

# Citrus Export Performances of Southeast Asian Countries: A Comparative Analysis

## *Kinerja Ekspor Jeruk Negara-Negara Asia Tenggara : Sebuah Analisis Komparatif*

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### ABSTRACT

Citrus is a popular horticultural commodity worldwide, including in Southeast Asian. This study aimed to comparatively analyze export performances of citrus (limited to lime and lemon) among Southeast Asian countries (ASEAN), that are represented by the top 5 larger exporters, namely Vietnam, Thailand, Indonesia, Malaysia, and Singapore. This study applied several approaches, i.e., RCA (Revealed Comparative Advantage), ECI (Export Competitiveness Index), TSI (Trade Specialization Index), AR (Acceleration Ratio), and EPD (Export Product Dynamics). The secondary data is derived from the International Trade Center from 2010 to 2020. The result showed that those five countries had a low comparative advantage ( $RCA < 1$ ), but Vietnam had a better performance than other countries. However, Indonesia displayed an upward trend in citrus exports in the last two years ( $ECI > 1$ ). If we look further, Indonesia was still in the initial stage of the citrus export activity to the world market ( $TSI < 0.9$ ), in similar to Singapore and Malaysia, while Vietnam's position was more advanced ( $TSI > 0.9$ ). Indonesia still has a chance to maintain its market share, as indicated by the increased export trend, even though the current condition showed a weak comparative advantage and is still in the initial export stage.

**Keywords:** lime; lemon; Indonesia; Thailand; Vietnam; ASEAN

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### ABSTRAK

*Jeruk adalah komoditas hortikultura populer di seluruh dunia, termasuk di kawasan Asia Tenggara. Penelitian ini bertujuan untuk melakukan analisis komparatif kinerja ekspor jeruk (khususnya nipis dan lemon) negara-negara di kawasan Asia Tenggara, yang diwakili oleh 5 negara eksportir terbesar yakni Vietnam, Thailand, Indonesia, Malaysia dan Singapura. Penelitian ini menggunakan beberapa pendekatan, seperti RCA (Revealed Comparative Advantage), ECI (Export Competitiveness Index), TSI (Trade Specialization Index), AR (Acceleration Ratio), and EPD (Export Product Dynamics). Data sekunder diperoleh dari database The International Trade Center untuk periode tahun 2010 hingga 2020. Hasil penelitian menunjukkan bahwa kelima negara eksportir tersebut memiliki keuntungan komparatif yang rendah ( $RCA < 1$ ), namun Vietnam cenderung memiliki kinerja yang lebih baik dibandingkan keempat negara lainnya. Indonesia menunjukkan tren ekspor jeruk yang meningkat dalam 2 tahun terakhir ( $ECI > 1$ ). Jika dilihat lebih rinci, posisi Indonesia masih pada fase permulaan dalam hal ekspor jeruk ke pasar dunia ( $TSI < 0.9$ ), sama halnya dengan posisi Singapura dan Malaysia. Hal ini berlawanan dengan posisi Vietnam yang sudah lebih maju ( $TSI > 0.9$ ). Indonesia masih memiliki potensi untuk mempertahankan pangsa pasarnya, dibuktikan dengan adanya tren ekspor yang meningkat, meskipun saat ini keuntungan komparatifnya masih rendah dan masih dalam fase permulaan ekspor.*

**Kata Kunci:** nipis, lemon, Indonesia, Thailand, Vietnam, ASEAN

### INTRODUCTION

The ASEAN is the community of several countries located in Southeast Asian countries, due to many similarities in term of history, vision and mission. As tropical countries, there is a high diversity of plant can be cultivated and the cultivation can be done in all year round, lead the ASEAN countries as the agriculture exporter countries. One of several important horticultural commodities in ASEAN is citrus. The center of origin and diversity of citrus is believed in Southeast Asian (Mabberley 2004). Additionally, citrus is an ancient fruit crop that have been recorded to be cultivated by the ancestors since 2100 BC (Moore 2001). Thus, the evaluation of citrus status in ASEAN can be interesting issue.

Citrus is widely used in numerous industry such as aromatherapy, cosmetic, food and beverages. Several

efforts have already formulated to improve citrus production, such as through artificial shading (Budiarto et al. 2019a), canopy manipulation (Budiarto et al. 2018) and root manipulation (Budiarto et al. 2019b). Citrus production is influenced by growing location (Efendi et al. 2021) and genetic factor. Various citrus found in Indonesia may have differ uses, for example mandarin (*Citrus reticulata*) and tangerine (*Citrus nobilis*) as fresh fruit; limau (*Citrus amblycarpa*) as ornamental plant (Budiarto et al. 2017); kaffir lime (*Citrus hystrix*) as food spice due to aromatic leaves (Budiarto et al. 2021a; 2021b; 2021c; 2021d; 2019c); lime (*Citrus aurantifolia*) and lemon (*Citrus limon*) as fresh juice (Penniston et al. 2008).

The popularity of citrus as fresh fruit is supported by its rich vitamin, flavonoid and other functional content (Turner and Burri 2013; Tripoli et al. 2007). This popularity is not only found in local and domestic scale, but also in

international level. Therefore, citrus is one of notable export-import fruit commodity worldwide. The export activity is an effort to sell out the product to the international market, while import is any activity to bring a product from the international market. In case of orange, Indonesia is reported to act as importer (Rachmi et al. 2018). There is still limited information in which citrus species Indonesia have a role as exporter. The role of exporter is importance due to its positive impact on country income (Nurhayati et al. 2019). There was a big and open opportunity for Indonesia to accelerate its export performances (Hasanah 2020). The improvement of export performances can be done through the improvement of production rate and market share that have been existed (Firmansyah et al. 2017). Unfortunately, there is still limited study regarding the export performances of citrus during the past decade. Therefore, this study aimed to comparatively analysis the citrus (limited to lime and lemon) export performances of Southeast Asian countries, including Indonesia during the past decade (2010-2020).

**METHODOLOGY**

**Data Collection**

This study was conducted between May to June 2021, by using a series of secondary data downloaded from the International Trade Center during the past decade, i.e., 2010 to 2020. Secondary data used in the present experiment was the data of lime (*Citrus aurantifolia*) and lemon (*Citrus limon*) both fresh and dried product (HS code 080550) (ITC 2021).

**Data Analysis**

All data were subjected to five types of data analysis, i.e revealed comparative advantage (RCA), export competitiveness index (ECI), trade specialization index (TSI), acceleration ratio (AR) and export product dynamic (EPD).

The RCA method was used to reveal the advantages of a product from a country with its competitors. RCA compared the export value of a product from a country to the world market (Hanani 2009). Furthermore, this method was very commonly used to see the competitiveness of agricultural products (Firmansyah et al. 2017; Rosiana et al. 2018). The calculation of RCA was shown below.

$$RCA = \left[ \frac{(x_{ij} / \sum_i X_{ij})}{\sum_j X_{ij} / \sum_j \sum_i X_{ij}} \right] \tag{1}$$

where:  $x_{ij}$  is export value of I product to J country,  $\sum_i X_{ij}$  is the total export of J country,  $\sum_j X_{ij}$  is the total export of I product in the world,  $\sum_j \sum_i X_{ij}$  is the total export of the world. When the result of RCA was more than 1, the country had a comparative advantage, whereas the RCA lower than 1 meant the country had low comparative advantage.

The ECI method was used to depict the trend of export competitiveness index, by using following formula.

$$ECI = \frac{\left(\frac{X_{ij}}{X_w}\right)_t}{\left(\frac{X_{ij}}{X_w}\right)_{t-1}} \tag{2}$$

where:  $X_{ij}$  is citrus export value of Southeast Asian country,  $X_w$  is the citrus export value of the world,  $t$  is on-going period, and  $t-1$  means previous period.. When the result of

ECI was more than 1, it was likely that the citrus export showed an increasing trend. In opposite, the ECI lower than 1 is associated with a decreasing trend (Putra et al. 2015).

The TSI was also carried out to see whether a country's tendency to trade performance based on the performance of a product. The TSI also showed the strength and weakness of a country's competitiveness for a product. The TSI value would indicate the tendency of a country either as an exporter or importer (Ashari et al. 2015). The calculation of TSI was shown below.

$$TSI_{ij} = \frac{(X_{ij} - M_{ij})}{(X_{ij} + M_{ij})} \tag{3}$$

where:  $TSI_{ij}$  is trade specialization index of citrus commodity in J country,  $X_{ij}$  is the citrus export value of J country,  $M_{ij}$  is the citrus import value of J country. The result of TSI is classified into 5 groups (Kemendag 2008), i.e., introduction stage (TSI value is -1 to -0.5 ), import substitution stage (TSI value is -0.51 to 0), growth stage (TSI value is 0.01-0.8), mature stage (TSI value is 0.81-1), re-import stage (TSI value is a decline from 1 to 0).

AR analysis also used to measure the strength of a country in maintaining its market share for a product, by using following calculation.

$$AR = \frac{Trend X_{ij} + 100}{Trend X_{ib} + 100} \tag{4}$$

where:  $X_{ij}$  is citrus export value of Southeast Asian country in the world market,  $X_{ib}$  is import export value of Southeast Asian country in the world market. When the AR value is more than 1, the country is assumed to have power in maintaining its market share for a product. In contrast, the results of AR is lower than 1 indicated that a country do not have enough power in maintaining its market share for a product leading to the loss of market share (Alexander and Nadapdap 2019).

The EPD is used to identify whether a commodity has a dynamic export performance or not. This indicator measures the market position of a country's commodity for a specific market purpose. EPD matrix consisted of market attractiveness and business strength information (Ezterhuizen 2006).

X-axis: Growth in market share of total exports (Southeast Asian countries)

$$X - axis = \frac{\sum_{t=1}^t \left(\frac{X_{aj}}{W_{aj}}\right)_t \times 100\% - \sum_{t=1}^t \left(\frac{X_{aj}}{W_{aj}}\right)_{t-1} \times 100\%}{T} \tag{5}$$

Y-axis: Growth in product market share

$$Y - axis = \frac{\sum_{t=1}^t \left(\frac{X_{ij}}{W_{ij}}\right)_t \times 100\% - \sum_{t=1}^t \left(\frac{X_{ij}}{W_{ij}}\right)_{t-1} \times 100\%}{T} \tag{6}$$

where:  $X_{aj}$  is the citrus export value of Southeast Asian country to the world,  $W_{aj}$  is the total citrus export value to the world,  $X_{ij}$  is the total export value of Indonesia to the world,  $W_{ij}$  is the total export value of the world,  $T$  – total year. The result of EPD is further classified into four categories, namely Rising Star, Falling Star, Lost Opportunity, and Retreat (Firmansyah et al. 2017) as shown in Table 1.

**Table 1. The export product dynamic (EPD) classification**

Share of Country's Export in World Trade (X)	Share of Product in World Trade (Y)	
	Rising/Dynamic (+)	Falling/Stagnant (-)
Rising/Competitive (+)	Optimal Rising Star	Vulnerable Falling Stars
Falling/Non- Competitive (-)	Weakness Lost Opportunity	Restructuring Retreat

## RESULTS AND DISCUSSION

### Revealed Comparative Index

The result of RCA showed that all countries experienced an increasing trend during 2010 to 2019; however, there was a reduction in 2020, except in Indonesia (Table 2). The reduction on most countries was caused by the presence of covid19 pandemic worldwide. All countries had RCA value lower than 1, implied that citrus commodity from all mentioned countries had a lower comparative advantage in world market. The highest RCA during the past decade was Vietnam, while the lowest one was Indonesia. Vietnam experienced the RCA value more than 1 in 2018 prior to decline in the 2019 and 2020. Vietnam proved that they could improve its horticultural export performance, as the impact of application of sustainable development of agriculture (Duong 2020). Present finding was in agreement with the previous study where ASEAN countries had RCA value less than 1 in 2009 regarding to citrus fruit export performance (Hanani et al. 2009).

**Table 2. The result of revealed comparative advantage (RCA) analysis of citrus commodity in top five exporter ASEAN countries during 2010 - 2020**

Year	ID	VT	SG	MY	TH
2010	0.002	0.087	0.021	0.047	0.006
2011	0.002	0.396	0.025	0.067	0.011
2012	0.015	0.244	0.029	0.059	0.007
2013	0.019	0.260	0.061	0.064	0.008
2014	0.014	0.367	0.143	0.120	0.007
2015	0.020	0.624	0.191	0.049	0.009
2016	0.019	0.708	0.084	0.041	0.009
2017	0.020	0.990	0.046	0.035	0.012
2018	0.019	1.006	0.030	0.033	0.006
2019	0.028	0.663	0.026	0.035	0.013
2020	0.029	0.342	0.022	0.026	0.134
M	0.017	0.517	0.062	0.052	0.020

Note: M-mean, ID-Indonesia, VT-Vietnam, SG-Singapore, MY-Malaysia, TH-Thailand

### Export Competitiveness Index

The results showed that all five countries had ECI value more than 1, which implied that all countries had strong export competitiveness in the world market. The highest ECI was Thailand, while the lowest result was observed in Malaysia. The ECI of Indonesia is also high, as the top two after Thailand. Interestingly, there was also an increasing pattern of ECI during the past two years (Table 3). To increase the ECI, there was an effort to disseminate agricultural technology to help small scale farmer improved their product quantity and quality. The production of citrus fruit in Indonesia mostly supported by small scale farmer that still need collaborative support from government and

agricultural scientist. The mean of ECI value of Indonesia was nearly similar to Vietnam. Several effort to improve the export competitiveness of Vietnam were plant variety improvement, scientific-based agricultural mechanization, intensification and integrated pest control (Duong 2020).

**Table 3. The result of export competitiveness index (ECI) of citrus commodity in top five exporter ASEAN countries during 2010 - 2020**

Year	ID	VT	SG	MY	TH
2011	0.887	5.063	1.192	1.342	1.883
2012	7.015	0.718	1.106	0.879	0.605
2013	1.209	1.198	2.092	1.052	1.158
2014	0.727	1.606	2.327	1.930	0.930
2015	1.369	2.110	1.283	0.407	1.345
2016	0.980	1.274	0.430	0.808	1.056
2017	1.096	1.543	0.562	0.883	1.271
2018	0.913	1.047	0.655	0.993	0.460
2019	1.416	0.738	0.848	1.027	2.416
2020	1.085	0.735	0.870	0.796	10.148
M	1.670	1.603	1.136	1.012	2.127

Note: M-mean, ID-Indonesia, VT-Vietnam, SG-Singapore, MY-Malaysia, TH-Thailand

**Table 3. The result of trade specialization index (TSI) of citrus commodity in top five exporter ASEAN countries during 2010 - 2020**

Year	ID	VT	SG	MY	TH
2010	-0.895	0.969	-0.768	-0.461	-0.449
2011	-0.956	0.996	-0.737	-0.441	-0.356
2012	-0.838	0.987	-0.738	-0.573	-0.656
2013	-0.855	0.988	-0.594	-0.637	-0.513
2014	-0.944	0.995	-0.424	-0.443	-0.412
2015	-0.950	0.995	-0.382	-0.847	-0.543
2016	-0.960	0.997	-0.568	-0.883	-0.428
2017	-0.950	0.999	-0.681	-0.869	-0.543
2018	-0.945	0.998	-0.750	-0.880	-0.761
2019	-0.957	0.996	-0.790	-0.887	-0.729
2020	-0.929	0.933	-0.798	-0.905	0.140
M	-0.925	0.987	-0.657	-0.711	-0.477

Note: M-mean, ID-Indonesia, VT-Vietnam, SG-Singapore, MY-Malaysia, TH-Thailand

### Trade Specialization Index

Indonesia's trade specialization Index for the last ten years was minus. Positive value was only observed in Vietnam and Thailand. The value of Vietnam's TSI in the last ten years has been consistent nearly to 1, i.e., 0.9. The TSI of Thailand had just been positive in the 2020 (Table 4). The value of Indonesia's TSI was lower than 1, indicated that Indonesia was still dominant as an importer than as an exporter because the proportion of exports was much smaller than the proportion of imports. Therefore, the Indonesia was still at the import substitution stage, while Vietnam was in mature stage. It was likely that the domestic production of citrus in Vietnam had exceeded the domestic

demand, whereas the opposite result happened in Indonesia.

**Acceleration Ratio**

The AR value of Vietnam was determined as the highest AR than others (Table 5), which implied that Vietnam was able to maintain market share for lemon and lime commodities. While Indonesia’s AR was still lower than 1, thus it was indicated that Indonesia had a less power in the world’s citrus export market share. The lower AR of Indonesia was associated with the lower export volume compared to others. To improve export volume, there is a need to deal with on-farm and off-farm problems. Farmers should be well-supported by favourable policy, short supply chain, and extension on how to produce high quality citrus fruit. A low-quality fresh product was frequently found to limit the access of farmer to international market and lowering the export competitiveness (Arifin 2013).

Table 4. The result of acceleration ratio of citrus commodity in top five exporter ASEAN countries during 2010 – 2020

Year	ID	VT	SG	MY	TH
2010	0.153	8.248	0.143	0.387	0.512
2011	0.071	40.315	0.162	0.402	0.553
2012	0.113	26.950	0.160	0.284	0.295
2013	0.094	36.397	0.260	0.231	0.405
2014	0.036	70.074	0.407	0.392	0.499
2015	0.031	122.472	0.449	0.088	0.354
2016	0.024	195.862	0.279	0.066	0.452
2017	0.029	344.967	0.194	0.075	0.332
2018	0.032	332.871	0.148	0.068	0.178
2019	0.025	196.444	0.123	0.064	0.178
2020	0.040	26.095	0.118	0.053	1.321
M	0.059	127.335	0.222	0.1918	0.462

Note: M-mean, ID-Indonesia, VT-Vietnam, SG-Singapore, MY-Malaysia, TH-Thailand

**Export Product Dynamic**

The result of EPD analysis was depicted in Figure 1. There were only four countries were listed, due to the elimination of Singapore’s EPD value that was too small and in a retreat position. Position of Indonesia was in the falling star, while both Vietnam and Thailand were in the rising star position. The position of Malaysia was in a lost opportunity. Each position had a different definition. The rising star position indicated that the product had high competitiveness and positive trade dynamics. The lost opportunity position implied that it was unable to seize the export market share of the destination country even though the demand for the product market share had increased. The lost opportunity condition showed a decrease in market share for domestic products, while the export market share had increased, leading to the lost export share opportunities. In the rising star quadrant, it showed that the export trade performance was fast and dynamic, where the export growth rate continued to increase in tandem with the increasing export share (Zuhdi and Suharno 2015). The fruit export performance was highly dependent on several factors, i.e., the gross domestic product (GDP) of the destination country and the origin country, the population of the destination country, the export price of the origin

country, and the exchange rate (Pradipta and Firdaus 2014).

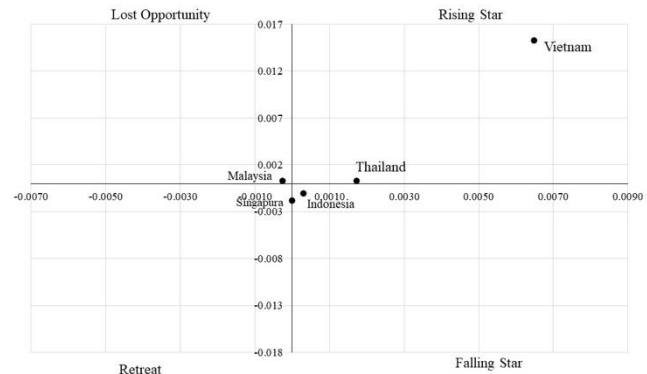


Figure 1. The result of export product dynamic (EPD) of citrus commodity in top five exporter ASEAN countries during 2010 – 2020

To boost Indonesia’s citrus export performances and competitiveness in the international market, there is an urgency to strengthen the penta-helix collaboration, placing the farmer as the core along with media, government, business, society and academician. Farmer should be creative and proactive to learning the development of citrus production. Government produced favorable policies for farmer, stimulated the extensification and intensification of citrus production. Society plays a role in overseeing government programs (social control), to be proud of local citrus fruits, reduces consumption of imported citrus fruits. The business provides capital assistance and skills in financial management as well as market guarantees if local products meet the quality elements agreed upon at the beginning. The media promote the superiority of local fruit. Academicians go hand in hand by creating research that is able to solve farmer’s real problems with an up-to-date approach to solve it.

**CONCLUSION**

Five countries in Southeast Asian were reported to be citrus (lime and lemon) exporting countries, namely Vietnam, Thailand, Indonesia, Malaysia and Singapore. All mentioned countries having a low comparative advantage ( $RCA < 1$ ), except Vietnam. Indonesia still has a chance to maintain its market share even though the current RCA value showed a weak comparative advantage and it was in the initial stage for exports, but Indonesia displayed an upward trend in citrus exports in the last two years ( $ECI > 1$ ). The penta-helix collaboration, placing the farmer as the core, along with media, government, business, society and academician is believed to be a recommendation for improving Indonesia’s citrus export performances.

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