ASEAN-CGIAR
Innovate for Food and Nutrition Security

TRADE LIBERALIZATION AND MARKET INTEGRATION OF ASEAN'S AGRI-FOOD SYSTEMS

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Contents

Summary

This report makes a comprehensive assessment of ASEAN's inter- and inter-regional agricultural trade using a coherent framework. We estimate the *ad valorem* equivalents (AVEs) of non-tariff measures with the gravity model approach (Kee, 2006; Mao et al., 2023) and add them on top of tariff rates to evaluate the overall degree of trade barriers both within and outside the region. Using the CEPII-BACI database covering the period of 1996 and 2021, we then describe the scale and structure of ASEAN's intra- and inter-regional agricultural trade with a focus on market and product dimensions. The specific trade performance of ASEAN with major outside partners and of the key AMS are examined in details. Finally, we evaluate the overall export competitiveness of ASEAN's agricultural products in the world using the revealed comparative advantage index and their relative competitiveness in China, the region's largest export market, with the import penetration index (Mao and Zhang, 2015).

Framework

The report's framework involves seven sections. Section 1 is the introductory section highlighting the great progress of the AMS in agri-food system transformation, while addressing trade liberalization challenges. Section 2 conducts an overall assessment of ASEAN's tariff and non-tariff barriers to agricultural trade. Section 3 examines the evolution of intra- and inter-regional trade scale and structure of ASEAN over years. In Section 4 and 5, we respectively investigate the trade performance of ASEAN in its top five partner markets and of the six key AMS. The export competitiveness of both ASEAN and the specific AMS and the relatively competitiveness of the region in China are evaluated in Section 6. Section 7 concludes the report.

Data and Methodologies

Data Sources: World Integrated Trade Solution (WITS) database, CEPII-BACI database, TRAINS database, CEPII-Gravity database.

Methodologies:

- **Trade barriers:** a) Measuring the tariff barrier: the ad valorem tariff rates; b) Measuring the non-tarriff barrier: ad valorem equivalents of NTMs estimated following the gravity model approach developed by Kee (2006).
- **Export competitiveness:** a) the index of revealed comparative advantage (RCA) proposed by Balassa (1965); b) the import penetration index proposed by Mao and Zhang (2015).

Key Findings

- **Agricultural Trade Liberalization in ASEAN:** a) We find that between 1996 and 2021, ASEAN's agricultural import and export tariff rates have both been declining. b) Yet the incidence of non-tariff measures and associated AVEs that we estimate have been rising. c) The overall level of export barriers has not been reduced much and that of import barriers, although being reduced by more than a half, was still about 5%.
- **Agricultural Trade Performance of ASEAN:** a) With increases of imports and an even faster growth of exports, the scale of ASEAN's total agricultural trade has expanded rapidly and been accompanied by a swell of trade surpluses before 2011. Afterwards, however, surpluses have been narrowed with a halt of export growth. b) There are substantial heterogeneities with respect to the agricultural trade performance of ASEAN in various partner and product markets. While over these years ASEAN has almost maintained the trade surplus status with its top five partners, i.e. China, EU, US, Japan and India, it has been primarily exporting palm oil, rubber products, aquaculture and fruits and importing food residuals, feeds, diary and egg products, which is a manifestation of the division based on comparative advantages. c) In the meantime, the intra-regional agricultural trade within ASEAN has become increasingly sophisticated, which changed from a pattern with a high concentration on limited exporters and importers in the region to much intertwined bilateral trade flows.
- **Agricultural Export Competitiveness of ASEAN:** a) The overall export competitiveness has been reduced by about a quarter during the period. b) Besides, the relative competitiveness of ASEAN to other exporters in the region's largest destination market China has also been notably declined.

Recommendations

- **Focus on Agricultural trade:** Direct attention towards the trade liberalization and performance of the agri-food section, to promote the intra and inter regional market integration of developing countries.
- **Policy Implications:** These findings indicate an urgency for the region to enhance its regional and global agri-food market integration with a focus on reducing non-tariff barriers and climbing the value chain to strengthen its competitiveness.

1. Introduction

The Association of Southeast Asian Nations (ASEAN) is a regional organization of Southeast Asian countries established in 1967, with as first batch of members Indonesia, Malaysia, Philippines, Singapore and Thailand. With the joining of the State of Brunei Darussalam in 1984 and Cambodia, Laos, Myanmar and Vietnam during the period of 1995 and 1999, the organization has expanded to cover all ten countries which are currently known as ASEAN member states (AMS). Over the past two more decades, the agricultural trade has grown rapidly both among the AMS and between the region and its major outside partners. In particular, the regional trade volume and its proportion in the total trade of these member states have both been rising and hit 22% in 2021. The shares of agricultural imports and exports of the region in the world have both expanded, respectively from 4.0% and 6.5% in 2000 to above 7% in 2021. These facts indicate a stronger market integration of the region and closer integration of ASEAN to the global market, which further shows the great progress of the AMS in agri-food system transformation.

Reducing trade barriers across the AMS and between ASEAN and its major outside partners are crucial drivers of the region's agricultural trade growth. Since the majority of AMS joining the WTO, the import and export tariffs of agricultural products of the AMS have been on a falling trend and dropped below 5% in 2021. At the same time, ASEAN has continued to promote agricultural trade liberalization by signing trade agreements and establishing free trade zones. In particular, at the fourth ASEAN Summit in 1992, the AMS leaders agreed to establish an ASEAN Free Trade Area (AFTA) by 2008, with the Common Effective Preferential Tariff (CEPT) Scheme as the critical implementing mechanism. In 2007, the AFTA Council Meeting decided to enhance the CEPT-AFTA Agreement, which finally led to the ASEAN Trade in Goods Agreement (ATIGA) that was signed in February 2009. Agreements specific to services and investment were also signed to strengthen the regional economic cooperation and development of an ASEAN Economic Community (AEC). In terms of outside economies in contrast, the region has respectively signed free trade agreements with India in 2003, China in 2004, Republic of Korea in 2005, Japan in 2008, and Australia and New Zealand in 2014. On November 15 of 2020, ASEAN signed the Regional Comprehensive Economic Partnership (RCEP) agreement along with Australia, China, Japan, New Zealand, and South Korea, marking a further progress in trade liberalization.

While it has been widely acknowledged that agricultural trade is a key contributor to food security, economic growth, and structural transformation of developing countries (Aksoy and Beghin, 2004; Teignier, 2018; Baylis et al., 2019), many challenges are still facing the region to promote further agricultural trade liberalization, market integration, and value chain development amidst long-run supply and demand transitions as well as increased near-term uncertainties (Chen and Mao, 2023). In the meantime, with surging intra- and inter-regional supply chains of key crops, primary producers in ASEAN are also worried about losing the sovereignty and opportunities for domestic

industrialization and value addition (SEARCA, 2016). To realize the benefits of ASEAN economies from market integration, it is therefore urgent to enhance the region's agricultural trade performance and competitiveness. Particularly, a systematic description and assessment of tariff and non-tariff barriers as well as status and characteristics of the current agricultural trade among ASEAN members and between the region and the rest of the world is needed to lay the foundation to policymakers to facilitate a more integrated agri-food system of the region.

Surprisingly, systematic delineations and assessments of ASEAN's agricultural trade are rather limited. Roy et al (2023) addressed the question of agricultural market integration of Cambodia, Lao, Myanmar, Vietnam and Philippines (CLMVP) countries within ASEAN and its other top trading partners over the period of 2005 to 2020. Based on the trade data derived from United Nations Commodity Trade Statistics Database (UN Comtrade), they demonstrated the export scale, product and market structure of CLMVP countries. Besides, based on the tariff and the number of non-tariff measures data derived from WTO, they discussed the trade barrier CLMVP countries imposed on their agricultural imports. Bouët et al (2022, a) assessed the agricultural trade integration in Southeast Asia in some specific years. Besides the traditional indicators of nontariff measures (NTMs) such as the frequency index, coverage ratio and prevalence score, they estimated *ad valorem* equivalents (AVEs) of agricultural NTMs using the refined methodology of Kee et al (2006) and Ghodsi et al (2016) with the data derived from World Bank's *Doing Business* database, UNCTAD TRAINS portal and CEPII-BACI database. Bouët et al (2022, b) revealed the agricultural trade integration in ASEAN in a similar way to Bouët et al (2022, a).

This report makes a comprehensive assessment of ASEAN's inter- and inter-regional agricultural trade using a coherent framework. We estimate the *ad valorem* equivalents (AVEs) of non-tariff measures with the gravity model approach (Kee, 2006; Mao et al., 2023) and add them on top of tariff rates to evaluate the overall degree of trade barriers both within and outside the region. Using the CEPII-BACI database covering the period of 1996 and 2021, we then describe the scale and structure of ASEAN's intra- and inter-regional agricultural trade with a focus on market and product dimensions. The specific trade performance of ASEAN with major outside partners and of the key AMS are examined in details. Finally, we evaluate the overall export competitiveness of ASEAN's agricultural products in the world using the revealed comparative advantage index and their relative competitiveness in China, the region's largest export market, with the import penetration index (Mao and Zhang, 2015). Compared with previous works such as Roy et al (2023), this report investigates ASEAN's agricultural trade and market integration issue with a wider scope that includes more member states beyond CLMVP and most of the region's primary trade partners, particularly those outside South Asia. Using the most recent data, we simultaneously take trade barriers, trade patterns, and trade competitiveness to a coherent analytical framework, instead of demonstrating them separately.

We find that between 1996 and 2021, ASEAN's agricultural import and export tariff rates have both been declining, yet the incidence of non-tariff measures and associated AVEs that we estimate have been rising. As a result, the overall level of export barriers has not been reduced much and that of import barriers, although being reduced by more than a half, was still about 5%. In terms of the overall trade performance, with increases of imports and an even faster growth of exports, the scale of ASEAN's total agricultural trade has expanded rapidly and been accompanied by a swell of trade surpluses before 2011. Afterwards, however, surpluses have been narrowed with a halt of export growth. There are substantial heterogeneities with respect to the agricultural trade performance of ASEAN in various partner and product markets. While over these years ASEAN has almost maintained the trade surplus status with its top five partners, i.e. China, EU, US, Japan and India, it has been primarily exporting palm oil, rubber products, aquaculture and fruits and importing food residuals, feeds, diary and egg products, which is a manifestation of the division based on comparative advantages. In the meantime, the intra-regional agricultural trade within ASEAN has become increasingly sophisticated, which changed from a pattern with a high concentration on limited exporters and importers in the region to much intertwined bilateral trade flows. In spite of the growth and diversification of ASEAN's agricultural trade, the overall export competitiveness of the region in the world has been reduced by about a quarter during the period. Besides, the relative competitiveness of ASEAN to other exporters in the region's largest destination market China has also been notably declined. These findings indicate an urgency for the region to enhance its regional and global agri-food market integration with a focus on reducing non-tariff barriers and climbing the value chain to strengthen its competitiveness.

The rest of this report is organized as follows. Section 2 conducts an overall assessment of ASEAN's tariff and non-tariff barriers to agricultural trade. Section 3 examines the evolution of intra- and inter-regional trade scale and structure of ASEAN over years. In Section 4 and 5, we respectively investigate the trade performance of ASEAN in its top five partner markets and of the six key AMS. The export competitiveness of both ASEAN and the specific AMS and the relatively competitiveness of the region in China are evaluated in Section 6. Section 7 concludes the report.

2. Agricultural Trade Liberalization in ASEAN

2.1 Overall import and export tariffs

The data of agricultural trade tariffs used in this section are obtained from the World Integrated Trade Solution (WITS) database of the World Bank. Tariffs are reported for a total of 768 agricultural products defined by the HS 6-digit system, with product codes all converted to the HS 1996 version for consistency. The WITS contains various types of tariff rates for each country-product combination. In line with Kaushik (2016), these tariff rates are chosen in the following order to derive the overall tariff level, i.e. preferential tariffs > most-favored-nation tariffs > effectively applied tariffs. We use

the simple average of tariff rates to calculate the import and export tariff barriers of a certain country, product or the whole region. Finally, we restrain ourselves to the period between 1996 and 2021 such that the coverage of calculated tariff levels can match that of trade flows in the CEPII-BACI database used in following sections.

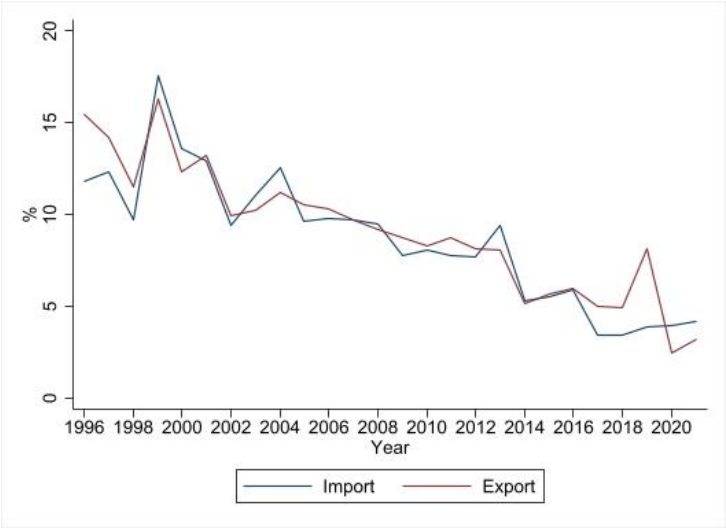


Figure 2-1. Overall Tariff Rates for ASEAN's Agricultural Trade.

Figure 2-1 demonstrates that the overall tariff rates, measured as the simple average across partners and products, for both agricultural imports and exports of ASEAN have been declining from over 15% to under 5% during 1996 and 2021. Compared with the top five trade partners of ASEAN including China, EU, US, Japan and India, as well as the world as a whole, ASEAN's agricultural import and export tariff levels are generally lower (Figure 2-2). In particular, the average agricultural import tariff rates of ASEAN was 8.93% over the period, which is lower than that of the world at 10.6%, China at 15.1%, EU at 10.5%, India at 30.5%, and Japan at 15.6%. However, it is relatively higher than the average import tariffs of the US at only 4.2%. The average export tariff rates of ASEAN was 8.8%, which is lower than that China at 10.6%, EU at 11.5%, India at 10.4%, Japan at 11.1%, and US at 12.4%.

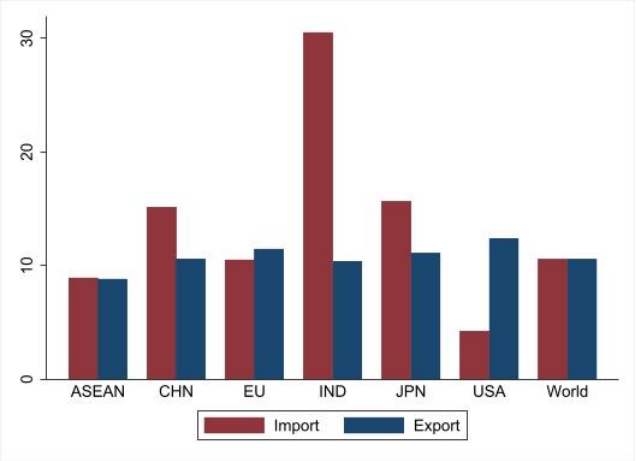


Figure 2-2. Tariff Rates of ASEAN and Its Major Partners (1996-2021).

By further distinguishing tariff rates which ASEAN members imposed on other AMS and outside partners, Figure 2-3 exhibits ASEAN's simple average tariff rates for intra- and inter-regional agricultural trade respectively. It is evident from the figure that both rates have remained at similar levels before 2003 and were on a general declining trend over time. However, while intra-regional tariffs have experienced two rounds of notable reductions during 2003-2009 and 2013-2015, inter-regional tariffs were only gradually declining after 2007. As a result, compared with an average intra-regional tariff below 5% after 2014 and staying around 1% in recent years, the inter-regional tariff is now about four times higher.

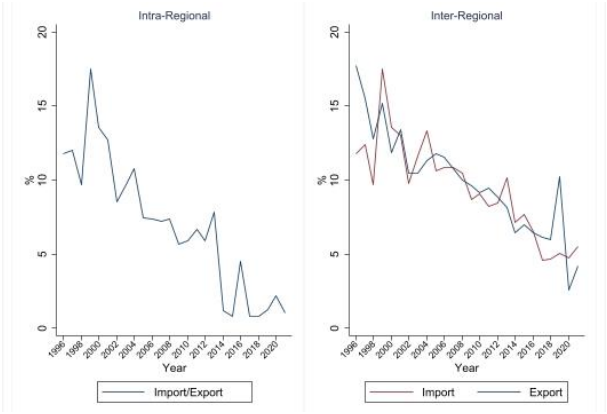


Figure 2-3. Overall Intra- and Inter-Regional Tariff Rates.

2.2 Tariffs for specific countries and products

Although the simple average of import tariffs on agricultural products in the ASEAN achieved 8.93% between 1996 and 2021, only three AMS including Thailand, Malaysia and Cambodia have an average import tariffs higher than that of the region. According to Table 2-1, the average tariffs of Thailand and Malaysia imposed on partners outside ASEAN were respectively 12.7% and 11.0%, and the average inter-regional import tariff of Cambodia was 9.4%. In terms of products, there are also only three product categories, defined by 2-digit HS codes, with an average import tariff level higher than the region's average. In particular, the product category with the highest tariffs was tobacco products (Chapter 24), featuring a 33.9% tariff rate imposed on imports from out of the region on average. Import tariffs were also notable for beverage and wine (Chapter 22) and cereals (Chapter 10), respectively at 22.2% and 11.0%.

Table 2-1. Countries and Products with Top Five Inter-Regional Tariffs (1996-2021).

Country	Tariff, %	Product, HS-2 codes	Tariff, %
Thailand	12.7	Chapter 24	33.9
Malaysia	11.0	Chapter 22	22.2
Cambodia	9.4	Chapter 10	11.0
Viet Nam	6.4	Chapter 21	7.9

Indonesia	4.5	Chapter 17	7.7

Notes: Chapter 24: tobacco products; Chapter 22: beverage and wine; Chapter 10:cereals; Chapter 17:sugar; Chapter 21:miscellaneous food.

In line with the overall declining trend demonstrated in Figure 2-3, the overall import and export tariffs between ASEAN and its top five trade partners, i.e. China, EU, US, Japan and India, have also been decreasing between 1996 and 2021 according to Figure 2-4. In particular, tariffs that ASEAN imposed on imports from the EU and the US were the highest among the five partners, both above 10%. However, tariffs on imports from Japan were reduced by the most, down from about 14% in 1996 to below 5% in 2021. In contrast, while tariffs that ASEAN received from its partners on agricultural exports were also the highest in the EU, US and Japanese markets, these rates were lower than those ASEAN imposed on imports from these partners.

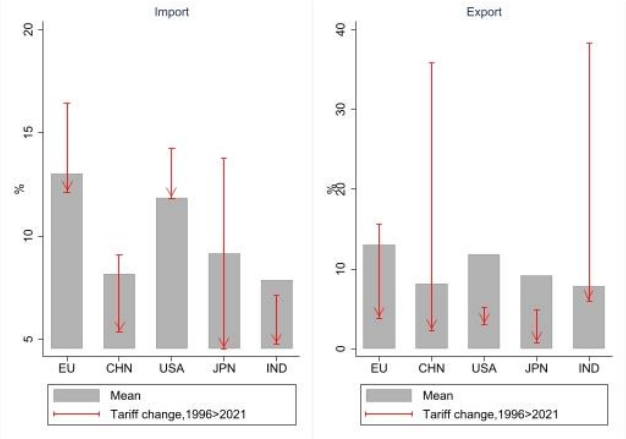


Figure 2-4. Inter-Regional Tariff Rates with Top Five Partners (1996-2021).

However, with respect to both China and India, the average tariff rates received by ASEAN's exports were higher than the tariff rates that ASEAN imposed on its imports. Besides, in both markets, tariff rates against ASEAN's exports have been substantially reduced during the period, from more than 35% in 1996 to around or below 5% in 2021.

Figure 2-5 compares the average import and export tariffs of ASEAN across 2-digit product categories. It finds that both tariffs were in general higher among food products (i.e. from Chapter 16 onwards) than less processed agricultural products. In particular, the import tariffs on tobacco products (Chapter 24) and beverage and wine (Chapter 22) were both beyond 40% and could even hit 60%. Although in general tariffs received by ASEAN's exports were lower than the region's import tariffs, tariff rates on ASEAN's exports were still as high as about 20% with regard to tobacco (Chapter 24) and beverage and wine (Chapter 22) products.

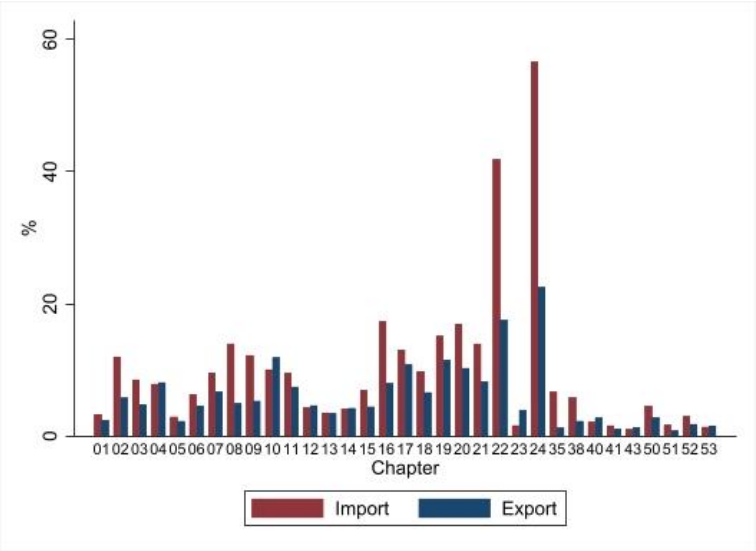


Figure 2-5. Inter-Regional Average Tariff Rates across Products (1996-2021).

Notes: Chapter 01: live animals; Chapter 02: meat; Chapter 03: fish; Chapter 04: dairy products; Chapter 05: animal products; Chapter 06: live trees and other plants; Chapter 07: vegetables; Chapter 08: fruit and nuts; Chapter 09: Coffee and tea; Chapter 10: cereals; Chapter 11: products of the milling industry; Chapter 12: oily kernels and fruits; Chapter 13: vegetable saps and extracts; Chapter 14: vegetable plaiting materials; Chapter 15: animal and plant oil; Chapter 16: meat and aquatic products; Chapter 17: sugar; Chapter 18: cocoa products; Chapter 19: cereal products; Chapter 20: vegetable and fruit products; Chapter 21: miscellaneous food; Chapter 22: beverage and wine; Chapter 23: animal feed; Chapter 24: tobacco; Chapter 35: albuminoidal substances; Chapter 38: miscellaneous chemical products; Chapter 40: rubber; Chapter 41: raw hides and skins; Chapter 43: furskins and artificial fur; Chapter 50: silk; Chapter 51: wool; Chapter 52: cotton; Chapter 53: other vegetable textile fibres.

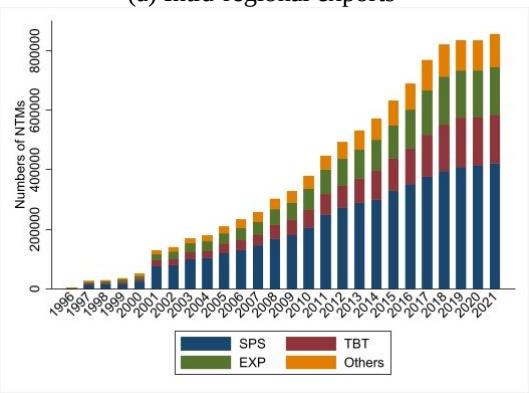
2.3 Overall non-tariff measures (NTM)

NTMs are policy measures, other than customs duties, that have the potential to have an economic impact on international trade in goods by altering traded quantities, prices or both. NTMs are playing a larger role in international trade due to the reduction of tariffs around the world following successive agreements under the General Agreement on Tariffs and Trade/World Trade Organization (GATT/WTO). They could also reflect the growing consumer concerns over the food safety, quality and environmental consequences. With respect to agricultural trade, sanitary and phytosanitary measures (SPS) and technical barriers to trade (TBT) stand out as the two major non-tariff measures. In the meantime, they are also known as technical measures as they aim to specify product regulations, standards, as well as testing and certification requirements. Aside from SPS and TBT, ASEAN has also imposed and received noticeable incidence of export-related measures (EXP) such as pre-export inspection requirements for fishery products. Thus, we will respectively examine NTMs in ASEAN's inter- and intra-regional trade with a focus on the composition of SPS, TBT, EXP and other

measures. We derive the data of NTMs from the TRAINS database of UNCTAD. While the original data split NTMs to HS 6-digit products and exporter-importer pairs, we aggregate their number at national, regional and product levels to present an overall picture about the application of various measures.

Figure 2-6 shows that over the period from 1996 to 2021, the total number of NTMs imposed on ASEAN's exports has been largely increasing regarding both the intra- and inter-regional trade, especially between 2001 and 2017. Nevertheless, the incidence of NTMs related to inter-regional exports was almost four times that for the intra-regional trade. With regard to both export flows, SPS measures have taken up the highest share in all types of NTMs. However, while TBT and EXP measures were equally prevalent at large in ASEAN's intra-regional exports, the share of EXP apparently took over that of TBT when intra-regional exports are concerned.

(a) Intra-regional exports



(b) Inter-regional exports

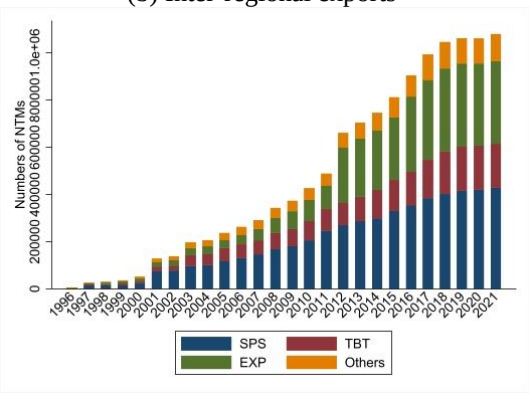


Figure 2-6. Number and Composition of NTMs on Intra- and Inter-Regional Exports.

Notes: SPS: sanitary and phytosanitary measures , TBT: technical barriers to trade, EXP: export-related measures.

Table 2-2 in contrast examines the number and composition of NTMs on ASEAN's intra- and inter-regional imports. In line with that found for NTMs on exports, the total number of NTMs on inter-regional imports was also much higher than that on the intra-regional trade, with the former being even close to 60 times that the latter. EXP has the largest share in ASEAN's NTMs on intra-regional imports, accounting for nearly a half in all measures imposed. However, with regard to ASEAN's inter-regional imports, the incidence of SPS was the highest at 40.6%, followed by that of EXP at 31.9%.

Table 2-2. Number and Composition of NTMs on Intra- and Inter-Regional Imports (1996-2021).

	SPS	TBT	EXP	Others	Total
Intra-regional	3576.7	1339.7	6146.1	2223.2	13285.8
	(26.9%)	(10.1%)	(46.3%)	(16.7%)	(100%)
Inter-regional	310451	130943	243944	79760.8	765098.8
	(40.6%)	(17.1%)	(31.9%)	(10.4%)	(100%)

Notes: SPS: sanitary and phytosanitary measures , TBT: technical barriers to trade, EXP: export-related measures. Period-averages are shown in the table.

2.4 Non-tariff measures for specific countries and products

Among ASEAN's top five agricultural trade partners, EU is the region with the most NTMs both for imports and exports according to Table 2-3. In spite of being ASEAN's fourth largest trade partner, Japan had the fewest NTMs on both imports and exports with the region. In terms of different types of NTMs, SPS measures remained the most, taking up around a half in NTMs that ASEAN received in its exports and 57% in NTMs that ASEAN imposed on imports. An interesting difference is that while TBT measures accounted for about or below 20% in NTMs that ASEAN imposed on its partners, they accounted for close to 36% in NTMs that ASEAN imposed on China.

Table 2-3. Number and Composition of NTMs with Top Five Partners.

	Partner	SPS	TBT	EXP	Others	Total
Exports	EU	197933.6	66501.3	106629.7	46067.3	417131.9
		(52.4%)	(17.2%)	(18.3%)	(12.1%)	(100%)
	CHN	198429.1	65015.0	69269.8	45693.2	378407.1
		(52.5%)	(17.2%)	(18.3%)	(12.1%)	(100%)
	USA	198235.0	64906.1	69050.6	45625.9	377817.6
		(47.5%)	(15.0%)	(25.6%)	(11.0%)	(100%)
	JPN	128428.6	42313.1	45337.1	29807.3	245886.1
		(52.2%)	(17.2%)	(18.4%)	(12.2%)	(100%)
	IND	198296.7	65015.3	69054.5	45674.3	378040.8
		(52.5%)	(17.2%)	(18.3%)	(12.1%)	(100%)
Imports	EU	110211	31249.5	1051.7	20091.3	162603.5
		(67.8%)	(19.2%)	(0.6%)	(12.4%)	(100%)
	CHN	14836.9	25604.1	18385.3	12414.8	71241.1
		(20.8%)	(35.9%)	(25.8%)	(17.5%)	(100%)
	USA	16871.2	2538.3	2386.3	2345.7	24141.5
		(69.9%)	(10.5%)	(9.9%)	(9.7%)	(100%)

JPN	8319.045	2048.8	1205.7	723.7	12297.3
	(67.6%)	(16.7%)	(9.8%)	(7.9%)	(100%)
IND	24668.6	8508.3	3391.1	2174	38742.0
	(63.7%)	(22.0%)	(8.8%)	(5.5%)	(100%)

Notes: SPS: sanitary and phytosanitary measures , TBT: technical barriers to trade, EXP: export-related measures. Period-averages are shown in the table.

In contrast, Figure 2-7 examines the number and composition of NTMs related with ASEAN's inter-regional trade across product categories. Among all HS 2-digit product categories, fish products (Chapter 03) were found with the largest amount of NTMs on ASEAN's imports and the second most NTMs with regard to ASEAN's exports, closely following those on dairy products (Chapter 04). The number of NTMs was also notable in ASEAN's inter-regional imports and exports of meat products (Chapter 02), vegetables products (Chapter 07), and fruit products (Chapter 08). Unlike tariffs, both NTMs in ASEAN's exports and imports were primarily imposed on less processed agricultural products rather than food. Figure 2-7 also reveals substantial differences in terms of the composition of various types of NTMs across products. In particular, the share of SPS measures was around or above 50% among both ASEAN's imports and exports of meat (Chapter 02), dairy (Chapter 04), fruits (Chapter 08), coffee and tea (Chapter 09), and those relatively more processed goods such as products of the milling industry (Chapter 11) as well as food (Chapter 16-24) except tobaccos (Chapter 24), yet was below 10% when considering textile materials in Chapters 51-53. In addition, while EXP measures were in general equally or even more prevalent than SPS measures for many products that ASEAN imported, they were almost always fewer than SPS when ASEAN's exports were concerned.

(a) Number of NTMs (b) Composition of NTMs

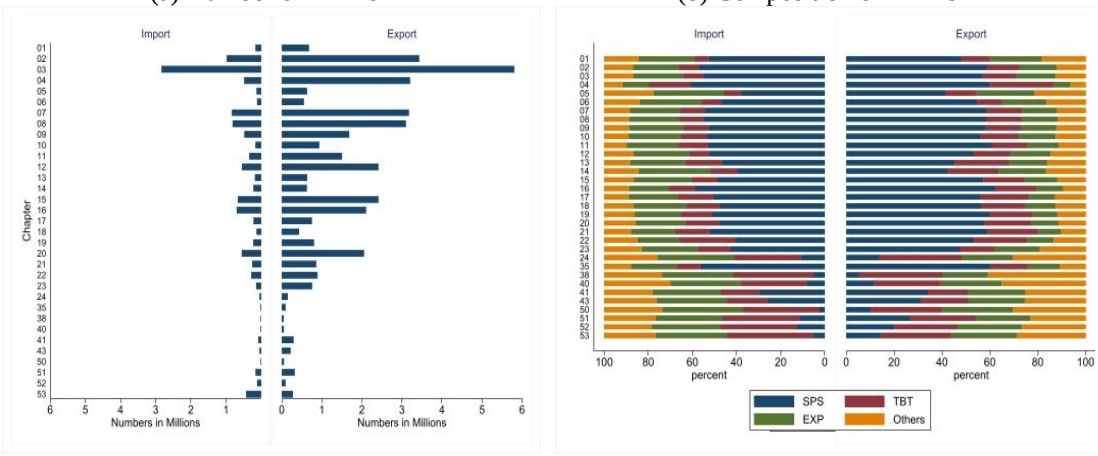


Figure 2-7. Number and Composition of NTMs across Products.

Notes: Chapter 01: live animals; Chapter 02: meat; Chapter 03: fish; Chapter 04: dairy products; Chapter 05: animal products; Chapter 06: live trees and other plants; Chapter 07: vegetables; Chapter 08: fruit and nuts; Chapter 09: Coffee and tea; Chapter 10: cereals; Chapter 11: products of the milling industry; Chapter 12: oily kernels and fruits;

Chapter 13: vegetable saps and extracts; Chapter 14: vegetable plaiting materials; Chapter 15: animal and plant oil; Chapter 16: meat and aquatic products; Chapter 17: sugar; Chapter 18: cocoa products; Chapter 19: cereal products; Chapter 20: vegetable and fruit products; Chapter 21: miscellaneous food; Chapter 22: beverage and wine; Chapter 23: animal feed; Chapter 24: tobacco; Chapter 35: albuminoidal substances; Chapter 38: miscellaneous chemical products; Chapter 40: rubber; Chapter 41: raw hides and skins; Chapter 43: furskins and artificial fur; Chapter 50: silk; Chapter 51: wool; Chapter 52: cotton; Chapter 53: other vegetable textile fibres. SPS: sanitary and phytosanitary measures , TBT: technical barriers to trade, EXP: export-related measures. Period-averages are shown in the table.

2.5 Ad valorem equivalents of NTMs

In order to evaluate the overall progress of ASEAN's agricultural trade liberalization, we estimated the *ad valorem* equivalents (AVEs) of NTMs such that the effect of these measures could be converted to tariff rates with an equal strength. We adopt the gravity model approach developed by Kee (2006) to estimate AVEs of the four major types of NTMs, which is described as follows:

$$\ln(m_{ijht}) = \beta_{0h} + \beta_{1h}\ln(1 + \text{Tariff}_{ijht}) + \sum_{n=1}^{N} \beta_{2h}^{n} NTM_{ijht}^{n} + \beta_{3h} C_{ijt} + \omega_{ht} + \omega_{ijh} + \mu_{ijht}, \quad (1)$$

$$\frac{\partial \ln m_{ih}}{\partial NTM_{ih}^{n}} = \frac{\partial \ln m_{ih}}{\partial \ln p_{ih}} \frac{\partial \ln p_{ih}}{\partial NTM_{ih}^{n}} = \varepsilon_{ih} AVE_{ih}^{n} \quad (2)$$

$$AVE_{ih}^{n} = \frac{e^{\beta_{2h}^{n}} - 1}{\varepsilon_{ih}} \quad (3)$$

$$\text{Mean } AVE_{ih} = \sum_{h} \frac{AVE_{ih}^{n} * m_{ih}}{m_{i}} \quad (4)$$

In the above equations, subscripts *i*, *j*, *h* and *t* respectively denote the importing country, exporting country, product and time. m_{ijht} stands for the quantity of country *i*'s imports from country *j*, and m_{ijht} and NTM^{n}_{ijht} are respectively the tariff and non-tariff measures of type *n* (i.e. SPS, TBT, EXP or others). Other determinants of bilateral trade considered by the conventional gravity equation are included in the vector C_{ijt}. Consistent with Mao et al. (2023), the impact of NTMs on bilateral trade estimated from Equation (1) could be translated to AVEs using the import demand elasticities ε_{ih} as in Equation (3).

The mean AVEs could then be calculated using Equation (4) when a particular importer and product combination is considered.

The data needed to estimate the AVEs include bilateral trade flows, tariff rates, NTM incidence for various measures, and gravity variables. The trade flow data are from the CEPII-BACI database, the tariff data are provided by the World Bank's WITS database, NTMs are from the TRAINS database of UNCTAD, and trade gravity variables could

be derived from the CEPII-Gravity database. While the original AVEs are estimated at a detailed level of HS 6-digit products, they can be aggregated by trade-weighted means to characterize the overall level for broader product categories.

Figure 2-8 demonstrates that the estimated AVEs of NTMs for ASEAN's agricultural imports and exports have both been rising before 2019 in general, especially during the period from 2008 to 2016. However, the AVE has gradually decreased from above 4% to around 1% since 2016 for NTMs that ASEAN imposed on its imports. And the AVE for NTMs that ASEAN received on its exports has also slightly declined in the past four years. Overall, NTMs on ASEAN's exports have always created a greater tariff-equivalent trade barrier than NTMs on its imports.

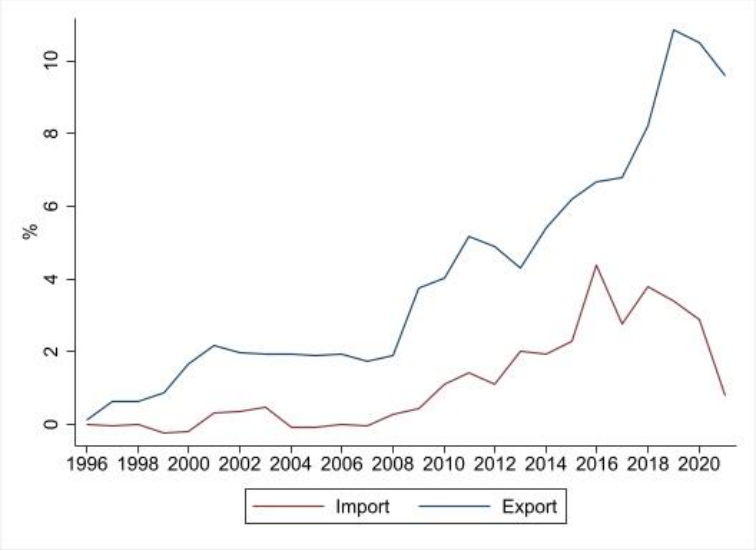
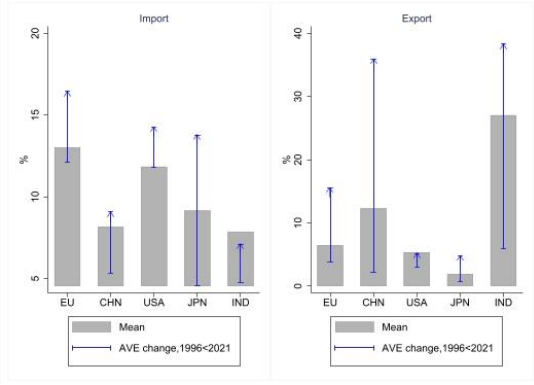


Figure 2-8. Estimated AVEs for NTMs on ASEAN Imports and Exports.

According to Figure 2-9, estimated AVEs associated with NTMs on both ASEAN's imports and exports have been rising in all the region's top five trade partners over the period. In particular, India has imposed NTMs with the highest AVE on ASEAN's exports, but China's NTMs were almost equally restrictive in 2021. The EU has received the most restrictive import NTMs by ASEAN, but the AVE on imports from Japan has witnessed the most obvious growth.

(a) Top five partners



(b) Top five products

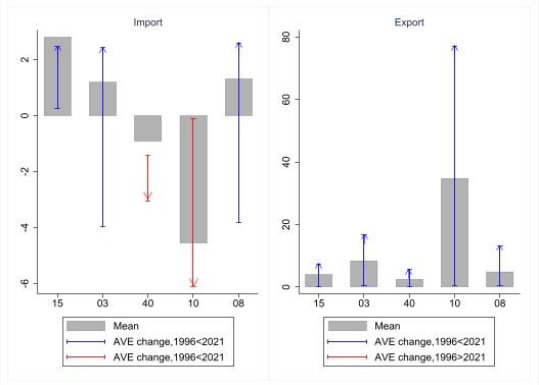


Figure 2-9. Estimated AVEs for Top Five Partners and Products.

Notes: Chapter 15: animal and plant oil; Chapter 03: fish; Chapter 40: rubber; Chapter 10: cereals; Chapter 08: fruit and nuts.

In terms of the top five products defined by the total trade scale, Panel (b) of Figure 2-9 shows that NTMs were always trade restrictive and equivalent to a noticeably high level of tariff rates on average, which was about 10% for fish (Chapter 03) and beyond 35% for cereals (Chapter 10). In contrast, with regard to ASEAN's imports, the estimated AVEs of NTMs were all below 3% on average among all the top five products and were even trade facilitating for rubber (Chapter 40) and grain (Chapter 10). Pro-trade effects of NTMs might take place if higher standards and stricter inspections could reduce the information asymmetry between consumers and foreign producers (Leland, 1979).
In Figure 2-10, we add estimated AVEs of NTMs on top of tariff rates to assess the overall trade barriers in ASEAN's agricultural imports and exports. It finds that export barriers have hardly been reduced between 1996 and 2021, due to substantial increases of NTMs that have offset most effects of tariff reductions. In fact, AVEs of NTMs have taken over tariff rates since 2014 and become the driving trade policy which restricted ASEAN's agricultural exports. As a result, the overall trade barrier remained at a tariff level about 12% in 2021, compared with the initial level merely above 15% in 1996. In contrast, with regard to the overall trade barriers in ASEAN's imports, while the overall trade barriers have been reduced from a tariff level about 12% in 1996 to below 5% in 2021, the progress has been roughly halted between 2014 and 2020 and only resumed in 2021 with further drops in AVEs of NTMs.

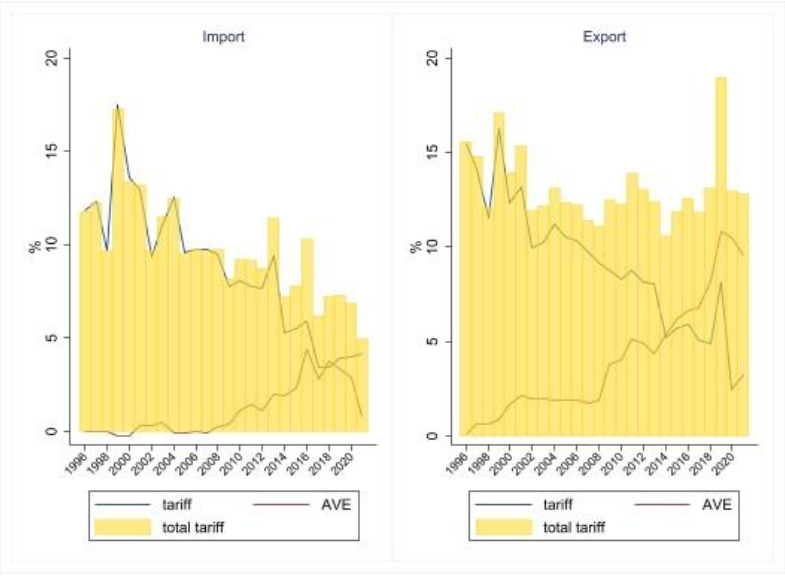


Figure 2-10. Overall Trade Barriers to ASEAN's Imports and Exports.

3. The Overall Pattern of Agricultural Trade of ASEAN

3.1 Trade scale and inter-/intra-regional trade

Trade data used in this report is derived from the BACI database developed by CEPII, which provides trade information at the HS 6-digit disaggregation for more than 5,000 products and 200 countries. This database has gradually come into popular use in recent studies. It employs an original procedure to assess the quality of declarations on mirror trade flows by countries, to adjust the cost, insurance and freight (CIF) rates to reconcile data from the United Nations COMTRADE database, as well as to identify and correct measurement errors or duplicates (Gaulier and Zignago, 2010; Imbs and Mejean, 2017). It therefore offers more reliable and consistent bilateral trade statistics at the commodity level. The data used in this report covers the period from 1996 to 2021[1], which identifies products with the HS coding system revised in 1996 and measures the value of trade in thousands of current US dollars. However, for the comparability of data over time, we follow Costa et al. (2016) and convert nominal values to 2015 US dollars using the US GDP deflator released by the World Bank in May 2023.

According to Figure 3-1, ASEAN's agricultural imports and exports have been rising rapidly during 1996 and 2021. Over the period, ASEAN has grown into the second largest exporter of agricultural products after the European Union with an annual growth rate of 5.86 percent and the fourth largest importer of agricultural products after the European Union, China and the United States with an annual growth rate of 6.72 percent. Both the growth rate of ASEAN's exports and imports are higher than the world's average at 3.55%, which contributes to its increasingly important role in the global agricultural trade. In the meantime, ASEAN has been consistently running an agricultural trade surplus over 26 years. However, because of the subdued exports after 2011, the scale of surplus has been reduced over the past decade.

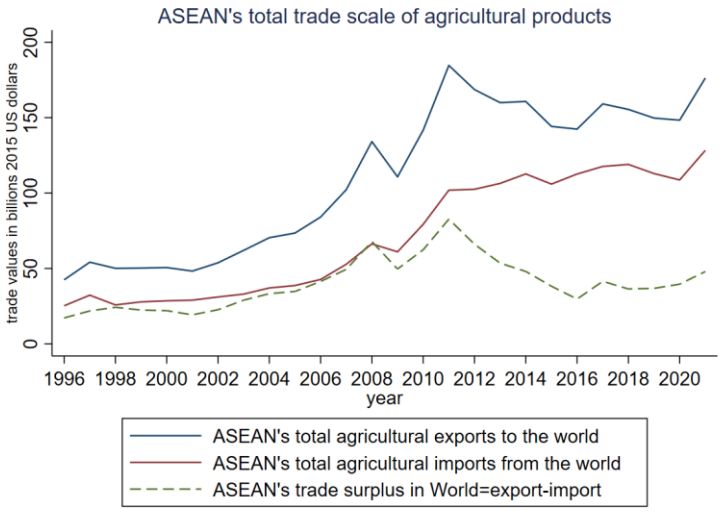


Figure 3-1. ASEAN's Agricultural Imports and Exports.

Inter-regional trade accounted for the lion's share in both ASEAN's agricultural exports and imports, but intra-regional trade has been more important in exports recently. Figure 3-2 demonstrates that the import share of intra-regional agricultural trade has

[1] This was the latest dataset under HS system revised in 1996 on February 1st, 2023.

always been fluctuating around 30%, while the export share climbed up from less than 10% in 1996 to 21.3% in 2021.

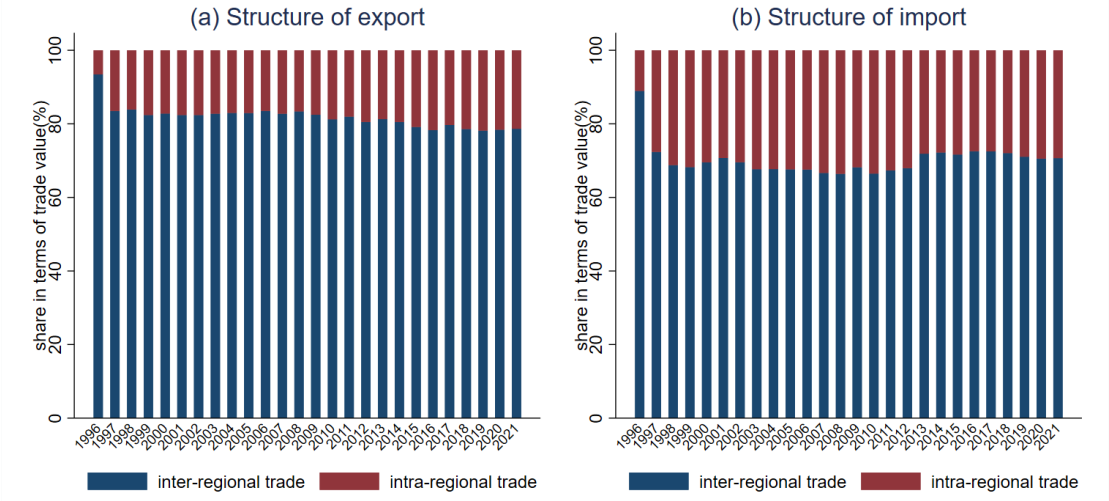


Figure 3-2. Inter-/Intra-Regional Trade Structure.

3.2 Inter-regional trade of specific countries and products

Panel (a) of Figure 3-3 examines the inter-regional agricultural exports from ASEAN and reveals Indonesia and Thailand being the top two exporters in the region. However, the share of Thailand has declined and is overshadowed in recent years by the increased share of Vietnam. Panel (b) examines the ASEAN exports to the region's top five trade partners. It demonstrates that the EU and China are the top two export destinations of ASEAN's inter-regional agricultural exports. Among the top five destinations, the share of the EU, US and Japan have all declined, and the share of China has exhibited the most obvious growth. With regard to the products involved in ASEAN's inter-regional agricultural trade, Panel (c) shows that animal and plant oil (Chapter 15) accounted for the bulk in ASEAN's exports, and the share has been growing over time. Rubber (Chapter 40) and fish and meat and aquatic products (Chapter 3 and 16) also accounted for notable shares in ASEAN's exports. However, these shares have declined.

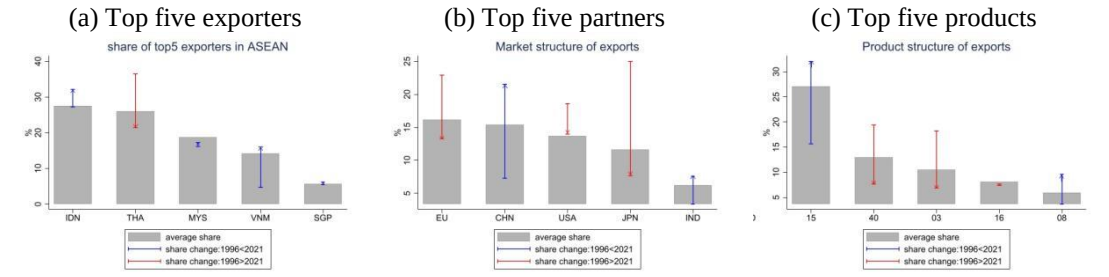


Figure 3-3. ASEAN's Inter-Regional Exports in Specific Countries and Products

Notes: Chapter 15: animal and plant oil; Chapter 40: rubber; Chapter 03: fish; Chapter 16: meat and aquatic products; Chapter 08: fruit and nuts.

Figure 3-4, in contrast, examines the inter-regional agricultural imports by ASEAN. Panel (a) finds that Vietnam and Indonesia are the top two importers in ASEAN's inter-regional trade. In particular, the share of Vietnam has increased rapidly and is now the highest among the top five importers in the region. According to Panel (b), the US and China are the top two source countries of ASEAN's agricultural imports. Nevertheless, only the share of China has increased, while the share of other countries in ASEAN's top five import partners has all declined. Panel (c) further shows that animal feed (Chapter 23) and grain (Chapter 10) are the main agricultural products that ASEAN imported from outside the region.

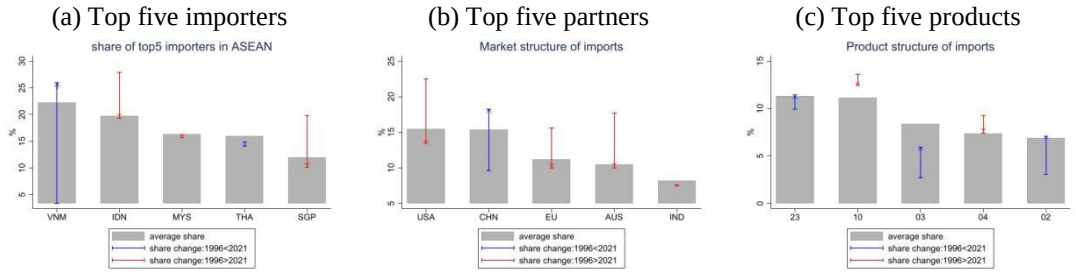


Figure 3-4. ASEAN's Inter-Regional Imports in Specific Countries and Products

Notes: Chapter 23: animal feed; Chapter 10: cereals; Chapter 03: fish; Chapter 04: dairy products; Chapter 02: meat.

3.3 Structure of intra-regional trade

Figure 3-5 examines the top exporters, top importers, and top products in ASEAN's intra-regional agricultural trade. Panel (a) shows that Thailand, Indonesia and Malaysia are the major exporters in the region with regard to the intra-regional trade, though their shares have both been declined over years. In contrast, according to Panel (b), Malaysia, Singapore and Vietnam are the major importers, and the share of Vietnam and that of Philippines have increased notably. As shown by Panel (c), animal and plant oil (Chapter 10) is the product with the largest trade share in ASEAN's intra-regional trade, and the share is increasing. The share of grain (Chapter 10), though remaining as the second largest, has notably declined.

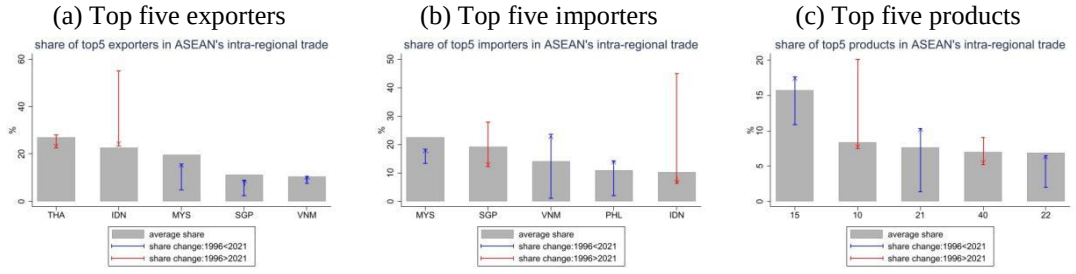
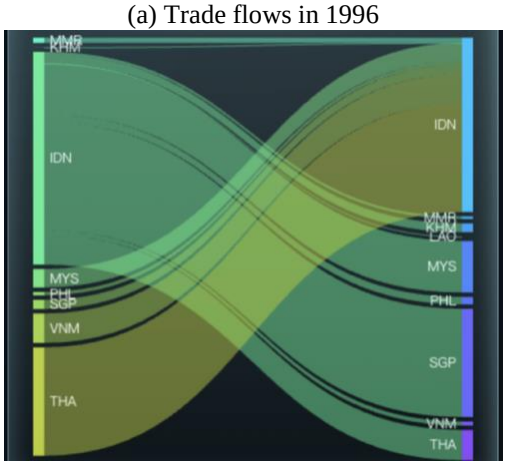


Figure 3-5. ASEAN's Inter-Regional Imports in Specific Countries and Products

Notes: Chapter 15: animal and plant oil; Chapter 10: grain; Chapter 21: miscellaneous food; Chapter 40: rubber; Chapter 22: beverage and wine.

Aside from an increased intra-regional agricultural trade, bilateral trade flows have become more diversified and intertwined over years. According to Figure 3-6, in 1996, Indonesia was the largest exporter in the intra-regional trade, with its share exceeding a half of the total intra-regional exports. Indonesia and Singapore were the two largest importers, with shares in the total intra-regional imports respectively being around 40% and 30%. In fact, bilateral exports from Indonesia to Singapore and from Thailand to Indonesia took up more than a half in the region's entire intra-regional agricultural trade. In 2021, however, both exporters and importers in the ASEAN's intra-regional agricultural trade have become more diversified. The share of the largest exporter and that of the largest importer in the intra-regional trade have both declined to around 20%. Most countries have established multiple import or export partners, such that bilateral trade flows are increasingly intertwined.

(a) Trade flows in 1996



(b) Trade flows in 2021

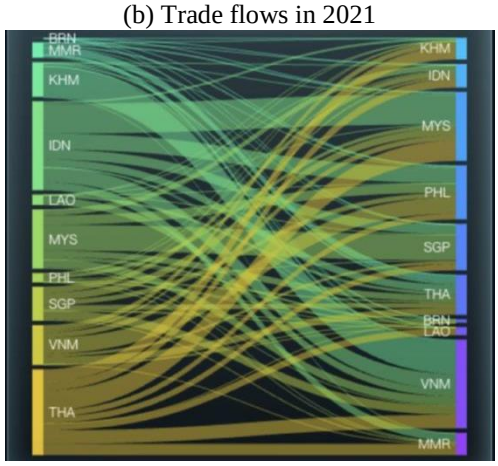


Figure 3-6. Bilateral Trade Flows in ASEAN's Intra-Regional Trade

4. ASEAN's Agricultural Trade with Major Partners

According to the share of total agricultural exports and imports with ASEAN through the period of 1996-2021 on average, China, EU, US, Japan and India are identified as the region's top five partners in inter-regional agricultural trade. They together account for 63% and 52% respectively in ASEAN's total agricultural exports and imports with the world.

4.1 China

Agricultural exports and imports of ASEAN with China were respectively 359 and 199 billion USD between 1996 and 2021, on average, accounting for 15.42% and 15.36% of the region's entire inter-regional agricultural exports and imports. As demonstrated by Figure 4-1, both ASEAN's agricultural exports and imports with China grew rapidly after China's accession to the WTO. The growth rate of exports was significantly higher than that of imports, leading to a widening trade surplus over time. Nevertheless, during the past decade, the scale of trade surplus has exhibited a declining trend due to subdued exports.

Panel (b) of Figure 4-1 investigates ASEAN's agricultural trade with China in major product markets. While animal and plant oil (Chapter 15) is the product with the largest trade share in ASEAN's agricultural exports to China on average, the leading position has been replaced by fruit and nuts (Chapter 8) that are labor intensive and in line with ASEAN's comparative advantages in 2021. In the meantime, with notable declines over time, the share of rubber (Chapter 40) has also slipped from the second largest to the third place in 2021. As to agricultural imports from China, Panel (b) finds that edible vegetables and certain roots and tubers (Chapter 7), fruit and nuts (Chapter 8), fish (Chapter 3), meat and aquatic products (Chapter 16) and vegetable and fruit products (Chapter 20) took the largest shares during the period of 1996-2021. Besides, their shares have all been increasing over time.

(a) Trade scale (b) Top Products

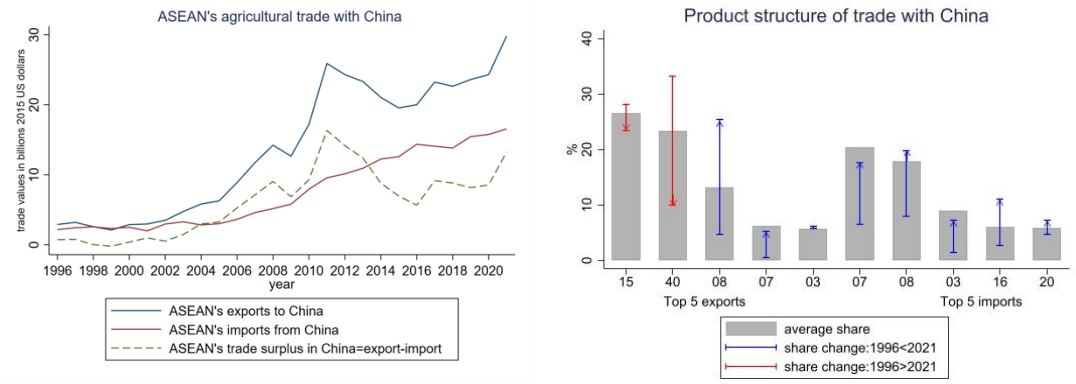


Figure 4-1. ASEAN's Agricultural Trade with China

Notes: Chapter 15: animal and plant oil; Chapter 40: rubber; Chapter 08: fruit and nuts; Chapter 07: vegetables; Chapter 03: fish; Chapter 16: meat and aquatic products; Chapter 20: vegetable and fruit products.

4.2 EU

Figure 4-2 investigates ASEAN's agricultural trade with the EU. During 1996-2021, agricultural exports and imports of ASEAN with EU totaled to 377 and 145 billion USD respectively, accounting for 16.16% and 11.2% of ASEAN's entire agricultural exports and imports with the world. Both export and import volumes have expanded with a fast pace until the outbreak of the global financial crisis in 2008. On average, ASEAN's agricultural trade with EU has shrunk since 2008 in spite of a short-lived revival during 2009-2011.

Panel (b) shows that ASEAN has predominately exported animal and plant oil (Chapter 15) to EU and imported beverage, wine and vinegar (Chapter 22) in turn. In general, the product structure of ASEAN's agricultural exports to EU has become more centralized with a notable increase of the total share of top five export products.

However, the product structure of ASEAN's agricultural imports to EU shows a larger diversification, seeing a decreasing total share of top five import products.

(a) Trade scale (b) Top Products

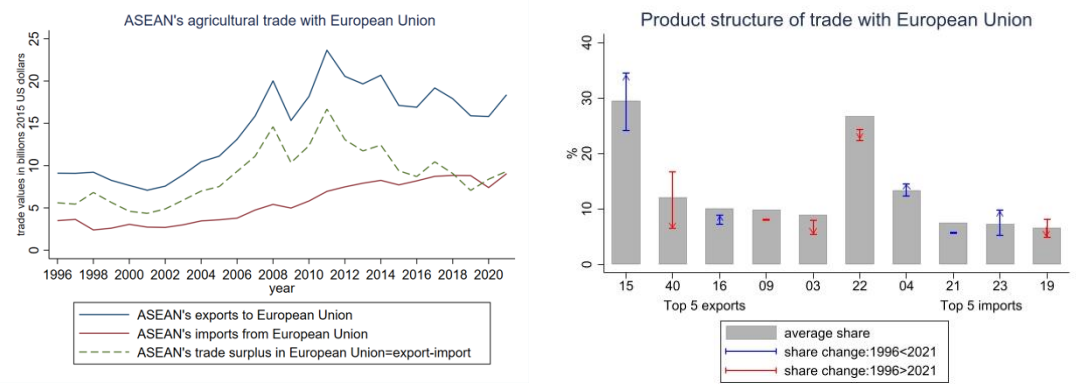


Figure 4-2. ASEAN's Agricultural Trade with EU

Notes: Chapter 15: animal and plant oil; Chapter 40: rubber; Chapter 16: meat and aquatic products; Chapter 09: coffee and tea; Chapter 03: fish; Chapter 22: beverage and wine; Chapter 04: dairy products; Chapter 21: miscellaneous food; Chapter 23: animal feed; Chapter 19: cereal products.

4.3 US

According to Figure 4-3, ASEAN's agricultural exports and imports with the US in the period of 1996-2021 respectively totaled to 319 and 200 billion USD. They took up 13.68% and 15.47% of ASEAN's entire agricultural exports and imports with the world. Though ASEAN has maintained an agricultural trade surplus with the US through the period, the rapid increase of its scale has halted since the outbreak of the global financial crisis.

fish (Chapter 3) accounted for the largest share in ASEAN's agricultural exports to the US, with an average share of 19.9% over the period of 1996-2021. However, the concentration on this product has gradually declined over time. In contrast, although ASEAN used to import primarily grain (Chapter 10) from the US in 1996, its top position has been replaced by oily kernels and fruits (Chapter 12) in 2021, whose import volume has continued to grow.

(a) Trade scale (b) Top Products

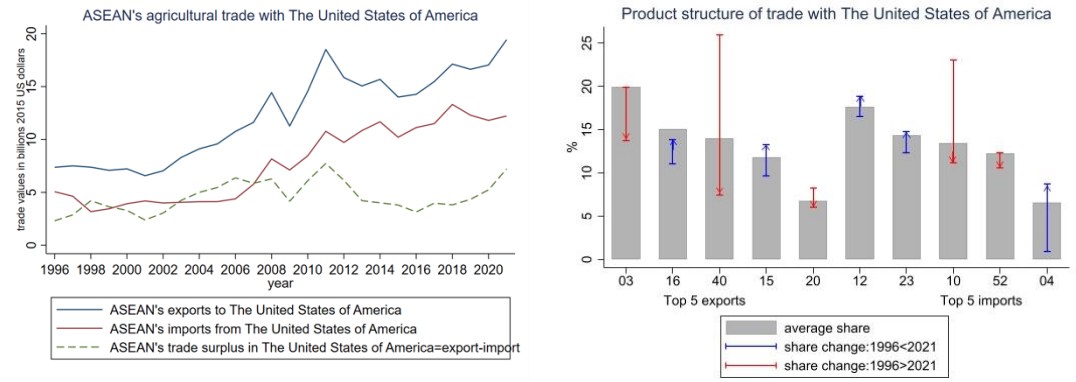


Figure 4-3. ASEAN's Agricultural Trade with US

Notes: Chapter 03: fish; Chapter 16: meat and aquatic products; Chapter 40: rubber; Chapter 15: animal and plant oil; Chapter 20: vegetable and fruit products; Chapter 12: oily kernels and fruits; Chapter 23: animal feed; Chapter 10: grain; Chapter 52: cotton; Chapter 04: dairy products.

4.4 Japan

Over the period of 1996-2021, ASEAN has kept a trade surplus which stayed almost close to its export value with Japan as a result of the comparatively limited scale of total imports from the country. According to Figure 4-4, ASEAN's total agricultural exports and imports with Japan were respectively of 271 and 21 billion USD over the period of 1996-2021, which accounted for 11.6% and 1.63% of the region's agricultural exports and imports with the world.

Panel (b) reveals ASEAN's trade performance with Japan in major product markets. The lead position of fish (Chapter 3) in ASEAN's export basket to Japan has been replaced by meat and aquatic products (Chapter 16). Yet in the meantime, fish (Chapter 3) still remained as the dominant product in ASEAN's import basket from Japan throughout the entire period.

(a) Trade scale (b) Top Products

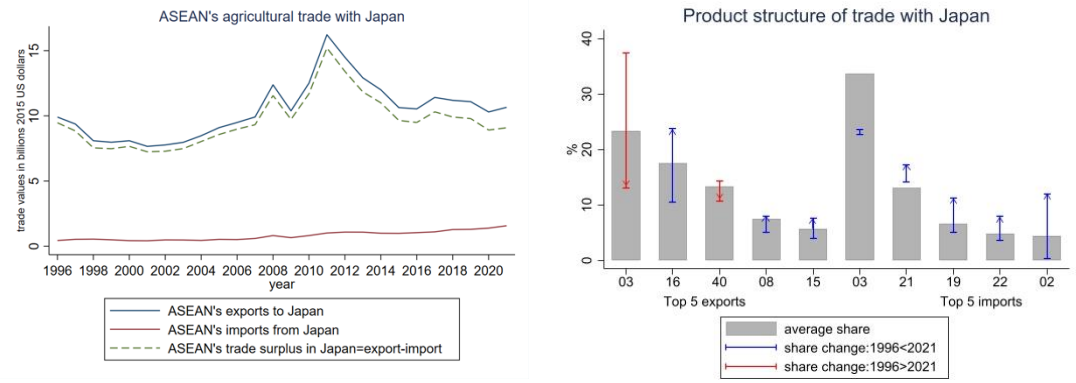


Figure 4-4. ASEAN's Agricultural Trade with Japan

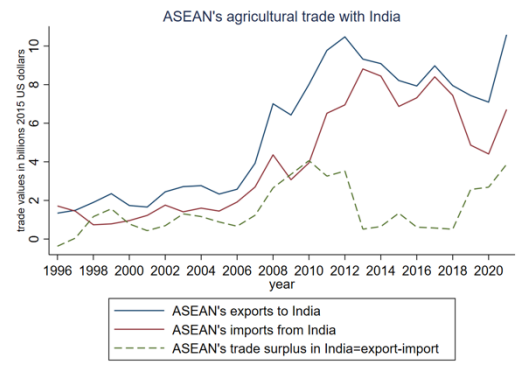
Notes: Chapter 03: fish; Chapter 16: meat and aquatic products; Chapter 40: rubber; Chapter 08: fruit and nuts; Chapter 15: animal and plant oil; Chapter 21: miscellaneous food; Chapter 19: cereal products; Chapter 22: beverage and wine; Chapter 02: meat.

4.5 India

Figure 4-5 examines ASEAN's agricultural trade with India. During 1996-2021, the region's agricultural exports and imports to India respectively totaled 146 and 106 billion USD, accounting for 6.24% and 8.18% of ASEAN's entire agricultural exports and imports with the world. The bilateral agricultural trade has remarkably soared since 2006, yet it turned to a declining trend after 2012.

In terms of the product structure, Panel (b) reveals that animal and plant oil (Chapter 15) has dominated in ASEAN's agricultural export basket to India, with a share of 70.6% on average during 1996 and 2021. However, the product structure of ASEAN's imports from India is noticeably more diversified. meat (Chapter 2) has made the largest share at 26.3% on average, which was followed by residues and wastes from the food industry (Chapter 23, 13.4%), fish (Chapter 3, 12.9%), grain (Chapter 10, 9.9%), and oily kernels and fruits (Chapter 12, 9.5%).

(a) Trade scale



(b) Top Products

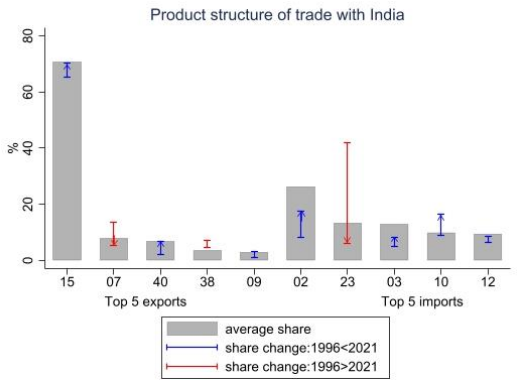


Figure 4-5. ASEAN's Agricultural Trade with India

Notes: Chapter 15: animal and plant oil; Chapter 07: vegetables products; Chapter 40: rubber; Chapter 38: miscellaneous chemical products; Chapter 09: coffee and tea; Chapter 02: meat; Chapter 23: animal feed; Chapter 03: fish; Chapter 10: grain; Chapter 12: oily kernels and fruits.

5. Agricultural Trade of Key ASEAN Member States

Indonesia, Cambodia, Myanmar, Philippines, Vietnam and Brunei are major players in ASEAN's intra- and inter-regional agricultural trade. They are also the key AMS that this project aims to target. This section provides an examination of the agricultural trade performance of these countries, to unveil typical patterns of their changing trade scales and structures with the world and major trade partners.

5.1 Indonesia

According to Figure 5-1, Indonesia has in general maintained an increasing trend of both agricultural exports and imports with the rest of the world throughout the period of 1996-2021. The total values of the country's exports and imports in this period were respectively 765 and 312 billion USD. With relatively more rapid increases of exports, Indonesia has remained in a status of agricultural trade surplus with the world and the scale of trade surpluses has expanded over time.

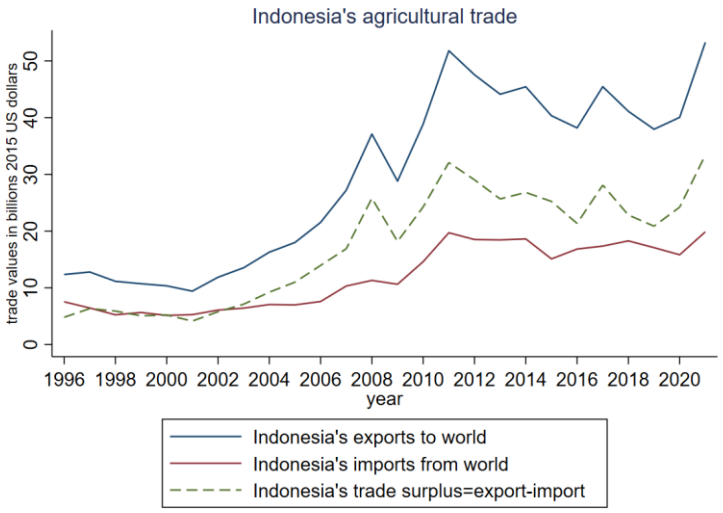


Figure 5-1. Indonesia's Agricultural Imports and Exports

Table 5-1 examines the market and product structure of Indonesia's agricultural trade with the world. It finds that the inter-regional trade has dominated in both the country's exports and imports. Among the top five export destinations and import sources of Indonesia, only Thailand is an ASEAN member. The US and EU respectively accounted for the largest share in Indonesia's agricultural import and export baskets.

Table 5-1. Major Partners and Products in Indonesia's Agricultural Trade

Imports				Exports			
Country	Share, %	Product	Share, %	Country	Share, %	Product	Share, %
USA	16.3	10	18.4	EU	15.7	15	45.9
AUS	14.7	23	13.4	USA	12.0	40	15.6
CHN	10.5	17	9.5	CHN	11.2	3	8.8
THA	7.4	52	8.8	IND	10.3	9	5.4
BRA	6.6	12	7.8	JPN	6.7	18	3.8

Notes: Chapter 10: grain; Chapter 23: animal feed; Chapter 17: sugar; Chapter 52: cotton; Chapter 12: oily kernels and fruits; Chapter 15: animal and plant oil; Chapter 40: rubber; Chapter 03: fish; Chapter 09: coffee and tea; Chapter 18: cocoa products.

Table 5-1 also finds that animal and plant oil (Chapter 15) was the major agricultural product that Indonesia exported, with a share of 45.9% in the country's total exports to the world on average between 1996 and 2021. The product structure is more diversified, however, when the country's agricultural imports are considered. To be specific, grain (Chapter 10) was the product with the largest share at 18.4% on average in Indonesia's agricultural imports, which was followed by residues and wastes from the food Industry (Chapter 23, 13.4%), sugar (Chapter 17, 9.5%), cotton (Chapter 52, 8.8%), as well as oily kernels and fruits (Chapter 12, 7.8%).

5.2 Cambodia

According to Figure 5-2, Cambodia has witnessed both overall growing agricultural exports and imports with the rest of the world as well through the period of 1996-2021. However, in most years except 2021, the scale of imports has remained larger than that of exports, which resulted in overall trade deficits. In particular, the country's imports have entered a stage of rapid growth since 2007, which has led to a widened trade deficit during the period of 2007-2019.

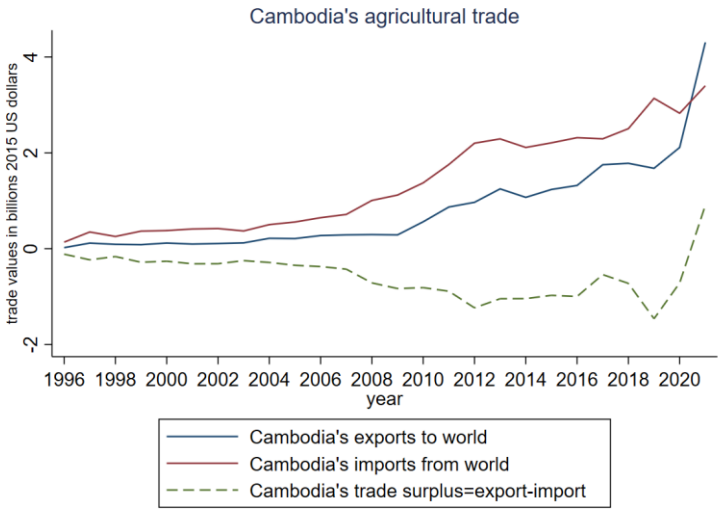


Figure 5-2. Cambodia's Agricultural Imports and Exports

Table 5-2 reveals that between 1996 and 2021, the intra-regional trade has dominated in both Cambodia's agricultural exports and imports. In particular, two AMS within the region, i.e. Thailand and Vietnam, have respectively ranked as the largest import source and export destination of Cambodia. In fact, Thailand accounted for 40.4% in Cambodia's total agricultural imports, while Vietnam accounted for 48.3% in Cambodia's total agricultural imports on average during the period.

Table 5-2. Major Partners and Products in Cambodia's Agricultural Trade

Imports				Exports			
Country	Share, %	Product	Share, %	Country	Share, %	Product	Share, %

THA	40.4	24	18.4	VNM	48.3	40	24.7
VNM	14.5	22	16.1	THA	12.2	10	20.5
IDN	11.4	17	11.8	CHN	10.3	7	19.7
EU	7.7	19	8.1	EU	8.7	8	18.1
SGP	6.8	23	8.1	MYS	5.8	24	2.6

Notes: Chapter 24: tobaccos; Chapter 22: beverage and wine; Chapter 17: sugar; Chapter 19: cereal products; Chapter 23: animal feed; Chapter 40: rubber; Chapter 10: grain; Chapter 7: vegetables products; Chapter 8: fruit products.

Table 5-2 also shows that Cambodia primarily exported bulk agricultural goods such as rubber (Chapter 40) and grain (Chapter 10) as well as horticultural products among the category of vegetables (Chapter 7) and fruits (Chapter 8) to the world. In contrast, it mainly imported consumer-ready commodities like tobaccos (Chapter 24), beverage and wine (Chapter 22), as well as sugar (Chapter 17) from the outside.

5.3 Myanmar

According to Figure 5-3, Myanmar has kept an increasing agricultural scale of both exports and imports with the world in general between 1996 and 2021. However, with a relatively small difference between export and import values, the country has overall remained with small agricultural trade balances. Particularly, the country has kept a small trade surplus throughout the period of 1996-2021. Yet during 2014-2017, due to a relatively faster growth rate of agricultural imports than exports, the scale of trade surplus has diminished and turned to a status of trade deficit.

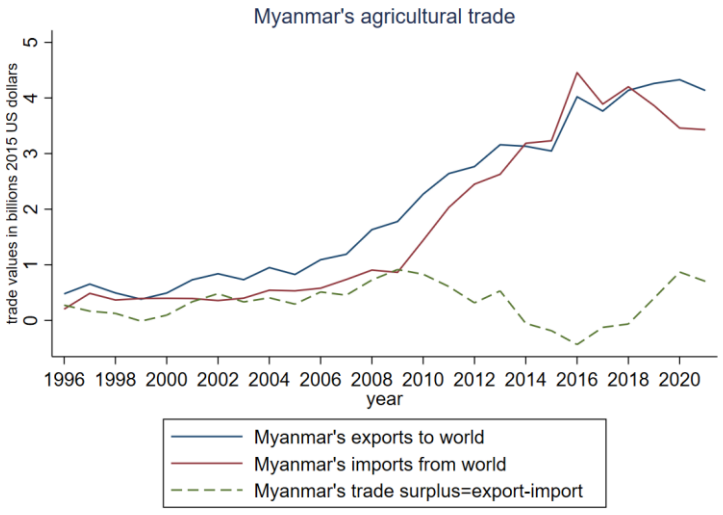


Figure 5-3. Myanmar's Agricultural Imports and Exports

Table 5-3 demonstrates that the intra-regional trade has dominated Myanmar's agricultural imports, with Thailand being the country's largest import source and accounting for around a third in its total imports. In contrast, China and India were

identified to be Myanmar's major export partners. They respectively accounted for 27.2% and 22.7% in the country's total agricultural exports.

Table 5-3. Major Partners and Products in Myanmar's Agricultural Trade

Imports				Exports			
Country	Share, %	Product	Share, %	Country	Share, %	Product	Share, %
THA	31.5	15	25.6	CHN	27.2	7	32.9
IDN	16.4	22	11.8	IND	22.7	3	20.0
CHN	12.9	21	11.8	THA	8.7	10	16.8
MYS	9.1	17	8.4	MYS	5.5	40	6.3
SGP	6.8	19	7.1	JPN	5.2	17	5.4

Notes: Chapter 15: animal and plant oil; Chapter 22: beverage and wine; Chapter 21: miscellaneous food; Chapter 17: sugar; Chapter 19: cereal products; Chapter 7: vegetables; Chapter 3: fish; Chapter 10: grain; Chapter 40: rubber.

Table 5-3 further shows that Myanmar has primarily imported intermediates such as animal and plant oil (Chapter 15) and consumer-ready commodities like beverage and wine (Chapter 22) and miscellaneous food (Chapter 21). In contrast, the country has primarily exported vegetables (Chapter 7) and seafood such as fish (Chapter 3).

5.4 Philippines

Figure 5-4 investigates the evolution of agricultural trade of the Philippines with the rest of the world. Over the period of 1996-2021, agricultural imports of the Philippines have remained a steady increasing trend, yet its agricultural exports have almost stalled or even slightly shrunk since the global financial crisis. As a result, the Philippines has turned into a status with agricultural trade deficits during the past 15 years, and the scale of trade deficits has expanded with a particularly fast pace during the past decade.

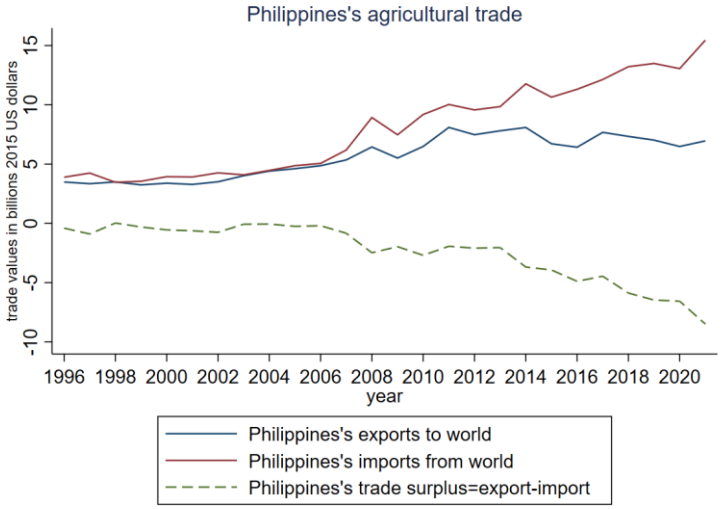


Figure 5-4. Philippines' Agricultural Imports and Exports

According to Table 5-4, the inter-regional agricultural trade has dominated the entire agricultural trade of the Philippines with the world. In particular, the US was the largest trade partner of the country. It was the country's greatest import source with a share of 19.9% in total imports on average and the greatest export market with a share of 21.3% in total exports on average.

In terms of the product structure, Table 5-4 shows that fruits (Chapter 8) and animal and plant oil (Chapter 15) have taken up the bulk in Philippines' export basket of agricultural products. In contrast, the product distribution of imports is relatively diversified. On average, grain (Chapter 10) makes up the largest share at 19.7%, followed by dairy, egg and other food animal products (Chapter 4, 10.3%), residues and wastes from the food Industry (Chapter 23, 9.3%), miscellaneous food (Chapter 21, 9.1%), as well as meat (Chapter 2, 7.3%).

Table 5-4. Major Partners and Products in Philippine's Agricultural Trade

Imports				Exports			
Country	Share, %	Product	Share, %	Country	Share, %	Product	Share, %
USA	19.9	10	19.7	USA	21.3	8	31.2
CHN	11.6	4	10.3	JPN	19.8	15	18.2
EU	9.8	23	9.3	EU	16.5	20	8.9
VNM	7.8	21	9.1	KOR	7.2	3	8.8
AUS	6.3	2	7.3	CHN	6.7	16	7.4

Notes: Chapter 10: grain; Chapter 4: dairy products; Chapter 23: animal feed; Chapter 21: miscellaneous food; Chapter 2: meat; Chapter 8: fruit and nuts; Chapter 15: animal and plant oil; Chapter 20: vegetable and fruit products; Chapter 3: fish; Chapter 16: meat and aquatic products.

5.5 Vietnam

Figure 5-5 examines the agricultural trade of Vietnam. While both export and import volumes of the country have been found to increase over time, imports have expanded more rapidly than exports since the global financial crisis as observed in the Philippines. Hence, the country shifted from a status of trade surplus and has become a net importer since 2013, with the scale of deficits growing over time.

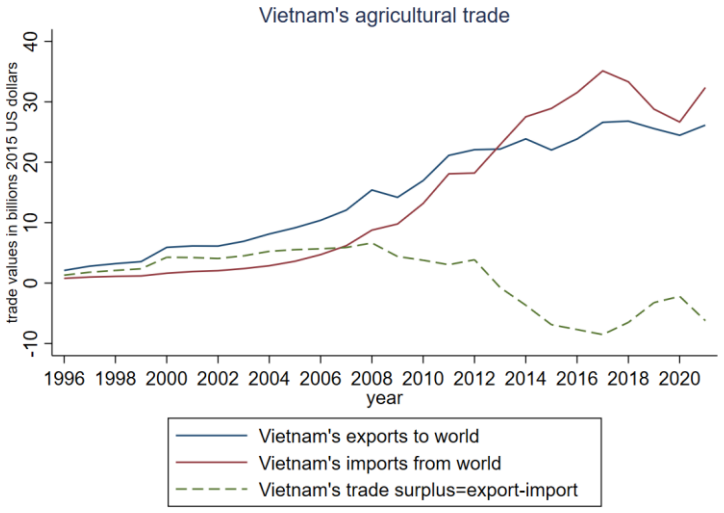


Figure 5-5. Vietnam's Agricultural Imports and Exports

According to Table 5-5, the inter-regional trade has dominated in Vietnam's agricultural trade. China and India were the country's largest import source market, both with a share around 11.5% in Vietnam's total agricultural imports from the world. The EU, China and US were the country's largest export destination markets. They respectively accounted for 16.3%, 15.7% and 13.6% in Vietnam's total exports.

As to the product structure of Vietnam's agricultural exports, Table 5-5 reveals that fish (Chapter 3) has made up the largest share at 25.3%, followed by coffee and tea (Chapter 9, 17.4%), grain (Chapter 10, 13.6%), and fruits (Chapter 8, 13.6%). These four products together accounted for roughly 70% of total agricultural exports by Vietnam. By contrast, Vietnam's import basket was much more diversified. The aggregate share of the top three products was only about a third in the country's total imports.

Table 5-5. Major Partners and Products in Vietnam's Agricultural Trade

Imports				Exports			
Country	Share, %	Product	Share, %	Country	Share, %	Product	Share, %
CHN	11.5	8	11.8	EU15	16.3	3	25.3
IND	11.4	23	11.5	CHN	15.7	9	17.4
USA	9.7	3	11.3	USA	13.6	10	13.6
ARG	6.3	2	9.1	JPN	8.4	8	13.6
HKG	6.1	10	7.8	KOR	4.4	16	7.2

Notes: Chapter 8: fruit products; Chapter 23: animal feed; Chapter 3: fish; Chapter 2: meat; Chapter 10: grain; Chapter 9: coffee and tea; Chapter 16: meat and aquatic products.

5.6 Brunei

Figure 5-6 examines the agricultural trade of Brunei with the rest of the world. Since the country has scarce land resources and labor force engaged in agriculture, the scale of its agricultural exports has been limited throughout the period of 1996-2021. As a result, Brunei has been highly dependent on agricultural imports, with the scale of imports almost equal to that of trade deficits, which have been increasing over time.

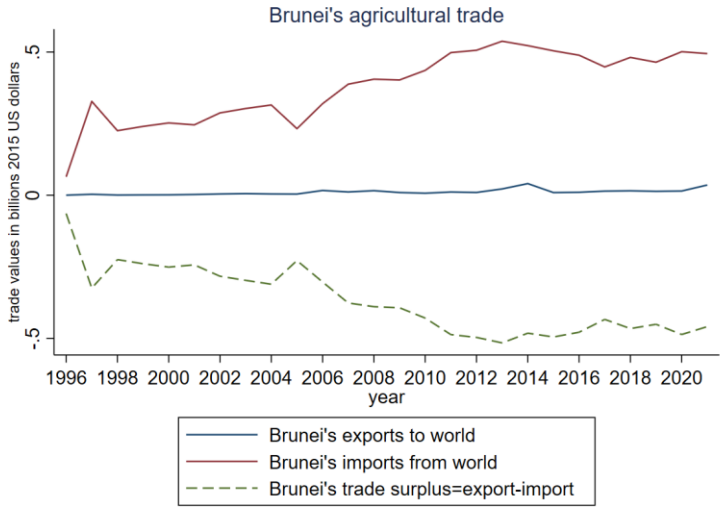


Figure 5-6. Brunei's Agricultural Imports and Exports

According to Table 5-6, the intra-regional trade has remained particularly important to Brunei. Malaysia was the country's largest import source market, with a share above 40% on average in its total imports from the world. Singapore was also a major import source with an average share about 17.8%, though most imported goods were re-exports from other markets. In terms of Brunei's exports, Malaysia also appeared to be the top export destination market, with a share of 32% on average in the country's total exports during the period.

Table 5-6 further shows that due to the negligible domestic production, Brunei's import basket has been rich in variety and remained relatively diversified. cereal products(Chapter 19) took the largest share at 12.0% in the country's total imports, followed by beverage and wine (Chapter 22, 9.1%), animal feed (Chapter 23, 8.9%), grain (Chapter 10, 8.3%) and miscellaneous food (Chapter 21). The major export product of Brunei was fish (Chapter 3), with a share of 36.5% in its total exports.

Table 5-6. Major Partners and Products in Brunei's Agricultural Trade

Imports				Exports			
Country	Share, %	Product	Share, %	Country	Share, %	Product	Share, %
MYS	40.9	19	12.0	MYS	31.6	3	36.5
SGP	17.8	22	9.1	EGY	9.0	7	10.1
THA	9.6	23	8.9	SGP	7.1	22	8.0
AUS	7.3	10	8.3	EU15	6.3	19	5.4

IDN	3.9	21	7.5	JPN	6.3	20	4.2

Notes: Chapter 19: cereal products; Chapter 22: beverage and wine; Chapter 23: animal feed; Chapter 10: grain; Chapter 21: miscellaneous food; Chapter 3: fish; Chapter 7: vegetables; Chapter 20: vegetable and fruit products.

6. Export Competitiveness of ASEAN and Key Member States

6.1 ASEAN's overall export competitiveness

This section investigates the overall export competitiveness of ASEAN's agricultural products and the competitiveness of the major AMS. Various measures have been used in the literature to measure export competitiveness. International market share, which is defined as X_{ik} / X_{wk} with X_{ik} and X_{wk} respectively being the export scale of product k for country i and the world, is probably the simplest one. However, this index is subject to the influence of the scale of the overall economy when comparing across countries. To take economic scales into account and make cross-country comparisons reasonable, Balassa (1965) proposed the later widely used index of revealed comparative advantage (RCA). This classical measure is defined as $(X_{ik} / X_i) / (X_{wk} / X_w)$, where X_{ik} and X_{wk} are again respectively the export scale of product k for country i and the world, and X_i and X_w are respectively the scale total exports of country i and the world to reflect the overall economic scale. Based on the trade specification index proposed by Liu (2002), following attempts have been made to revise RCA to account for the influence of reexports in a country's relative export concentration on specific products. Specifically, the export competitiveness is considered as the difference between the country's RCA and import concentration in the same product, or in mathematical terms, $(X_{ik} / X_i) / (X_{wk} / X_w) - (M_{ik} / M_i) / (M_{wk} / M_w)$ with M representing import scales. However, this measure could be biased towards zero if the export and import terms incorporate different varieties of the product, which is especially likely when aggregate product categories are concerned. Therefore, this section relies on RCA to measure the export competitiveness of ASEAN in agricultural trade.

(a) Overall competitiveness (b) Competitiveness of top five export products

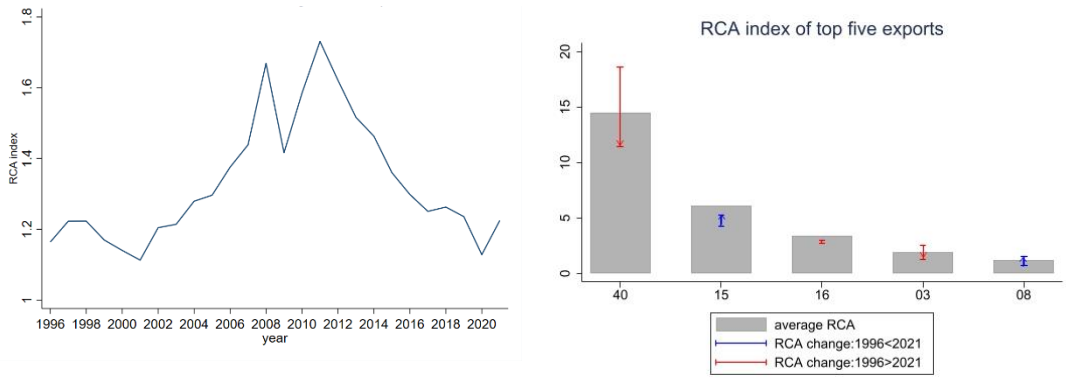


Figure 6-1. Export Competitiveness of ASEAN and Its Major Products

Notes: Chapter 40: rubber; Chapter 15: animal and plant oil; Chapter 16: meat and aquatic products; Chapter 03: fish; Chapter 08: fruit and nuts.

According to Figure 6-1, ASEAN has demonstrated an inverted-U shaped pattern of its overall export competitiveness at large throughout the period of 1996-2021. However, aside from a temporary dip during the global financial crisis, the export competitiveness was in general increasing before 2011 and grown by roughly 50%. This was in line with the observation of a rapid expansion of the region's total exports during this subperiod as demonstrated by Figure 3-1. The export competitiveness has substantially weakened in the past decade, returning to a level that was merely higher than that in the beginning of the period in 2021. As a result, the growth of the region's agricultural exports have stalled since 2011 as Figure 3-1 reveals. Among the region's top five export products, Panel (b) of Figure 6-1 shows that they were all relatively competitive in the world over this period with an average RCA exceeding unit. However, rubber (Chapter 40), fish (Chapter 3), as well as meat and aquatic products (Chapter 16) have all become less competitive over time, with the competitiveness of rubber lost by almost a third. In contrast, the competitiveness of animal and plant oil (Chapter 15) and fruits (Chapter 8) has slightly increased.

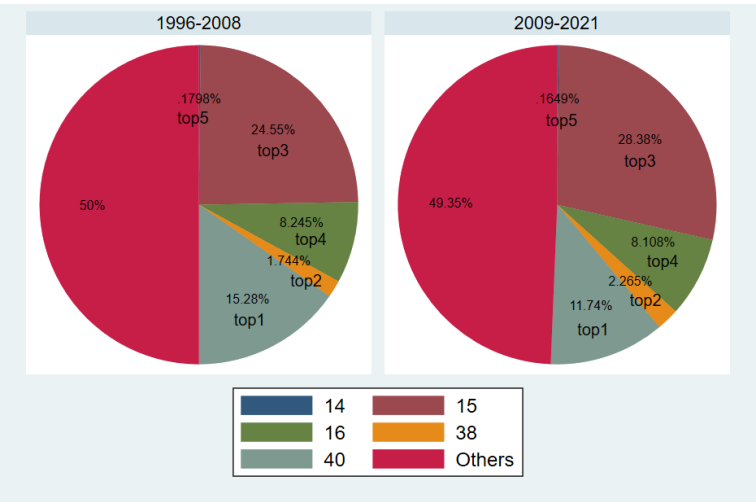


Figure 6-2. Share of Top Five Competitive Products in ASEAN Exports.

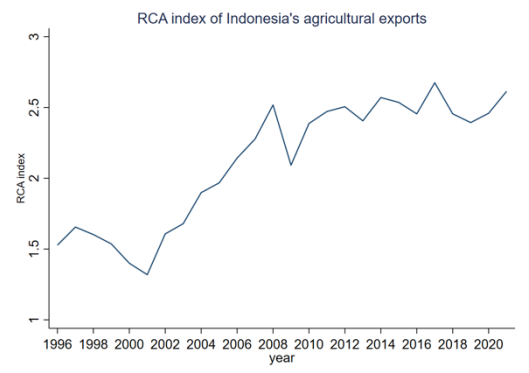
Notes: Chapter 14: vegetable plaiting materials; Chapter 15: animal and plant oil; Chapter 16: meat and aquatic products; Chapter 38: miscellaneous chemical products; Chapter 40: rubber.

According to Figure 6-2, animal and plant oil (Chapter 15), rubber (Chapter 40), meat and aquatic products (Chapter 16), vegetable plaiting materials (Chapter 14) and miscellaneous chemical products (Chapter 38) are the most competitive exports of ASEAN in terms of RCA. Particularly, ASEAN enjoys overwhelming superiority in the production of rubber (Chapter 40) with a RCA index exceeding 14, which is largely owing to its abundant resources and appropriate climate. While the total share of the five most competitive products has remained relatively stable, the share of rubber (Chapter 40) was heavily encroached by animal and plant oil (Chapter 15) after the global financial crisis.

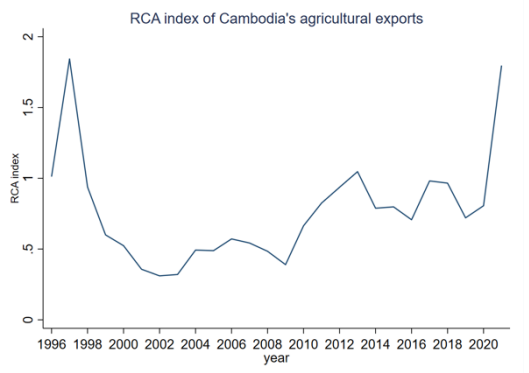
6.2 The overall export competitiveness of key ASEAN member states

Figure 6-2 further evaluates the overall export competitiveness in agricultural trade of the six key AMS with a specific concern in the region and of this report. It finds that compared to other countries, Myanmar was the AMS of the strongest export competitiveness overall, with the highest average RCA around 3. However, the competitiveness of the country has been generally decreasing over time and roughly stalled in the latest years. Similarly, a noticeable declining trend has also been observed in the export competitiveness of Vietnam. It led the country stepping into a state of export incompetitiveness in 2021 with an RCA less than unit, from being the second competitive country in 1996 among the six AMS. In contrast, the export competitiveness of Indonesia has increased steadily at a rapid pace, making it surpass Myanmar and become the most competitive nation in the region in 2021. The export competitiveness of both Cambodia and the Philippines has been fluctuating around unit over time. Nonetheless, after the global financial crisis, the competitiveness of Cambodia has promptly increased and approached the level of Myanmar, whereas that of the Philippines has been subdued below unit. Finally, the export competitiveness of Brunei was small but generally increasing over time.

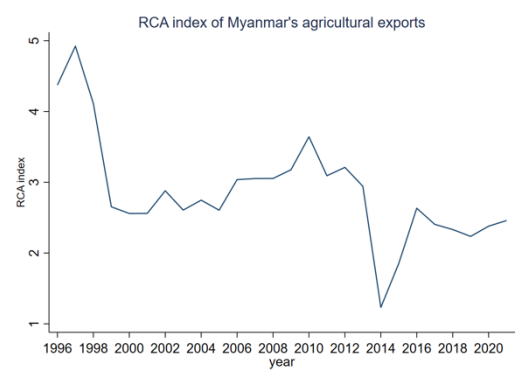
(a) Indonesia



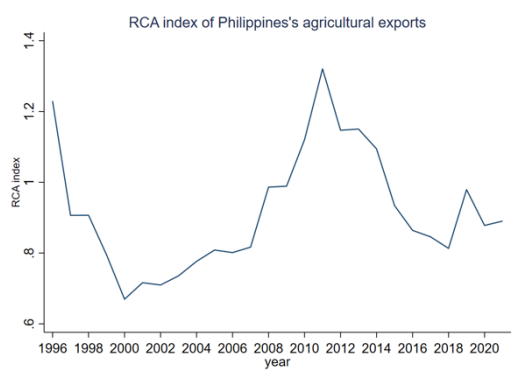
(b) Cambodia



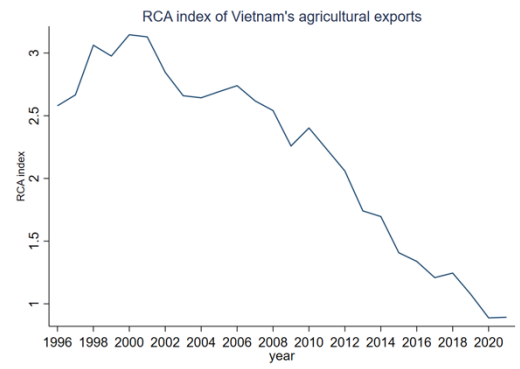
(c) Myanmar



(d) Philippines



(e) Vietnam



(f) Brunei

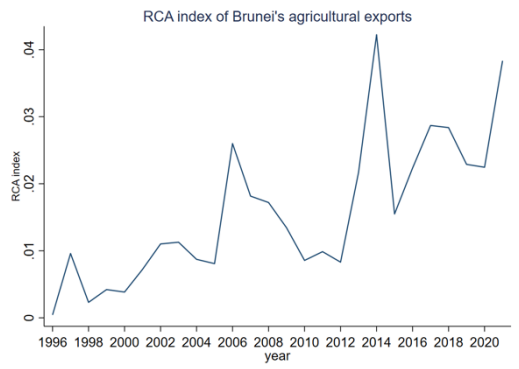


Figure 6-3. Export Competitiveness of Key ASEAN Members States

6.3 Export competitiveness of ASEAN in the Chinese market

Seeing that China has overtaken the EU, US and Japan and become ASEAN's largest export destination, it is of a particular importance to examine the evolution of ASEAN's agricultural export competitiveness in the Chinese market and its relative strength with a comparison of export competitiveness of the country's other leading import partners. Seeing that the limitation of the RCA index to distinguish an exporter's competitiveness in specific destination markets, the market penetration rate (MPR) is used in this section to allow for the focus on the Chinese market and a comparison across multiple exporters (Mao and Zhang, 2015). In particular, the MPR is measured by X_{ijk} / M_{jk}, with X_{ijk} being exports of product k from exporter i to importer j, and M_{jk} being total imports of product k by country j.

According to Figure 6-4, ASEAN has enjoyed the strongest export competitiveness overall in China through the period of 1996-2021, as indicated by its greatest MPR on average. During the first decade of the new millennium, the competitiveness of ASEAN has been challenged by that of the US, seeing that the two indicators stayed at a similar level and decline as the other increases. With a weakened export competitiveness of the US after the global financial crisis, however, the challenge of Brazil has been increasing

rapidly. As a result, the leading export competitiveness of ASEAN in the Chinese market has been overtaken by Brazil since 2018. In the meantime, the EU is also becoming increasingly competitive in China during the past one more decade, as demonstrated by an overall increasing trend in its MPR index. However, its latest competitiveness was still roughly a half compared with that of Brazil, ASEAN and the US.

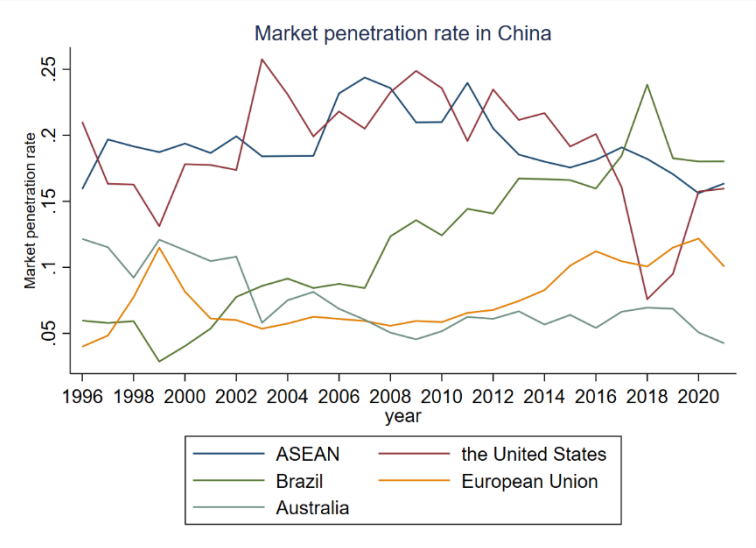


Figure 6-4. Export Competitiveness of ASEAN in the Chinese Market

7. Conclusions

This report investigates the integration of ASEAN's agricultural market during 1996 and 2021 by examining the process of trade liberalization, stylized fact of trade patterns, and evolution of export competitiveness at both intra- and inter-regional levels. We find that agricultural tariff rates of both ASEAN and its key member states have been largely declined, yet the restriction of non-tariff measures have been tightened. As a result, the region's overall import barriers has remained around 5% in spite of a reduction by more than a half, and export barriers have not exhibited notable declines.

The overall scale of ASEAN's agricultural trade has expanded rapidly in this period, with increased trade surpluses before 2011. However, because of halted export growth, the size of surplus was narrowed afterwards. ASEAN has been roughly kept in a trade surplus status with its top five partners, i.e. China, EU, US, Japan and India, during the period. Its major exports included palm oil, rubber products, aquaculture and fruits, and major imports include food residuals, feeds, diary and egg products. This product structure is largely in line with the international division defined by the region's comparative advantages. In terms of the direction of trade flows, despite the dominance of the inter-regional trade, the importance of intra-reginal flows in ASEAN's agricultural trade has increased over time. We also found notable heterogeneities of the

trade performance at the country level, although the overall trade scale has been largely increasing for major AMS countries of interest.

In spite of the growth and diversification of ASEAN's agricultural trade, the overall export competitiveness of the region in the world has been reduced by about a quarter during the period. Besides, the relative competitiveness of ASEAN to other exporters in the region's largest destination market China has also been notably declined.

These findings indicate an urgency for the region to enhance its regional and global agri-food market integration with a focus on reducing non-tariff barriers and climbing the value chain to strengthen its competitiveness. ASEAN member states should strive for increased transparency and harmonization of NTMs, involving establishing a transparent system for monitoring and reporting NTMs and revitalize export growth by eliminating hidden trade restrictions. ASEAN should encourage product diversification and promote value-added processing within the agricultural sector through supportive policies, investment in R&D, and the development of robust supply chains, which would help mitigate risks associated with commodity price fluctuations and changing market demands. The increasing significance of intra-regional flows suggests that ASEAN should deepen its internal market integration further. Policies should be implemented to improve logistics infrastructure, streamline customs procedures, and align food safety and quality standards across member states. Promoting regional trade agreements and facilitating cross-border investments can enhance the flow of goods and services within ASEAN, thus leveraging the comparative advantages of different member countries. Additionally, ASEAN should implement targeted capacity-building programs and technical assistance initiatives to uplift smaller and less developed member countries, ensuring they can capitalize on the growing agricultural trade opportunities and contribute more effectively to the region's economic growth and resilience.

References

Aksoy, M. A. & Beghin, J. C. (2004). *Global Agricultural Trade and Developing Countries*. Washington, D.C.: World Bank Publications.

Balassa, B. (1965). Trade liberalization and revealed comparative advantage. *Manchester School of Economic and Social Studies*, 33(2): 99-123.

Baylis, K., Fan, L. & Nogueira, L. (2019). Agricultural market liberalization and household food security in rural China. *American Journal of Agricultural Economics*, *101*(1), 250-269.

Bouët, A., Elbehri, A., Nguyen, D. B., & Traoré, F. (2022). Measuring agricultural trade integration in Southeast Asia. Journal of Economic Integration, 37(2), 235-266. Vienna: Vienna Institute for International Economic Studies, Mimeo.

Bouët, A., Nguyen, D.B., Traoré, F. and Elbehri A. 2022. Intra-regional agricultural trade in ASEAN – An assessment of the impact of non-tariff measures. Bangkok. FAO. https://doi.org/10.4060/cc0223en

Chen, K. Z. & Mao, R. (2020). Fire lines as fault lines: Increased trade barriers during the COVID-19 pandemic further shatter the global food system. *Food Security*, *12*, 735-738.

Chen, K. Z. & Mao, R. (2023). Sino-Asia Agricultural Trade and Development Cooperation: Progress, Challenges, and Outlook. *Royal Canadian Collins Press*.

Costa, F., Garred, J. & Pessoa, J. P. (2016). Winners and losers from a commodities-for-manufactures trade boom. *Journal of International Economics*, *102*, 50-69.

Gaulier, G. & Zignago, S. (2010). BACI: International trade database at the product-level (the 1994-2007 version). *CEPII Working Paper* no. 2010-23.

Imbs, J. & Mejean, I. (2017). Trade elasticities. *Review of International Economics*, *25*(2), 383-402.

Kaushik, A. (2016). WTO Dispute on EC—tariff preferences: Systemic implications. In: Das, A. & Nedumpara, J. (eds), *WTO Dispute Settlement at Twenty*. Singapore: Springer.

Kee, H. L., Nicita, A. & Olarreaga, M. (2006). Estimating trade restrictiveness indices. *World Bank Policy Research Working Paper* no. 3840.

Leland, H. E. (1979). Quacks, lemons, and licensing: A theory of minimum quality standards. *Journal of Political Economy*, *87*(6), 1328-1346.

Liu, R. (2002). A comparative study of export competitiveness between East Asian Countries. *Nankai Economic Studies, 51*(5): 40-46.

Mao, R., Liu, Y. & Wang, X. (2023). Economic and environmental impacts of agricultural non-tariff measures: evidence based on ad valorem equivalent estimates. *International Food and Agribusiness Management Review*, 1-18.

Mao, R. & Zhang, B. (2015). Export Destination and Export Market Penetration of the People's Republic of China: Past and Future. *Asian Development Review*, *32*(1), 142-166.

Roy, D., Kamar, A., Pradhan, M., Saroj, S., & Ajmani, M. (2023). Agricultural transformation and market integration in the ASEAN region: Responding to food

security and inclusiveness concerns (No. 2188). International Food Policy Research Institute (IFPRI).
SEARCA (2016). Agricultural Transformation and Market Integration in the ASEAN Region: Responding to Food Security and Inclusiveness Concerns. SEARCA Activity Brief.
Teignier, M. (2018). The role of trade in structural transformation. *Journal of Development Economics*, *130*, 45-65.