

INTRAREGIONAL TRADE COSTS IN ASIA: A PRIMER

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While much has been said about the need to promote intraregional trade and the importance of reducing associated trade costs, quantitative estimates of such costs have been lacking. In this paper a new comprehensive measure of international trade costs is applied to calculate, according to value, trade costs within and between four Asian subregions, including the Association of Southeast Asian Nations (ASEAN) and the South Asian Association for Regional Cooperation (SAARC). Extraregional trade costs of the four subregions with free trade areas outside Asia, such as the North American Free Trade Area (NAFTA) and the European Union (EU), as well as their trade costs with China, India and Japan are also calculated. The analysis concludes with an evaluation of the importance of tariffs in overall trade costs and with the identification of sharp differences across Asian subregions.

JEL Classification: F10, F12, F15.

Key words: Trade facilitation, trade costs, regional integration, subregion, Asia.

I. INTRODUCTION

Reducing international trade costs is a high priority for developing countries in Asia as they strive to maintain or enhance their trade competitiveness in an increasingly challenging global environment. At the same time, it has become increasingly clear that these countries need to diversify their export markets and trade more among themselves, both to foster harmonious and sustainable regional development and to reduce risks associated with dependence on a limited number of developed country markets.

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Most Asian countries are already actively engaged in bilateral or regional trade and economic integration initiatives, many of which include trade facilitation or trade cost reduction programs or targets.¹ There is ample evidence that successful implementation of these programs – or achievement of targets – would have a very significant impact on intraregional trade.² However, little is known about the level of intraregional trade costs in Asia and to what extent these costs may have decreased over time. In an effort to address this knowledge gap, we estimate and analyze intra and extraregional trade costs of four Asian subregions, namely Association of Southeast Asian Nations (ASEAN), South Asian Association for Regional Cooperation (SAARC), North and Central Asia, and East and North-East Asia.

The definition and measure of trade costs adopted in this paper is presented in the next section, along with other methodological considerations and data sources. Empirical findings are discussed in sections III, IV and V, starting with intra and extraregional trade costs of Asia as a whole, followed by intra- and inter-subregional trade costs, and trade costs of Asian and other subregions with China, Japan and India. Tariff and non-tariff trade costs of Asian subregions are also examined briefly in section VI, while section VII provides conclusions and recommendations.

II. METHODOLOGY AND DATA

Trade cost definition and measure

There have been many attempts to develop trade costs measures. Much effort has focused on direct measurement of various trade cost components, such as international transport costs (using actual shipping costs of a standard container to various destinations or more aggregate CIF/FOB trade data),³ or costs of moving goods from the factory to the deck of a ship at the nearest sea port (including cost of preparing trade documentation, customs clearance, goods transport and handling to the port).⁴ Others (Kee and others, 2006) have estimated the cost of observed tariff and policy based non-tariff barriers (import quotas, subsidies, antidumping duties). Still others have relied on surveys of business or logistics service providers to derive

¹ For example, Asia-Pacific Economic Cooperation (APEC) leaders committed to a 5 per cent reduction in trade costs in 2001, followed by an additional commitment of a 5 per cent cut in 2005. Quantitative estimates of trade costs – necessary to determine whether or not targets were being achieved – have not been made available, however (Shepherd, 2010).

² See, e.g., Helble and others (2007), Abe and Wilson (2008), and Duval and Utoktham (2009).

³ See, e.g., Limão and Venables (2001) and De (2006a; 2006b).

⁴ For example, cost of export and/or cost of import indicator in World Bank Doing Business Report 2010.

qualitative or quantitative indicators of international trade cost components.⁵ However, these approaches do not provide a comprehensive measure of international trade costs, and combining the different measures and indicators into a comprehensive measure is hardly feasible.

We therefore adopt the measure of comprehensive trade costs proposed by Jacks and others (2009) for calculating international trade costs in this paper.⁶ This bilateral measure of trade costs is comprehensive in the sense that it includes all additional costs involved in trading goods bilaterally relative to those involved in trading goods intranationally (domestically). It captures trade costs in its wider sense, including not only international transport costs and tariffs, but also other trade cost components discussed in Anderson and van Wincoop (2004), such as costs associated with the use of different languages and currencies. Direct and indirect costs associated with completing trade procedures or obtaining necessary information are also included.

This measure is derived from the gravity equation, the workhorse econometric model of trade, and is fully grounded in trade theory. Bilateral trade costs can be expressed as a tariff equivalent as follows:⁷

$$\tau_{ij} \equiv \left(\frac{t_{ij} t_{ji}}{t_{ii} t_{jj}} \right)^{\frac{1}{2}} - 1 = \left(\frac{x_{ii} x_{jj}}{x_{ij} x_{ji}} \right)^{\frac{1}{2(\sigma-1)}} - 1$$

where τ_{ij} denotes geometric average trade costs between country i and country j

t_{ij} denotes international trade costs from country i to country j

t_{ji} denotes international trade costs from country j to country i

t_{ii} denotes intranational trade costs of country i

t_{jj} denotes intranational trade costs of country j

x_{ij} denotes international trade flows from country i to country j

x_{ji} denotes international trade flows from country j to country i

x_{ii} denotes intranational trade of country i

x_{jj} denotes intranational trade of country j

σ denotes elasticity of substitution

⁵ For example, see the Logistics Performance Index of the World Bank or the Executive Opinion Survey of the World Economic Forum, and its Enabling Trade reports.

⁶ This measure was also earlier derived by Head and Ries (2001).

⁷ For the detailed derivation, see annex A.

According to this equation, trade costs are directly inferred from observable bilateral and intranational (domestic) trade data, showing how much more expensive bilateral trade is relative to intranational trade. Intranational trade is ideally defined as gross output less exports. However, since gross output data is not available for most developing countries in Asia, intranational trade is calculated instead as gross domestic product (GDP) minus export. This approach is proposed and tested by Jacks and others (2009), who finds that the percentage change of trade costs over time using GDP in the calculation is similar to those computed with gross output. That paper shows a high correlation between change in gross output and GDP growth, which makes using GDP as a proxy of gross output still theory consistent.⁸ Novy (2009) notes, however, that using GDP data overstates intranational trade and thus, the level of trade costs because GDP includes (non-tradable) services.

Subregional trade costs are calculated as simple averages of bilateral trade costs of countries within each subregion.⁹

Data and country groups

Bilateral international trade flows¹⁰ from 1988-2008 are obtained from the United Nations Commodity trade database (Comtrade) and downloaded using the World Integrated Trade Solution (WITS). Bilateral import data is used as it is generally believed to be of better quality than export data. GDP and gross exports, which are used in the calculation of bilateral intranational trade, are obtained from the World Development Indicator (WDI) and the United Nations Comtrade respectively.¹¹ Bilateral tariff data used to calculate non-tariff trade costs at the subregional level are from the United Nations Conference on Trade and Development (UNCTAD) TRAINS database.¹² Following past literature, elasticity of substitution is assumed to be constant over time and set at $\sigma = 8$.¹³

⁸ As pointed by an anonymous referee that the paper does not show the levels of trade costs calculated using GDP as opposed to gross output will be correlated across country-pairs. This issue deserves further study.

⁹ We initially calculated subregional trade costs using aggregate international and intranational trade of subregions, but this was found to be misleading due to missing trade and GDP data of different countries in each subregion in various years.

¹⁰ Bilateral trade flows used for calculating trade costs are bilateral imports.

¹¹ All above-mentioned data was downloaded in June 2010.

¹² Data downloaded through WITS as simple average of effectively applied tariff in July 2010.

¹³ This value of elasticity of substitution is the same as in Anderson and van Wincoop (2004) and Novy (2009). The past literature, for example, Anderson and van Wincoop (2003) and Jacks and others (2009), suggests that results are not sensitive to the choice of parameter. To check the robustness of our dataset, we calculated trade costs with elasticity of substitution equals 5, 8 and 10 as well. Relative trade costs are found to remain stable across the different values.

Various country groups were identified to enable analysis of trade costs at the subregional level. Most country groups were based on existing subregional integration initiatives or free trade area memberships such as ASEAN and the North American Free Trade Area (NAFTA). The East and North-East Asia and the North and Central Asia subregions are defined following the practice of the United Nations. Importantly, table 1 shows countries in each subregion of which data were available, and which could therefore be included in the calculation of subregional trade costs.

Table 1. Country groups – definition of regions and subregions

MERCOSUR	EU5	NAFTA	AUS-NZ	Asia			
				ASEAN	East and North-East Asia	North and Central Asia	SAARC
Argentina	France	Canada	Australia	Indonesia	China	Armenia	Bangladesh
Brazil	Germany	Mexico	New Zealand	Malaysia	Japan	Azerbaijan	India
	Italy	United States of America		Philippines	Republic of Korea	Georgia	Pakistan
	Spain			Thailand		Kazakhstan	Sri Lanka
	United Kingdom				Macao, China	Kyrgyz Rep.	
					Mongolia	Russian Federation	

III. INTRAREGIONAL AND EXTRAREGIONAL TRADE COSTS OF ASIA

As shown in table 1, the Asia group considered here consists of Japan and 20 developing economies spanning South, South-East, East and North-East, as well as North and Central Asia – all are members of ESCAP. Figures 1 and 2 show trade costs of Asia with subregional groups of economies both within and outside it, and how these costs have changed between 2003 and 2007.

Asia trade costs with all of its four subregions are higher than those with the European Union 5 (EU5). They are also higher than ones with NAFTA, except in the case of trade with East and North-East Asia and ASEAN. Trade costs with NAFTA amount to a 190 per cent tariff equivalent, while those with intraregional groups range from 175 per cent (for ASEAN) to 253 per cent (for North and Central Asia) tariff equivalents. Asia extraregional trade costs with the Common Market of the South America (MERCOSUR) are the highest as of 2007, but it is with that subregion that most progress was made in reducing costs since 2003 (-6 per cent).

Asia intraregional trade costs with North and Central Asia are the highest, followed by South Asia. Those with ASEAN are the lowest, but the results suggest progress in reducing trade costs with that subregion may have stalled since 2003. Most progress in reducing intraregional trade costs seems to have been made with South Asia (-6 per cent), although trade costs with that subregion remain 26 per cent higher than ones with ASEAN. Overall, trade costs of Asia, as a group, with itself remain high. Intra and extraregional trade costs have changed little between 2003 and 2007, decreasing by similarly small amounts during that period.

Generally, these results confirm the lack of economic and trade integration between economies of the greater Asia region. It also shows that these countries, as a group, may have focused more on reducing trade costs with developed countries and trading blocs outside Asia than within the region. We explore if these results hold at the more disaggregated level of Asian subregions in the next section.

Figure 1. Intraregional trade costs of Asia (with its subregions)

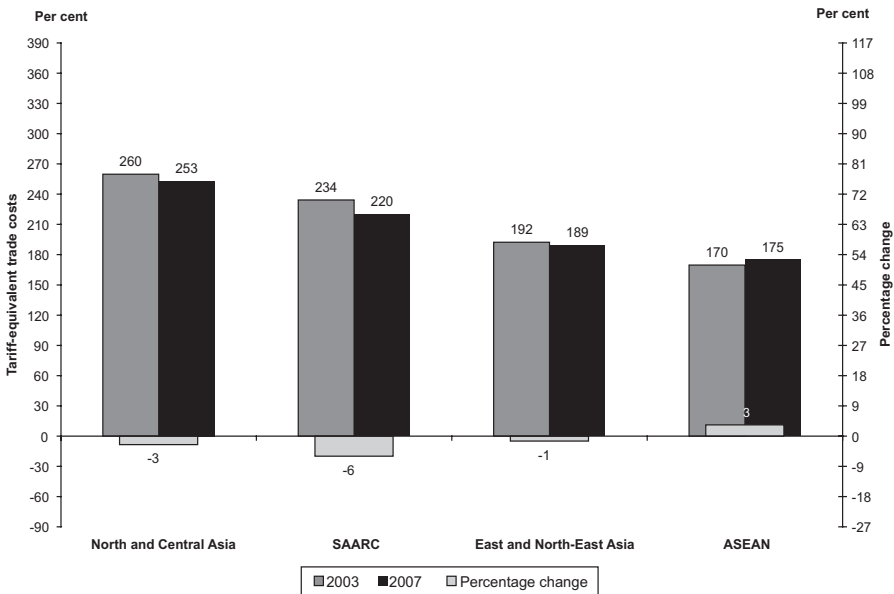
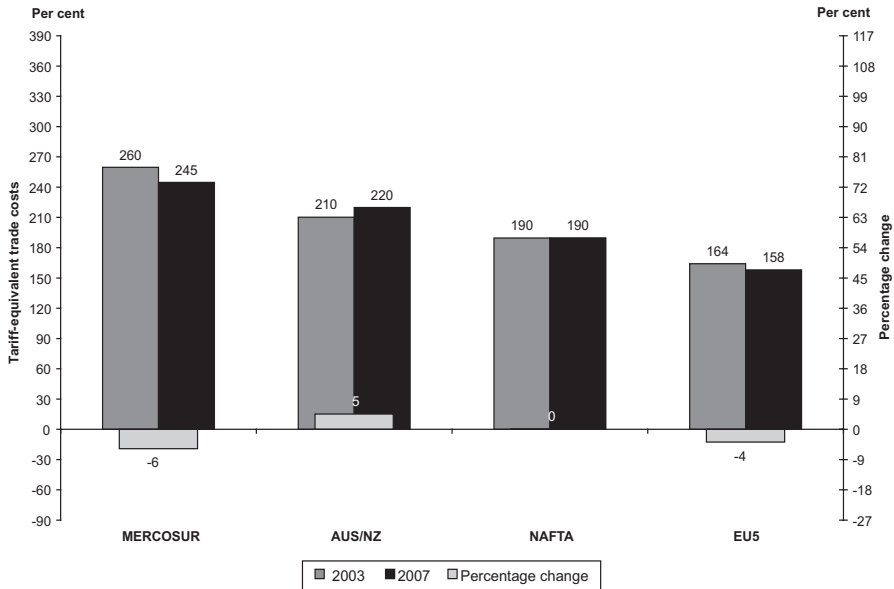


Figure 2. Extraregional trade costs of Asia (with selected free trade areas)



Box 1. Comparison of trade costs with those of other similar studies

Anderson and van Wincoop (2004), based on an extensive reviews of available information on trade costs, suggested that overall ad valorem trade costs between developed countries might amount to about 170 per cent, broken down into 74 per cent international trade costs and 55 per cent local distribution costs.

Very recent papers by Novy (2009) and Shepherd (2010) use the same trade cost measure adopted in our paper. Novy reports trade costs in 2000 ranging from 25 per cent (between the United States of America and Canada) to 70 per cent (between the United States and Germany), but used gross output data rather than GDP data. He finds that using GDP data increases substantially its trade cost estimates (from 31 per cent to 47 per cent for the United States and Canada in 1993).¹⁴ Shepherd (2010) uses GDP data and its trade cost estimates in 2006 range from 35 per cent (between China and the World) to 86 per cent (between Brunei Darussalam and the World) respectively. According to Shepherd

¹⁴ Our own estimate in this study is 50 per cent for the same year, which is also consistent with the estimate of Anderson and van Wincoop (2004).

(2010), trade costs of APEC and ASEAN with the rest of the world during 2001-2006 stand at 56 and 53 per cent respectively.¹⁵

Our own estimate of trade costs between the United States and Canada and the United States and Mexico stand at 41 per cent and 47 per cent in 2007 respectively. This is in line with Novy's own estimates using GDP data. However, the Asian subregional trade costs calculated using the same method and data sources and reported in this paper range from 61 per cent (between ASEAN countries) to 359 per cent (between Australia/New Zealand and North and Central Asia) in 2007. The mostly higher values of ad valorem trade costs in this paper may therefore not be attributed to methodological or data differences but rather to the fact that we are estimating trade costs between groups of developing countries (with the exception of Japan), some of which including landlocked countries facing significant natural barriers to trade. The impressively wide range of comprehensive trade costs reported in this study is consistent with findings from earlier studies that focused on measuring specific trade cost components. For example, import costs reported in the World Bank Doing Business 2010 for Central Asian landlocked countries often exceed US\$ 3,000 per container while they amount to around US\$ 600 for ASEAN.

Brooks and Ferrarini (2010), using a closely related but different trade cost measure and trade data sources, report trade costs of 27 per cent between China and ASEAN, and 42 per cent between India and ASEAN in 2007. In contrast, we estimate trade costs between China and ASEAN at 62 per cent, and at 113 per cent between India and ASEAN. One underlying reason for the different estimates is the use of different elasticities of substitutions. While these estimates are clearly different in absolute terms, they are similar in relative terms, both suggesting that trade costs of ASEAN with India are much higher (at least 60 per cent higher) than those with China.

Overall, the variation in absolute values of overall trade costs in the most recent literature suggests that it would be inappropriate to use estimates from different studies – using different methodologies and data sources – to compare and assess national or regional performances, although comparison of trade cost results presented in relative terms may be feasible. In that context, the development of a consistent and up-to-date database of bilateral trade cost estimates by ESCAP and the Asia-Pacific Research and Training Network (ARTNeT) is a welcome development.

¹⁵ Shepherd (2010) appears to be using $i = \text{country}$ and $j = \text{rest or the world}$ when applying the bilateral trade costs formula, such that his results are difficult to compare with those of Novy (2009) or ours.

IV. INTRA-SUBREGIONAL AND INTER-SUBREGIONAL TRADE COSTS IN ASIA

Trade costs of the four Asian subregions among themselves and with one another are summarized in table 2. Trade costs of these subregions with Australia and New Zealand (AUS/NZ), EU5 and NAFTA are also included for benchmarking purposes.

Table 2. Intra-subregional and inter-subregional trade costs in Asia: 2007 estimates and progress since 2003

Full Dataset	2007						
	ASEAN	SAARC	East and North-East Asia	North and Central Asia	AUS/NZ	EU5	NAFTA
ASEAN	61% (-2%)						
SAARC	151% (-7%)	150% (-8%)					
East and North-East Asia	155% (-1%)	246% (1%)	128% (-3%)				
North and Central Asia	300% (8%)	301% (-14%)	223% (-7%)	162% (-3%)			
AUS/NZ	103% (-4%)	185% (-1%)	174% (4%)	359% (-3%)	74% (3%)		
EU5	127% (1%)	155% (-5%)	153% (-4%)	184% (-5%)	148% (0%)	72% (-2%)	
NAFTA	122% (1%)	179% (-10%)	138% (-12%)	282% (-6%)	149% (0%)	124% (-4%)	62% (-3%)

Note: Values in parentheses show percentage changes in trade costs since 2003.

Inter-subregional costs are consistently much higher than intra-subregional costs. This is consistent with the existence of natural trade costs, such as those associated with geographical distances and not easily addressed through policy intervention, as well as the fact that most trade integration initiatives have taken place at the subregional rather than at the regional level of Asia. At the same time, however, trade costs changes reported in table 2 suggest that in recent years more progress

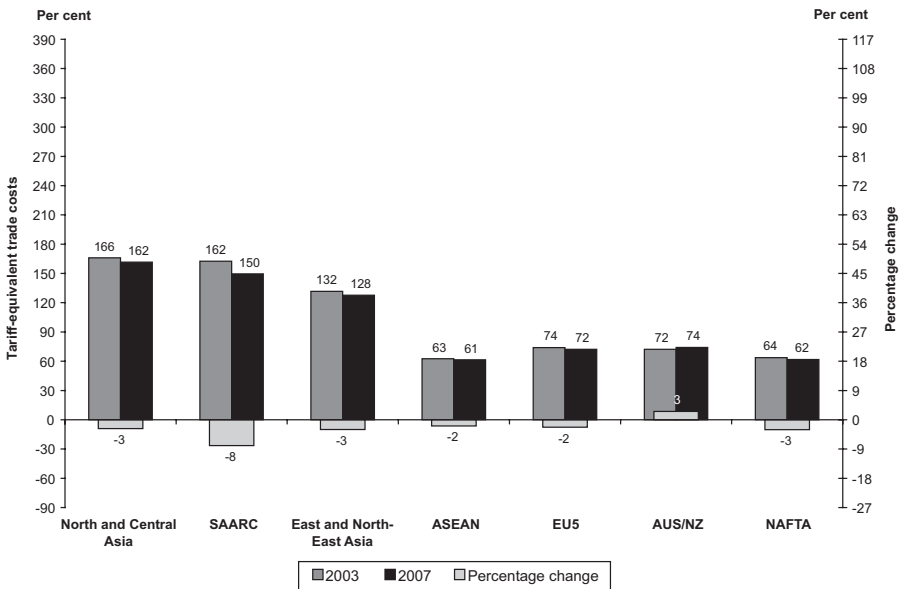
has been made in reducing trade costs inter-subregionally than intra-subregionally. Trade costs of each Asian subregion are briefly discussed below.

ASEAN trade costs

ASEAN has the lowest intra-subregional trade costs of all subregions although results show only minor improvements have been made between 2003 and 2007. ASEAN intraregional trade costs fell from 92 per cent in 1996 to 66 per cent tariff equivalent in 2001, with limited subsequent progress (see annex B). ASEAN trade costs with other Asian subregions are found to be at least twice as high as the intra-ASEAN trade costs, suggesting a comparatively high level of trade and economic integration.

Figure 3 also shows that the intraregional trade costs of ASEAN are comparable to those of NAFTA and about 15 per cent lower than those of EU5 or between Australia and New Zealand. This is noteworthy as it suggests that the relatively low amount of intraregional trade within ASEAN – compared to that of EU5, for example – may not be attributed to trade facilitation issues, but rather to issues of trade complementarities between members.

Figure 3. Intra-subregional trade costs of Asian subregions, 2003/2007



ASEAN trade costs with the East and North-East Asia region and SAARC are similar, involving a 90 per cent additional ad valorem trade cost compared to intra-ASEAN trade.¹⁶ This is significantly higher than the additional trade costs involved in trading with Australia/New Zealand or EU5 (42 per cent and 66 per cent respectively). ASEAN trade costs with North and Central Asia remain prohibitively high with no improvements made between 2003 and 2007. In contrast, ASEAN trade costs with SAARC have decreased substantially (-7 per cent) during that period.

SAARC trade costs

Intra-SAARC trade costs are found to be very high, amounting to two-and-a-half times the Intra-ASEAN trade costs. SAARC is the only region investigated for which intraregional trade costs are not significantly lower than its extra-subregional trade costs. Indeed, SAARC trade costs with ASEAN and with itself are roughly the same.¹⁷

SAARC trade costs with other subregions do not compare favourably with those of ASEAN. Our estimates suggest that SAARC trade with EU5 and East and North-East Asia involves additional ad valorem trade costs of 28 to 91 per cent respectively, compared to ASEAN trade costs with those regions. SAARC and ASEAN trade costs with North and Central Asia are similar although SAARC is geographically much closer to that subregion.

Notwithstanding SAARC's generally high trade costs, results suggest that the region has made significant progress between 2003 and 2007 in lowering costs. Intra-SAARC costs have decreased by 8 per cent since 2003, and its costs with ASEAN and North and Central Asia have also decreased by 7 and 14 per cent respectively.

East and North-East Asia trade costs

Aggregate trade costs of this subregion are difficult to interpret as it features two Organization for Economic Co-operation and Development (OECD) member countries (the Republic of Korea and Japan), as well as one least developed and landlocked country (Mongolia) and China. The intraregional trade cost estimate, which is roughly double that of ASEAN, suggests, at best, a moderate level of trade integration among members of this group.

¹⁶ As shown in annex C, trade costs between ASEAN and East Asia (China-Japan-the Republic of Korea) are only 69 per cent, such as involving only an 8 per cent additional trade costs compared to intra-ASEAN trade.

¹⁷ This is particularly noteworthy, as our SAARC trade cost estimate does not even include Nepal trade costs due to missing data.

This group is characterized by a relatively narrow range of trade costs with other subregions, ranging from 155 per cent ad valorem trade costs with ASEAN to 246 per cent with SAARC. This subregion has the lowest trade costs of any Asian subregion with North and Central Asia, and trade costs with that subregion have decreased significantly since 2003 (-7 per cent).

When the three leading economies in this group, China, Japan, and the Republic of Korea, are isolated and brought together into an East Asia subregion, we find that this newly defined East Asia group has lower intra-subregional trade costs than even ASEAN. This is particularly remarkable as the three countries had not entered into free trade agreements with one another as of 2007. East Asia is also found to have made significant progress in reducing trade costs with all Asian and non-Asian subregions (-4 per cent to -19 per cent) between 2003 and 2007, resulting in this group having the lowest trade costs of any subregion with any subregion (see annex C).

North and Central Asia trade costs

This subregion consists of economies in transition that are mostly landlocked. This certainly contributes to making trade costs in North and Central Asia the highest among all Asian subregions. This is true of both its intra-subregional trade costs and its trade costs with other subregions.

While this subregion is geographically proximate to both EU5, East and North-East Asia, and SAARC, its trade costs with SAARC appear to be capping at approximately 70 per cent higher than those with EU5 or the East and North-East Asia subregion. However, the significant reduction in trade costs observed between North and Central Asia and both SAARC and East Asia (-14 per cent and -7 per cent respectively) indicate that Central Asia is increasingly integrating into the rest of Asia.

V. TRADE COSTS OF ASIAN SUBREGIONS WITH CHINA, INDIA AND JAPAN

In order to further deepen our understanding of intra-Asia trade costs, we explore below the trade costs between the four Asian subregions and the three Asian giants: China, India, and Japan,

Trade costs of all subregions with China are the lowest, followed by Japan and India. The most striking finding is that the trade costs of all Asian subregions with China are lower or closely equal to their intra-subregional trade costs (refer to figure 3). The range of trade costs faced by China across the subregions is also much

Figure 4. Trade costs between selected subregions and China, India and Japan (2007)

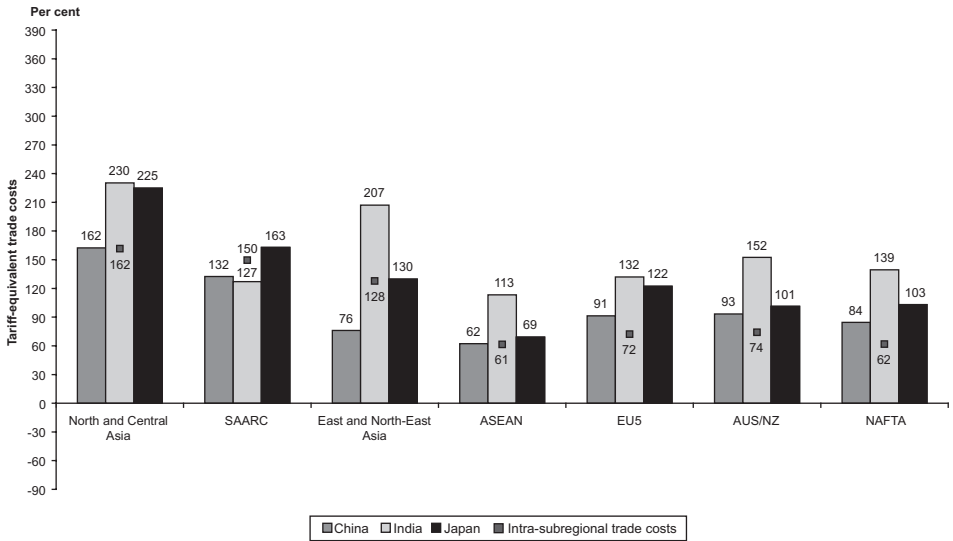
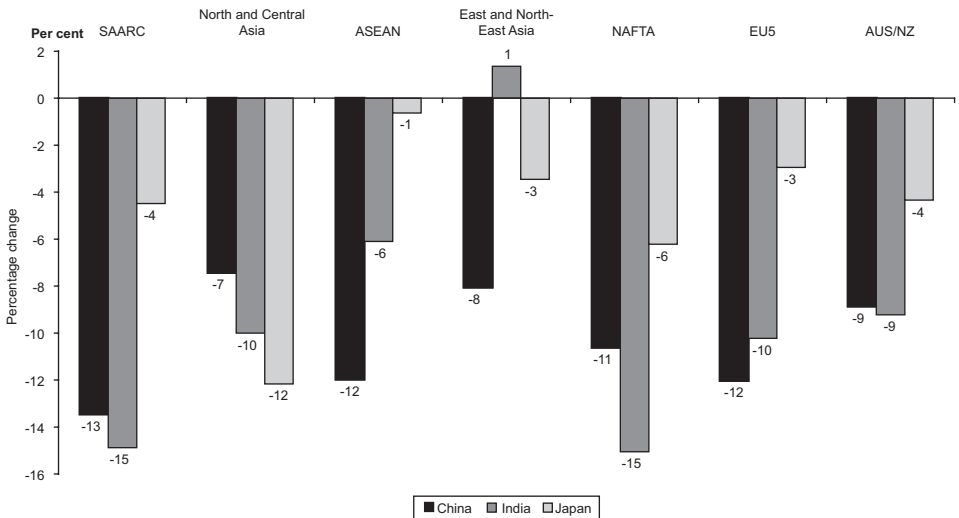


Figure 5. Changes in trade costs between selected subregions and China, India and Japan: 2003-2007 (percentage change)



lower than those faced by Japan (and India), revealing China's success in reducing trade costs with a wide range of country groups in Asia and beyond. Indeed, trade costs between China and Australia/New Zealand are even found to be slightly lower than those between Japan and Australia/New Zealand.

Trade costs of all three Asian giants with ASEAN are the lowest, ranging from a 62 per cent tariff equivalent for China to 113 per cent for India. This confirms the role of ASEAN as a regional trade hub, with which each of the three major Asian economies have signed free trade agreements. Trade costs between each of the three countries and other Asian subregions – to which they do not belong – are often almost twice as high as those with ASEAN. Trade costs of China, India and Japan with North and Central Asia are unsurprisingly the highest.

As shown in figure 5, trade costs reductions with China have been most consistent across all Asian subregions, ranging from 7 to 13 per cent. In contrast, trade costs reductions with India have varied greatly, from a 15 per cent reduction with SAARC (India's own subregion) to an actual increase in trade costs with the East and North-East Asia subregion.

In the case of Japan, improvement of trade costs in recent years are found to have been most significant with North and Central Asia (-12 per cent), with costs reduction with other subregions not exceeding 4 per cent. In particular, our results indicate that trade integration between ASEAN and Japan, measured in terms of trade costs reduction, has been much slower than with China in recent years, resulting in an ad valorem Japan-ASEAN trade cost premium of 7 per cent over those of China-ASEAN in 2007.

VI. ASIAN SUBREGIONS TARIFF VS NON-TARIFF TRADE COSTS

The comprehensive measure of trade costs used in this study includes all added observable and unobservable costs associated with trading goods internationally rather than domestically. While breaking down this overall trade cost measure into its key components would be useful, we leave this challenging task for another paper. As an initial step, however, we simply calculate comprehensive non-tariff ad valorem trade costs by removing applied tariff rates from our comprehensive ad valorem trade costs.¹⁸

¹⁸ Non-tariff trade costs = $[(1 + \text{Trade Costs}) / (1 + \text{Tariff})] - 1$.

The resulting non-tariff trade costs are compared to tariff costs at the subregional level. Table 3 shows the level of these ad valorem costs for trade within and among each of the Asian subregions for the years 2003-2004 and 2007-2008. The results indicate that non-tariff barriers are clearly on a very different scale than tariff barriers: average subregional tariffs vary from nearly 0 to at most 21 per cent while non-tariff costs vary from 58 per cent to over 330 per cent. Table 3 also suggests that Asian subregions have made relatively more progress in reducing tariffs than in reducing non-tariff barriers, with reduction in tariff costs in many cases exceeding 25 per cent between 2003-2004 and 2007-2008.

Table 3. Intra- and inter-subregional tariff and non-tariff trade costs in Asia (2003-2004 and 2007-2008)

Reporter/Partner	Period	Data	ASEAN	East and North-East Asia	North and Central Asia	SAARC
ASEAN	2003-2004	Tariff	2%	8%	6%	7%
		Non-tariff	58%	136%	261%	144%
	2007-2008	Tariff	2%	4%	4%	7%
		Non-tariff	60%	145%	281%	136%
East and North-East Asia	2003-2004	Tariff	5%	6%	3%	7%
		Non-tariff	143%	117%	223%	231%
	2007-2008	Tariff	4%	4%	3%	4%
		Non-tariff	146%	118%	216%	231%
North and Central Asia	2003-2004	Tariff	4%	4%	6%	5%
		Non-tariff	268%	221%	151%	337%
	2007-2008	Tariff	5%	6%	0%	6%
		Non-tariff	275%	207%	165%	284%
SAARC	2003-2004	Tariff	20%	19%	15%	15%
		Non-tariff	116%	200%	300%	126%
	2007-2008	Tariff	14%	13%	10%	8%
		Non-tariff	121%	206%	267%	130%

Note: For each subregional pair (e.g. ASEAN-SAARC), the tariff costs shown are those of the first subregion mentioned in the label such as ASEAN tariff in our example.

ASEAN confirms its leadership position as an efficient and trade-friendly group, featuring the lowest intra-subregional non-tariff trade costs and moderate levels of tariff costs both intra- and extra-subregionally. The East and North-East Asia subregion features the lowest extra-subregional tariff costs. SAARC tariff and non-tariff trade costs with other subregions were clearly the highest in 2003-2004, but its trade cost gap with other subregions had rapidly narrowed by 2007-2008. The North and Central Asia group has also made impressive progress in lowering its tariff both within and outside the group, but has made very limited progress, if any, in reducing its non-tariff trade barriers. This is admittedly due at least in part to the geographic nature of these costs.

VII. CONCLUSION

This paper provides for the first time an overview of the overall trade cost situation in Asia using a comprehensive measure of international trade costs. Following an overall assessment of trade costs of Asian countries as a group with selected regional groupings, trade costs within and between Asian subregions are presented and benchmarked against those of the EU5, NAFTA and Australia/New Zealand. Trade costs of Asian subregions with China, India and Japan are also examined.

Trade costs within Asian countries as a group are found to be high, generally exceeding those between them and non-Asian regional groupings, such as NAFTA and EU5. This is consistent with the heterogeneity of the greater Asian region and the lack of trade or economic integration initiatives spanning the entire region.

The subregional analysis reveals sharp differences across Asian subregions. ASEAN is found to have much lower intra-subregional trade costs than other Asian subregions, as well as mostly lower inter-subregional trade costs. On the other hand, SAARC intra-subregional trade costs remain exceedingly high although most progress in reducing such costs since 2003 was made in South Asia. North and Central Asia, which is grouped with Russia and landlocked economies in transition, faces prohibitive trade costs – sometimes exceeding 300 per cent tariff equivalent. Finally, within the East and North-East Asia subregion, a subset of three countries – China, the Republic of Korea and Japan – was found to have the lowest intra-group trade costs of any free trade areas examined in this paper (including NAFTA), although the three countries had not yet signed free trade agreements with one another.

Estimates of trade costs between Asian subregions and China, India and Japan, highlight how effective China has been in reducing its trade costs with ASEAN as well as other Asian and non-Asian subregions, achieving generally lower

international trade costs than Japan as of 2007. In contrast, estimates of trade costs between India and Asian subregions (other than SAARC) suggest much room left for improvement.

Our analysis shows that tariff costs account for a small portion of the overall international trade costs of Asian subregions – typically 10 per cent or less. This confirms the need for trade policy makers and negotiators to sharpen their focus on reducing non-tariff barriers, including trade facilitation and improvement of trade logistics services.

Decomposing the large non-tariff portion of the international trade costs presented here into key components will be emphasized in future work to derive more specific policy recommendations. Alternative ways to calculate intranational trade – as an essential element in the calculation of ad valorem trade costs – in the absence of gross output data in most Asian countries will also be explored, in particular to take into account the potential bias of the GDP-based estimates presented in this paper against countries and subregions with large services sectors.¹⁹

¹⁹ Updated bilateral trade cost data will be made available at: <http://www.unescap.org/tid/artnet/trade-costs.asp> as it becomes available.

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APPENDIX

Annex A. Derivation of trade cost equation

Anderson and van Wincoop (2003) derived the micro-founded gravity equation with trade cost component as

$$x_{ij} = \frac{y_i y_j}{y^w} \left(\frac{t_{ij}}{\Pi_i P_j} \right)^{1-\sigma} \quad (1)$$

where x_{ij} denotes nominal exports from i to j ; y_i and y_j denotes nominal income from countries i and j respectively; y^w denotes world income; $\sigma > 1$ denotes elasticity of substitution across goods; Π_i and P_j denotes price index of countries i and j respectively; t_{ij} denotes bilateral trade costs (as one plus ad valorem term).

Anderson and van Wincoop (2003) defines Π_i and P_j as multilateral resistance terms²⁰ as those price indices incorporate average trade barriers with all other trading partners. Novy (2009) suggests the expression of intranational trade as

$$x_{ii} = \frac{y_i y_i}{y^w} \left(\frac{t_{ii}}{\Pi_i P_i} \right)^{1-\sigma} \quad (2)$$

where t_{ii} becomes intranational trade costs.

Re-arranging (2) as the product of multilateral resistance term as follows:

$$x_{ii} = \frac{y_i y_i}{y^w} \left(\frac{\Pi_i P_i}{t_{ii}} \right)^{\sigma-1}$$

$$(\Pi_i P_i)^{\sigma-1} = \frac{x_{ii} y^w}{y_i y_i} t_{ii}^{\sigma-1}$$

²⁰ Basically, multilateral resistance indicates the trade between reporting country i and a particular partner j depends on the bilateral barrier between i and j relative to the average barriers of that pair and all trading partners (such as global trading partners). From the derivation (from Equation (4) to (5)), the multilateral resistance is cancelled out in the mathematical equation (see Novy (2009)). Thus, the ex ante obstacles (such as the realized barriers before initiating international trade transaction) are not ignored; they have been taken into account but they disappear in the mathematical process.

$$\begin{aligned}
 (\prod_i P_i)^{\sigma-1} &= \frac{x_{ii}/y_i}{y_i/y^w} t_{ii}^{\sigma-1} \\
 \prod_i P_i &= \left(\frac{x_{ii}/y_i}{y_i/y^w} \right)^{\frac{1}{\sigma-1}} t_{ii}
 \end{aligned}
 \tag{3}$$

In the same analogy, the opposite direction of trade flows in (1) can be written as

$$x_{ji} = \frac{y_j y_i}{y^w} \left(\frac{t_{ji}}{\prod_i P_i} \right)^{1-\sigma}
 \tag{4}$$

Multiply (1) and (4) together and get

$$x_{ij} x_{ji} = \left(\frac{y_i y_j}{y^w} \right)^2 \left(\frac{t_{ij} t_{ji}}{\prod_i P_i \prod_j P_j} \right)^{1-\sigma}$$

Substitute the result from (3)

$$\begin{aligned}
 x_{ij} x_{ji} &= \left(\frac{y_i y_j}{y^w} \right)^2 \left(\frac{\prod_i \prod_j P_i P_j}{t_{ij} t_{ji}} \right)^{\sigma-1} \\
 x_{ij} x_{ji} &= \left(\frac{y_i y_j}{y^w} \right)^2 \left(\frac{1}{t_{ij} t_{ji}} \right)^{\sigma-1} \left(\frac{x_{ii}/y_i}{y_i/y^w} \right) t_{ii}^{\sigma-1} \left(\frac{x_{jj}/y_j}{y_j/y^w} \right) t_{jj}^{\sigma-1} \\
 x_{ij} x_{ji} &= \left(\frac{t_{ii} t_{jj}}{t_{ij} t_{ji}} \right)^{\sigma-1} x_{ii} x_{jj} \\
 \frac{x_{ij} x_{ji}}{x_{ii} x_{jj}} &= \left(\frac{t_{ii} t_{jj}}{t_{ij} t_{ji}} \right)^{\sigma-1} \\
 \left(\frac{t_{ij} t_{ji}}{t_{ii} t_{jj}} \right)^{\sigma-1} &= \frac{x_{ii} x_{jj}}{x_{ij} x_{ji}}
 \end{aligned}$$

Then, the product of bidirectional trade costs relative to the product of their intranational trade costs is equivalent to

$$\frac{t_{ij} t_{ji}}{t_{ii} t_{jj}} = \left(\frac{X_{ii} X_{jj}}{X_{ij} X_{ji}} \right)^{\frac{1}{\sigma-1}} \quad (5)$$

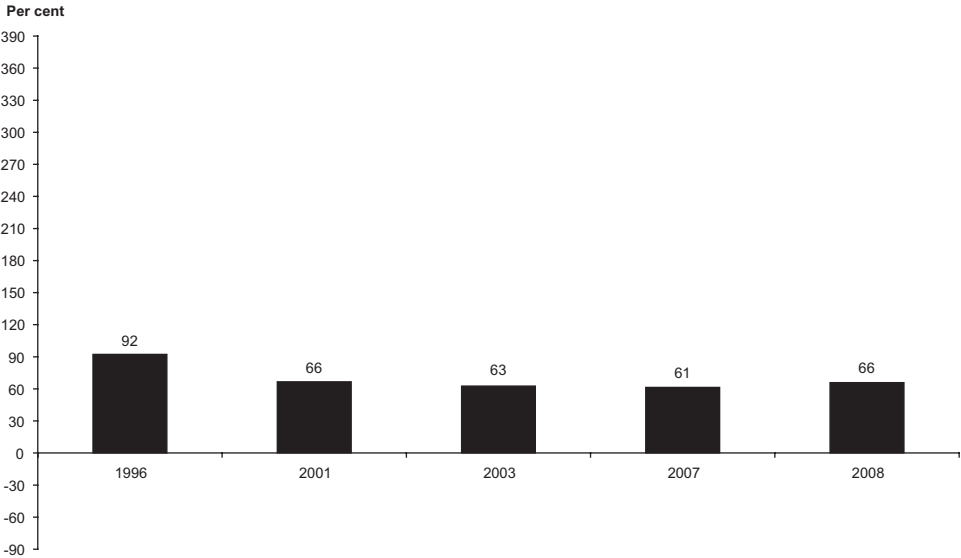
Therefore, geometric average of bilateral trade costs is defined as

$$T_{ij} = \left(\frac{t_{ij} t_{ji}}{t_{ii} t_{jj}} \right)^{\frac{1}{2}} = \left(\frac{X_{ii} X_{jj}}{X_{ij} X_{ji}} \right)^{\frac{1}{2(\sigma-1)}} \quad (6)$$

Tariff-equivalent term is done by deducting one from (6) and thus,

$$\tau_{ij} = \left(\frac{t_{ij} t_{ji}}{t_{ii} t_{jj}} \right)^{\frac{1}{2}} - 1 = \left(\frac{X_{ii} X_{jj}}{X_{ij} X_{ji}} \right)^{\frac{1}{2(\sigma-1)}} - 1 \quad (7)$$

Annex B. Intra-subregional trade costs of ASEAN (1996-2008)



**Annex C. Intra-subregional and inter-subregional trade costs of East Asia
(China, Republic of Korea and Japan)**

	2007						
	ASEAN	SAARC	East Asia	North and Central Asia	AUS/NZ	EU5	NAFTA
ASEAN	61% (-2%)						
SAARC	151% (-7%)	150% (-8%)					
East Asia	69% (-4%)	147% (-7%)	57% (-11%)				
North and Central Asia	300% (8%)	301% (-14%)	193% (-19%)	162% (-3%)			
AUS/NZ	103% (-4%)	185% (-1%)	100% (-5%)	359% (-3%)	74% (3%)		
EU5	127% (1%)	155% (-5%)	111% (-6%)	184% (-5%)	148% (0%)	72% (-2%)	
NAFTA	122% (1%)	179% (-10%)	97% (-8%)	282% (-6%)	149% (0%)	124% (-4%)	62% (-3%)