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Exploring Pathways for Deeper Regional Cooperation on NTMs in ASEAN and East Asia

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Abstract: *In this paper, we develop and examine an indicator for regulatory harmonisation amongst member countries in a given regional agreement based on the regulatory differences between countries using a non-tariff measure (NTM) data set. This study defines the 'optimal' set of regulations as the set of regulations where the adoption cost (i.e. differences in regulation between a base country and a partner country) is the lowest, considering all the possible trading pairs in an agreement. This provides guidance to policymakers regarding which country's regulations could serve as the basis for discussion on regulatory harmonisation. To do so, we examine regional integration efforts in Asia – 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 China–Japan–Republic of Korea Free Trade Agreement negotiations (CJK).*

1. Introduction

Unlike in past decades when international trade registered double-digit growth, it seems that one cannot expect international trade to grow as fast as in the past. In fact, trade in goods in 2023 is expected to contraction of 4.5% (UNCTAD 2023). In recent years, incidents such as the spread of the coronavirus disease (COVID-19), the war in Ukraine, and tensions between China and the United States have raised doubts about freer international trade, and concerns are growing regarding the less liberal international trade environment. In this context, the impact of non-tariff measures (NTMs) on international trade has raised alarm because of falling tariff rates, especially through regional integration efforts. Some studies examining the impacts of NTMs on bilateral trade have found negative impacts stemming from differences in regulations in partner countries (Nabeshima and Obashi 2021; Nabeshima, Obashi, and Kim, 2021).

Many countries are now parties to some form of free trade agreement (FTA), including mega FTAs with numerous countries. These agreements have achieved tariff reductions, with varying degrees of success in deeper integration involving issues such as regulatory harmonisation (or mutual recognition agreements). The results of studies based on bilateral trade suggest that achieving regulatory harmonisation (or mutual recognition) could stimulate more trade within an agreement (e.g. Mattoo, Mulabdic, and Ruta, 2022). However, so far, there has been no guidance on how these countries could proceed with this process. For instance, regulatory harmonisation implies that all countries need to agree on a "harmonised regulation". If a country's regulation differs from that agreed upon regulation, then a country needs to revise her regulation. Countries can either formulate a completely new regulation or identify an existing regulation that can serve as the base for harmonisation. It would seem to be more practical to initiate the discussion on harmonization on existing regulations. Then, the question is whose regulation that these countries should use as reference? So far, no studies have examined this issue. In this paper, we attempt to provide guidance on this issue by proposing an indicator that aggregates the differences in regulations between each pair of countries in a given FTA. By doing so, we hope to provide the basis for constructive discussions on regulatory harmonisation (and mutual recognition).

We examine regional integration efforts in Asia through the Association of Southeast Asian Nations (ASEAN) Economic Community (AEC),[1] the Comprehensive and Progressive

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[1] ASEAN/AEC includes Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Viet Nam.

Agreement for Trans-Pacific Partnership (CPTPP),[2] the Regional Comprehensive Economic Partnership (RCEP),[3] and China–Japan–Republic of Korea (henceforth, Korea) Free Trade Agreement (CJK) negotiations.

2.   International Differences in Regulatory Patterns

2.1. Bilateral Regulatory Dissimilarity Indicator

We first construct a vector representing a regulatory pattern of technical measures implemented domestically in exporter (origin) country o against product i as

$$F_{oi}^D = (F_{oi1}^D, \ldots, F_{oik}^D, \ldots, F_{oiK}^D) \tag{1}$$

where F_{oik}^D is the number of technical measures in force within a measure type grouping k. This domestic regulatory pattern vector (F_{oi}^D) is approximated by a set of technical measures implemented in country o against product i imported from all countries (with no discrimination amongst trading partners), which are also expected to be applicable to domestic production and sales.

Following Nabeshima, Obashi, and Kim (2021), we consider 18 groupings (i.e. K=18) of technical measure types. We consider NTMs classified under chapters A, B, or C as technical measures. However, we exclude 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. The 18 groups of measures in Table 1 are applicable to both the M3 (February 2012) and M4 (2019) versions of NTM classification.[4]

We construct another vector representing a regulatory pattern in importer (destination) country d against product i imported from country o as

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

where F_{odik}^F is the number of technical measures in force within type k.

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[2] CPTPP includes Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and Viet Nam.
[3] RCEP includes 10 ASEAN countries and Australia, China, Japan, Korea, and New Zealand
[4] We mainly used the United Nations Conference on Trade and Development (UNCTAD) TRAINS NTM researcher file for use in Stata (version 12) that was publicly available on the UNCTAD webpage (UNCTAD, n.d.). In this data set, measures are categorised into types based on the M3 (2012) UNCTAD NTM classification. In addition, we manually collected data on India, Korea, and the United States (US), which were recorded based on the newer M4 (2019) classification.

Table 1: Groupings of Technical Measures

Group of technical measures	Maximum possible number of measures within group
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

Notes: Among the measure codes under chapters A–C, we excluded the explicitly prohibitive measures of A11, A12, and B11. Indeed, B11 of M3 corresponds to either of E323, E324, or E325 of M4, under the category E32, which covers 'Prohibition for non-economic reasons'. If an aggregated code (e.g. A1) was reported in the data set, 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: Created by the authors.

Using the above pair of vectors defined at product level (F_{oi}^{D} and F_{odi}^{F}), we define a bilateral regulatory dissimilarity indicator for exporter country o with respect to importer country d as

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

with

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

where $F_o^D = (F_{o1}^D, \ldots, F_{oi}^D, \ldots, F_{oI}^D)$ and $F_{od}^F = (F_{od1}^F, \ldots, F_{odi}^F, \ldots, F_{odI}^F)$. I is the total number of products under study.[5] The bilateral dissimilarity indicator ranges from 0 (meaning exactly the same) to 1 (indicating orthogonality or decorrelation).

2.2. Bilateral Regulatory Dissimilarity Amongst Asian Countries and Their Trading Partners

Table 2 shows a matrix of bilateral regulatory dissimilarity indicators for 20 countries involved in regional integration efforts in Asia, plus the United States (US) and the European Union (EU). We include the US and the EU, considering their importance in both Asian and world markets. In calculating the indicators, we considered all the goods traded internationally at the Harmonized System (HS) six-digit codes of the H2 (HS2002) version (i.e. I=5,224).

First, none of the calculated indicators are equal to one or zero for any pair of the 22 countries under study (or any pair of 70 countries in our whole data set).[6] That is, one country's set of technical regulations is not completely different from another country's set of regulations; meanwhile, no identical regulatory pattern is observed between any pair of countries. One country's pattern of regulations is partially overlapped with the other country's pattern (at least, at aggregate country level, considering all merchandise).

Second, looking at the right-hand column of Table 2, the average value of bilateral regulatory dissimilarity indicators calculated across 69 (= 70 – 1) importer countries ranges from 0.54 (Viet Nam) to 0.70 (Malaysia) amongst the 22 countries under study. For reference, considering all 70 countries in our data set (as exporters as well as importers), the worldwide average value is 0.66, ranging from 0.54 (Viet Nam) to 0.94 (Costa Rica). Viet Nam on average has a similar regulatory pattern to other countries in the world. Viet Nam's regulatory pattern

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[5] The bilateral dissimilarity indicator can be calculated not only at aggregate country level, but also by industry.

[6] See Appendix A for the list of 70 countries in our data set, including the 20 countries involved in regional integration efforts in Asia as well as the US and the EU. In our original data set, individual EU member states were considered as exporter (origin) countries, while the EU was treated as a single importer (destination) country statistical unit. The use of the single statistical unit for imports is because EU member states, which are part of a customs union, implement the same technical regulations on imported products. The bilateral regulatory dissimilarity indicators calculated for a particular importer country vary across the exporting EU member states because the importer can implement different regulations on products imported from different countries. Such differences in the bilateral dissimilarity indicator among the exporting EU member states, however, were negligibly small in the data set: considering all merchandise, for example, the standard deviation was on average 0.0002. We therefore took a simple average of the bilateral dissimilarity indicators across the exporting EU member states and reported the average figures in Tables 2–9.

is especially close to Thailand (0.271) and the Lao People's Democratic Republic (Lao PDR) (0.272). Korea, the Philippines, and Australia also achieve relatively low average values.

The highest average value, on the other hand, is observed for Malaysia, indicating that Malaysia on average implements a distinct set of regulations from other countries in the world. Malaysia's regulatory pattern is especially different from that of the Lao PDR (0.77) and Chile (0.76), as highlighted in darker grey. Other countries that have average values above the worldwide average of 0.66 include New Zealand, Cambodia, Chile, Japan, and the US.

Third, of the 22 countries under study, the bilateral regulatory dissimilarity indicator for Thailand (as exporter) against Viet Nam (0.269) is the lowest. It is noticeable that white-coloured cells indicating low values are concentrated amongst Thailand, Viet Nam, and the Lao PDR. Overall, not only these three countries but also other AEC member states tend to have similar regulatory patterns, as highlighted in white or lighter grey. An exception is the high dissimilarity of Malaysia with the Lao PDR (as mentioned above).

Meanwhile, the bilateral regulatory dissimilarity indicators calculated between New Zealand and the Lao PDR are the highest (0.78 for either country as exporter), followed by those calculated between Malaysia and the Lao PDR. In addition, Malaysia, as well as New Zealand, tends to be highly dissimilar in its regulatory pattern with Chile, Peru, and Mexico amongst the CPTPP partner countries.

Table 2: Bilateral Regulatory Dissimilarity Indicators – All Merchandise

Exporter \ Importer	BRN	MYS	SGP	VNM	IDN	KHM	LAO	MMR	PHL	THA	AUS	JPN	NZL	CHN	KOR	IND	CAN	CHL	MEX	PER	USA	EUN	Average across 69 importers
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	0.5		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	0.5	0.5	0.8	0.7	0.7	0.7	0.6	0.70
SGP	0.4	0.6		0.4	0.4	0.6	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	0.7	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	0.5	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	0.7	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	0.6	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	0.61
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	0.6	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	0.58
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	0.6	0.4	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	0.4	0.5	0.4		0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.54
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
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

Column groupings: CPTPP (BRN, MYS, SGP, VNM) | AEC (BRN, MYS, SGP, VNM, IDN, KHM, LAO, MMR, PHL, THA) within RCEP (through KOR) | CPTPP (AUS, JPN, NZL) | CPTPP (CAN, CHL, MEX, PER).

AEC = ASEAN Economic Community, ASEAN = Association of Southeast Asian Nations, AUS = Australia, BRN = Brunei Darussalam, CAN = Canada, CHL = Chile, CHN = China, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, EU = European Union, IDN = Indonesia, IND = India, JPN = Japan, KHM = Cambodia, KOR = Korea, LAO = Lao PDR, MEX = Mexico, MMR = Myanmar, MYS = Malaysia, NZL = New Zealand, PER = Peru, PHL = Philippines, RCEP = Regional Comprehensive Economic Partnership, SGP = Singapore, THA = Thailand, USA = United States of America, VNM = Viet Nam.

Notes: The EU is treated as a single unit for the importer country category, while the 28 individual EU member states are considered exporter countries. 'EUN average' is calculated as the simple average of bilateral cosine dissimilarity indicators across EU member states (as exporter countries) for each importer country. The left-hand column shows an average across 69 importer countries in our data set for each exporter country. Cells are highlighted in darker grey colour if the figure is greater and close to the maximum value of 1.

Source: Created by the authors.

Sectoral Data Observations

Tables 3, 4, and 5 complement Table 2 by presenting matrices of bilateral dissimilarity indicators exclusively for agricultural sectors. Table 3 shows the calculated indicators in the animal products sector (corresponding to HS two-digit codes 01–05). Korea, followed by Viet Nam, Australia, and Singapore, on average has a similar regulatory pattern to other countries in the world. Although the average values listed in the right-hand column of Table 3 are relatively low compared with the worldwide average value of 0.66 calculated for all merchandise (Table 2), Malaysia, followed by New Zealand, on average implements a distinct set of regulations from other countries. Consistent with these worldwide patterns, the indicators calculated between Viet Nam and Australia are the lowest (0.10 for either country as exporter), followed by those calculated between Australia and Singapore (0.11), amongst the 22 countries under study. In contrast, the high dissimilarity between Malaysia and the Lao PDR (0.90) and between New Zealand and the Lao PDR (0.78) are noticeable.

In Table 4, for the vegetable products sector (HS two-digit codes 06–15), Viet Nam, followed by Korea, on average has a similar regulatory pattern to other countries in the world. Cambodia, followed by Malaysia, on the other hand, on average implements a distinct set of regulations from other countries. White cells indicating low values are concentrated amongst AEC member states, centring on Viet Nam. A noticeable exception, however, is Cambodia, as highlighted in darker grey: the dissimilarity indicator for the US and Cambodia is the highest (0.82).

In Table 5, for the foodstuffs sector (HS two-digit codes 16–24), Korea, followed by Australia and Thailand, on average has a similar regulatory pattern to other countries in the world. Chile, followed by Malaysia, on the other hand, on average implements a distinct set of regulations from other countries. The dissimilarity indicator for Australia and Thailand is the lowest (0.10), whereas that of Chile and Malaysia is the highest (0.93). It is noticeable that Chile uniformly has high dissimilarity with 21 (= 22 − 1) partner countries under study, as highlighted in darker grey.

Tables 3, 4, and 5 together indicate that international differences in the implementation pattern of technical regulations vary even across agricultural sectors, suggesting the complex nature of regulatory regimes. Nevertheless, while Malaysia's regulatory pattern tends to be significantly different from those of other countries, Korea tends to occupy an intermediate position in the diverse regulatory patterns across the world.

Table 3: Bilateral Regulatory Dissimilarity Indicators – Animal Products

Exporter		Importer	BRN	MYS	SGP	VNM	IDN	KHM	LAO	MMR	PHL	THA	AUS	JPN	NZL	CHN	KOR	IND	CAN	CHL	MEX	PER	USA	EUN	Average across 69 importers
CPTPP / RCEP / 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	0.4	0.5	0.5	0.4	0.6	0.4	0.51
		MYS	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	0.3	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	0.3	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	0.2	0.5		0.4	0.2	0.5	0.6	0.3	0.2	0.3	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
		AUS	0.3	0.4	0.1	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
		KOR	0.4	0.4	0.2	0.1	0.2	0.3	0.3	0.4	0.2	0.2	0.2	0.3	0.3	0.2		0.2	0.2	0.3	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	0.5	0.3	0.5	0.5		0.5	0.4	0.7	0.4	0.53
		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	0.3	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

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Notes: The EU is treated as a single unit for the importer country category, while the 28 individual EU member states are considered exporter countries. 'EUN average' is calculated as the simple average of bilateral cosine dissimilarity indicators across EU member states (as exporter countries) for each importer country. The left-hand column shows an average across 69 importer countries in our data set for each exporter country. Cells are highlighted in darker grey colour if the figure is greater and close to the maximum value of 1.

Source: Created by the authors.

Table 4: Bilateral Regulatory Dissimilarity Indicators – Vegetable Products

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

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Notes: The EU is treated as a single unit for the importer country category, while the 28 individual EU member states are considered exporter countries. 'EUN average' is calculated as the simple average of bilateral cosine dissimilarity indicators across EU member states (as exporter countries) for each importer country. The left-hand column shows an average across 69 importer countries in our data set for each exporter country. Cells are highlighted in darker grey colour if the figure is greater and close to the maximum value of 1.

Source: Created by the authors.

Table 5: Bilateral Regulatory Dissimilarity Indicators – Foodstuffs

Exporter / Importer	BRN	MYS	SGP	VNM	IDN	KHM	LAO	MMR	PHL	THA	AUS	JPN	NZL	CHN	KOR	IND	CAN	CHL	MEX	PER	USA	EUN	Average across 69 importers
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
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
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		0.4	0.6	0.3	0.3	0.5	0.8	0.6	0.5	0.7	0.3	0.61
NZL	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.4	0.4	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
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	0.4	0.7	0.8	0.6	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	0.2	0.5	0.8	0.5	0.5	0.5		0.53
																						World average	0.60

AEC = ASEAN Economic Community, ASEAN = Association of Southeast Asian Nations, AUS = Australia, BRN = Brunei Darussalam, CAN = Canada, CHL = Chile, CHN = China, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, EU = European Union, IDN = Indonesia, IND = India, JPN = Japan, KHM = Cambodia, KOR = Korea, LAO = Lao PDR, MEX = Mexico, MMR = Myanmar, MYS = Malaysia, NZL = New Zealand, PER = Peru, PHL = Philippines, RCEP = Regional Comprehensive Economic Partnership, SGP = Singapore, THA = Thailand, USA = United States of America, VNM = Viet Nam.

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Source: Created by the authors.

Next, Tables 6, 7, 8, and 9 examine bilateral dissimilarity indicators in manufacturing sectors, presenting another interesting pattern of international regulatory differences. Table 6, 7, 8, and 9 show the calculated indicators, respectively, in the chemicals (corresponding to HS two-digit codes 28–38), textiles (HS 50–63), machinery (HS 84–85), and transportation (HS 86–89) sectors. The average values listed in the right-hand column of each table are relatively high compared with those of the agricultural sectors. Moreover, the calculated indicators tend to be high overall, as suggested by more cells highlighted in darker grey. It appears that countries tend to implement unique sets of technical regulations with less similarity to each other.

The prevalence of darker grey-coloured cells is partly because some countries implement only a handful of technical regulations on manufactured products – unlike agricultural products, which are often subject to many regulations but quite similar amongst countries. More importantly, however, there is no row or column of missing values in the matrices of calculated bilateral dissimilarity indicators: each of the 22 countries under study implements some regulation against some product in each sector.[1] In addition, there is only a single pair of cells with a value of zero: a complete similarity in the regulatory pattern of the textiles sector the between Lao PDR and Myanmar. Except for this exception, no identical regulatory pattern is observed between any pair of countries even though some countries have a relatively simple structure of regulations in the manufacturing sectors compared with the agricultural sectors.[2]

In Table 6, for the chemicals sector, Canada, followed by China, on average has a similar regulatory pattern to other countries in the world. Chile, followed by India, on the other hand, on average implements a distinct set of regulations from other countries. The bilateral dissimilarity indicators calculated amongst the US, Peru, and Cambodia are strikingly low (0.20–0.23), as highlighted in white. Chile uniformly has high dissimilarity with the other 21

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[1] If a country were to implement no regulations in a certain sector, the country's regulatory vector would contain zeros only and we could not calculate $Cos(\theta)_{od}$ and $Dissimilarity_{od}$ in (3) with respect to any other country. If this were the case, we would observe a row and column consisting of missing values only.

[2] As shown in Appendix B, agricultural sectors correspond to the HS two-digit codes 01–24 and manufacturing sectors correspond to the HS two-digit codes 28–89. HS two-digit codes 25–27 are for mineral products and HS two-digit codes 90–99 are for miscellaneous products. Of the 10 manufacturing sectors, we present the results for the chemicals, textiles, machinery, and transportation sectors in the main text due to the following reasons: (i) Myanmar implements no technical regulations in the plastics/rubbers sector (HS 39–40); (ii) Viet Nam, Cambodia, the Lao PDR, Myanmar, and Thailand implement no technical regulations in the hides and skins sector (HS 41–43); (iii) Brunei, Cambodia, the Lao PDR, Myanmar, and Thailand implement no technical regulations in the footwear sector (HS 64–67); and (iv) many bilateral dissimilarity indicators are calculated to be equal to one, indicating decorrelation, in the sectors of stone/glass (HS 68–71) and metals (HS 72–83). Nevertheless, the results for the other six manufacturing sectors are available upon request.

countries under study, as highlighted in darker grey; the dissimilarity of Chile and the US is the highest (0.90). The US is included both in the lowest and highest calculated figures, which would suggest that the US implements multiple regulations on chemicals while Peru and Cambodia implement only a few regulations, many of which constitute a subset of the US regulatory set.

In Table 7, for the textiles sector, the EU, followed by Canada, on average has a similar regulatory pattern to other countries in the world. Singapore, followed by Thailand, on the other hand, on average implements a distinct set of regulations from other countries. Amongst the 22 countries under study, the dissimilarity indicators calculated between the Lao PDR and Myanmar are zero, indicating that these countries implement the same set of technical regulations on textile products. Moreover, the dissimilarity indicators calculated between Chile and Australia (0.14–0.15) and those between the EU and Canada (0.25) are at exceptionally low levels, as highlighted in white. Nevertheless, darker grey-coloured cells are more prevalent in the textiles sector that in other sectors under study: in particular, Singapore has dissimilarity of 0.97 against Cambodia and complete dissimilarity with a value of one uniformly against the other countries. Such extremely high values close to one are frequently observed for Malaysia, Brunei, Cambodia, and other AEC member states as well as India.

In Table 8, for the machinery sector, Australia, followed by India and China, on average has a similar regulatory pattern to other countries in the world. The Lao PDR, followed by Peru and Myanmar, on the other hand, on average implements a distinct set of regulations from other countries. The dissimilarity indicators calculated between India and Korea are the lowest (0.22 for either country as exporter). Lighter grey-coloured cells indicating smaller values are concentrated amongst the '+6' countries[3] of the RCEP, including India and Korea. In contrast, the Lao PDR and Myanmar, as well as Peru, have uniformly high dissimilarity with the other countries under study, as highlighted in darker grey. In addition, there are eight cells with a value of one calculated between AEC member states such as the Lao PDR and Myanmar.

In Table 9, for the transportation sector, Australia, followed by China and the US, on average has a similar regulatory pattern to other countries in the world. Myanmar, followed by Thailand and Chile, on the other hand, on average implements a distinct set of regulations from other countries. The dissimilarity indicators calculated between Canada and the US are the lowest (0.20 for either country as exporter). As in the machinery sector, lighter grey-coloured

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[3] These countries are: Australia, China, India, Japan, Korea, and New Zealand.

cells indicating smaller values are concentrated amongst the '+6' countries of the RCEP. In contrast, Myanmar and Thailand, as well as Chile, have complete dissimilarity with a value of one or a high value close to one with the other countries under study, as highlighted in darker grey. The dissimilarity indicators are calculated as one for 34 pairs (cells) between AEC member states such as Myanmar and Thailand.

Table 6: Bilateral Regulatory Dissimilarity Indicators – Chemicals

Exporter		BRN	MYS	SGP	VNM	IDN	KHM	LAO	MMR	PHL	THA	AUS	JPN	NZL	CHN	KOR	IND	CAN	CHL	MEX	PER	USA	EUN	Average across 69 importers
CPTPP / RCEP / AEC	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	0.7	0.5	0.7	0.7	0.7	0.8	0.6	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	0.7	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	0.7	0.6	0.6	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	0.6	0.5	0.6	0.5	0.68
	NZL	0.7	0.8	0.7	0.8	0.8	0.8	0.8	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
RCEP	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	0.5	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
	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
CPTPP	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	0.5	0.6	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	0.8	0.9	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	0.8	0.7	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	0.9	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

AEC = ASEAN Economic Community, ASEAN = Association of Southeast Asian Nations, AUS = Australia, BRN = Brunei Darussalam, CAN = Canada, CHL = Chile, CHN = China, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, EU = European Union, IDN = Indonesia, IND = India, JPN = Japan, KHM = Cambodia, KOR = Korea, LAO = Lao PDR, MEX = Mexico, MMR = Myanmar, MYS = Malaysia, NZL = New Zealand, PER = Peru, PHL = Philippines, RCEP = Regional Comprehensive Economic Partnership, SGP = Singapore, THA = Thailand, USA = United States of America, VNM = Viet Nam.
Notes: The EU is treated as a single unit for the importer country category, while the 28 individual EU member states are considered exporter countries. 'EUN average' is calculated as the simple average of bilateral cosine dissimilarity indicators across EU member states (as exporter countries) for each importer country. The left-hand column shows an average across 69 importer countries in our data set for each exporter country. Cells are highlighted in darker grey colour if the figure is greater and close to the maximum value of 1.
Source: Created by the authors.

Table 7: Bilateral Regulatory Dissimilarity Indicators – Textiles

Exporter \ Importer	BRN	MYS	SGP	VNM	IDN	KHM	LAO	MMR	PHL	THA	AUS	JPN	NZL	CHN	KOR	IND	CAN	CHL	MEX	PER	USA	EUN	Average across 69 importers
BRN		1	1	0.9	1	1	0.6	0.6	0.7	1	0.98	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	0.999	0.82
SGP	1	1		1	1	0.97	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	0.8	0.9	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
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	0.98	0.8	0.9	0.4		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
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	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		0.5	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	0.9	0.995	0.9	0.8	0.95	1	0.97	0.8		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	0.9	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

Column groupings: CPTPP spans BRN–VNM and AUS–NZL and CAN–PER. RCEP spans BRN–IND. AEC spans BRN–THA. Exporter groupings mirror: CPTPP (BRN–VNM, AUS–NZL, CAN–PER), RCEP, AEC (IDN–THA).

AEC = ASEAN Economic Community, ASEAN = Association of Southeast Asian Nations, AUS = Australia, BRN = Brunei Darussalam, CAN = Canada, CHL = Chile, CHN = China, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, EU = European Union, IDN = Indonesia, IND = India, JPN = Japan, KHM = Cambodia, KOR = Korea, LAO = Lao PDR, MEX = Mexico, MMR = Myanmar, MYS = Malaysia, NZL = New Zealand, PER = Peru, PHL = Philippines, RCEP = Regional Comprehensive Economic Partnership, SGP = Singapore, THA = Thailand, USA = United States of America, VNM = Viet Nam.

Notes: The EU is treated as a single unit for the importer country category, while the 28 individual EU member states are considered exporter countries. 'EUN average' is calculated as the simple average of bilateral cosine dissimilarity indicators across EU member states (as exporter countries) for each importer country. The left-hand column shows an average across 69 importer countries in our data set for each exporter country. Cells are highlighted in darker grey colour if the figure is greater and close to the maximum value of 1.

Source: Created by the authors.

Table 8: Bilateral Regulatory Dissimilarity Indicators – Machinery

Exporter	Importer	BRN	MYS	SGP	VNM	IDN	KHM	LAO	MMR	PHL	THA	AUS	JPN	NZL	CHN	KOR	IND	CAN	CHL	MEX	PER	USA	EUN	Average across 69 importers
	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
	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
	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	0.9	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
	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
	MEX	0.9	0.6	0.8	0.9	0.9	0.6	1.0	1.0	0.9	0.9	0.7	0.8	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	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

AEC = ASEAN Economic Community, ASEAN = Association of Southeast Asian Nations, AUS = Australia, BRN = Brunei Darussalam, CAN = Canada, CHL = Chile, CHN = China, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, EU = European Union, IDN = Indonesia, IND = India, JPN = Japan, KHM = Cambodia, KOR = Korea, LAO = Lao PDR, MEX = Mexico, MMR = Myanmar, MYS = Malaysia, NZL = New Zealand, PER = Peru, PHL = Philippines, RCEP = Regional Comprehensive Economic Partnership, SGP = Singapore, THA = Thailand, USA = United States of America, VNM = Viet Nam.

Notes: The EU is treated as a single unit for the importer country category, while the 28 individual EU member states are considered exporter countries. 'EUN average' is calculated as the simple average of bilateral cosine dissimilarity indicators across EU member states (as exporter countries) for each importer country. The left-hand column shows an average across 69 importer countries in our data set for each exporter country. Cells are highlighted in darker grey colour if the figure is greater and close to the maximum value of 1.

Source: Created by the authors.

Table 9: Bilateral Regulatory Dissimilarity Indicators – Transportation

Exporter			Importer →	CPTPP			RCEP	AEC						CPTPP						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		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		0.5	0.8		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
RCEP / AEC		VNM		0.7	1	0.9		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		0.8	0.9	0.8	0.9		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		0.8	0.8	0.5	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		0.96	1	0.97	0.9	0.96	0.97		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	0.85
		MMR		1	1	1	1	0.9	1	1		0.9	1	1	1	1	1	0.97	1	0.9	1	1	1	0.9	1	0.93
		PHL		0.6	0.9	0.6	1	0.6	0.7	0.96	0.9		0.9	0.6	0.6	0.6	0.6	0.6	0.7	0.5	1	0.6	0.8	0.4	0.7	0.70
		THA		1	1	1	1	0.98	1	0.9	1	0.9		0.96	1	1	0.95	0.96	1	0.99	1	0.8	1	0.95	0.9	0.92
CPTPP		AUS		0.3	0.9	0.6	0.7	0.8	0.9	0.7	1	0.6	0.9		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		0.7	0.8	0.6	1	0.8	0.8	0.9	1	0.6	1	0.5		0.6	0.6	0.5	0.5	0.6	0.97	0.6	0.8	0.5	0.6	0.71
		NZL		0.6	0.8	0.6	0.9	0.9	0.6	0.97	1	0.7	1	0.6	0.6		0.6	0.6	0.7	0.7	1	0.7	0.7	0.7	0.8	0.72
		CHN		0.4	0.9	0.5	0.7	0.8	0.8	0.7	1	0.6	0.9	0.3	0.6	0.5		0.4	0.5	0.4	0.9	0.6	0.5	0.4	0.5	0.64
		KOR		0.4	0.9	0.7	0.8	0.8	0.8	0.8	0.97	0.6	0.9	0.3	0.5	0.6	0.4		0.4	0.4	0.98	0.7	0.5	0.3	0.4	0.66
		IND		0.5	0.9	0.7	0.7	0.9	0.9	0.7	1	0.7	1	0.4	0.5	0.7	0.4	0.4		0.5	0.9	0.6	0.6	0.5	0.6	0.68
CPTPP		CAN		0.3	0.9	0.5	0.7	0.7	0.8	0.9	0.9	0.5	0.98	0.4	0.6	0.6	0.5	0.4	0.5		0.996	0.6	0.6	0.2	0.6	0.66
		CHL		0.99	1	1	1	1	0.99	0.98	1	1	1	0.99	0.97	1	0.9	0.98	0.9	0.996		0.95	1	1	0.97	0.92
		MEX		0.7	0.6	0.7	1	0.9	0.7	0.9	1	0.6	0.7	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.95		0.8	0.6	0.7	0.69
		PER		0.3	1	0.8	0.6	0.9	1	0.96	1	0.7	1	0.4	0.8	0.6	0.4	0.5	0.6	0.6	1	0.8		0.5	0.8	0.73
		USA		0.4	0.9	0.6	0.8	0.7	0.9	0.8	0.9	0.4	0.9	0.4	0.5	0.6	0.4	0.3	0.5	0.2	1	0.6	0.5		0.5	0.65
		EUN average		0.7	0.9	0.7	0.9	0.8	0.9	0.8	1	0.7	0.9	0.5	0.6	0.8	0.5	0.4	0.6	0.6	0.97	0.7	0.8	0.5		0.74
																									World average	0.77

AEC = ASEAN Economic Community, ASEAN = Association of Southeast Asian Nations, AUS = Australia, BRN = Brunei Darussalam, CAN = Canada, CHL = Chile, CHN = China, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, EU = European Union, IDN = Indonesia, IND = India, JPN = Japan, KHM = Cambodia, KOR = Korea, LAO = Lao PDR, MEX = Mexico, MMR = Myanmar, MYS = Malaysia, NZL = New Zealand, PER = Peru, PHL = Philippines, RCEP = Regional Comprehensive Economic Partnership, SGP = Singapore, THA = Thailand, USA = United States of America, VNM = Viet Nam.

Notes: The EU is treated as a single unit for the importer country category, while the 28 individual EU member states are considered exporter countries. 'EUN average' is calculated as the simple average of bilateral cosine dissimilarity indicators across EU member states (as exporter countries) for each importer country. The left-hand column shows an average across 69 importer countries in our data set for each exporter country. Cells are highlighted in darker grey colour if the figure is greater and close to the maximum value of 1.

Source: Created by the authors.

3. Regulatory Adoption Costs in Regional Integration

3.1. Approximation of Regulatory Adoption Costs

We next consider regulatory harmonisation amongst the member countries of certain regional trade agreements to determine which country's implementation pattern of technical regulations would best serve as a benchmark to which the other member countries should adjust their regulations as part of regional integration efforts. We utilise the bilateral regulatory dissimilarity indicator to identify the optimal benchmark to minimise the regulatory adoption costs borne by the member countries.

Let $\mathcal{R}$ be a set of countries participating in a certain regional trade agreement and N be the total number of the member countries. Now consider a set of domestic regulations in country $o \in \mathcal{R}$ as a benchmark; other member countries will harmonise their own technical regulations with the benchmark regulatory pattern. We approximate the magnitude of the overall adjustment costs of regulatory harmonisation by taking the square sum of the bilateral regulatory dissimilarity indicators ($\text{Dissimilarity}_{od}$) calculated for country o with respect to all the other member countries $d \neq o$. To adjust for the number of countries involved in a regional trade agreement, we divide the square sum by the degree of freedom (N-1), which can be interpreted as the average adjustment cost that must be borne by countries other than the benchmark country.

The lower the (adjusted) square sum of $\text{Dissimilarity}_{od}$, the less adjustment (on average) is required from the member countries' d's. In other words, when countries target regulatory harmonisation through regional integration, using the country with the lowest square sum as a benchmark is optimal because this minimises the average regulatory adoption costs borne by the member countries. We identify the optimal benchmark country o^* for a regional trade agreement of interest as follows:

$$o^* = \underset{o \in \mathcal{R}}{\text{argmin}} \frac{\sum_{d \neq o}(\text{Dissimilarity}_{od})^2}{N-1} \tag{4}$$

3.2. Regulatory Adoption Costs in Asian Regional Integration Efforts

Using ongoing regional integration efforts in Asia – the AEC, CPTPP, RCEP, and CJK – as examples, we can derive an answer as to which country's regulatory pattern would best serve as a benchmark to achieve regulatory harmonisation in each regional integration agreement.

We calculate the square sums of the bilateral regulatory dissimilarity indicators for each country involved in a regional integration effort of interest and identify the optimal benchmark

country with the lowest square sum. To compare the magnitude of regulatory adoption costs or the ease of achieving regulatory harmonisation between regional integration efforts, we are interested in comparing the square sums adjusted for the degree of freedom. In addition, we calculate the square sums by including large economies in the regional as well as world markets, such as the US, EU, China, Japan, and Korea, which are important destination markets for most Asian countries that we address.[1] This allows us to examine how the optimal benchmark country would change when coordination with important trading partner countries outside regional integration is required, which has implications for the argument for open regionalism.

Table 10 shows the overall regulatory adoption costs approximated for the countries taken as a benchmark within a certain group of countries (the adjusted regulatory adoption costs are listed in parentheses). Each column corresponds to the Asian regional integration effort indicated in the top row of the table. 'Intra-regional' indicates that the regulatory adoption costs reported in the column are based on the bilateral regulatory dissimilarity indicators calculated for the country listed in the left-hand column as a benchmark (exporter) country with respect to all the other (export destination, i.e. importer) countries involved in the regional integration. 'Open' indicates that the reported regulatory adoption costs are approximated by including the US, EU, China, Japan, and Korea (as needed) in addition to the member countries of the regional integration. In each column, the higher values are highlighted in darker grey while the lower values are highlighted in lighter grey, with the lowest in white.

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[1] When calculating the square sums, the EU was included as a single unit on both the exporter and importer sides. As explained in the footnote 6, we employed the average value of bilateral dissimilarity indicators calculated for a certain importer country with respect to individual EU member countries.

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

AEC = ASEAN Economic Community, ASEAN = Association of Southeast Asian Nations, CJK = China–Japan–Korea Free Trade Agreement negotiations, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, EU = European Union, RCEP = Regional Comprehensive Economic Partnership, US = United States. Notes: 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 $Dissimilarity_{od}$ divided by N-1) in parentheses. The higher (lower) values are highlighted in darker (lighter) grey colour in each column. Source: Created by the authors.

For the AEC, using Viet Nam's domestic regulations as a benchmark regulatory pattern minimises the regulatory adoption costs (to 1.760 overall and 0.196 adjusted) within the region. Although the regulatory adoption cost is the lowest for Korea in the open setting, Viet Nam is still ranked the second lowest and appears to serve best as a benchmark country if the AEC aims at eventually moving to a wider open regional setting. Yet, as expected, the overall regulatory adoption costs increase as more countries are included in the open regional setting. Moreover, even the adjusted regulatory adoption costs tend to be higher in the open regional setting than in the intra-regional setting (with the exception of Cambodia), suggesting that a transition to open regionalism would not be easy.

The regulatory adoption cost is maximised within the AEC when Cambodia's domestic regulations are used as a benchmark regulatory pattern (3.727 overall and 0.414 adjusted). Malaysia is ranked the second highest. In the open regional setting of the AEC, on the other hand, the regulatory adoption cost is the highest for Malaysia (5.532 overall and 0.395 adjusted), followed by Cambodia. It appears that the regulatory regimes of Cambodia and Malaysia are significantly different from those of the other AEC member states. Policy efforts and international cooperation by Cambodia and Malaysia in adjusting their technical regulations to the other country's regulatory pattern would be crucial for achieving regulatory harmonisation within the AEC under open regionalism.

In the CPTPP, Australia appears to be the optimal benchmark, followed by Viet Nam. The adjusted regulatory adoption cost with Australia as a benchmark is 0.252. In contrast to the AEC, the adjusted regulatory adoption costs tend to be lower in the open regional setting than in the intra-regional setting (with the exception of Brunei). For example, where Australia is used as the benchmark, the adjusted regulatory adoption cost declines from 0.252 to 0.232 due to the presence of the US and other major economies. As in the open regional setting of the AEC, taking Korea as a benchmark minimises the adjusted cost burden (to 0.208); still, Australia is ranked the second lowest and Viet Nam the third lowest. Australia, as well as Viet Nam, appear to play an important role in the transition to open regionalism.

Within the CPTPP, the adjusted regulatory adoption cost is the highest for Chile (0.427), followed by Japan and Malaysia. In the open regional setting of the CPTPP, the adjusted regulatory adoption cost is also the highest for Chile (0.401), followed by the US and Malaysia. Policy efforts and international cooperation by Chile and Malaysia appear to be essential for achieving regulatory harmonisation in the CPTPP. Policy efforts by Japan are also of importance to the intra-regional harmonisation.

In the RCEP, which embraces more member countries than the AEC, both the overall regulatory adoption costs and the adjusted figures tend to be high, with the exception of Malaysia and Cambodia. Australia appears to be the optimal benchmark both in the intra-regional and open regional settings: the adjusted regulatory adoption cost with Australia as a benchmark is minimised to 0.202 in the intra-regional setting and to 0.207 in the open regional setting, which is comparable to the level of minimised costs in the case of the AEC. Despite the larger and more diverse memberships, the minimised adjusted cost burden is even lower in the open regional setting of the RCEP (0.207 for Australia) than in the open regional setting of the AEC (0.214 for Korea). In addition, consistent with the results on the AEC and CPTPP, Korea is ranked the second lowest, followed by Thailand and Viet Nam, both in the intra-regional and open regional settings.

Within the RCEP, the adjusted regulatory adoption cost is the highest for Cambodia (0.405), followed by New Zealand and Japan. In the open regional setting of the RCEP, the adjusted regulatory adoption cost is also the highest for Cambodia (0.399), followed by the US and New Zealand. As in the AEC, policy efforts and international cooperation by Cambodia appear to be essential for achieving regulatory harmonisation in the RCEP. In addition, as in the case of the CPTPP, policy efforts by Japan are of importance to intra-regional harmonisation.

In the CJK, which consists of only three members, both the overall regulatory adoption costs and the adjusted figures tend to be lower than in the other regional integration efforts, as expected. Korea appears to be the optimal benchmark both in the intra-regional and open regional settings of the CJK, whereas Japan's policy efforts appear to be essential for achieving regulatory harmonisation in the region.

Sectoral Analysis

Table 11 summarizes the sectoral results of the calculated regulatory adoption costs, by listing the countries with the lowest and second lowest values for each type of regional integration efforts.[1] Table 12 resembles Table 11 but lists the highest and second highest values instead. The upper portions of Tables 11 and 12 are the summarised versions of Table 10 regarding technical regulations affecting all merchandise. The rest of Tables 11 and 12 show,

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[1] For the detailed results by sector on the calculated regulatory adoption costs (corresponding to Table 10 for all merchandise), see Appendix Tables C.1–C.7.

respectively, the lowest and second lowest figures and the highest and second highest figures for each of the seven sectors under study.

Comparing the calculated regulatory adoption costs across sectors (i.e. comparing the figures vertically in each column of Tables 11 or 12), the figures tend to be low in the animal products sector and high in the textiles sector. An exception is the AEC, for which the maximised costs (Table 12) are lower in the foodstuffs sector than in other sectors. Overall, international regulatory harmonisation appears to be less difficult in animal products but more difficult in textiles amongst Asian countries and their trading partners.

For the AEC, Viet Nam appears to serve best as a benchmark country in the animal products and vegetable products sectors, as well as when considering all merchandise. Viet Nam appears to play an important role in the transition to open regionalism in the textiles sector as well. The Philippines appears to be the optimal benchmark in the chemicals sector. In contrast, Cambodia is ranked the highest in the vegetable products and food stuffs sectors while Malaysia is ranked the highest in the animal products and chemicals sectors, both in the intra-regional and open regional settings. In these sectors, Cambodia and Malaysia appear to need to make policy efforts in adjusting their technical regulations to the other country's regulatory pattern.

In addition, mixed results are observed regarding Singapore, which appears to serve best as a benchmark in the foodstuffs sector while being ranked the highest in the textiles sector, indicating sectoral variations in the possible pathways towards regulatory harmonisation. In the machinery and transportation sectors, if the AEC aims at eventually moving to an open regional setting, the AEC member states need to make policy efforts to adapt to the regulatory regimes of major partner countries such as China. Policy efforts of the Lao PDR, Myanmar, and Thailand appear to be crucial.

For the CPTPP, Australia appears to be the optimal benchmark in the animal products, vegetable products, foodstuffs, machinery, and transportation sectors, as well as when considering all merchandise. Australia is also ranked the second best within the CPTPP in the textiles sector. In the chemicals sector, on the other hand, Canada appears to be the optimal benchmark both in the intra-regional and open regional settings. In contrast, Chile is ranked the highest in the vegetable products, food stuffs, chemicals, and transportation sectors, both in the intra-regional and open regional settings. In these sectors, Chile appears to need to make substantial policy efforts towards regulatory harmonisation. Malaysia, Singapore, and Peru,

respectively, are also ranked the highest and their policy efforts appear to be essential in the animal products, textiles, and machinery sectors.

For the RCEP, Australia appears to be the optimal benchmark in the animal products and machinery sectors both in the intra-regional and open regional settings, as well as when considering all merchandise. Australia appears to serve best as a benchmark, considering an eventual transition to open regionalism, in the transportation sector as well. Meanwhile, in the vegetable products and foodstuffs sectors, Korea appears to be the optimal benchmark, followed by Australia as the second best. Korea appears to serve best as a benchmark in the textiles sector as well. In addition, China appears to serve best as a benchmark in the chemicals sector. Consistent with the results on the AEC, China's important role in the transition to open regionalism is also observed in the machinery and transportation sectors.

As in the AEC, Cambodia is ranked the highest in the vegetable products and food stuffs sectors, both in the intra-regional and open regional settings. In these sectors, policy efforts by Cambodia appear to be essential for achieving regulatory harmonisation. As in the AEC and CPTPP, Malaysia and Singapore are ranked the highest and their policy efforts appear to be essential, respectively, in the animal products and textiles sector. Also, as in the AEC, the Lao PDR is ranked the highest in the machinery sector and policy efforts by the Lao PDR, as well as Myanmar and Thailand, appear to be crucial in the machinery and transportation sectors.

As for the CJK, consisting of three members, only a country with the lowest (highest) value is listed in Table 11 (Table 12). Korea appears to be the optimal benchmark except for the machinery sector, in which Japan appears to be a better benchmark. Meanwhile, policy efforts by Japan appear to be crucial for achieving regulatory harmonisation except for the machinery sector.

Table 11: Benchmark Countries with the Lowest and Second Lowest Regulatory Adoption Costs

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

AEC = ASEAN Economic Community, ASEAN = Association of Southeast Asian Nations, CJK = China–Japan–Korea Free Trade Agreement negotiations, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, EU = European Union, RCEP = Regional Comprehensive Economic Partnership, US = United States.

Notes: 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: Created by the authors.

Table 12: Benchmark Countries with the Highest and Second Highest Regulatory Adoption Costs

	AEC Intraregional	AEC Open	CPTPP Intraregional	CPTPP Open	RCEP Intraregional	RCEP +India	RCEP Open	CJK Intraregional	CJK 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)		

AEC = ASEAN Economic Community, ASEAN = Association of Southeast Asian Nations, CJK = China–Japan–Korea Free Trade Agreement negotiations, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, RCEP = Regional Comprehensive Economic Partnership, US = United States.

Notes: 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: Created by the authors.

4.   Policy Discussion

Studies such as Nabeshima and Obashi (2021) and Nabeshima, Obashi, and Kim (2021) show that differences in regulations between trading partners reduce overall trade value between these countries. The decomposition of this negative impact on trade reveals that less varieties of goods are traded, and even when they are traded, the prices of the imported goods are higher and the quantity imported is lower. These studies also show that the impacts of regulatory differences are stronger for trade between developed and developing countries. To stimulate further trade between countries, harmonisation of regulations could be another avenue to explore. This is especially so for countries involved in some kind of regional integration efforts since the tariff rates would have been lowered for most of the goods.

However, even though harmonisation in regulation is desirable and countries are willing to do so, sometimes it is not clear the optimal approach to harmonization. What we have shown here provides some guidance on this issue. The calculations for regulatory dissimilarity indicators in the previous section reveal significant variations in regulations between East Asia and its main trading partners. Moreover, there are large differences across sectors, especially between the agriculture/food sectors and the manufacturing sectors. What is surprising is that regulatory differences amongst countries in the agriculture and food sectors are smaller than those in the manufacturing sectors. This may be because most countries adopt similar regulations that conform to the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures. The data that we utilised can only show the 'kind' of regulations (e.g. the application of certain pesticides) but not the stringency of the regulations (e.g. the maximum residue limits for pesticides). Further studies are necessary to examine the effect of the stringency of particular regulations.

In contrast, for manufactured goods, regulations adopted in these countries differ significantly, and there is large scope for harmonisation to stimulate trade. This is especially so for the textile industry. Each country seems to apply different sets of regulations to this commodity, and this may be one of the priorities for discussion to streamline regulations amongst countries. What is interesting is in the machinery and transport sectors, where two different groups are present – ASEAN Member States and +6 countries. It seems that amongst the +6 countries, the regulations are similar (relatively speaking), but amongst ASEAN Member States, they differ substantially. This is another area that countries should prioritise, especially lower-income countries. Machinery imports are vital components for industrial and economic development, especially for lower-income countries. Reducing the differences between partner

countries could stimulate more trade in machinery, which could in turn contribute to accelerated industrialisation and technology transfer embedded in machinery.

The results for the optimal benchmark country are shown in Tables 10 and 11. When considering all goods,using Australia as the benchmark country of r the CPTPP and RCEP, and Viet Nam for the AEC seems to be the least-cost approach.. If the RCEP is to be an ASEAN-driven initiative, the harmonisation process can be based on Viet Nam. The discussions on regulatory harmonisation are complicated, and it is unlikely that these countries will discuss the issues for all commodities at the same time. It is more likely that the discussions will be done by individual commodity groups. In that case, Table 11 provides least-cost options for each regional integration effort and the potential benchmark countries. While Australia and Viet Nam appear in many settings, other countries such as Canada, Korea, and the Philippines are also present. Depending on the type of product, harmonisation efforts can be based on different countries. While we have shown the results for an aggregate of the commodity groups, this kind of analysis could be performed for each commodity.

Regardless of the commodity groupings or regional integration efforts, the key to move the harmonisation process forward is to how to convince the most affected (i.e. countries with the largest differences from the benchmark country). One way, which may be more practical to reduce the regulatory differences, is to stimulate the adoption of mutual recognition amongst member countries. In comparison with the CPTPP, the RCEP seems to lack strong commitment in this area, even though the RCEP includes some framework for this (Armstrong and Drysdale, 2022; ADB, 2022). Regulatory harmonisation is a difficult process since regulations reflect the specific conditions of countries, historical developments, and domestic concerns. However, while keeping domestic regulations intact (at least in the short term), a country could agree to mutual recognition in many different areas, which could stimulate trade amongst these countries.

5.   Conclusion

In this paper, we have examined the regulatory differences between countries using the NTM data set, which is based on the domestic regulations of these countries. Using these bilateral differences in regulations, we have also developed an indicator for regulatory harmonisation amongst member countries in a given regional agreement. Regulatory harmonisation is often discussed as part of deeper integration efforts. However, until now, no metric or guidance has identified an optimal set of regulations to serve as a benchmark for

countries to harmonise their national regulatory frameworks?. This study defines the 'appropriate' set of regulations as the set of regulations where the adoption cost (i.e. differences in regulation between a base country and a partner country) is the lowest. This provides guidance to policymakers regarding country-specific regulations, which could serve as the basis for discussion on regulatory harmonisation. Of course, the actual harmonisation of regulations is difficult and sometimes impossible. However, mutual recognition of regulations amongst member economies is an achievable goal, and the indicators developed in this paper could also be utilised to identify priority areas where such discussion should be pursued.

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Appendix A
List of 70 Countries in Our Data Set

Sample Countries Used in the Research	Other Countries
AUS†‡ BRN*†‡ CAN‡ CHL‡ CHN†	ARE ATG BHR BHS BOL
EUN IDN*† IND JPN†‡ KHM*†	ARG BRA BRB CHE CMR
KOR† LAO*† MEX‡ MMR*† MYS*†‡	COL CRI CUB DMA DZA
NZL†‡ PER‡ PHL*† SGP*†‡ THA*†	ECU ETH GRD GTM GUY
USA VNM*†‡	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

AEC = ASEAN Economic Community, ASEAN = Association of Southeast Asian Nations, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, RCEP = Regional Comprehensive Economic Partnership.

Notes: Codes shown in this table are the ISO3 codes of each country. * refers to AEC member countries, † refers to RCEP member countries, ‡ refers to CPTPP member countries.

Source: Created by the authors.

Appendix B
Sectoral Decomposition and HS Codes

Sector	Product group	HS two-digit code
Agricultural sectors	Animal & animal products	01-05
	Vegetable products	06-15
	Foodstuffs	16-24
	Mineral products	25-27
Manufacturing sectors	Chemicals & allied industries	28-38
	Plastics/Rubbers	39-40
	Raw hides, skins, leather & furs	41-43
	Wood & wood products	44-49
	Textiles	50-63
	Footwear/Headgear	64-67
	Stone/Glass	68-71
	Metals	72-83
	Machinery/Electrical	84-85
	Transportation	86-89
	Miscellaneous	90-99

HS = Harmonized System.
Source: Created by the authors.

Appendix C.1

Regulatory Adoption Costs in Regional Integration: Animal Products

Benchmark	AEC		CPTPP		RCEP			CJK	
	Intra-Regional	Open	Intra-Regional	Open	Intra-Regional	+India	Open	Intra-Regional	Open
Brunei	1.724	2.679	1.687	2.343	2.388	2.553	3.051		
	(0.192)	(0.191)	(0.169)	(0.167)	(0.171)	(0.170)	(0.179)		
Malaysia	3.130	4.425	2.493	3.410	3.984	4.069	4.713		
	(0.348)	(0.316)	(0.249)	(0.244)	(0.285)	(0.271)	(0.277)		
Singapore	0.701	1.292	1.368	1.679	1.256	1.379	1.593		
	(0.078)	(0.092)	(0.137)	(0.120)	(0.090)	(0.092)	(0.094)		
Viet Nam	0.871	1.274	1.144	1.463	1.247	1.314	1.531		
	(0.097)	(0.091)	(0.114)	(0.104)	(0.089)	(0.088)	(0.090)		
Indonesia	0.943	1.514			1.574	1.684	1.915		
	(0.105)	(0.108)			(0.112)	(0.112)	(0.113)		
Cambodia	1.334	2.039			2.139	2.292	2.573		
	(0.148)	(0.146)			(0.153)	(0.153)	(0.151)		
Lao PDR	1.785	2.797			3.097	3.454	3.847		
	(0.198)	(0.200)			(0.221)	(0.230)	(0.226)		
Myanmar	1.761	2.783			2.680	2.799	3.193		
	(0.196)	(0.199)			(0.191)	(0.187)	(0.188)		
Philippines	1.188	1.797			1.993	2.133	2.326		
	(0.132)	(0.128)			(0.142)	(0.142)	(0.137)		
Thailand	0.979	1.574			1.424	1.536	1.843		
	(0.109)	(0.112)			(0.102)	(0.102)	(0.108)		
Australia			0.928	1.299	1.000	1.048	1.293		
			(0.093)	(0.093)	(0.071)	(0.070)	(0.076)		
Japan		2.765	1.853	2.490	2.687	2.737	3.127	0.319	0.710
		(0.198)	(0.185)	(0.178)	(0.192)	(0.182)	(0.184)	(0.160)	(0.177)
New Zealand			1.822	2.464	3.014	3.115	3.607		
			(0.182)	(0.176)	(0.215)	(0.208)	(0.212)		
China	1.919			1.828	2.001	2.205	2.397	0.298	0.490
	(0.137)			(0.131)	(0.143)	(0.147)	(0.141)	(0.149)	(0.123)
Rep. of Korea	1.163			1.120	1.129	1.180	1.365	0.113	0.298
	(0.083)			(0.080)	(0.081)	(0.079)	(0.080)	(0.057)	(0.075)
India						1.839	2.120		
						(0.123)	(0.125)		
Canada			1.391	1.851					
			(0.139)	(0.132)					
Chile			2.129	2.947					
			(0.213)	(0.211)					
Mexico			2.320	2.652					
			(0.232)	(0.189)					
Peru			1.756	2.051					
			(0.176)	(0.146)					
US	3.336		3.366		4.003			0.894	
	(0.238)		(0.240)		(0.235)			(0.223)	
EU	1.734		1.775		2.087			0.504	
	(0.124)		(0.127)		(0.123)			(0.126)	

AEC = ASEAN Economic Community, CJK = China–Japan–Korea Free Trade Agreement negotiations, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, EU = European Union, RCEP = Regional Comprehensive Economic Partnership, US = United States.

Notes: 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 $Dissimilarity_{od}$ divided by N-1) in parentheses. The higher (lower) values are highlighted in darker (lighter) grey colour in each column.
Source: Created by the authors.

Appendix C.2

Regulatory Adoption Costs in Regional Integration: Vegetable Products

	AEC		CPTPP		RCEP			CJK	
Benchmark	Intra-Regional	Open	Intra-Regional	Open	Intra-Regional	+India	Open	Intra-Regional	Open
Brunei	1.159	1.982	1.397	2.011	1.747	1.860	2.256		
	(0.129)	(0.142)	(0.140)	(0.144)	(0.125)	(0.124)	(0.133)		
Malaysia	2.925	4.101	3.026	3.703	3.852	3.975	4.423		
	(0.325)	(0.293)	(0.303)	(0.264)	(0.275)	(0.265)	(0.260)		
Singapore	1.468	2.579	2.133	2.846	2.543	2.720	3.109		
	(0.163)	(0.184)	(0.213)	(0.203)	(0.182)	(0.181)	(0.183)		
Viet Nam	0.956	1.717	1.561	2.173	1.583	1.708	2.157		
	(0.106)	(0.123)	(0.156)	(0.155)	(0.113)	(0.114)	(0.127)		
Indonesia	1.670	3.143			2.974	3.285	4.122		
	(0.186)	(0.224)			(0.212)	(0.219)	(0.242)		
Cambodia	3.919	6.104			6.031	6.514	7.623		
	(0.435)	(0.436)			(0.431)	(0.434)	(0.448)		
Lao PDR	1.516	2.712			2.795	3.099	3.739		
	(0.168)	(0.194)			(0.200)	(0.207)	(0.220)		
Myanmar	1.216	1.860			1.865	1.985	2.229		
	(0.135)	(0.133)			(0.133)	(0.132)	(0.131)		
Philippines	1.262	1.927			1.975	2.145	2.438		
	(0.140)	(0.138)			(0.141)	(0.143)	(0.143)		
Thailand	1.187	2.048			1.803	1.904	2.360		
	(0.132)	(0.146)			(0.129)	(0.127)	(0.139)		
Australia			1.534	1.999	1.626	1.667	1.944		
			(0.153)	(0.143)	(0.116)	(0.111)	(0.114)		
Japan		3.483	2.746	3.583	3.361	3.446	4.028	0.318	0.900
		(0.249)	(0.275)	(0.256)	(0.240)	(0.230)	(0.237)	(0.159)	(0.225)
New Zealand			2.634	3.117	3.862	3.984	4.317		
			(0.263)	(0.223)	(0.276)	(0.266)	(0.254)		
China		2.844		2.521	2.928	3.130	3.383	0.330	0.583
		(0.203)		(0.180)	(0.209)	(0.209)	(0.199)	(0.165)	(0.146)
Rep. of Korea		1.586		1.583	1.563	1.603	1.822	0.124	0.343
		(0.113)		(0.113)	(0.112)	(0.107)	(0.107)	(0.062)	(0.086)
India						2.489	2.693		
						(0.166)	(0.158)		
Canada			2.494	3.218					
			(0.249)	(0.230)					
Chile			3.102	4.066					
			(0.310)	(0.290)					
Mexico			3.060	3.808					
			(0.306)	(0.272)					
Peru			2.586	2.949					
			(0.259)	(0.211)					
US		4.104		3.360			4.705		0.759
		(0.293)		(0.240)			(0.277)		(0.190)
EU		2.539		2.224			2.762		0.527
		(0.181)		(0.159)			(0.162)		(0.132)

AEC = ASEAN Economic Community, CJK = China–Japan–Korea Free Trade Agreement negotiations, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, EU = European Union, RCEP = Regional Comprehensive Economic Partnership, US = United States.

Notes: 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 $\text{Dissimilarity}_{od}$ divided by N-1) in parentheses. The higher (lower) values are highlighted in darker (lighter) grey colour in each column.

Source: Created by the authors.

Appendix C.3
Regulatory Adoption Costs in Regional Integration: Foodstuffs

Benchmark	AEC Intra-Regional	AEC Open	CPTPP Intra-Regional	CPTPP Open	RCEP Intra-Regional	RCEP +India	RCEP Open	CJK Intra-Regional	CJK Open
Brunei	2.129	3.471	2.122	3.103	2.996	3.182	3.841		
	(0.237)	(0.248)	(0.212)	(0.222)	(0.214)	(0.212)	(0.226)		
Malaysia	2.629	3.914	3.216	3.979	3.723	3.841	4.254		
	(0.292)	(0.280)	(0.322)	(0.284)	(0.266)	(0.256)	(0.250)		
Singapore	1.196	2.147	1.935	2.493	1.965	2.113	2.469		
	(0.133)	(0.153)	(0.194)	(0.178)	(0.140)	(0.141)	(0.145)		
Viet Nam	1.490	2.264	2.092	2.622	2.065	2.207	2.622		
	(0.166)	(0.162)	(0.209)	(0.187)	(0.148)	(0.147)	(0.154)		
Indonesia	2.650	4.053			4.054	4.335	4.873		
	(0.294)	(0.290)			(0.290)	(0.289)	(0.287)		
Cambodia	2.804	4.278			4.232	4.605	5.291		
	(0.312)	(0.306)			(0.302)	(0.307)	(0.311)		
Lao PDR	2.125	3.225			3.095	3.365	3.928		
	(0.236)	(0.230)			(0.221)	(0.224)	(0.231)		
Myanmar	2.446	3.742			3.715	3.887	4.276		
	(0.272)	(0.267)			(0.265)	(0.259)	(0.252)		
Philippines	1.774	2.630			2.638	2.845	3.201		
	(0.197)	(0.188)			(0.188)	(0.190)	(0.188)		
Thailand	1.281	2.087			1.787	1.888	2.318		
	(0.142)	(0.149)			(0.128)	(0.126)	(0.136)		
Australia			1.816	2.263	1.677	1.724	1.994		
			(0.182)	(0.162)	(0.120)	(0.115)	(0.117)		
Japan		4.087	2.769	3.614	3.893	3.994	4.519	0.395	0.921
		(0.292)	(0.277)	(0.258)	(0.278)	(0.266)	(0.266)	(0.198)	(0.230)
New Zealand			2.219	2.668	2.530	2.583	2.871		
			(0.222)	(0.191)	(0.181)	(0.172)	(0.169)		
China		2.685		3.065	2.692	2.927	3.260	0.386	0.719
		(0.192)		(0.219)	(0.192)	(0.195)	(0.192)	(0.193)	(0.180)
Rep. of Korea		1.676		1.725	1.589	1.633	1.833	0.128	0.328
		(0.120)		(0.123)	(0.114)	(0.109)	(0.108)	(0.064)	(0.082)
India						2.469	2.644		
						(0.165)	(0.156)		
Canada			2.739	3.773					
			(0.274)	(0.270)					
Chile			5.965	7.643					
			(0.597)	(0.546)					
Mexico			3.095	3.995					
			(0.310)	(0.285)					
Peru			2.962	3.432					
			(0.296)	(0.245)					
US		3.915		4.150			4.438		0.895
		(0.280)		(0.296)			(0.261)		(0.224)
EU		2.396		2.547			2.571		0.571
		(0.171)		(0.182)			(0.151)		(0.143)

AEC = ASEAN Economic Community, CJK = China–Japan–Korea Free Trade Agreement negotiations, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, EU = European Union, RCEP = Regional Comprehensive Economic Partnership, US = United States.

Notes: 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 $Dissimilarity_{od}$ divided by N-1) in parentheses. The higher (lower) values are highlighted in darker (lighter) grey colour in each column.

Source: Created by the authors.

Appendix C.4

Regulatory Adoption Costs in Regional Integration: Chemicals

Benchmark	AEC		CPTPP		RCEP			CJK	
	Intra-Regional	Open	Intra-Regional	Open	Intra-Regional	+India	Open	Intra-Regional	Open
Brunei	3.709	6.053	4.326	5.747	5.908	6.603	7.601		
	(0.412)	(0.432)	(0.433)	(0.411)	(0.422)	(0.440)	(0.447)		
Malaysia	4.760	7.026	5.335	6.660	6.945	7.550	8.584		
	(0.529)	(0.502)	(0.534)	(0.476)	(0.496)	(0.503)	(0.505)		
Singapore	4.083	6.529	5.033	6.719	6.405	7.091	8.232		
	(0.454)	(0.466)	(0.503)	(0.480)	(0.458)	(0.473)	(0.484)		
Viet Nam	3.721	6.355	5.126	6.676	6.165	6.546	7.731		
	(0.413)	(0.454)	(0.513)	(0.477)	(0.440)	(0.436)	(0.455)		
Indonesia	4.137	6.482			6.801	7.503	8.340		
	(0.460)	(0.463)			(0.486)	(0.500)	(0.491)		
Cambodia	4.082	5.220			5.848	6.566	6.839		
	(0.454)	(0.373)			(0.418)	(0.438)	(0.402)		
Lao PDR	3.005	4.831			4.932	5.600	6.383		
	(0.334)	(0.345)			(0.352)	(0.373)	(0.375)		
Myanmar	3.583	6.130			5.958	6.530	7.549		
	(0.398)	(0.438)			(0.426)	(0.435)	(0.444)		
Philippines	2.902	4.780			4.814	5.379	6.119		
	(0.322)	(0.341)			(0.344)	(0.359)	(0.360)		
Thailand	3.799	6.280			5.929	6.363	7.590		
	(0.422)	(0.449)			(0.423)	(0.424)	(0.446)		
Australia			4.481	5.613	5.415	5.876	6.679		
			(0.448)	(0.401)	(0.387)	(0.392)	(0.393)		
Japan		5.127	4.154	4.972	5.209	5.753	6.306	0.377	0.931
		(0.366)	(0.415)	(0.355)	(0.372)	(0.384)	(0.371)	(0.188)	(0.233)
New Zealand			5.044	6.236	7.002	7.413	8.261		
			(0.504)	(0.445)	(0.500)	(0.494)	(0.486)		
China		4.791		4.794	4.937	5.428	5.954	0.453	0.979
		(0.342)		(0.342)	(0.353)	(0.362)	(0.350)	(0.226)	(0.245)
Rep. of Korea		5.473		5.232	5.647	6.010	6.503	0.304	0.796
		(0.391)		(0.374)	(0.403)	(0.401)	(0.383)	(0.152)	(0.199)
India						8.267	9.508		
						(0.551)	(0.559)		
Canada			3.499	4.436					
			(0.350)	(0.317)					
Chile			6.556	8.761					
			(0.656)	(0.626)					
Mexico			5.702	7.475					
			(0.570)	(0.534)					
Peru			4.706	5.194					
			(0.471)	(0.371)					
US		6.037		6.158		7.615			1.042
		(0.431)		(0.440)		(0.448)			(0.261)
EU		5.579		5.396		6.907			1.222
		(0.399)		(0.385)		(0.406)			(0.306)

AEC = ASEAN Economic Community, CJK = China–Japan–Korea Free Trade Agreement negotiations, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, EU = European Union, RCEP = Regional Comprehensive Economic Partnership, US = United States.

Notes: 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 $Dissimilarity_{od}$ divided by N-1) in parentheses. The higher (lower) values are highlighted in darker (lighter) grey colour in each column.

Source: Created by the authors.

Appendix C.5
Regulatory Adoption Costs in Regional Integration: Textiles

Benchmark	AEC Intra-Regional	AEC Open	CPTPP Intra-Regional	CPTPP Open	RCEP Intra-Regional	RCEP +India	RCEP Open	CJK Intra-Regional	CJK Open
Brunei	6.915	11.854	9.061	11.999	11.870	12.870	14.809		
	(0.768)	(0.847)	(0.906)	(0.857)	(0.848)	(0.858)	(0.871)		
Malaysia	7.959	12.386	9.375	12.120	11.823	12.375	14.373		
	(0.884)	(0.885)	(0.938)	(0.866)	(0.844)	(0.825)	(0.845)		
Singapore	8.950	13.950	10.000	13.000	13.950	14.950	16.950		
	(0.994)	(0.996)	(1.000)	(0.929)	(0.996)	(0.997)	(0.997)		
Viet Nam	6.058	8.258	8.152	9.135	9.561	10.557	11.143		
	(0.673)	(0.590)	(0.815)	(0.652)	(0.683)	(0.704)	(0.655)		
Indonesia	6.781	9.263			9.557	10.474	11.305		
	(0.753)	(0.662)			(0.683)	(0.698)	(0.665)		
Cambodia	7.842	12.388			12.232	12.991	14.983		
	(0.871)	(0.885)			(0.874)	(0.866)	(0.881)		
Lao PDR	5.745	10.321			10.298	11.298	13.255		
	(0.638)	(0.737)			(0.736)	(0.753)	(0.780)		
Myanmar	5.745	10.321			10.298	11.298	13.255		
	(0.638)	(0.737)			(0.736)	(0.753)	(0.780)		
Philippines	5.797	9.262			8.493	9.486	10.911		
	(0.644)	(0.662)			(0.607)	(0.632)	(0.642)		
Thailand	8.913	13.853			13.853	14.853	16.853		
	(0.990)	(0.990)			(0.990)	(0.990)	(0.991)		
Australia			6.267	8.111	10.458	11.456	12.521		
			(0.627)	(0.579)	(0.747)	(0.764)	(0.737)		
Japan		11.891	7.229	9.460	11.410	12.385	13.698	1.643	2.956
		(0.849)	(0.723)	(0.676)	(0.815)	(0.826)	(0.806)	(0.821)	(0.739)
New Zealand			6.924	9.284	10.362	11.156	12.687		
			(0.692)	(0.663)	(0.740)	(0.744)	(0.746)		
China		10.029		9.280	10.637	11.536	12.542	1.318	2.324
		(0.716)		(0.663)	(0.760)	(0.769)	(0.738)	(0.659)	(0.581)
Rep. of Korea		8.711		8.217	9.555	10.408	10.718	1.124	1.435
		(0.622)		(0.587)	(0.683)	(0.694)	(0.630)	(0.562)	(0.359)
India						13.678	15.675		
						(0.912)	(0.922)		
Canada			6.835	7.542					
			(0.683)	(0.539)					
Chile			5.884	7.863					
			(0.588)	(0.562)					
Mexico			8.186	10.461					
			(0.819)	(0.747)					
Peru			7.507	10.006					
			(0.751)	(0.715)					
US		10.571		9.983			13.540		1.924
		(0.755)		(0.713)			(0.796)		(0.481)
EU		9.242		6.894			10.906		1.224
		(0.660)		(0.492)			(0.642)		(0.306)

AEC = ASEAN Economic Community, CJK = China–Japan–Korea Free Trade Agreement negotiations, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, EU = European Union, RCEP = Regional Comprehensive Economic Partnership, US = United States.

Notes: 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 $Dissimilarity_{od}$ divided by N-1) in parentheses. The higher (lower) values are highlighted in darker (lighter) grey colour in each column.

Source: Created by the authors.

Appendix C.6

Regulatory Adoption Costs in Regional Integration: Machinery

Benchmark	AEC		CPTPP		RCEP			CJK	
	Intra-Regional	Open	Intra-Regional	Open	Intra-Regional	+India	Open	Intra-Regional	Open
Brunei	5.734	9.287	7.124	9.216	9.128	9.824	11.252		
	(0.637)	(0.663)	(0.712)	(0.658)	(0.652)	(0.655)	(0.662)		
Malaysia	5.879	8.882	5.419	7.340	8.231	8.712	10.150		
	(0.653)	(0.634)	(0.542)	(0.524)	(0.588)	(0.581)	(0.597)		
Singapore	6.716	9.874	6.791	8.753	9.600	10.180	11.606		
	(0.746)	(0.705)	(0.679)	(0.625)	(0.686)	(0.679)	(0.683)		
Viet Nam	6.489	9.725	7.535	9.415	9.894	10.537	11.748		
	(0.721)	(0.695)	(0.753)	(0.672)	(0.707)	(0.702)	(0.691)		
Indonesia	5.782	8.221			8.049	8.538	9.529		
	(0.642)	(0.587)			(0.575)	(0.569)	(0.561)		
Cambodia	5.324	7.432			6.639	6.945	8.169		
	(0.592)	(0.531)			(0.474)	(0.463)	(0.481)		
Lao PDR	8.538	12.636			12.556	13.448	15.085		
	(0.949)	(0.903)			(0.897)	(0.897)	(0.887)		
Myanmar	7.073	11.709			11.398	12.336	14.267		
	(0.786)	(0.836)			(0.814)	(0.822)	(0.839)		
Philippines	5.467	7.813			7.264	7.738	8.835		
	(0.607)	(0.558)			(0.519)	(0.516)	(0.520)		
Thailand	5.820	9.532			9.343	10.085	11.599		
	(0.647)	(0.681)			(0.667)	(0.672)	(0.682)		
Australia			4.972	5.447	5.810	5.905	6.266		
			(0.497)	(0.389)	(0.415)	(0.394)	(0.369)		
Japan		6.845	5.424	6.056	6.764	6.853	7.317	0.327	0.791
		(0.489)	(0.542)	(0.433)	(0.483)	(0.457)	(0.430)	(0.163)	(0.198)
New Zealand			5.110	6.505	7.004	7.359	8.499		
			(0.511)	(0.465)	(0.500)	(0.491)	(0.500)		
China		6.621		5.465	6.694	6.886	7.230	0.417	0.762
		(0.473)		(0.390)	(0.478)	(0.459)	(0.425)	(0.209)	(0.191)
Rep. of Korea		7.414		5.679	7.739	7.786	8.197	0.354	0.764
		(0.530)		(0.406)	(0.553)	(0.519)	(0.482)	(0.177)	(0.191)
India						6.979	7.285		
						(0.465)	(0.429)		
Canada			5.658	7.052					
			(0.566)	(0.504)					
Chile			5.040	5.887					
			(0.504)	(0.421)					
Mexico			5.819	7.138					
			(0.582)	(0.510)					
Peru			9.194	11.933					
			(0.919)	(0.852)					
US		8.947		7.434			10.466		1.454
		(0.639)		(0.531)			(0.616)		(0.364)
EU		7.106		5.621			7.730		0.428
		(0.508)		(0.401)			(0.455)		(0.107)

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Source: Created by the authors.

Appendix C.7
Regulatory Adoption Costs in Regional Integration: Transportation

Benchmark	AEC		CPTPP		RCEP			CJK	
	Intra-Regional	Open	Intra-Regional	Open	Intra-Regional	+India	Open	Intra-Regional	Open
Brunei	6.335	7.733	4.338	5.062	7.609	7.844	8.435		
	(0.704)	(0.552)	(0.434)	(0.362)	(0.543)	(0.523)	(0.496)		
Malaysia	7.914	11.701	7.970	10.356	11.649	12.433	13.974		
	(0.879)	(0.836)	(0.797)	(0.740)	(0.832)	(0.829)	(0.822)		
Singapore	5.748	7.802	4.935	6.127	7.518	7.989	8.905		
	(0.639)	(0.557)	(0.494)	(0.438)	(0.537)	(0.533)	(0.524)		
Viet Nam	7.730	11.236	7.266	9.164	11.069	11.587	12.944		
	(0.859)	(0.803)	(0.727)	(0.655)	(0.791)	(0.772)	(0.761)		
Indonesia	6.767	9.869			10.125	10.890	12.081		
	(0.752)	(0.705)			(0.723)	(0.726)	(0.711)		
Cambodia	6.775	10.289			9.785	10.587	12.171		
	(0.753)	(0.735)			(0.699)	(0.706)	(0.716)		
Lao PDR	8.220	11.480			11.635	12.168	13.455		
	(0.913)	(0.820)			(0.831)	(0.811)	(0.791)		
Myanmar	8.631	13.389			13.572	14.572	16.389		
	(0.959)	(0.956)			(0.969)	(0.971)	(0.964)		
Philippines	5.709	7.454			7.620	8.109	8.742		
	(0.634)	(0.532)			(0.544)	(0.541)	(0.514)		
Thailand	8.651	13.251			13.393	14.393	16.168		
	(0.961)	(0.947)			(0.957)	(0.960)	(0.951)		
Australia			4.145	4.594	6.807	6.944	7.318		
			(0.414)	(0.328)	(0.486)	(0.463)	(0.430)		
Japan		8.177	5.301	6.230	8.212	8.494	9.089	0.588	1.184
		(0.584)	(0.530)	(0.445)	(0.587)	(0.566)	(0.535)	(0.294)	(0.296)
New Zealand			5.254	6.636	8.166	8.665	9.742		
			(0.525)	(0.474)	(0.583)	(0.578)	(0.573)		
China		6.802		4.578	6.687	6.901	7.353	0.524	0.976
		(0.486)		(0.327)	(0.478)	(0.460)	(0.433)	(0.262)	(0.244)
Rep. of Korea		6.812		4.964	7.037	7.172	7.382	0.415	0.625
		(0.487)		(0.355)	(0.503)	(0.478)	(0.434)	(0.208)	(0.156)
India						7.789	8.333		
						(0.519)	(0.490)		
Canada			4.248	4.841					
			(0.425)	(0.346)					
Chile			9.790	12.501					
			(0.979)	(0.893)					
Mexico			5.419	6.665					
			(0.542)	(0.476)					
Peru			5.231	6.265					
			(0.523)	(0.448)					
US		6.671		4.925			7.449		0.757
		(0.476)		(0.352)			(0.438)		(0.189)
EU		7.978		6.832			9.215		1.075
		(0.570)		(0.488)			(0.542)		(0.269)

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