

# Exploring Pathways for Deeper Regional Cooperation in ASEAN and East Asia

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*Regulatory harmonization is increasingly recognized as a key component of deeper regional integration. However, identifying the optimal approach to regulatory harmonization remains a challenge. This paper proposes a metric to identify the optimal benchmark country for aligning national regulatory frameworks within a regional trade agreement. Using the United Nations Trade and Development's (UNCTAD) non-tariff measures database, we develop a bilateral regulatory dissimilarity indicator to quantify regulatory differences between countries. We then identify the optimal benchmark country whose regulatory framework minimizes regulatory adoption costs for other members in the cases of regional integration efforts in Asia. When considering all merchandise, our findings indicate that Vietnam serves as the least costly, optimal benchmark for the AEC, while Australia is optimal for the CPTPP and RCEP. In comparison, using Cambodia or Malaysia as the benchmark incurs high regulatory adoption costs, suggesting the need for policy efforts by these countries. The study also highlights sectoral variations in regulatory differences. These findings offer valuable insights for policymakers seeking to advance regulatory harmonization and facilitate deeper integration.*

**Keywords:** non-tariff measures, regional agreements, regional integration, technical regulations, regulatory harmonization

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## 1. Introduction

Unlike the past era of double-digit growth in international trade, current expectations remain uncertain. In 2023, global trade in goods contracted by 4.5 per cent (UNCTAD 2023). Recent disruptions, including the coronavirus disease (COVID-19) pandemic, the war in Ukraine and rising tensions between China and the United States (US) have raised scepticism about trade liberalization. In this context, the role of non-tariff measures (NTMs) has drawn increasing attention as they offer greater policy discretion than tariffs, which have already been reduced to sufficiently low levels. Many countries now participate in multiple free trade agreements (FTAs), including mega FTAs with numerous countries. However, FTAs vary widely in terms of the extent to which they achieve deeper integration—beyond tariff reductions—by eliminating unnecessary non-tariff barriers to trade, such as those arising from regulatory differences across countries.

Regulatory harmonization is often discussed as part of deeper integration efforts. Empirical studies indicate that regulatory harmonization can boost bilateral trade within a regional trade agreement (Mattoo, Mulabdic and Ruta 2022). However, even when countries recognize its importance, the optimal approach towards regulatory harmonization remains unclear. In principle, harmonization requires all member countries to adopt a common regulatory framework. If a country's domestic regulations differ from this agreed framework, they must be revised accordingly. One approach is to draft an entirely new regulatory framework as a benchmark, but a more practical strategy is to begin by aligning existing frameworks. However, this raises another issue concerning the choice of regulatory framework that should serve as the benchmark.

This paper aims to address this issue by proposing a metric to identify the country that could serve as an optimal benchmark so other members can align their national regulatory frameworks within a given regional trade agreement. Specifically, we utilize UNCTAD's NTM database—based on national regulations on technical measures and other NTMs—to propose an indicator that quantifies regulatory differences between countries. Using these calculated bilateral regulatory differences, we identify the optimal benchmark country whose regulatory framework minimizes adoption costs for other members. We focus on regional integration efforts in Asia and examine the Association of Southeast Asian Nations (ASEAN) Economic Community (AEC), the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), the Regional Comprehensive Economic Partnership (RCEP) and the ongoing China-Japan-Korea (CJK) FTA negotiations.<sup>1</sup> To the best of the authors' knowledge, this is the first study that proposes a metric for identifying an optimal regulatory benchmark within a regional trade agreement. In addition to identifying the benchmark country, our analysis also highlights priority sectors and countries facing high regulatory adoption costs. This provides a foundation for constructive discussions on regulatory harmonization and facilitates deeper economic integration.

This paper is closely related to the literature on regulatory distance and dissimilarity measures that quantify differences in the existence and implementation pattern of NTMs across countries (Cadot et al. 2015; Cadot and Ing 2015; Inui et al. 2021; Knebel and Peters 2019). Unlike existing measures, our proposed bilateral regulatory dissimilarity indicator quantifies differences in regulatory frameworks for a specific sector or product between trading countries by calculating the cosine (dis)similarity between: (i) a set of technical measures on domestic production and sales in the exporting (origin) country and (ii) a set of regulatory measures imposed by the destination country on imports from the origin country. This approach accounts for the diverse nature of regulatory regimes across countries as well as the fact that countries often implement multiple technical measures in combination to regulate a single product. Moreover, this paper contributes to the literature by introducing a novel application of regulatory dissimilarity measures to develop a metric for identifying the least costly, optimal benchmark country for regulatory harmonization within a regional trade agreement.

Our study also builds upon previous research by proposing summary indicators to assess regulatory differences between countries at the product level as an alternative to the conventional count variable

and frequency ratio approaches. These conventional methods rely on dummy variables indicating the presence of technical measures or other NTMs on certain products (Bowen et al. 2016; Disdier and Fugazza 2020; Kee et al. 2009; Niu et al. 2018). For instance, Drogué and DeMaria (2012) employed Pearson’s distance to measure dissimilarity between vectors representing maximum residue limits (MRLs) on apples and pears. While the Drogué and DeMaria (2012)’s indicator is symmetric between a given pair of countries, Winchester et al. (2012) proposed a directional indicator to assess the relative stringency of MRLs affecting animal and plant products in the destination compared to the origin country. Instead of using these indicators, which are based on quantitative information on MRLs, our proposed bilateral regulatory dissimilarity indicator is designed to capture international differences in regulatory frameworks using qualitative information from national legal documents that specify a series of technical measures as compiled in UNCTAD’s NTM database.

Existing studies on the trade effects of NTMs suggest that regulatory differences in technical measures can hinder bilateral trade (Nabeshima and Obashi 2021) by leading to smaller quantities of fewer products traded (Nabeshima et al. 2021). Given that most countries engaged in regional integration have already lowered tariff rates for most goods, regulatory harmonization could serve as an additional policy tool to stimulate trade expansion. Indeed, empirical studies suggest that regulatory harmonization within a regional trade agreement—when accompanied by an appropriate legal and institutional framework—can yield welfare gains for member countries in specific regions such as: (i) UNCTAD (2015) and Vanzetti et al. (2016) for Southern African Development Community (SADC), (ii) UNCTAD (2017) for Mercosur (Southern Common Market) and UNCTAD (2018) for the Economic Community of West African States (ECOWAS) and the West African Economic and Monetary Union (WAEMU).

The rest of this paper is structured as follows: Section 2 presents our methodology for quantifying international regulatory differences and identifying the optimal benchmark country for regulatory harmonization within a regional trade agreement, followed by a data description. Section 3 presents analytical results on bilateral regulatory differences and adoption costs for regional integration efforts in Asia. Section 4 concludes with policy discussions.

## 2. Methodology and Data

This section introduces a bilateral regulatory dissimilarity indicator to quantify regulatory differences across countries based on Nabeshima and Obashi (2021). Using this metric, Section 2.2 shows how to identify the optimal benchmark that minimises regulatory adoption costs within a regional trade agreement. Section 2.3 describes the NTM dataset used to calculate dissimilarity indicators and approximate the adoption costs.

### 2.1 Bilateral Regulatory Dissimilarity Indicator

First, we construct a vector representing the domestic regulatory framework in country  $o$  for product  $i$  as:

$$F_{oi}^D = (F_{oi1}^D, \dots, F_{oik}^D, \dots, F_{oiK}^D) \quad (\text{Equation 1})$$

where  $F_{oik}^D$  is the number of regulatory measures in force within measure type  $k$ . This domestic regulation vector is approximated by a set of import measures imposed by country  $o$  on product  $i$ , regardless of its origin, as these measures generally apply to domestic production and sales as well. Similarly, we construct another vector representing the regulatory framework in country  $d$  for product  $i$  imported from country  $o$ :

$$F_{odi}^F = (F_{odi1}^F, \dots, F_{odik}^F, \dots, F_{odiK}^F) \tag{Equation 2}$$

where  $F_{odik}^F$  is the number of technical measures in force within type  $k$ . Using these vectors, Equations (1) and (2), we define the bilateral regulatory dissimilarity indicator for exporter  $o$  relative to importer  $d$  as:

$$\text{Dissimilarity}_{od} = 1 - \text{Cos}(\theta)_{od} \tag{Equation 3}$$

$$\text{Cos}(\theta)_{od} = \frac{F_o^D \cdot F_{od}^{F'}}{\|F_o^D\| \|F_{od}^F\|} = \frac{\sum_{i=1}^I \sum_{k=1}^K F_{oik}^D F_{odik}^F}{\sqrt{\sum_{i=1}^I \sum_{k=1}^K (F_{oik}^D)^2} \sqrt{\sum_{i=1}^I \sum_{k=1}^K (F_{odik}^F)^2}}, \tag{Equation 4}$$

where  $F_o^D = (F_{o1}^D, \dots, F_{oi}^D, \dots, F_{oI}^D)$  and  $F_{od}^F = (F_{od1}^F, \dots, F_{odi}^F, \dots, F_{odI}^F)$ .  $I$  is the total number of products under study.<sup>2</sup> This bilateral dissimilarity indicator ranges from 0 to 1, indicating complete similarity to orthogonality or decorrelation, respectively.

Our dissimilarity indicator bilaterally captures the regulatory differences between each importer and exporter. The indicator particularly focuses on the additional requirements that exporters need to follow before entering the foreign market. We assume that domestic regulations in the exporters' market are prerequisites for the exporters before entering the importers' market. As such, the indicator solely calculates the different regulations that importers impose relative to the exporters' domestic market. The smaller the indicator, the lesser the burden on exporters when entering the foreign market. This implies that regulation harmonisation is relatively high compared with the relationship where our regulatory dissimilarity indicator shows a higher value closer to 1.

### 2.2 Regulatory Adoption Costs and the Optimal Benchmark

Next, we examine regulatory harmonization within a regional trade agreement to determine which country's regulatory framework would serve as the most suitable benchmark for other member countries to align their regulations. Our research is particularly interested in evaluating baseline regulatory differences among sample countries. Let  $\mathcal{R}$  be a set of countries participating in a given regional trade agreement with  $N$  representing the total number of members. Suppose country  $o \in \mathcal{R}$  is chosen as the benchmark, meaning that all other members will adjust their regulations to match it. To approximate the overall adjustment costs of regulatory harmonization, the squared sum of the bilateral regulatory dissimilarity indicators was calculated—as seen in Equation (3)—for country  $o$  relative to all other members  $d \neq o$ . To account for differences in the number of members across regional integration efforts, we normalize this sum by the degree of freedom,  $N-1$ , which represents the average adjustment cost borne by members other than the benchmark country. The lower the (normalized) squared sum, the smaller the regulatory adjustment required on average. In other words, when countries pursue regulatory harmonization through regional integration, it is optimal to select the country with the lowest squared sum as the benchmark because it minimizes the regulatory adoption costs for all members. The optimal benchmark country  $o^*$  for a given trade agreement is identified as:

$$o^* = \underset{o \in \mathcal{R}}{\text{argmin}} \frac{\sum_{d \neq o} (\text{Dissimilarity}_{od})^2}{N - 1} \tag{Equation 5}$$

As a reference, we calculate the squared sums by including major economies in regional and global markets, such as the US, the European Union (EU), China, Japan and Korea. This allows us to assess how the optimal benchmark country changes when coordination with large market economies outside regional integration is required, thereby providing insights into the argument for open regionalism.

### 2.3 Data on NTMs

To calculate the bilateral regulatory dissimilarity indicator in Equation (3) and identify the optimal benchmark country that minimizes the regulatory adoption costs in Equation (5), we use the “UNCTAD TRAINS NTM researcher file for use in Stata (version 12)” which is publicly available online (UNCTAD n.d.). This data file categorizes NTMs into types based on the M3 (2012) UNCTAD NTM classification. Since India, Korea and the US recorded their NTMs using the newer M4 (2019) classification, we manually collected data for these countries and integrated it with the UNCTAD data file. Our final dataset covers NTMs imposed by 70 countries (listed in the Appendix) on all merchandise imports (and domestic production and sales), spanning 5,224 products at the Harmonized System (HS) six-digit level under the H2 (HS2002) version. We focus on technical regulations and product standards of NTMs, commonly referred to as “technical measures”, which include Sanitary and Phytosanitary (SPS) measures and Technical Barriers to Trade (TBT). These are classified under chapters A, B or C of the UNCTAD NTM classification. Following Nabeshima et al. (2021), we consider 18 type groupings (=18) of technical measures as listed in Table 1.

## 3. Results

This section presents the calculated values of international regulatory differences. First, the values for all merchandise is presented in Section 3.1, followed by a sectoral breakdown in Section 3.2. In Section 3.3, we use these calculated regulatory differences to examine the overall regulatory adoption costs for respective countries if they serve as a benchmark within a given regional integration effort. In Section 3.4, we extend this analysis to the sectoral level.

### 3.1 Bilateral Regulatory Dissimilarity Amongst Asian Countries and Their Trading Partners

Table 2 shows a matrix of bilateral regulatory dissimilarity indicators for all merchandise exported and imported by 20 countries engaged in regional integration efforts in Asia. Given their importance in both Asian and global markets, the US and the EU<sup>3</sup> are also included. Three noteworthy observations emerge from the data.

First, none of the calculated dissimilarity values are exactly 0 or 1 for any pair among the 22 countries of interest (nor for the 70 countries in the dataset). This indicates that no two countries have completely identical or entirely different regulatory frameworks. Instead, each country’s framework partially overlaps with others.

Second, the right-hand column of Table 2 shows the average bilateral dissimilarity for each of the 70 countries as exporters across 69 importer countries. Among the 22 countries, values range from 0.54 (Vietnam) to 0.70 (Malaysia). Across all 70 countries, the worldwide average is 0.66 with values spanning 0.54 (Vietnam) and 0.94 (Costa Rica). Vietnam’s regulatory framework is relatively similar to those of other countries, particularly Thailand (with a value of 0.271) and Lao PDR (0.272). Korea, the Philippines and Australia also exhibit relatively low average dissimilarity. By contrast, Malaysia has the highest average dissimilarity, indicating that its regulatory framework is notably distinct. Its set of

TABLE 1  
Groupings of Technical Measures

<i>Group of technical measures</i>	<i>Maximum possible number of measures within group</i>
A13, A14, A15, A19	4
A20, A21, A22	3
A30, A31, A32, A33	4
A41, A42, A49	3
A51, A52, A53, A59	4
A61, A62, A63, A64, A69	5
A81, A82, A83, A84, A85, A86, A89	7
A9	1
B14, B15, B19	3
B20, B21, B22	3
B30, B31, B32, B33	4
B41, B42, B49	3
B6	1
B7	1
B81, B82, B83, B84, B85, B89	6
B9	1
C1, C9	2
C2, C3, C4	3

NOTE: The groupings are applicable to both the M3 (February 2012) and M4 (2019) versions of the UNCTAD NTM classification. Among measure type codes classified under chapters A–C, we excluded A11 (temporary geographic prohibitions for sanitary and phytosanitary reasons), A12 (geographical restrictions on eligibility) and B11 (prohibition due to technical barriers to trade) since imports are, by definition, explicitly prohibited upon the implementation of these measures, unlike the other technical measures. If an aggregated code (e.g., A1) was reported in the dataset, we converted it to the corresponding miscellaneous code if available (e.g., A1 was converted to A19). Otherwise, we treated an aggregated code as an independent code (e.g., A3 was treated as an independent code of “A30” since there was no relevant miscellaneous code [e.g., A39]).

SOURCE: Authors.

technical measures differs significantly from those of Lao PDR (0.77) and Chile (0.76). Other countries with above-average values ( $>0.66$ ) include New Zealand, Cambodia, Chile, Japan and the US.

Third, among the 22 countries, the lowest bilateral dissimilarity at 0.269 was observed for Thailand as an exporter against Vietnam. Notably, low dissimilarity values are concentrated among Thailand, Vietnam and Lao PDR. Aside from these three countries, other ASEAN Member States tend to have similar regulatory frameworks. As noted earlier, one exception is Malaysia, which exhibits high dissimilarity against Lao PDR. The highest dissimilarity is observed between New Zealand and Lao PDR (0.78 for either country as exporter) followed by Malaysia and Lao PDR. Additionally, Malaysia and New Zealand tend to have high dissimilarity, with Chile, Peru and Mexico among the CPTPP partner countries.

### 3.2 Sectoral Analysis of Bilateral Regulatory Dissimilarity

Tables 3, 4 and 5 complement Table 2 by presenting bilateral regulatory dissimilarity indicators for agricultural sectors. Table 3 focuses on the animal products sector (HS two-digit codes 01–05) where Korea, followed by Vietnam, Australia and Singapore, has regulatory frameworks that are relatively similar to those of other countries. Although the average bilateral dissimilarity values in Table 3 are lower than the world average of 0.66 for all merchandise (Table 2), Malaysia, followed by New Zealand, implements a more distinct set of technical measures. Consistent with these patterns, the lowest dissimilarity is observed between Vietnam and Australia (0.10 for either country as exporter), followed by Australia and Singapore (0.11). In contrast, the high dissimilarity between Malaysia and Lao PDR (0.90) and between New Zealand and Lao PDR (0.78) are noticeable.

Table 4 presents the results for the vegetable products sector (HS 06–15) where Vietnam, followed by Korea, exhibits a regulatory framework that is relatively similar to those of other countries while Cambodia, followed by Malaysia, implements a more distinct set of technical measures. Low dissimilarity

TABLE 2  
Bilateral Regulatory Dissimilarity Indicators – All Merchandise

Importer \ Exporter		CPTPP										RCEP					CPTPP					Average across 69 importers			
		BRN	MYS	SGP	VNM	IDN	KHM	LAO	MMR	PHL	THA	AUS	JPN	NZL	CHN	KOR	IND	CAN	CHL	MEX	PER	USA	EUN		
CPTPP	AFC	BRN	0.5	0.4	0.4	0.6	0.7	0.5	0.4	0.5	0.3	0.4	0.6	0.6	0.6	0.5	0.6	0.5	0.7	0.6	0.6	0.7	0.6	0.61	
		MYS	0.4	0.6	0.6	0.7	0.7	0.8	0.5	0.7	0.6	0.5	0.7	0.5	0.6	0.6	0.6	0.5	0.5	0.8	0.7	0.7	0.7	0.6	0.70
		SGP	0.4	0.6	0.4	0.4	0.4	0.6	0.4	0.5	0.5	0.3	0.4	0.6	0.6	0.6	0.5	0.6	0.5	0.7	0.6	0.6	0.6	0.6	0.59
		VNM	0.4	0.6	0.4	0.4	0.4	0.7	0.3	0.4	0.3	0.3	0.3	0.6	0.7	0.5	0.4	0.5	0.5	0.6	0.5	0.5	0.6	0.6	0.54
		IDN	0.6	0.7	0.4	0.4	0.5	0.5	0.6	0.4	0.5	0.5	0.6	0.7	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.60
		KHM	0.7	0.7	0.6	0.7	0.5	0.6	0.6	0.7	0.6	0.7	0.6	0.6	0.7	0.6	0.6	0.7	0.7	0.8	0.7	0.6	0.6	0.6	0.69
		LAO	0.6	0.8	0.4	0.3	0.5	0.6	0.5	0.3	0.4	0.5	0.6	0.8	0.5	0.5	0.7	0.7	0.7	0.6	0.6	0.5	0.7	0.7	0.58
		MMR	0.4	0.5	0.5	0.4	0.5	0.7	0.5	0.4	0.4	0.5	0.7	0.6	0.6	0.5	0.6	0.5	0.7	0.6	0.6	0.6	0.6	0.6	0.61
		PHL	0.6	0.6	0.5	0.3	0.4	0.6	0.3	0.4	0.4	0.4	0.6	0.6	0.5	0.4	0.6	0.5	0.6	0.5	0.5	0.5	0.5	0.6	0.57
		THA	0.3	0.5	0.3	0.3	0.5	0.7	0.4	0.4	0.4	0.3	0.6	0.6	0.5	0.4	0.5	0.5	0.7	0.6	0.5	0.7	0.6	0.6	0.58
CPTPP	RCEP	AUS	0.4	0.5	0.4	0.3	0.5	0.6	0.5	0.5	0.4	0.3	0.5	0.5	0.5	0.4	0.3	0.5	0.6	0.6	0.6	0.4	0.5	0.57	
		JPN	0.6	0.7	0.6	0.6	0.7	0.6	0.7	0.7	0.7	0.6	0.5	0.5	0.6	0.4	0.5	0.6	0.7	0.7	0.6	0.6	0.5	0.68	
		NZL	0.6	0.5	0.6	0.7	0.7	0.7	0.8	0.6	0.6	0.6	0.5	0.5	0.6	0.5	0.5	0.5	0.8	0.7	0.7	0.7	0.6	0.69	
		CHN	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.6	0.4	0.6	0.5	0.6	0.5	0.4	0.5	0.5	0.61	
		KOR	0.5	0.6	0.5	0.4	0.5	0.6	0.5	0.5	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.54
CPTPP	RCEP	IND	0.6	0.5	0.6	0.5	0.6	0.7	0.7	0.6	0.6	0.5	0.3	0.5	0.5	0.6	0.4	0.5	0.7	0.7	0.7	0.6	0.4	0.64	
		CAN	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.4	0.5	0.6	0.6	0.6	0.6	0.5	0.63	
		CHL	0.7	0.7	0.7	0.6	0.6	0.8	0.6	0.7	0.6	0.7	0.6	0.7	0.7	0.6	0.5	0.7	0.6	0.6	0.6	0.7	0.6	0.68	
		MEX	0.6	0.7	0.6	0.5	0.6	0.7	0.6	0.6	0.5	0.6	0.6	0.7	0.7	0.5	0.5	0.7	0.6	0.6	0.5	0.6	0.6	0.65	
		PER	0.6	0.7	0.6	0.5	0.6	0.6	0.5	0.6	0.5	0.5	0.6	0.6	0.6	0.4	0.4	0.7	0.6	0.6	0.5	0.4	0.6	0.60	
CPTPP	RCEP	USA	0.7	0.7	0.6	0.7	0.7	0.6	0.7	0.6	0.5	0.7	0.6	0.7	0.7	0.5	0.4	0.6	0.6	0.8	0.6	0.4	0.5	0.68	
		EUN average	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.6	0.6	0.4	0.5	0.6	0.5	0.4	0.5	0.5	0.6	0.7	0.6	0.5	0.64	
World average																							0.66		

NOTE: The EU is treated as a single unit for the importer country category, while its individual member states are considered exporter countries. The “EUN average” is calculated as the simple average of bilateral dissimilarity indicators across EU member states (as exporters) for each importer country. The left-hand column presents an average across 69 importer countries in the dataset for each exporter country. ISO3 country codes: AUS = Australia, BRN = Brunei Darussalam, CAN = Canada, CHL = Chile, CHN = China, EUN = European Union, IDN = Indonesia, IND = India, JPN = Japan, KHM = Cambodia, KOR = Republic of Korea, LAO = Lao PDR, MEX = Mexico, MMR = Myanmar, MYA = Malaysia, NZL = New Zealand, PER = Peru, PHL = Philippines, SGP = Singapore, THA = Thailand, USA = United States of America, VNM = Vietnam.

SOURCE: Authors.

TABLE 3  
Bilateral Regulatory Dissimilarity Indicators – Animal Products

Importer \ Exporter		CPTPP										RCEP										CPTPP				USA	EUN	Average across 69 importers
		AEC																										
		BRN	MYS	SGP	VNM	IDN	KHM	LAO	MMR	PHL	THA	AUS	JPN	NZL	CHN	KOR	IND	CAN	CHL	MEX	PER	USA	EUN					
CPTPP	AEC	BRN	0.4	0.3	0.4	0.4	0.5	0.5	0.4	0.5	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.5	0.5	0.4	0.6	0.4	0.51					
		MYS	0.5	0.5	0.5	0.5	0.5	0.7	0.9	0.4	0.7	0.5	0.4	0.4	0.3	0.5	0.4	0.3	0.6	0.7	0.6	0.6	0.5	0.61				
		SGP	0.3	0.5	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.1	0.5	0.4	0.3	0.2	0.4	0.2	0.5	0.4	0.3	0.4	0.3	0.38				
		VNM	0.4	0.5	0.2	0.1	0.2	0.2	0.5	0.2	0.2	0.1	0.3	0.4	0.3	0.1	0.3	0.3	0.4	0.3	0.3	0.4	0.1	0.37				
		IDN	0.5	0.6	0.2	0.1	0.2	0.2	0.4	0.2	0.2	0.2	0.4	0.5	0.3	0.2	0.3	0.2	0.4	0.4	0.4	0.4	0.2	0.39				
		KHM	0.5	0.6	0.3	0.2	0.2	0.2	0.5	0.2	0.4	0.3	0.5	0.6	0.3	0.3	0.4	0.4	0.5	0.4	0.4	0.5	0.3	0.42				
		LAO	0.5	0.9	0.2	0.2	0.2	0.2	0.6	0.2	0.3	0.3	0.6	0.8	0.4	0.3	0.6	0.5	0.5	0.3	0.4	0.6	0.3	0.45				
		MMR	0.4	0.4	0.3	0.5	0.3	0.5	0.6	0.4	0.4	0.3	0.5	0.4	0.5	0.4	0.3	0.3	0.6	0.6	0.5	0.4	0.5	0.51				
		PHL	0.5	0.6	0.2	0.2	0.2	0.2	0.5	0.4	0.4	0.2	0.5	0.6	0.3	0.2	0.4	0.3	0.5	0.3	0.3	0.3	0.3	0.39				
		THA	0.3	0.5	0.2	0.2	0.2	0.4	0.3	0.4	0.3	0.2	0.4	0.4	0.3	0.2	0.3	0.3	0.4	0.4	0.3	0.5	0.3	0.42				
CPTPP		AUS	0.3	0.4	0.1	0.1	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.4	0.2	0.2	0.2	0.4	0.4	0.4	0.5	0.2	0.38					
		JPN	0.4	0.4	0.5	0.3	0.4	0.5	0.6	0.5	0.5	0.4	0.3	0.5	0.5	0.3	0.2	0.4	0.4	0.6	0.5	0.6	0.3	0.50				
		NZL	0.4	0.2	0.4	0.5	0.5	0.6	0.8	0.4	0.6	0.4	0.3	0.5	0.4	0.4	0.3	0.3	0.5	0.6	0.5	0.5	0.4	0.54				
		CHN	0.4	0.5	0.3	0.3	0.3	0.3	0.4	0.5	0.3	0.3	0.4	0.5	0.4	0.2	0.5	0.4	0.5	0.2	0.3	0.3	0.3	0.43				
CPTPP		KOR	0.4	0.4	0.2	0.1	0.2	0.3	0.3	0.4	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.3	0.4	0.2	0.36					
		IND	0.4	0.3	0.4	0.3	0.3	0.4	0.6	0.3	0.4	0.3	0.2	0.2	0.3	0.4	0.2	0.2	0.5	0.5	0.5	0.4	0.3	0.45				
		CAN	0.4	0.3	0.3	0.3	0.2	0.4	0.6	0.3	0.4	0.3	0.2	0.4	0.3	0.4	0.2	0.2	0.5	0.5	0.4	0.4	0.3	0.44				
		CHL	0.5	0.6	0.5	0.4	0.4	0.5	0.5	0.6	0.5	0.4	0.4	0.4	0.5	0.3	0.5	0.5	0.5	0.5	0.4	0.7	0.4	0.53				
CPTPP		MEX	0.5	0.7	0.4	0.3	0.3	0.4	0.3	0.6	0.3	0.4	0.4	0.6	0.6	0.2	0.3	0.5	0.5	0.5	0.3	0.4	0.4	0.47				
		PER	0.4	0.6	0.3	0.3	0.3	0.4	0.4	0.5	0.3	0.3	0.4	0.5	0.5	0.3	0.5	0.4	0.4	0.2	0.4	0.3	0.44					
		USA	0.6	0.6	0.4	0.5	0.4	0.5	0.6	0.4	0.3	0.5	0.5	0.6	0.5	0.3	0.4	0.4	0.5	0.7	0.4	0.4	0.5	0.53				
EUN average		0.4	0.5	0.3	0.2	0.2	0.3	0.3	0.5	0.3	0.3	0.2	0.3	0.4	0.3	0.2	0.4	0.3	0.4	0.4	0.3	0.5	0.42					
		World average																				0.49						

NOTE: See the note on Table 2.

SOURCE: Authors.

TABLE 4  
Bilateral Regulatory Dissimilarity Indicators – Vegetable Products

Importer \ Exporter		CPTPP										RCEP										CPTPP				USA	EUN	Average across 69 importers
		AEC																										
		BRN	MYS	SGP	VNM	IDN	KHM	LAO	MMR	PHL	THA	AUS	JPN	NZL	CHN	KOR	IND	CAN	CHL	MEX	PER	USA	EUN					
CPTPP	AEC	BRN	0.4	0.2	0.2	0.3	0.7	0.4	0.2	0.3	0.1	0.2	0.4	0.4	0.5	0.3	0.3	0.4	0.5	0.5	0.5	0.6	0.3	0.47				
		MYS	0.4	0.5	0.5	0.5	0.7	0.7	0.8	0.4	0.5	0.5	0.3	0.6	0.3	0.5	0.4	0.4	0.4	0.8	0.7	0.7	0.6	0.3	0.62			
		SGP	0.2	0.5	0.3	0.3	0.4	0.7	0.3	0.3	0.4	0.2	0.3	0.5	0.5	0.6	0.4	0.4	0.5	0.6	0.6	0.5	0.5	0.4	0.52			
		VNM	0.2	0.5	0.3	0.2	0.6	0.1	0.3	0.1	0.2	0.2	0.3	0.5	0.4	0.2	0.4	0.5	0.3	0.4	0.4	0.5	0.4	0.4	0.41			
		IDN	0.4	0.7	0.4	0.2	0.6	0.3	0.4	0.3	0.4	0.4	0.4	0.7	0.6	0.4	0.6	0.6	0.4	0.5	0.4	0.7	0.6	0.5	0.52			
		KHM	0.7	0.7	0.7	0.6	0.6	0.6	0.7	0.6	0.7	0.7	0.6	0.7	0.5	0.6	0.7	0.8	0.7	0.7	0.7	0.8	0.7	0.7	0.70			
		LAO	0.4	0.8	0.3	0.1	0.2	0.6	0.3	0.2	0.3	0.3	0.5	0.8	0.5	0.3	0.6	0.7	0.3	0.5	0.4	0.6	0.6	0.4	0.47			
		MMR	0.2	0.4	0.3	0.3	0.4	0.7	0.3	0.2	0.3	0.2	0.4	0.4	0.4	0.2	0.3	0.4	0.4	0.5	0.4	0.4	0.3	0.4	0.45			
		PHL	0.3	0.5	0.4	0.2	0.3	0.6	0.2	0.2	0.3	0.3	0.5	0.5	0.3	0.2	0.4	0.5	0.4	0.4	0.3	0.4	0.4	0.4	0.43			
		THA	0.1	0.4	0.2	0.2	0.4	0.7	0.3	0.3	0.3	0.1	0.4	0.4	0.5	0.2	0.3	0.5	0.5	0.6	0.5	0.6	0.4	0.4	0.48			
CPTPP		AUS	0.2	0.3	0.3	0.2	0.4	0.7	0.3	0.2	0.3	0.1	0.3	0.4	0.4	0.2	0.2	0.5	0.5	0.5	0.5	0.5	0.3	0.46				
		JPN	0.4	0.5	0.5	0.4	0.5	0.7	0.5	0.5	0.5	0.4	0.4	0.6	0.5	0.3	0.3	0.5	0.6	0.6	0.6	0.7	0.4	0.57				
		NZL	0.4	0.3	0.5	0.5	0.7	0.7	0.8	0.4	0.5	0.4	0.4	0.6	0.4	0.4	0.4	0.4	0.7	0.6	0.6	0.5	0.3	0.60				
		CHN	0.5	0.5	0.6	0.4	0.6	0.5	0.5	0.4	0.3	0.5	0.4	0.5	0.4	0.3	0.4	0.5	0.5	0.5	0.2	0.3	0.4	0.51				
CPTPP		KOR	0.3	0.4	0.4	0.2	0.4	0.6	0.3	0.2	0.2	0.2	0.2	0.4	0.3	0.2	0.4	0.4	0.4	0.3	0.4	0.3	0.4	0.41				
		IND	0.3	0.3	0.4	0.4	0.5	0.7	0.6	0.3	0.4	0.3	0.2	0.3	0.3	0.4	0.2	0.5	0.6	0.6	0.5	0.4	0.2	0.41				
		CAN	0.4	0.4	0.5	0.5	0.6	0.8	0.7	0.4	0.5	0.5	0.5	0.5	0.4	0.5	0.4	0.5	0.6	0.6	0.5	0.6	0.4	0.59				
		CHL	0.5	0.8	0.6	0.3	0.4	0.7	0.3	0.4	0.3	0.5	0.5	0.5	0.7	0.5	0.4	0.6	0.6	0.5	0.3	0.6	0.7	0.54				
CPTPP		MEX	0.5	0.7	0.6	0.4	0.5	0.7	0.5	0.5	0.4	0.6	0.5	0.6	0.6	0.5	0.4	0.6	0.6	0.5	0.4	0.5	0.5	0.57				
		PER	0.5	0.7	0.5	0.4	0.4	0.7	0.4	0.4	0.3	0.5	0.5	0.5	0.6	0.2	0.3	0.5	0.5	0.3	0.4	0.3	0.5	0.49				
		USA	0.6	0.6	0.5	0.5	0.7	0.8	0.6	0.4	0.4	0.6	0.5	0.6	0.5	0.3	0.4	0.4	0.6	0.6	0.5	0.3	0.4	0.57				
EUN average		0.3	0.3	0.4	0.4	0.6	0.7	0.6	0.3	0.4	0.4	0.3	0.4	0.3	0.2	0.4	0.7	0.5	0.5	0.4	0.4	0.5	0.51					
		World average																				0.56						

NOTE: See the note on Table 2.

SOURCE: Authors.

values are concentrated among ASEAN member states, centring on Vietnam. However, Cambodia stands out as an exception with the highest dissimilarity at 0.82 between the US and Cambodia.

Table 5 focuses on the foodstuffs sector (HS 16–24) where Korea, followed by Australia and Thailand, has a regulatory framework that is relatively similar to those of other countries. In contrast, Chile, followed by Malaysia, implements a more distinct set of technical measures. The lowest dissimilarity is observed between Australia and Thailand (0.10) while the highest dissimilarity is between Chile and Malaysia (0.93). Notably, Chile consistently exhibits high dissimilarity with all 21 partner countries.

Taken together, Tables 3, 4 and 5 indicate that international regulatory differences vary even within agricultural sectors, suggesting the complex nature of regulatory regimes. Nonetheless, while Malaysia's regulatory framework tends to differ significantly from those of other countries, Korea occupies an intermediate position in the global regulatory landscape. This may indicate that the NTMs imposed by Malaysia are not shared by its trade partners. Tables 6, 7, 8 and 9 further examine bilateral regulatory dissimilarity in manufacturing sectors, including chemicals (HS 28–38), textiles (HS 50–63), machinery (HS 84–85) and transportation (HS 86–89)<sup>4</sup>. The average bilateral dissimilarity values in each table are relatively high compared with those in agriculture (Tables 3–5). Also, the calculated dissimilarity values tend to be high overall. These suggest that countries generally implement less similar technical measures in manufacturing than in agriculture.

The prevalence of higher dissimilarity values is partly due to the fact that some countries impose only a handful of technical measures on manufactured products. This is unlike agricultural products, which are often subject to more extensive but relatively uniform regulations across countries such as those established under the WTO's SPS Agreement. It is important to note that the data used in our calculations capture only the type of technical measures (e.g., restrictions on the use of a particular pesticide) but not

TABLE 5  
Bilateral Regulatory Dissimilarity Indicators – Foodstuffs

Importer		CPTPP				RCEP					CPTPP				CPTPP				USA	EUN	Average across 69 importers		
		BRN	MYS	SGP	VNM	IDN	KHM	LAO	MMR	PHL	THA	AUS	JPN	NZL	CHN	KOR	IND	CAN				CHL	MEX
Exporter	AEC																					Average across 69 importers	
	BRN	MYS	SGP	VNM	IDN	KHM	LAO	MMR	PHL	THA	AUS	JPN	NZL	CHN	KOR	IND	CAN	CHL	MEX	PER	USA		EUN
CPTPP	BRN	0.4	0.3	0.4	0.6	0.7	0.5	0.5	0.6	0.2	0.3	0.5	0.3	0.6	0.4	0.4	0.4	0.8	0.5	0.5	0.7	0.4	0.59
	MYS	0.4	0.4	0.5	0.6	0.6	0.7	0.3	0.7	0.4	0.3	0.6	0.3	0.6	0.4	0.3	0.5	0.9	0.6	0.8	0.5	0.4	0.65
	SGP	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.5	0.4	0.4	0.3	0.4	0.4	0.7	0.4	0.5	0.5	0.4	0.51
	VNM	0.4	0.5	0.3	0.6	0.6	0.1	0.5	0.2	0.1	0.1	0.5	0.4	0.3	0.2	0.4	0.5	0.7	0.5	0.3	0.5	0.3	0.46
RCEP	IDN	0.6	0.6	0.4	0.6	0.2	0.6	0.6	0.5	0.6	0.6	0.7	0.5	0.4	0.5	0.5	0.6	0.8	0.6	0.6	0.6	0.5	0.62
	KHM	0.7	0.6	0.4	0.6	0.2	0.6	0.7	0.5	0.6	0.6	0.6	0.5	0.4	0.5	0.6	0.6	0.8	0.5	0.6	0.6	0.5	0.62
	LAO	0.5	0.7	0.4	0.1	0.6	0.6	0.6	0.1	0.2	0.2	0.6	0.6	0.4	0.3	0.5	0.7	0.7	0.5	0.3	0.6	0.5	0.51
	MMR	0.5	0.3	0.4	0.5	0.6	0.7	0.6	0.5	0.4	0.4	0.7	0.4	0.5	0.4	0.4	0.4	0.8	0.6	0.6	0.4	0.4	0.62
	PHL	0.6	0.7	0.3	0.2	0.5	0.5	0.2	0.5	0.3	0.3	0.6	0.5	0.3	0.3	0.5	0.6	0.6	0.5	0.3	0.4	0.4	0.49
	THA	0.2	0.4	0.2	0.1	0.6	0.6	0.2	0.4	0.3	0.1	0.4	0.3	0.4	0.2	0.3	0.5	0.8	0.5	0.4	0.6	0.3	0.47
CPTPP	AUS	0.3	0.3	0.2	0.1	0.6	0.6	0.2	0.4	0.3	0.1	0.4	0.3	0.4	0.2	0.2	0.5	0.8	0.5	0.4	0.5	0.2	0.47
	JPN	0.5	0.6	0.5	0.5	0.7	0.6	0.6	0.7	0.6	0.4	0.4	0.6	0.3	0.3	0.5	0.8	0.6	0.5	0.7	0.3	0.3	0.61
	NZL	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.4	0.5	0.3	0.3	0.4	0.4	0.3	0.2	0.4	0.8	0.6	0.5	0.5	0.3	0.55
	CHN	0.6	0.6	0.4	0.3	0.4	0.4	0.4	0.5	0.3	0.4	0.4	0.6	0.4	0.2	0.5	0.6	0.7	0.5	0.3	0.4	0.4	0.52
CPTPP	KOR	0.4	0.4	0.3	0.2	0.5	0.5	0.3	0.4	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.4	0.6	0.4	0.3	0.4	0.2	0.44
	IND	0.4	0.3	0.4	0.4	0.5	0.6	0.5	0.4	0.4	0.3	0.2	0.3	0.2	0.5	0.2	0.5	0.9	0.5	0.5	0.4	0.2	0.53
	CAN	0.4	0.5	0.4	0.5	0.6	0.6	0.7	0.4	0.6	0.5	0.5	0.5	0.4	0.6	0.4	0.5	0.8	0.6	0.6	0.7	0.5	0.63
	CHL	0.8	0.9	0.7	0.7	0.8	0.8	0.7	0.8	0.6	0.8	0.8	0.8	0.8	0.7	0.6	0.9	0.7	0.8	0.6	0.8	0.8	0.79
	MEX	0.5	0.6	0.4	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.4	0.5	0.6	0.8	0.5	0.6	0.5	0.62
	PER	0.5	0.8	0.5	0.3	0.6	0.6	0.3	0.6	0.3	0.4	0.4	0.5	0.5	0.3	0.2	0.5	0.6	0.6	0.5	0.4	0.4	0.53
USA		0.7	0.5	0.5	0.5	0.6	0.6	0.6	0.4	0.4	0.6	0.4	0.7	0.4	0.4	0.4	0.7	0.8	0.6	0.4	0.4	0.4	0.61
EUN average		0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.4	0.3	0.2	0.3	0.3	0.5	0.2	0.5	0.8	0.5	0.5	0.5	0.4	0.53
World average																						0.60	

NOTE: See the note on Table 2.

SOURCE: Authors.

TABLE 6  
Bilateral Regulatory Dissimilarity Indicators – Chemicals

Importer \ Exporter	CPTPP					RCEP					CPTPP					CPTPP				USA	EUN	Average across 69 importers			
	AEC										AUS	JPN	NZL	CHN	KOR	IND	CAN	CHL	MEX				PER		
	BRN	MYS	SGP	VNM	IDN	KHM	LAO	MMR	PHL	THA															
CPTPP	BRN		0.8	0.5	0.7	0.7	0.7	0.7	0.5	0.6	0.5	0.6	0.7	0.7	0.7	0.7	0.8	0.5	0.8	0.6	0.7	0.8	0.7	0.71	
	MYS	0.8		0.8	0.7	0.7	0.8	0.4	0.8	0.7	0.7	0.6	0.7	0.8	0.5	0.7	0.8	0.6	0.8	0.9	0.7	0.7	0.7	0.76	
	SGP	0.5	0.8		0.7	0.7	0.7	0.6	0.7	0.6	0.7	0.6	0.7	0.8	0.7	0.7	0.8	0.6	0.8	0.8	0.8	0.8	0.8	0.6	0.75
	VNM	0.7	0.7	0.7		0.7	0.7	0.6	0.6	0.5	0.4	0.6	0.8	0.8	0.6	0.7	0.6	0.6	0.8	0.7	0.8	0.8	0.7	0.74	
	IDN	0.7	0.7	0.6	0.7		0.6	0.6	0.7	0.6	0.8	0.7	0.7	0.8	0.7	0.7	0.8	0.7	0.9	0.8	0.7	0.7	0.6	0.75	
	KHM	0.7	0.8	0.7	0.7	0.6		0.6	0.6	0.5	0.7	0.6	0.6	0.8	0.5	0.5	0.8	0.6	0.9	0.8	0.2	0.2	0.5	0.71	
	LAO	0.7	0.4	0.6	0.6	0.6	0.6		0.6	0.4	0.7	0.6	0.6	0.8	0.5	0.7	0.8	0.6	0.8	0.8	0.6	0.7	0.6	0.69	
	MMR	0.5	0.8	0.7	0.6	0.7	0.6	0.6		0.4	0.6	0.5	0.7	0.7	0.7	0.7	0.8	0.6	0.8	0.7	0.7	0.7	0.7	0.73	
	PHL	0.6	0.7	0.6	0.6	0.6	0.5	0.4	0.4		0.6	0.5	0.6	0.7	0.6	0.6	0.8	0.5	0.8	0.7	0.6	0.6	0.6	0.68	
	THA	0.5	0.7	0.7	0.4	0.8	0.7	0.7	0.6	0.6		0.6	0.7	0.7	0.6	0.7	0.7	0.6	0.8	0.8	0.8	0.8	0.7	0.75	
CPTPP	AUS	0.6	0.6	0.7	0.6	0.7	0.6	0.6	0.5	0.5	0.6		0.7	0.8	0.6	0.6	0.7	0.6	0.8	0.8	0.6	0.8	0.7	0.72	
	JPN	0.7	0.7	0.5	0.8	0.7	0.6	0.6	0.7	0.6	0.7	0.7		0.5	0.5	0.3	0.7	0.5	0.8	0.8	0.5	0.6	0.5	0.68	
	NZL	0.7	0.8	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.8	0.5		0.6	0.5	0.6	0.5	0.9	0.8	0.7	0.8	0.5	0.76	
	CHN	0.7	0.5	0.7	0.6	0.7	0.5	0.5	0.7	0.6	0.6	0.6	0.5	0.6		0.4	0.7	0.5	0.8	0.8	0.5	0.5	0.5	0.67	
	KOR	0.7	0.7	0.7	0.7	0.7	0.5	0.7	0.7	0.6	0.7	0.6	0.3	0.5	0.4		0.6	0.6	0.8	0.8	0.4	0.4	0.6	0.70	
CPTPP	IND	0.8	0.8	0.8	0.6	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.6	0.7	0.6		0.7	0.8	0.8	0.9	0.8	0.7	0.82	
	CAN	0.5	0.6	0.6	0.6	0.7	0.6	0.6	0.5	0.5	0.6	0.6	0.5	0.5	0.6	0.7	0.7		0.7	0.7	0.6	0.7	0.4	0.66	
	CHL	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8		0.8	0.8	0.9	0.9	0.83	
	MEX	0.6	0.9	0.8	0.7	0.8	0.8	0.8	0.7	0.7	0.8	0.7	0.8	0.8	0.8	0.8	0.7	0.8	0.8		0.7	0.8	0.8	0.78	
	PER	0.7	0.7	0.8	0.8	0.7	0.2	0.6	0.7	0.6	0.8	0.6	0.5	0.7	0.5	0.4	0.9	0.6	0.8	0.7		0.2	0.5	0.68	
USA	0.7	0.7	0.8	0.8	0.7	0.2	0.6	0.7	0.6	0.8	0.6	0.6	0.7	0.5	0.4	0.8	0.7	0.5	0.8	0.8	0.2	0.6	0.73		
EUN average	0.7	0.7	0.7	0.7	0.6	0.5	0.6	0.7	0.6	0.7	0.7	0.5	0.5	0.6	0.6	0.8	0.5	0.9	0.8	0.5	0.6		0.68		
World average																						0.74			

NOTE: See the note on Table 2.

SOURCE: Authors.

TABLE 7  
Bilateral Regulatory Dissimilarity Indicators – Textiles

Importer \ Exporter	CPTPP					RCEP					CPTPP					CPTPP				USA	EUN	Average across 69 importers			
	AEC										AUS	JPN	NZL	CHN	KOR	IND	CAN	CHL	MEX				PER		
	BRN	MYS	SGP	VNM	IDN	KHM	LAO	MMR	PHL	THA															
CPTPP	BRN		1	1	0.9	1	1	0.6	0.6	0.7	1	0.98	1	1	1	1	1	1	1	0.97	0.9	0.8	0.98	0.99	0.85
	MYS	1		1	1	0.8	0.8	1	1	0.95	0.9	1	0.97	0.7	0.9	0.9	0.7	1	1	1	1	1	1	1	0.88
	SGP	1	1		1	1	0.97	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.88
	VNM	0.9	1	1		0.6	1	0.5	0.5	0.7	0.9	0.96	0.99	0.98	0.6	0.5	0.998	0.6	0.9	0.9	0.7	0.5	0.6	0.71	
	IDN	1	0.8	1	0.6		0.7	0.95	0.95	0.8	0.9	0.8	0.9	0.7	0.8	0.6	0.96	0.6	0.8	0.9	0.9	0.7	0.6	0.70	
	KHM	1	0.8	0.97	1	0.7		1	1	0.98	0.9	1	0.96	0.9	0.9	0.9	0.9	0.997	1	1	0.999	1	0.996	0.85	
	LAO	0.6	1	1	0.5	0.95	1		0	0.5	1	0.99	0.98	0.98	0.9	0.9	1	1	0.8	0.9	0.6	0.99	0.99	0.80	
	MMR	0.6	1	1	0.5	0.95	1	0		0.5	1	0.99	0.98	0.98	0.9	0.9	1	1	0.8	0.9	0.6	0.99	0.99	0.80	
	PHL	1	0.95	1	0.7	0.8	0.98	0.5	0.5		0.99	0.6	0.8	0.6	0.9	0.8	0.996	0.7	0.5	0.9	0.7	0.98	0.7	0.71	
	THA	1	1	1	1	1	0.98	1	1	0.97		1	1	1	0.97	1	1	1	1	1	0.97	1	1	0.88	
CPTPP	AUS	1	1	1	0.96	0.8	1	0.99	0.99	0.6	0.9		0.4	0.6	0.9	0.8	0.999	0.5	0.1	0.9	0.9	0.97	0.3	0.67	
	JPN	1	0.97	1	0.99	0.9	0.96	0.98	0.8	0.9	0.4	0.8		0.8	0.96	0.9	0.99	0.6	0.4	0.995	0.95	0.99	0.6	0.75	
	NZL	1	0.7	1	0.98	0.7	0.9	0.98	0.98	0.6	0.98	0.6	0.8		0.9	0.7	0.9	0.8	0.6	0.9	0.9	0.997	0.7	0.73	
	CHN	1	0.9	1	0.6	0.8	0.9	0.9	0.9	0.9	0.8	0.9	0.96	0.9		0.6	0.9	0.7	0.9	0.8	0.8	0.7	0.7	0.73	
	KOR	1	0.9	1	0.5	0.6	0.9	0.9	0.9	0.8	0.95	0.8	0.9	0.7	0.6		0.9	0.5	0.8	0.95	0.9	0.4	0.4	0.67	
CPTPP	IND	1	0.7	1	0.998	0.96	0.9	1	1	0.996	0.97	0.999	0.99	0.9	0.9	0.9	0.999	1	1	1	1	1	0.998	0.85	
	CAN	1	1	1	0.6	0.6	0.997	1	1	0.7	0.98	0.5	0.6	0.8	0.7	0.5	0.999	0.6	0.5	0.97	0.999	0.3	0.2	0.65	
	CHL	0.97	1	1	0.9	0.8	1	0.8	0.8	0.5	1	0.1	0.4	0.6	0.9	0.8	1	0.6	0.8	0.8	0.99	0.4	0.68		
	MEX	0.9	1	1	0.9	0.9	1	0.9	0.9	0.9	0.9	0.995	0.9	0.8	0.95	1	0.97	0.8	0.6	0.6	0.96	0.9	0.80		
	PER	0.8	1	1	0.7	0.9	0.999	0.6	0.6	0.7	0.99	0.9	0.95	0.9	0.8	0.9	1	0.95	0.8	0.6	0.99	0.9	0.79		
USA	0.98	1	1	0.5	0.7	1	0.99	0.99	0.98	1	0.99	0.99	0.997	0.7	0.4	1	0.3	0.99	0.97	0.99	0.5	0.73			
EUN average	0.99	0.999	1	0.6	0.6	0.996	0.99	0.99	0.7	0.97	0.4	0.6	0.7	0.7	0.4	0.998	0.2	0.4	0.9	0.9	0.5		0.63		
World average																						0.74			

NOTE: See the note on Table 2.

SOURCE: Authors.

their stringency (e.g., a specific level of the maximum residue limits for that pesticide). Future research should explore regulatory differences not only in terms of type but also in stringency. More importantly, there are no missing rows or columns in the matrices, meaning that each of the 22 countries implements some measures against some products in each sector.<sup>5</sup> In addition, only one instance of complete similarity with a value of 0 is observed: Lao PDR and Myanmar have identical regulatory frameworks in the textiles sector. Apart from this exception, no other countries exhibit a completely identical regulatory framework even though some countries have relatively simple regulatory structures in manufacturing compared with agriculture.

Another reason why the regulatory divergence is larger for manufactured products compared with agricultural goods is that manufacturing regulations often deal with a wider range of technical regulations—such as safety standards or conformity assessments that occur with greater complexity and variation across markets—and are more vulnerable to intricate global value chains participation. While agricultural regulations are also complex and challenging, the focus is on regulations that have higher interconnectedness of cross-border disease transmission such as food safety and the consumption of harmful goods.

In the chemicals sector (Table 6), Canada, followed by China, has a regulatory framework that is relatively similar to those of other countries, whereas Chile, followed by India, implements a distinct set of technical measures. The bilateral dissimilarity values between the US, Peru and Cambodia are strikingly low (0.20–0.23). In contrast, Chile exhibits high dissimilarity with all 21 partners; it has the highest dissimilarity (0.90) with the US. Notably, the US is included in both the lowest and highest

TABLE 8  
Bilateral Regulatory Dissimilarity Indicators – Machinery

Importer \ Exporter	CPTPP				RCEP							CPTPP					CPTPP				Average across 69 importers			
	AEC				RCEP							CPTPP					CPTPP							
	BRN	MYS	SGP	VNM	IDN	KHM	LAO	MMR	PHL	THA	AUS	JPN	NZL	CHN	KOR	IND	CAN	CHL	MEX	PER		USA	EUN	
CPTPP	BRN	0.9	0.9	0.6	0.8	0.8	1.0	0.8	0.8	0.3	0.7	0.9	0.9	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.8	0.9	0.73	
	MYS	0.9	0.7	0.9	0.8	0.4	1.0	0.9	0.7	0.9	0.7	0.7	0.6	0.7	0.8	0.7	0.6	0.6	0.6	1.0	0.9	0.8	0.68	
	SGP	0.9	0.7	1.0	0.8	0.7	0.9	1.0	0.7	1.0	0.8	0.8	0.7	0.7	0.8	0.8	0.8	0.7	0.8	1.0	0.9	0.8	0.73	
	VNM	0.6	0.9	1.0	0.8	0.9	1.0	0.8	0.8	0.7	0.8	0.9	0.9	0.8	0.8	0.8	0.9	0.8	0.9	0.9	0.8	0.7	0.75	
	RCEP	IDN	0.8	0.8	0.8	0.8	0.7	1.0	0.9	0.6	0.8	0.6	0.7	0.7	0.6	0.8	0.7	0.8	0.8	0.9	1.0	0.7	0.7	0.70
		KHM	0.8	0.4	0.7	0.9	0.7	1.0	0.9	0.5	0.8	0.5	0.4	0.4	0.6	0.6	0.6	0.7	0.7	0.6	0.9	0.9	0.7	0.64
		LAO	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	0.8	0.9	1.0	0.9	0.9	0.9	1.0	1.0	1.0	0.9	0.9	0.9	0.82
		MMR	0.8	0.9	1.0	0.8	0.9	0.9	1.0	0.9	0.8	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	0.7	1.0	1.0	0.79
	CPTPP	PHL	0.8	0.7	0.7	0.8	0.6	0.5	1.0	0.9	0.8	0.5	0.6	0.6	0.5	0.8	0.7	0.8	0.8	0.9	0.9	0.8	0.7	0.67
		THA	0.3	0.9	1.0	0.7	0.8	0.8	1.0	0.8	0.8	0.8	0.9	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.74
AUS		0.7	0.7	0.8	0.8	0.6	0.5	0.8	0.9	0.5	0.7	0.3	0.5	0.3	0.5	0.3	0.7	0.7	0.7	0.9	0.5	0.3	0.60	
JPN		0.9	0.7	0.8	0.9	0.7	0.4	0.9	0.9	0.6	0.9	0.3	0.5	0.4	0.4	0.3	0.8	0.7	0.8	0.9	0.6	0.4	0.63	
CPTPP	NZL	0.9	0.6	0.7	0.9	0.7	0.4	1.0	0.9	0.6	0.9	0.5	0.5	0.5	0.7	0.6	0.7	0.7	0.6	0.9	0.8	0.7	0.64	
	CHN	0.8	0.7	0.7	0.8	0.7	0.6	0.9	0.9	0.6	0.8	0.4	0.4	0.5	0.5	0.4	0.7	0.6	0.7	0.9	0.5	0.3	0.61	
	KOR	0.8	0.8	0.8	0.8	0.7	0.6	0.9	1.0	0.8	0.9	0.5	0.4	0.7	0.4	0.2	0.5	0.4	0.6	1.0	0.6	0.3	0.62	
	IND	0.8	0.7	0.8	0.8	0.7	0.6	0.9	1.0	0.7	0.9	0.3	0.3	0.6	0.4	0.2	0.5	0.4	0.6	1.0	0.5	0.2	0.61	
	CAN	0.8	0.6	0.8	0.9	0.8	0.7	1.0	1.0	0.8	0.9	0.7	0.8	0.7	0.7	0.5	0.5	0.4	0.6	1.0	0.7	0.7	0.68	
	CHL	0.9	0.6	0.7	0.8	0.8	0.7	1.0	1.0	0.8	0.9	0.7	0.7	0.6	0.6	0.4	0.4	0.4	0.5	1.0	0.5	0.5	0.64	
CPTPP	MEX	0.9	0.6	0.8	0.9	0.9	0.6	1.0	1.0	0.9	0.7	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.5	1.0	0.7	0.6	0.67	
	PER	0.9	1.0	1.0	0.9	1.0	0.9	0.9	0.7	0.9	0.9	1.0	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.81		
	USA	0.8	0.9	0.9	0.9	0.8	0.9	0.9	1.0	0.8	0.9	0.7	0.7	0.8	0.6	0.6	0.7	0.7	0.5	0.7	1.0	0.6	0.69	
EUN average		0.9	0.8	0.8	0.7	0.7	0.7	0.9	1.0	0.7	0.9	0.3	0.4	0.7	0.3	0.3	0.2	0.7	0.5	0.6	1.0	0.3	0.62	
World average																						0.71		

NOTE: See the note on Table 2.

SOURCE: Authors.

TABLE 9  
Bilateral Regulatory Dissimilarity Indicators – Transportation

Importer	CPTPP										RCEP					CPTPP					CPTPP					Average across 69 importers	
	CPTPP										RCEP					CPTPP					CPTPP						
	CPTPP										RCEP					CPTPP					CPTPP						
Exporter	CPTPP										RCEP					CPTPP					CPTPP						
	BRN	MYS	SGP	VNM	IDN	KHM	LAO	MMR	PHL	THA	AUS	JPN	NZL	CHN	KOR	IND	CAN	CHL	MEX	PER	USA	EUN					
CPTPP	BRN		1	0.5	0.7	0.8	0.8	0.96	1	0.6	1	0.3	0.7	0.6	0.4	0.4	0.5	0.3	0.99	0.7	0.3	0.3	0.7	0.67			
	MYS		1		0.8	1	0.9	0.8	1	1	0.9	1	0.9	0.8	0.8	0.9	0.9	0.9	0.9	1	0.6	1	0.9	0.9	0.82		
	SGP			1		0.9	0.8	0.5	0.97	1	0.6	1	0.6	0.6	0.5	0.5	0.7	0.7	0.5	1	0.7	0.8	0.6	0.7	0.67		
	VNM				1		0.9	1	0.9	1	1	1	0.7		1	0.8	0.7	0.8	0.7	0.7	1	1	0.6	0.8	0.9	0.85	
	IDN					1		0.9	0.96	0.9	0.6	0.96	0.8	0.8	0.9	0.8	0.8	0.9	0.7	1	0.9	0.9	0.7	0.8	0.82		
	KHM						1		0.9	0.97	1	0.7	1	0.9	0.8	0.6	0.8	0.8	0.9	0.8	0.99	0.7	1	0.9	0.9	0.77	
	LAO							1		0.96	0.9	0.7	0.9	0.96	0.7	0.8	0.7	0.9	0.98	0.9	0.96	0.8	0.8	0.8	0.85		
	MMR								1		1	1	1	1	1	1	1	1	0.97	1	0.9	1	1	1	0.93		
	PHL									1		0.9	0.6	0.6	0.6	0.6	0.7	0.5	1	0.6	0.8	0.4	0.7	0.7	0.70		
	THA										1	0.95	0.96	1	0.99	1	0.99	1	0.8	1	0.95	0.9	0.9	0.9	0.92		
CPTPP	AUS										1	0.5	0.5	0.3	0.3	0.4	0.4	0.99	0.6	0.4	0.3	0.5	0.63				
	JPN											1	0.5	0.6	0.5	0.5	0.6	0.97	0.6	0.8	0.5	0.6	0.71				
	NZL												1	0.6	0.6	0.6	0.7	0.7	1	0.7	0.7	0.7	0.8	0.72			
	CHN													1	0.6	0.9	0.3	0.6	0.5	0.4	0.9	0.6	0.5	0.4	0.5	0.64	
	KOR														1	0.4	0.4	0.4	0.4	0.4	0.98	0.7	0.5	0.3	0.4	0.66	
	IND															1	0.5	0.9	0.6	0.6	0.6	0.6	0.5	0.6	0.68		
	CAN																1	0.996	0.6	0.6	0.2	0.6	0.66				
	CHL																		1	0.99	0.98	0.9	0.996	0.95	1	0.97	0.92
	MEX																				1	0.8	0.8	0.6	0.7	0.69	
	PER																					1	0.8	0.5	0.8	0.73	
CPTPP	USA																							0.5	0.8	0.65	
	EUN average																								0.74		
World average																							0.77				

NOTE: See the note on Table 2.

SOURCE: Authors.

dissimilarity, suggesting that while the US imposes multiple technical measures on chemicals, Peru and Cambodia impose only a few—many of which constitute a subset of the US regulatory set.

In the textiles sector (Table 7), the EU, followed by Canada, has a regulatory framework that is relatively similar to those of other countries. Meanwhile, Singapore, followed by Thailand, implements a more distinct set of technical measures. Among the 22 countries, the bilateral dissimilarity values between Lao PDR and Myanmar are 0, indicating that they share an identical regulatory framework for textile products. Additionally, the calculated dissimilarity values between Chile and Australia (0.14–0.15), and between the EU and Canada (0.25) are exceptionally low. However, higher dissimilarity values are more prevalent in the textiles sector than in the other sectors examined, suggesting greater regulatory divergence. Singapore exhibits extremely high dissimilarity against Cambodia (0.97) and complete dissimilarity of 1 against all other countries. High dissimilarity is also frequently observed for Malaysia, Brunei, Cambodia and other ASEAN Member States, as well as India.

In the machinery sector (Table 8), Australia, followed by India and China, has a regulatory framework that is relatively similar to those of other countries while Lao PDR, followed by Peru and Myanmar, implements a more distinct set of technical measures. The least dissimilarity is observed between India and Korea (0.22 for either country as exporter). Lower dissimilarity are concentrated among the “+6” countries<sup>6</sup> of the RCEP, including India and Korea. In contrast, Lao PDR and Myanmar, as well as Peru, exhibit consistently high dissimilarity with other countries. Additionally, eight cells with the calculated dissimilarity value of 1 are observed between ASEAN Member States such as Lao PDR and Myanmar, indicating complete regulatory divergence.

In the transportation sector (Table 9), Australia, followed by China and the US, has a regulatory framework that is relatively similar to those of other countries, while Myanmar, followed by Thailand and Chile, implements a distinct set of technical measures. The least dissimilarity is observed between Canada

and the US (0.20 for either country as exporter). Like the machinery sector (Table 8), lower dissimilarity values are concentrated among the “+6” countries of the RCEP. Conversely, Myanmar and Thailand, as well as Chile, exhibit complete dissimilarity values at 1 or high values close to 1 with other countries. Again, 34 cells with the calculated dissimilarity value of 1 are observed between ASEAN Member States such as Myanmar and Thailand, indicating complete regulatory divergence.

### 3.3 Regulatory Adoption Costs in Asian Regional Integration Efforts

Table 10 presents the overall regulatory adoption costs for countries serving as a benchmark within a given regional integration effort. The adjusted regulatory adoption costs are shown in parentheses. Each column corresponds to an Asian regional integration initiative as indicated in the top row of the table. The “Intraregional” column reports adoption costs with the country listed in the left-hand column serving as the benchmark (exporter) country for all other (importing) member countries within the regional integration. The “Open” column includes the US, the EU, China, Japan and Korea (as needed) in addition to the regional integration members to assess how adoption costs change under an open regional setting.

For the AEC, Vietnam serves as the optimal benchmark with its minimized adoption costs at 1.760 (overall) and 0.196 (adjusted) within the region. While Korea incurs the lowest adoption cost in the open setting, Vietnam ranks second, indicating its strong suitability as a benchmark if the AEC transitions to open regionalism. However, adoption costs increase as more countries are included in the open regional setting and even the adjusted costs are generally higher than in the intraregional setting—except for Cambodia, suggesting that the shift to open regionalism poses challenges. The highest adoption cost in the AEC occurs when Cambodia serves as the benchmark with values of 3.727 (overall) and 0.414 (adjusted), followed by Malaysia. Furthermore, in the open regional setting, Malaysia incurs the highest adoption cost with values of 5.532 (overall) and 0.395 (adjusted), followed by Cambodia. To achieve regulatory harmonization within the AEC, irrespective of intraregional or open regional settings, policy efforts and international cooperation from both Cambodia and Malaysia are essential.

In the CPTPP, the adjusted adoption cost for Australia is 0.252, which appears to be the optimal benchmark, followed by Vietnam. Unlike the AEC, the adjusted adoption costs are generally lower in the open regional setting than in the intraregional setting, except for Brunei. For instance, when Australia is the benchmark, the adjusted adoption cost decreases from 0.252 to 0.232 due to the inclusion of the US and other major economies. As with the AEC, Korea minimizes the adjusted cost burden to 0.208 in the open regional setting, yet Australia remains second lowest with Vietnam ranking third, suggesting that both Australia and Vietnam play key roles in the transition to open regionalism. Within the CPTPP, the highest adjusted adoption cost is observed for Chile (0.427), followed by Japan and Malaysia. In the open regional setting, Chile remains the highest (0.401), followed by the US and Malaysia. These results highlight the need for policy efforts and international cooperation from Chile and Malaysia to facilitate regulatory harmonization in the CPTPP. Meanwhile, Japan’s role is crucial for intraregional harmonization.

In the RCEP, which includes more members than the AEC, both overall and adjusted adoption costs tend to be high except for Malaysia and Cambodia. Australia serves as the optimal benchmark in both intraregional and open regional settings with an adjusted cost of 0.202 in the intraregional setting and 0.207 in the open regional setting, which is comparable to the minimized cost level in the AEC. Despite the RCEP’s larger and more diverse membership, the minimized adjusted cost burden in the open regional setting for Australia (0.207) is actually lower than in the AEC’s corresponding value for Korea (0.214). Consistent with results for the AEC and CPTPP, Korea ranks second, followed by Thailand and Vietnam, in both intraregional and open regional settings. Within the RCEP, the highest adjusted adoption cost is observed for Cambodia (0.405), followed by New Zealand and Japan. In the open regional setting, Cambodia remains the highest (0.399), followed by the US and New Zealand. As with the AEC, policy

TABLE 10  
Regulatory Adoption Costs in Regional Integration – All Merchandise

Benchmark	AEC		CPTPP		RCEP			CJK	
	Intra-Regional	Open	Intra-Regional	Open	Intra-Regional	+India	Open	Intra-Regional	Open
Brunei	2.311 (0.257)	4.151 (0.296)	2.807 (0.281)	4.031 (0.288)	3.753 (0.268)	4.073 (0.272)	4.944 (0.291)		
Malaysia	3.505 (0.389)	5.532 (0.395)	3.841 (0.384)	5.119 (0.366)	5.129 (0.366)	5.382 (0.359)	6.292 (0.370)		
Singapore	1.953 (0.217)	3.643 (0.260)	2.887 (0.289)	4.003 (0.286)	3.370 (0.241)	3.701 (0.247)	4.473 (0.263)		
Viet Nam	1.760 (0.196)	3.239 (0.231)	2.750 (0.275)	3.727 (0.266)	3.055 (0.218)	3.326 (0.222)	4.055 (0.239)		
Indonesia	2.393 (0.266)	4.164 (0.297)			4.121 (0.294)	4.508 (0.301)	5.286 (0.311)		
Cambodia	3.727 (0.414)	5.454 (0.390)			5.607 (0.400)	6.069 (0.405)	6.780 (0.399)		
Lao PDR	2.223 (0.247)	4.020 (0.287)			3.962 (0.283)	4.442 (0.296)	5.316 (0.313)		
Myanmar	2.218 (0.246)	4.047 (0.289)			3.876 (0.277)	4.182 (0.279)	4.956 (0.292)		
Philippines	2.092 (0.232)	3.552 (0.254)			3.505 (0.250)	3.846 (0.256)	4.478 (0.263)		
Thailand	1.817 (0.202)	3.463 (0.247)			3.057 (0.218)	3.308 (0.221)	4.151 (0.244)		
Australia			2.515 (0.252)	3.242 (0.232)	2.907 (0.208)	3.028 (0.202)	3.512 (0.207)		
Japan		5.241 (0.374)	3.880 (0.388)	4.876 (0.348)	5.132 (0.367)	5.392 (0.359)	6.045 (0.356)	0.502 (0.251)	1.155 (0.289)
New Zealand			3.685 (0.369)	4.784 (0.342)	5.226 (0.373)	5.517 (0.368)	6.310 (0.371)		
China		4.093 (0.292)		3.866 (0.276)	4.201 (0.300)	4.527 (0.302)	4.973 (0.293)	0.481 (0.241)	0.927 (0.232)
Rep. of Korea		2.991 (0.214)		2.919 (0.208)	3.038 (0.217)	3.171 (0.211)	3.523 (0.207)	0.284 (0.142)	0.636 (0.159)
India						4.485 (0.299)	5.027 (0.296)		
Canada			3.146 (0.315)	4.066 (0.290)					
Chile			4.268 (0.427)	5.617 (0.401)					
Mexico			3.829 (0.383)	4.933 (0.352)					
Peru			3.476 (0.348)	4.229 (0.302)					
US		5.302 (0.379)		5.141 (0.367)			6.479 (0.381)		1.139 (0.285)
EU		4.721 (0.337)		4.210 (0.301)			5.440 (0.320)		0.894 (0.223)

NOTE: The table shows the overall regulatory adoption costs calculated using a country listed in the left-hand column as a benchmark with adjusted figures (i.e., the squared sum of divided by N-1) in parentheses.

SOURCE: Author.

efforts and international cooperation by Cambodia are crucial for achieving regulatory harmonization in the RCEP while Japan also plays a key role in intraregional harmonization, similar to its role in the CPTPP. For CJK, which consists of only three members, both overall and adjusted adoption costs are lower than in the other regional integration efforts. Korea serves as the optimal benchmark in both intraregional and open regional settings, whereas Japan's policy efforts are essential for achieving regulatory harmonization in the region.

### 3.4 Sectoral Analysis of Regulatory Adoption Costs

The upper sections of Tables 11 and 12 provide a summary of Table 10 regarding technical measures affecting all merchandise. The remaining sections present, respectively, the lowest and second-lowest figures and the highest and second-highest figures for each of the seven sectors under study.<sup>7</sup> In comparing sectors by examining each column of Tables 11 and 12 vertically, we see that regulatory adoption costs tend to be lower in the animal products sector and higher in the textiles sector. An exception is observed in the AEC, where the highest adoption costs (Table 12) are lower in the foodstuffs sector than in other sectors. Overall, international regulatory harmonization appears to be less challenging in the animal products sector but more complex in textiles among Asian countries and their trading partners.

In the AEC, Vietnam serves as the optimal benchmark in the animal products and vegetable products sectors as well as for all merchandise. Vietnam also plays a key role in transitioning to open regionalism in the textiles sector. In the chemicals sector, the Philippines emerges as the optimal benchmark. Conversely, Cambodia records the highest adoption cost in the vegetable products and foodstuffs sectors while Malaysia ranks highest in the animal products and chemicals sectors, both in the intraregional and open regional settings. These results suggest that Cambodia and Malaysia need to adjust their regulations to align more closely with other ASEAN members. Singapore presents mixed results, ranking as the optimal benchmark in the foodstuffs sector while having the highest adoption cost in textiles, indicating sectoral variation in pathways toward regulatory harmonization. In the machinery and transportation sectors, if the AEC aims to transition to open regionalism, ASEAN Member States must align their regulations with major trading partners such as China. Policy efforts by Lao PDR, Myanmar and Thailand are particularly crucial in this process.

In the CPTPP, Australia emerges as the optimal benchmark across multiple sectors, including animal products, vegetable products, foodstuffs, machinery, transportation as well as for all merchandise. Australia is also the second-optimal benchmark in textiles. However, in the chemicals sector, Canada serves as the optimal benchmark in both intraregional and open regional settings. On the other hand, Chile records the highest adoption cost in the vegetable products, foodstuffs, chemicals and transportation sectors, highlighting the need for substantial policy efforts on regulatory adjustments by Chile. In other sectors, Malaysia, Singapore and Peru have the highest adoption costs in the animal products, textiles and machinery sectors respectively, emphasizing the importance of their policy efforts.

For the RCEP, Australia serves as the optimal benchmark in the animal products and machinery sectors, both in intraregional and open regional settings as well as for all merchandise. Australia also appears to be the best benchmark for a future transition to open regionalism in the transportation sector. In the vegetable products and foodstuffs sectors, Korea emerges as the optimal benchmark, followed by Australia. Korea is also the optimal benchmark in the textiles sector while China serves as the optimal benchmark in the chemicals sector. Consistent with the AEC results, China's role is crucial in transitioning to open regionalism in the machinery and transportation sectors.

Similar to the AEC, Cambodia records the highest adoption costs in the vegetable products and foodstuffs sectors—both in intraregional and open regional settings—reinforcing the importance of policy efforts in these areas. As observed in the AEC and CPTPP, Malaysia and Singapore have the highest

TABLE 11  
Benchmark Countries with the Lowest and Second Lowest Regulatory Adoption Costs

	AEC		CPTPP				RCEP			CJK							
	Intraregional	Open	Intraregional	Open	Intraregional	+India	Open	Intraregional	Open								
All merchandise																	
Viet Nam	1.760 (0.196)	Rep. of Korea (0.214)	2.991	Australia (0.252)	2.515	Rep. of Korea (0.208)	2.919	Australia (0.208)	2.907	Australia (0.202)	3.028	Australia (0.207)	3.512	Rep. of Korea (0.142)	0.284	Rep. of Korea (0.159)	0.636
Thailand	1.817 (0.202)	Viet Nam (0.231)	3.239	Viet Nam (0.275)	2.750	Australia (0.232)	3.242	Rep. of Korea (0.217)	3.038	Rep. of Korea (0.211)	3.171	Rep. of Korea (0.207)	3.523				
Animal products																	
Singapore	0.701 (0.078)	Rep. of Korea (0.083)	1.163	Australia (0.093)	0.928	Rep. of Korea (0.080)	1.120	Australia (0.071)	1.000	Australia (0.070)	1.048	Australia (0.076)	1.293	Rep. of Korea (0.057)	0.113	Rep. of Korea (0.075)	0.298
Viet Nam	0.871 (0.097)	Viet Nam (0.091)	1.274	Viet Nam (0.114)	1.144	Australia (0.093)	1.299	Rep. of Korea (0.081)	1.129	Rep. of Korea (0.079)	1.180	Rep. of Korea (0.080)	1.365				
Vegetable products																	
Viet Nam	0.956 (0.106)	Rep. of Korea (0.113)	1.586	Brunei (0.140)	1.397	Rep. of Korea (0.113)	1.583	Rep. of Korea (0.112)	1.563	Rep. of Korea (0.107)	1.603	Rep. of Korea (0.107)	1.822	Rep. of Korea (0.062)	0.124	Rep. of Korea (0.086)	0.343
Brunei	1.159 (0.129)	Viet Nam (0.123)	1.717	Australia (0.153)	1.534	Australia (0.143)	1.999	Viet Nam (0.113)	1.583	Australia (0.111)	1.667	Australia (0.114)	1.944				
Foodstuffs																	
Singapore	1.196 (0.133)	Rep. of Korea (0.120)	1.676	Australia (0.182)	1.816	Rep. of Korea (0.123)	1.725	Rep. of Korea (0.114)	1.589	Rep. of Korea (0.109)	1.633	Rep. of Korea (0.108)	1.833	Rep. of Korea (0.064)	0.128	Rep. of Korea (0.082)	0.328
Thailand	1.281 (0.142)	Thailand (0.149)	2.087	Singapore (0.194)	1.935	Australia (0.162)	2.263	Australia (0.120)	1.677	Australia (0.115)	1.724	Australia (0.117)	1.994				
Chemicals																	
Philippines	2.902 (0.322)	Philippines (0.341)	4.780	Canada (0.350)	3.499	Canada (0.317)	4.436	Philippines (0.344)	4.814	Philippines (0.359)	5.379	China (0.350)	5.954	Rep. of Korea (0.152)	0.304	Rep. of Korea (0.199)	0.796
Lao PDR	3.005 (0.334)	China (0.342)	4.791	Japan (0.415)	4.154	China (0.342)	4.794	Lao PDR (0.352)	4.932	China (0.362)	5.428	Philippines (0.360)	6.119				
Textiles																	
Lao PDR	5.745 (0.638)	Viet Nam (0.590)	8.258	Chile (0.588)	5.884	EU (0.492)	6.894	Philippines (0.607)	8.493	Philippines (0.632)	9.486	Rep. of Korea (0.630)	10.718	Rep. of Korea (0.562)	1.124	EU (0.306)	1.224
Myanmar	5.745 (0.638)	Rep. of Korea (0.622)	8.711	Australia (0.627)	6.267	Canada (0.539)	7.542	Rep. of Korea (0.683)	9.555	Rep. of Korea (0.694)	10.408	EU (0.642)	10.906				
Machinery																	
Cambodia	5.324 (0.592)	China (0.473)	6.621	Australia (0.497)	4.972	Australia (0.389)	5.447	Australia (0.415)	5.810	Australia (0.394)	5.905	Australia (0.369)	6.266	Japan (0.163)	0.327	EU (0.107)	0.428
Philippines	5.467 (0.607)	Japan (0.489)	6.845	Chile (0.504)	5.040	China (0.390)	5.465	Cambodia (0.474)	6.639	Japan (0.457)	6.853	China (0.425)	7.230				
Transportation																	
Philippines	5.709 (0.634)	US (0.476)	6.671	Australia (0.414)	4.145	China (0.327)	4.578	China (0.478)	6.687	China (0.460)	6.901	Australia (0.430)	7.318	Rep. of Korea (0.208)	0.415	Rep. of Korea (0.156)	0.625
Singapore	5.748 (0.639)	China (0.486)	6.802	Canada (0.425)	4.248	Australia (0.328)	4.594	Australia (0.486)	6.807	Australia (0.463)	6.944	China (0.433)	7.353				

NOTE: The above table shows the lowest and the second lowest values of the overall regulatory adoption costs (and the adjusted costs in parentheses) calculated for each type of regional integration efforts, by sector.

SOURCE: Authors.

adoption costs in the animal products and textiles sectors, respectively. Lao PDR records the highest adoption cost in machinery with policy efforts from Lao PDR, Myanmar and Thailand being crucial for regulatory alignment in the machinery and transportation sectors.

For CJK, which consists of three members, only the lowest (Table 11) and highest (Table 12) values are reported. Korea serves as the optimal benchmark in all sectors except machinery, where Japan appears to be the better benchmark. Japan's role is critical in achieving regulatory harmonization, except in the machinery sector.

TABLE 12  
Benchmark Countries with the Highest and Second Highest Regulatory Adoption Costs

	AEC		CPTPP				RCEP			CJK	
	Intraregional	Open	Intraregional	Open	Intraregional	+India	Open	Intraregional	Open		
All merchandise											
Cambodia	3.727 (0.414)	Malaysia 5.532 (0.395)	Chile 4.268 (0.427)	Chile 5.617 (0.401)	Cambodia 5.607 (0.400)	Cambodia 6.069 (0.405)	Cambodia 6.780 (0.399)	Japan 0.502 (0.251)	Japan 1.155 (0.289)		
Malaysia	3.505 (0.389)	Cambodia 5.454 (0.390)	Japan 3.880 (0.388)	US 5.141 (0.367)	New Zealand 5.226 (0.373)	New Zealand 5.517 (0.368)	US 6.479 (0.381)				
Animal products											
Malaysia	3.130 (0.348)	Malaysia 4.425 (0.316)	Malaysia 2.493 (0.249)	Malaysia 3.410 (0.244)	Malaysia 3.984 (0.285)	Malaysia 4.069 (0.271)	Malaysia 4.713 (0.277)	Japan 0.319 (0.160)	US 0.894 (0.223)		
Lao PDR	1.785 (0.198)	US 3.336 (0.238)	Mexico 2.320 (0.232)	US 3.366 (0.240)	Lao PDR 3.097 (0.221)	Lao PDR 3.454 (0.230)	US 4.003 (0.235)				
Vegetable products											
Cambodia	3.919 (0.435)	Cambodia 6.104 (0.436)	Chile 3.102 (0.310)	Chile 4.066 (0.290)	Cambodia 6.031 (0.431)	Cambodia 6.514 (0.434)	Cambodia 7.623 (0.448)	China 0.330 (0.165)	Japan 0.900 (0.225)		
Malaysia	2.925 (0.325)	US 4.104 (0.293)	Mexico 3.060 (0.306)	Mexico 3.808 (0.272)	New Zealand 3.862 (0.276)	New Zealand 3.984 (0.266)	US 4.705 (0.277)				
Foodstuffs											
Cambodia	2.804 (0.312)	Cambodia 4.278 (0.306)	Chile 5.965 (0.597)	Chile 7.643 (0.546)	Cambodia 4.232 (0.302)	Cambodia 4.605 (0.307)	Cambodia 5.291 (0.311)	Japan 0.395 (0.198)	Japan 0.921 (0.230)		
Indonesia	2.650 (0.294)	Japan 4.087 (0.292)	Malaysia 3.216 (0.322)	US 4.150 (0.296)	Indonesia 4.054 (0.290)	Indonesia 4.335 (0.289)	Indonesia 4.873 (0.287)				
Chemicals											
Malaysia	4.760 (0.529)	Malaysia 7.026 (0.502)	Chile 6.556 (0.656)	Chile 8.761 (0.626)	New Zealand 7.002 (0.500)	India 8.267 (0.551)	India 9.508 (0.559)	China 0.453 (0.226)	EU 1.222 (0.306)		
Indonesia	4.137 (0.460)	Singapore 6.529 (0.466)	Mexico 5.702 (0.570)	Mexico 7.475 (0.534)	Malaysia 6.945 (0.496)	Malaysia 7.550 (0.503)	Malaysia 8.584 (0.505)				
Textiles											
Singapore	8.950 (0.994)	Singapore 13.950 (0.996)	Singapore 10.000 (1.000)	Singapore 13.000 (0.929)	Singapore 13.950 (0.996)	Singapore 14.9502 (0.997)	Singapore 16.950 (0.997)	Japan 1.643 (0.821)	Japan 2.956 (0.739)		
Thailand	8.913 (0.990)	Thailand 13.853 (0.990)	Malaysia 9.375 (0.938)	Malaysia 12.120 (0.866)	Thailand 13.853 (0.990)	Thailand 14.853 (0.990)	Thailand 16.853 (0.991)				
Machinery											
Lao PDR	8.538 (0.949)	Lao PDR 12.636 (0.903)	Peru 9.194 (0.919)	Peru 11.933 (0.852)	Lao PDR 12.556 (0.897)	Lao PDR 13.448 (0.897)	Lao PDR 15.085 (0.887)	China 0.417 (0.209)	US 1.454 (0.364)		
Myanmar	7.073 (0.786)	Myanmar 11.709 (0.836)	Viet Nam 7.535 (0.753)	Viet Nam 9.415 (0.672)	Myanmar 11.398 (0.814)	Myanmar 12.336 (0.822)	Myanmar 14.267 (0.839)				
Transportation											
Thailand	8.651 (0.961)	Myanmar 13.389 (0.956)	Chile 9.790 (0.979)	Chile 12.501 (0.893)	Myanmar 13.572 (0.969)	Myanmar 14.572 (0.971)	Myanmar 16.389 (0.964)	Japan 0.588 (0.294)	Japan 1.184 (0.296)		
Myanmar	8.631 (0.959)	Thailand 13.251 (0.947)	Malaysia 7.970 (0.797)	Malaysia 10.356 (0.740)	Thailand 13.393 (0.957)	Thailand 14.393 (0.960)	Thailand 16.168 (0.951)				

NOTE: The table shows the highest and the second highest values of the overall regulatory adoption costs (and the adjusted costs in parentheses) calculated for each type of regional integration efforts, by sector.

SOURCE: Authors.

#### 4. Policy Discussion and Conclusion

In this paper, we examined regulatory differences between countries using the NTM datasets that are based on national regulations on technical measures and other NTMs. The calculations for bilateral regulatory dissimilarity indicators reveal that regulatory frameworks in East Asia and its main trading partners differ significantly. Moreover, international regulatory differences vary across sectors. While our calculations do not account for differences in regulatory stringency, there remains substantial scope for harmonising regulatory frameworks in terms of type, particularly in manufacturing sectors. This is particularly relevant

in the textiles sector where each country applies a distinct set of technical measures, making it a priority for streamlining. Another key area is the machinery and transportation sectors, where two contrasting country groups emerge: ASEAN Member States and the “+6” countries. Among the “+6” countries, regulatory frameworks are relatively similar whereas among ASEAN Member States, they differ substantially. This suggests that ASEAN Member States should prioritize harmonization in these sectors. Machinery imports are critical for industrial and economic development, especially for lower-income countries. Reducing regulatory differences in the machinery sector could stimulate trade expansion, thereby accelerating industrialization and facilitating technology transfer embedded in machinery.

Using the calculated bilateral regulatory differences, we propose a metric to identify the least costly, optimal benchmark for member countries to align their national regulatory frameworks, providing guidance for regulatory harmonization within a given regional agreement. When considering all merchandise, our analysis suggests that using Vietnam as the benchmark for the AEC and Australia for the CPTPP and RCEP is the least costly approach. If the RCEP is to remain an ASEAN-driven initiative, the harmonization process could be based on Vietnam’s regulatory framework. Korea consistently ranks among the lower-cost benchmarks across multiple regional integration efforts, particularly in open regional settings. In contrast, using Cambodia or Malaysia as the benchmark results in high regulatory adoption costs, indicating that their regulatory frameworks differ significantly from those of their regional partners, and highlighting the need for policy efforts by these countries. Similarly, Japan’s policy efforts are crucial in facilitating intraregional harmonization of both the CPTPP and RCEP. Transitioning to open regionalism remains a challenge, as regulatory adoption costs generally increase when more countries are included.

Regulatory dissimilarity, however, have limitations in capturing the regulatory quality of each NTM. While our research focuses on evaluating baseline regulatory differences among sample countries, capturing the magnitude of each NTM is challenging. Available NTM data often describe the existence of technical regulations but lack details of how the magnitude of each NTM would have different impact on an exporter or importer. Future research could take into account the magnitude of NTMs to further research related to the quality of NTMs divergence.

Since regulatory harmonization discussions are unlikely to address all merchandise simultaneously, a sector-by-sector approach is more practical. Our sectoral analysis indicates that Vietnam and Australia are the least costly, optimal benchmarks across multiple sectors. At the same time, Canada, Korea and the Philippines also emerge as optimal benchmarks in specific sectors. Different benchmark countries could lead intraregional harmonization efforts that focus on certain sectors or products. While the current study presents findings at the sectoral level, similar analyses could be conducted at a more disaggregated level to examine specific products. Specifically, each country needs to streamline NTMs domestically, address procedural and administrative obstacles, and engage in harmonization whether regional or plurilateral using benchmark countries to minimize the bilateral divergence of NTMs.

Regardless of product groups or regional integration efforts, the key challenge in advancing regulatory harmonization is convincing the most affected countries, particularly those with the largest regulatory differences from the benchmark country. A practical approach to narrowing these differences is to promote mutual recognition of technical measures among member countries. Compared to the CPTPP, the RCEP lacks strong commitments in this area even though it includes some regulatory cooperation frameworks (Armstrong and Drysdale 2022; ADB 2022). Since regulatory frameworks reflect domestic conditions, historical developments and national policy concerns, harmonization can be politically and administratively challenging. Rather than requiring immediate regulatory convergence, Mutual Recognition Agreements (MRAs) could serve as a pragmatic pathway to enhancing trade integration. While some challenges related to MRAs still exist, streamlining technical measures at the domestic level and aligning technical measures with international standards would buttress the role of MRAs, which in the end result in conformity of different technical measures across countries.

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## Appendix: 70 Countries in Our Dataset

<i>Countries Participating in Regional Trade Agreements under Study</i>	<i>Other Countries</i>
AUS†‡ BRN*†‡ CAN‡ CHL‡ CHN† EUN IDN*† IND JPN†‡ KHM*† KOR† LAO*† MEX‡ MMR*† MYS*†‡ NZL†‡ PER‡ PHL*† SGP*†‡ THA*† USA VNM*†‡	ARE ATG BHR BHS BOL ARG BRA BRB CHE CMR COL CRI CUB DMA DZA ECU ETH GRD GTM GUY HKG HND ISR JAM JOR KAZ KGZ KWT LBN LKA MAR MRT NIC OMN PAK PAN PNG PRY QAT RUS SAU SLV SUR TJK TTO TUN URY VEN

NOTE: The table lists ISO3 country codes, with \*, †, and ‡, indicating the AEC, RCEP, and CPTPP member countries, respectively.

SOURCE: Authors.

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## NOTES

1. See Appendix for a list of countries participating in each regional trade agreement under study.
2. The dissimilarity indicator can be calculated not only at aggregate country level but also by industry.
3. The EU is treated as a single statistical unit on the import side as all EU member states impose the same NTMs on imports from outside the customs union. However, a non-EU importer may impose different NTMs on imports from individual EU members. In our dataset, such differences are negligible; for instance, the standard deviation across all merchandise averages 0.0002. Therefore, we calculated a simple average of the dissimilarity indicators across exporting EU member states and reported the averaged figures in Tables 2–9.
4. Although manufacturing sectors correspond to HS 28–89, we present the results only for the chemicals (HS 28–38), textiles (HS 50–63), machinery (HS 84–85) and transportation (HS 86–89) sectors for the following reasons: (i) Myanmar implements no technical measures in the plastics/rubbers sector (HS 39–40); (ii) Vietnam, Cambodia, Lao PDR, Myanmar and Thailand implement no technical measures in the hides and skins sector (HS 41–43); (iii) Brunei, Cambodia, Lao PDR, Myanmar and Thailand implement no technical measures in the footwear sector (HS 64–67); and (iv) many bilateral dissimilarity values are 1, indicating complete decorrelation, in the stone/glass (HS 68–71) and metals (HS 72–83) sectors. Results for these subsectors are available upon request.
5. If a country were to implement no regulations in a certain sector, the country’s regulatory vector would contain only zeros and we could not calculate  $\text{Cos}(\theta)_{od}$  or  $\text{Dissimilarity}_{od}$  in Equation (3) with respect to any other country. If this were the case, we would observe a row and column consisting of missing values only.
6. “+6” countries of the RCEP are Australia, China, India, Japan, Korea, and New Zealand. The full sectoral results are available upon request.
7. The full sectoral results are available upon request.

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