

## Chapter III

### Agricultural trade costs in the Asia-Pacific region:

#### A need for a sectoral approach to trade facilitation<sup>93</sup>

### Introduction

As developing and emerging economies in the Asia-Pacific region seek ways to maintain growth in a difficult global economic environment, enhancing competitiveness in international markets has become a priority. Reducing international trade transaction costs can go a long way towards making a country more competitive. While costs vary substantially across developing countries in the region, most still face very high extra- and intraregional trade costs on average. This is particularly true for trade in agriculture and food products.

Agriculture is the backbone of most Asian and Pacific economies, and approximately 50% of the Asian working population is employed in the agricultural sector (figure 1). In view of the export potential of agricultural products in the region, it is particularly important to reduce trade costs in this sector. Not least, a more competitive agricultural sector may contribute to urgently needed poverty alleviation in developing countries in the region.<sup>94</sup>

With rising incomes, changing food habits and a growing population in the region, agricultural trade is expected to expand in the coming years. In fact, agricultural commodity production and consumption is already shifting away from developed countries towards developing regions such as Asia and the Pacific (OECD-FAO 2009). However, as figure 2 illustrates, agricultural trade costs remain exceedingly high, particularly when compared with manufacturing trade costs.

Given the important role of agricultural trade in the Asia-Pacific region, it is essential to have a deeper understanding about the level of agricultural trade costs and to what extent these costs may have decreased over time. Thus, this paper presents intra-, inter- and extraregional agricultural trade costs of Asia-Pacific subregions, and compares them with those in member countries of the European Union-3 (EU-3): France, Germany and the United Kingdom of Great Britain and Northern Ireland) as well as MERCOSUR-4 (Brazil, Argentina, Colombia and Chile) and the United States of America.

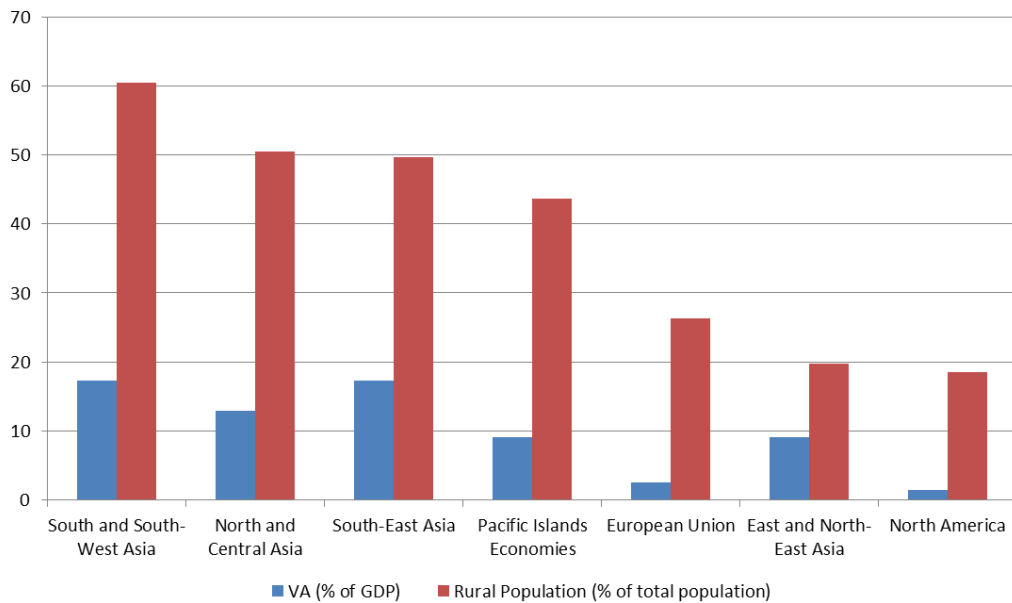
Section A summarizes comprehensive trade cost patterns in Asia and the Pacific and some other regions. Section B separately discusses the tariff and non-tariff components of agricultural trade costs. Section C presents the results of an empirical assessment investigating the impact of tariff and other policy- and non-policy-related factors that influence comprehensive trade costs in agriculture. The conclusion is given in Section D.

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<sup>93</sup> This chapter is a shorter, updated and edited version of Duval, Utoktham, Wermelinger and Lee (2012). The full working paper is available at [http://www.unescap.org/sites/default/files/TIDwp02\\_12.pdf](http://www.unescap.org/sites/default/files/TIDwp02_12.pdf)

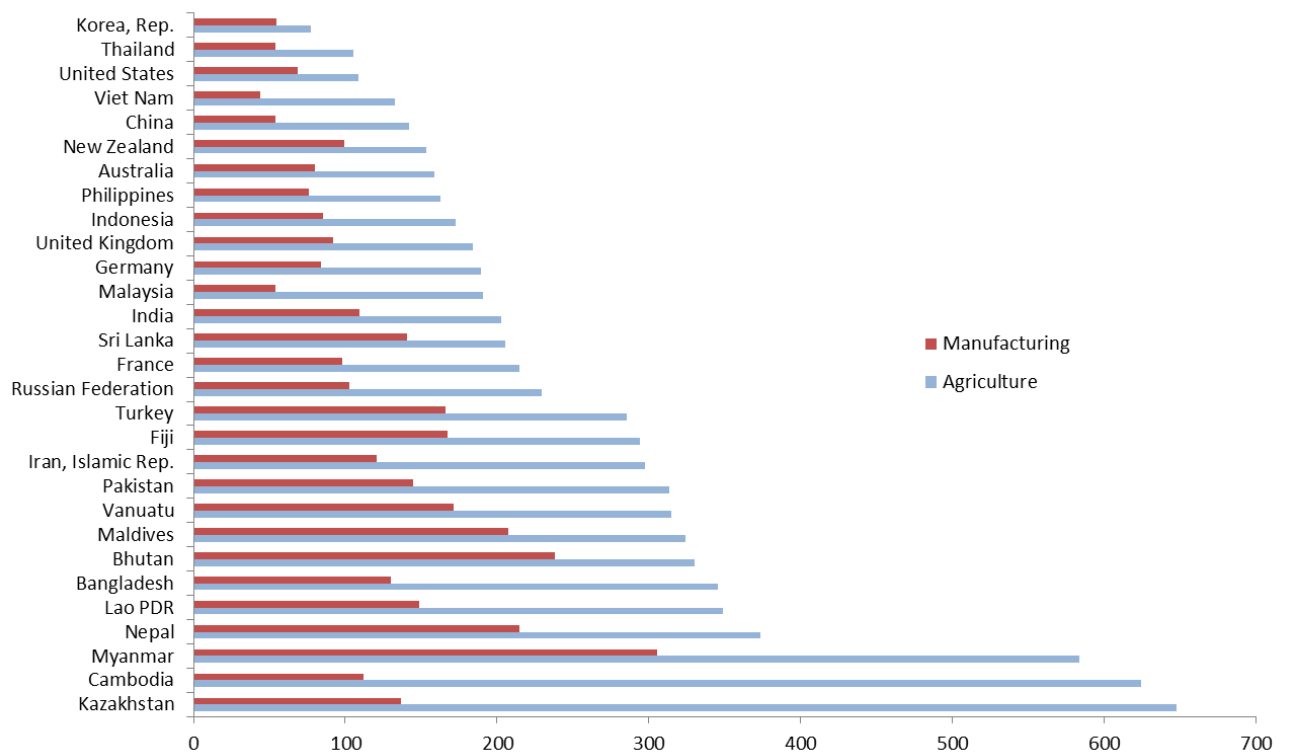
<sup>94</sup> The Asia-Pacific region is home to more than two-thirds of the world's poor (ESCAP, 2010).

**Figure 1. Value-added in agriculture as a percentage of GDP, and economically active population in rural areas as a percentage of total population, 2014**



Source: Databank, World Bank, September 2015.

**Figure 2. Agricultural and manufacturing comprehensive trade costs, excluding tariffs, between selected economies and Japan, 2008-2013**



Source: Author's calculation, based on the ESCAP-World Bank Trade Costs Database.

## A. Patterns of comprehensive agricultural trade costs

Broadly defined, international trade costs include all costs incurred in getting a good to a final user, other than the marginal cost of producing the good (Anderson and van Wincoop, 2004). In particular, this includes transportation costs (both freight costs and time costs), policy barriers (tariffs and non-tariff barriers), costs of information and contract enforcement, costs associated with the use of different currencies, and legal and regulatory costs, both direct and indirect. This broad definition of trade costs is adopted in this chapter and we therefore rely on the data contained in the ESCAP-World Bank Trade Costs Database, which features aggregate bilateral costs of trade in goods from 1995 to 2013, both for trade in agricultural goods and trade in manufacturing goods.

The descriptive analysis in this and the next section considers only those countries and subregions listed in table 1. Most country groups are based on existing subregional integration initiatives or free trade agreements, e.g., ASEAN and the South Asian Association in Regional Cooperation (SAARC). Other regions and subregions are defined according to the practice of the United Nations.

**Table 1. Countries and regions included in the subregional analysis**

Asian and South Pacific economies				
Australia and New Zealand (AUS-NZL)	East Asia-3	Association of Southeast Asian Nations -4 (ASEAN-4)	South Asian Association for Regional Cooperation (SAARC-4)	North and Central Asia-4 (NCA-4)
Australia New Zealand	China Japan Republic of Korea	Indonesia Malaysia Philippines Thailand	Bangladesh India Pakistan Sri Lanka	Georgia Kazakhstan Kyrgyzstan Russian Federation
Pacific Island Developing Economies (PAC-2)	EU-3	United States	South America-4 (SA-4)	
Fiji Papua New Guinea	France Germany United Kingdom	United States	Argentina Brazil Chile Colombia	

This section presents average trade cost patterns between and within Asia-Pacific and other subregions in the agricultural sector. In particular, table 2 shows average bilateral comprehensive trade costs for these country groups during 2008-2013 and how these costs have changed since 2003-2007. Average trade costs between North and Central Asian-4 (NCA) countries and other groups are particularly high; the highest costs are found with PAC-2 (402%). Intra-NCA trade costs are, however, lower than NCA-4 trade costs with all other subregions and country groups considered. In accordance with conventional trade theories, trade costs are lower within free trade regimes compared with trade costs between country groups, which are not in the same trading regime. Given the geographic proximity of countries within the investigated groups, the finding is also consistent with the argument of higher trade costs for regions/countries geographically further away. ASEAN-4, East Asia-3 and PAC-2 are exceptions in the case of Asia-Pacific; their trade costs are the lowest with some other subregions rather than within the group.

Overall, the Asia-Pacific subregions and the other country groups shown in table 2 have managed to reduce their average intra- and extra-regional trade costs since 2003; however, some exceptions exist (e.g., in the case of NCA-4 with most regions). While East Asia-3 considerably reduced trade costs with most of the other country groups (ranging from 5% to 33% cost reductions), other Asia-Pacific subregions show lower reductions on average.

**Table 2. Trade-weighted average of agricultural trade costs between and within country groups: Average for 2008-2013 – in tariff equivalent percentages – and change since 2003-2007 (in percentage)**

	ASEAN-4	East Asia-3	NCA-4	PAC-2	SAARC-4	AUS-NZL	EU-3	SA-4
ASEAN-4	159 (1.8)							
East Asia-3	129 (-9.3)	152 (-1.7)						
NCA-4	327 (-5.5)	171 (4.2)	142 (19.5)					
PAC-2	303 (-9.3)	286 (-39.2)		304 (-5.5)				
SAARC-4	177 (-9.6)	193 (-13.5)	235 (9.1)	402 (-11.9)	146 (-1.4)			
AUS-NZL	136 (-13.7)	133 (-18.0)	373 (-11.5)	88 (-39.2)	163 (-12.0)	92 (-8.3)		
EU-3	194 (-6.0)	193 (-10.3)	231 (0.2)	86 (-64.0)	214 (-2.0)	164 (-18.6)	70 (-19.3)	
SA-4	175 (-7.7)	172 (-19.1)	144 (2.5)		283 (-10.7)	229 (-10.2)	169 (-7.2)	126 (-10.1)
USA	113 (-3.1)	112 (-11.7)	292 (9.4)	179 (-29.5)	150 (-5.8)	142 (-4.4)	136 (-5.3)	128 (-2.4)

Source: ESCAP-World Bank Trade Cost Database, updated June 2015. Available at <http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=escap-world-bank-international-trade-costs> and [www.unescap.org/tid/artnet/trade-costs.asp](http://www.unescap.org/tid/artnet/trade-costs.asp).

Notes: Trade costs may be interpreted as tariff equivalents. Percentage changes in trade costs between 2002-2007 and 2008-2013 are shown in parentheses.

## B. Tariff and non-tariff components of comprehensive agricultural trade costs

There are many potentially important determinants of agricultural trade costs. This section separately investigates the tariff and non-tariff components of comprehensive agricultural trade costs between and within Asia-Pacific and other sub-regions.

There has been considerable progress in tariff reduction since 2000. However, tariff rates on agricultural goods exceed the rates applied to manufactured goods in some developed and developing economies (see annex 1). The level of agricultural tariff protection is particularly high in East Asia-3 and SAARC-4. Unilateral reforms as well as bilateral and regional trade agreements since 2001 have led to significant tariff reductions in Asian and Pacific countries. The progress of liberalization is, however, slower in the agricultural sector compared with manufacturing.

Table 3 shows the average bilateral tariff rates on agricultural goods between and within Asia-Pacific and other subregions as well as the respective percentage changes since 2003-2007. It can be seen that average bilateral tariffs in most of the Asia-Pacific subregions decreased considerably with all other subregions. Particularly interesting is the fact that SAARC-4 imposes relatively high tariffs on most of the regions as well as on themselves. Among Asia-Pacific subregions, the intraregional tariff rates of NCA in 2008-2013 were approximately 1%. This is largely attributed to the free trade agreement between NCA countries.

Despite some progress in agricultural tariff liberalization, Asia-Pacific countries should continue their efforts to reduce tariffs, as their imposition not only creates a direct cost in the customs duties collected, but also indirect costs in the form of additional documentation requirements and controls – both of which are included in the non-tariff comprehensive trade cost component. Reduced or zero tariffs may therefore result in multiplier effects with regard to the reduction of total trade costs (Duval and Utoktham, 2011c).

Overall, the analysis shows that direct tariff costs account for a relatively small portion (ranging from 1% to 18%) of total comprehensive agricultural trade costs in all the investigated country groups of Asia and the Pacific. Therefore, the focus of trade policymakers in the promotion of trade has shifted towards non-tariff costs. The non-tariff comprehensive trade cost component corresponds to the difference between total comprehensive ad valorem trade costs and applied tariff rates, and thus not only includes border and behind-the-border trade restrictive policies (such as SPS, TBT, quotas, import and export licences, export restrictions, customs surcharges, and anti-dumping, safeguard measures and discretionary licensing),<sup>95</sup> but also any form of other costs such as distance, culture, history, logistics infrastructure and services, exchange rates, the business environment, level bureaucratic border and behind-the-border procedures.

Agricultural non-tariff comprehensive trade costs between and within Asia and the Pacific and other subregions are illustrated in table 4. Non-tariff trade costs between subregions are always higher than those within the subregion, except in the case of ASEAN-4, NCA-4 and PAC-2. This is consistent with the existence of natural trade costs (e.g., geographic distance), which cannot be influenced by policy interventions.<sup>96</sup> Overall, compared with the other investigated Asia-Pacific subregions, AUS-NZL has the lowest non-tariff comprehensive trade cost levels, followed by ASEAN-4 and East Asia-3. The number ranges from 92% trade between AUS-NZL, to high levels of 355% for trade with AUZ-NZL; NCA-4 has high non-tariff trade costs with all other subregions, which

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<sup>95</sup> Table 2 in annex 3 presents UNCTAD's list of non-tariff trade policies.

<sup>96</sup> The costs due to geographical distance may however decrease with better infrastructure and transportation means.

illustrates the trade challenges developing landlocked countries face in Asia-Pacific. While, in most cases, non-tariff trade costs were reduced between and within the investigated country groups during the past decade, ASEAN-4, East Asia-3 and AUS-NZL are among the subregions that made high progress in trade cost reduction.

**Table 3. Trade-weighted average of agricultural tariffs between and within country groups: Average of 2008-2013 – in tariff equivalent percentages – and change since 2003-2007 (in percentage)**

Region	ASEAN-4	East Asia-3	NCA-4	PAC-2	SAARC-4	AUS-NZL	EU-3	SA-4
ASEAN-4	8 (57.8)							
East Asia-3	7 (-33.5)	21 (-9.0)						
NCA-4	5 (-10.9)	10 (6.1)	1 (-58.5)					
PAC-2	10 (7.7)	9 (-5.9)		9 (-24.2)				
SAARC-4	16 (-20.7)	18 (-11.3)	13 (-9.2)	10 (-19.1)	15 (-39.0)			
AUS-NZL	6 (-3.3)	7 (-6.1)	4 (1.3)	10 (-0.9)	12 (-3.9)	0 N/A		
EU-3	6 (-9.8)	8 (-7.5)	6 (-2.4)	4 (-32.5)	13 (-5.2)	3 (-7.8)	0 N/A	
SA-4	8 (-11.3)	10 (-16.9)	6 (-18.0)	4 (36.3)	16 (-13.6)	2 (-20.7)	5 (-17.4)	1 (-70.4)
USA	6 (-1.2)	8 (-3.2)	4 (-7.8)	5 (-26.4)	13 (-5.2)	2 (212.9)	4 (0.7)	4 (-7.2)

Source: ESCAP-World Bank Trade Cost Database, updated June 2015. Available at [www.unescap.org/tid/artnet/trade-costs.asp](http://www.unescap.org/tid/artnet/trade-costs.asp).

Notes: Trade costs may be interpreted as tariff equivalents. Percentage changes in trade costs between 2002-2007 and 2008-2013 are in parentheses.

**Table 4. Trade-weighted average of agricultural non-tariff comprehensive trade costs between and within country groups – average for 2008-2013 in tariff equivalent percentages – and change since 2003-2007 (in percentage)**

AB	ASEAN-4	East Asia-3	NCA-4	PAC-2	SAARC-4	AUS-NZL	EU-3	SA-4
ASEAN-4	141 (-2.4)							
East Asia-3	115 (-3.7)	109 (-0.2)						
NCA-4	304 (-3.1)	147 (15.2)	141 (80.4)					
PAC-2	274 (-3.0)	258 (-33.7)		276 (-0.0)				
SAARC-4	139 (-5.3)	149 (-11.9)	198 (13.3)	333 (25.9)	115 (14.1)			
AUS-NZL	124 (-13.6)	118 (-18.2)	355 (-11.5)	72 (-36.1)	136 (-12.0)	92 (-8.3)		
EU-3	177 (-5.4)	172 (-9.8)	213 (7.8)	81 (24.8)	179 (-1.0)	157 (-18.5)	70 (-19.3)	
SA-4	155 (-6.9)	147 (-17.9)	134 (4.8)		229 (-6.5)	224 (-9.6)	157 (-6.0)	124 (-6.2)
USA	101 (-2.9)	97 (-12.2)	278 (19.5)	167 (-22.7)	122 (-5.2)	137 (-6.9)	127 (-5.4)	119 (-2.0)

Source: ESCAP-World Bank Trade Cost Database, updated June 2015.

Available at [www.unescap.org/tid/artnet/trade-costs.asp](http://www.unescap.org/tid/artnet/trade-costs.asp).

Notes: Trade costs may be interpreted as tariff equivalents. Percentage changes in trade costs between 2002-2007 and 2008-2013 are in parentheses.

### C. Determinants of comprehensive agricultural trade costs

This section examines the determinants of agricultural trade costs, particularly the relative contribution to agricultural trade costs of natural factors (including geographic or cultural distance and language)<sup>97</sup> as well as those related to policies and regulations (tariff and non-tariff). To do so, a simple trade cost model is developed here, featuring natural factors as well as a number of policy related factors known to affect trade costs. Indicators used to represent these policy-related determinants of trade costs are presented below, followed by the model specification and a discussion of the estimation results.

Following Duval and Utoktham (2010), depth of credit information is used as a proxy for ease of getting credit, an important factor in agricultural trade where completing a trade transaction typically takes longer than when trading manufacturing goods. A proxy for ease of access as well as use of information and communication technologies (ICT) in partner countries (i.e., Internet users per 100 people) is also included in the trade cost model, given the importance of ICT access and usage found in earlier studies on trade facilitation (e.g., Shepherd and Wilson, 2009, among others). Taking into account previous literature on trade facilitation and trade costs,

<sup>97</sup> Anderson and van Wincoop (2004); Chen and Novy (2009); and Jack and others (2008).

which suggests the central role of maritime and port logistics performance in trade costs of goods (e.g., Duval and Utoktham, 2011b and 2011c), UNCTAD's liner shipping connectivity index is also included in the model.

Table 5 illustrates the progress of depth of credit information in each region. All regions, especially in North and Central Asia, have improved their credit data acquisition quality.

**Table 5. Depth of credit information (scale 0-8: 0 is worst, 8 is best)**

Region	Depth of credit information index (0-8)				Getting credit (score)			
	2004-2006	2007-2009	2010-2012	2013-2015	2004-2006	2007-2009	2010-2012	2013-2015
ASEAN-4	2.7	3.8	4.3	5.5	50.0	60.4	65.6	56.0
East Asia-3	5.0	5.3	6.0	6.6	53.1	65.3	67.4	58.9
NCA-4	0.0	1.4	5.0	6.3	28.1	39.1	68.8	67.0
PAC-2	1.8	2.0	2.0	2.3	48.4	50.0	50.0	38.3
SAARC-4	0.0	1.7	5.0	4.1	34.4	47.4	57.8	48.1
AUS-NZL	5.0	5.0	5.0	6.5	90.6	90.6	90.6	93.8
EU-3	5.0	5.2	5.3	6.7	75.0	79.2	79.2	69.7
SA-4	5.3	5.3	5.3	6.5	57.8	57.8	58.9	56.5
USA	N/A	N/A	N/A	8.0	93.8	93.8	93.8	94.6

Source: Doing Business, available at [www.doingbusiness.org](http://www.doingbusiness.org).

Table 6 illustrates the progress with regard to Internet users per 100 people and liner shipping connectivity index. Again, North and Central Asia takes the lead in the highest development rate for both ICT development and cross-border facilitation. Moderate progress can be observed in other subregions of Asia.

**Table 6. Internet users per 100 people and liner shipping connectivity index**

Region	Internet users per 100 people		Liner shipping Connectivity Index (maximum value in 2004 = 100)	
	2004-2006	2012-2014	2004-2006	2013-2015
ASEAN-4	17.7	37.5	35.2	48.3
East Asia-3	49.8	72.3	81.7	112.0
NCA-4	8.4	47.1	7.9	22.4
PAC-2	5.1	22.0	7.0	8.9
SAARC-4	2.8	14.0	24.9	33.3
AUS-NZL	64.1	82.8	24.0	25.5
EU-3	59.9	85.4	76.0	86.5
SA-4	21.0	57.6	22.1	36.9
USA	67.2	83.6	85.6	94.9

Source: World Development Indicator Databank, online available at <http://data.worldbank.org>.

Note: LSCI for North and Central Asia is available only for non-landlocked countries.



One of the crucial trade impediments in the agricultural sector is non-tariff measures (NTMs) rather than tariff measures. Table 7 gives an overview of average OTRI (Overall Trade Restrictiveness Index); TTRI (Tariff Trade Restrictiveness Index) and NTM (non-tariff measures) by country groups.<sup>98</sup> It is worth noting that, according to these indices, NTMs rose only in the European Union between 2005 and 2007. Following Hoekman and Nicita (2008), who included the NTM index in an extended gravity model, NTM is included here in the trade cost model.

**Table 7. Trade restrictiveness index (2005-2007)**

Regional Grouping	Trade restrictiveness (%)	2005	2006	2007
<b>ASEAN</b>	OTRI	38.77	41.22	33.33
	TTRI	7.06	9.06	4.67
	NTM	31.71	31.91	30.32
<b>AUS/NZL</b>	OTRI	38.38	34.33	32.66
	TTRI	2.24	3.23	2.97
	NTM	36.14	31.10	29.69
<b>East and North-East Asia</b>	OTRI	47.07	53.61	35.81
	TTRI	28.00	28.30	27.84
	NTM	19.07	17.65	15.43
<b>North and Central Asia</b>	OTRI	44.27	33.63	31.73
	TTRI	11.78	4.54	4.17
	NTM	32.49	29.63	28.44
<b>SAARC</b>	OTRI	48.30	45.53	32.61
	TTRI	31.32	20.81	14.64
	NTM	25.46	26.80	21.92
<b>European Union</b>	OTRI	54.99	58.00	58.48
	TTRI	24.80	16.35	14.01
	NTM	30.18	41.92	44.47
<b>MERCOSUR</b>	OTRI	42.01	39.58	38.98
	TTRI	11.65	10.46	11.32
	NTM	30.36	29.12	27.66
<b>NAFTA</b>	OTRI	41.02	32.83	21.09
	TTRI	20.63	14.75	8.45
	NTM	20.39	18.08	12.64

Source: World Trade Indicator Database.<sup>99</sup>

Note: ASEAN – Cambodia, Indonesia, Malaysia, the Philippines, Thailand and Viet Nam; AUS/NZL – Australia, and New Zealand; East and North-East Asia – China, Japan, Republic of Korea, and Mongolia; SAARC – Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka; European Union – Austria, Belgium, Bulgaria (2007), Cyprus (2004), Czech Rep. (2004), Denmark, Estonia (2004), Finland, France, Germany, Greece, Hungary (2004), Ireland, Italy, Latvia (2004), Lithuania (2004), Luxembourg, Malta (2004), Netherlands, Poland, Portugal, Romania (2007), Slovakia (2004), Slovenia, Spain, Sweden and the United Kingdom; MERCOSUR – Argentina, Brazil, Paraguay, Uruguay and Venezuela; NAFTA – Canada, Mexico and the United States.

<sup>98</sup> For details, see the methodology of non-tariff measures (NTMs) in Hoekman and Nicita, 2008. See also Kee and others, 2009, based on World Bank Policy Research Working Paper 3840, February 2006.

<sup>99</sup> Available at

<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/TRADE/0,,contentMDK:22421950~pagePK:148956~piPK:216618~theSitePK:239071,00.html>.

The following reduced form equation is estimated using a cross-country panel of 60 countries for 2005-2007:

$$\ln(\text{CTC}_{ij}) = \beta_0 + \beta_1 \ln(\text{distance}_{ij}) + \beta_2 (\text{cult}_{ij}) + \beta_3 \ln(\text{tariff}_{ij} * \text{ji}) + \beta_4 \ln(\text{NTM}_{ij}) + \beta_5 \ln(\text{lsci}_{ij}) + \beta_6 \ln(\text{internet}_{ij}) + \beta_7 (\text{creditinfo}_{ij}), \quad (1)$$

where

- $\text{CTC}_{ij}$  is comprehensive trade costs between country i and country j
- $\text{distance}_{ij}$  is bilateral distance in kilometres
- $\text{cult}_{ij}$  is a set of dummy variables of cultural distance, which consists of
  - $\text{contig}$  dummy variable indicating if countries i and j are contiguous
  - $\text{comlang\_off}$  dummy variable indicating if countries i and j have a common official language
- $\text{tariff}_{ij} * \text{ji}$  is a geometric average of  $\text{tariff}_{ij}$  and  $\text{tariff}_{ji}$
- $\text{NTM}_{ij}$  is a geometric average of  $\text{NTM}_i$  and  $\text{NTM}_j$
- $\text{lsci}_{ij}$  is a geometric average of liner shipping connectivity index of country i and j
- $\text{internet}_{ij}$  is a geometric average of Internet users per 100 inhabitants in country i and j
- $\text{creditinfo}_{ij}$  is a geometric average of ease of doing business indicators of i and j, which is proxied by the depth of credit information index (0-6).

Detailed information about the variables and data used in the estimations (including their expected sign) are in Annex 2, along with the list of countries included in the analysis and results of the empirical model estimations. The model is estimated for all countries included in the analysis (model 1), as well as for a subset of ASEAN and OECD economies trading within and among each other (model 3), and for a subset of ASEAN countries trading with OECD and OECD with ASEAN (model 5).

Model (1) suggests that physical distance is an important factor of trade costs, as well as sharing official language, with a 10% increase in distance between partner countries, implying a 1.6% increase in comprehensive trade costs. Having a common border with a partner country has a moderate impact on trade costs and contributes to their reduction by approximately 19%. Reductions in tariff or non-tariff measures (NTM) by 10% result in a reduction in agricultural comprehensive trade costs by nearly 6% and 3%, respectively. A 10% improvement in the liner shipping connectivity index also implies a reduction in trade costs by almost 2%.

For behind-the-border indicators, having a decent quality ICT infrastructure such as a streamlined Internet connection has a minimal effect on trade costs. For the doing business factor, the credit information index contributes at least a 3.6% trade cost reduction if the index increases from 5 to 6.

The relative contributions by each factor are reported in table 8. Based on estimates from model (1), (2) or (3), natural barriers contribute between 19% and 30% to total comprehensive trade costs. Tariffs account for up to 5% in these models. Non-tariff measures appear to play only a minor role in trade costs in the three models; however, the role is more significant (up to 5%) with the trade between OECD and ASEAN developing countries. Trade-related infrastructure, i.e., the LSCI variable, contributes between 5% and more than 15% to total trade costs. Ease of access as well as use of information and communication technologies, proxied by Internet users per 100 inhabitants, account for less than 2% and the depth of credit information accounts 2% to 6%.

From the estimation results of the sub-sample including only ASEAN countries' trade costs with OECD countries in model (5), distance is not the main contributor to trade costs variation anymore and port connectivity becomes even more important compared to the other models. The drastic reduction in the contribution by distance to trade costs when one focuses solely on trade between ASEAN and OECD may derive from the fact that OECD countries are mostly European and thus geographically close together. The distances between each ASEAN country and each OECD country are large but not that much different from each other. This would make trade cost variations due to distance minimal among the ASEAN-OECD country pairs, with liner shipping connectivity and logistics services explaining a larger share of the variation in trade costs between the countries.

The significant positive contribution of NTMs to agricultural trade costs in the case of ASEAN-OECD trade, combined with the non-significance of tariff costs, also implies that product standards and conformance issues among countries in these two groups may need particular attention. These results indeed suggest that although tariffs may at times be prohibitive, real or perceived inability to meet NTMs, such as SPS/TBT requirements, likely account for a larger share of agricultural trade costs.

**Table 8. Relative contributions by different factors to comprehensive trade costs (in percentage)**

	(1)	(2)	(3)	(5)
ln of distance	19.35	23.37	29.65	1.18
Contiguity	3.46	1.97	3.24	0.00
Common official language	0.13	0.16	1.09	1.63
ln of geometric average bi-directional tariff	2.32	1.27	3.22	-2.18
ln of non-tariff barriers	-0.66	0.27	-1.01	4.74
ln of LSCI	10.98	4.76	15.05	26.17
ln of Internet users	2.01	0.53	0.56	0.75
Credit information	4.24	2.03	5.46	14.13
Partner fixed-effects		26.40		
Income group fixed-effects	1.98	0.00	-1.52	-0.76
Year fixed-effects	0.01	0.01	0.15	0.38
Total variation explained by model	43.82	60.77	55.89	46.04
Residual	56.18	39.23	44.11	53.96
Total	100.00	100.00	100.00	100.00

## D. Conclusion

Agriculture remains the backbone of most Asia-Pacific developing economies, and approximately 50% of the Asian working population was employed in the agricultural sector. In view of the export potential of agricultural products in the region, it is urgent that trade costs are reduced in this sector, particularly since they are typically twice as high as those for manufactured goods.

Agricultural trade costs within each of the different Asian subregions and country groups are not found to differ sharply, particularly when tariff costs are excluded. Indeed, while agricultural tariffs amount to less than 5% in most subregions, they remain high between South Asian countries (SAARC) as well as between East and North-East Asian countries (ENEA). Agricultural trade costs appear to have fallen between 2003 and 2009 within and between most subregions and country groups examined, although improvements in trade costs appear to have been slower in Asian subregions than in developed country groups (i.e., European Union and NAFTA).

The trade cost model and analyses reveal that, when a wide range of countries are considered, geographic distance is the single most important factor accounting for differences in trade costs between country pairs, followed by maritime logistics performance and ease of getting credit. Access to, and use of ICT in partner countries and tariff rates of partner countries are also found to account for a significant but a small and similar share of agricultural trade cost variations across countries.

Interestingly, when the analysis focused only on trade costs between ASEAN and OECD countries, the importance of geographic distance and tariff costs in explaining trade cost differences across countries vanished, while the importance of maritime logistics services and non-tariff measures such as SPS/TBT requirements become the key determinants. These results clearly suggest a need for many individual Asian developing countries to enhance maritime and other international logistics services while further building capacity to comply with non-tariff measures.

## Annex 1

**Annex Table 1. Comparison of bilateral agricultural tariff rates and manufacturing tariff rates – selected countries and subregions**

Region	2002-2007			2008-2013			Percentage differential		
	Agriculture, hunting, forestry; fishing (A+B)	Manufacturing (D)	Total Goods (GTT)	Agriculture, hunting, forestry; fishing (A+B)	Manufacturing (D)	Total Goods (GTT)	Agriculture, hunting, forestry; fishing (A+B)	Manufacturing (D)	Total Goods (GTT)
ASEAN-4	8.84%	9.77%	9.71%	8.47%	8.78%	8.77%	-0.37%	-0.99%	-0.95%
East Asia-3	12.32%	8.46%	8.71%	12.06%	7.40%	7.62%	-0.27%	-1.06%	-1.09%
NCA-4	7.19%	7.77%	7.65%	5.65%	6.09%	5.96%	-1.54%	-1.68%	-1.68%
PAC-2	13.14%	8.69%	8.43%	8.24%	8.99%	8.79%	-4.90%	0.30%	0.35%
SAARC-4	13.24%	13.60%	13.45%	11.32%	11.15%	11.11%	-1.92%	-2.45%	-2.35%
AUS-NZL	5.11%	7.84%	7.74%	4.89%	5.82%	5.80%	-0.22%	-2.02%	-1.94%
EU-3	5.62%	4.96%	5.00%	4.50%	4.27%	4.29%	-1.12%	-0.69%	-0.71%
SA-4	9.29%	10.56%	10.51%	7.81%	9.65%	9.62%	-1.49%	-0.92%	-0.89%
USA	6.30%	6.74%	6.71%	5.73%	5.69%	5.68%	-0.57%	-1.05%	-1.03%

Sources: ESCAP Trade Cost database; ESCAP-World Bank Trade Cost Database, updated June 2015. Available at [www.unescap.org/tid/artnet/trade-costs.asp](http://www.unescap.org/tid/artnet/trade-costs.asp).

## Annex 2

**Annex Table 2. Trade cost model variables and data sources**

Variable name	Source	Expected sign	Description
ln(ctcij)	ESCAP/TID		Natural log of comprehensive trade costs CTC ( $T_{ij}$ ).
ln(distanceij)	CEPII	+	Natural log of geodesic distance, following the great circle formula, which uses latitudes and longitudes of the most important cities/agglomeration (dense of population) In kilometres between reporting country and its trade partner.
contig	CEPII	-	Dummy variable indicating “1” if two countries are contiguous and “0” otherwise.
comlang_off	CEPII	-	Dummy variable indicating “1” if two countries share official language and “0” otherwise.
ln(tariffij*ji)	TRAINS	+	Natural log of geometric average of tariffij and tariffji
ln(NTMij)	WB TI*	+	Natural log of geometric average of NTMi and NTMj
ln(lscij)	WB TI*	-	Natural log of geometric average of liner shipping connectivity index of reporter and partner (maximum value in 2004 = 100): The higher the LSCI, the better the port connectivity, which implies lower trade costs.
ln(internetusers_per100pplij)	WB TI*	-	Natural log of Internet users (per 100 people): the more Internet users, the better ICT infrastructure and services, which implies lower trade costs.
creditinfoij	WB TI*/WB DB**	-	Geometric average of getting credit: depth of credit information index (0-6): the more credit information available, the easier and cheaper the credit, which implies lower trade costs.

\* World Bank Trade Indicator Database, available at <http://info.worldbank.org/etools/wti/1a.asp>.

\*\* World Bank Doing Business Data, available at [www.doingbusiness.org](http://www.doingbusiness.org).

**Annex Table 3. Countries included in the analysis**

East Asia and Pacific (10)		Europe and Central Asia (29)			North America (2)
Australia	Korea (Rep. of)	Austria*	Ireland	Romania	Canada
Brunei	Malaysia	Czech Republic	Italy	Russian Federation	United States of America
Darussalam				Slovakia*	
China	New Zealand	Denmark	Kazakhstan*	Slovenia	South Asia (3)
Indonesia	Philippines	Estonia	Latvia	Spain	Bangladesh
Japan	Thailand	Finland	Lithuania	Sweden	India
		France	Moldova*	Switzerland	Sri Lanka
		Germany	Netherlands	Turkey	
		Greece	Norway	United Kingdom	
		Hungary*	Poland		
		Iceland	Portugal		
<b>Latin America and Caribbean (11)</b>			<b>Middle East and North Africa (2)</b>		<b>Sub-Saharan Africa (3)</b>
Argentina	Colombia	Peru	Malta*	Oman	Cameroon
Bolivia	Mexico	Uruguay			Namibia
Brazil	Nicaragua	Venezuela			South Africa
Chile	Paraguay				

\* Indicates the additional coverage only in Model 2.

#### Annex Table 4. Estimation results

Models (1), (3) and (5) are estimated using Ordinary Least Squares. Models (2), (4) and (6) are estimated using Poisson Pseudo Maximum Likelihood (PPML), following Chen and Novy (2009). Standard errors are reported with clustering unit “country pair” (to take account of possible correlations of errors within country pairs). Models (1) and (2) report estimates for all countries included in the analysis. Models (3) and (4) report estimates for a subset of ASEAN economies trading with both ASEAN and OECD countries, and OECD countries trading with ASEAN and OECD. Models (5) and (6) report estimates for a subset of ASEAN countries trading with OECD and OECD with ASEAN.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	All: OLS with bilateral variables	All: PPML with bilateral variables	ASEAN/ OECD: OLS	ASEAN/OE CD: PPML	AO/OA: OLS	AO/OA: PPML
ln(distance <sub>ij</sub> )	0.160*** [18.03]	0.168*** [15.63]	0.167*** [16.04]	0.170*** [14.68]	0.140** [2.465]	0.137** [2.210]
contig	-0.210*** [-5.454]	-0.259*** [-5.550]	-0.133*** [-2.835]	-0.170*** [-3.288]		
comlang_off	-0.0276 [-0.895]	-0.0119 [-0.326]	-0.0989*** [-2.941]	-0.111*** [-2.637]	-0.174* [-1.756]	-0.147 [-1.150]
ln(tariff <sub>ij</sub> *j <sub>i</sub> )	0.586*** [4.043]	0.578*** [3.321]	0.890*** [4.463]	0.957*** [4.747]	1.179** [1.988]	0.766 [1.112]
ln(NTM <sub>ij</sub> )	0.288** [2.263]	0.306* [1.901]	0.452*** [2.609]	0.530*** [2.796]	1.889*** [5.353]	1.838*** [4.919]
ln(lsc <sub>ij</sub> )	-0.181*** [-16.04]	-0.182*** [-13.78]	-0.163*** [-12.25]	-0.163*** [-11.41]	-0.225*** [-4.962]	-0.219*** [-4.832]
ln(internetusers_per100p plij)	-0.0295 [-1.255]	-0.0293 [-0.949]	-0.0162 [-0.457]	-0.00182 [-0.0448]	-0.0259 [-0.295]	0.00796 [0.0801]
creditinfo <sub>ij</sub>	-0.0461*** [-6.516]	-0.0564*** [-6.938]	-0.0996*** [-6.020]	-0.116*** [-6.644]	-0.123*** [-3.384]	-0.121*** [-3.108]
Constant	0.643*** [6.560]	0.632*** [5.628]	0.564*** [4.030]	0.565*** [3.584]	0.809 [1.409]	0.685 [1.117]
Observations	2,017	2,017	903	903	190	190
R-squared	0.438	0.321	0.559	0.452	0.460	0.366
Reporter FIXED-EFFECTS	No	No	No	No	No	No
Partner FIXED-EFFECTS	No	No	No	No	No	No
Income group	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Clustered SE	Country pair	Country pair	Country pair	Country pair	Country pair	Country pair
Adj. R-squared	0.434	.	0.552	.	0.424	.
Robust in brackets *** p<0.01, ** p<0.05, * p<0.1 t-stat. in square brackets						

See full paper appendix for additional robustness checks of this model. The full paper is available at [www.unescap.org/resources/agricultural-trade-costs-asia-and-pacific-patterns-compositions-and-determinants](http://www.unescap.org/resources/agricultural-trade-costs-asia-and-pacific-patterns-compositions-and-determinants).