of Indonesian processed pineapple, few have examined changes in competitiveness longitudinally over time, particularly following the COVID-19 pandemic, which has significantly impacted horticultural trade patterns. Therefore, this study makes a novel contribution by uncovering changes in Indonesia's competitive position in the context of post-pandemic challenges, such as increased import substitution, logistics costs, and shifting global consumer preferences toward climate-friendly products.

## METHODOLOGY

This study aims to see the competitiveness of Indonesian processed pineapple in the Southeast Asian market. The type of data used is secondary data obtained from UN Comtrade data for processed pineapple in 2014 to 2023. Southeast Asia is the largest exporting region for processed pineapple with HS code 200820 (pineapples, otherwise prepared or preserved, whether or not containing added sugar or other sweetening matter) in the world. In 2023, Southeast Asia's contribution to world exports will reach 39% (UN Comtrade, 2025). The countries with the highest processed pineapple export value in the world are countries in the Southeast Asian region such as Thailand contributing 15.42% of world processed pineapple exports, Indonesia (11.04%) and the Philippines (10.78%). Based on this, this study uses a descriptive quantitative approach to measure: 1) The comparative advantage of exports of Indonesian processed pineapple to the ASEAN market through the Revealed Comparative Advantage (RCA) analysis; 2) The position of Indonesian processed pineapple trade specialization through the Trade Specialization Index (TSI) analysis.

### 3.1 Revealed Comparative Advantage (RCA)

RCA is an analysis method to measure the comparative advantage of export activities of certain products in a country. Study of (Balassa, 1965), RCA can be described with the following formula:

$$RCA = \frac{(X_{ij}/X_{it})}{(X_{wj}/X_{wt})}$$

Note:

$X_{ij}$  : Export of processed pineapple by Indonesia;

$X_{it}$  : Total exports of all products by Indonesia;

$X_{wj}$  : Export of processed pineapple by the world;

$X_{wt}$  : Total exports of all products by the world

There are criteria that must be met in this analysis, including:

- $RCA > 1$ , shows that Indonesia has a comparative advantage;
- $RCA < 1$ , shows that Indonesia does not have a comparative advantage

### 3.2 Trade Specialization Index (TSI)

TSI is a measuring tool to map the level of specialization of a country towards a commodity. According to (Tambunan, 2004), the following is the formula:

$$TSI_i = \frac{X_i - M_i}{X_i + M_i}$$

Note:

$X_i$  : Export value of processed pineapple from Indonesia

$M_i$  : Value of Indonesian processed pineapple imports

The division of categories in this analysis method includes:

TSI  $\leq$  -0.5 : Importing Country

TSI -0.5 until 0 : Import substitution

TSI 0 – 0.7 : Exports are growing

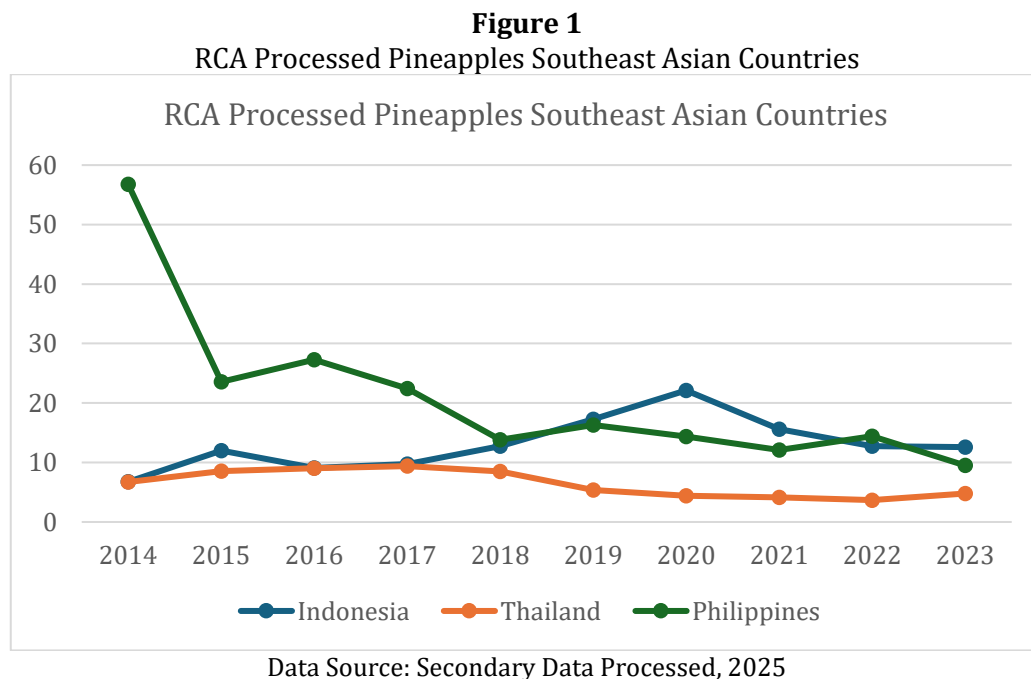
TSI 0.8 – 1.0 : Export mature

TSI re-importing: TSI drops back to zero

## RESULTS AND DISCUSSION

### 4.1 Revealed Comparative Advantage (RCA)

The following Figure 1 is the calculation result of the RCA analysis for processed pineapple in Indonesia and competing countries in the Southeast Asia region, namely Thailand and Philippines.



Based on Figure 1, the RCA results illustrate that Indonesia's processed pineapple exports have a comparative advantage in the international market. In 2014 to 2023, Indonesia's RCA value is at a value of more than one. In accordance with the criteria in the study of (Balassa, 1965), it shows that Indonesia's processed pineapple has a comparative advantage in the Southeast Asian market. The greater the RCA value, the stronger its competitiveness. The average RCA of Indonesia's processed pineapple for 10 years, namely 2014 to 2023, reached 13.07. This value illustrates that Indonesia's processed pineapple has very high competitiveness in the global market.

From 2014 to 2023, Indonesia's processed pineapple RCA fluctuated but tended to increase. In 2014, the RCA of processed pineapple with a value of 6.75 experienced a sharp increase until 2020 reaching 22.12. This shows that processed pineapple exports in Indonesia are experiencing rapid growth. In the midst of the post-Covid-19 conditions in 2020, this growth is in line with the implementation of

the government's strategy to overcome the impact of Covid-19 on the agricultural sector by concentrating on five priorities. One of them is accelerating the export of strategic commodities to maintain the country's economic growth (Arif et al., 2020). In addition, this is also the impact of the government's policy to control imports of processed pineapple. The import price of processed pineapple during this period was lower than the price of domestic producers (Ministry of Agriculture, 2022). However, after 2020, Indonesia's RCA value began to decline until 2023, although its RCA value still states that processed pineapple has a comparative advantage in the Southeast Asian market. The RCA value decreased to 15.62 in 2021, 12.74 in 2022 and 12.57 in 2023. This phenomenon occurred simultaneously with the increase in the value of Indonesian processed pineapple imports in 2021 by \$33,853 to 2023 by \$122,809 (UN Comtrade, 2025).

Several possibilities arise from this phenomenon, including the entry of import substitute products with certain specifications such as pineapples, otherwise prepared/preserved, in airtight containers for retail sale (HS 20082010) and pineapples, otherwise prepared/preserved, not in airtight containers for retail sale (HS 20082090) (Ministry of Agriculture, 2022). Another possibility is that the container crisis and congestion at the port cause the costs to be incurred to increase for exports (Yaşar Dinçer et al., 2024). The next possibility is that after Covid-19, people began to shift to climate-friendly consumption patterns due to concerns about personal health (Van Bussel et al., 2022). Therefore, although Indonesia's competitiveness is still high, this phenomenon needs to be a concern for continuous improvement in export strategies, especially in terms of product innovation, logistics efficiency, and expansion of destination markets.

When compared to Thailand and the Philippines, Indonesia's processed pineapple is between the two countries. The highest RCA value is in the Philippines with an average of 21.06. The Philippines' RCA value in 2014 reached a value of 56.77, but tended to decline continuously until 2023 to only 9.50. This shows that the Philippines started with high competitiveness but is getting weaker every year. Thailand's RCA value is the smallest value even though Thailand was the highest exporter from 2014 to 2018, but it tends to decline until 2023. This indicates that Thailand's processed pineapple competitiveness is increasingly eroded.

Overall, Indonesia not only has a comparative advantage in processed pineapple, but Indonesia also shows quite strong competitive resilience compared to the largest exporting countries in the Southeast Asian market, namely the Philippines and Thailand. However, the decline in processed pineapple exports after 2020 shows the importance of strategies to increase added value, product innovation, and strengthen sustainability-based competitiveness so that Indonesia can maintain its position as an exporter with the highest RCA value.

#### 4.2 Trade Specialization Index (TSI)

Several studies have utilized the TSI to measure the development stage and competitiveness of agrifood products. The TSI and RCA to classify the market stage of Indonesian horticultural products (Firmansyah et al., 2017). Furthermore, the TSI is statistically effective for analyzing regional and global trade specialization (Saleh & Widodo, 2010) (Pawlak & Lukasiewicz, 2022). Table 2 is the result of TSI calculation of Indonesian processed pineapple products. TSI is one of the indicators to measure the level of specialization of Indonesia towards processed pineapple products in international trade.

| No. | Year | TSI    |
|-----|------|--------|
| 1   | 2014 | 0.9994 |
| 2   | 2015 | 0.9995 |
| 3   | 2016 | 0.9997 |
| 4   | 2017 | 0.9998 |
| 5   | 2018 | 0.9991 |
| 6   | 2019 | 0.9979 |
| 7   | 2020 | 0.9997 |
| 8   | 2021 | 0.9998 |
| 9   | 2022 | 0.9996 |
| 10  | 2023 | 0.9989 |

Data Source: Secondary Data Processed, 2025

Based on Table 2, it shows that the TSI of Indonesian processed pineapple from 2014 to 2023 is close to 1 every year. The highest TSI value for Indonesian processed pineapple is in 2017 and 2021 with a TSI value of 0.9998. The lowest TSI value is in 2019 with a TSI value of 0.9979. This TSI value indicates that Indonesia is a highly specialized country as an exporter of processed pineapple.

The high TSI value indicates that Indonesian processed pineapple has a very strong industrial structure and is export-oriented. The high TSI value indicates that the volume of Indonesian processed pineapple exports is higher than its imports. Although processed pineapple imports in Indonesia in 2018 increased to \$168,525 from 2017 of \$70,493 and also in 2023 increased to \$122,809 from 2022 of \$61,218. Implicitly, Indonesian processed pineapple shows that the domestic market does not depend on foreign supplies. This is reinforced by Indonesia's geographical location in the tropics, so it can produce pineapple commodities all year round.

The stable TSI value is a sign that Indonesian processed pineapple can survive amidst external pressures. In 2021 to 2023, the export value of Indonesian processed pineapple decreased from \$285,123,119 to \$220,115,261 and imports of Indonesian processed pineapple increased from \$33,835 to 122,809, but the ISP value still shows the criteria for export maturity. Although previous research stated that the Covid-19 pandemic affected the trade balance of various commodities in the Asian region (Wahyuningsih, 2024), this did not apply to Indonesian processed pineapple. However, this could be a signal for Indonesia that there is domestic demand for pineapple processed product variants that have not been produced locally. Therefore, domestic producers need to pay attention to changes in domestic market preferences in order to continue to be able to dominate the domestic and foreign markets simultaneously.

## CONCLUSION

The results of this study confirm that Indonesian processed pineapple (HS 200820) has a strong comparative advantage and a high level of trade specialization in the Southeast Asian market. Based on the Revealed Comparative Advantage (RCA) analysis, Indonesia consistently maintained an RCA value greater than 1 from 2014 to 2023, with an average RCA of 13.07. This indicates that processed pineapple is a product with high international competitiveness. Despite experiencing a downward trend after 2020—reaching 12.57 in 2023—Indonesia remains among the top three competitive countries alongside the Philippines and Thailand. The RCA decline is likely influenced by increasing imports of substitute products, rising logistics costs, and shifting consumer preferences toward climate-conscious products.

Furthermore, the Trade Specialization Index (TSI) results show values consistently approaching 1 (between 0.9979 and 0.9998), indicating that Indonesia is a highly specialized exporter of processed pineapple. This reflects a strong industrial structure and export orientation, supported by Indonesia's tropical climate that enables year-round production. Although export values declined and import values increased in the post-pandemic period, Indonesia still retained its export maturity classification based on the TSI criteria.

Overall, Indonesia demonstrates resilient competitiveness in the processed pineapple sector. However, to sustain and enhance this position, strategic improvements are needed in the form of product innovation, sustainability-based production, market diversification, and adaptation to shifting global consumption trends. These efforts are essential for maintaining Indonesia's leadership in the regional and global processed pineapple market. Future research could investigate the effectiveness of trade policies, regional cooperation, and export incentives in sustaining Indonesia's processed pineapple competitiveness in Southeast Asia.

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