



Food and Agriculture  
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United Nations



# INTRA-REGIONAL AGRICULTURAL TRADE IN ASEAN

An assessment of the impact of non-tariff measures





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The present report is authored by **Antoine Bouët** (lead investigator), **Duc Bao Nguyen**, and **Fousseini Traoré** with contributions by **Aziz Elbehri**, FAO-RAP. Antoine Bouët and Fousseini Traoré are from the Markets, Trade, and Institutions Division of the International Food Policy Research Institute (IFPRI). Duc Bao Nguyen is from the Vietnam National University.

The report offers an analysis of non-tariff measures in ASEAN countries analysis on literature, data and analysis pre-dating the COVID-19 pandemic. It serves as baseline for a follow up analysis on intra-regional trade in the context of COVID-19 and post-COVID-19 environment.

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# Abbreviations and acronyms

<b>AATM</b>	Africa Agriculture Trade Monitor
<b>ANZCERTA</b>	Australia-New Zealand Closer Economic Relations Trade Agreement
<b>ASEAN</b>	Association of Southeast Asian Nations
<b>AVE</b>	ad valorem equivalent
<b>CEPII</b>	Centre d'Etudes Prospectives et d'Informations Internationales
<b>CIF</b>	cost, insurance, freight
<b>ECOWAS</b>	Economic Community of West African States
<b>GDP</b>	gross domestic product
<b>HS</b>	Harmonized System
<b>MERCOSUR</b>	Mercado Comun del Sur
<b>NAFTA</b>	North American Free Trade Agreement
<b>NTB</b>	nontariff barrier
<b>NTM</b>	nontariff measure
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>PPML</b>	Poisson pseudo-maximum likelihood
<b>RTA</b>	regional trade agreement
<b>RTI</b>	regional trade introversion
<b>SPS</b>	sanitary and phytosanitary
<b>TBT</b>	technical barriers to trade
<b>UNCTAD</b>	United Nations Conference on Trade and Development
<b>WTO</b>	World Trade Organization
<b>WTO I-TIP</b>	WTO Integrated Trade Intelligence Portal

# Summary

In Southeast Asia, the prevalence of undernourishment significantly declined between 2005 and 2016, from 17.3 percent to 10.0 percent. Since 2016, it has remained stagnant at 9.8 percent. This situation deteriorated with the COVID-19 pandemic that began in early 2020. According to Elbehri (2020), COVID-19 could cause 83 to 132 million more people worldwide to be undernourished and 6.7 million more children to suffer acute malnutrition, with significant damage inflicted to Southeast Asia.

Greater trade integration of these countries in the agriculture and food sectors would certainly be a factor in significantly improving food security. More integration in this region could be achieved by the reduction and harmonization of protectionist nontariff measures (NTMs). These measures may constitute a barrier to trade, but they are also adopted to enhance food safety and human and plant health, avoid the spread of diseases, or address market failures or issues related to the “global commons.” More integration in Southeast Asia could also be achieved by trade facilitation measures and improvements in customs procedures.

NTMs have been heavily used in ASEAN (Association of Southeast Asian Nations) countries and are particularly frequently imposed on the agriculture and food sectors. While in 2010 the countries of this region had adopted more of these measures than the rest of the world, by 2018 this was no longer the case: the frequency index, the import coverage and average number of NTMs per product are no longer dissimilar. In agriculture in ASEAN countries, at least one NTM is adopted for more than 96 percent of all products. They cover more than 99 percent of trade in value terms, except in Malaysia. The average number of NTMs for agricultural and food products is between 10 (Cambodia) and 27 (the Philippines). Concerning prepared foodstuffs, 100 percent of all products and of import value are the target of at least one NTM in Cambodia, Indonesia, Malaysia, and the Socialist Republic of Viet Nam.

The sanitary and phytosanitary (SPS) measures adopted by Southeast Asian countries have an impact on agricultural and food trade equivalent to an average import tariff of 44.3 percent, versus 48.3 percent in the rest of the world. In the agriculture and food sectors, Indonesia, Myanmar, and Singapore have adopted relatively restrictive measures compared to the rest of the world. The vegetable and food sectors are subject to more restrictive measures in general. Sanitary and phytosanitary (SPS) impact on agricultural and food trade is equivalent to an average tariff of 68.6 percent, compared to 70.5 percent in the rest of the world. Indonesia, the Philippines, and Malaysia have adopted measures with a significantly more restrictive effect on trade in agricultural and food products, while those adopted by Myanmar and Thailand are significantly less restrictive.

# Introduction

During the last two years, with the onset of COVID-19 pandemic, the global and regional trade systems faced shocks and disruptions some of which were indirect and resulting from COVID-19 protection measures, while some were the result of direct policy interventions either supporting or restricting trade (mostly exports). Prior to the pandemic, the Asia and the Pacific was already undergoing trade-related adjustments related to rising trade tensions between the United States of America and China. However, given the broad-based impact of COVID-19 pandemic on trade flow patterns, countries have quickly realized the critical importance of reaffirming the importance of trade and mutual exchange. This is particularly the case for the Association of Southeast Asian Nations (ASEAN) whose 10-Member States<sup>1</sup> affirmed in 2020 the importance of strengthening regional food and agriculture trade as the best way to face off the COVID-19 challenges. This is also in line in many regions of the world where the search for deeper integration has been keeping momentum. Indeed, regional integration still appears to be an attractive trade policy option.

In this context, this report focuses on the ASEAN region and provide a detailed analysis of the status of trade measures between the Members States and with third countries, with special focus on non-tariff measures where there is much more scope for more open, transparent and efficient trade. The study analyzes pre-COVID-19 non-tariff measures for ASEAN, a regional intergovernmental organization that promotes intergovernmental cooperation and facilitates economic integration among its members and other countries in Asia.

To complement this report on non-tariff measures, a statistics section (with 4 graphs and 38 tables) on agricultural trade in Southeast Asia is added in Annex. The data were prepared from the BACI database of international trade data. These graphs and tables provide raw statistical information to the reader, without any comment, to allow him to form his own opinion on the state of agricultural trade in Southeast Asia before the COVID-19 pandemic.<sup>2</sup>

Table 1 provides economic and social indicators describing ASEAN countries. Several observations emerge. First, significant heterogeneity exists between member countries. For example, in terms of economic size, Brunei Darussalam is 77 times smaller than Indonesia. Cambodia's gross domestic product (GDP) per capita is 23 times smaller than that of Singapore. Singapore's surface area is 2 658 times smaller than that of Indonesia. While about one-quarter of domestic value added is produced in the agriculture, forestry, and fishing sector in Myanmar, in Singapore that figure is only 0.02 percent (World Development Indicators 2021). Indeed, Brunei Darussalam

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<sup>1</sup> Brunei Darussalam, Cambodia, Indonesia, the Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and the Socialist Republic of Viet Nam.

<sup>2</sup> The BACI database comes from a statistical treatment of the United Nations COMTRADE database, a statistical treatment carried out by the CEPII (Centre d'Etudes Prospectives et d'Informations Internationales - Paris) to improve the accuracy of measurement of international trade.

**Table 1. Economic and social indicators for ASEAN countries**

Country	Area (x 1 000 squared kms)	Population (mlns)	GDP (current USD blns)	GDP per capita, PPP (current USD)	Trade in% of GDP	Agricultural exports (%of merchandise exports)	Agricultural imports (%of merchandise imports)	Agriculture, forestry and fishing value added (%of GDP)	Life expectancy (years)	Gini index
Brunei Darussalam	5.77	0.428	13.56	80 920	93.9	0.1	12.3	1.02	75.7	na
Cambodia	181.04	16.249	24.542	4 361	124.9	7.4	9.8	22.01	69.6	na
Indonesia	1913.6	267.7	1 042.17	13 079	43.02	25.5	13.1	12.81	71.5	39
Lao People's Democratic Republic	236.8	7.06	17.95	7 439	75.09	25.6	13.5	15.71	67.6	na
Malaysia	330.34	31.52	358.58	31 782	130.5	10.8	9.2	7.53	76	41
Myanmar	676.59	53.71	71.21	6 674	47.95	34.6	15.1	24.55	66.86	30.7
Philippines	300	106.65	330.91	8 951	76.06	9.6	11.9	9.28	71.1	44.4
Singapore	0.72	5.64	364.16	101 531	326.2	3.8	4.0	0.02	83.1	na
Thailand	513.12	69.43	504.99	19 051	123.3	17.5	7.5	8.12	76.9	36.4
Viet Nam	331.23	95.54	245.21	7 448	208.3	12.5	11.0	14.68	75.3	35.7

Source: World Development Indicators.

Note: Trade in percentage of GDP is defined as (exports of goods and services + imports of goods and services) / GDP; GDP stands for gross domestic product; PPP stands for purchasing power parity; Agricultural exports (imports) in % of merchandise exports are defined as the sum of agricultural raw materials exports (imports) in % of merchandise exports and food exports (imports); Data are from 2018 except: the Lao People's Democratic Republic -trade in percentage of GDP is for 2016-; Malaysia -Gini index is for 2015-; Myanmar -Gini index and Trade in percentage of GDP are for 2017-; Philippines -Gini index is for 2015-; na stands for not available. PDR stands for People's Democratic Republic.

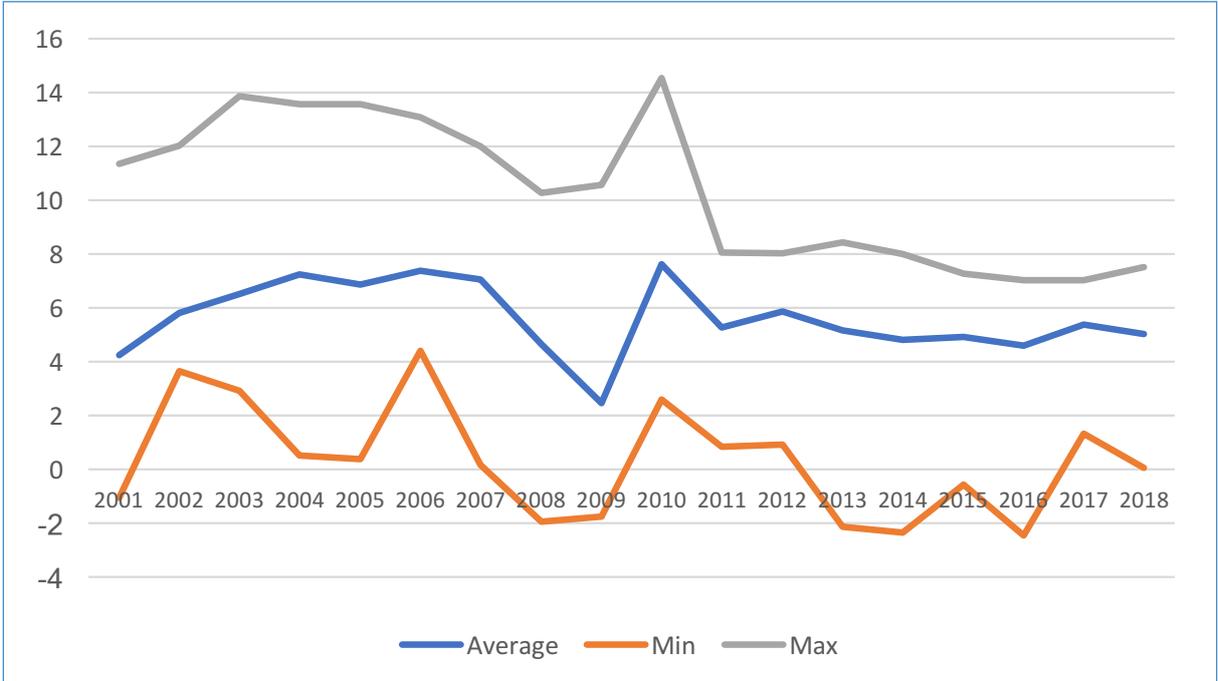
and Singapore are classified as high-income economies by the World Bank. Cambodia, the Lao People’s Democratic Republic, and Myanmar are Least Developed Countries. Agricultural exports account for almost nothing in Brunei Darussalam, but for more than one third of merchandise exports in Myanmar.

Second, each of the following countries has a relatively high ratio of trade over GDP, and one-half of them have a ratio greater than one: (in decreasing order) Singapore, the Socialist Republic of Viet Nam, Malaysia, Cambodia, and Thailand. Singapore was recognized as the most competitive and open economy in 2018 at the World Economic Forum.

Third, another feature of ASEAN countries is their relatively strong economic growth in the long term: the average long-term economic growth of ASEAN countries since 2001<sup>3</sup> has been between 5.5 percent and 6.5 percent (in real terms) (Figure 1). Economic growth has been low in Brunei Darussalam since 2012, with negative performance in 2013, 2014, 2015, and 2016, while very high in Cambodia and the Lao People’s Democratic Republic.

ASEAN countries ratified the ASEAN Trade in Goods Agreement (ATIGA) in February 2009, an agreement subsequently entered into force in May 2010. The agreement aimed to achieve free

**Figure 1. Economic growth in ASEAN region: Average, lowest, and highest rate of economic growth in volume (%) – 2001–2018**



Source: World Development Indicators and author’s calculation.  
 Note: Min is the lowest rate of economic growth among ASEAN countries; max is the highest.

<sup>3</sup> These data also come from the World Development Indicators.

trade in goods, with fewer trade barriers, lower business costs, and a larger market to enable firms to operate with more economies of scale. Since then, ASEAN countries have eliminated almost all intra-ASEAN import duties. They focus today on addressing nontariff measures (NTMs) that could have a substantial negative impact on regional trade, and particularly on agricultural products.

The RCEP (Regional Comprehensive Economic Partnership) agreement was signed on November 15, 2020, during the ASEAN summit. It includes all ASEAN countries and five emerging (China) or high-income countries (Australia, Japan, New Zealand, the Republic of Korea). It implies trade liberalization, as tariffs will be eliminated for 92 percent of tariff lines on average (the agreement contains a sensitive products clause) and regulatory provisions are negotiated (the most significant in practice is the establishment of common rules of origin). It remains to know if truly binding commitments have been imposed on SPS issues or on technical barriers to trade (TBTs) (Guimbard and Jean 2020).

Starting early 2020, the COVID-19 pandemic has caused severe damage and disruption on many aspects of societies and economies. Since its official announcement as a global pandemic in mid-March 2020 by the World Health Organization (WHO), as of late April 2021, more than 155 million people in the world have been infected. At the end of the first quarter of 2021, 133 million cases have recovered and 3 million people have passed away. Among ASEAN Member States, 3.3 million people have been infected, with Indonesia, the Philippines and Malaysia accounting for the majority.

In 2020-2021, the ASEAN economy is witnessing a slowdown in economic growth due to accompanying policies enacted by governments to fight the propagation of the virus. Intra-bloc trade will be directly affected by these measures, especially concerning agricultural products. For Chong *et al.* (2020), in the long term, ASEAN member countries export goods which are more substitute for each other than complementary. COVID-19 would be a great challenge to intra-trade due to rising transportation costs. In order to address domestic supply-demand disruption, many countries used trade measures to adjust trade inflows and outflows, especially for essential products such as medical supplies and food. This issue imposes a high risk of insecurity in the long-term in small countries since they would lose access to those products (Chandra *et al.*, 2020). Trade-restrictive measures related to the pandemic were limited to few countries, compared to the 2007/2008 crisis, and they were generally short-lived: on November 2021, a majority of exports restrictions related to COVID-19 have been phased out (WTO, 2021).

According to FAO *et al.* (2020), COVID-19 could cause 83 to 132 million more people worldwide to be undernourished and 6.7 million more children to suffer acute malnutrition.<sup>4</sup> In ASEAN,

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<sup>4</sup> See also : <https://www.unicef.org/press-releases/unicef-additional-67-million-children-under-5-could-suffer-wasting-year-due-covid-19>

disruption in food supply chains would impose a challenge on achieving a “nutrition adequate” diet<sup>5</sup> for its people, based on an analysis of the Asia Pacific Foundation of Canada (APFC, 2021). COVID-19, de facto, did slow down South-East Asia nations in the progress to 2030 Sustainable Development Goals (SDGs) (UNESCAP, 2020).

With this current situation and an unpredictable development of COVID-19, rebuilding resilient good supply chains and promote intra-bloc cooperation is a priority. ASEAN nations need to propose and execute initiatives to unclog intra-bloc trade flow via multilateral trade agreements and fortifying regional agreements.

This research project evaluates the potential trade impact of NTMs on intraregional trade in agricultural products in the ASEAN region. Specifically, it aims to:

- Collect data on NTMs on agricultural products in ASEAN countries and design a database that allows the calculation of descriptive statistics: number of NTMs by country, by product, by year, by type of NTM, and coverage and frequency indexes, among others.
- Estimate the potential impact of NTMs on trade, conducted through an econometric estimation of their ad valorem equivalents (AVEs).

Throughout this research project the large diversity of NTMs is kept in mind. Indeed, NTMs include SPS and TBT which are primarily being implemented for health protection reasons (human, animal, and plant health). But a few NTMs may also be implemented for protectionist reasons.

Section 3 gives the background of the study. Section 4 reviews the literature. Section 5 provides a measurement of trade integration in Southeast Asia. Section 6 presents the methodology of the study. Section 7 provides a statistical analysis of NTMs on agricultural and food products in the ASEAN region, while Section 8 offers an estimation of the trade impact of NTMs there. Section 9 concludes.

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<sup>5</sup> Nutrition adequate diets are defined as “diets that contain a balance of carbohydrates, proteins, fats, vitamins and minerals to maintain proper health and avoid diet-related illnesses and diseases” (APFC, 2021, p. 8). The objective of the APFC report was to assess the consequences of the COVID-19 pandemic on food security and local value chains in the ASEAN region. To achieve this, it conducted a simulation modelling and statistical analysis, and based the evaluation on food security on this concept of nutrition adequate diets.

# Background

## NTMs: What are they?

NTMs are generally defined as “policy measures other than ordinary customs tariffs that can potentially have an economic effect on international trade in goods, changing quantities traded, or prices or both” (UNCTAD 2010).

NTMs are heterogeneous, ranging from regulations on preshipment inspection of cargo to SPS measures and rules of origin related to implementation of a free trade agreement, among others. Table 2 lists all NTMs by UNCTAD (United Nations Conference on Trade and Development) classification.

A distinction is made between import-related measures (chapters A to O) and export-related measures (chapter P). Among the former, technical measures are distinguished from non-technical measures.

**Table 2. List of NTMs according to UNCTAD classification**

Imports	Technical measures	A Sanitary and phytosanitary measures B Technical barriers to trade C Preshipment inspection and other formalities
	Nontechnical measures	D Contingent trade-protective measures E Nonautomatic licensing, quotas, prohibitions, and quantity control measures other than for SPS or TBT reasons F Price control measures, including additional taxes and charges G Finance measures H Measures affecting competition I Trade-related investment measures J Distribution restrictions K Restrictions on postsales services L Subsidies (excluding export subsidies under P7) M Government procurement restrictions N Intellectual property O Rules of origin
Exports		P Export-related measures

Source: Authors' illustration based on UNCTAD (2018).

Technical measures include:

- SPS measures, that is, those: (i) related to food safety and to animal and plant health, such as restrictions on substances and preventions of disease spread; and (ii) to assess product conformity assessment procedures, like certification, testing, inspections, and quarantine.
- TBTs, which regulate the technical characteristics of a product, production and packaging methods, labeling requirements, and also assess product conformity assessment procedures. Concerning agrifood products, their objective is also the protection of the environment and the safety of consumers.
- Preshipment inspections and other customs formalities.

Non-technical measures include:

- Contingent protection (antidumping duties, safeguards, countervailing duties).
- Quantity control and price control measures.
- Behind-the-border measures, such as those related to finance, government procurement, and product distribution.

## Why do countries implement NTMs?

It is important to understand why governments adopt NTMs. Their objective is to adopt norms related to food safety, to human and plant health, or to the spread of diseases. NTMs address market failures (affecting consumers, producers, or both) or issues related to the “global commons” (Van Tongeren, Beghin, and Marette 2009; Beghin and Xiong 2016).

For example, the production and especially storage of a peanut can naturally favor the concentration of aflatoxin, a mycotoxin produced by certain fungi appearing and proliferating in hot, humid storage conditions. The consumption of this mycotoxin can have adverse effects, so a sanitary regulation may be desirable to ensure that its presence in food is not harmful to health. This is an externality from production to consumption that a free market without intervention fails to address because this substance is not detectable by standard consumers.

As another example, an animal population may be subject to so much predatory activity by humans that the survival of that species becomes an issue. Again, regulation in the form of a restriction or even a sales ban may be desirable. This is a question of managing the “global commons.”

When the exchange of goods is the subject of an international transaction, the regulation put in place to address this health or environmental objective may be considered a barrier to trade. It imposes an additional fixed cost on the exporter (for example, to comply with the maximum aflatoxin content) or involves a higher unit cost of production. In the case of a prohibition, imports are cancelled.

Nevertheless, an SPS regulation that increases consumer information or gives consumers guarantees on the composition of a product or the absence of substances dangerous to human health or the environment may encourage purchase of the good in question or, in the case of an international transaction, increase imports of that product. It is therefore not clear if an SPS measure constitutes a barrier to trade.

The application of NTMs may result in protecting local producers. It is difficult to demonstrate that NTMs are protectionist and to distinguish those NTMs adopted with the legitimate aim of protecting consumers or the environment or of correcting market failure from those that constitute barriers to trade. Nevertheless, many authors have insisted on the potentially protectionist nature of NTMs, starting with Fischer and Serra (2000), who study the behavior of a government wishing to implement a minimum quality standard in a sector where the national market is shared between a national firm and a foreign firm. They show that when a consumption externality exists, there is always a protectionist decision in the sense that the standard is higher than in a situation where the two firms are national.<sup>6</sup>

In this vein, recent research points out that governments might implement NTMs to exert retaliation in the international trade policy arena. Nes and Shaefer (2020) construct a dataset including public standards between 1996–2015 matched with annual, bilateral trade flows and the initiation of antidumping and countervailing duty (ADCV) proceedings. They find that public standards were frequently used for retaliatory purposes.

This report takes the view that NTMs are policies adopted to protect human health and the environment, but that these measures can sometimes have a restrictive effect on international trade, without it being possible to prove that the initial objective of their implementation is protectionist.

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<sup>6</sup> See Anderson, Damania, and Jackson (2004), in the case of genetically modified food and trade between the United States of America and the European Union; Beghin, Li, and Xiong (2013) in the case of national Maximum Residue Limit (MRL) regulations affecting agricultural and food trade; and Orden *et al.* (2012).

## Trade agreements and NTMs

Any country may adopt an NTM. As a member of the WTO, it must notify this measure to the international institution, but the notification requirements and obligations are not the same under each WTO agreement. For example, SPS and TBT regulations must be notified if they are not based on an international standard, and if they are considered to have a significant effect on trade.

Each of its trading partners can then complain to the Dispute Settlement Body. It often happens when its exports are hurt by this measure.

Concerning SPS measures and TBTs which are the most relevant NTMs for the agrifood sector, two countries in an intergovernmental negotiation, or a supranational body on behalf of a group of countries, may look for regulatory convergence with respect to NTMs, either through harmonization or equivalence.<sup>7</sup> Harmonization is a difficult process because it requires negotiations between the countries involved to bridge differences in their preferences. This can be avoided by choosing the route of equivalence, which implies that a product approved for sale in one country is automatically approved in the other.

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<sup>7</sup> On regulatory convergence of NTMs, see De Frahan and Vancauteran (2006), UNCTAD (2018), and Knebel and Peters (2019). Indeed, the term mostly used for SPS measures and TBTs is equivalence, and not mutual recognition: often, the recognition is not mutual. A country may recognize the equivalence of an exporting country measure or system or controls, but not necessarily vice-versa.

# Review of literature

The economic literature on NTMs has proliferated since 2000. We identified three categories of studies of NTMs in this literature. First, literature reviews focus on NTMs in general, on the methodologies used to assess their impact, or on the available data. Second, studies assess the impact of NTMs, or impact of regional agreements including NTM provisions on trade, on welfare, world prices, production costs of exporting firms. Third, some articles examine the distance or proximity of regulatory systems and their potential convergence.

## Surveys

The book edited by Olivier Cadot and Mariem Malouche (2012), entitled “Non-Tariff Measures – A Fresh Look at Trade Policy’s New Frontier,” is an interesting and comprehensive presentation of the topic, with a good overview in Chapter 1. This book includes a review of the system of WTO notifications, a statistical analysis of NTMs, and a review of econometric studies of not only the impact of NTMs, but also the enforcement of SPS measures.

On methodologies that estimate the trade and welfare impact of NTMs, Ferrantino (2006) is a detailed, precise, almost exhaustive review of the various methods available to study the trade and economic effects of not only NTMs but also trade facilitation measures. Ferrantino (2006) successively reviews the “handicraft” method of price comparisons, econometric analyses of prices, econometric analyses of trade flows, and simulation models. This literature review is even more interesting in that it presents the advantages and disadvantages of each method by identifying purely methodological problems and those related to the particularity of the data on which these estimates are based.

Fugazza and Maur (2008) discuss and question the various treatments of NTBs in Computable General Equilibrium (CGE) models. They distinguish between the protective effect of an NTB at the border, or behind the border, and the domestic market-regulating effects of NTBs (supply- or demand-shifting effect). Concerning the ways NTBs are integrated in CGE models, they distinguish between the use of AVEs of NTBs, an efficiency-based approach, a cost-augmenting approach, and last concerning the social benefits, the modification of CES (constant elasticity of substitution) between domestic and foreign goods. Cadot and Jammes (2012) provide an interesting survey of methodological issues related to the use of AVEs of NTMs in partial equilibrium models.

A few databases on NTMs are available. The point of departure of Rial, Winters, and de Córdoba (2019) is that policymakers have very incomplete information on NTMs. They describe the efforts undertaken at UNCTAD since the 1980s to fill this gap with not only establishment of the TRAIN-i-Tip database, which covers 109 countries and 90 percent of world trade, but also at the ASEAN level the effort resulting from a collaboration between UNCTAD and ERIA (Economic Research Institute for ASEAN and East Asia). Interesting in this contribution is the description of the principles adopted for the constitution of these databases and the categorization of 177 NTMs into 16 chapters (from A to P). Last, it describes the indicators (frequency and coverage indexes, prevalence scores) used by economists to give a statistical assessment of their importance, together with a presentation of their advantages and defaults.

Ghodsi, Reiter, and Stehrer (2015) provide the first results of an effort to construct a database using information from the WTO Integrated Trade Intelligence Portal (WTO I-TIP), a research project initiated at the WTO's Economic Research and Statistics Division. They point out several data issues and suggest further steps in improving these data, give details of the contents of the database, and indicate potential procedures to improve the database.

## Impact studies

Many studies are published on the impact of NTMs: on their direct impact on trade; on the trade impact of regional trade agreements (RTAs) that include agreements on NTMs; on the welfare impact of NTMs; on the impact on production costs of exporting firms; and on world prices. The first four are discussed now.

**a. Direct impact of NTMs on trade.** Otsuki, Wilson, and Sewadeh (2001) assess the impact of a European aflatoxin standard on African countries' exports using a gravity equation at the product level. They conclude that this new standard will save the lives of 1.4 people out of 1 billion people per year, but will imply a 64 percent drop in African exports of cereals, dried fruits, and nuts to the European Union.

Wilson and Otsuki (2002), using a gravity equation estimated on 11 importing OECD (Organisation for Economic Co-operation and Development) countries and 19 exporters, study the effects of pesticide regulations on banana trade. They conclude that a 10 percent decrease in pesticide residue requirements reduces banana imports by 14.8 percent.

Wilson, Otsuki, and Majumdsar (2003) examine the impact of residue limits of an antibiotic (tetracycline) in beef. They find that beef imports are significantly lower when importing countries have a more stringent residue limit. They conclude that regulatory convergence toward the international standard set by Codex Alimentarius would increase the international trade of beef by about USD3.2 billion.

Disdier, Fontagné, and Mimouni (2008), using a gravity equation based on 154 importing countries, 183 exporting countries, and 690 products but only one year (2004), estimate the impact of SPS and TBT measures' regulations. They find that they do not significantly affect bilateral trade between OECD members, but significantly reduce Developing and Least Developed Countries' exports to OECD countries. SPS and TBT measures could foster trade in some sectors like cereals and wool, but strongly impede trade in sectors like live trees, plants bulbs, and roots, among others.

Xiong and Beghin (2014) use a double critique of the paper by Otsuki, Wilson, and Sewadeh (2001) – no time variation in the application of standards, no consideration of zero trade flows – to reestimate the impact of European Maximum Residue Limits on African peanut exports. Using a database of firms, they conclude that SPS standards are not necessarily a barrier to trade and that supply-side factors are as important as market access.

Kee, Nicita, and Olarreaga (2009) estimate the AVEs of NTBs for 78 countries and 4,575 products in two steps: they first estimate the impact of NTBs on the volume of trade, and then estimate the AVE of these barriers (price effect) using existing estimates of import demand elasticities. They find an average AVE of 9.2 percent if a simple average is used and 7.8 percent if the AVE is trade-weighted. They conclude that developing countries have more restrictive trade policies, but also face more barriers to their exports.

Beghin, Disdier, and Marette (2015) reestimate the AVEs of NTMs using the approach by Kee, Nicita, and Olarreaga (2009) for 2001 to 2003, but they allow for positive and negative values of AVEs. They conclude that a substantial share of NTMs exhibit an import-facilitating effect.

Ghodsi, Gruebler, and Stehrer (2016a) proceed to a new estimation of AVEs of NTMs but interact NTM variables with importer country dummies to obtain importer-specific AVEs. They also lag tariffs and NTMs by one period to account for the delay of impact and to treat the potential endogeneity issue. They confirm a trade-promoting effect in the case of SPS and TBT measures. If rich countries apply more NTMs than developing countries, the trade impact of the former is smaller.

UNCTAD (2018) estimates the AVEs of NTMs and studies their impact in the ECOWAS (Economic Community of West African States) region. NTBs in the form of quantitative restrictions in ECOWAS dramatically increase product prices by almost 50 percent. Each single technical NTM tends to increase product prices by 1.2 percent to 1.7 percent on average, which is much less than that of quantitative restrictions. However, technical NTMs are much more frequent in ECOWAS.

**b. Trade impact of RTAs with provisions on NTMs.** Chen and Mattoo (2004) find that adoption of a regional standard not only increases intraregional trade, but also increases exports from developed countries excluded from the agreement to that region. It also reduces exports from developing countries excluded from the agreement. These results are obtained using an imperfect competition model (Cournot) and an empirical verification based on a database of standards in the manufacturing industry in 42 countries (28 OECD countries and 14 developing countries) over the period 1986–2001.

De Frahan and Vancauteran (2006) study if European harmonization of food regulations led to significant increases in trade between the European Union participating countries. They use a special database that identifies products covered by harmonization (10 food sectors over 1990–2001). They conclude that the European Union harmonization of food regulations increases trade, with heterogeneous impact across sectors. Globally in the food industry, the tariff equivalent of the cost of the European Union nonharmonized food regulation is 183.9 percent.

Based on a dataset of the European Union imports that covers 15 countries and 80 different agricultural industries annually from 1980 to 1995, and a gravity equation with multilateral resistance terms at both aggregated and disaggregated levels, Moenius (2006) finds that: (i) on average, importer standards are a barrier to trade, while exporter standards promote trade; (ii) harmonization of standards, on average, reduces trade in agricultural products; (iii) harmonization of standards decreases variety; and (iv) the results diverge for trade between the European Union members and imports from outsiders: country-specific standards for agricultural products within the the European Union do not hinder intra-the European Union trade, but they significantly reduce imports from outsiders.

Maertens and Swinnen (2009) assess the impact of the adoption of European standards on Senegalese fruit and vegetable exports. These exports increased significantly between 1991 and 2005, which had a substantial positive effect on the income of poor households. Adoption of these standards changed the structure of the supply chain from a myriad of small contract farmers to a small number of large companies. They conclude that not only was there a strong trade effect, but also a substantial welfare effect. Their study is based on statistics on horticulture production and exports, quantitative and structured interviews with 9 of the 20 horticulture-exporting companies in the Dakar region, and a large survey among farm households in the main horticulture zone.

Disdier, Fontagné, and Cadot (2015) study the impact of North-South RTAs that include clauses on product standards (harmonization) on the trade of Southern countries, particularly South-South trade. This type of agreement is likely to incorporate an alignment of Southern standards with those of the North, and thus reduce South-South trade outside the regional agreement, since standards harmonization is costly and raises the price of

affected products, which leads to export losses to other Southern countries. Their empirical study confirms this effect.

- c. Welfare impact of NTMs.** UNCTAD (2018) provides an analysis of NTMs in 13 ECOWAS countries, based on data collected by UNCTAD and the African Development Bank (AfDB). The incidence of quantitative restrictions in ECOWAS is low on average but these restrictions tend to be concentrated in some countries and on a few important sectors. A single measure increases product prices by 1.5 percent on average, but when multiple measures are imposed on the same product, they can increase prices by up to almost 50 percent. A scenario of regulatory convergence concludes that intra-ECOWAS trade would increase by 15 percent and ECOWAS countries' income would increase by USD300 million annually. Regulatory convergence toward international standards has the highest benefits for these West African countries: intraregional trade is expected to rise by 14 percent and income in ECOWAS by USD1.57 billion annually.

Itakura (2019) assesses the welfare effects of NTMs by assuming that their effect on trade can be fully estimated through an increase in firms' fixed costs, an increase that acts as a barrier to entry in the export market. This fixed cost is introduced in a model with heterogeneous firms: it is a model of the Armington-Krugman-Melitz type, developed by Dixon and Rimmer (2012). Three fixed costs are introduced in the GTAP (Global Trade Analysis Project) model: a cost of entry into the sector, a cost of entry on sales on the local market, and a cost of entry on exports. The initial number of firms in each country is calibrated to 1, and the calibration process gives the importance of the different fixed costs: on average, 10 percent of a firm's total cost allows it to enter a sector, between 4 percent and 8 percent to sell on the domestic market, and between 11 percent and 14 percent to export. Itakura (2019) estimates the consequences of three scenarios for ASEAN countries: a 20 percent drop in fixed costs for exports on intra-ASEAN trade; a 20 percent drop in the fixed costs associated with selling on the domestic market; and a 20 percent drop in these two costs. The first scenario significantly increases intra-ASEAN trade; the second reduces it; the third generally decreases it. The welfare effects are strong, but difficult to fully believe, as they do not take into account the effects on food safety and the environment.

- d. Impact of NTMs on production costs of exporting firms.** Maskus, Otsuki, and Wilson (2005) develop an econometric model to estimate the incremental production costs for firms in developing nations in conforming to standards imposed by major importing countries. Estimation is based on firm-level data generated from 16 developing countries in the World Bank Technical Barriers to Trade (TBT) Survey Database. They conclude that standards significantly increase short-run production costs: a 1 percent increase in investment to meet compliance costs in importing countries significantly raises variable production costs by between 0.06 percent and 0.13 percent. They also find a significant fixed cost of compliance: approximately USD425,000 per firm on average.

Ing, Peters, and Cadot (2019) find that in ASEAN countries, the compliance costs associated with SPS measures on agrifood products range, on average, between 3.7 percent of their cost, insurance, freight (CIF) import price (the Philippines) and 16.6 percent (Socialist Republic of Viet Nam). These compliance costs are relatively high for animal products, fats, and oils. Estimates of compliance costs associated with TBT measures imposed by ASEAN countries are lower, from an average of 2.8 percent (Cambodia) to 5.7 percent (Indonesia). They are high in both the textile and automobile sectors.

## Structural comparison of regulatory structures

The topic of several studies of NTMs is a structural comparison of these measures between regulatory structures (countries or RTAs) and an evaluation of regulatory convergence.

Cadot *et al.* (2015) offer a toolkit for addressing various issues concerning NTMs, especially the evaluation of the similarity between regulatory systems, which is quite important as harmonization or mutual recognition of NTMs is much easier when these regulatory systems are close. This method can be used to identify the best way to regional integration and to benchmark its progress. This method is based on whether a regulation of the same type is applied by two different countries to the same product. They also explore methodologies to evaluate the distance in regulatory stringency.

Knebel and Peters (2019) use the toolkit designed by Cadot *et al.* (2015) first to evaluate the regulatory distance in ASEAN countries, second to estimate the AVEs of NTMs in the region, and third to estimate the price effect of a regulatory convergence. They find that in the Southeast Asian region, regulatory distance is higher in agriculture than in industry. A regulatory reform to realign existing NTMs and to maximize regulatory overlap, but without increasing or decreasing the number of NTMs in any country, could reduce the current net effects of NTMs by 15 percent to 25 percent.

As mentioned earlier, Wilson, Otsuki, and Majumdsar (2003) find that regulatory convergence toward the international standard set by Codex Alimentarius concerning residue limits of an antibiotic (tetracycline) in beef would increase international trade of this product by about USD3.2 billion. UNCTAD (2018) evaluates various scenarios of regulatory convergence to conclude that the highest benefits are obtained thanks to a convergence toward international standards.

# Trade integration in Southeast Asia

This section measures the intensity of trade integration in the ASEAN region. We first review measurement of trade integration based on trade barriers, and then on trade flows. We provide indicators covering the period 2003–2018. Indicators of integration based on trade barriers are based on data from the MACMaps-HS6 (Harmonized System 6) database,<sup>8</sup> but also on other datasets on NTMs and other trade impediments. Indicators of integration based on trade flows are based on data from the 2020 AATM (Africa Agriculture Trade Monitor) database.<sup>9</sup>

## Measurement based on trade barriers

Figure 2 indicates the average tariff on imports given by MACMAP-HS6 for 2016 for the 10 ASEAN countries for all products and for only agricultural and food products, together with estimations of the AVEs of NTMs by Kee, Nicita, and Olarreaga (2009; these estimates are not available for Cambodia, the Lao People's Democratic Republic, Myanmar, and the Socialist Republic of Viet Nam). Figure 3 gives the same statistics for agricultural products.

These estimations of AVEs of NTMs are not recent. Policies might have changed since 2000. Policy conclusions emerging from this section must be carefully considered. A new estimation of AVEs of NTMs is conducted in sections 6 to 8 of this report.

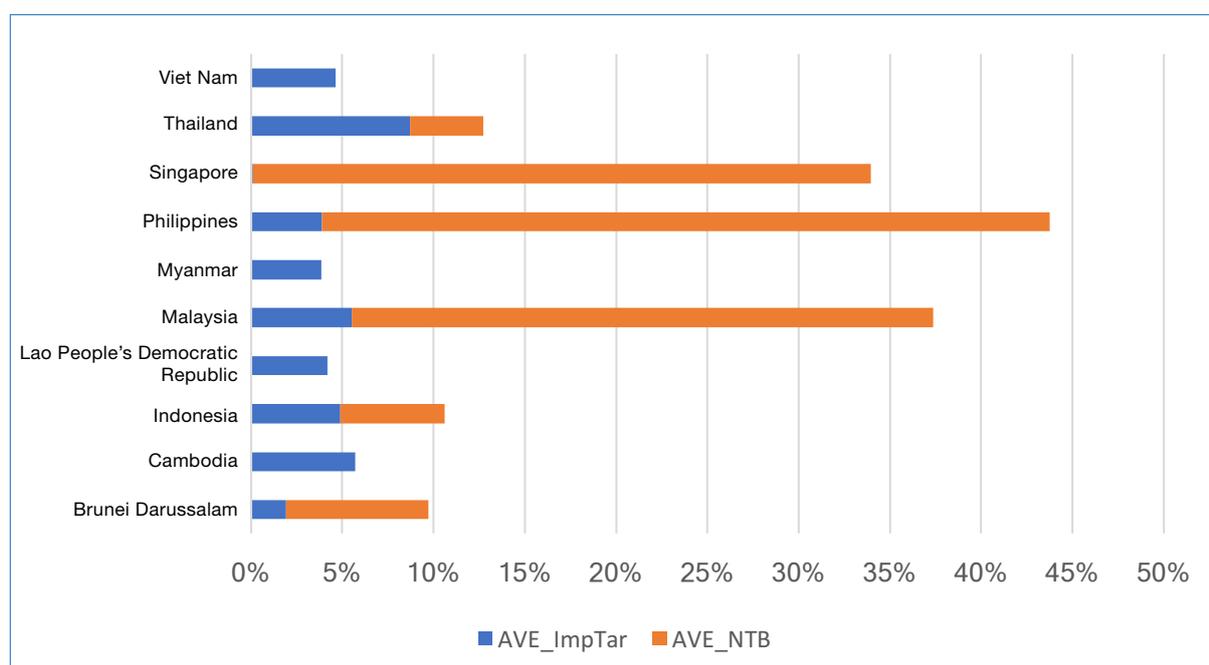
In the MACMAP-HS6 for 2016, the simple average of average tariffs on imports among 195 countries is 7.2 percent and the median is 6.2 percent, which reflects a right-skewed distribution (a few relatively high tariffs). In terms of import duties, all ASEAN countries are relatively open, except Thailand, where the average tariff is 8.7 percent. Tariff protection is 0.1 percent in Singapore.

However, the relatively low import tariffs in Malaysia, the Philippines, and Singapore are offset by very high AVEs of NTMs, as estimated by Kee, Nicita, and Olarreaga (2009): the simple average of their country estimates is 11.2 percent, while the AVE of NTMs is estimated at 31.8 percent in Malaysia, 33.8 percent in Singapore, and 39.8 percent in the Philippines. AVEs of NTMs are relatively low in Brunei Darussalam, Indonesia, and Thailand. Furthermore, the AVE figures are likely underestimated, as shown later, due to the abovementioned studies' failure to consider Jensen's inequality in their econometric estimations.

<sup>8</sup> "Market Access Map (MACMap) provides a disaggregated, exhaustive and bilateral measurement of *applied* tariff duties. It takes regional agreements and trade preferences exhaustively into account. The source data is from ITC (UNCTAD-WTO)." Extracted from the CEPII website on July 21, 2020.

<sup>9</sup> This analytical database was developed with the support of the CGIAR Research Program on Policies, Institutions, and Markets (PIM), and based on the United Nations Commodity Trade Statistics Database (UN-COMTRADE). Raw trade data are processed to provide an accurate estimate of formal cross-border trade in Africa. In the first step, the dataset is harmonized and cleaned. The second step reconstructs a unique trade flow in the presence of discrepancies in mirror trade flows. Finally, the trade flows are all expressed in CIF value.

**Figure 2. Average tariff on imports (2016) and AVEs of NTMs (around 2000) – ASEAN countries**



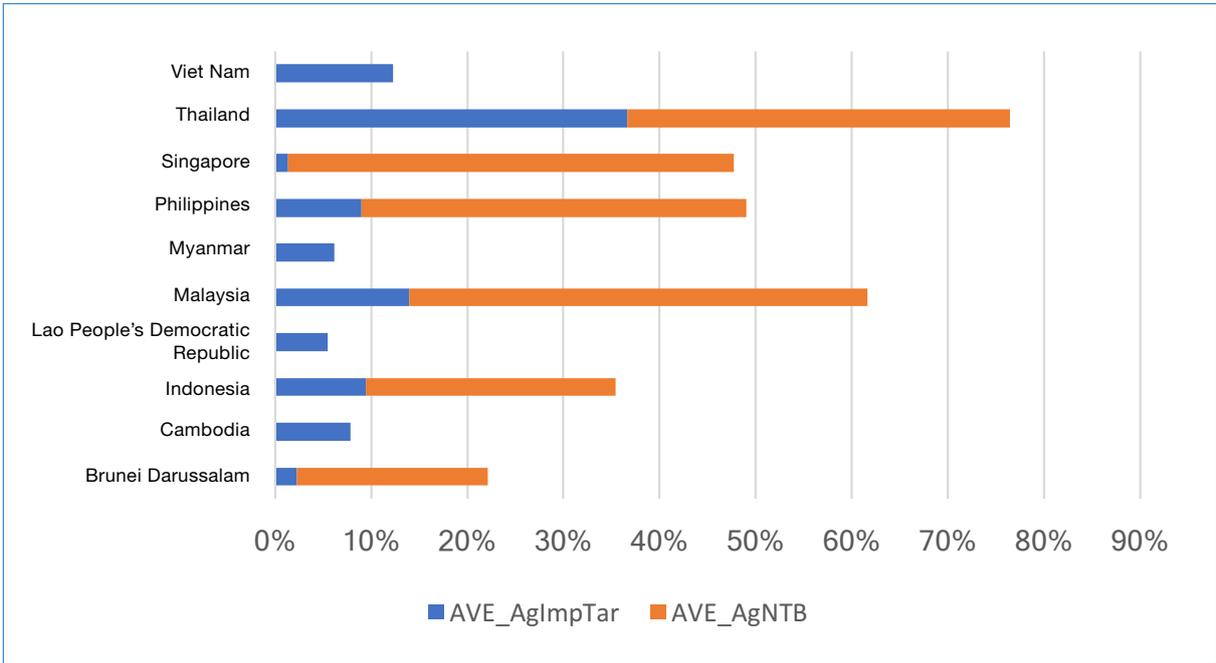
Source: MACMAP-HS6 2016 for tariffs and Kee, Nicita, and Olarreaga (2009) for NTBs.

Note: AVE\_ImpTar stands for ad valorem equivalent of import tariffs; AVE\_NTB stands for ad valorem equivalent of NTMs.

In the agriculture sector, the same conclusions apply (Figure 3), but the worldwide average of protection is higher. The simple average of average tariffs on agricultural imports is 14.9 percent and the median is 12.7 percent: the agriculture sector of all ASEAN countries is relatively less protected, except in Thailand, which applies an average tariff of 36.6 percent. Agricultural tariff protection is 0.1 percent in Singapore. However, the relatively low agricultural import tariffs in Malaysia, the Philippines, and Singapore are offset by a very high AVE of NTMs, as estimated by Kee, Nicita, and Olarreaga (2009): the world simple average of these estimates is 27.3 percent, while the AVE of NTMs is estimated at 47.7 percent in Malaysia, 46.3 percent in Singapore, and 40.0 percent in the Philippines. Thailand imposes not only high tariff protection in agriculture, but also restrictive NTMs: its AVE is 39.8 percent, for a total protection estimated at 76.5 percent in the agriculture and food sectors (again, these estimations of AVEs of NTMs need to be updated).

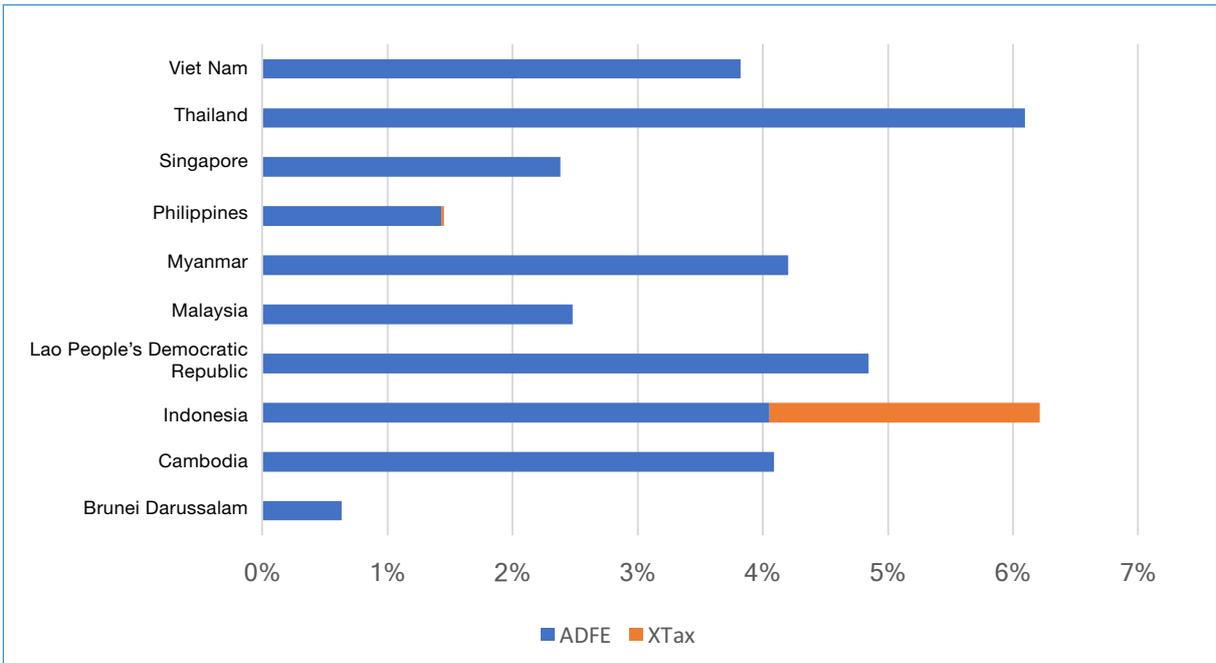
The insertion of an economy in world trade can also be evaluated through the access it gets to foreign markets. With the MACMAP-HS6 database, calculation of the average duty faced by a country's exports when entering foreign countries is possible. Figure 4 presents the average duty faced by ASEAN countries' exports in 2016 on all products, while Figure 5 indicates the same information for agricultural products. In 2016, the simple average of all countries' average duties faced on exports stands at 5.2 percent for all products and at 13.7 percent for agricultural products. All ASEAN countries benefit from better access on average for all

**Figure 3. Average tariff on agricultural imports (2016) and AVEs of NTMs in agriculture (around 2000) – ASEAN countries**



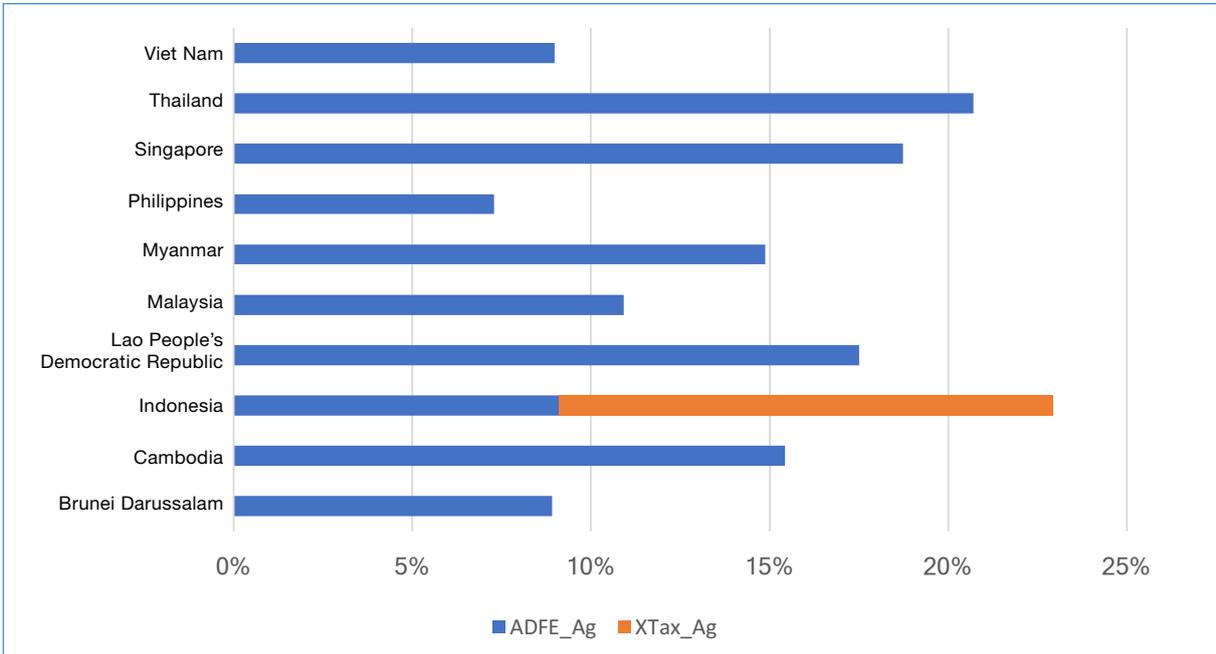
Source: MACMAP-HS6 2016 and Kee, Nicita, and Olarreaga (2009).  
 Note: AVE\_AgImpTar stands for ad valorem equivalent of agricultural import tariffs; AVE\_AgNTB stands for ad valorem equivalent of NTMs in agriculture.

**Figure 4. Average tariff faced on exports (2016) and AVEs of export tax (2011–2012) – ASEAN countries**



Source: MACMAP-HS6 2016 and Bouët, Estrades, and Laborde (2013).  
 Note: ADFE stands for Average Duty Faced by Exports; XTax stands for average export tax

**Figure 5. Average tariff faced on agricultural exports (2016) and AVEs of agricultural export taxes (2011–2012) – ASEAN countries**



Source: MAcMAP-HS6 2016 and Bouët, Estrades, and Laborde (2013).  
 Note: ADFE\_Ag stands for Average Duty Faced by Exports in Agriculture; XTax\_Ag stands for average export tax in Agriculture.

products, except Thailand, where exports face an average tariff of 6.1 percent. In agriculture, five ASEAN countries (Cambodia, the Lao People’s Democratic Republic, Myanmar, Singapore, Thailand) are penalized by relatively high duties applied by trading partners on their exports. This is especially the case in Thailand, for which agricultural exports face an average import duty of 20.7 percent when they enter foreign markets.

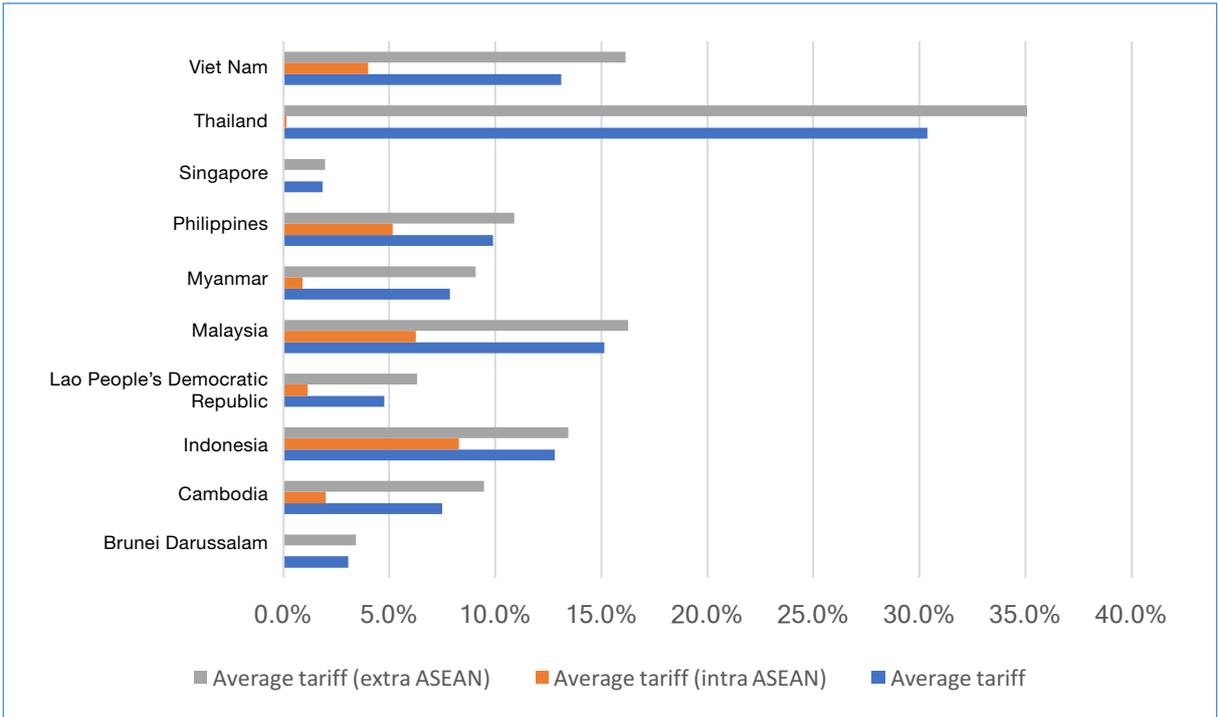
Why does a country face a higher or lower duty on its exports? Two elements can explain this situation. First, a country may have obtained more or less preferential arrangements from trading partners. Second, a country may be specialized in the export of products more or less taxed worldwide: countries specialized in agricultural exports are often penalized by high duties on their exports, especially when they export cereals, milk and dairy products, meat and meat products, or fruit and vegetables.

Countries can also impose taxes on their own exports to get public revenues, to decrease local prices, or to increase world prices of their exports (Bouët and Laborde 2010). However, accessible information is limited as WTO members do not usually notify these export taxes. In the region, only Indonesia has been identified as implementing significant export taxes, especially on a few products like untreated skin, white tanned leather, and coal (Bouët, Estrades, and Laborde 2013). On Figure 4, it is indicated that only Indonesia’s exports are found to be impeded by Indonesian export taxes (2.2 percent on average). The same picture appears when considering agriculture (Figure 5) with a higher average export tax (14 percent).

Figure 6 compares ASEAN countries' average tariffs on agrifood imports, on intra-ASEAN agrifood imports, and on extra-ASEAN agrifood imports. Anderson and van Wincoop (2003) demonstrate that what matters is not the absolute level of an import tariff (or of any barrier to trade), but its relative level. In other words, a low level of tariffs between ASEAN countries will cause more agrifood trade between ASEAN countries if the level of their tariffs on agrifood imports coming from non-ASEAN countries is higher.

Figure 6 reveals three important points. First, agrifood trade between ASEAN countries is not fully liberalized in terms of import duties: while these tariffs are zero or close to zero in Brunei Darussalam, Myanmar, Singapore, and Thailand, some significant import tariffs still exist in other ASEAN countries, especially Indonesia, Malaysia, and the Philippines (decreasing order).

**Figure 6. Average tariff on agrifood imports, intra-ASEAN agrifood imports, and extra-ASEAN agrifood imports (2016) – ASEAN countries**



Source: MAcMAP-HS6 2016 and authors' calculation.

Second, the level of ASEAN countries' protection vis-à-vis the rest of the world is heterogeneous, with low agrifood protectionism in Singapore (2.0 percent) and a relatively high level of agrifood tariff protection in Thailand (35.1 percent) and, to a lesser extent, in Malaysia (16.3 percent) and Vietnam (16.1 percent).

Third, comparing average tariffs on intraregional imports with those on extraregional imports leads to very heterogeneous conclusions. On one hand, the very low level of Singapore's tariff on

intraregional trade (0.0 percent) supports such trade, but Singapore imposes low tariffs on agrifood imports coming from non-ASEAN countries. On the other hand, Thailand has an interesting tariff structure: its average tariff on intraregional trade (0.2 percent) supports intraregional trade, a support amplified by the high level of average tariff on extra-ASEAN imports (35.1 percent).

Border measures, either tariffs or NTMs, are not the only impediments to international trade. Other trading costs can slow down or even prevent trading across borders; these include high domestic transportation costs, lack of communication infrastructure, and insufficient access to credit and insurance markets.

Doing Business 2019 (World Bank 2020) constructed indicators to measure the cost in both time and money, excluding tariffs and border taxes, of exporting and importing a specific shipment of goods to and from an economy's main trading partners. For all countries, imports are shipments of containerized auto parts from that country's natural partner. For exports, a product that represents comparative advantage is identified; the country of destination is the largest purchaser of this product (the natural partner). Time to export and time to import include documentary compliance, border compliance, and domestic transport (all in hours). Cost to export and cost to import include documentary compliance, border compliance, and domestic transport (all in USD). The advantage of these indicators is that they include many trading costs associated with exporting and importing operations.

Figure 7 indicates the level of these indicators in 2019 for the 10 ASEAN countries and on average for OECD high-income countries as a benchmark. These administrative trade barriers are especially high in Brunei Darussalam and Myanmar, and, albeit to a lesser extent, in Cambodia and Indonesia. In Cambodia, the main impediment to trade is the time for documentary compliance to both export and import. In Indonesia, the time for border compliance is also relevant. Malaysia, Thailand, and especially Singapore have procedures that are almost as efficient as those of high-income countries.

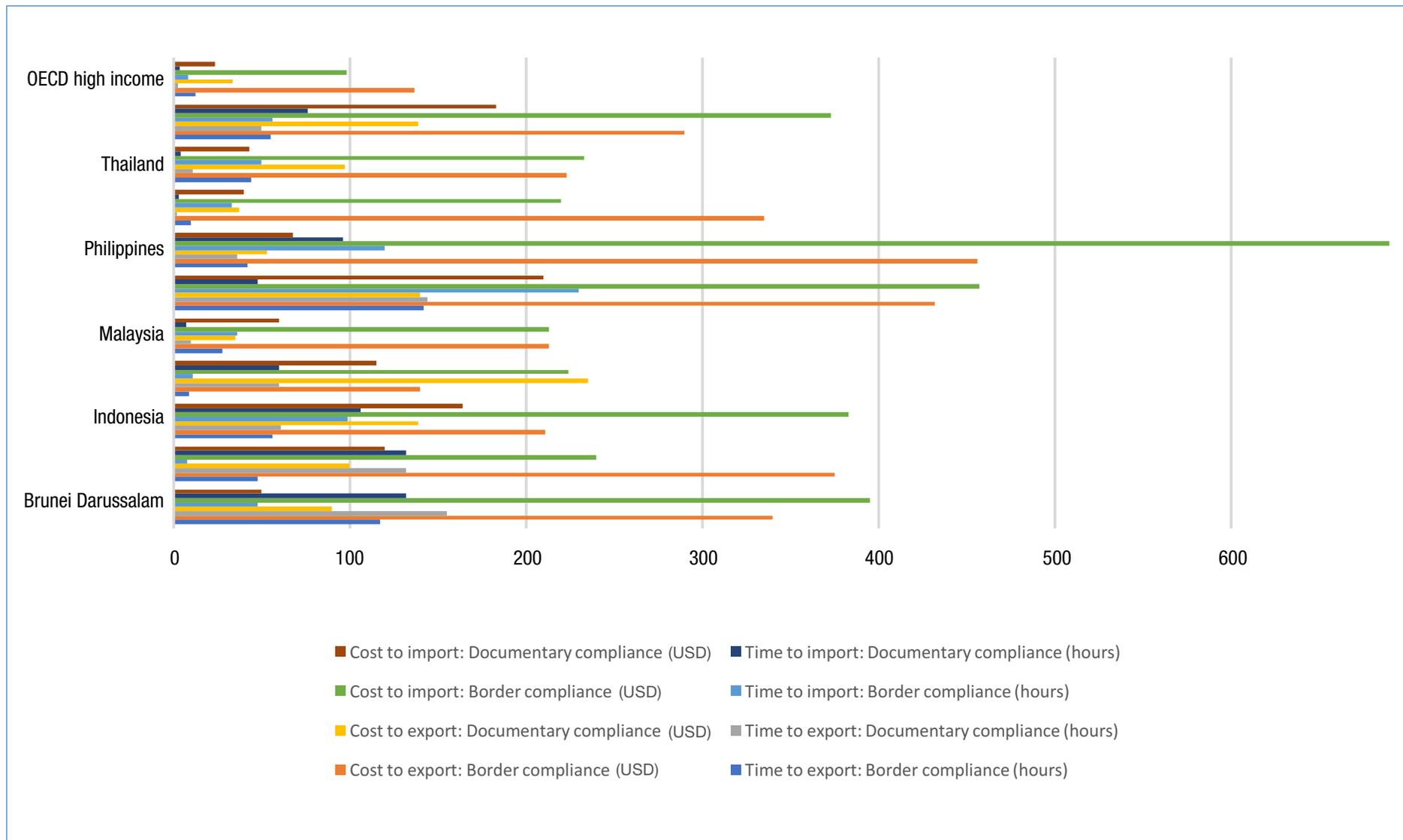
The World Bank has also facilitated estimation of the cost of business in agriculture with its “Enabling the Business of Agriculture” indicator (World Bank 2019). Concerning trade integration, the “Trading Food” indicator (a score and an index) “measures laws and regulations that help domestic farmers trade agricultural products.”<sup>10</sup> It includes the time and cost required to obtain mandatory documents for each shipment.

Table 3 gives the score of the seven ASEAN countries in the database, together with the score of three high-income countries as a benchmark. Among ASEAN countries, only Malaysia gets an honorable score and has an environment that well enables the trade of agricultural commodities. Of the 101 countries in the Enabling the Business of Agriculture database, Cambodia scores last and Thailand 99th.

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<sup>10</sup> Extracted from <https://eba.worldbank.org/en/methodology#a>, on July 27, 2020.

**Figure 7. Doing Business indicators – 2019**



Source: World Bank (2020).

**Table 3. Enabling the Business of Agriculture indicators – 2019**

Country	Trading Food Score	Time to obtain agriculture-specific export documents (hours)	Cost to obtain agriculture-specific export documents (USD)	Trading Food Index (0-7)
Cambodia	19.05	144	218	4
Lao People's Democratic Republic	38.19	96	148	4
Malaysia	77.08	60	25	6
Myanmar	47.62	96	65	3
Philippines	69.64	48	1	3
Thailand	25.40	96	195	3
Viet Nam	58.30	72	35	3
France	85.69	36	7	6
Netherlands	100	0	0	7
United States of America	66.01	48	106	6

Source: Authors' illustration based on UNCTAD (2018).

## Measurement of trade integration based on trade data

To gauge the degree of trade integration in the ASEAN region and especially in the agriculture sector, we provide indicators for all products and for only agricultural and food products for the ASEAN region, as well as for three other RTAs: the European Union, the Mercado Común del Sur (MERCOSUR), and the North American Free Trade Agreement (NAFTA).<sup>11</sup>

It is considered standard to evaluate the degree of trade integration in an RTA with the share of intraregional trade in a region's total trade (SIT). This is the simplest and most widely used indicator of regional integration. SIT for the ASEAN region is 21.5 percent in 2018, against 48.4 percent for the European Union, but 13.2 percent for MERCOSUR and 2.8 percent for NAFTA.

However SIT is a flawed indicator of trade integration of a region (Bouët, Cosnard and Laborde, 2017).

To tackle some of the issues and limitations discussed previously, a few refined trade-based indicators have been developed. The regional trade introversion (RTI) index was designed by

<sup>11</sup> NAFTA has been replaced by the United States of America Mexico Canada Agreement (USMCA), which is effective since July, 1st 2020.

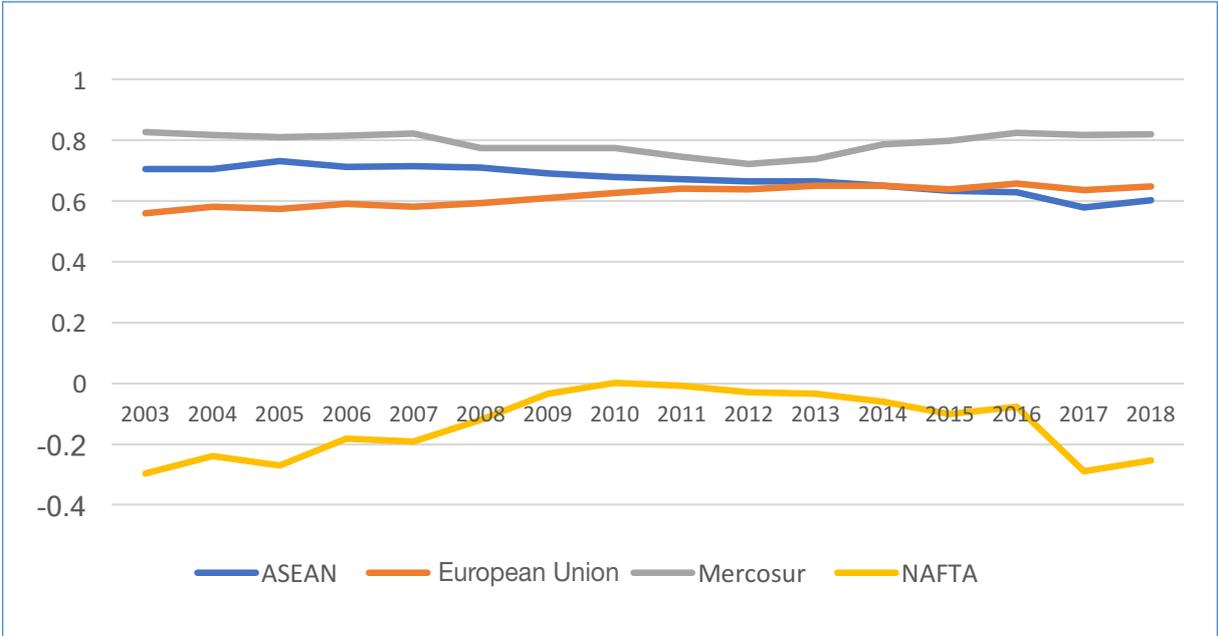
lapadre and Luchetti (2010) to overcome the biases of measures based on simple trade shares. The idea of the RTI is to compare intraregional trade shares to the region’s share in trade with the rest of the world. Taking the rest of the world as the benchmark instead of the whole world enables us to overcome many biases attached to more simple regional trade share indexes.

The RTI index is symmetric and independent from the size of the region, and it increases only if intraregional trade grows more quickly than extraregional trade (lapadre and Luchetti 2010; Hamanaka 2015). With this indicator and contrary to regional trade share, cross-regional comparisons are possible. A positive (negative) sign means that a region is more (less) introverted than extraverted.

Figure 8 indicates the average RTI indexes for the ASEAN region, the European Union, NAFTA, and MERCOSUR over the period 2003–2018, and drastically modifies the story depicted by statistics of regional SITs. The most introverted trade agreement is MERCOSUR, while trade introversion in the ASEAN region is close to that of the European Union. NAFTA is more extraverted than introverted.

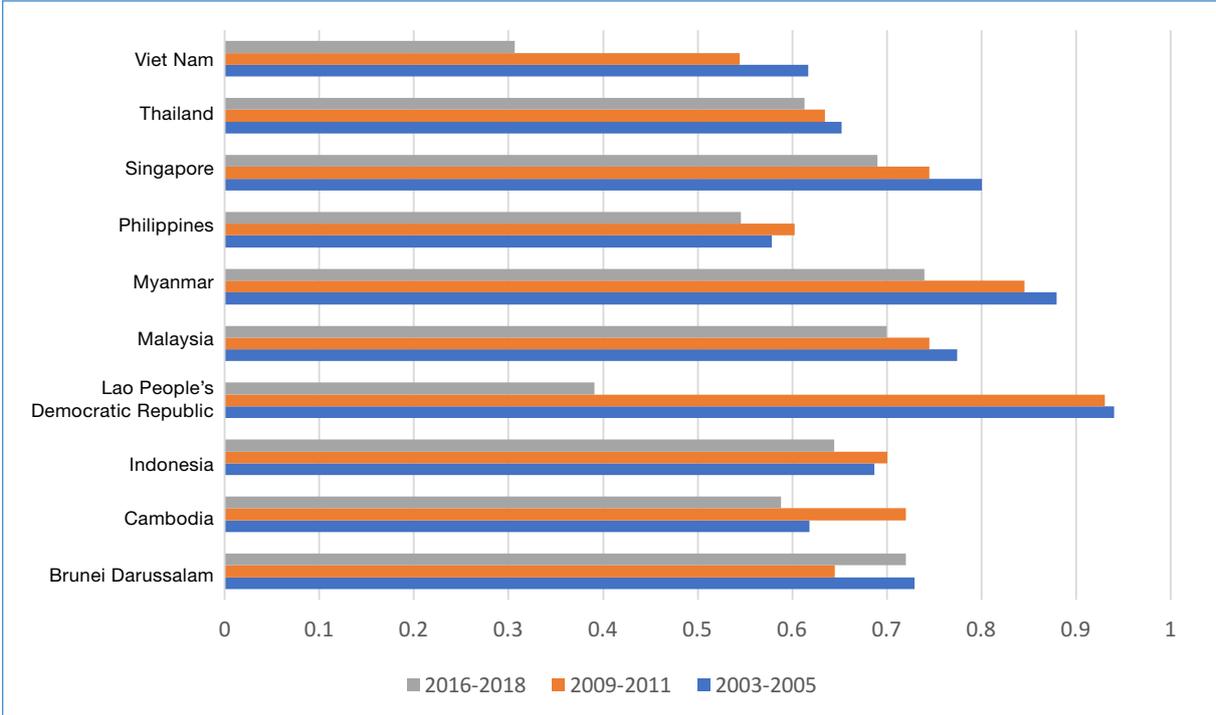
Figure 9 presents RTI indexes for each ASEAN country relative to the ASEAN RTA. For all these countries trade is more introverted within the ASEAN region than extraverted. However the introversion decreased significantly during the period 2003–2018 for the Lao People’s Democratic Republic, Malaysia, Myanmar, Singapore, Thailand, and the Socialist Republic of Viet Nam.

**Figure 8. RTI index by trade agreement**



Source: 2020 AATM and authors’ calculation.  
 Note: ASEAN for Association of Southeast Asian Nations; European Union stands for European Union; MERCOSUR for Mercado Común del Sur; NAFTA stands for North American Free Trade Agreement.

**Figure 9. RTI index for Southeast Asian countries vis-à-vis the ASEAN**



Source: 2020 AATM and authors' calculation.

Most trade integration indicators do not explicitly link the observed levels of trade with any determinant. Trade between country *r* and country *s* may be determined by trade barriers between *r* and *s*, but also by other determinants, such as the intensity of demand in *s*, consumer tastes in *s*, production capacity in *r*, transportation costs, and so on. Gravity models offer a theoretical way to assess the level of trade integration of a country with a full accounting for all determinants. In a simple and symmetric form, a gravity equation relates bilateral trade to each country's size, bilateral trade barriers, and multilateral trade resistance (Anderson and van Wincoop 2003). Trade resistance consists of bilateral trade barriers between *r* and *s*, *r*'s resistance to trade with all regions, and *s*'s resistance to trade with all regions. For example, exports from Cambodia to Thailand depend on trade barriers applied by Thailand on Cambodia's exports, trade barriers applied by all countries and regions in the world on Cambodia's exports (the higher these are, the bigger the exports from Cambodia to Thailand will be), and trade barriers applied by Thailand on imports from all other countries (the higher these are, the bigger the exports from Cambodia to Thailand will be). Consequently, a gravity model provides a statistical method to estimate potential levels of trade flows based on a series of specific determinants.

Anderson and van Wincoop (2003) propose an interesting approach to estimating the importance of trade resistance. Let  $X_{r,s,t}$  be the exports from *r* to *s* during year *t*,  $Y_{r,t}$  be country *r*'s GDP for year *t*,  $d_{r,s}$  be the distance between *r* and *s*, and  $\delta_r$  be a country dummy

equal to 1 if trade includes country  $r$  (a country fixed effect). It is then possible to estimate the following equation:

$$\ln X_{r,s,t} - \ln Y_{r,t} - \ln Y_{s,t} = k + \alpha \ln d_{r,s} + \beta_r \delta_r + \beta_s \delta_s + \varepsilon_{r,s,t} \quad (1)$$

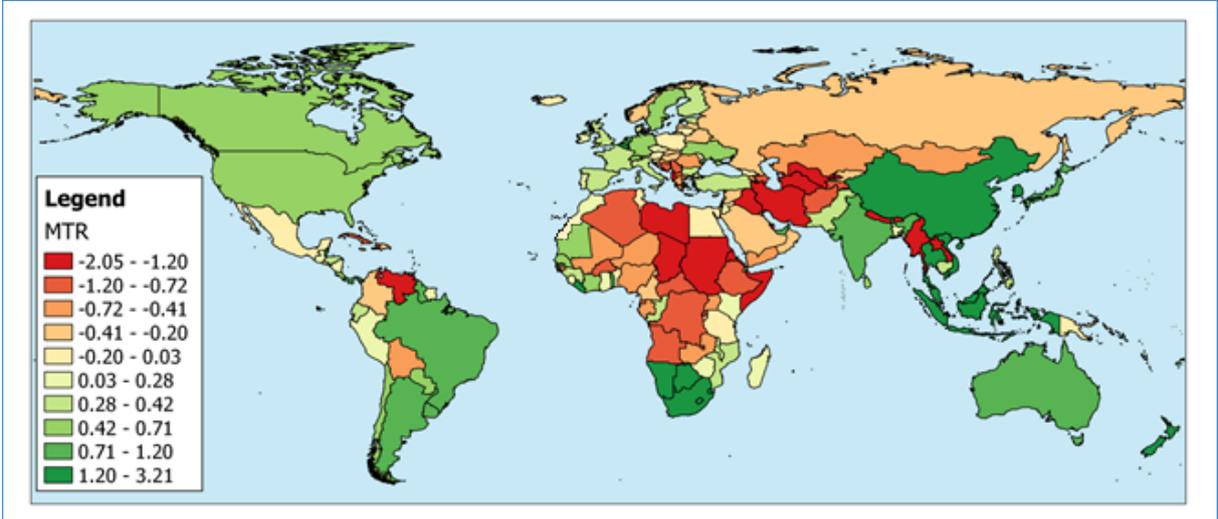
As Anderson and van Wincoop (2003) explain, this formulation of a gravity equation has theoretical foundations, is simple to implement (ordinary least squares can be applied), and does not require any assumption about the internal distance between states or provinces. Multilateral resistance is included through the use of country-specific dummies.

To estimate this equation, Bouët, Cosnard, and Laborde (2017) use annual trade data from 2005 to 2013 from BACI (Base pour l'Analyse du Commerce International) from the Centre d'Etudes Prospectives et d'Information – Internationale (CEPII), GDP data from the World Development Indicators (2021), and distance data from the CEPII website. In this specification, the coefficients of most country fixed effects are significant. Those country coefficients that represent inverses of countries' multilateral trade resistances are shown on the map in Figure 10. Negative (red) coefficients indicate that trade is less than it should be, while positive coefficients indicate that it is greater than it should be.

From Figure 10, we conclude that multilateral trade resistance is relatively high in the Lao People's Democratic Republic and Myanmar, indicating a relatively low trade as compared to the gravity equation. In other ASEAN countries, trade is relatively high as compared to determinants.

We now present the methodology used in this study to provide a new estimate of the AVEs of NTMs, with an application to agrifood trade in the ASEAN region.

**Figure 10. World map of multilateral trade resistance coefficients, 2005–2013**



Source: Bouët, Cosnard, and Laborde (2017).

# Methodology for an assessment of the intensity of NTMs in the ASEAN region

We successively present the data used in this study, the indicators that assess the importance of the adoption of NTMs in the ASEAN region, and the method to estimate the AVEs of NTMs.

## Data on NTMs

The collection of data on NTMs on agricultural products in the ASEAN region and the design of a database are based on various existing databases, like the WTO I-TIP and the World Bank's Temporary Trade Barriers database.

Other RTAs are used as comparison, in particular those considered “deeply free-trading,” and that include a dismantling of NTMs. A reference may be the Australia-New Zealand Closer Economic Relations Trade Agreement (ANZCERTA). Indeed ANZCERTA includes: elimination of all tariffs; quantitative import and export restrictions on trade in goods originating in the Free Trade Area; removal of many measures that contributed to market distortions in trade in goods, including through domestic industry assistance and export subsidies and incentives; harmonization of food standards; mutual recognition of goods and occupations; removal of many TBTs; and a protocol on investment.

## Trade and macro data

Trade flow data come from BACI. This is a comprehensive disaggregated (HS6 level) database of trade flows at the bilateral level built by CEPII in France with improved coverage compared to UN COMTRADE. Starting with COMTRADE, BACI uses mirror flows and gravity estimates of CIF/FOB (Free on Board) ratios to calculate a reconciled unique trade flow for country pairs.<sup>12</sup> Data on tariffs come from the 2016 MACMap-HS6 database, also built by CEPII, which includes all RTAs and trade preferences to evaluate a bilateral measure of market access at a detailed level of product disaggregation (HS6). Data on macroeconomic variables and factor endowments are from the World Development Indicators (WDI) managed by the World Bank and from Penn World Tables.

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<sup>12</sup> See Gaulier and Zignago (2010) for a full description of the methodology.

## Indicators

It is common to illustrate the intensity of NTMs in a sector and/or in a country by three indexes:

- The frequency index is the percentage of products subject to one or more NTMs.
- The coverage ratio is the percentage of imports subject to one or more NTMs.
- The prevalence score captures the average number of NTMs that apply to a product.

The disadvantages of the frequency index are numerous. First, it identically weights products that are only slightly imported and those that are massively imported. Second, it identically weights a very restrictive NTB (for example, a prohibition) and one that is only slightly restrictive (for example, a pre-shipment inspection). Third, it identically weights multilateral and bilateral trade barriers. Fourth, it identically weights a product exposed to only one NTM and a product exposed to many NTMs.

The coverage ratio only addresses the first and third criticisms. However, like any indicator based on an own-import weighting system, it underestimates the protectionist nature of a trade policy, since a very restrictive barrier will see its weight reduced, or even cancelled (prohibition); this is what economists used to call endogeneity of the weights. To address the fourth criticism (accounting for products exposed to several NTMs), construction of a prevalence score matters.

## Estimating AVEs

The objective of the work is to come up with AVEs of a series of NTMs in Asia. The two main NTMs are SPS measures (since the focus is on agricultural products) and, to a lesser extent, TBTs.

After a thorough literature review (Kee, Nicita, and Olarreaga 2009; Ghodsi, Grübler, and Stehrer 2016a), our approach builds upon a two-step econometric procedure. We first estimate a gravity-type model to assess the impact of NTMs on trade flows in volume. In the second step, we combine the quantitative impact of NTMs with import demand elasticities to compute the AVEs.

### - Extended gravity equation

The equation to be estimated is:

$$\ln(M_{i,j,h,t}) = \beta_{0h} + \beta_{1h} \ln(1 + t_{i,j,h,t-1}) + \sum_{n=1}^{N-1} \beta_{2hn} NTM_{i,j,h,t-1}^n + \sum_{i=1}^I \beta_{2i,h}^n \omega_i NTM_{i,j,h,t-1}^{n'} + \beta_{3h} X_{i,j,t-1} + \varphi_{i,j,h} + \theta_{h,t} + \varepsilon_{i,j,h,t} \quad (2)$$

where:

- $M_{i,j,h,t}$ : import quantities of product h to country i from partner country j at time t
- $t_{i,j,h,t}$ : ad valorem tariff rate applied by country i on product h from partner j at time t
- $NTM_{i,j,h,t}^n$ : count variable that shows the total number of NTM regulations in force of type n applied by country i on product h from partner j at time t
- $NTM_{i,j,h,t}^{n'}$ : count variable that shows the total number of NTM regulations in force of type n' applied by country i on product h from partner j at time t
- $X_{i,j,t}$ : time-varying country-pair characteristics consisting of classical gravity variables and factor endowments
- $n$  and  $n' \in \{1, 2, \dots, N\}$  where  $n \neq n'$ , the set of NTM types.

$\phi_{i,j,h}$  is a country-pair product fixed effect

$\theta_{h,t}$  is a product-time fixed effect

The coefficient  $\beta_{2i,h}^{n'}$  measures the importer-specific impact of NTM of type n' under consideration, with the help of the dummy variable  $\omega_i$  which is a dummy variable equal to one when the importing country is country i.  $\beta_{2i,h}^{n'}$  measures all other NTM types that we take into account. Explanatory variables are lagged by one period to avoid a potential endogeneity bias in cases where NTMs or tariffs are imposed in response to changes in imports. The Poisson pseudo-maximum likelihood (PPML) estimator suggested by Santos Silva and Tenreyro (2006) is used in the estimations to solve both the heteroskedasticity and zero trade flow issues.

### - Computation of AVEs:

AVEs are obtained by differentiating equation (2) with respect to the NTM type under consideration. More precisely, the impact of a specific NTM on import quantities can be decomposed into the impact of prices on import quantities (import elasticities) and the impact of the NTM on prices (AVEs).

$$\frac{\partial \ln(M_{i,h})}{\partial NTM_{i,h}^{n'}} = \frac{\partial \ln(M_{i,h})}{\partial \ln(p_{i,h})} \frac{\partial \ln(p_{i,h})}{\partial NTM_{i,h}^n} = \epsilon_{i,h} AVE_{i,h}^{n'} \quad (3)$$

$\epsilon_{i,h}$  represents the import demand elasticity for country i for product h and  $p_{i,h}$  the price of product h in country i. Solving for a particular NTM n' in (3) and rearranging terms yields the AVE:

$$AVE_{i,h}^{n'} = \frac{e^{\beta_{2i,h}^{n'}} - 1}{\epsilon_{i,h}} \quad (4)$$

The formula in Equation (4) is used in previous studies like Kee, Nicita, and Olarreaga (2009) and Ghodsi, Grübler and Stehrer (2016a). However, we claim that this is a biased estimate of the

true value. Indeed, the fact that the impact of NTMs on import quantities must be exponentiated (nonlinear transformation) automatically yields a biased estimate due to Jensen's inequality. Following Kennedy (1981) and Giles (1982), the true value is given by:

$$\widehat{AVE}_{i,h}^{n'} = \frac{e^{\left(\widehat{\beta}_{2i,h}^{n'} - \frac{1}{2}\sigma_{\widehat{\beta}_{2i,h}^{n'}}^2\right)} - 1}{\epsilon_{ih}} \quad (5)$$

where  $\sigma_{\widehat{\beta}_{2i,h}^{n'}}^2$  is the variance of  $\widehat{\beta}_{2i,h}^{n'}$ .

For import demand elasticities, we rely on the extensive work of Ghodsi, Grübler, and Stehrer (2016b), which is more recent (estimations are from 1996 to 2014) than Kee, Nicita, and Olarreaga (2008), which stops in 2001. Ghodsi, Grübler, and Stehrer (2016b) provide import demand elasticity estimates for 167 countries and 5,124 products at the HS6 level.

A recent study by Ing, Peters, and Cadot (2019) suggests that a mixture of compliance cost and effects might arise from the demand-enhancing effects stemming from the correction of market failures. However, their approach relies on a series of assumptions that are not general: (i) the importer country is small, and (ii) the NTM compliance costs are borne by the producer and passed through in the form of a proportional increase in the export price. Also, the authors did not find significant differences with previous estimates, particularly those of Ghodsi, Grübler, and Stehrer (2016b).

# Statistical analysis of NTMs on agricultural and food products in the ASEAN region

This section presents the statistical analysis of NTMs in ASEAN countries. It is based on the calculation of frequency indexes, coverage ratios, and prevalence scores for each of the 115 importing countries (including the 10 ASEAN countries) for which data on NTMs are available through the UNCTAD TRAINS portal.

As countries declare these measures based on different versions of the Harmonized System (HS 1992, HS 1996, HS 2002, HS 2007, HS 2012, or HS 2017), harmonization is necessary. In the next section, AVEs are estimated with the help of import demand elasticities from Ghodsi, Grübler, and Stehrer (2016b). As these authors use the HS 1996 classification, all data on NTMs (UNCTAD TRAINS portal), on trade (BACI), and on protection (MacMAP-HS6) are converted into this classification.<sup>13</sup> We obtain 5,113 products at the HS6 (version HS 1996), of which 704 are agricultural products (chapters 1 to 24). These 704 agricultural products are divided into three subgroups: animal and animal products (called hereafter animal) (from HS2 01 to HS2 05), fruit, vegetable and other crops (called hereafter vegetable) (from HS2 06 to HS215), and food products and tobacco (called hereafter food) (from HS2 16 to HS24). The Annex presents the NTM profiles of each ASEAN country. These profiles include frequency indexes, coverage indexes, and prevalence scores for each ASEAN country in 2010, 2014, and 2018, for all products and by HS2 product group.

## NTMs by importers

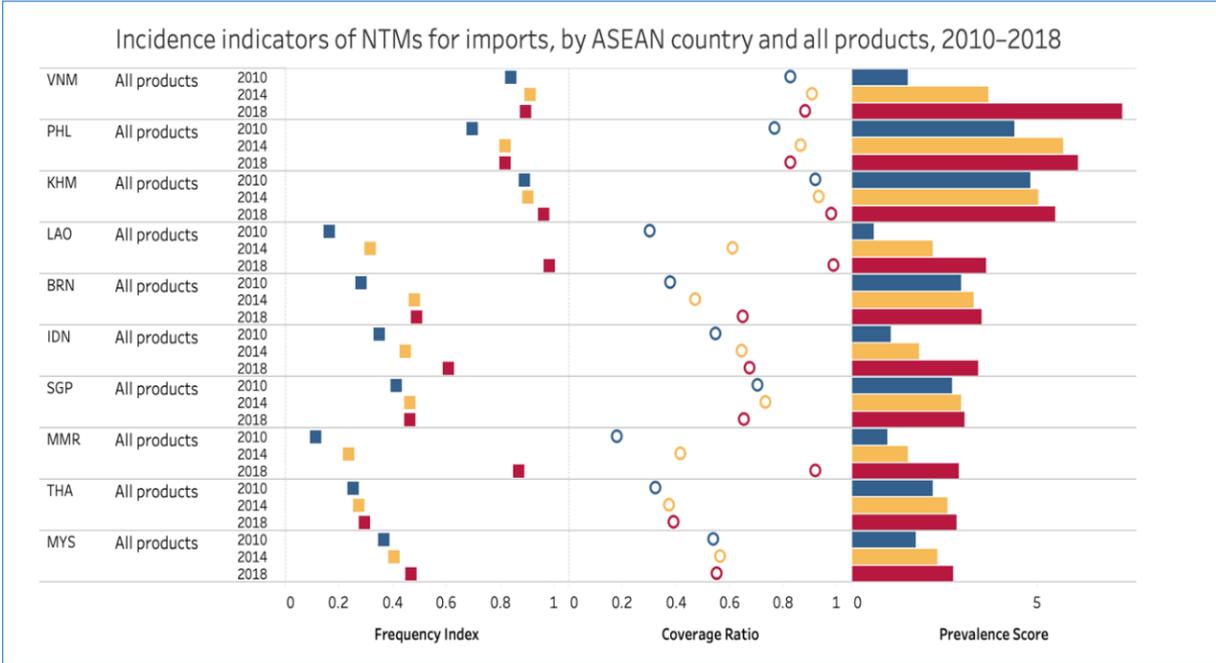
This first subsection presents frequency indexes, coverage ratios, and prevalence scores for each ASEAN country in a way that facilitates intercountry comparison and time evolution, for all products (Figure 11), agrifood products (Figure 12), animal products (Figure 13), vegetable products (Figure 14), and food products (Figure 15).

A significant rise in the number of NTMs in the ASEAN region occurred between 2010 and 2018. This is especially the case in the Lao People's Democratic Republic and Myanmar between 2014 and 2018 (Figure 11): in the Lao People's Democratic Republic agrifood sector, the frequency index rose from 80.2 percent in 2010 to 99.8 percent in 2018.

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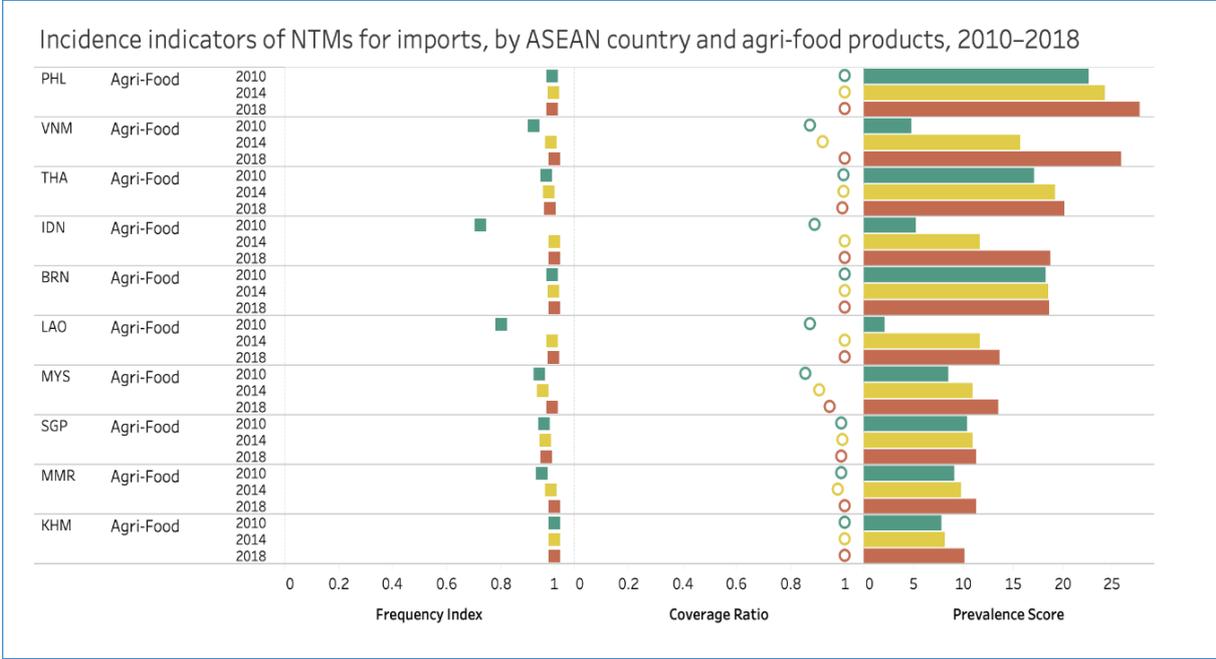
<sup>13</sup> This conversion is based on the inter-HS6 version's correspondence table of UN COMTRADE.

**Figure 11. NTMs by importer: ASEAN countries, 2010-2014-2018, All products**



Source: UNCTAD and authors' calculation.

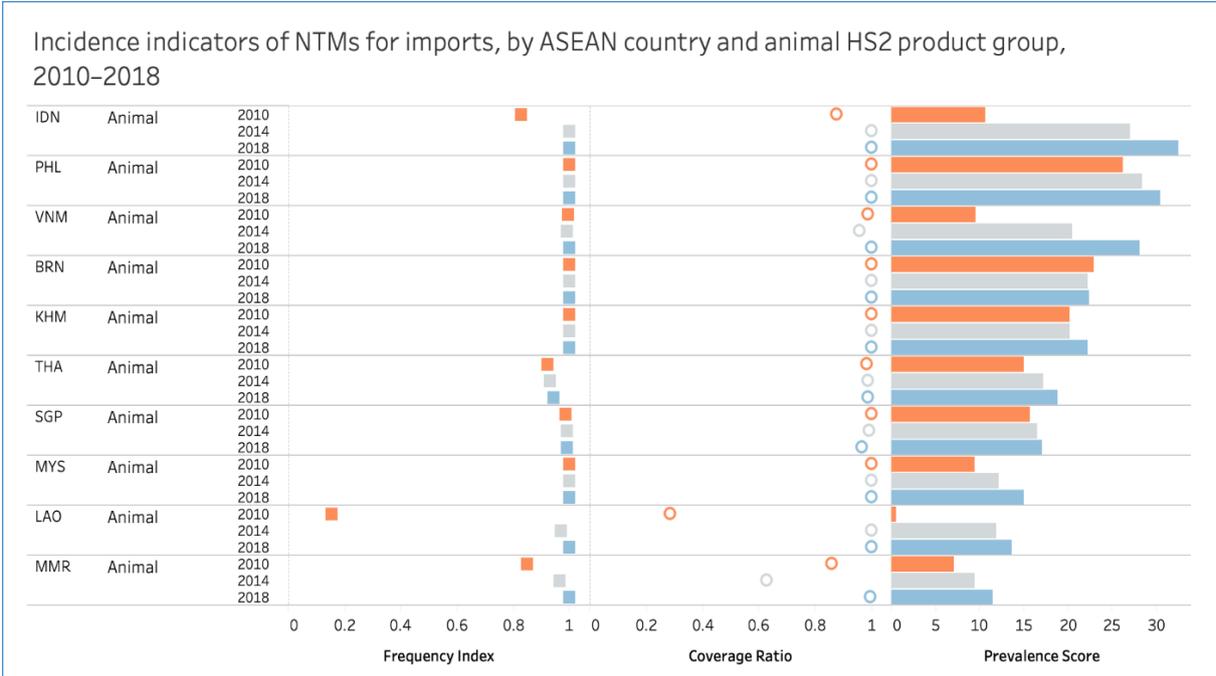
**Figure 12. NTMs by importer: ASEAN countries, 2010-2014-2018, Agrifood products**



Source: UNCTAD and authors' calculation.

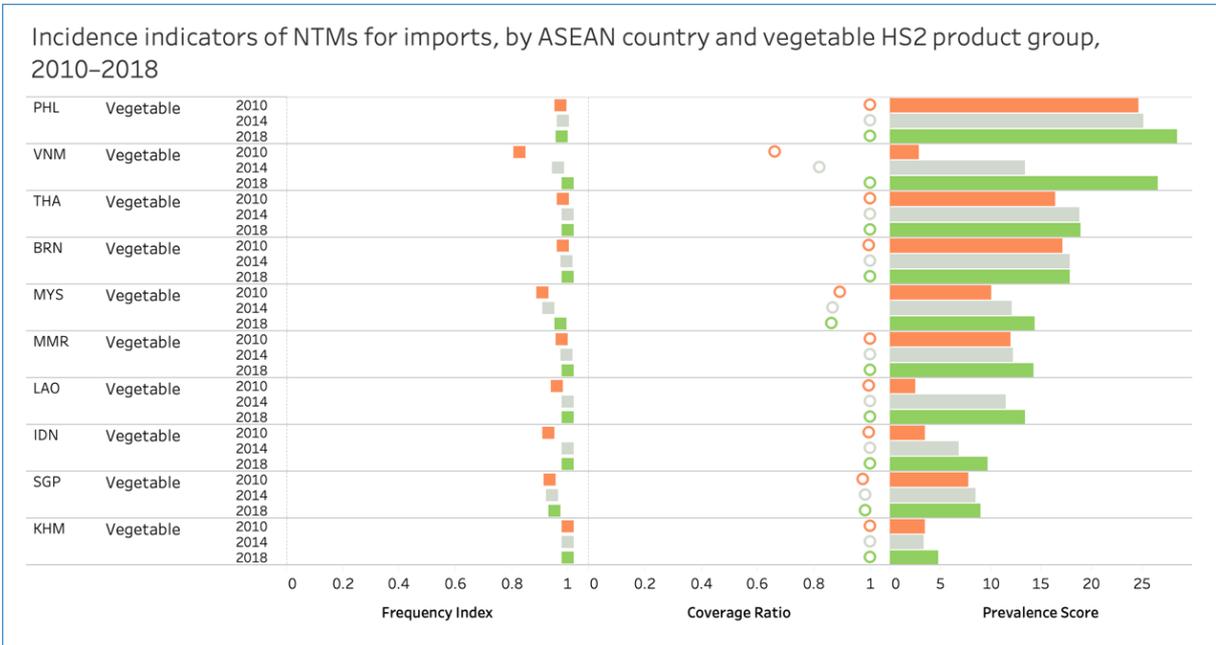
The frequency and coverage indexes are relatively high in the Lao People's Democratic Republic and Cambodia, and lower in Brunei Darussalam, Singapore, and Thailand. Prevalence scores are very high in the Philippines. In agriculture, frequency indexes are between 96 percent and 100 percent;

**Figure 13. NTMs by importer: ASEAN countries, 2010-2014-2018, Animal products**



Source: UNCTAD and authors' calculation.

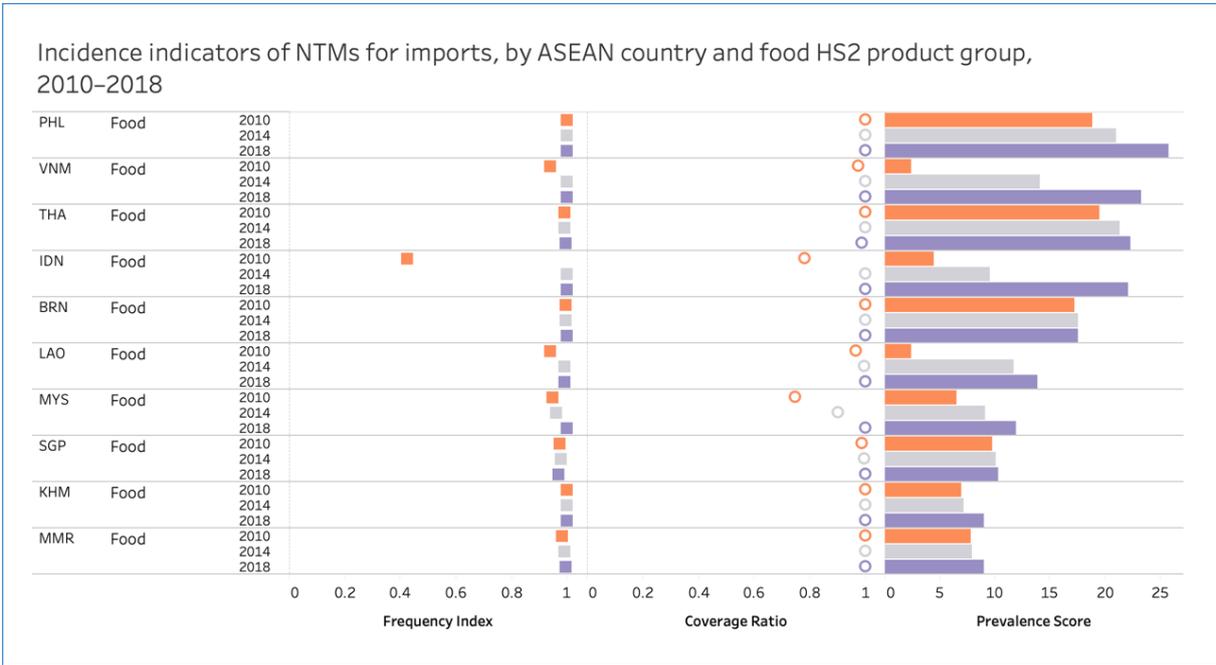
**Figure 14. NTMs by importer: ASEAN countries, 2010-2014-2018, Vegetable products**



Source: UNCTAD and authors' calculation.

coverage indexes are greater than 99 percent, except in Malaysia; prevalence scores are between 10 (Cambodia) and 27 (the Philippines). Frequency and coverage indexes for food products are 100 percent in Cambodia, Indonesia, Malaysia, and the Socialist Republic of Viet Nam.

**Figure 15. NTMs by importer: ASEAN countries, 2010-2014-2018, Food product group and by HS2**



Source: UNCTAD and authors' calculation.

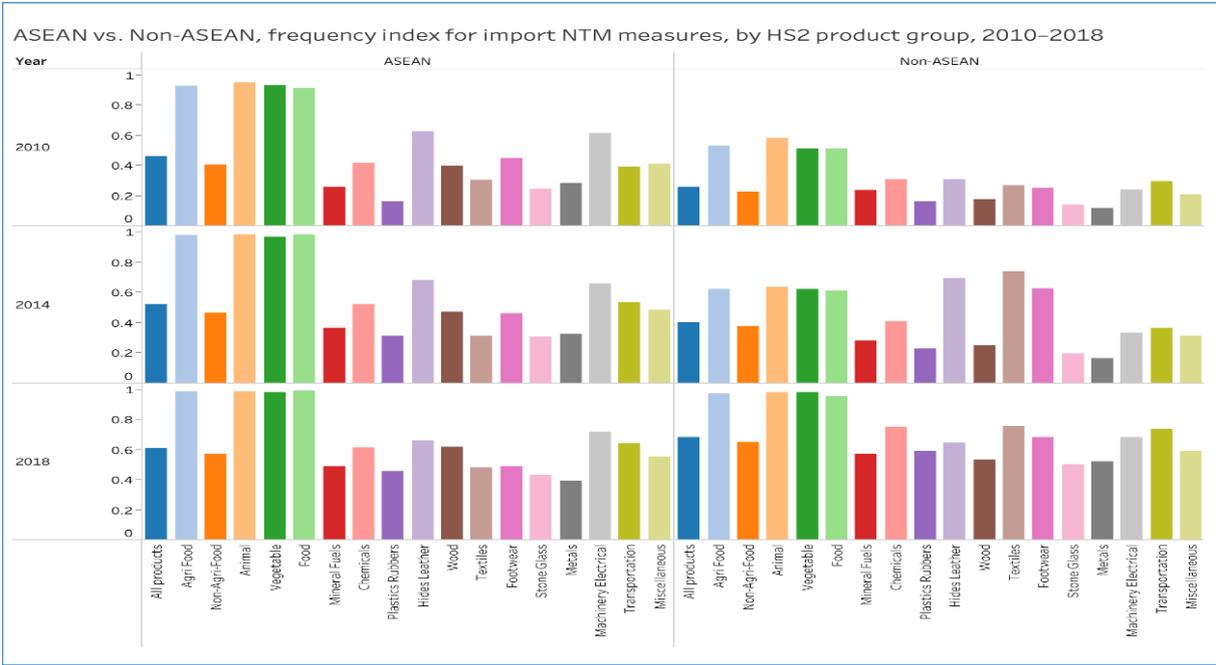
### NTMs in ASEAN versus non-ASEAN countries and versus ANZCERTA

This subsection compares frequency indexes, coverage ratios, and prevalence scores globally in the ASEAN region to non-ASEAN countries, but also to ANZCERTA. Figure 16, Figure 17, and Figure 18 compare, respectively, frequency indexes, coverage indexes, and prevalence scores of NTMs in ASEAN and non-ASEAN countries by year (2010-2014-2018) and by HS2.

Whereas in 2010 frequency indexes and coverage ratios but also prevalence scores on all products were greater in ASEAN than in non-ASEAN countries, they are close in 2018. This is also true for agrifood products. For example, in 2010 frequency indexes for agrifood products were 93.1 percent in ASEAN and 52.8 percent in non-ASEAN countries, but 98.8 percent and 97.2 percent, respectively, in 2018. In 2010 coverage indexes for agrifood products were 92.8 percent in ASEAN and 50.4 percent in non-ASEAN countries, but 98.8 percent and 98.3 percent in 2018. Likewise, in 2010 prevalence scores for agrifood products were 11.4 in ASEAN and 6.4 in non-ASEAN countries, compared to 17.6 and 18.6 in 2018.

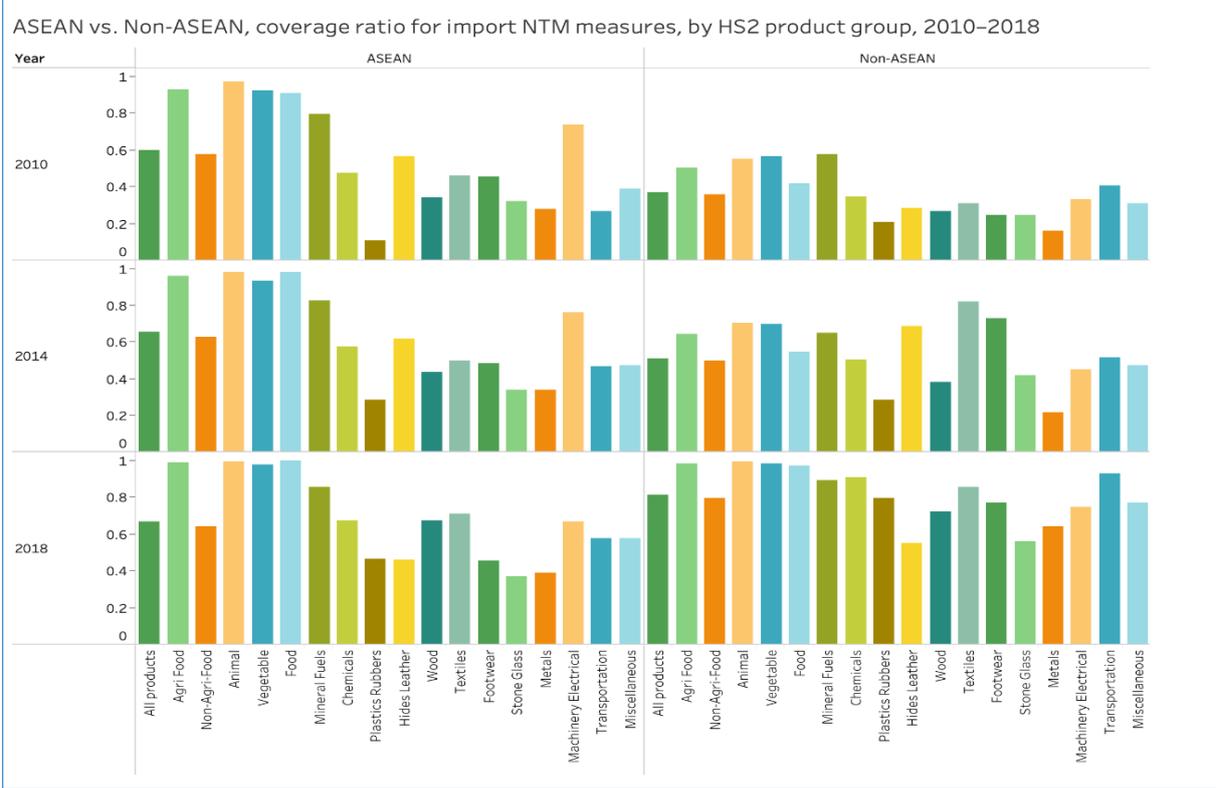
In 2010, 2014, and 2018, frequency and coverage indexes and prevalence scores in the ASEAN region are close to those in ANZCERTA. In the latter region, in 2010 the frequency index for agrifood products was 94.7 percent (93.1 percent in the ASEAN region), versus 98.4 percent in 2018 (97.2 percent in the ASEAN region). In 2010 the coverage index for

**Figure 16. NTMs by importer: Frequency index, 2010-2014-2018, All products and by HS2, in ASEAN vs. non-ASEAN countries**



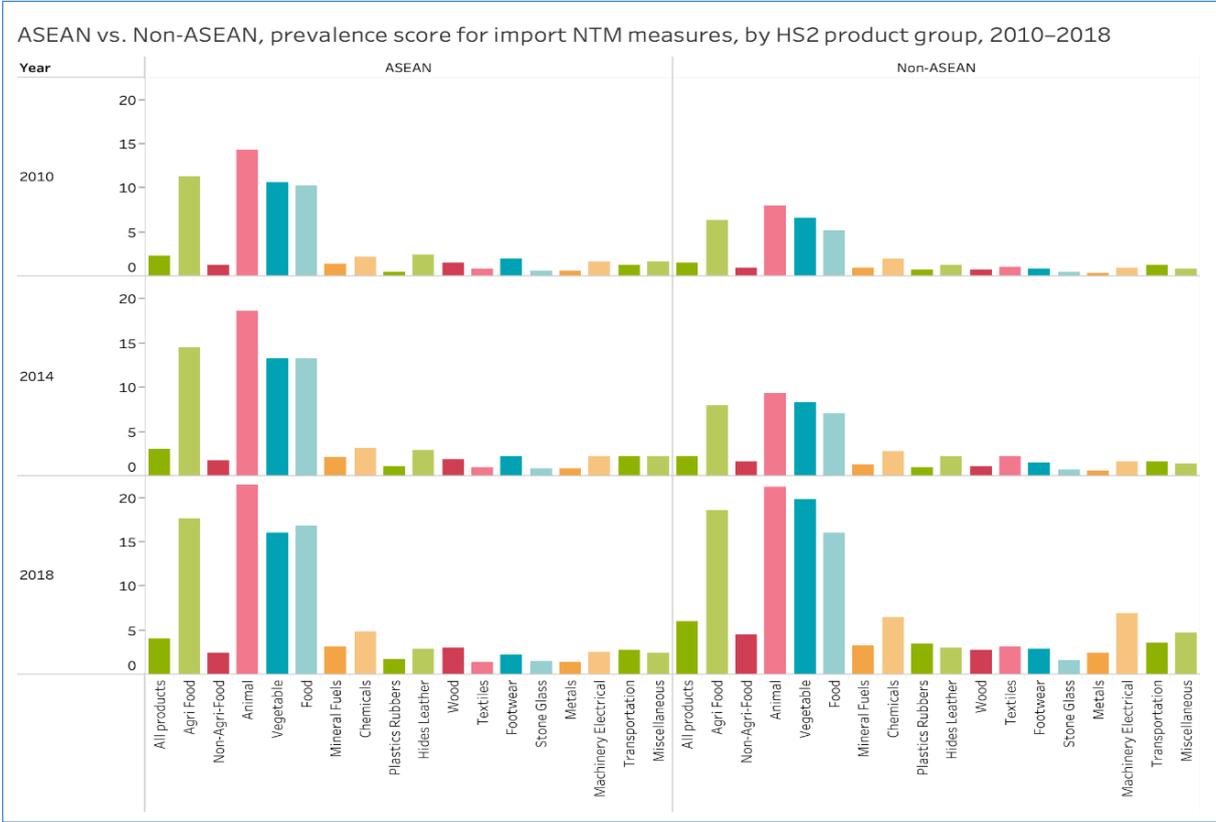
Source: UNCTAD and authors' calculation.

**Figure 17. NTMs by importer: Coverage ratio, 2010-2014-2018, All products and by HS2, in ASEAN vs. non-ASEAN countries**



Source: UNCTAD and authors' calculation.

**Figure 18. NTMs by importer: Prevalence score, 2010-2014-2018, All products and by HS2, in ASEAN vs. non-ASEAN countries**



Source: UNCTAD and authors' calculation.

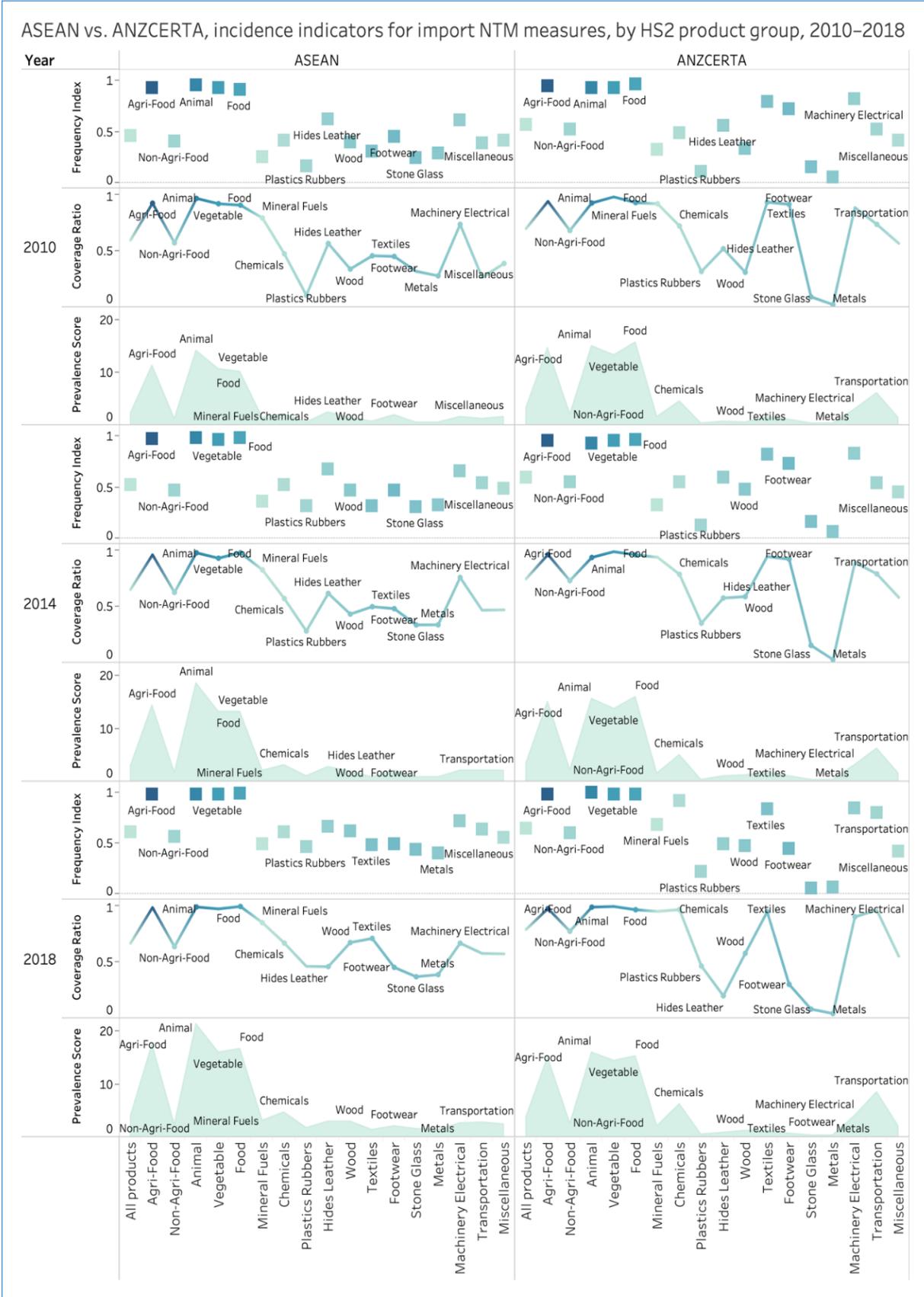
agrifood products was 94.4 percent in ANZCERTA (92.8 percent in the ASEAN region) and 97.9 percent in 2018 (98.8 percent in the ASEAN region). Similarly, in 2010 the prevalence score for agrifood products was 14.8 in ANZCERTA (11.4 in the ASEAN region) and 15.1 in 2018 (17.6 in the ASEAN region).

**NTMs by type**

This subsection examines the distribution of NTMs by types adopted by ASEAN, non-ASEAN, and ANZCERTA countries. Indeed, NTMs include various types: SPS, TBT, price control, and quantity control measures, among others.

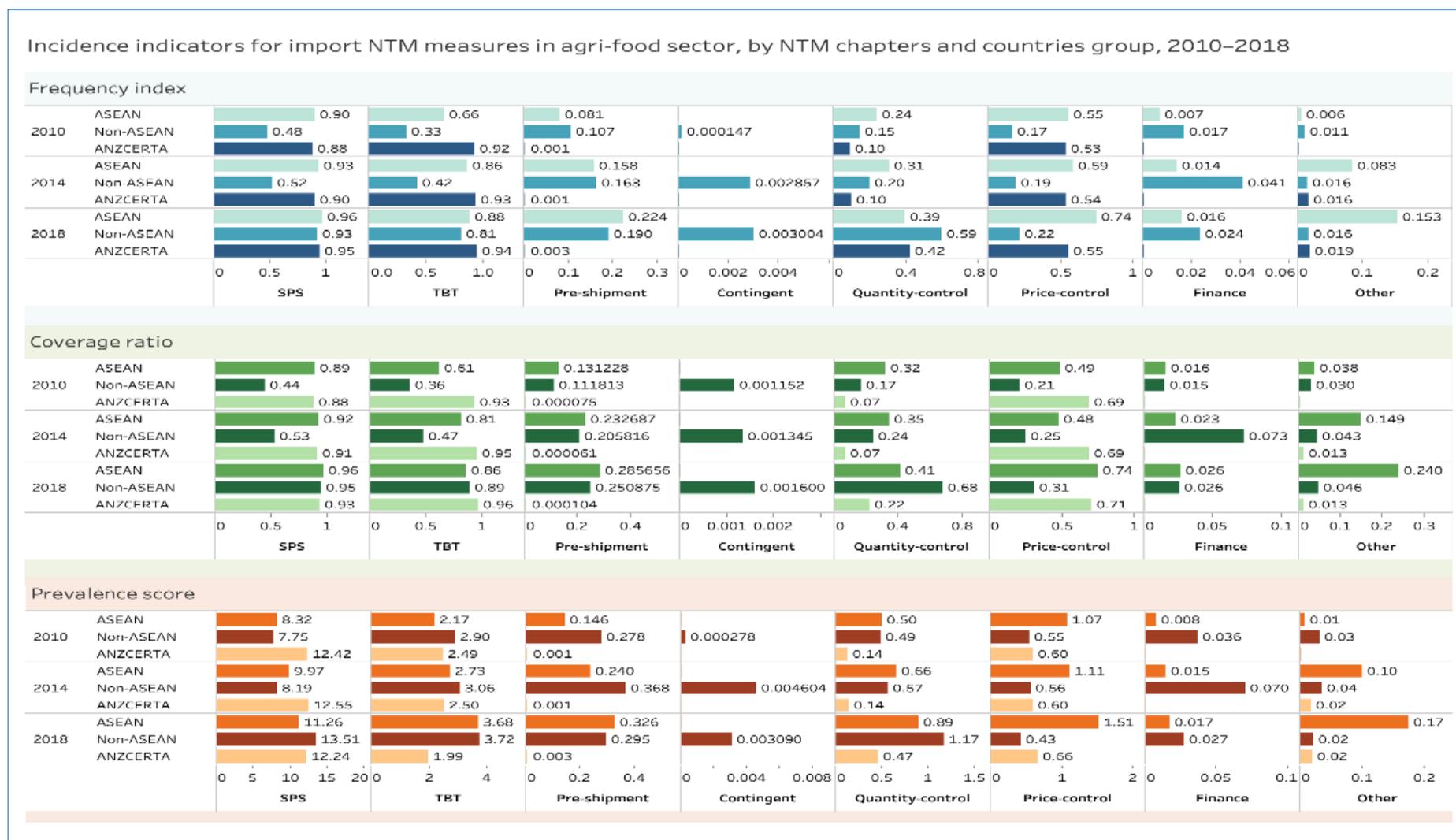
Figure 20 presents frequency and coverage indexes and prevalence scores by importer and by type in 2010, 2014, and 2018 for all products and by HS2 in ASEAN, non-ASEAN, and ANZCERTA countries. In 2010 the frequency and coverage indexes for SPS regulations were

**Figure 19. NTMs by importer: Frequency and coverage indexes and prevalence scores, 2010-2014-2018, All products and by HS2, in ASEAN vs. ANZCERTA countries**



Source: UNCTAD and authors' calculation.

**Figure 20. NTMs by importer and type: Frequency and coverage indexes and prevalence scores, 2010-2014-2018, Agrifood sector, in ASEAN, non-ASEAN, and ANZCERTA countries**



Source: UNCTAD and authors' calculation.

relatively high in ASEAN as compared to non-ASEAN countries, but were close to those indexes in ANZCERTA. However, in 2018 the difference is no longer significant: all regions have around 94–95 percent of HS6 products and imports in value impacted by at least one SPS regulation. In 2010 prevalence scores for SPS regulations were close between ASEAN and non-ASEAN countries, but smaller than in ANZCERTA, while in 2018 the three regions imposed around 12 SPS regulations on average on each HS6 product.

The frequency and coverages indexes of TBTs are very close in the three regions in 2018. However, they differed in 2010, with ANZCERTA implementing TBTs on 92 percent of HS6 products, while this share was only 66 percent in the ASEAN region. In 2018, many price control measures are in place in ASEAN and ANZCERTA countries, while non-ASEAN countries have many quantity control and contingent measures.

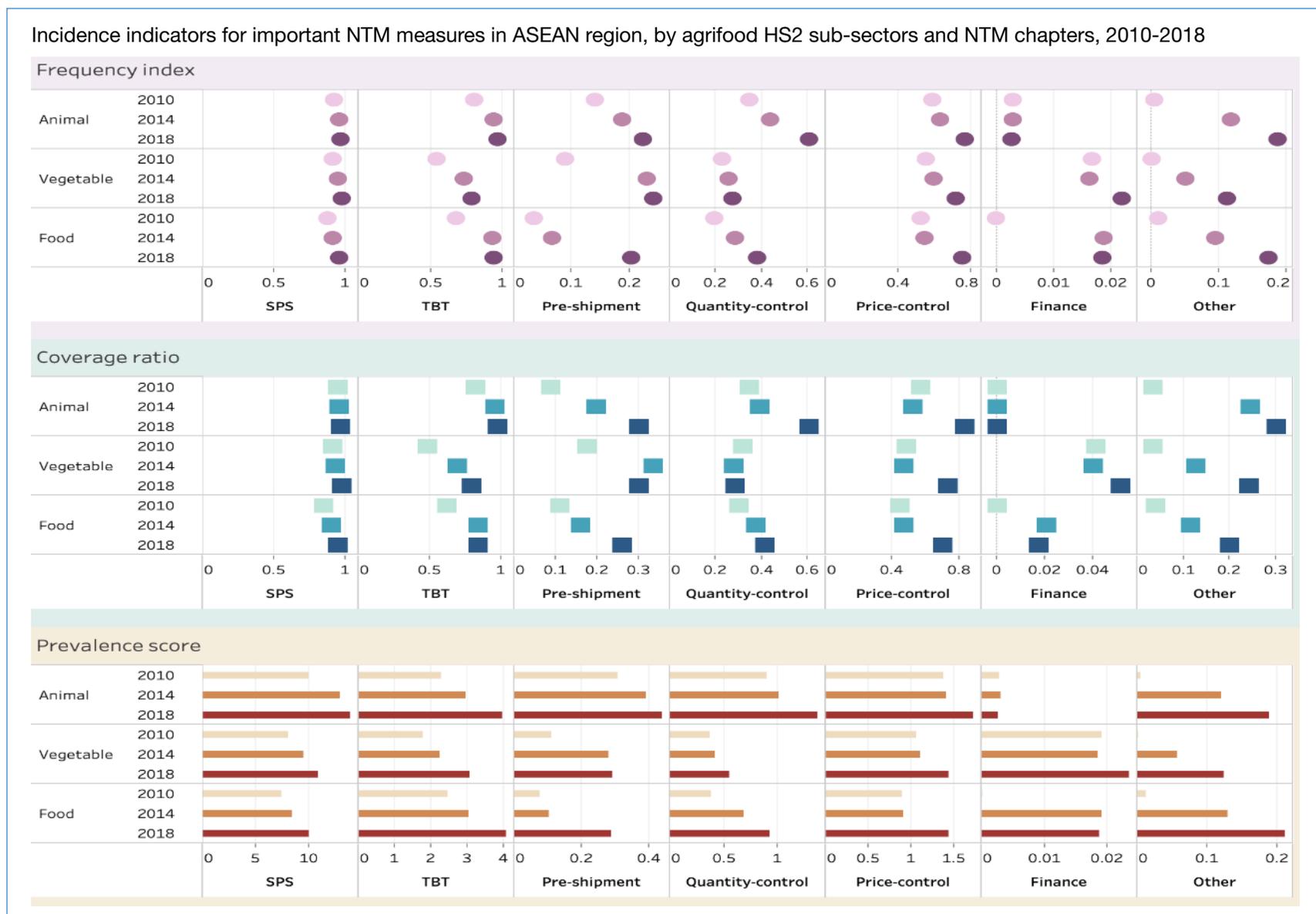
Figure 21 presents frequency and coverage indexes and prevalence scores by type for the animal, vegetable, and food sectors in 2010, 2014, and 2018 in ASEAN countries. In these three sectors, the average number of SPS regulations by product is high, especially in the animal sector (14).

## **NTMs faced by ASEAN exports to non-ASEAN countries**

This fourth subsection provides frequency indexes, coverage ratios, and prevalence scores for import measures when the exporter is the ASEAN region. It gives the frequency index, the coverage ratio, and the prevalence score of NTMs in the rest of the world on imports coming from the ASEAN region. This is provided globally for the ASEAN region in comparison with non-ASEAN countries (Figure 22), for each ASEAN country for all agrifood products (Figure 23), and for each ASEAN country for animal, vegetable, and food products (Figure 24).

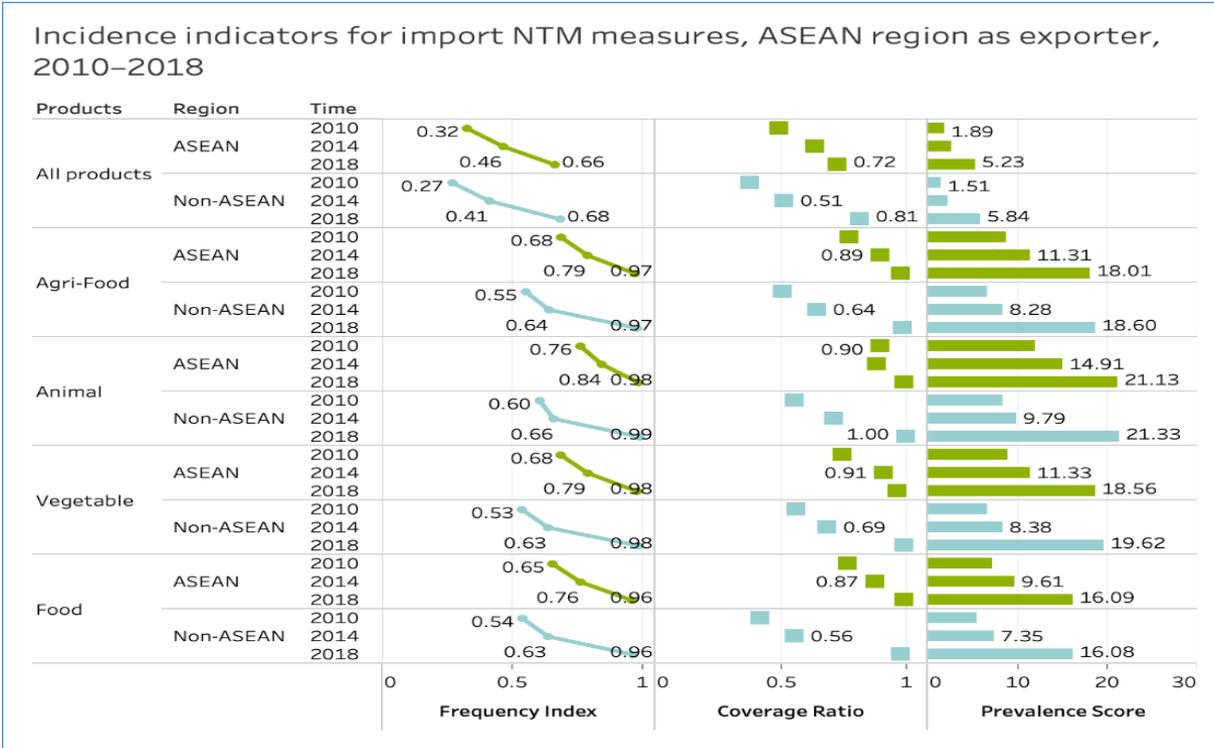
Frequency indexes, coverage ratios, and prevalence scores of NTMs faced by ASEAN countries' exports all increased significantly between 2014 and 2018. However, the trend is identical for non-ASEAN countries. ASEAN exports of agrifood products face many more NTMs than do exports of nonagricultural products and the prevalence score is especially high (but close to the score of non-ASEAN exports). The same conclusions apply for all ASEAN countries, although the Lao People's Democratic Republic prevalence score is especially high.

**Figure 21. NTMs by HS2 and type: Frequency and coverage indexes and prevalence scores, 2010-2014-2018, for animal, vegetable, and food sectors, in the ASEAN region**



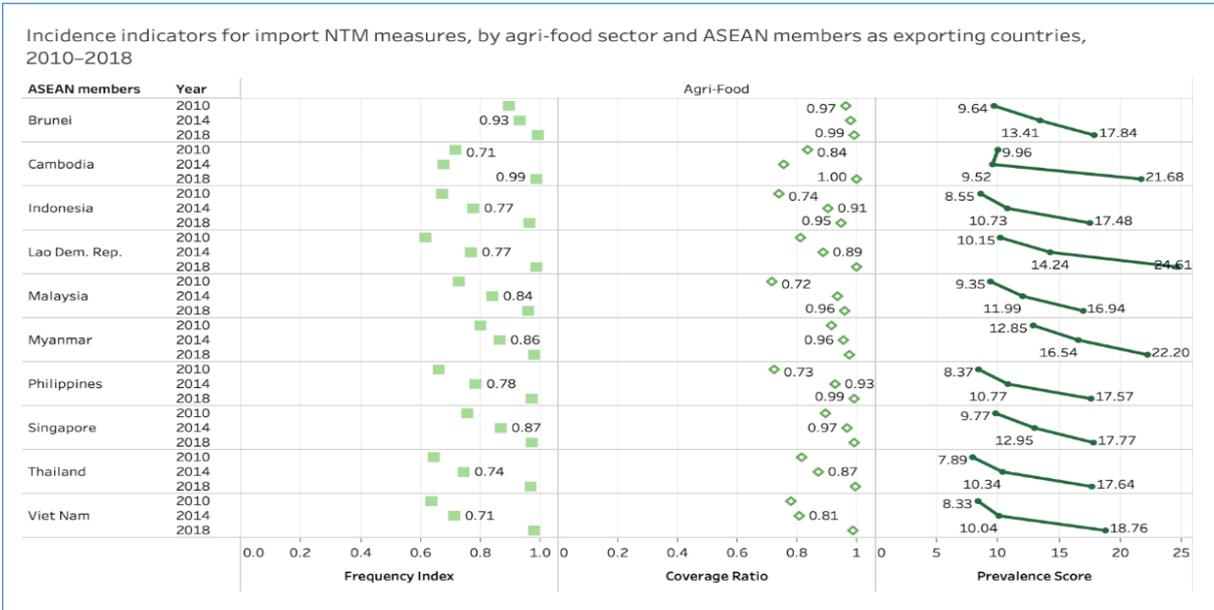
Source: UNCTAD and authors' calculation.

**Figure 22. NTMs faced by ASEAN and non-ASEAN exports: Frequency and coverage indexes and prevalence scores, 2010-2014-2018, All products and by HS2**



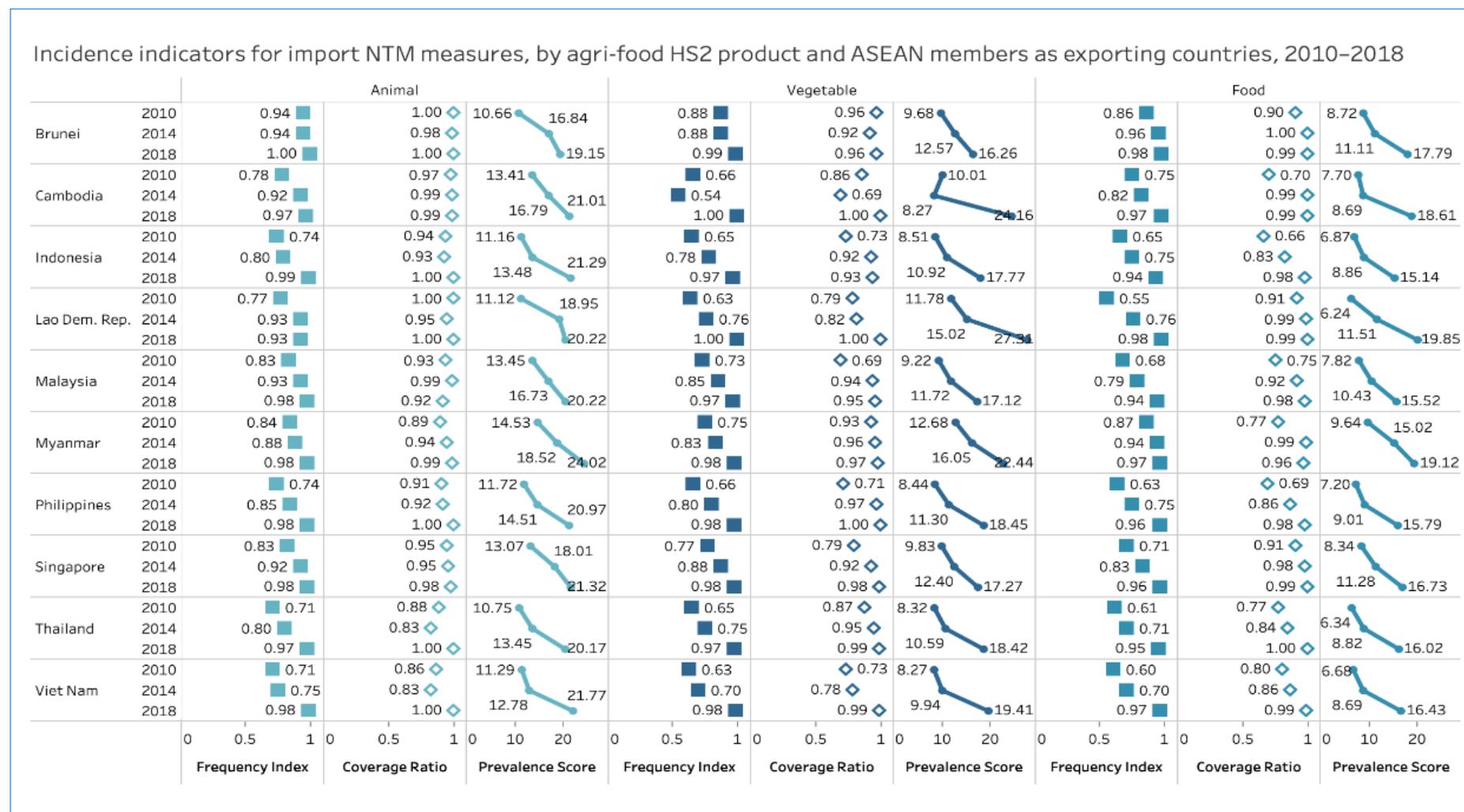
Source: UNCTAD and authors' calculation.

**Figure 23. NTMs faced by ASEAN exports: Frequency and coverage indexes and prevalence scores, 2010-2014-2018, by country, Agrifood**



Source: UNCTAD and authors' calculation.

**Figure 24. NTMs faced by ASEAN exports: Frequency and coverage indexes and prevalence scores, 2010-2014-2018, by country, Animal, vegetable, and food products**



Source: UNCTAD and authors' calculation.

# Estimation of the trade impact of NTMs in the ASEAN region

This section estimates the AVEs of NTMs based on the methodology presented earlier. To limit the size of the database and the time for executing regressions, we separately estimate 704 agricultural products (HS 01-24) with the PPML estimator and a set of fixed effects including importer, exporter, year, and importer-exporter fixed effects. Our regressions cover the period 2009–2018 for 115 importing countries for which the NTM data are available.

Estimations of “import demand elasticities” come from Ghodsi, Grübler, and Stehrer (2016b), although they do not provide these for six importing countries (Afghanistan, Guyana, the Lao People’s Democratic Republic, Liberia, Papua New Guinea, Tajikistan). All these countries were excluded except the Lao People’s Democratic Republic, which is an ASEAN member. For the Lao People’s Democratic Republic, an average of “import demand elasticities” of the other ASEAN countries was used for each product.

SPS and TBT measures are the predominant NTMs employed in food and agricultural commodities. We thus focus on an analysis of the trade impact of SPS measures on food and agricultural products in ASEAN countries and then provide the trade impact of TBTs on these products.

Extreme values and potential outliers of AVEs are excluded. To do this, we first determine the maximum and minimum values of the distribution of AVE values using the interquartile range rule (that is, the minimum AVE value equals the lower quartile minus three interquartile range, while the maximum AVE value equals the upper quartile plus three interquartile range). We define the lower bound for negative AVEs at -100, as suggested by Ghodsi, Grübler, and Stehrer (2016a), since the domestic price of a commodity can only be decreased by a maximum of 100 percent.

## Trade impact of SPS measures

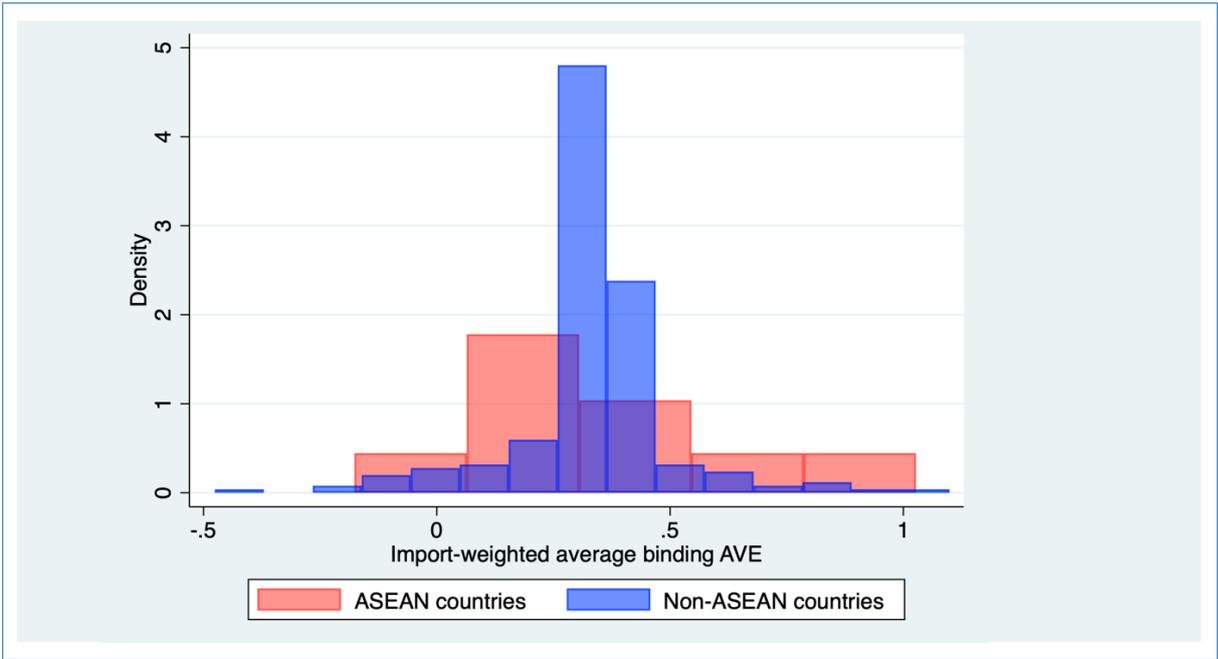
Figure 25 shows the distribution of import-weighted average binding AVEs of SPS measures on food and agricultural products (HS 01-24) by importing country. ASEAN countries are represented in red bars and non-ASEAN countries in blue bars. This analysis considers only binding AVE estimates for which the impact of NTMs on import quantities is statistically different from zero at the 10 percent level. Using import values as weights<sup>14</sup> for the AVEs of NTMs, we can account for import structures of importing countries and emphasize the importance of AVEs for certain

<sup>14</sup> Import-weighted average AVE =  $\sum_h \frac{AVE_{ih} \cdot imports_{ih}}{imports_i}$ , where  $imports_i$  constitutes imports of country  $i$  from other partners over all  $h$  products for which at least one AVE could be calculated.

agricultural products. Indeed, when employing this technique, we likely underestimate the import-impeding impacts of NTMs on the overall value of imports.

The two distributions in Figure 25 are quite similar, suggesting that the trade impacts of SPS measures on agricultural products in ASEAN countries are not different from those in the rest of the world, even if the compliance costs of SPS measures in ASEAN countries are slightly lower than those in non-ASEAN countries. For ASEAN countries, at the importer-section level, the median and mean AVEs of SPS measures are 40.8 percent and 40.7 percent, respectively. The median and mean AVEs of SPS measures across all other countries are 48.5 percent and 47.7 percent, respectively.

**Figure 25. Distribution of import-weighted average binding AVEs of SPS measures on agrifood HS sections**

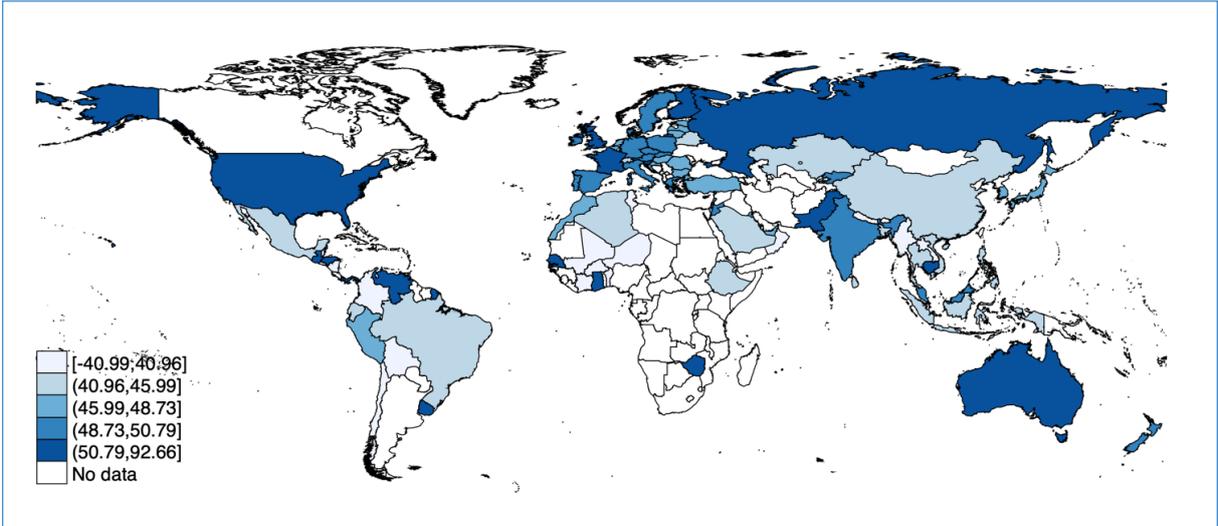


Source: Authors' calculation.  
 Note: Density is on the vertical axis. AVEs are in algebraic form, which means 0.5 = 50%. Import-weighted (using import values) averages of AVEs are calculated by importing country and by agrifood HS sections (HS 01–04).

Figure 26 shows the import-weighted binding AVEs for SPS measures on agricultural products for 95 countries for which we can compute them. Many countries are excluded because we do not have information on applied NTMs (for example, many countries in Southern and West Africa) or we do not obtain AVEs of SPS measures that are statistically significant at the 10 percent level (for example, Canada, Argentina). Darker shading in Figure 26 represents higher AVE values. We find the highest import-impeding effects of SPS measures on agricultural and food products in the United States of America, the European Union member states, Australia,

the Russian Federation, and Pakistan, among others, for which the trade impacts of SPS measures lie between 48.73 percent and 92.66 percent. The AVEs of most ASEAN countries are brightly shaded, implying a relatively modest import-restricting effect of SPS measures (that is, between 41.0 percent and 48.7 percent), except in Cambodia (54.2 percent).

**Figure 26. World map of import-weighted binding AVEs of SPS measures on agricultural and food products (HS 01-24)**



Source: Authors' calculation.

Table 4 displays a breakdown of average binding AVEs for SPS measures by HS product group and ASEAN importer. The upper panel of Table 4 shows results when we compute the simple average AVEs over all country-product-specific AVEs, implying simple averages over all traded HS 6-digit products within the same HS section per importing country.<sup>15</sup> Within the ASEAN region, vegetable products (HS 05-15) face higher AVEs of SPS measures than do animal and food products.

For instance, the highest AVEs for vegetable products are observed in Myanmar (77.0 percent), Singapore (60.2 percent), and Indonesia (53.0 percent). Myanmar and Cambodia also witness the highest AVEs of SPS measures for prepared food products (HS 16–24), at 87.8 percent and 60.2 percent, respectively. Such high values of AVEs of SPS measures suggest high compliance costs due to bureaucratic friction and limited capabilities to implement and monitor NTMs in those countries. Across all agricultural products sections, Singapore, Indonesia, and Myanmar experience the highest averages AVEs: 51.9 percent, 48.5 percent, and 48.3 percent. Singapore's high value of AVEs of SPS measures may reflect the fact that Singaporean

<sup>15</sup> From the aspect of simple average AVE, we put an equal weight on every imported product of each country, regardless of its influence on import structure.

**Table 4. Average AVEs of SPS measures, by agrifood product groups and importer (%)**

<b>Simple average binding AVE: SPS</b>												
Product group	Brunei Darussalam	Indonesia	Cambodia	Lao People's Democratic Republic	Myanmar	Malaysia	Philippines	Singapore	Thailand	Viet Nam	ASEAN countries	Non-ASEAN countries
Animal (HS 01-05)	42.1	47.4	40.7	34.7	25.7	47.5	46.8	41.2	36.0	41.3	40.2	45.8
Vegetable (HS 06-15)	-	53.0	44.9	39.0	77.5	45.2	49.7	60.2	42.8	40.9	44.8	47.9
Food (HS 16-24)	-	30.6	60.2	34.6	87.8	44.6	40.5	39.6	36.6	37.2	37.9	47.1
Simple average	42.1	48.5	46.1	36.8	48.3	45.7	45.8	51.9	38.3	40.1	41.8	47.1
<b>Import-weighted average binding AVE: SPS</b>												
Product group	Brunei Darussalam	Indonesia	Cambodia	Lao People's Democratic Republic	Myanmar	Malaysia	Philippines	Singapore	Thailand	Viet Nam	ASEAN countries	Non-ASEAN countries
Animal (HS 01-05)	-29.6	48.5	22.6	30.7	18.6	43.3	57.8	64.8	47.2	40.8	44.6	49.1
Vegetable (HS 06-15)	-	40.8	101.6	36.8	77.5	57.0	48.4	64.6	36.5	43.3	45.8	46.4
Food (HS 16-24)	-	25.5	61.3	21.0	87.8	44.5	26.2	24.9	42.1	47.3	39.9	49.9
Import-weighted average	-29.6	41.0	54.2	26.9	40.9	49.5	45.2	55.1	43.7	42.8	44.3	48.3

Source: Authors' calculation.

consumers are likely to have more concerns for food safety and quality, especially for live animals, fish products, and edible vegetables and fruits. In the ASEAN region, Thailand, the Socialist Republic of Viet Nam, and the Lao People's Democratic Republic display the lowest average AVEs of SPS measures. The simple average AVEs of SPS measures in ASEAN countries are also lower than those in non-ASEAN countries, suggesting weaker trade-restricting effects of SPS measures on agricultural food products in ASEAN countries than elsewhere.

The lower panel of Table 4 illuminates some differences between simple average binding AVEs and import-weighted average binding AVEs for SPS measures. For instance, the AVE of SPS measures for animal products in Brunei Darussalam becomes negative (-29.61 percent) and that for vegetable products in Cambodia goes above 100 percent. In recent literature (Beghin, Disdier, and Marette 2015; Bratt 2014; Grübler, Ghodsi, and Stehrer 2016), negative AVEs of NTMs can imply their trade-facilitating effects. The changes in results of these import-weighted average AVEs emerge from the import structures of importing countries; that is, depending on products that are predominantly imported by a country. For Brunei Darussalam, the AVE of SPS measures for animal products is driven by fish, fresh or chilled (HS 030269). In Cambodia, the AVE of SPS measures for vegetable products is mainly driven by fruit, edible and fresh (HS 081090). Across all agricultural HS sections, Singapore, Cambodia, and Malaysia show the highest import-weighted average AVEs of SPS measures. The average AVEs of SPS measures in ASEAN countries continue to be lower than those in non-ASEAN countries. This finding is consistent with the previous result that makes use of the simple average technique. Furthermore, the increase in the import-weighted average binding AVEs of SPS measures in both ASEAN and non-ASEAN countries indicates that import-impeding NTMs tend to be more effective and imposed on agricultural products that are relatively important for international trade.

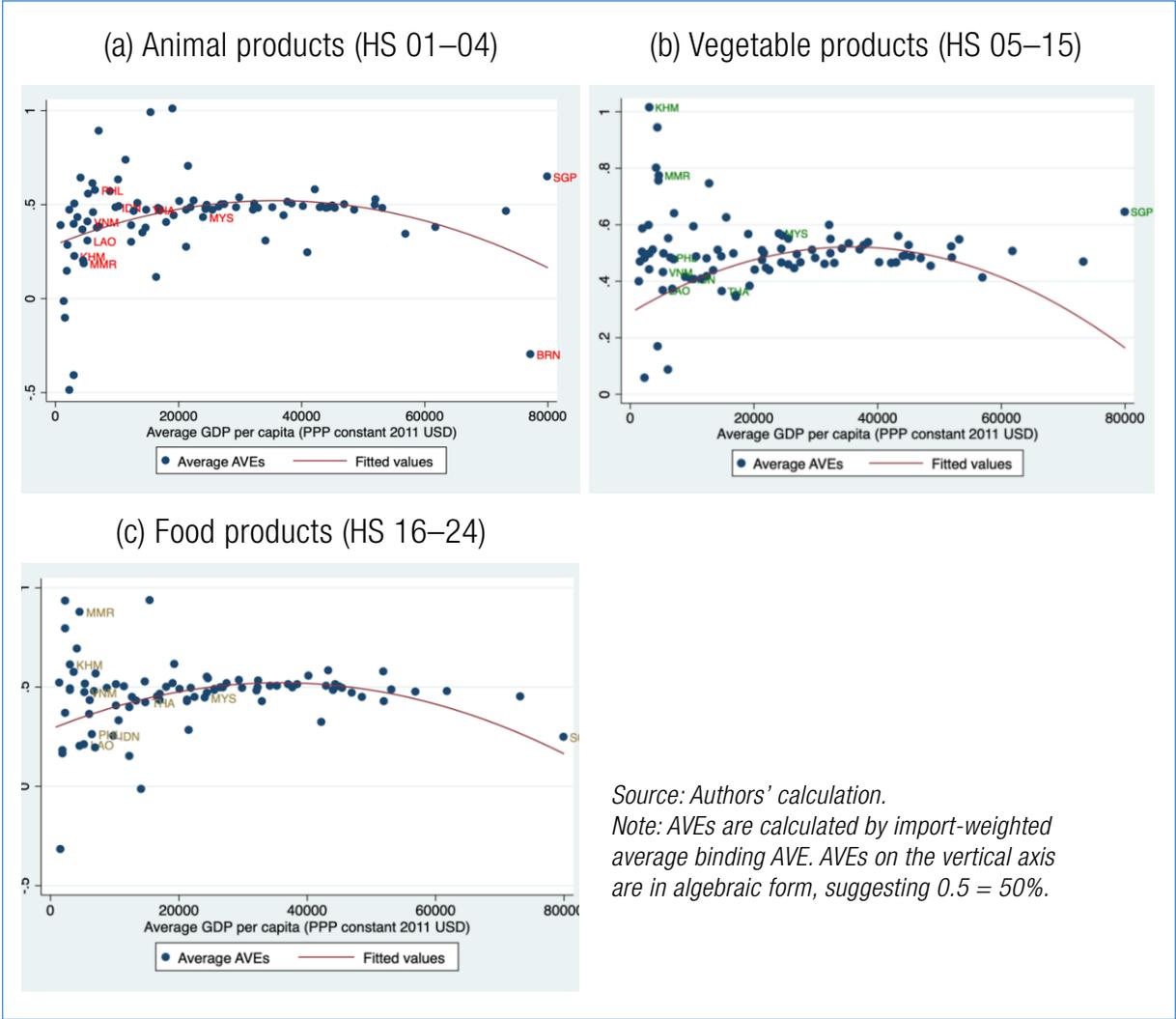
The 10 ASEAN countries experience different income levels. For instance, the Lao People's Democratic Republic, Cambodia, Myanmar, the Philippines, and the Socialist Republic of Viet Nam are lower-middle-income economies; Indonesia, Malaysia, and Thailand are upper-middle-income economies; and Brunei Darussalam and Singapore are high-income economies. Consequently, it is worthwhile to explore the link between average AVEs of SPS measures and income level for each ASEAN country.

Figure 27 plots the import-weighted average binding AVE of SPS measures against GDP per capita (in PPP) for both ASEAN and non-ASEAN countries for animal, vegetable, and food products. Across all agricultural food products, AVEs tend to increase with income and start to fall at certain income thresholds. Poorer economies experience a wide span of AVEs of SPS measures, ranging from strongly negative to strongly positive. The range of AVEs becomes smaller with increasing income. As suggested by Ing, Peters, and Cadot (2019), SPS measures may be excessively employed by poor countries with a very high level of AVE. Most ASEAN countries follow the trend of increasing AVE with income value, excluding Cambodia and Myanmar (lower-middle-income economies) and Brunei Darussalam and Singapore (high-income economies). As expected, trade-restricting impacts of SPS measures rise with wealthier

populations; these populations are supposedly more aware of food safety and quality issues. Yet at certain income thresholds in some developed economies, the compliance costs of SPS measures may be reduced, as administrative procedures and compliance of regulations are more straightforward. Grübler, Ghodsi, and Stehrer (2016) also find a clear downward trend of the linkages between AVEs of SPS measures and income level in the European Union members. However, this statistical explanation and finding is likely to be only part of the story, and thus merits further scrutiny.

Summing up, we find that the average binding AVEs of SPS measures on agricultural products in ASEAN countries are close to those in non-ASEAN countries, using both simple average and import-weighted average techniques. The highest import-hampering effects of SPS measures on agricultural products imposed by ASEAN importers are observed for live animals, fish products, and fresh vegetables.

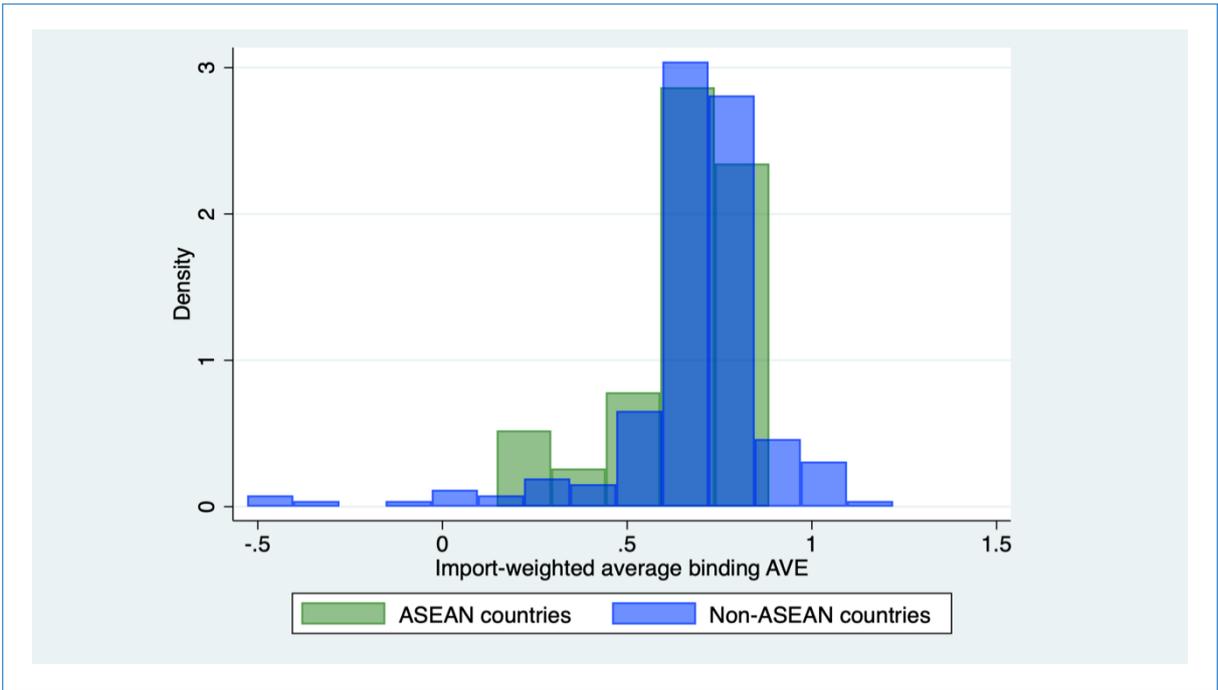
**Figure 27. Import-weighted average binding AVEs of SPS measures and GDP per capita, agricultural products (HS 01–24)**



## Trade impact of TBT measures

Figure 28 shows the distribution of import-weighted average binding AVEs of TBT measures on food and agricultural products (HS 01-04) by importing country. ASEAN countries are represented in green bars and other countries in blue bars. The distribution of AVEs of TBTs in ASEAN countries is in close form with that of non-ASEAN countries. Across ASEAN countries, the median and mean AVEs of TBTs at the importer-section level are 66.2 percent and 67.2 percent, respectively. The median and mean AVEs of TBTs across all other countries are 71.7 percent and 69.8 percent, respectively.

**Figure 28. Distribution of import-weighted average binding AVEs of TBT measures on agrifood HS sections**



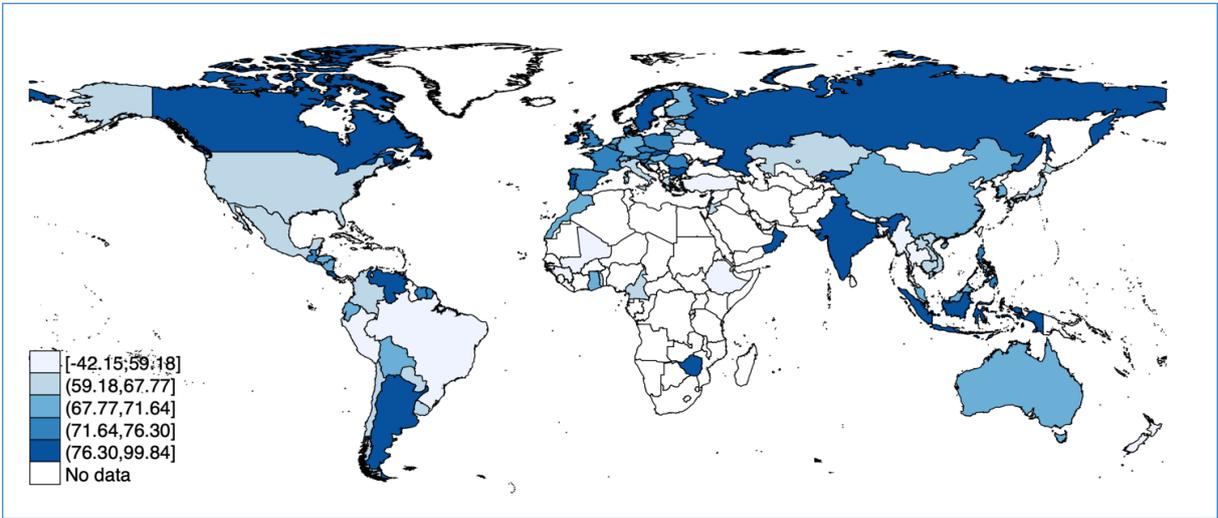
Source: Authors' calculation.

Note: Density is on the vertical axis. AVEs are in algebraic form, which means 0.5 = 50%. Import-weighted (using import values) averages of AVEs are calculated by importing country and by agrifood HS sections (HS 01-04).

Figure 29 shows the import-weighted binding AVEs for TBTs on agricultural products for 89 countries for which we can compute them. Similar to the world map of AVEs of SPS measures, many countries do not yield any result due to lack of information on applied NTMs (for example, most African countries) or due to AVEs of TBTs that are statistically insignificant at the 10 percent level (for example, Algeria, Nigeria, Pakistan).

Darker shading in Figure 29 represents a higher value of AVEs. The highest import-impeding effects of TBT measures on agricultural and food products are in the United States of America, the European Union member states, India, the Russian Federation, and Uruguay, for which the trade impacts of TBTs lie between 71.6 percent and 99.7 percent. The AVEs of most ASEAN countries are brightly shaded, implying moderate import-impeding effects of TBTs (between 59.2 percent and 76.3 percent), except in Indonesia (80.9 percent).

**Figure 29. World map of import-weighted binding AVEs of TBT measures on agricultural and food products (HS 01-24)**



Source: Authors' calculation.

Table 5 displays a breakdown of average binding AVEs for TBT measures by HS product group and ASEAN importer. The AVEs of TBTs for Brunei Darussalam and Myanmar (in animal products) are not statistically significant at the 10 percent level. Vegetable products (HS 05-15) face higher simple average AVEs of TBTs than do animal and food products. For instance, the highest AVEs for vegetable products are observed in Cambodia (94.3 percent), the Philippines (84.6 percent), and Singapore (78.6 percent). Singapore and Vietnam also experience high AVEs for animal products and food products. Different from other ASEAN countries, Thailand tends to have the lowest AVEs of TBTs on agricultural food products (a simple average AVE of 31.9 percent). However, the import-weighted average AVE of TBTs for Thailand in prepared food products is significantly higher, driven by beverages, spirits products (for example, whisky-HS 220830).

Compared to the average of AVEs of TBTs across agricultural products in non-ASEAN countries, a higher average AVE is only observed for vegetable products in ASEAN countries. The average AVEs of TBTs in ASEAN countries display slightly lower values than those in non-ASEAN countries for all agricultural HS sections, using both simple average and import-weighted average techniques.

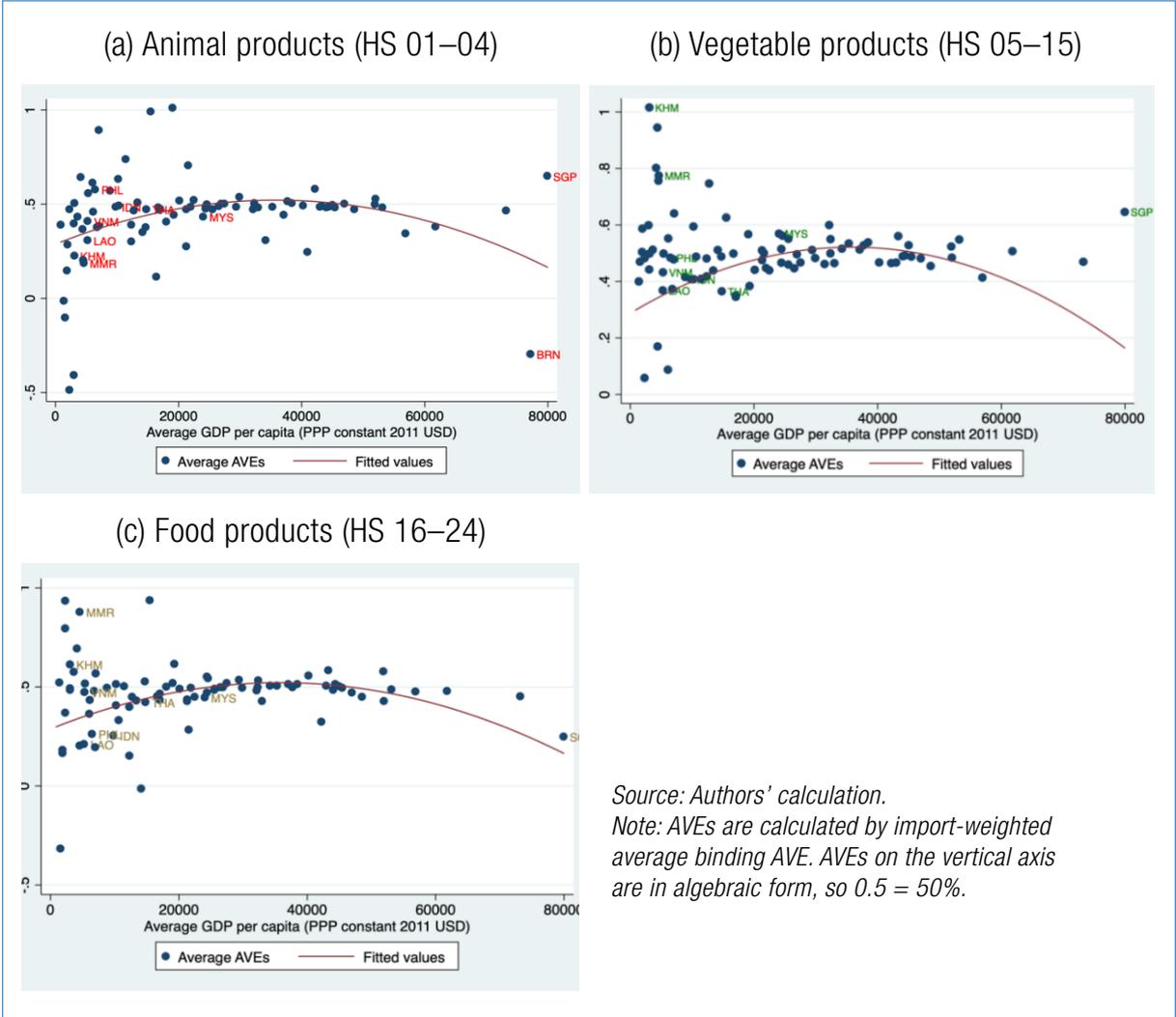
**Table 5. Average AVEs, TBT measures, by agrifood product group and importer (%)**

<b>Simple average binding AVE: TBT</b>												
Product group	Brunei Darussalam	Indonesia	Cambodia	Lao People's Democratic Republic	Myanmar	Malaysia	Philippines	Singapore	Thailand	Viet Nam	ASEAN countries	Non-ASEAN countries
Animal (HS 01-05)	-	63.2	64.7	81.5	-	62.1	66.1	58.8	22.5	65.3	62.6	62.8
Vegetable (HS 06-15)	-	76.7	94.3	74.5	64.7	68.5	84.6	78.6	45.7	69.0	75.0	68.0
Food (HS 16-24)	-	45.6	63.1	48.2	39.1	60.8	65.1	75.2	48.2	67.8	58.9	66.1
Simple average	-	60.8	76.3	64.7	55.1	64.7	69.8	68.5	31.9	67.7	65.7	66.3
<b>Import-weighted average binding AVE: TBT</b>												
Product group	Brunei Darussalam	Indonesia	Cambodia	Lao People's Democratic Republic	Myanmar	Malaysia	Philippines	Singapore	Thailand	Viet Nam	ASEAN countries	Non-ASEAN countries
Animal (HS 01-05)	-	79.8	48.0	87.9	-	66.5	69.6	82.7	28.8	66.2	66.2	67.2
Vegetable (HS 06-15)	-	83.9	88.5	62.4	40.2	78.6	83.5	74.2	44.6	70.3	73.9	68.4
Food (HS 16-24)	-	64.1	60.8	53.4	14.7	65.0	79.2	63.5	60.6	60.5	65.5	73.5
Import-weighted average	-	80.9	64.6	61.0	37.7	71.6	75.9	68.0	46.6	67.0	68.6	70.5

Source: Authors' calculation.

Figure 30 shows the statistical relation between import-weighted average binding AVEs of TBT measures and GDP per capita for both ASEAN and non-ASEAN countries for animal, vegetable, and food products. Across all agricultural food products, the AVEs of TBTs tend to increase with income, especially in live animal products (HS 01–04). Poorer economies experience a wide range of AVEs of TBTs, as with the AVEs of SPS measures. The range of AVEs also becomes smaller with increasing income. Many ASEAN countries follow the trend of increasing AVEs of TBTs with income value, excluding Cambodia, Myanmar, and Thailand. Yet at certain income thresholds in some developed economies, the compliance costs of TBT measures may be reduced, as administrative procedures and compliance of regulations are more straightforward, especially those for vegetable and food products.

**Figure 30. AVEs of TBT measures and GDP per capita, agricultural products (HS 01–24)**



Our findings regarding AVEs for SPS and TBT measures on agricultural products during the period 2009–2018 suggest that the average trade impacts of SPS and TBT measures for ASEAN countries are quite similar to those of non-ASEAN countries. We observe higher AVEs for TBT measures on agricultural and food products, for both ASEAN countries and the rest of the world. Compared to Grübler, Ghodsi, and Stehrer (2016) and Ing, Peters, and Cadot (2019), our estimates are higher due to the difference in the methodology of computing AVEs of NTMs, the period of study, and the sample. Yet the trend in our AVEs estimates relative to country income is similar to that of Grübler, Ghodsi, and Stehrer (2016).

Our results should be interpreted with caution for several reasons. First, we cannot include in our regressions a set of fixed effects that better control for the unobservable time-variant, country-specific effects (that is, importer-time and exporter-time fixed effects) because our variables of interest (AVEs of SPS/TBT measures of each country in the sample) are omitted due to the collinearity problem. Second, a robustness check of our methodology can be applied by using trade unit values as a dependent variable, as proposed by Ing, Peters, and Cadot (2019), and observing the SPS and TBT measures' compliance costs through their AVEs estimated on trade unit values in agricultural and food products: this robustness check is planned for the future. Third, low AVEs, especially negative AVEs, do not necessarily reflect the trade-facilitating effects of NTMs or efficient import activities. Instead, they may imply the failure of governments to implement NTMs. These impacts deserve further investigation.

# Conclusion

This report assessed the importance of NTMs in Southeast Asian countries and their impact on regional trade in agricultural and food products. The measures have been in place in these countries since 2010 (but they could have been adopted before 2010) and are used particularly frequently in the agriculture and food sectors. In 2010 the countries of this region had adopted more of these measures compared to the rest of the world, but by 2018 the frequency, import coverage, and average number of imports per product were no longer dissimilar. In other words, the rest of the world adopted significantly more new measures over the period, “catching up” with Southeast Asian countries.

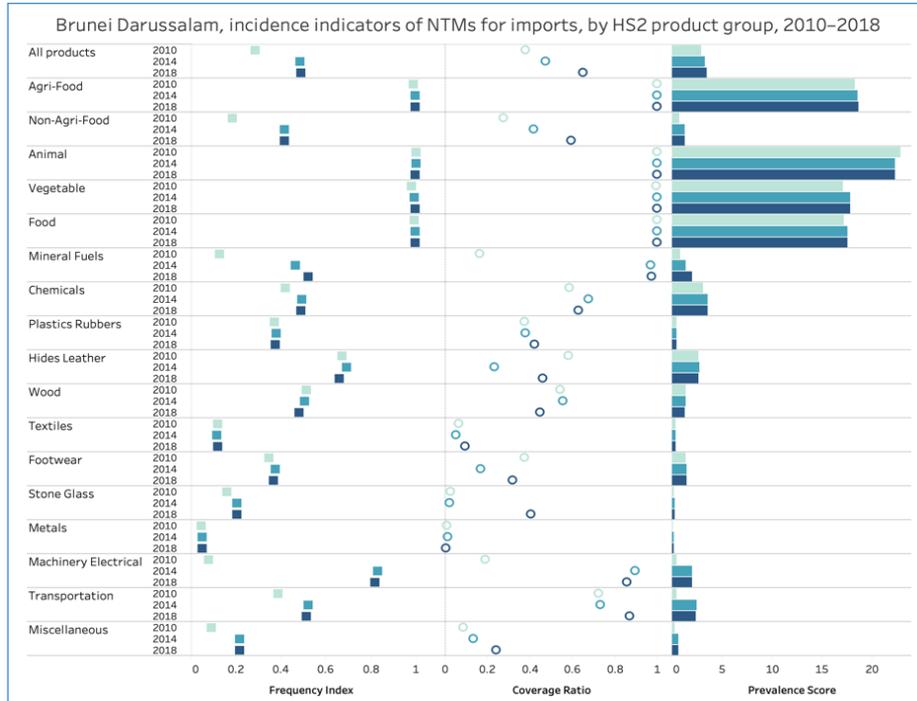
The report estimated the impact of NTMs on trade, in particular SPS and TBT measures on trade of agricultural and food products. The SPS measures adopted by ASEAN countries have an impact equivalent to an average tariff of 44.3 percent, versus 48.3 percent in the rest of the world. In the same sector, Indonesia, Myanmar, and Singapore have adopted relatively restrictive measures compared to the rest of the world. The vegetable and food sectors are subject to more restrictive measures in general.

TBTs’ impact on agricultural and food trade is equivalent to an average tariff of 68.6 percent, compared to 70.5 percent in the rest of the world. Indonesia, the Philippines, and Malaysia have adopted measures with a significantly more restrictive effect on trade in these products, while those adopted by Myanmar and Thailand are significantly less restrictive.

All in all, the countries of the Southeast Asian region appear to be relatively open to the world, but regional integration could be strengthened, particularly in the agriculture and food sectors. More integration could be achieved, on one hand by cancelling all customs duties between ASEAN countries, and on the other hand by improving customs procedures, and finally by convergence of SPS and TBT measures. Greater trade integration of these countries in the agriculture and food sectors would certainly be a factor in significantly improving food security. This is a fundamental issue because in Southeast Asia, eradication of hunger and malnutrition has been stagnant since 2016. This perspective makes it even more necessary to put in place policies to improve food security in the region. Making trade in agricultural products more fluid between ASEAN countries, through general harmonization of NTMs or widespread adoption of mutual recognition procedures, would certainly contribute positively to this objective.

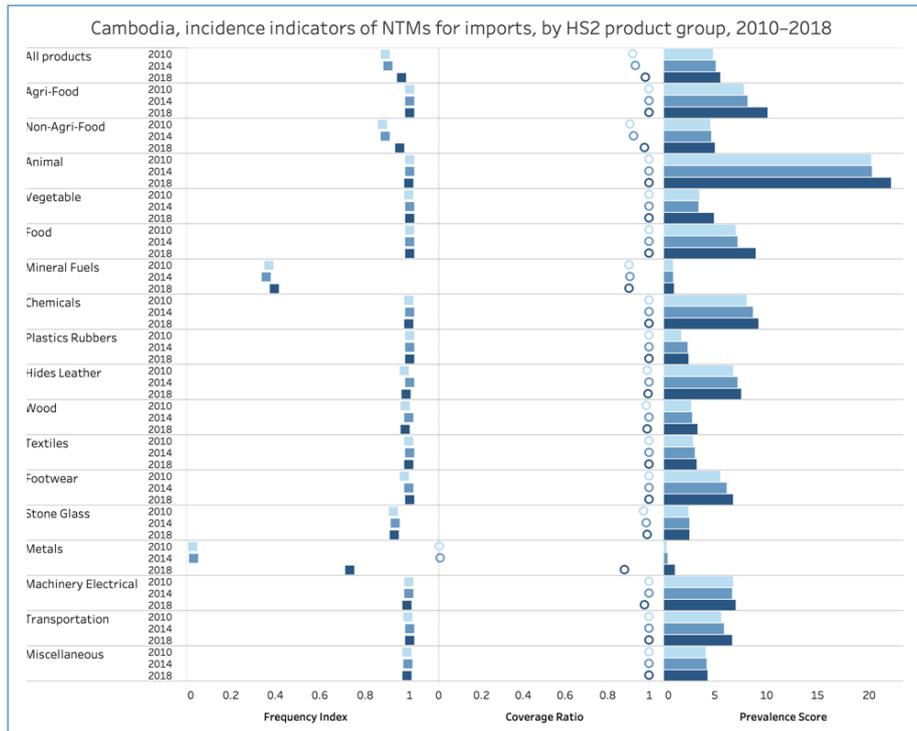
# Annex

**Figure 31. NTMs by importer: Brunei Darussalam, 2010-2014-2018, All products and by HS2**



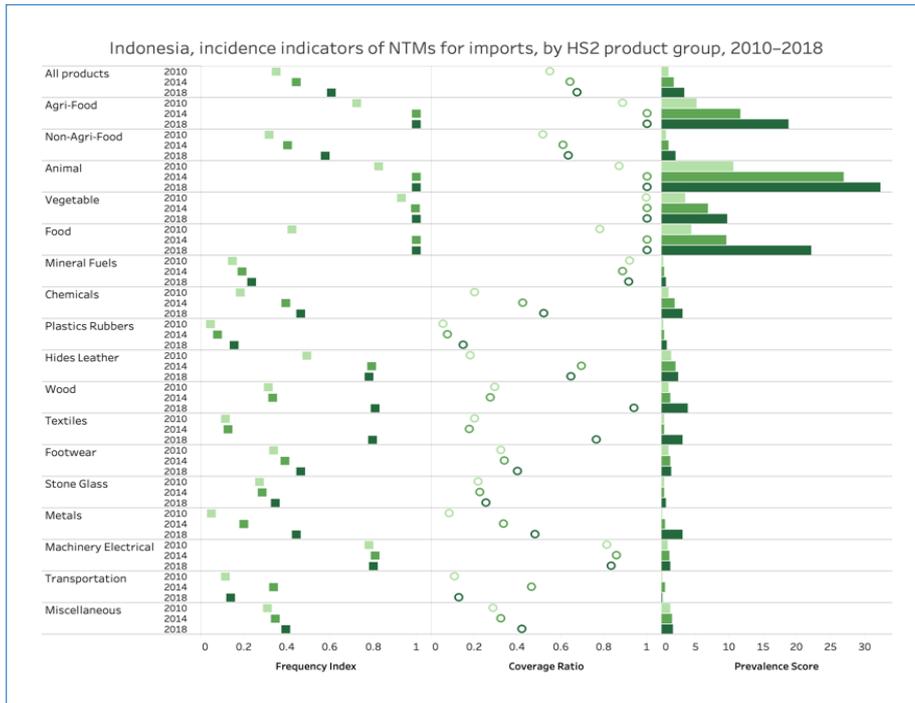
Source: UNCTAD and authors' calculation.

**Figure 32. NTMs by importer: Cambodia, 2010-2014-2018, All products and by HS2**



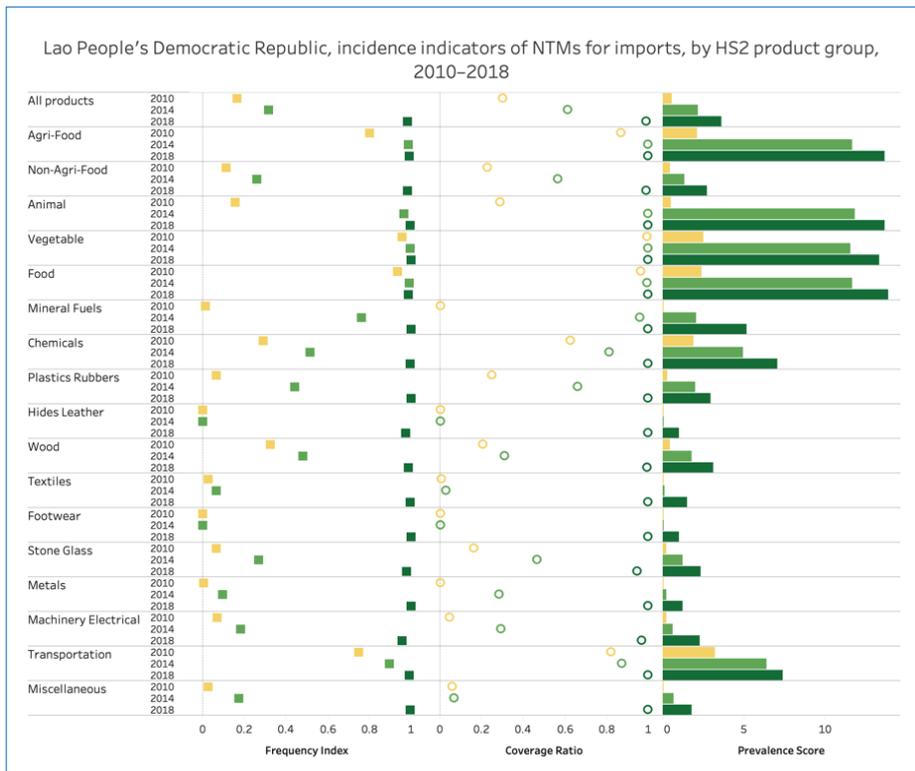
Source: UNCTAD and authors' calculation.

**Figure 33. NTMs by importer: Indonesia, 2010-2014-2018, All products and by HS2**



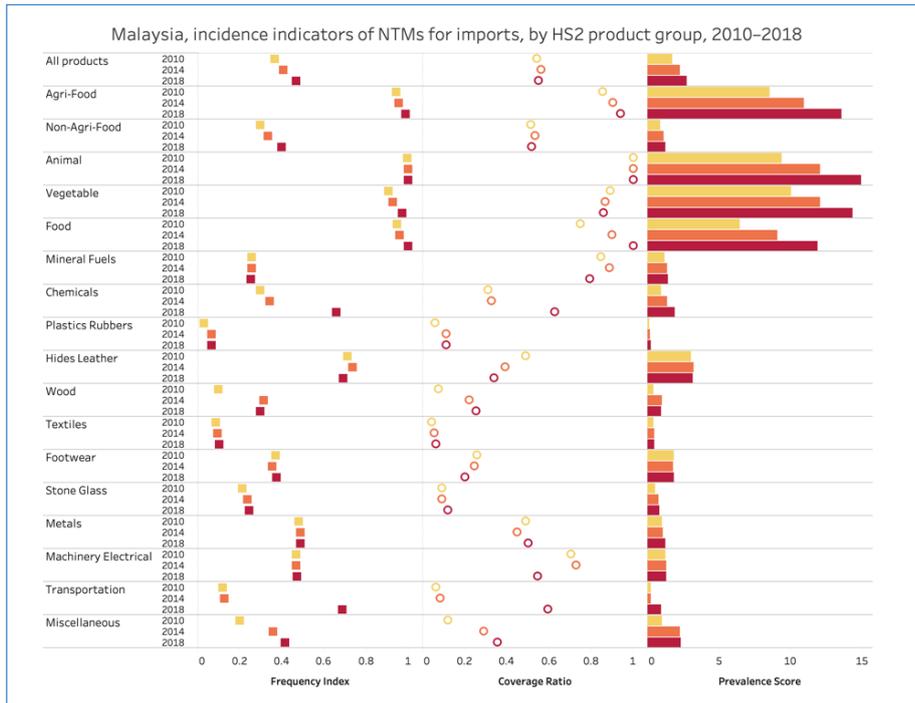
Source: UNCTAD and authors' calculation.

**Figure 34. NTMs by importer: the Lao People's Democratic Republic, 2010-2014-2018, All products and by HS2**



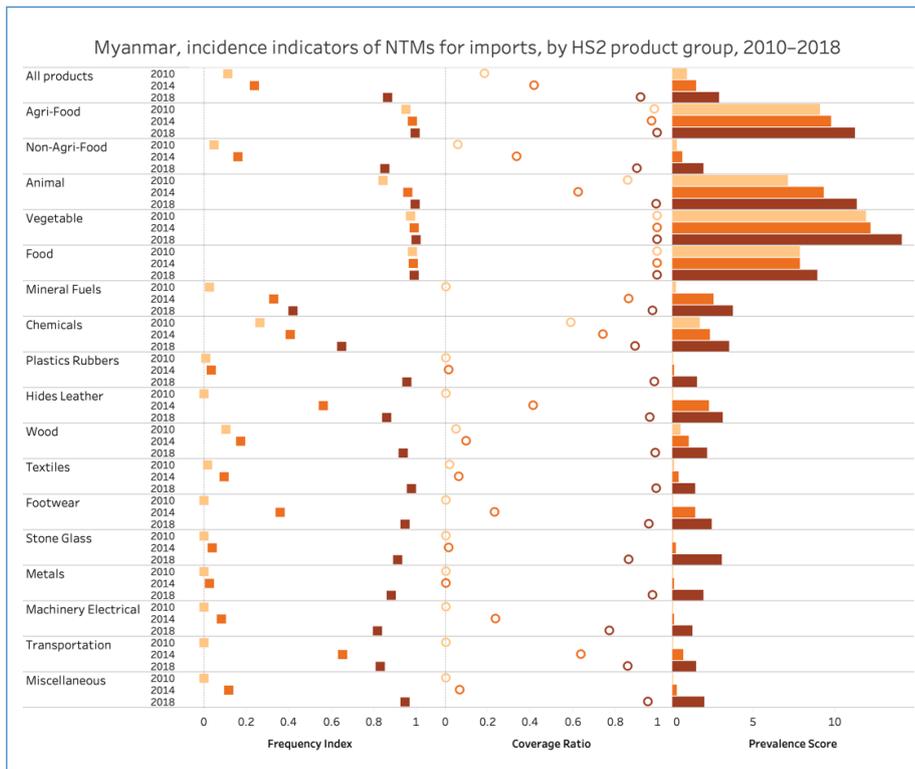
Source: UNCTAD and authors' calculation.

**Figure 35. NTMs by importer: Malaysia, 2010-2014-2018, All products and by HS2**



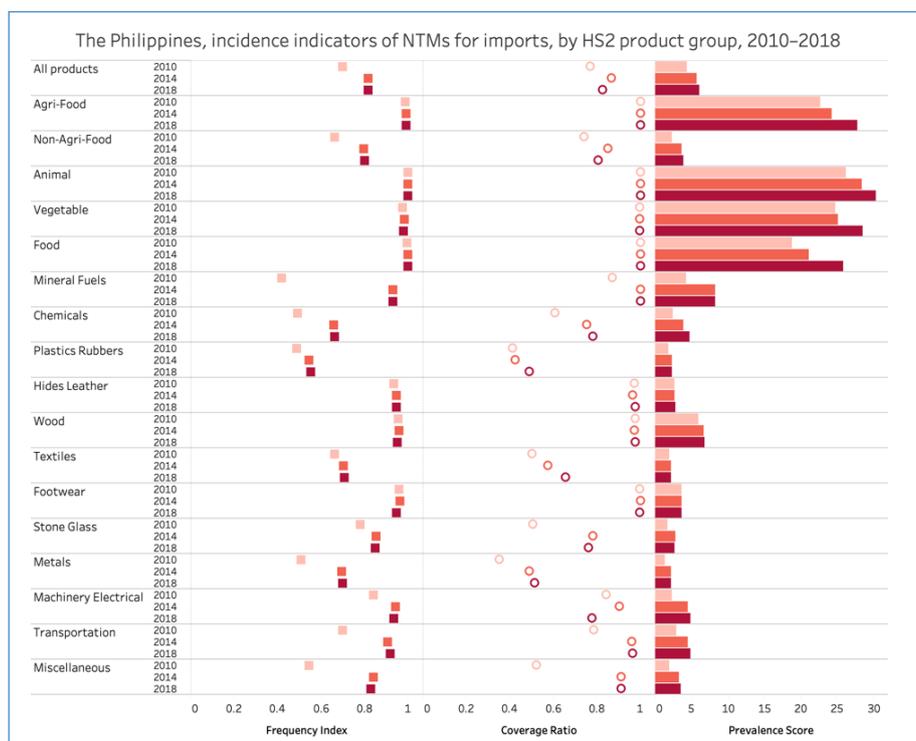
Source: UNCTAD and authors' calculation.

**Figure 36. NTMs by importer: Myanmar, 2010-2014-2018, All products and by HS2**



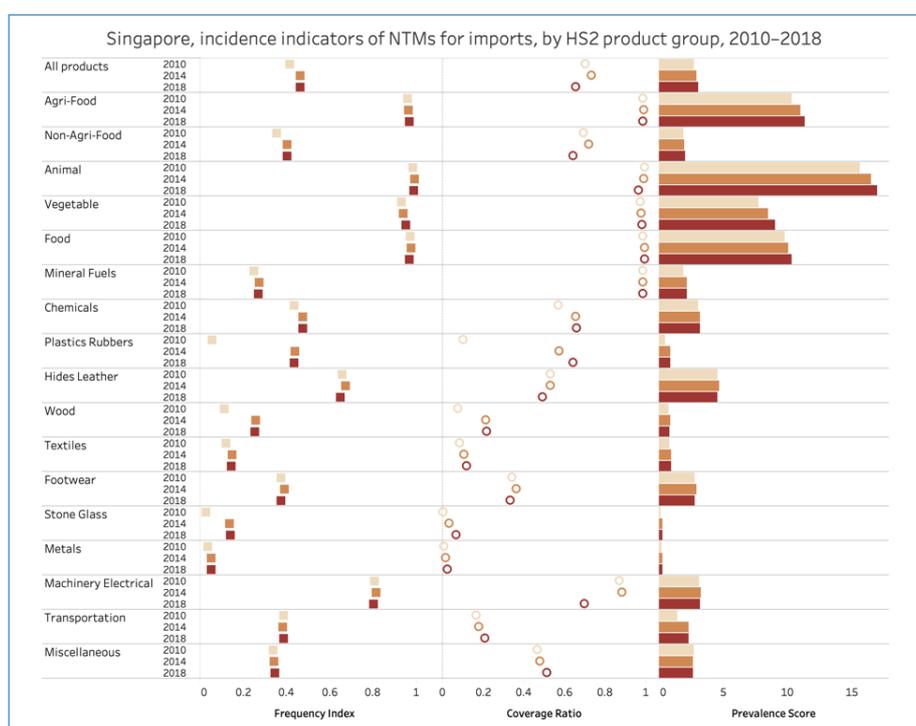
Source: UNCTAD and authors' calculation.

**Figure 37. NTMs by importer: The Philippines, 2010-2014-2018, All products and by HS2**



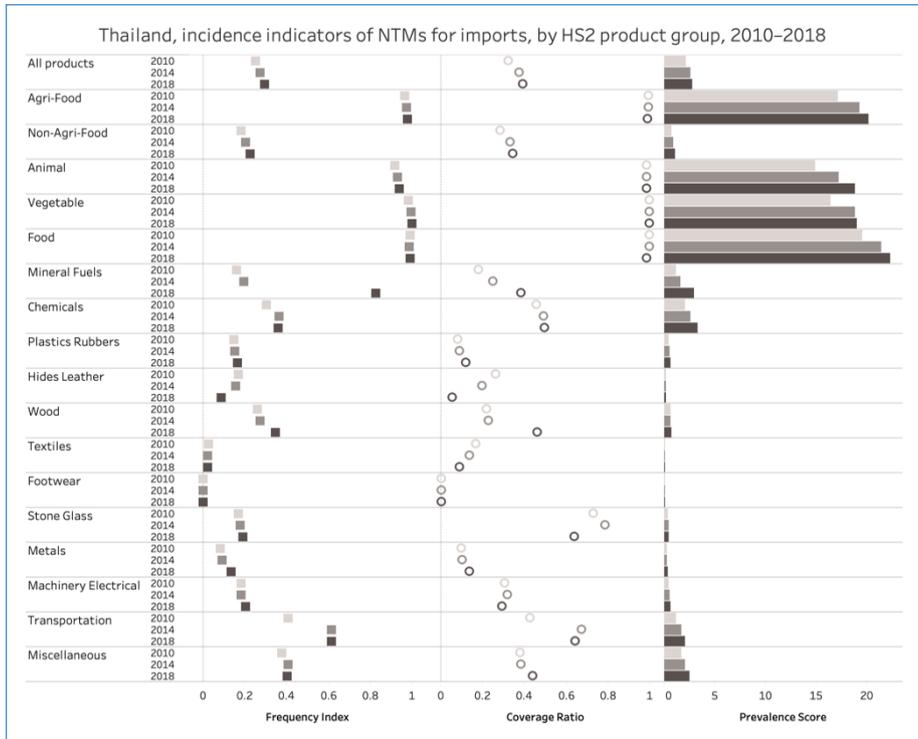
Source: UNCTAD and authors' calculation.

**Figure 38. NTMs by importer: Singapore, 2010-2014-2018, All products and by HS2**



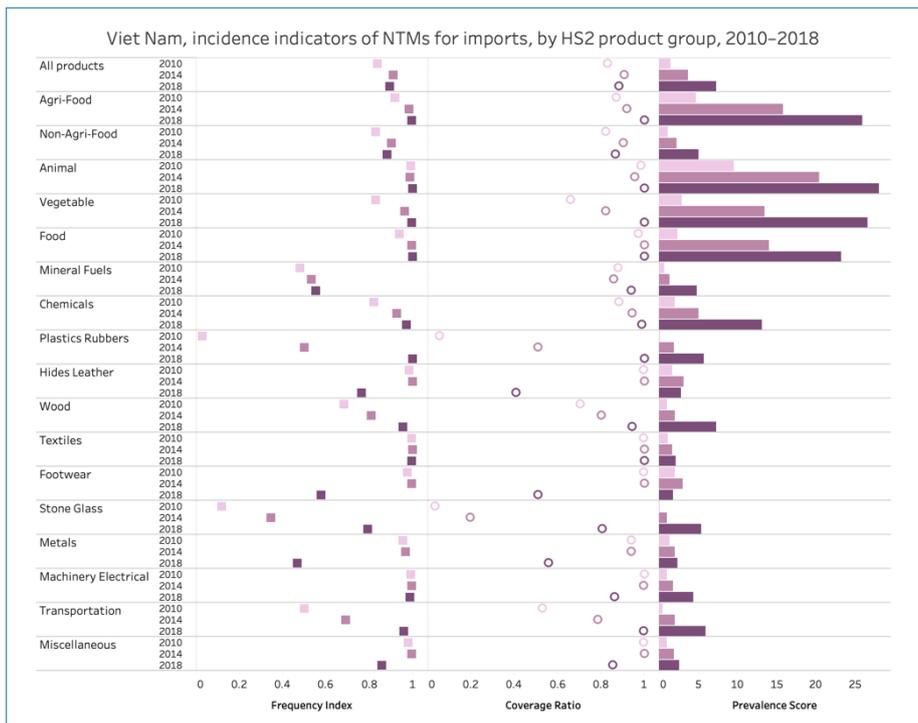
Source: UNCTAD and authors' calculation.

**Figure 39. NTMs by importer: Thailand, 2010-2014-2018, All products and by HS2**



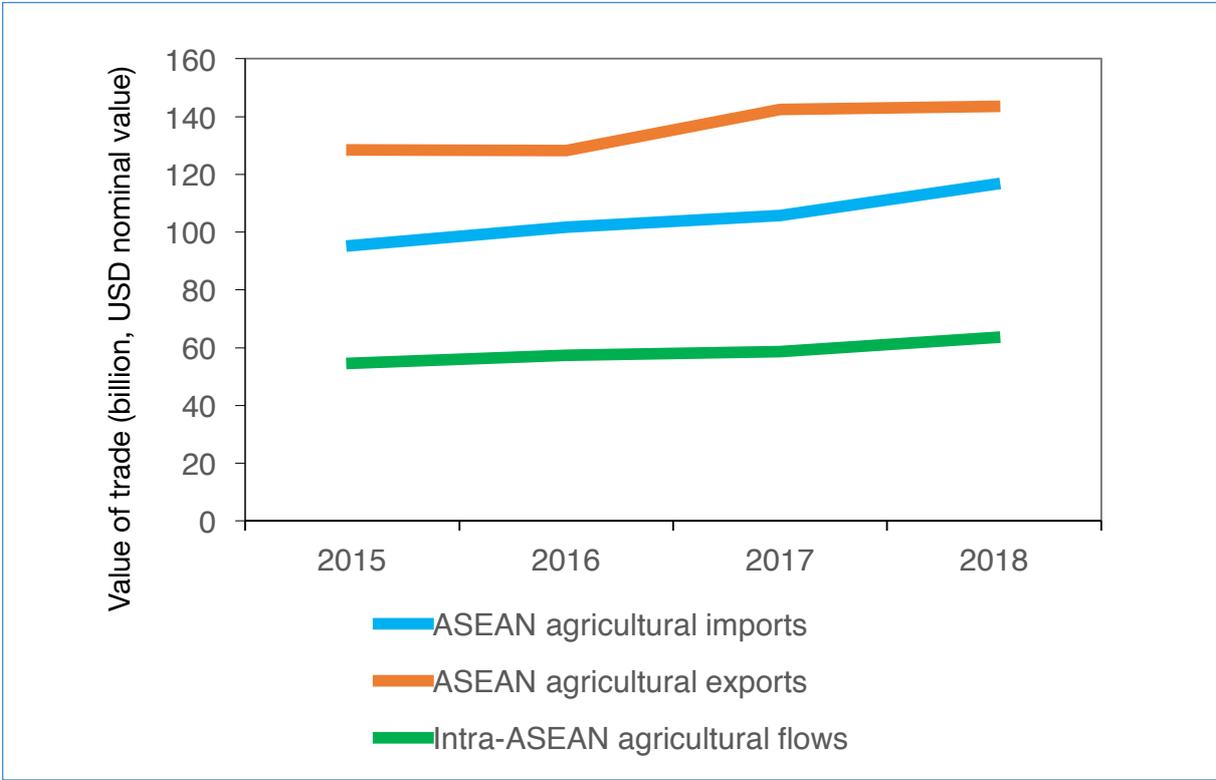
Source: UNCTAD and authors' calculation.

**Figure 40. NTMs by importer: the Socialist Republic of Viet Nam, 2010-2014-2018, All products and by HS2**



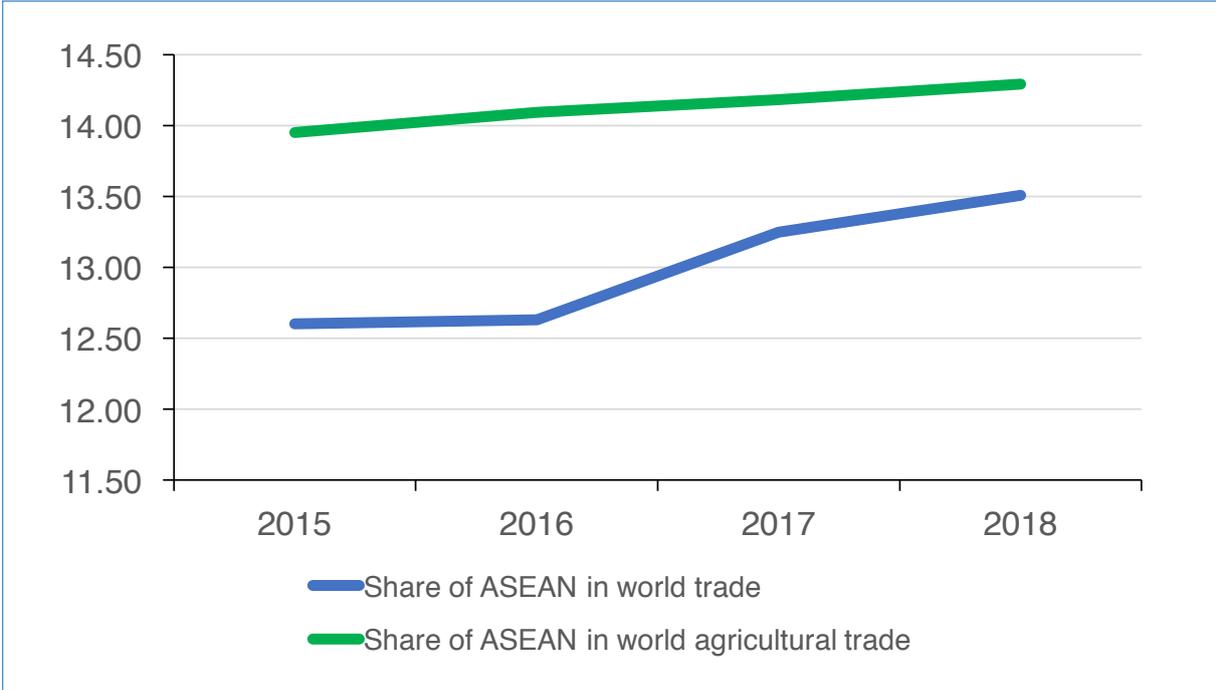
Source: UNCTAD and authors' calculation.

**Figure 41. Value of ASEAN agricultural exports and imports (billion USD, nominal value) 2015–2018**



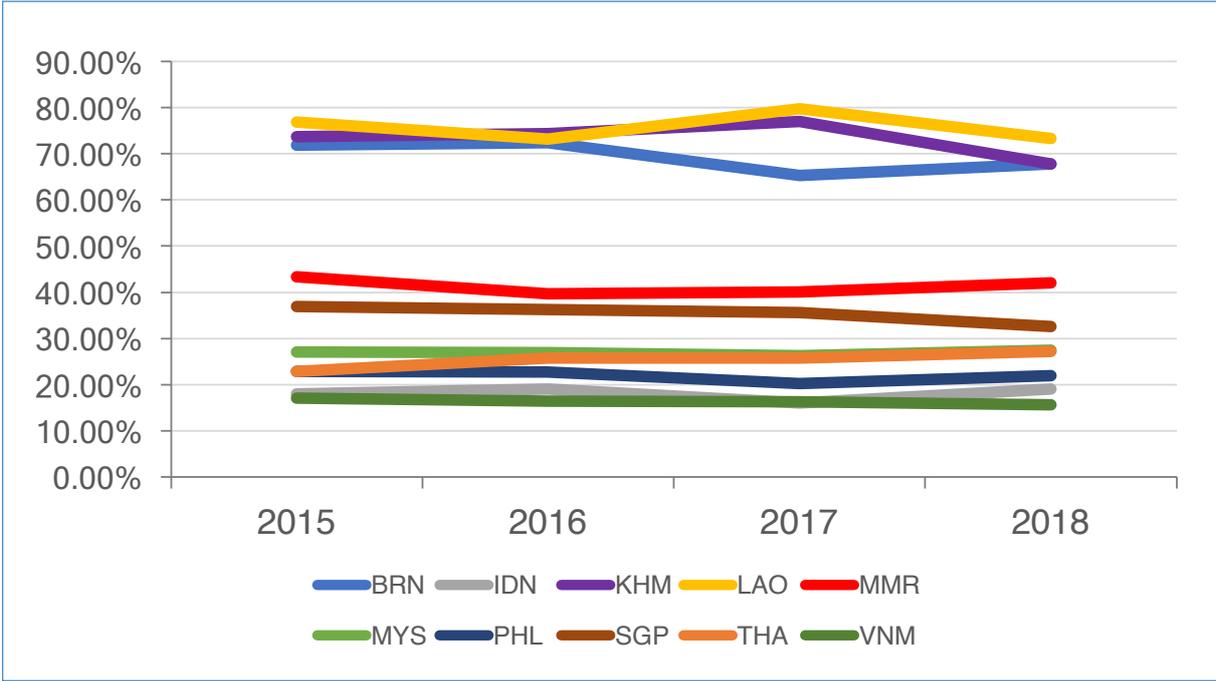
Source: BACI (2010) and authors' calculations.

**Figure 42. Share of ASEAN in world trade and world agricultural trade, 2015–2018**



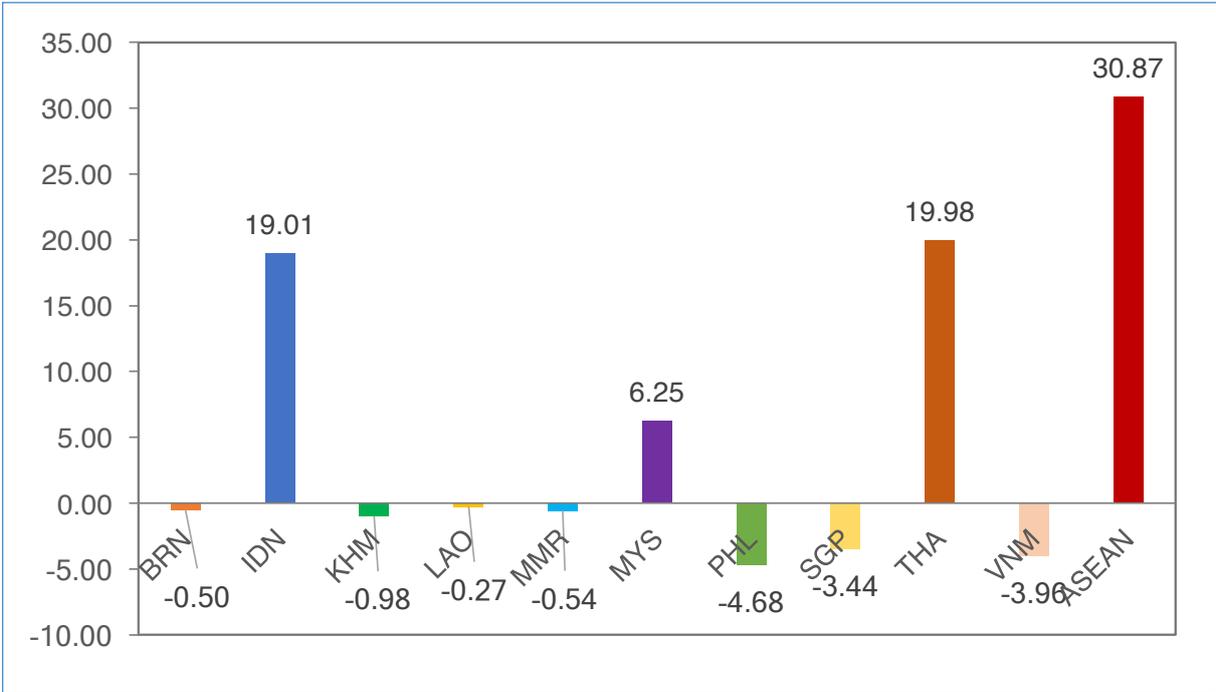
Source: BACI (2020) and authors' calculations.

**Figure 43. Share of ASEAN members intraregional trade for agricultural products 2015–2018**



Source: BACI (2020) and authors' calculations.  
 Note: BRN = Brunei Darussalam; IDN = Indonesia; KHM = Cambodia; LAO = Lao People's Democratic Republic; MMR = Myanmar; MYS = Malaysia; PHL = Philippines; SGP = Singapore; THA = Thailand; VNM = Viet Nam.

**Figure 44. ASEAN agricultural net exports (billion USD), average 2015–2018**



Source: BACI (2020) and authors' calculations.  
 Note: BRN = Brunei Darussalam; IDN = Indonesia; KHM = Cambodia; LAO = Lao People's Democratic Republic; MMR = Myanmar; MYS = Malaysia; PHL = Philippines; SGP = Singapore; THA = Thailand; VNM = Viet Nam; ASEAN = all members.

**Table 6. Top 10 agricultural products exported and imported of Brunei Darussalam (average, 2015–2018)**

Top 10 agricultural products exported	Share of agricultural exports (%)	Top 10 agricultural products imported	Share of agricultural imports (%)
Other shrimps and prawns, frozen (030617)	23.70	Preparations of a kind used in animal feeding, other (230990)	6.93
Waters, including mineral waters and aerated waters, containing added sugar or other sweetening matter or flavoured (220210)	12.16	Rice, semi-milled or wholly milled rice, whether or not polished or glazed (100630)	5.86
Food preparations, other (210690)	6.23	Waters, other non-alcoholic beverages (220290)	5.16
Rice, semi-milled or wholly milled rice, whether or not polished or glazed (100630)	4.08	Bread, pastry, cakes, biscuits, other (190590)	3.39
Other cheese (040690)	3.51	Meat of bovine animals, frozen, boneless (020230)	2.38
Beans of the species Vigna mungo, dried (071331)	3.29	Food preparations, other (210690)	2.25
Tunas, frozen, skipjack or stripe-bellied bonito, excluding livers and roes, other (030349)	3.17	Other sauces (210390)	2.18
Guts, bladders and stomachs of animals (other than fish), whole and pieces thereof, fresh, chilled, frozen, salted, in brine, dried or smoked (050400)	2.11	Waters, including mineral waters and aerated waters, containing added sugar or other sweetening matter or flavoured (220210)	2.04
Kidney beans, including white pea beans, dried (071333)	2.10	Malt extract; food preparations of flour, groats, meal, starch or malt extract, other (190190)	1.90
Inactive yeasts; other single-cell micro-organisms, dead (210220)	2.06	Other pasta (190230)	1.66

Source: BACI (2020) and authors' calculations, computed at the HS6 level of classification (HS 2012).

**Table 7. Top 10 agricultural products exported and imported of Cambodia (average, 2015–2018)**

<b>Top 10 agricultural products exported</b>	<b>Share of agricultural exports (%)</b>	<b>Top 10 agricultural products imported</b>	<b>Share of agricultural imports (%)</b>
Manioc (cassava), fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets (071410)	37.36	Cigarettes containing tobacco (240220)	15.60
Rice, semi-milled or wholly milled rice, whether or not polished or glazed (100630)	28.62	Waters, other non-alcoholic beverages (220290)	13.22
Cashew nuts, in shell (080131)	9.45	Cane or beet sugar, other (170199)	11.62
Dog or cat food, put up for retail sale (230910)	3.42	Preparations of a kind used in animal feeding, other (230990)	4.33
Soya beans, whether or not broken, other (120190)	1.77	Waters, including mineral waters and aerated waters, containing added sugar or other sweetening matter or flavoured (220210)	4.03
Starches, manioc (cassava) starch (110814)	1.73	Food preparations, other (210690)	3.69
Palm oil and its fractions, crude oil (151110)	1.68	Beer made from malt (220300)	2.95
Raw sugar not containing added flavouring or colouring matter, other cane sugar (170114)	1.25	Other pasta (190230)	2.92
Cigarettes containing tobacco (240220)	1.20	Malt extract, preparations for infant use (190110)	2.58
Primates, live (010611)	1.19	Palm oil and its fractions, refined (151190)	1.96

Source: BACI (2020) and authors' calculations, computed at the HS6 level of classification (HS 2012).

**Table 8. Top 10 agricultural products exported and imported of Indonesia (average, 2015–2018)**

Top 10 agricultural products exported	Share of agricultural exports (%)	Top 10 agricultural products imported	Share of agricultural imports (%)
Palm oil and its fractions, refined (151190)	33.53	Wheat and meslin (100199)	13.47
Palm oil and its fractions, crude oil (151110)	12.46	Raw sugar not containing added flavouring or colouring matter, other cane sugar (170114)	9.63
Palm kernel or babassu oil and fractions thereof, refined (151329)	4.28	Oil-cake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of soyabean oil (230400)	9.51
Other shrimps and prawns, frozen (030617)	3.81	Soya beans, whether or not broken, other (120190)	6.03
Coffee not roasted, not decaffeinated (090111)	3.15	Live cattle, other (010229)	3.22
Cigarettes containing tobacco (240220)	2.36	Tobacco, partly or wholly stemmed/stripped (240120)	2.87
Cocoa butter, fat and oil (180400)	2.13	Garlic, fresh or chilled (070320)	2.76
Vegetable fats and oils and their fractions, partly or wholly hydrogenated, inter-esterified, re-esterified or elaidinised, whether or not refined (151620)	1.73	Food preparations, other (210690)	2.62
Oil-cake and other solid residues, resulting from the extraction of vegetable fats or oils, of palm nuts or kernels (230660)	1.60	Rice, semi-milled or wholly milled rice, whether or not polished or glazed (100630)	2.38
Edible mixtures or preparations of animal or vegetable fats or oils (151790)	1.54	Preparations of a kind used in animal feeding, other (230990)	2.27

Source: BACI (2020) and authors' calculations, computed at the HS6 level of classification (HS 2012).

**Table 9. Top 10 agricultural products exported and imported of the Lao People's Democratic Republic (average, 2015–2018)**

Top 10 agricultural products exported	Share of agricultural exports (%)	Top 10 agricultural products imported	Share of agricultural imports (%)
Coffee not roasted, not decaffeinated (090111)	12.85	Meat and edible offal of fowls of the species <i>Gallus domesticus</i> , cuts and offal, frozen (020714)	9.71
Waters, other non-alcoholic beverages (220290)	10.81	Waters, other non-alcoholic beverages (220290)	7.23
Manioc (cassava), fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets (071410)	10.42	Cane or beet sugar, other (170199)	5.30
Plantains, fresh or dried (080310)	8.61	Rice, semi-milled or wholly milled rice, whether or not polished or glazed (100630)	4.85
Maize (corn), other (100590)	7.71	Live cattle, other (010229)	4.74
Cigarettes containing tobacco (240220)	5.66	Preparations of a kind used in animal feeding, other (230990)	4.36
Raw sugar not containing added flavouring or colouring matter, other cane sugar (170114)	4.84	Live swine > 50 kg (010392)	3.97
Husked (brown) rice (100620)	2.88	Other pasta (190230)	3.10
Sugar cane, fresh, chilled, frozen or dried (121293)	2.62	Food preparations, other (210690)	2.93
Rice, semi-milled or wholly milled rice, whether or not polished or glazed (100630)	2.39	Preparations with a basis of extracts, essences or concentrates or with a basis of coffee (210112)	2.68

Source: BACI (2020) and authors' calculations, computed at the HS6 level of classification (HS 2012).

**Table 10. Top 10 agricultural products exported and imported of Malaysia (average, 2015–2018)**

Top 10 agricultural products exported	Share of agricultural exports (%)	Top 10 agricultural products imported	Share of agricultural imports (%)
Palm oil and its fractions, refined (151190)	33.28	Cocoa beans, whole or broken, raw or roasted (180100)	4.74
Palm oil and its fractions, crude oil (151110)	13.32	Raw sugar not containing added flavouring or colouring matter, other cane sugar (170114)	4.30
Vegetable fats and oils and their fractions, partly or wholly hydrogenated, inter-esterified, re-esterified or elaidinised, whether or not refined (151620)	3.63	Maize (corn), other (100590)	4.03
Food preparations, other (210690)	2.69	Food preparations, other (210690)	3.92
Palm kernel or babassu oil and fractions thereof, refined (151329)	2.58	Oil-cake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of soyabean oil (230400)	3.07
Cocoa butter, fat and oil (180400)	2.15	Meat of bovine animals, frozen, boneless (020230)	3.01
Bread, pastry, cakes, biscuits, other (190590)	2.02	Rice, semi-milled or wholly milled rice, whether or not polished or glazed (100630)	2.76
Malt extract; food preparations of flour, groats, meal, starch or malt extract, other (190190)	1.70	Milk and cream in powder, granules or other solid forms, of a fat content, by weight < 1.5 % (040210)	1.77
Edible mixtures or preparations of animal or vegetable fats or oils (151790)	1.60	Palm oil and its fractions, refined (151190)	1.76
Oil-cake and other solid residues, resulting from the extraction of vegetable fats or oils, of palm nuts or kernels (230660)	1.54	Wheat and meslin (100199)	1.75

Source: BACI (2020) and authors' calculations, computed at the HS6 level of classification (HS 2012).

**Table 11. Top 10 agricultural products exported and imported of Myanmar (average, 2015–2018)**

Top 10 agricultural products exported	Share of agricultural exports (%)	Top 10 agricultural products imported	Share of agricultural imports (%)
Beans of the species <i>Vigna mungo</i> , dried (071331)	17.60	Cane or beet sugar, other (170199)	18.12
Cane or beet sugar, other (170199)	9.50	Palm oil and its fractions, refined (151190)	13.57
Cane or beet sugar, containing added flavouring or colouring matter (170191)	5.29	Food preparations, other (210690)	6.20
Husked (brown) rice (100620)	4.25	Vegetable fats and oils and their fractions, partly or wholly hydrogenated, inter-esterified, re-esterified or elaidinised, whether or not refined (151620)	5.75
Rice, semi-milled or wholly milled rice, whether or not polished or glazed (100630)	4.14	Waters, other non-alcoholic beverages (220290)	4.60
Live cattle, other (010229)	3.52	Oil-cake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of soyabean oil (230400)	2.71
Maize (corn), seed (100510)	3.51	Wheat and meslin (100199)	2.44
Pigeon peas, dried (071360)	3.34	Beer made from malt (220300)	2.43
Broken rice (100640)	3.19	Malt extract; food preparations of flour, groats, meal, starch or malt extract, other (190190)	2.36
Other shrimps and prawns, frozen (030617)	2.43	Apples, fresh (080810)	1.94

Source: BACI (2020) and authors' calculations, computed at the HS6 level of classification (HS 2012).

**Table 12. Top 10 agricultural products exported and imported of the Philippines (average, 2015–2018)**

Top 10 agricultural products exported	Share of agricultural exports (%)	Top 10 agricultural products imported	Share of agricultural imports (%)
Bananas, fresh or dried, other (080390)	24.46	Wheat and meslin (100199)	10.28
Coconut (copra) oil and its fractions, crude oil (151311)	10.55	Oil-cake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of soyabean oil (230400)	6.15
Coconut (copra) oil and its fractions, refined (151319)	7.31	Food preparations, other (210690)	5.81
Pineapples, fresh or dried (080430)	4.75	Rice, semi-milled or wholly milled rice, whether or not polished or glazed (100630)	4.35
Coconut, fresh or dried, desiccated (080111)	4.61	Palm oil and its fractions, refined (151190)	3.72
Tunas, skipjack and bonito, whole or in pieces, but not minced (160414)	4.31	Meat of bovine animals, frozen, boneless (020230)	2.97
Pineapples, whether or not containing added sugar or other sweetening matter or spirit (200820)	2.79	Milk and cream in powder, granules or other solid forms, of a fat content, by weight < 1.5 % (040210)	2.80
Mucilages and thickeners, derived from vegetable products, other (130239)	2.23	Preparations of a kind used in animal feeding, other (230990)	2.18
Cigarettes containing tobacco (240220)	2.11	Extracts, essences and concentrates of coffee (210111)	1.98
Waters, other non-alcoholic beverages (220290)	1.96	Meat of swine, frozen, other (020329)	1.71

Source: BACI (2020) and authors' calculations, computed at the HS6 level of classification (HS 2012).

**Table 13. Top 10 agricultural products exported and imported of Singapore (average, 2015–2018)**

Top 10 agricultural products exported	Share of agricultural exports (%)	Top 10 agricultural products imported	Share of agricultural imports (%)
Food preparations, other (210690)	23.29	Spirits obtained by distilling grape wine or grape marc (220820)	5.42
Spirits obtained by distilling grape wine or grape marc (220820)	9.02	Cigarettes containing tobacco (240220)	5.42
Malt extract; food preparations of flour, groats, meal, starch or malt extract, other (190190)	8.97	Whiskies (220830)	4.34
Cigarettes containing tobacco (240220)	7.48	Food preparations, other (210690)	3.29
Whiskies (220830)	4.48	Sparkling wine (220410)	2.53
Malt extract, preparations for infant use (190110)	4.05	Fats of bovine animals, sheep or goats, tallow (150210)	2.45
Sparkling wine (220410)	3.03	Cocoa beans, whole or broken, raw or roasted (180100)	1.94
Chocolate in blocks, slabs or bars or in liquid, paste, powder, granular > 2 kg (180620)	2.59	Other wine, grape must with fermentation prevented or arrested by the addition of alcohol, in containers holding < 2 l (220421)	1.78
Preparations of a kind used in animal feeding, other (230990)	2.07	Rice, semi-milled or wholly milled rice, whether or not polished or glazed (100630)	1.64
Cocoa butter, fat and oil (180400)	1.74	Meat and edible offal of fowls of the species <i>Gallus domesticus</i> , cuts and offal, frozen (020714)	1.49

Source: BACI (2020) and authors' calculations, computed at the HS6 level of classification (HS 2012).

**Table 14. Top 10 agricultural products exported and imported of Thailand (average, 2015–2018)**

Top 10 agricultural products exported	Share of agricultural exports (%)	Top 10 agricultural products imported	Share of agricultural imports (%)
Rice, semi-milled or wholly milled rice, whether or not polished or glazed (100630)	12.24	Oil-cake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of soyabean oil (230400)	7.40
Prepared or preserved meat of fowls of the species <i>Gallus domesticus</i> (160232)	6.83	Soya beans, whether or not broken, other (120190)	7.35
Tunas, skipjack and bonito, whole or in pieces, but not minced (160414)	5.98	Skipjack or strip-bellied bonito, frozen (030343)	5.50
Raw sugar not containing added flavouring or colouring matter, other cane sugar (170114)	4.38	Wheat and meslin (100199)	5.06
Cane or beet sugar, other (170199)	4.04	Food preparations, other (210690)	3.95
Waters, other non-alcoholic beverages (220290)	3.63	Cuttle fish and squid, other (030749)	2.45
Manioc (cassava), fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets (071410)	3.62	Preparations of a kind used in animal feeding, other (230990)	2.22
Starches, manioc (cassava) starch (110814)	3.49	Other fish, excluding livers and roes, frozen (030389)	2.10
Food preparations, other (210690)	3.38	Manioc (cassava), fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets (071410)	2.04
Dog or cat food, put up for retail sale (230910)	3.31	Malt extract; food preparations of flour, groats, meal, starch or malt extract, other (190190)	1.54

Source: BACI (2020) and authors' calculations, computed at the HS6 level of classification (HS 2012).

**Table 15. Top 10 agricultural products exported and imported of the Socialist Republic of Viet Nam (average, 2015–2018)**

Top 10 agricultural products exported	Share of agricultural exports (%)	Top 10 agricultural products imported	Share of agricultural imports (%)
Coffee not roasted, not decaffeinated (090111)	12.65	Other shrimps and prawns, frozen (030617)	7.24
Cashew nuts, shelled (080132)	11.90	Oil-cake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of soyabean oil (230400)	6.09
Rice, semi-milled or wholly milled rice, whether or not polished or glazed (100630)	8.63	Cashew nuts, in shell (080131)	5.60
Other shrimps and prawns, frozen (030617)	8.27	Maize (corn), other (100590)	5.45
Catfish, frozen fillets (030462)	6.10	Wheat and meslin (100199)	3.04
Shrimps and prawns, prepared or preserved, not in airtight container (160521)	4.14	Meat of bovine animals, frozen, boneless (020230)	2.96
Pepper, neither crushed nor ground (090411)	4.07	Spirits obtained by distilling grape wine or grape marc (220820)	2.94
Other fruit, fresh (081090)	3.92	Cigarettes containing tobacco (240220)	2.53
Starches, manioc (cassava) starch (110814)	2.23	Soya beans, whether or not broken, other (120190)	2.34
Frozen fish, other (030499)	1.52	Meat and edible offal of fowls of the species <i>Gallus domesticus</i> , cuts and offal, frozen (020714)	2.17

Source: BACI (2020) and authors' calculations, computed at the HS6 level of classification (HS 2012).

**Table 16. Top 10 agricultural products exported and imported of ASEAN (average, 2015–2018)**

Top 10 agricultural products exported	Share of agricultural exports (%)	Top 10 agricultural products imported	Share of agricultural imports (%)
Palm oil and its fractions, refined (151190)	14.23	Oil-cake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of soyabean oil (230400)	5.36
Palm oil and its fractions, crude oil (151110)	5.51	Wheat and meslin (100199)	5.17
Rice, semi-milled or wholly milled rice, whether or not polished or glazed (100630)	4.92	Food preparations, other (210690)	3.39
Food preparations, other (210690)	3.31	Soya beans, whether or not broken, other (120190)	2.85
Other shrimps and prawns, frozen (030617)	3.24	Maize (corn), other (100590)	2.40
Coffee not roasted, not decaffeinated (090111)	3.04	Raw sugar not containing added flavouring or colouring matter, other cane sugar (170114)	2.24
Tunas, skipjack and bonito, whole or in pieces, but not minced (160414)	2.15	Cigarettes containing tobacco (240220)	2.17
Cashew nuts, shelled (080132)	2.07	Meat of bovine animals, frozen, boneless (020230)	2.15
Prepared or preserved meat of fowls of the species Gallus domesticus (160232)	1.76	Other shrimps and prawns, frozen (030617)	2.10
Cigarettes containing tobacco (240220)	1.60	Palm oil and its fractions, refined (151190)	1.90

Source: BACI (2020) and authors' calculations, computed at the HS6 level of classification (HS 2012).

**Table 17. Top Brunei Darussalam agricultural imports and exports (average, 2015–2018)**

Top importer of Brunei Darussalam agricultural products	Share of Brunei Darussalam agricultural exports (%)	Top importer of Brunei Darussalam animal products (HS 01–05)	Top importer of Brunei Darussalam vegetable products (HS 06–15)	Top importer of Brunei Darussalam food products (HS 16–24)
Malaysia	24.02	Malaysia	Malaysia	Papua New Guinea
China	13.21	China	Singapore	Malaysia
Papua New Guinea	10.15	Australia	France	Singapore
Australia	9.85	Japan	Egypt	Canada
Singapore	8.24	China, Hong Kong Special Administrative Region	Japan	Japan
Japan	7.37	United Kingdom of Great Britain and Northern Ireland	Southern African Customs Union	Viet Nam
Canada	3.69	Taiwan Province of China	United States of America	China
France	3.41	Thailand	China, Hong Kong Special Administrative Region	Taiwan Province of China
Egypt	3.26	United States of America	Syrian Arab Republic	Kenya
China, Hong Kong Special Administrative Region	2.87	Viet Nam	Canada	Türkiye

Top agricultural exporter to Brunei Darussalam	Share of Brunei Darussalam agricultural imports (%)	Top exporter to Brunei Darussalam, animal products (HS 01–05)	Top exporter to Brunei Darussalam, vegetable products (HS 06–15)	Top exporter to Brunei Darussalam, food products (HS 16–24)
Malaysia	44.19	Malaysia	Malaysia	Malaysia
Singapore	9.89	Australia	Thailand	Singapore
Thailand	8.19	Singapore	China	Indonesia
Australia	6.97	India	Singapore	Thailand
Indonesia	4.32	Netherlands	Cambodia	Argentina
China	3.85	New Zealand	Australia	Australia
India	3.67	China	India	United States of America
Argentina	3.18	Norway	United States of America	China
United States of America	2.08	Viet Nam	Indonesia	Philippines
Cambodia	1.44	Indonesia	Argentina	Taiwan Province of China

Source: BACI (2020) and authors' calculations.

**Table 18. Top Cambodia agricultural imports and exports (average, 2015–2018)**

<b>Top importer of Cambodia agricultural products</b>	<b>Share of Cambodia agricultural exports (%)</b>	<b>Top importer of Cambodia animal products (HS 01–05)</b>	<b>Top importer of Cambodia vegetable products (HS 06–15)</b>	<b>Top importer of Cambodia food products (HS 16–24)</b>
Viet Nam	31.42	Thailand	Viet Nam	Viet Nam
Thailand	25.25	United States of America	Thailand	Thailand
China	11.56	Japan	China	United States of America
France	5.24	China	France	China
Malaysia	4.06	Viet Nam	Malaysia	Republic of Korea
Germany	2.97	the Lao People's Democratic Republic	Germany	Singapore
United States of America	2.59	Republic of Korea	Netherlands	Croatia
Netherlands	1.75	Singapore	Poland	China, Macao Special Administrative Region
Poland	1.25	Taiwan Province of China	Italy	China, Hong Kong Special Administrative Region
Italy	1.09	Canada	Czech Republic	Bulgaria

<b>Top agricultural exporter to Cambodia</b>	<b>Share of Cambodia agricultural imports (%)</b>	<b>Top exporter to Cambodia, animal products (HS 01–05)</b>	<b>Top exporter to Cambodia, vegetable products (HS 06–15)</b>	<b>Top exporter to Cambodia, food products (HS 16–24)</b>
Thailand	47.14	Thailand	Viet Nam	Thailand
Indonesia	13.08	Japan	Thailand	Indonesia
Viet Nam	9.99	Viet Nam	Australia	Viet Nam
Singapore	5.90	Australia	China	Singapore
Republic of Korea	3.63	France	United States of America	Republic of Korea
Malaysia	2.70	United States of America	Denmark	Malaysia
United States of America	2.56	New Zealand	Germany	United States of America
China	2.25	China	Netherlands	China
Japan	1.97	Singapore	India	France
France	1.84	Poland	Singapore	Taiwan Province of China

Source: BACI (2020) and authors' calculations.

**Table 19. Top Indonesia agricultural imports and exports (average, 2015–2018)**

<b>Top importer of Indonesia agricultural products</b>	<b>Share of Indonesia agricultural exports (%)</b>	<b>Top importer of Indonesia animal products (HS 01–05)</b>	<b>Top importer of Indonesia vegetable products (HS 06–15)</b>	<b>Top importer of Indonesia food products (HS 16–24)</b>
India	11.92	United States of America	India	United States of America
China	11.78	Japan	China	Malaysia
United States of America	11.27	China	United States of America	Philippines
Malaysia	5.32	Singapore	Pakistan	Singapore
Pakistan	4.39	China, Hong Kong Special Administrative Region	Malaysia	China
Japan	3.64	Thailand	Bangladesh	Japan
Netherlands	3.38	Malaysia	Netherlands	Netherlands
Singapore	2.98	Viet Nam	Italy	Cambodia
Bangladesh	2.64	Taiwan Province of China	Spain	Viet Nam
Italy	2.62	Italy	Russian Federation	Australia

<b>Top agricultural exporter to Indonesia</b>	<b>Share of Indonesia agricultural imports (%)</b>	<b>Top exporter to Indonesia, animal products (HS 01–05)</b>	<b>Top exporter to Indonesia, vegetable products (HS 06–15)</b>	<b>Top exporter to Indonesia, food products (HS 16–24)</b>
Australia	15.04	Australia	United States of America	Thailand
United States of America	14.31	New Zealand	China	Brazil
China	11.82	United States of America	Australia	Argentina
Thailand	10.14	India	Canada	China
Brazil	7.12	China	Thailand	United States of America
Argentina	6.72	France	India	Malaysia
India	3.62	Belgium-Luxembourg	Ukraine	Australia
Malaysia	3.54	Taiwan Province of China	Viet Nam	Singapore
Canada	3.22	Netherlands	Argentina	Republic of Korea
New Zealand	2.77	Germany	Pakistan	India

Source: BACI (2020) and authors' calculations.

**Table 20. Top the Lao People's Democratic Republic agricultural imports and exports (average, 2015–2018)**

Top importer of the Lao People's Democratic Republic agricultural products	Share of the Lao People's Democratic Republic agricultural exports (%)	Top importer of the Lao People's Democratic Republic animal products (HS 01–05)	Top importer of the Lao People's Democratic Republic vegetable products (HS 06–15)	Top importer of the Lao People's Democratic Republic food products (HS 16–24)
China	29.29	Viet Nam	China	Viet Nam
Viet Nam	27.53	China	Thailand	Thailand
Thailand	24.05	Thailand	Viet Nam	China
Japan	3.37	Cambodia	Japan	United Arab Emirates
Belgium-Luxembourg	1.59	United States of America	Belgium-Luxembourg	United Kingdom
Germany	1.49	Republic of Korea	Germany	Poland
France	1.29	Mauritania	France	Bulgaria
United Arab Emirates	1.10	Ukraine	Taiwan Province of China	Singapore
Italy	1.06	Indonesia	United States of America	China, Hong Kong Special Administrative Region
Poland	0.77	China, Hong Kong Special Administrative Region	Republic of Korea	Cambodia

Top agricultural exporter to the Lao People's Democratic Republic	Share of the Lao People's Democratic Republic agricultural imports (%)	Top exporter to the Lao People's Democratic Republic, animal products (HS 01–05)	Top exporter to the Lao People's Democratic Republic, vegetable products (HS 06–15)	Top exporter to the Lao People's Democratic Republic, food products (HS 16–24)
Thailand	84.61	Thailand	Thailand	Thailand
Viet Nam	5.87	Viet Nam	Viet Nam	Viet Nam
China	4.30	India	China	China
Singapore	0.97	Japan	Germany	Singapore
India	0.76	Türkiye	United States of America	France
Japan	0.47	Malaysia	Belgium-Luxembourg	Republic of Korea
Germany	0.42	China	Belarus	India
France	0.36	Cambodia	Japan	Netherlands
Malaysia	0.29	Australia	Malaysia	Japan
Republic of Korea	0.25	Italy	Italy	Brazil

Source: BACI (2020) and authors' calculations.

**Table 21. Top Malaysia agricultural imports and exports (average, 2015–2018)**

<b>Top importer of Malaysia agricultural products</b>	<b>Share of Malaysia agricultural exports (%)</b>	<b>Top importer of Malaysia animal products (HS 01–05)</b>	<b>Top importer of Malaysia vegetable products (HS 06–15)</b>	<b>Top importer of Malaysia food products (HS 16–24)</b>
Singapore	9.56	Singapore	India	Singapore
China	9.50	China	China	China
India	8.61	China, Hong Kong Special Administrative Region	Singapore	Indonesia
Japan	4.35	Viet Nam	Netherlands	Thailand
United States of America	4.15	Thailand	United States of America	Viet Nam
Viet Nam	3.91	Brunei Darussalam	Japan	Japan
Netherlands	3.21	Japan	Türkiye	United States of America
Philippines	3.16	Australia	Pakistan	Philippines
Indonesia	2.76	United States of America	Viet Nam	Australia
Thailand	2.73	Republic of Korea	Philippines	China, Hong Kong Special Administrative Region

<b>Top agricultural exporter to Malaysia</b>	<b>Share of Malaysia agricultural imports (%)</b>	<b>Top exporter to Malaysia, animal products (HS 01–05)</b>	<b>Top exporter to Malaysia, vegetable products (HS 06–15)</b>	<b>Top exporter to Malaysia, food products (HS 16–24)</b>
Indonesia	12.54	New Zealand	Indonesia	Indonesia
China	11.88	India	China	China
Thailand	8.01	Australia	Argentina	Thailand
Argentina	7.06	China	Thailand	Singapore
Australia	6.24	Indonesia	Brazil	Brazil
Brazil	6.14	Thailand	India	Argentina
India	6.14	United States of America	USA	United States of America
United States of America	5.44	Viet Nam	Australia	Australia
Singapore	4.26	Germany	Viet Nam	Ghana
New Zealand	3.86	France	Canada	Côte d'Ivoire

Source: BACI (2020) and authors' calculations.

**Table 22. Top Myanmar agricultural imports and exports (average, 2015–2018)**

Top importer of Myanmar agricultural products	Share of Myanmar agricultural exports (%)	Top importer of Myanmar animal products (HS 01–05)	Top importer of Myanmar vegetable products (HS 06–15)	Top importer of Myanmar food products (HS 16–24)
China	34.71	Thailand	India	China
India	18.18	China	China	Thailand
Thailand	10.45	Japan	Thailand	Republic of Korea
Japan	3.40	Saudi Arabia	Indonesia	Singapore
Malaysia	2.72	Malaysia	Malaysia	Viet Nam
Singapore	1.94	United States of America	Japan	Japan
United Arab Emirates	1.93	United Kingdom of Great Britain and Northern Ireland	Belgium-Luxembourg	India
Indonesia	1.84	Singapore	Bangladesh	Indonesia
Bangladesh	1.72	China, Hong Kong Special Administrative Region	Viet Nam	Cambodia
United Kingdom of Great Britain and Northern Ireland	1.62	United Arab Emirates	United Arab Emirates	United Arab Emirates

Top agricultural exporter to Myanmar	Share of Myanmar agricultural imports (%)	Top exporter to Myanmar, animal products (HS 01–05)	Top exporter to Myanmar, vegetable products (HS 06–15)	Top exporter to Myanmar, food products (HS 16–24)
Thailand	30.71	Thailand	Indonesia	Thailand
Indonesia	17.10	India	China	India
China	11.23	China	Thailand	China
India	9.85	New Zealand	Australia	Singapore
Malaysia	5.89	Singapore	Malaysia	Brazil
Singapore	4.76	Taiwan Province of China	United States of America	Malaysia
Australia	3.68	Malaysia	India	United Arab Emirates
Brazil	3.25	Australia	Singapore	Indonesia
United States of America	2.28	Republic of Korea	Canada	United States of America
United Arab Emirates	1.51	Germany	Ukraine	Viet Nam

Source: BACI (2020) and authors' calculations.

**Table 23. Top the Philippines agricultural imports and exports (average, 2015–2018)**

<b>Top importer of the Philippines agricultural products</b>	<b>Share of the Philippines agricultural exports (%)</b>	<b>Top importer of the Philippines animal products (HS 01–05)</b>	<b>Top importer of the Philippines vegetable products (HS 06–15)</b>	<b>Top importer of the Philippines food products (HS 16–24)</b>
United States of America	20.73	United States of America	Japan	United States of America
Japan	16.15	Japan	United States of America	Republic of Korea
China	10.43	China, Hong Kong Special Administrative Region	China	Japan
Republic of Korea	7.61	China	Netherlands	Malaysia
Netherlands	6.62	Taiwan Province of China	Republic of Korea	Thailand
China, Hong Kong Special Administrative Region	2.72	Thailand	Saudi Arabia	Germany
Germany	2.45	Spain	United Arab Emirates	United Kingdom of Great Britain and Northern Ireland
Malaysia	2.44	Republic of Korea	Germany	China
United Arab Emirates	2.40	Italy	China, Hong Kong Special Administrative Region	Singapore
Saudi Arabia	2.15	Canada	Islamic Republic of Iran	United Arab Emirates

<b>Top agricultural exporter to the Philippines</b>	<b>Share of the Philippines agricultural imports (%)</b>	<b>Top exporter to the Philippines, animal products (HS 01–05)</b>	<b>Top exporter to the Philippines, vegetable products (HS 06–15)</b>	<b>Top exporter to the Philippines, food products (HS 16–24)</b>
United States of America	21.43	United States of America	United States of America	United States of America
China	13.00	China	China	China
Indonesia	7.29	New Zealand	Viet Nam	Thailand
Thailand	7.16	Australia	Malaysia	Indonesia
Viet Nam	5.88	Germany	Indonesia	Singapore
Malaysia	5.69	India	Thailand	Argentina
Australia	5.17	Netherlands	Australia	Malaysia
Singapore	4.04	Viet Nam	Ukraine	Viet Nam
New Zealand	3.31	Canada	India	Spain
Argentina	2.52	France	Canada	Republic of Korea

Source: BACI (2020) and authors' calculations.

**Table 24. Top Singapore agricultural imports and exports (average, 2015–2018)**

Top importer of Singapore agricultural products	Share of Singapore agricultural exports (%)	Top importer of Singapore animal products (HS 01–05)	Top importer of Singapore vegetable products (HS 06–15)	Top importer of Singapore food products (HS 16–24)
Viet Nam	12.27	Japan	Islamic Republic of Iran	Viet Nam
Japan	9.07	China, Hong Kong Special Administrative Region	Indonesia	Japan
United States of America	8.26	Viet Nam	India	United States of America
Malaysia	6.95	Malaysia	Malaysia	Australia
Australia	6.73	Indonesia	Israel	China
China	6.67	United States of America	United States of America	Malaysia
Philippines	5.18	Myanmar	Japan	Philippines
China, Hong Kong Special Administrative Region	5.10	Philippines	Thailand	Thailand
Thailand	4.67	China	China, Hong Kong Special Administrative Region	China, Hong Kong Special Administrative Region
Indonesia	4.22	Brunei Darussalam	Bangladesh	Taiwan Province of China

Top agricultural exporter to Singapore	Share of Singapore agricultural imports (%)	Top agricultural exporter to Singapore, animal products (HS 01–05)	Top exporter to Singapore, vegetable products (HS 06–15)	Top exporter to Singapore, food products (HS 16–24)
Malaysia	16.09	Malaysia	Malaysia	France
France	9.73	Australia	Indonesia	Malaysia
Indonesia	8.37	Brazil	Australia	United Kingdom of Great Britain and Northern Ireland
China	8.12	New Zealand	China	China
Australia	7.48	Indonesia	United States of America	United States of America
United States of America	6.55	United States of America	Thailand	Indonesia
United Kingdom of Great Britain and Northern Ireland	4.93	China	India	Thailand
Thailand	4.65	Netherlands	Viet Nam	Australia
New Zealand	3.56	Viet Nam	New Zealand	Viet Nam
Viet Nam	3.08	Thailand	Burkina Faso	Japan

Source: BACI (2020) and authors' calculations.

**Table 25. Top Thailand agricultural imports and exports (average, 2015–2018)**

Top importer of Thailand agricultural products	Share of Thailand agricultural exports (%)	Top importer of Thailand animal products (HS 01–05)	Top importer of Thailand vegetable products (HS 06–15)	Top importer of Thailand food products (HS 16–24)
China	12.55	Japan	China	Japan
Japan	12.38	United States of America	Viet Nam	United States of America
United States of America	10.70	Lao People's Democratic Republic	United States of America	Indonesia
Indonesia	4.95	China	China, Hong Kong Special Administrative Region	Myanmar
Viet Nam	4.79	Viet Nam	Benin	United Kingdom of Great Britain and Northern Ireland
Myanmar	3.57	China, Hong Kong Special Administrative Region	Malaysia	Cambodia
Malaysia	3.55	Malaysia	Indonesia	Viet Nam
United Kingdom of Great Britain and Northern Ireland	2.95	Netherlands	Japan	China
Cambodia	2.92	Italy	Philippines	Australia
China, Hong Kong Special Administrative Region	2.86	Cambodia	Southern African Customs Union	Malaysia

Top agricultural exporter to Thailand	Share of Thailand agricultural imports (%)	Top exporter to Thailand, animal products (HS 01–05)	Top exporter to Thailand, vegetable products (HS 06–15)	Top exporter to Thailand, food products (HS 16–24)
China	14.20	China	China	United States of America
United States of America	11.92	India	United States of America	Brazil
Brazil	9.28	New Zealand	Brazil	China
Viet Nam	4.55	United States of America	Cambodia	Singapore
Indonesia	4.38	Myanmar	Australia	Malaysia
India	4.28	Taiwan Province of China	Indonesia	Indonesia
Malaysia	4.13	Viet Nam	Viet Nam	Viet Nam
Australia	3.46	Japan	Ukraine	Argentina
New Zealand	3.08	Indonesia	India	United Kingdom of Great Britain and Northern Ireland
Singapore	3.06	Australia	Malaysia	France

Source: BACI (2020) and authors' calculations.

**Table 26. Top Viet Nam agricultural imports and exports (average, 2015–2018)**

Top importer of Viet Nam agricultural products	Share of Viet Nam agricultural exports (%)	Top importer of Viet Nam animal products (HS 01–05)	Top importer of Viet Nam vegetable products (HS 06–15)	Top importer of Viet Nam food products (HS 16–24)
China	18.61	United States of America	China	United States of America
United States of America	15.75	Japan	United States of America	Japan
Japan	6.87	China	Germany	China
Republic of Korea	4.87	Republic of Korea	Philippines	Republic of Korea
Germany	4.41	China, Hong Kong Special Administrative Region	Netherlands	Thailand
Philippines	3.06	Thailand	Japan	Philippines
Thailand	2.82	Canada	Spain	Singapore
Netherlands	2.63	United Kingdom of Great Britain and Northern Ireland	Italy	Cambodia
Malaysia	2.24	Netherlands	Malaysia	Germany
United Kingdom of Great Britain and Northern Ireland	2.20	Germany	Indonesia	Australia

Top agricultural exporter to Viet Nam	Share of Viet Nam agricultural imports (%)	Top exporter to Viet Nam, animal products (HS 01–05)	Top exporter to Viet Nam, vegetable products (HS 06–15)	Top exporter to Viet Nam, food products (HS 16–24)
China	10.72	India	China	Argentina
India	8.10	Ecuador	United States of America	Singapore
Argentina	7.94	China, Hong Kong Special Administrative Region	Brazil	Thailand
China, Hong Kong Special Administrative Region	7.69	Australia	Argentina	United States of America
United States of America	7.44	United States of America	Thailand	China
Thailand	6.10	China	Côte d'Ivoire	China, Hong Kong
Australia	4.93	New Zealand	China, Hong Kong Special Administrative Region	Taiwan Province of China
Brazil	4.51	Thailand	Australia	Malaysia
Singapore	4.25	Norway	Indonesia	Brazil
Ecuador	4.16	Indonesia	Malaysia	Indonesia

Source: BACI (2020) and authors' calculations.

**Table 27. Top ASEAN agricultural imports and exports (average, 2015–2018)**

Top importer of ASEAN agricultural products	Share of ASEAN agricultural exports (%)	Top importer of ASEAN animal products (HS 01–05)	Top importer of ASEAN vegetable products (HS 06–15)	Top importer of ASEAN food products (HS 16–24)
China	13.01	United States of America	China	United States of America
United States of America	10.68	Japan	India	Japan
Japan	7.49	China	United States of America	China
India	5.55	Singapore	Japan	Viet Nam
Viet Nam	3.80	China, Hong Kong Special Administrative Region	Netherlands	Malaysia
Malaysia	3.38	Republic of Korea	Pakistan	Indonesia
Singapore	3.15	Thailand	Malaysia	Singapore
Netherlands	2.76	Malaysia	Viet Nam	Australia
Philippines	2.65	Viet Nam	Germany	Philippines
Republic of Korea	2.63	Italy	Philippines	Republic of Korea

Top agricultural exporter to ASEAN	Share of ASEAN agricultural imports (%)	Top exporter to ASEAN, animal products (HS 01–05)	Top exporter to ASEAN, vegetable products (HS 06–15)	Top exporter to ASEAN, food products (HS 16–24)
China	11.23	Australia	China	Thailand
United States of America	9.94	India	United States of America	United States of America
Thailand	8.62	New Zealand	Indonesia	China
Australia	6.71	China	Australia	Argentina
Indonesia	6.00	United States of America	Thailand	Singapore
Brazil	5.07	China, Hong Kong Special Administrative Region	Brazil	Brazil
India	5.06	Ecuador	Malaysia	Malaysia
Malaysia	5.01	Thailand	Argentina	Indonesia
Argentina	4.80	Malaysia	India	France
Singapore	3.30	Indonesia	Viet Nam	Australia

Source: BACI (2020) and authors' calculations.

**Table 28. Top five agricultural products in terms of revealed comparative advantage by ASEAN country (2015–2018)**

Country	Top 5 Revealed comparative advantage products (2015)	Top 5 Revealed comparative advantage products (2018)	Top 5 Revealed comparative advantage products (average, 2015–2018)
<b>Brunei Darussalam</b>	Eels, fresh or chilled (030274)	Tunas, skipjack or stripe-bellied bonito, fresh or chilled (030233)	Eels, fresh or chilled (030274)
	Tunas, frozen, skipjack or stripe-bellied bonito, excluding livers and roes, other (030349)	Eels, fresh or chilled (030274)	Tunas, skipjack or stripe-bellied bonito, fresh or chilled (030233)
	Fish fillets and other fish meat (whether or not minced), fresh or chilled, other (030459)	Eels, frozen (030326)	Tunas, frozen, skipjack or stripe-bellied bonito, excluding livers and roes, other (030349)
	Beans of the species Vigna mungo, dried (071331)	Tunas, frozen, skipjack or stripe-bellied bonito, excluding livers and roes, other (030349)	Eels, frozen (030326)
	Crustaceans, not frozen, other, including flours, meals and pellets of crustaceans, fit for human consumption (030629)	Turmeric (curcuma) (091030)	Fish fillets and other fish meat (whether or not minced), fresh or chilled, other (030459)
<b>Cambodia</b>	Manioc (cassava), fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets (071410)	Manioc (cassava), fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets (071410)	Manioc (cassava), fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets (071410)
	Tilapias, catfish, carp, eels, Nile perch and snakeheads, salted but not dried or smoked and fish in brine (030564)	Primates, live (010611)	Primates, live (010611)
	Cashew nuts, in shell (080131)	Palm nuts and kernels, whether or not broken (120710)	Palm nuts and kernels, whether or not broken (120710)
	Primates, live (010611)	Rice, semi-milled or wholly milled rice, whether or not polished or glazed (100630)	Cashew nuts, in shell (080131)
	Palm nuts and kernels, whether or not broken (120710)	Starches, manioc (cassava) starch (110814)	Tilapias, catfish, carp, eels, Nile perch and snakeheads, salted but not dried or smoked and fish in brine (030564)

Country	Top 5 Revealed comparative advantage products (2015)	Top 5 Revealed comparative advantage products (2018)	Top 5 Revealed comparative advantage products (average, 2015–2018)
Indonesia	Mace, neither crushed nor ground (090821)	Mace, neither crushed nor ground (090821)	Mace, neither crushed nor ground (090821)
	Palm kernel or babassu oil and fractions thereof, refined (151329)	Palm kernel or babassu oil and fractions thereof, refined (151329)	Palm kernel or babassu oil and fractions thereof, refined (151329)
	Coconut, fresh or dried, in the inner shell (080112)	Oil-cake and other solid residues, resulting from the extraction of vegetable fats or oils, of palm nuts or kernels (230660)	Edible products of animal origin (041000)
	Mace, crushed or ground (090822)	Edible products of animal origin (041000)	Oil-cake and other solid residues, resulting from the extraction of vegetable fats or oils, of palm nuts or kernels (230660)
	Oil-cake and other solid residues, resulting from the extraction of vegetable fats or oils, of palm nuts or kernels (230660)	Nutmeg, neither crushed nor ground (090811)	Areca nuts, fresh or dried (080280)
Lao People's Democratic Republic	Sugar cane, fresh, chilled, frozen or dried (121293)	Sugar cane, fresh, chilled, frozen or dried (121293)	Sugar cane, fresh, chilled, frozen or dried (121293)
	Flour, meal and powder of sago or of roots or tubers (110620)	Other worked grains (for example, hulled, pearled, sliced or kibbled), of other cereals (110429)	Flour, meal and powder of sago or of roots or tubers (110620)
	Plantains, fresh or dried (080310)	Manioc (cassava), fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets (071410)	Plantains, fresh or dried (080310)
	Other worked grains (for example, hulled, pearled, sliced or kibbled), of other cereals (110429)	Flour, meal and powder of sago or of roots or tubers (110620)	Other worked grains (for example, hulled, pearled, sliced or kibbled), of other cereals (110429)
	Brussels sprouts, fresh or chilled (070420)	Cereal groats and meal, of other cereals (110319)	Manioc (cassava), fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets (071410)

Country	Top 5 Revealed comparative advantage products (2015)	Top 5 Revealed comparative advantage products (2018)	Top 5 Revealed comparative advantage products (average, 2015–2018)
Malaysia	Oil-cake and other solid residues, resulting from the extraction of vegetable fats or oils, of palm nuts or kernels (230660)	Guinea fowls, live, weighing < 185 g (10515)	Oil-cake and other solid residues, resulting from the extraction of vegetable fats or oils, of palm nuts or kernels (230660)
	Palm oil and its fractions, crude oil (151110)	Oil-cake and other solid residues, resulting from the extraction of vegetable fats or oils, of palm nuts or kernels (230660)	Palm oil and its fractions, refined (151190)
	Palm oil and its fractions, refined (151190)	Palm kernel or babassu oil and fractions thereof, crude oil (151321)	Palm oil and its fractions, crude oil (151110)
	Palm kernel or babassu oil and fractions thereof, refined (151329)	Palm oil and its fractions, refined (151190)	Palm kernel or babassu oil and fractions thereof, crude oil (151321)
	Vegetable fats and oils and their fractions, partly or wholly hydrogenated, inter-esterified, re-esterified or elaidinised, whether or not refined (151620)	Palm oil and its fractions, crude oil (151110)	Palm kernel or babassu oil and fractions thereof, refined (151329)
Myanmar	Ground-nuts, seed (120230)	Catfish, fresh or chilled (030272)	Catfish, fresh or chilled (030272)
	Catfish, fresh or chilled (030272)	Carp, fresh or chilled (030273)	Ground-nuts, seed (120230)
	Carp, frozen (030325)	Buffalo, live, pure-bred breeding animals (010231)	Beans of the species Vigna mungo, dried (071331)
	Beans of the species Vigna mungo, dried (071331)	Carp, frozen (030325)	Carp, frozen (030325)
	Pigeon peas, dried (071360)	Ground-nuts, seed (120230)	Pigeon peas, dried (071360)

Country	Top 5 Revealed comparative advantage products (2015)	Top 5 Revealed comparative advantage products (2018)	Top 5 Revealed comparative advantage products (average, 2015–2018)
Philippines	Oil-cake and other solid residues, resulting from the extraction of vegetable fats or oils, of coconut or copra (230650)	Coconut (copra) oil and its fractions, crude oil (151311)	Coconut (copra) oil and its fractions, crude oil (151311)
	Coconut (copra) oil and its fractions, crude oil (151311)	Oil-cake and other solid residues, resulting from the extraction of vegetable fats or oils, of coconut or copra (230650)	Oil-cake and other solid residues, resulting from the extraction of vegetable fats or oils, of coconut or copra (230650)
	Coconut, fresh or dried, desiccated (080111)	Coconut, fresh or dried, desiccated (080111)	Coconut, fresh or dried, desiccated (080111)
	Coconut (copra) oil and its fractions, refined (151319)	Coconut (copra) oil and its fractions, refined (151319)	Coconut (copra) oil and its fractions, refined (151319)
	Mucilages and thickeners, derived from vegetable products, other (130239)	Pineapples, whether or not containing added sugar or other sweetening matter or spirit (200820)	Pineapples, whether or not containing added sugar or other sweetening matter or spirit (200820)
Singapore	Scallops, including queen scallops, prepared	Sugar cane, fresh, chilled, frozen or dried (121293)	Sugar cane, fresh, chilled, frozen or dried (121293)
	or preserved (160552)	Rattans (140120)	Rattans (140120)
	Ornamental fish, live, freshwater (030111)	Ornamental fish, live, freshwater (030111)	Spirits obtained by distilling grape wine or grape marc (220820)
	Cigars, cheroots, cigarillos and cigarettes, of tobacco, other (240290)	Malt extract; food preparations of flour, groats, meal, starch or malt extract, other (190190)	Cloves (whole fruit, cloves and stems), neither crushed nor ground (090710)
	Spirits obtained by distilling grape wine or grape marc (220820)	Frozen fillets, swordfish (030484)	Malt extract; food preparations of flour, groats, meal, starch or malt extract, other (190190)

Country	Top 5 Revealed comparative advantage products (2015)	Top 5 Revealed comparative advantage products (2018)	Top 5 Revealed comparative advantage products (average, 2015–2018)
<b>Thailand</b>	Durians, fresh (081060)	Starches, manioc (cassava) starch (110814)	Starches, manioc (cassava) starch (110814)
	Manioc (cassava), fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets (071410)	Durians, fresh (081060)	Durians, fresh (081060)
	Starches, manioc (cassava) starch (110814)	Manioc (cassava), fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets (071410)	Manioc (cassava), fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets (071410)
	Pineapples, whether or not containing added sugar or other sweetening matter or spirit (200820)	Pineapples, whether or not containing added sugar or other sweetening matter or spirit (200820)	Pineapples, whether or not containing added sugar or other sweetening matter or spirit (200820)
	Orchids, fresh (060313)	Other fruit, dried (081340)	Orchids, fresh (060313)
<b>Viet Nam</b>	Catfish, frozen fillets (030462)	Catfish, frozen fillets (030462)	Catfish, frozen fillets (030462)
	Tilapias, catfish, carp, eels, Nile perch and snakeheads, frozen fillets (030493)	Tilapias, catfish, carp, eels, Nile perch and snakeheads, salted but not dried or smoked and fish in brine (030564)	Catfish, frozen (030324)
	Catfish, frozen (030324)	Catfish, frozen (030324)	Cashew nuts, shelled (080132)
	Cashew nuts, shelled (080132)	Cashew nuts, shelled (080132)	Tilapias, catfish, carp, eels, Nile perch and snakeheads, frozen fillets (030493)
	Catfish, fresh or chilled fillets (030432)	Catfish, fresh or chilled fillets (030432)	Catfish, fresh or chilled fillets (030432)

Source: BACI (2020) and authors' calculations.

## KEY AGRICULTURAL PRODUCTS, AVERAGE 2015–2018

**Table 29. Live bovine animals (HS 0102), average 2015–2018**

Country	Value of exports (1000 USD)	Value of imports (1000 USD)	Net exports (1000 USD)	Product share in total agricultural exports (%)	
Brunei Darussalam	0.48	8 575.15	-8 574.67	0.00412	
Indonesia	0.00	545 687.08	-545 687.08	0.00000	
Cambodia	714.86	2 032.27	-1 317.41	0.06261	
Lao People's Democratic Republic	10 479.69	93 494.26	-83 014.57	1.53595	
Myanmar	151 449.25	120.98	151 328.27	4.42086	
Malaysia	2 063.36	44 376.15	-42 312.79	0.00965	
Philippines	2.07	12 980.66	-12 978.59	0.00003	
Singapore	36.92	48.37	-11.46	0.00040	
Thailand	128 635.06	66 247.08	62 387.98	0.37696	
Viet Nam	8 451.05	309 474.66	-301 023.61	0.03706	
Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Brunei Darussalam	100.00	24.02	Australia, Malaysia, Germany	Malaysia	0.00013
Indonesia	0.00	0.01	Australia, Singapore, United States of America	–	0
Cambodia	100.00	34.89	Australia, Viet Nam, Austria	Viet Nam	0.07165
Lao People's Democratic Republic	77.77	99.14	Thailand, Viet Nam, Australia	Viet Nam, China	20.82549
Myanmar	40.58	100.00	Thailand	China, Thailand, Bangladesh	78.87734
Malaysia	100.00	16.56	Australia, Thailand, New Zealand	Brunei Darussalam, Indonesia, Lao People's Democratic Republic	0.08308

Philippines	100.00	0.78	Australia, New Zealand, Viet Nam	Thailand	0.00004
Singapore	95.09	2.16	United States of America, Australia, United Kingdom of Great Britain and Northern Ireland	Indonesia, Malaysia, China, Hong Kong Special Administrative Region	0.00051
Thailand	100.00	92.67	Myanmar, Australia, United States of America	Lao People's Democratic Republic, Viet Nam, Malaysia	13.78420
Viet Nam	97.53	14.49	Australia, Thailand, Lao People's Democratic Republic	Lao People's Democratic Republic, Cambodia, China	0.32848

Source: BACI (2020) and authors' calculations, computed at the HS4 level of classification (HS 2012).

**Table 30. Live swine (HS 0103), average 2015–2018**

Country	Value of exports (1000 USD)	Value of imports (1000 USD)	Net exports (1000 USD)	Product share in total agricultural exports (%)	
Indonesia	56 067.92	17.31	56 050.61	0.15712	
Cambodia	850.82	43 603.07	-42 752.26	0.07452	
Lao People's Democratic Republic	353.76	46 929.63	-46 575.87	0.05185	
Myanmar	37.78	4 148.09	-4 110.31	0.00110	
Malaysia	2 518.71	886.93	1 631.79	0.01178	
Philippines	0.00	2 369.78	-2 369.78		
Singapore	0.80	58 657.13	-58 656.33	0.00001	
Thailand	93 529.41	1 787.57	91 741.84	0.27409	
Viet Nam	36 399.20	5 576.97	30 822.23	0.15963	
Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Indonesia	100.00	4.60	United Kingdom of Great Britain and Northern Ireland, Singapore, Denmark	Singapore, Timor-Leste	1.54015
Cambodia	100.00	100.00	Thailand, Lao People's Democratic Republic, Viet Nam	Lao People's Democratic Republic	0.35114

Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Lao People's Democratic Republic	97.64	99.98	Thailand, Cambodia, Viet Nam	Cambodia, Viet Nam, China	1.73352
Myanmar	70.13	100.00	Thailand	Thailand, India	0.01342
Malaysia	100.00	4.28	United States of America, Denmark, Canada	Singapore	0.04613
Philippines	0.00	0.00	Netherlands, United States of America, Canada	–	0
Singapore	100.00	99.88	Indonesia, Malaysia, United States of America	Indonesia	0.00002
Thailand	99.94	1.80	Denmark, Canada, United States of America	Lao People's Democratic Republic, Cambodia, Myanmar	15.92509
Viet Nam	1.28	7.48	Denmark, Canada, United States of America	China, Lao People's Democratic Republic, Cambodia	2.74763

Source: BACI (2020) and authors' calculations, computed at the HS4 level of classification (HS 2012).

**Table 31. Live poultry (HS 0105), average 2015–2018**

Country	Value of exports (1000 USD)	Value of imports (1000 USD)	Net exports (1000 USD)	Product share in total agricultural exports (%)
Brunei Darussalam	0.00	1 304.47	-1 304.47	0.00000
Indonesia	34.56	18 143.09	-18 108.53	0.00010
Cambodia	25.76	2 049.09	-2 023.33	0.00226
Lao People's Democratic Republic	90.38	1 232.20	-1 141.83	0.01325
Myanmar	300.27	8 722.14	-8 421.87	0.00876
Malaysia	185 346.27	15 484.90	169 861.37	0.86717
Philippines	201.18	0.00	201.18	0.00279
Singapore	54.06	179 175.74	-179 121.68	0.00058
Thailand	8 996.07	25 344.62	-16 348.55	0.02636
Viet Nam	515.34	9 890.99	-9 375.66	0.00226

Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Brunei Darussalam	0.00	99.54	Malaysia, Philippines, Belgium-Luxembourg	–	0
Indonesia	66.86	0.26	United States of America, New Zealand, France	Myanmar, Timor-Leste, Cambodia	0.00239
Cambodia	100.00	99.61	Thailand, Viet Nam, Malaysia	Lao People's Democratic Republic, Thailand	0.00697
Lao People's Democratic Republic	100.00	99.94	Thailand, Cambodia, China	Viet Nam	0.22208
Myanmar	17.33	66.26	Thailand, Malaysia, Australia	China, Thailand, Japan	0.12657
Malaysia	98.44	0.02	United States of America, France, United Kingdom of Great Britain and Northern Ireland	Singapore, Nepal, Myanmar	104.60754
Philippines	63.31	0.00	Netherlands, United States of America, United Kingdom of Great Britain and Northern Ireland	Nepal, Brunei Darussalam, Indonesia	0.07492
Singapore	0.00	99.93	Malaysia, Netherlands, Saudi Arabia	United States of America, Taiwan Province of China	0.00134
Thailand	77.39	1.41	Netherlands, United Kingdom of Great Britain and Northern Ireland, United States of America	Myanmar, Nepal, Cambodia	4.58901
Viet Nam	96.35	4.12	France, United States of America, Australia	Cambodia, China, Myanmar	0.04392

Source: BACI (2020) and authors' calculations, computed at the HS4 level of classification (HS 2012).

**Table 32. Meat of bovine animals, fresh or chilled (HS 0201), average 2015–2018**

Country	Value of exports (1000 USD)	Value of imports (1000 USD)	Net exports (1000 USD)	Product share in total agricultural exports (%)	
Brunei Darussalam	13.78	1014.43	-1000.65	0.11771	
Indonesia	74.92	31324.06	-31249.15	0.00021	
Cambodia	0.00	1411.19	-1411.19	0.00000	
Lao People's Democratic Republic	63.61	2326.27	-2262.66	0.00932	
Myanmar	80.41	293.11	-212.69	0.00235	
Malaysia	10061.92	19296.98	-9235.06	0.04708	
Philippines	4.88	8548.79	-8543.91	0.00007	
Singapore	2168.22	84771.61	-82603.39	0.02341	
Thailand	477.88	28539.06	-28061.17	0.00140	
Viet Nam	98.87	14343.29	-14244.42	0.00043	
Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Brunei Darussalam	100.00	0.00	Australia, United Kingdom of Great Britain and Northern Ireland	Malaysia	0.00288
Indonesia	58.62	2.47	Australia, Singapore, New Zealand	Singapore, Australia, Lao People's Democratic Republic	0.00086
Cambodia	0.00	7.70	Australia, Singapore, United States of America	–	0.00000
Lao People's Democratic Republic	99.34	80.19	Malaysia, Japan, Thailand	Viet Nam, Belgium-Luxembourg	0.01158
Myanmar	0.00	18.13	Australia, Singapore, New Zealand	China	0.00553
Malaysia	99.34	1.16	Australia, New Zealand, Japan	Thailand, Lao People's Democratic Republic, India	0.15522
Philippines	100.00	0.01	Australia, United States of America, Japan	Lao People's Democratic Republic	0.00006

Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Singapore	55.96	0.04	Australia, New Zealand, United States of America	Indonesia, Maldives, Oman	0.11214
Thailand	74.20	29.94	Australia, Malaysia, Japan	Lao People's Democratic Republic, Japan, Oman	0.01424
Viet Nam	4.65	0.61	Australia, New Zealand, Madagascar	New Zealand, France, Poland	0.00356

Source: BACI (2020) and authors' calculations, computed at the HS4 level of classification (HS 2012).

**Table 33. Meat of bovine animals, frozen (HS 0202), average 2015–2018**

Country	Value of exports (1 000 USD)	Value of imports (1 000 USD)	Net exports (1 000 USD)	Product share in total agricultural exports (%)	
Brunei Darussalam	30.64	12 924.64	-12 894.00	0.26174	
Indonesia	324.47	410 835.98	-410 511.51	0.00091	
Cambodia	144.79	37 752.93	-37 608.14	0.01268	
Lao People's Democratic Republic	660.62	16 684.88	-16 024.26	0.09682	
Myanmar	3 972.92	23 795.99	-19 823.07	0.11597	
Malaysia	10 459.50	493 803.12	-483 343.62	0.04894	
Philippines	493.39	372 023.38	-371 529.99	0.00684	
Singapore	10 348.65	12 0445.78	-110 097.13	0.11171	
Thailand	9 490.69	76 566.33	-67 075.65	0.02781	
Viet Nam	2 934.37	824 139.38	-821 205.01	0.01287	
Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Brunei Darussalam	9.52	1.93	India, Australia, Germany	United Arab Emirates, Pakistan, Malaysia	0.00637

Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Indonesia	27.63	0.68	Australia, India, New Zealand,	Angola, Singapore, Malaysia	0.00563
Cambodia	99.79	1.05	Japan, United States of America, Australia	Viet Nam, Greenland	0.00621
Lao People's Democratic Republic	97.99	55.72	Thailand, India, Japan	Thailand, Viet Nam, China	0.52183
Myanmar	0.00	0.56	India, Australia, Spain	China, Saudi Arabia	0.55995
Malaysia	72.76	1.19	India, Australia, New Zealand	Singapore, Pakistan, Oman	0.62624
Philippines	1.96	0.00	India, Australia, United States of America	United Arab Emirates, Qatar, Saudi Arabia	0.02114
Singapore	80.75	5.74	Brazil, Australia, United States of America	Malaysia, Indonesia, Maldives	0.95578
Thailand	95.79	0.72	India, Australia, New Zealand	Lao People's Democratic Republic, India, Viet Nam	0.40843
Viet Nam	35.58	0.09	India, China, Hong Kong Special Administrative Region, Paraguay	China, Malaysia, Japan	0.12616

Source: BACI (2020) and authors' calculations, computed at the HS4 level of classification (HS 2012).

**Table 34. Meat of swine, fresh, chilled or frozen (HS 0203), average 2015–2018**

Country	Value of exports (1000 USD)	Value of imports (1000 USD)	Net exports (1000 USD)	Product share in total agricultural exports (%)
Brunei Darussalam	1.55	8 866.32	-8 864.78	0.01321
Indonesia	193.98	2 809.03	-2 615.05	0.00054
Cambodia	1.13	175.70	-174.57	0.00010
Lao People's Democratic Republic	18.12	2 755.75	-2 737.63	0.00266
Myanmar	1.13	1467.19	-1 466.06	0.00003
Malaysia	9 188.02	52 681.52	-43 493.49	0.04299

Country	Value of exports (1000 USD)	Value of imports (1000 USD)	Net exports (1000 USD)	Product share in total agricultural exports (%)	
Philippines	441.89	22 6218.19	-22 5776.30	0.00613	
Singapore	5 274.04	247 165.87	-241 891.83	0.05693	
Thailand	6 260.80	5 125.17	1 135.64	0.01835	
Viet Nam	66 453.21	71 512.82	-5 059.61	0.29144	
Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Brunei Darussalam	100.00	88.27	Malaysia, Singapore, China	Malaysia	0.00016
Indonesia	90.89	18.01	United States of America, Singapore, Malaysia	Singapore, Malaysia, United States of America	0.00232
Cambodia	0.00	41.91	United States of America, Thailand, Singapore	Greenland	0.00004
Lao People's Democratic Republic	66.11	92.25	Thailand, Viet Nam, Italy	Thailand, China, Singapore	0.00535
Myanmar	100.00	38.45	China, Thailand, Singapore	Singapore	0.00004
Malaysia	97.80	18.81	Germany, Spain, Viet Nam	Brunei Darussalam, Singapore, Indonesia	0.50152
Philippines	5.64	0.00	Germany, Canada, United States of America	Qatar, United Arab Emirates, Canada	0.01820
Singapore	49.58	0.74	Brazil, Australia, Netherlands	United States of America, Malaysia, Brunei Darussalam	0.45224
Thailand	57.78	4.33	Netherlands, Italy, Spain	Lao People's Democratic Republic, China, Hong Kong Special Administrative Region, Malaysia	0.28840
Viet Nam	12.44	0.31	China, Hong Kong Special Administrative Region, United States of America, Poland	Hong Kong Special Administrative Region, Malaysia, China, Macao Special Administrative Region	2.65306

Source: BACI (2020) and authors' calculations, computed at the HS4 level of classification (HS 2012).

**Table 35. Meat and edible offal of the poultry, fresh, chilled or frozen (HS 0207), average 2015–2018**

Country	Value of exports (1000 USD)	Value of imports (1000 USD)	Net exports (1000 USD)	Product share in total agricultural exports (%)	
Brunei Darussalam	9.79	9 741.48	-9 731.69	0.08360	
Indonesia	33.27	8 913.28	-8 880.01	0.00009	
Cambodia	9.92	10 353.91	-10 344.00	0.00087	
Lao People's Democratic Republic	164.13	95 957.13	-95 793.01	0.02405	
Myanmar	22.10	8 869.16	-8 847.06	0.00065	
Malaysia	21 795.76	152 156.74	-130 360.98	0.10197	
Philippines	4 708.72	175 646.24	-170 937.52	0.06530	
Singapore	17 654.23	233 663.33	-216 009.10	0.19057	
Thailand	616 472.22	11 619.06	604 853.16	1.80656	
Viet Nam	8 586.78	618 754.83	-610 168.05	0.03766	
Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Brunei Darussalam	100.00	45.92	Malaysia, Netherlands, United Kingdom of Great Britain and Northern Ireland	Malaysia, Viet Nam	0.00183
Indonesia	0.00	88.31	Singapore, Malaysia, France	Maldives, Ireland, Timor-Leste	0.00023
Cambodia	95.88	40.04	Japan, Thailand, China	Thailand, Slovakia	0.00054
Lao People's Democratic Republic	100.00	97.36	Thailand, Türkiye, China	Viet Nam, Thailand	0.09839
Myanmar	0.00	62.03	Thailand, China, Hong Kong Special Administrative Region, Netherlands	Kuwait, Qatar	0.00111
Malaysia	81.27	44.51	Thailand, China, Brazil	Singapore, Brunei Darussalam, Thailand	3.13140
Philippines	0.00	0.02	United States of America, Netherlands, Brazil	Japan, United Arab Emirates, Qatar	0.36612

Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Singapore	67.23	3.72	Brazil, United States of America, Malaysia	Indonesia, Malaysia, Timor-Leste	3.37494
Thailand	27.53	31.87	Malaysia, China, Hong Kong Special Administrative Region, Hungary	Japan, Lao People's Democratic Republic, Malaysia	184.15919
Viet Nam	0.66	0.65	China, Hong Kong Special Administrative Region, United States of America, Republic of Korea	China, Japan, Pakistan	0.55018

Source: BACI (2020) and authors' calculations, computed at the HS4 level of classification (HS 2012).

**Table 36. Milk and dairy products (HS 0401–0406), average 2015–2018**

Country	Value of exports (1000 USD)	Value of imports (1000 USD)	Net exports (1000 USD)	Product share in total agricultural exports (%)	
Brunei Darussalam	488.82	37 980.45	-37 491.63	4.17604	
Indonesia	44 066.94	898 125.49	-854 058.55	0.12349	
Cambodia	147.27	73 211.95	-73 064.67	0.01290	
Lao People's Democratic Republic	778.98	31 203.18	-30 424.20	0.11417	
Myanmar	183.40	92 849.01	-92 665.60	0.00535	
Malaysia	348 658.97	801 083.37	-452 424.40	1.63125	
Philippines	13 717.31	920 864.70	-907 147.39	0.19024	
Singapore	231 573.28	735 676.11	-504 102.83	2.49979	
Thailand	236 978.19	560 231.26	-323 253.07	0.69446	
Viet Nam	36 410.95	554 163.62	-517 752.68	0.15968	
Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Brunei Darussalam	98.81	68.24	Malaysia, Australia, Singapore	Malaysia, Philippines, Singapore	0.22730
Indonesia	46.01	2.35	New Zealand, United States of America, Australia	Philippines, Timor-Leste, Nigeria	12.71274

Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Cambodia	94.59	81.47	Thailand, Viet Nam, France	Viet Nam, United States of America, Ireland	0.00347
Lao People's Democratic Republic	97.67	99.12	Thailand, Viet Nam, Singapore	Viet Nam, Mauritania, Bangladesh	0.31448
Myanmar	16.56	45.33	New Zealand, Singapore, Thailand	Sri Lanka, Singapore, Republic of Korea	0.00555
Malaysia	32.74	2.18	New Zealand, Australia, United States of America	China, Hong Kong Special Administrative Region, Philippines, Singapore	174.81096
Philippines	46.29	7.73	New Zealand, United States of America, Australia	United Arab Emirates, Malaysia, Viet Nam	6.00401
Singapore	23.22	11.89	New Zealand, Australia, Thailand	Japan, China, Hong Kong Special Administrative Region, Myanmar	91.67751
Thailand	78.99	2.53	New Zealand, Australia, France	Singapore, Cambodia, Lao People's Democratic Republic	60.95613
Viet Nam	37.65	4.86	New Zealand, United States of America, Australia	China, China, Hong Kong Special Administrative Region, Cambodia	4.06144

Source: BACI (2020) and authors' calculations, computed at the HS4 level of classification (HS 2012).

**Table 37. Wheat and meslin (HS 1001), average 2015–2018**

Country	Value of exports (1000 USD)	Value of imports (1000 USD)	Net exports (1000 USD)	Product share in total agricultural exports (%)	
Brunei Darussalam	0.00	32.33	-32.33	0.00000	
Indonesia	1 499.98	228 3202.60	-228 1702.62	0.00420	
Cambodia	0.00	9 800.36	-9 800.36	0.00000	
Lao People's Democratic Republic	0.00	231.15	-231.15	0.00000	
Myanmar	70.42	105 329.48	-105 259.06	0.00206	
Malaysia	2 517.07	347 065.53	-344 548.46	0.01178	
Philippines	1.89	122 6445.30	-122 6443.41	0.00003	
Singapore	11 247.95	54 200.02	-42 952.07	0.12142	
Thailand	692.21	743 605.88	-742 913.67	0.00203	
Viet Nam	4 724.67	821 664.54	-816 939.87	0.02072	
Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Brunei Darussalam	0.00	73.08	Malaysia, India, Australia	–	0
Indonesia	5.41	0.05	Australia, Canada, Ukraine	Papua New Guinea, Singapore, Taiwan Province of China	0.02136
Cambodia	0.00	13.84	Australia, Viet Nam, Ukraine	–	0
Lao People's Democratic Republic	0.00	100.00	Thailand, Viet Nam	–	0
Myanmar	4.32	1.04	Australia, United States of America, Moldova	China, Thailand	0.00261
Malaysia	98.75	0.93	Australia, Canada, United States of America	Singapore, Viet Nam, Philippines	0.04663
Philippines	0.00	0.03	United States of America, Australia, Ukraine	United Kingdom of Great Britain and Northern Ireland, United States of America	0.00001

Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Singapore	17.85	3.17	Australia, United States of America, Canada	Israel, Bangladesh, Indonesia	0.23277
Thailand	96.99	0.01	Ukraine, United States of America, Australia	Myanmar, Lao People's Democratic Republic, Malaysia	0.00865
Viet Nam	98.12	0.08	Australia, Russian Federation, Canada	Malaysia, Cambodia, Philippines	0.04525

Source: BACI (2020) and authors' calculations, computed at the HS4 level of classification (HS 2012).

**Table 38. Maize (corn) (HS 1005), average 2015–2018**

Country	Value of exports (1000 USD)	Value of imports (1000 USD)	Net exports (1000 USD)	Product share in total agricultural exports (%)	
Brunei Darussalam	56.84	4 008.54	-3 951.70	0.48562	
Indonesia	32 388.94	25 9910.67	-22 7521.73	0.09077	
Cambodia	11 125.88	58 97.73	5 228.15	0.97445	
Lao People's Democratic Republic	52 614.30	1 341.84	51 272.46	7.71139	
Myanmar	148 473.92	18 655.30	129 818.62	4.33401	
Malaysia	7 786.98	861 331.99	-853 545.01	0.03643	
Philippines	2 951.91	175 332.35	-172 380.44	0.04094	
Singapore	66 593.37	11 616.50	54 976.88	0.71886	
Thailand	156 486.10	28 068.38	128 417.72	0.45858	
Viet Nam	16 486.88	1 485 197.00	-1 468 710.12	0.07231	
Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Brunei Darussalam	100.00	10.16	Argentina, Malaysia, India	Malaysia	0.00515

Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Indonesia	96.18	3.20	Argentina, Brazil, United States of America	Philippines, Viet Nam, Brazil	1.11700
Cambodia	96.28	92.73	Thailand, Viet Nam, Brazil	Thailand, Viet Nam, Taiwan Province of China	1.03273
Lao People's Democratic Republic	26.30	76.96	Thailand, China, Viet Nam	China, Thailand, Viet Nam	28.56077
Myanmar	5.87	69.38	Thailand, India, Brazil	China, Viet Nam, Philippines	62.66333
Malaysia	93.50	0.47	Argentina, Brazil, United States of America	Singapore, Indonesia, Sri Lanka	0.26033
Philippines	71.01	65.01	Thailand, Indonesia, United States of America	Viet Nam, Indonesia, Pakistan	0.23259
Singapore	1.61	55.09	Malaysia, Southern African Customs Union, India	Islamic Republic of Iran, Malawi, Republic of Korea	1.77654
Thailand	78.51	76.58	Lao People's Democratic Republic, Cambodia, Southern African Customs Union	Philippines, Viet Nam, Myanmar	20.25436
Viet Nam	82.08	2.51	Argentina, Brazil, United States of America	Philippines, Cambodia, Japan	0.73075

Source: BACI (2020) and authors' calculations, computed at the HS4 level of classification (HS 2012).

**Table 39. Rice (HS 1006), average 2015–2018**

Country	Value of exports (1000 USD)	Value of imports (1000 USD)	Net exports (1000 USD)	Product share in total agricultural exports (%)	
Brunei Darussalam	477.38	31 879.52	-31 402.14	4.07833	
Indonesia	3 769.10	543 039.24	-539 270.14	0.01056	
Cambodia	340 332.13	4 990.11	335 342.02	29.80783	
Lao People's Democratic Republic	40 457.40	48 089.66	-7 632.26	5.92962	
Myanmar	400 464.50	7 518.84	392 945.66	11.68972	
Malaysia	9 984.15	42 5421.39	-41 5437.24	0.04671	
Philippines	1 136.04	557 278.54	-556 142.50	0.01576	
Singapore	47 603.82	231 567.03	-183 963.21	0.51387	
Thailand	4 993 068.30	38 439.23	4 954 629.07	14.63206	
Viet Nam	2 230 098.20	43 788.74	2 186 309.46	9.78038	
Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Brunei Darussalam	97.35	91.63	Thailand, Cambodia, Viet Nam	Singapore, Malaysia, Egypt	0.21612
Indonesia	9.63	76.73	Viet Nam, Thailand, Pakistan	Mali, Bangladesh, Sri Lanka	0.47300
Cambodia	12.63	58.02	Thailand, United States of America, Viet Nam	China, France, Germany	1425.16140
Lao People's Democratic Republic	14.60	98.61	Thailand, United States of America, China	China, Viet Nam, Belgium-Luxembourg	154.94305
Myanmar	8.98	78.34	Thailand, Republic of Korea, China	Belgium-Luxembourg, Cote d'Ivoire, Bangladesh	2369.87460
Malaysia	44.76	81.87	Thailand, Viet Nam, Pakistan	Indonesia, Senegal, Southern African Customs Union	0.76551

Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Philippines	45.72	89.33	Viet Nam, Thailand, India	Indonesia, United Arab Emirates, Viet Nam	0.22690
Singapore	59.93	67.69	Thailand, India, Viet Nam	Indonesia, Benin, Malaysia	9.16116
Thailand	15.34	6.46	Niger, Australia, Lao People's Democratic Republic	Benin, China, United States of America	4 867.24990
Viet Nam	28.72	41.39	China, Thailand, Lao People's Democratic Republic	China, Philippines, Ghana	1 621.27710

Source: BACI (2020) and authors' calculations, computed at the HS4 level of classification (HS 2012).

**Table 40. Seeds (HS 1201–1209), average 2015–2018**

Country	Value of exports (1000 USD)	Value of imports (1000 USD)	Net exports (1000 USD)	Product share in total agricultural exports (%)	
Brunei Darussalam	89.94	1 448.52	-1 358.58	0.76836	
Indonesia	75 249.57	1 326 115.30	-1 250 865.73	0.21088	
Cambodia	25 742.07	7 254.39	18 487.68	2.25461	
Lao People's Democratic Republic	5 554.08	2 886.89	2 667.19	0.81403	
Myanmar	181 940.68	60 521.82	121 418.86	5.31092	
Malaysia	48 090.73	427 475.55	-379 384.82	0.22500	
Philippines	9 717.19	377 790.98	-368 073.79	0.13476	
Singapore	52 973.00	81 671.59	-28 698.59	0.57183	
Thailand	291 092.24	1 219 977.90	-928 885.66	0.85304	
Viet Nam	59 522.79	1 011 693.70	-952 170.92	0.26104	
Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Brunei Darussalam	80.21	29.19	Canada, India, Malaysia	Malaysia, Egypt, Mozambique	0.01204

Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Indonesia	47.19	2.36	United States of America, India, China	Malaysia, Bangladesh, Philippines	12.45656
Cambodia	97.69	26.21	United States of America, India, Thailand	Viet Nam, Thailand, Malaysia	4.62327
Lao People's Democratic Republic	82.78	67.70	Thailand, China, India	Thailand, China, Viet Nam	4.67404
Myanmar	29.98	12.87	United States of America, China, Thailand	China, Thailand, Japan	211.44333
Malaysia	64.37	10.10	United States of America, Canada, India	Indonesia, Pakistan, Sri Lanka	6.25173
Philippines	46.78	3.27	United States of America, India, Papua New Guinea	India, Thailand, Malaysia,	1.39091
Singapore	17.12	10.92	Burkina Faso, Canada, India	Islamic Republic of Iran, Israel, Indonesia	4.93752
Thailand	13.86	5.17	Brazi, United States of America, China	Mexico, United States of America, India	106.48874
Viet Nam	7.01	3.75	United States of America, Brazil, India	China, Mexico, United States of America	11.21742

Source: BACI (2020) and authors' calculations, computed at the HS4 level of classification (HS 2012).

**Table 41. Vegetable oils (soya-bean oil, palm oil, coconut oil, colza oil) (HS 1507, 1511, 1513, 1514), average 2015–2018**

Country	Value of exports (1000 USD)	Value of imports (1000 USD)	Net exports (1000 USD)	Product share in total agricultural exports (%)	
Brunei Darussalam	18.71	5 978.62	-5 959.91	0.15983	
Indonesia	19 241 979.00	55 527.65	19 186 451.35	53.92308	
Cambodia	21 042.31	47 966.76	-26 924.45	1.84298	
Lao People's Democratic Republic	4.82	4 736.87	-4 732.05	0.00071	
Myanmar	913.25	551 608.57	-550 695.32	0.02666	
Malaysia	11 234 396.00	1 192 812.20	10 041 583.80	52.56177	
Philippines	1 314 255.20	583 963.14	730 292.06	18.22674	
Singapore	273 205.38	388 913.99	-115 708.61	2.94920	
Thailand	319 668.91	65 422.89	254 246.02	0.93678	
Viet Nam	112 546.26	559 539.34	-446 993.08	0.49359	
Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Brunei Darussalam	1.78	96.51	Malaysia, Indonesia, Singapore	China, Hong Kong Special Administrative Region, Jordan, United Arab Emirates	0.00406
Indonesia	9.13	50.25	Malaysia, Australia, Papua New Guinea	India, China, Pakistan	13 106.12100
Cambodia	58.37	99.94	Viet Nam, Thailand, Malaysia	Malaysia, Switzerland, Kenya	3.36893
Lao People's Democratic Republic	0.00	99.15	Thailand, Malaysia, Viet Nam	United Arab Emirates, China	0.00036
Myanmar	1.69	99.60	Indonesia, Malaysia, Thailand	Switzerland, Thailand, Madagascar	0.06763
Malaysia	9.39	79.80	Indonesia, Thailand, Argentina	India, China, Netherlands	8 555.98190

Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Philippines	2.85	98.43	Malaysia, Indonesia, Thailand	United States of America, Netherlands, Japan	729.39070
Singapore	7.45	93.71	Malaysia, Indonesia, United Arab Emirates	Islamic Republic of Iran, India, United States of America	80.83539
Thailand	57.87	94.91	Indonesia, Malaysia, Australia	Malaysia, India, Myanmar	65.52984
Viet Nam	39.45	93.45	Malaysia, Indonesia, Argentina	Cambodia, Republic of Korea, United States of America	12.96914

Source: BACI (2020) and authors' calculations, computed at the HS4 level of classification (HS 2012).

**Table 42. Prepared or preserved meat (HS 1601, 1602), average 2015–2018**

Country	Value of exports (1000 USD)	Value of imports (1000 USD)	Net exports (1000 USD)	Product share in total agricultural exports (%)	
Brunei Darussalam	94.71	11 086.72	-10 992.01	0.80913	
Indonesia	590.01	28 010.49	-27 420.48	0.00165	
Cambodia	34.60	14 021.69	-13 987.09	0.00303	
Lao People's Democratic Republic	9.27	1 854.45	-1 845.18	0.00136	
Myanmar	246.56	7 712.39	-7 465.83	0.00720	
Malaysia	145 594.48	27 086.72	118 507.76	0.68119	
Philippines	20 918.68	83 026.38	-62 107.70	0.29011	
Singapore	9 300.19	163 187.79	-153 887.60	0.10039	
Thailand	2 513 959.90	33 093.21	2 480 866.69	7.36709	
Viet Nam	5 650.09	45 894.70	-40 244.61	0.02478	
Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Brunei Darussalam	55.41	75.57	Malaysia, Australia, China	Malaysia, Myanmar, Türkiye	0.10694

Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Indonesia	28.44	24.30	Australia, United States of America, Malaysia	China, Hong Kong Special Administrative Region, Singapore, Timor-Leste	0.05618
Cambodia	95.19	84.71	Thailand, China, Malaysia	Thailand, Germany, Greenland	0.00344
Lao People's Democratic Republic	26.54	93.70	Thailand, Viet Nam, Republic of Korea	China, Thailand, Viet Nam	0.00529
Myanmar	4.76	57.81	Thailand, China, Republic of Korea	China, Japan, Thailand	0.06228
Malaysia	29.07	5.96	China, Denmark, Singapore	Saudi Arabia, Singapore, United Arab Emirates	66.48834
Philippines	2.75	1.99	United States of America, China, New Zealand	United Arab Emirates, Qatar, Japan	21.92717
Singapore	61.06	61.92	Thailand, Malaysia, China	Indonesia, China, Hong Kong Special Administrative Region, Malaysia	4.48499
Thailand	3.64	3.04	China, Australia, Argentina	Japan, United Kingdom of Great Britain and Northern Ireland, Netherlands	1 523.83200
Viet Nam	13.44	5.40	China, Hong Kong Special Administrative Region, United States of America, Saudi Arabia	Japan, China, Hong Kong Special Administrative Region, China	0.95687

Source: BACI (2020) and authors' calculations, computed at the HS4 level of classification (HS 2012).

**Table 43. Cane or beet sugar (HS 1701), average 2015–2018**

Country	Value of exports (1 000 USD)	Value of imports (1 000 USD)	Net exports (1 000 USD)	Product share in total agricultural exports (%)	
Brunei Darussalam	5.87	5 856.35	-5 850.48	0.05011	
Indonesia	14 798.97	1 665 311.30	-1 650 512.33	0.04147	
Cambodia	25 844.91	246 392.73	-220 547.83	2.26361	
Lao People's Democratic Republic	41 766.73	58 372.12	-16 605.39	6.12152	
Myanmar	573 446.24	741 400.32	-167 954.08	16.73913	
Malaysia	80 676.34	707 105.18	-626 428.84	0.37746	
Philippines	89 219.01	108 995.28	-19 776.27	1.23733	
Singapore	72 437.65	146 413.31	-73 975.66	0.78195	
Thailand	2 916 979.10	8 185.91	2 908 793.19	8.54813	
Viet Nam	32 253.13	162 646.93	-130 393.80	0.14145	
Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Brunei Darussalam	100.00	76.17	Thailand, Singapore, Egypt	Malaysia	0.00068
Indonesia	84.55	59.34	Thailand, Australia, Brazil	Myanmar, United States of America, Singapore	2.92442
Cambodia	46.09	98.85	Thailand, Morocco, Pakistan	Viet Nam, China, Croatia	7.83569
Lao People's Democratic Republic	39.26	99.96	Thailand, Viet Nam, Cuba	Viet Nam, Thailand, China	41.78324
Myanmar	0.35	42.55	Thailand, India, Brazil	China, Indonesia, Malaysia	211.39156
Malaysia	39.35	16.41	Brazil, Thailand, Australia	Singapore, Republic of Korea, New Zealand	13.32086
Philippines	2.47	82.60	Thailand, China, Viet Nam	United States of America, China, Japan	33.68066

Country	Share of intraregional exports (%)	Share of intraregional imports (%)	Top 3 source markets	Top 3 destination markets	Revealed comparative advantage index
Singapore	24.12	50.66	Thailand, Australia, Malaysia	Islamic Republic of Iran, Myanmar, Bangladesh	14.01275
Thailand	65.71	90.38	Lao People's Democratic Republic, United States of America, Taiwan Province of China	Indonesia, Myanmar, Cambodia	1 425.82030
Viet Nam	26.42	75.00	Thailand, Cambodia, United Arab Emirates	China, Myanmar, Philippines	2.37756

Source: BACI (2020) and authors' calculations, computed at the HS4 level of classification (HS 2012).

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