Asia-Pacific Research and Training Network on Trade
Working Paper Series, No. 94, January 2011

Trade Facilitation in Asia and the Pacific: Which Policies and Measures affect Trade Costs the Most?

By

Yann Duval
*Chorthip Utoktham**

*Yann Duval and Chorthip Utoktham, are Economic Affairs Officers and Consultant, respectively, in the Trade and Investment Division, ESCAP. Authors are grateful to Prabir De, Mia Mikic, and Ben Shepherd for their comments on an earlier version of the paper. This work was carried out with the aid of a grant from IDRC, Canada and is part of the joint ARTNeT – UNNExT research programme on trade facilitation (see www.artnetontrade.org and http://www.unescap.org/unnext/ for details). The views expressed are those of the authors and should not necessarily be considered as reflecting the views or carrying the endorsement of the United Nations. All remaining errors are the responsibility of the Authors. The authors may be contacted at duvaly@un.org.

Executive Summary

How much of international trade costs can be mitigated through implementation of trade facilitation measures and policies? What measures and policies affect trade costs the most? This paper presents findings from an initial analysis of new non-tariff trade cost estimates and their determinants, based on a bilateral database of comprehensive trade cost maintained by ESCAP. Although trade costs consist for the most part of non-tariff trade costs, tariff cuts accounted for a very significant portion of trade costs reduction between 1996-99 and 2004-07. That said, most countries are found to have reduced their non-tariff policy-related trade costs between 1996 and 2007. Among the top trade facilitating economies are Malaysia, the United States, China, Republic of Korea and Thailand, with Japan and Germany following closely. The dominance of Asian countries in the ranking is fully consistent with the trade-led growth strategies of these economies and their emphasis on reducing international trade costs.

The more detailed analysis of bilateral non-tariff policy-related trade costs further reveals that ASEAN developing countries often faced higher such costs when trading with one another than with the United States or Japan in 2007. However, while the trade costs of many developing countries with developed countries have remained roughly unchanged since 1996, their trade costs with other developing countries have often sharply decreased between 1996 and 2007 – at least within ASEAN. A closer look at the bilateral trade costs of large Asian economies revealed that China, Republic of Korea and Japan have achieved similar levels of trade facilitation, but that India has lagged behind. China impressively reduced its trade costs with all 13 partner economies examined in our study. Non-tariff policy-related trade costs between China and India decreased significantly over the past 10 years.

Results of the non-tariff policy-related trade costs modeling exercise strongly suggest that improving port efficiency (liner shipping connectivity) and access to information and communication technology facilities is essential to reducing trade costs. Policies aimed at liberalizing logistics and information technology services and increasing competition among service providers should therefore be readily considered, with a view to maximizing efficiency at any given level of hard infrastructure development. Establishment of public-private partnerships to accelerate the development of the national IT and transport and logistics infrastructure may also be actively pursued. The econometric results also supports the view that, given limited resources available, focusing on improving the overall business environment may be often more effective in facilitating trade than implementing soft measures solely targeted at speeding up movement of goods between factory and the port (or vice-versa).

Table of Contents

List of Tables

List of Figures

List of Boxes

Introduction

Trade facilitation, broadly defined here as the reduction of (direct and indirect) trade costs, has become a priority for developing countries who seek to maintain their competitiveness. Indeed, international trade costs faced by developing countries remain high, including for intra-regional trade. This is also the case in Asia, where trade facilitation performance varies greatly across subregions, as well as within countries in each subregion. As shown in table, 1, comprehensive costs of trade in goods range from 53% of value of goods for intraregional trade among Southeast Asian countries, to a prohibitive 282% for trade in goods between South and Central Asia countries.

Table 1: Intra-regional Comprehensive Trade Costs (2007; Tariff Equivalent)

	Southeast Asia	South Asia	East and North-East Asia	North and Central Asia	Australia-New-Zealand	European Union	North America
Intra Asian trade							
Southeast Asia	53%						
South Asia	139%	138%					
East and North-East Asia	141%	227%	113%				
North and Central Asia	280%	282%	204%	149%			
Extra Asian trade							
Australia-New-Zealand	90%	168%	155%	329%	61%		
European Union	113%	139%	135%	166%	129%	59%	
North America	109%	162%	122%	259%	130%	107%	50%

Source: Duval and Utoktham (2010), Annex 3 (services-sector adjusted estimates).

How much of international trade costs of goods can be mitigated through implementation of trade facilitation measures and policies? What measures and policies affect trade costs the most? Trade facilitation performance is affected by a wide range of factors. Some are inherent to the location, culture or history of the trading partners and may be difficult to address through policy, at least within a reasonable time frame. Others, such as the availability of logistics infrastructure and services, a favorable exchange rate, a conducive business environment, or transparent and streamlined border procedures, may be influenced by policy makers. This paper evaluates the overall importance of the component of international trade costs that is influenced by these other factors, and assesses the significance of a number of specific policy-related factors in reducing trade costs.

This paper makes several contributions to the existing literature on trade facilitation and trade costs. First, we present trade costs based on a measure that is both comprehensive and founded in micro-economic theory. In contrast, most of the available empirical research on trade costs is based on a specific subset of trade costs (e.g., transport costs) or on data from perception surveys. Second, we decompose our comprehensive trade costs into natural (time-invariant) and non-tariff policy-related trade cost estimates, the later providing a broad indicator of the level of bilateral trade facilitation performance. While these initial estimates will certainly need to be refined in future work, they provide new insights on potential to improve trade facilitation between partner countries. Finally, we estimate the direct effect of various trade facilitation measures and policies on trade costs. Past literature, analyzing the impact of trade facilitation has done so mainly by estimating the effect of various trade facilitation indicators on bilateral trade flows using extended gravity models (e.g., Wilson, Mann and Otsuki, 2004). Given that trade facilitation measures and policies affect trade flows through reducing the cost of trade, our approach can reasonably be expected to yield more accurate results and understanding of what factors may be most important for policymakers to focus on.

Methodology and Data

Defining Comprehensive Trade Costs

As shown by Jack, Meissner, and Novy (2008; 2009), gravity equations derived from the Anderson and van Wincoop (2003) trade model as well as other leading trade models such as the model with heterogeneous firms of Melitz and Ottaviano (2008), can be solved for an expression of bilateral comprehensive trade costs. This bilateral measure of trade costs is truly comprehensive in the sense that it includes *all additional costs involved in trading goods internationally with another partner (i.e. bilaterally) relative to those involved in trading goods intranationally (i.e., internally or 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 language and currencies. Direct and indirect costs associated with completing trade procedures or obtaining necessary information are also included.

Following Chen and Novy (2009), such all-inclusive trade costs may be defined as follows:

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

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 between all goods[2]

According to this equation, trade costs are directly inferred from observable bilateral and intranational (domestic) trade data, showing how much more expensive bilateral international trade is relative to intranational trade. Intranational trade is ideally defined as gross output less export. However, since gross output data is not available for most developing countries in Asia, alternative measures are needed. Following Novy (2008) and others (e.g., Shepherd, 2010), we first define x_{ii} and x_{jj} as gross domestic product (GDP) less export and apply equation (1) to calculate trade costs. In an effort to improve on previous studies, however, we call the resulting cost estimates "upper-bound" trade costs (τ_{ij}^{UB}) [3] and calculate "lower-bound" trade costs (τ_{ij}^{LB}) where x_{ii} and x_{jj} is adjusted for the

[1] As in Jack, Meissner, and Novy (2008), trade costs may be expressed in tariff-equivalent form, defined as $TET_{ij} = T_{ij}-1$. See Annex 1 for the full derivation of trade cost from the micro-founded gravity equation of Anderson and van Wincoop.

[2] See Anderson and van Wincoop (2003) for detailed discussion of elasticity of substitution between goods. For the purpose of comparing results to past literatures, this paper follows Anderson and van Wincoop (2004) and Novy (2008) by setting $\sigma = 8$.

[3] Novy (2008) finds that the percentage change of trade costs over time using GDP in the calculation is similar to those computed with gross output. Novy (2008) also shows high correlation between gross output and GDP, which makes GDP as a proxy of gross output still theory consistent. Novy (2008) notes however that using GDP data overstates intranational trade and thus the level of trade costs because GDP includes (non-tradable) services.

share of services in GDP.[4] T_{ij}, referred to as "comprehensive trade costs" (CTC) in the rest of the paper, is then calculated as the simple average of the upper-bound and lower-bound trade costs.

Table 2: Comparison of GDP and Gross Output based trade cost of selected countries with the United States of America (in tariff-equivalent)

Reporter::	Partner:	Upper-bound Trade Costs	Lower-bound Trade Costs	Comprehensive Trade Costs (CTC)	Novy (2009)
United States	Canada	41	21	31	25
	Germany	85	58	71	70
	Japan	80	53	66	65
	Korea	76	50	63	70
	Mexico	47	27	37	33
	United Kingdom	88	61	74	63

Table 2 provides a comparison between various trade cost calculated using GDP data and those calculated using gross output for selected developed economies by Novy (2008). Our CTC estimates are found to provide a better approximation of gross output based trade costs than simply using GDP based upper bounds trade costs.

Isolating Non-Tariff Policy-related Comprehensive Trade Costs

As we are mainly interested in non-tariff barriers to trade in the context of trade facilitation, we start by removing import tariff from our bilateral measure of comprehensive trade cost to calculate a non-tariff comprehensive trade cost (T_{ij}^{nt}). Following Anderson and van Wincoop (2004), this is done by dividing geometric average trade cost T_{ij} *by* $(1+tariff_{ij})$, where the tariff is the weighted average tariff rate of country *i* on imports from country *j*.[5] We then seek to remove the "natural" and essentially time-invariant factors affecting trade, which themselves may not be influenced by policy.[6]

[4] $x_{ii}^{for\ \tau_{ij}^{LB}} = NS(x_{ii})$, where NS is the average non-service sector share of GDP of countries in the income group to which country *i* belongs to. Income group definition follows that of the World Development Indicator database. The same applies to country *j*.

[5] CTC is an aggregate measure of import and export costs, such that the tariff of *j* on *i* are also included in it. Therefore, one could also have used the geometric average of the tariff imposed by each country in a given country-pair on each other (i.e., $(tariff_{ij}*tariff_{ji})^{1/2}$), given that T_{ij} is in theory influenced by tariffs imposed by both countries. By using only $tariff_{ij}$ to arrive at our non-tariff measure of trade cost of country *i* with country *j*, we recognize the fact that country *i* has no direct influence on the tariff of country *j*. Overall, both approaches often yield nearly identical estimates, due to the fact that tariff typically account for only about 3-6% of comprehensive trade costs when expressed in tariff equivalent terms.

[6] The importance of these "exogenous" factors have been discussed extensively in the past. See for example, Rodrick et al. (2002).

Based on the existing trade modeling literature, such factors include geographic distance between countries as well as cultural distance, such as the use of different languages.[7] Non-tariff comprehensive trade cost can therefore be modeled as follows:

$$T_{ijt}^{nt} = DISTANCE_{ij}^{\beta_1} e^{\beta_0 + \beta_2 CULT_{ij} + \varepsilon_{ijt}} \quad (2)$$

where

$DISTANCE_{ij}$ is bilateral distance in kilometers

$CULT_{ij}$ is a set of dummy variables of cultural distance, namely, CONTIG and COMLANG_OFF as defined in table 3.

Taking natural logarithm to linearize parameters, we obtain:

$$\ln(T_{ijt}^{nt}) = \beta_0 + \beta_1 \ln(DISTANCE_{ij}) + \beta_2 (CULT_{ij}) + \varepsilon_{ijt} \quad (3)$$

Equation (3) is estimated using ordinary least squares with reporter, partner and year fixed effects. The fixed-effect dummies broadly capture the characteristics (e.g., business environment, infrastructure, trade policies, etc.) of each reporter and partner countries. The model is estimated using a cross-country panel data of 92 countries covering the period 1988-2008 (see table 3). Definitions, sources and expected signs of all variables are presented in table 4.

[7] Anderson and van Wincoop (2004): "The death of distance is exaggerated"; Chen and Novy (2009); Jack, Meissner, and Novy (2008).

Table 3: Countries included in the data set

Asian and South Pacific Economies**					Middle East	Africa
East and Northeast Asia	**Southeast Asia**	**South and Southwest Asia**	**North and Central Asia**	**South Pacific**		
China Hong Kong, China Japan Korea (Rep.of) Macao, China Mongolia	Brunei Cambodia Indonesia Malaysia Myanmar* Philippines Singapore Thailand Vietnam	Afghanistan Bangladesh Bhutan India Iran Maldives Nepal Pakistan Sri Lanka Turkey	Armenia Azerbaijan Georgia Kazakhstan Kyrgyz Rep. Russian Fed. Turkmenistan	Fiji* French Polynesia* Kiribati* New Caledonia* Papua New Guinea Samoa* Tonga* Vanuatu	Israel Oman Yemen	Cameroon Lesotho Mozambique Namibia South Africa
AUS-NZL	**EU25**			**Europe-others**	**North America**	**Other America**
Australia New Zealand	Austria Belgium Cyprus Czech Rep. Denmark Estonia Finland France	Germany Greece Hungary Ireland Italy Latvia Lithuania Luxembourg	Malta Netherlands Poland Portugal Slovak Rep. Slovenia Spain Sweden United Kingdom	Bulgaria Croatia Iceland Moldova Norway Romania Switzerland	Canada Mexico United States	Argentina Bahamas Brazil Chile Colombia Dominican Rep.

Note: * denotes the countries appearing as trade partners only; **United Nations ESCAP members only.

Table 4: Definitions, Sources, Expected signs and Data Description Regression

Variable Name (in STATA)	Source	Expected Sign	Description
ln_ctc	ESCAP/TID		Natural log of comprehensive trade costs CTC (T_{ij}).
ln_ctcxtariff	ESCAP/TID		Natural log of non-tariff comprehensive trade costs (T_{ij}^{nt}).[8]
ln_dist	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 kilometers between reporting country and its trade partner.
contig	CEPII	-	Dummy variable indicating "1" if 2 countries are contiguous and "0" otherwise.
comlang_off	CEPII	-	Dummy variable indicating "1" if 2 countries share official language and "0" otherwise.

Notes:
ESCAP/TID: ESCAP Trade and Investment Division maintains a trade cost database at: http://www.unescap.org/tid/artnet/tcdb.asp.
CEPII: French Research Center in International Economics (http://www.cepii.fr).

Regression results of non-tariff comprehensive trade cost equation (3) are presented in Table 5. As shown in that table, the model is estimated for 4 different time periods, but we see no significant changes in the estimated coefficients or their individual significance over time. To further check the robustness of these results, additional models of trade costs were estimated, including one

[8] Trade-weighted effective import tariff data from WITS is used to calculate T_{ij}^{nt}. Missing bilateral tariff data in a given year is replaced with tariff data from closest prior year so as to retain as many observations as possible. As shown in Annex 2, where results with and without use ofthe prior-year tariff data are reported, this does not affect the regression results significantly.

of comprehensive trade costs with tariff as an explanatory variable, as shown in Annex 2. They confirm the significance and stability of the coefficients.

Table 5: Estimation Results of the Non-Tariff Comprehensive Trade Cost Model

Time period	1988-2008	2004-2007	2004-2005	2006-2007
Explanatory Variables				
ln_dist	0.173***	0.177***	0.176***	0.177***
	[31.59]	[30.40]	[26.72]	[26.58]
contig	-0.0601***	-0.0612***	-0.0778***	-0.0480*
	[-2.650]	[-2.641]	[-3.098]	[-1.853]
comlang_off	-0.0779***	-0.0845***	-0.0733***	-0.0879***
	[-5.605]	[-5.467]	[-3.962]	[-5.476]
Constant	-0.917***	-1.062***	-1.380***	-0.777***
	[-10.23]	[-19.90]	[-19.52]	[-9.856]
Observations	61,500	41,886	8,412	9,836
Adj. R-squared	0.735	0.742	0.730	0.761

*** p<0.01, ** p<0.05, * p<0.1

t-stat. in square brackets

Referring to equation (2), non-tariff comprehensive trade costs may be decomposed into a "natural" bilateral trade cost component $NC = DISTANCE_{ij}^{\beta_1} e^{\beta_3 CULT_{ij}}$, and a non-tariff "policy" component such that $PC^{nt} = T^{nt}/NC$. The policy component – whose value is usually between 0 and 1 - in effect mitigates the "natural" physical and language component – whose value is always above 1 and constant over time. By definition, PC^{nt} includes all trade costs other than tariff and natural costs. In particular, it includes all trade costs that can be affected by a country through non-tariff policies and measures, e.g. policies to improve logistics infrastructure and services, or simplification and automation of trade procedures, including related to meeting customs requirements and/or product quality standards.

Isolating the policy component of trade cost makes it easier to compare how effective countries have been in implementing trade facilitation policies and measures with different partners, regardless of how close they are geographically or culturally. Indeed, comprehensive trade costs between USA and Canada are likely to be much lower than those between USA and Japan simply because the territories of USA and Canada are adjacent and they have strong cultural similarities. However, lower comprehensive trade costs do not necessarily mean that USA facilitates trade with Canada more than with Japan from a policy point of view. This can only be answered by looking at

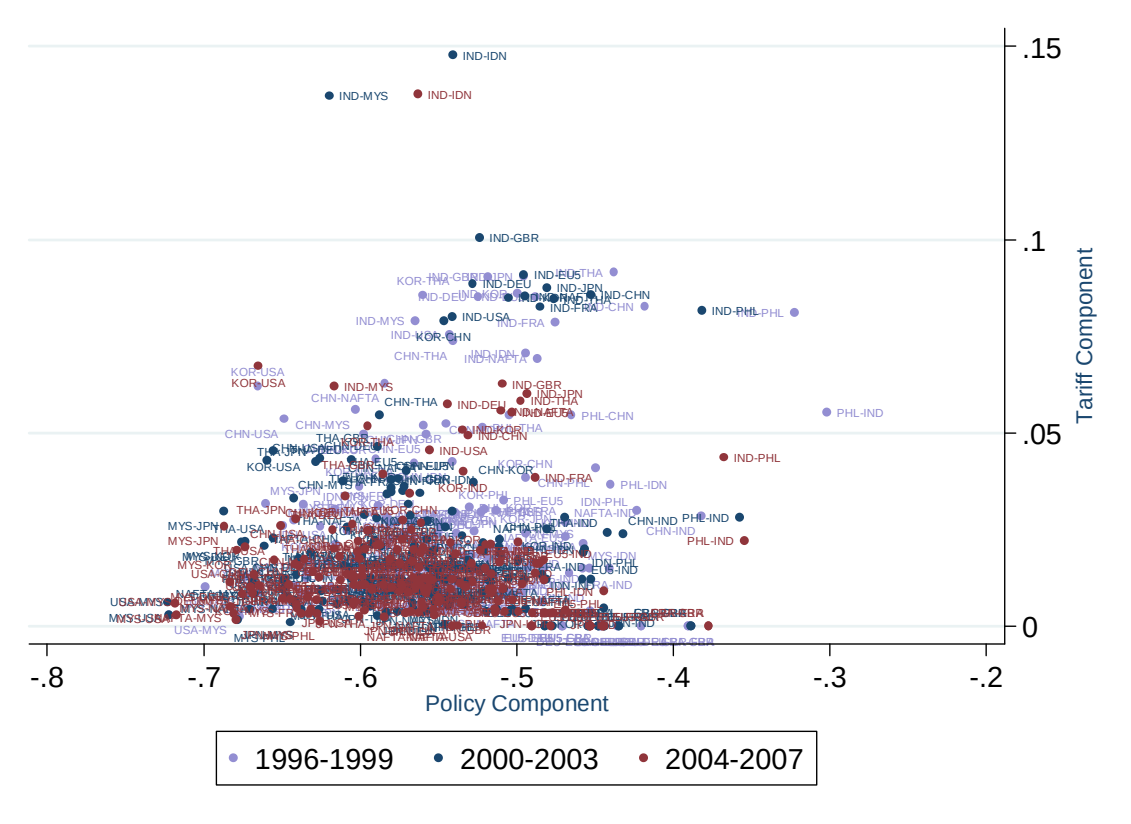
the policy component of trade cost, which we have tried to (albeit imperfectly) to isolate as explained above.

Tariff Costs versus Non-Tariff Policy-Related Trade Costs

When PC^{nt} is expressed in a tariff-equivalent form as $pc^{nt} = PC^{nt} - 1$, it takes a negative value generally ranging from -40 to -70% in our sample of countries and years. The lower the value of PC^{nt} or pc^{nt}, the more "trade facilitating" a country is. As shown in Figure 1, the non-tariff policy component pc^{nt} is large compared to tariff rates, which typically range from 3 to 9% in our sample. The figure highlights that the tariff cost, although a small part of comprehensive trade costs, have been significantly reduced between 1996-1999 and 2004-2007. The bilateral trade weighted-average effectively applied tariff rates of most countries were reduced during these two time periods to between 0 and 5%. The figure suggests relatively slower progress in addressing non-tariff issues, resulting in trade cost reduction of a similar absolute magnitude to those made through tariff cuts during the period, of about 3 to 6%. It also confirms that, although a significant part of overall trade cost reduction over the past 15 years may be attributed to tariff reduction, the scope for further reduction will depend on how effectively countries can tackle non-tariff policy-related costs.[9]

[9] New estimates of trade restrictiveness by Kee et al. (2009) also support this view.

Figure 1: Bilateral Tariff vs. Tariff-Equivalent Non-Tariff Policy-Related Trade Costs (1996-2007)*



*Policy Component refers to bilateral non-tariff policy trade cost, expressed as tariff-equivalent.

Non-Tariff Comprehensive Trade Costs: Overview and Ranking

Table 6 shows the geometric average non-tariff comprehensive trade cost of selected countries, as well as their natural and policy-related decomposition over three different time periods.[10] The trade cost values should be interpreted as an index, with a higher value indicating higher cost – over time or compared to another country. Some countries with high average natural trade costs (e.g., the United States) are able to effectively mitigate these costs through effective domestic non-tariff trade-related policies and achieve low overall trade costs. Most countries are found to have reduced their non-tariff policy-related trade costs between 1996 and 2007, although

[10] These averages are illustrative only and calculated based on trade costs of each reporting country *i* with the following 12 countries and 2 regions: China, France, Germany, India, Indonesia, Japan, Korea, Malaysia, Philippines, Thailand, United Kingdom and United States; EU5 and NAFTA. Bilateral data is available at http://www.unescap.org/tid/artnet/tcdb.asp.

they increased slightly in the Philippines and the United Kingdom; and stayed the same in India, Indonesia and the United States during that period.

Malaysia, China, the Republic of Korea and Thailand not only have some of the lowest non-tariff policy-related trade costs in our sample on average, they are also among the countries which made the most progress in reducing their trade costs over the past 15 years. Among developed economies, Germany and Japan made substantial progress in trade facilitation, achieving non-tariff comprehensive trade costs on par with those of the United States, ranked number one among developed country according to our non-tariff trade cost measure.

Table 6: Average Non-Tariff Comprehensive Trade Cost of Selected Asian Countries

Reporter	1996-1999			2000-2003			2004-2007		
	Non-Tariff CTC	Natural Trade Cost	Non-tariff Policy-related CTC	Non-Tariff CTC	Natural Trade Cost	Non-tariff Policy-related CTC	**Non-Tariff CTC**	Natural Trade Cost	**Non-tariff Policy-related CTC**
Malaysia	1.42	4.28	0.34	1.39	4.28	0.33	**1.38**	4.28	**0.33**
China	1.66	4.22	0.40	1.58	4.22	0.38	**1.53**	4.22	**0.37**
Korea, Rep.	1.63	4.28	0.38	1.65	4.28	0.39	**1.58**	4.28	**0.37**
Thailand	1.63	4.27	0.39	1.61	4.27	0.38	**1.59**	4.27	**0.37**
United States	1.71	4.85	0.36	1.71	4.85	0.36	**1.71**	4.85	**0.36**
Germany	1.79	4.42	0.42	1.77	4.42	0.41	**1.72**	4.42	**0.40**
Japan	1.77	4.39	0.41	1.75	4.39	0.40	**1.72**	4.39	**0.39**
India	1.74	4.29	0.41	1.67	4.29	0.39	**1.76**	4.29	**0.41**
Indonesia	1.83	4.45	0.41	1.85	4.45	0.42	**1.83**	4.45	**0.41**
Philippines	1.79	4.25	0.42	1.81	4.25	0.43	**1.84**	4.25	**0.43**
United Kingdom	1.85	4.35	0.44	1.86	4.35	0.44	**1.89**	4.35	**0.45**
France	1.94	4.43	0.45	1.93	4.43	0.45	**1.91**	4.43	**0.44**

The top 5 trade facilitating countries based on our non-tariff policy-related trade cost estimates are Malaysia, followed by the United States, China, Republic of Korea and Thailand.[11] Japan and Germany follow closely. The dominance of Asian countries in the ranking, even when Singapore and Hong-Kong, China could not be included for technical reasons, is fully consistent with the trade-led growth strategies of these economies and their emphasis on reducing international trade costs as evidenced by other trade facilitation performance measurements – notably the Doing Business and Logistics Performance indicators of the World Bank.

[11] See Annex 3 for a ranking of countries based on their bilateral Non-Tariff Comprehensive and Non-Tariff Policy-Related Trade Costs with Japan and other selected trade partners.

We construct an index of non-tariff trade cost performance using Japan's own trade cost performance for the 1996-99 as the base.[12] This *J-index* measures how much cheaper/expensive it is for country *i* to trade with *j* relative to Japan's own cost of trading with j in 1996-99. If J_{ijt} exceeds 100, it is more expensive for country *i* to trade than for Japan. The same concept is applied to policy-related trade costs in order to see the evolution of the J-index over time.

It is worth noting, that averages of bilateral trade costs are strongly affected by the set of partner countries considered – or for which data is available -, such that it is best to look at a country's J-index or trade cost with a specific country to understand its performance – as shown in Annex 3 and 4. That said, table 7 gives an overview of the average J-index for selected countries.[13] Malaysia, China, Republic of Korea and Thailand are found to have a non-tariff trade cost advantage over Japan; and that cost advantage has been successfully maintained over time. Japan managed to bring its trade costs to the same level as those of the USA in 2004-2007, after starting out with higher non-tariff trade costs in the late 1990's. Philippines, Indonesia and India, as well as European countries including Germany, all face higher trade costs than Japan for the sample of trading partners considered.

Table 7: Overview of Non-Tariff CTC and PC J-index [Japan (1996-1999) = 100]

	1996-1999		2000-2003		2004-2007	
	CTC^{nt} J-Index	*PC^{nt} J-Index*	*CTC^{nt} J-Index*	*PC^{nt} J-Index*	*CTC^{nt} J-Index*	*PC^{nt} J-Index*
Malaysia	79.85	83.84	77.97	81.77	77.17	80.56
China	94.58	99.05	89.65	93.84	87.23	91.20
Korea, Rep.	91.73	94.70	93.65	96.56	89.75	92.51
Thailand	93.43	97.14	91.76	95.55	90.63	94.22
Japan	**100.00**	**100.00**	**98.93**	**98.93**	**97.33**	**97.33**
United States	97.46	87.62	97.17	87.36	97.35	87.56
Germany	103.66	104.79	101.90	103.04	99.04	100.36
India	102.29	104.62	96.93	99.00	102.11	104.53
Indonesia	105.12	105.38	106.21	106.14	104.55	104.12
Philippines	101.92	106.02	103.05	107.17	104.87	109.19
United Kingdom	107.12	109.92	107.40	110.22	109.80	112.39
France	112.57	113.35	112.20	112.90	111.36	112.22

[12] $J_{ijt} = T_{ijt} / T_{JPN,j,1996–1999} \times 100$

[13] See footnote 7.

Box 1- Contribution of Natural Bilateral Barriers and Country Characteristics to Trade Costs

The model suggest that physical distance is an important factor of trade costs, with a 10% increase in distance between partner countries implying a 1.73% increase in non-tariff trade costs. Having a common border with a partner country, or having a common language, both have a significant impact on trade cost and contribute to their reduction.

Following Fields (2003), we can quantify the contribution of explanatory variables to total variation of trade costs as:

$$\kappa_h = \frac{\beta_h \operatorname{cov}(x_h, T_{ijt})}{\operatorname{var}(T_{ijt})}$$

where κ_h denote contribution (in percentage) of explanatory variable x_h to trade costs T_{ijt}
β_h denotes the estimated coefficient associated with x_h

Applying the above equation to our models and data, we find that physical distance explains about 20 to 21% of the variation in non-tariff trade costs. Contiguity of countries and common language explain an additional 1 to 1.5%. These time-invariant and policy-independent factors all together therefore account for nearly 23% of non-tariff trade costs across countries. Most interestingly, we find that behind- and at-the-border characteristics of member countries account for 51 to 55% of the variation in trade costs, and many of these characteristics may be reasonably expected to be affected through policy intervention. Results are summarized below, and available in more details in Annex 5.

Contribution of factors to variations in non-tariff policy trade costs[14]

Factors	Contribution
Distance	20.0 - 21.2%
Contiguity	0.6 - 0.9%
Common official language	0.4 - 0.6%
Total - "natural" policy-independent factors	21.1 - 22.7%
Reporter specific characteristics (importing country fixed effects)	21.7 - 24.2%
Partner specific characteristics (exporting country fixed effects)	28.7 - 30.5%
Total - reporter and partner specific characteristics	51.3 - 54.6%
Total variation explained by the Models (1 to 4)	73.5 - 76.5%
Unexplained variation (Residual)	23.5 - 26.5%

[14] Negative value of contribution is interpreted as no contribution to the variation of the dependent variable. See Fields (2003) for a detailed discussion.

Non-Tariff Policy-Related Trade Costs of ASEAN Countries (1999-2007)

Figure 2 shows the non-tariff policy component of trade costs in Indonesia, Malaysia, Philippines and Thailand with thirteen of their main trading partners. Generally, the level of trade facilitation of the 4 Asian countries was highest in trade with developed countries in 1996/99. For example, non-tariff policy- related trade costs of Malaysia during this period were 20% higher with Malaysia than with the United States or Japan. In the two most recent time periods studied however, the level of trade facilitation of ASEAN countries when trading with each other and other developing countries consistently and significantly increased, while the level of trade facilitation with developed countries stagnated, or in some cases decreased. For example, while Indonesia's policy-related trade costs decreased by 5% or more with Malaysia and Thailand since 2001, those costs increased by 2 to 3% with the European Union and the North American Free Trade Area during the same period.[15]

Overall, Malaysia has the best trade facilitation performance of all 4 ASEAN countries, followed by Thailand, Indonesia and the Philippines. The four countries generally improved trade costs with each other and China the most, with good progress also made in improving trade facilitation with India and the Republic of Korea – except in the case of Philippines.

Malaysia's lowest bilateral non-tariff policy-related trade costs are with the United States and Japan, followed by Republic of Korea and Germany. Its non-tariff policy-related trade costs are highest with Indonesia and Thailand, although major progress has been made over the past 15 years. Within ASEAN4, Malaysia is most successful in facilitating trade with Philippines, although no improvements were made between 2000-3 and 2004-7. Malaysia's level of trade facilitation with India are noteworthy – at roughly the same level as with Thailand, particularly when compared with that of other ASEAN countries with India.

Indonesia's lowest bilateral non-tariff policy-related trade costs are with Japan, the Republic of Korea and the United States, although it seems to be rapidly reaching similar levels of policy-related trade costs with China. Its non-tariff policy-related trade costs are highest with the Philippines, with only limited progress made over the past 15 years. Trade facilitation levels of Indonesia with

[15] It is worth noting that these changes in non-tariff trade costs may be attributed to policy changes in Indonesia, in the partner country, or both.

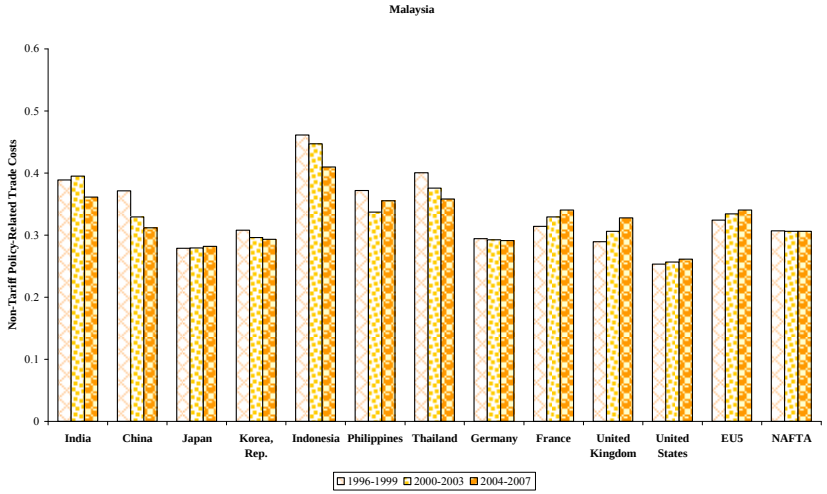
Thailand and Malaysia have increased over time and reached similar levels than those with European countries. Indonesia has made most progress in facilitating trade with Malaysia, Thailand and China.

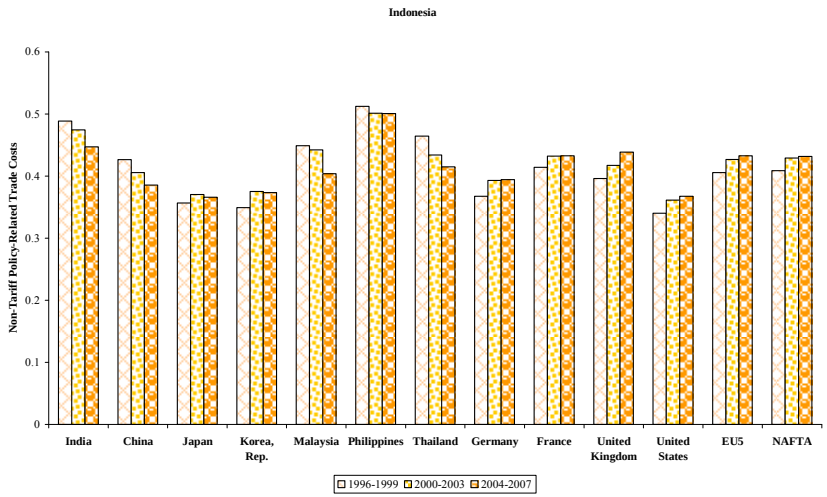
Thailand's lowest bilateral non-tariff policy-related trade costs are with Japan and the United States, followed closely by those with China. Its policy-related trade costs with Malaysia are also low, on par with those with the main European countries and lower than with the Republic of Korea. Unlike the other 3 ASEAN countries considered here, Thailand's policy-related trade costs with the United States and Europe have not worsened significantly over the past 15 years. Its progress in trade facilitation with India is also striking, although Thailand-India policy-related trade costs remain high.

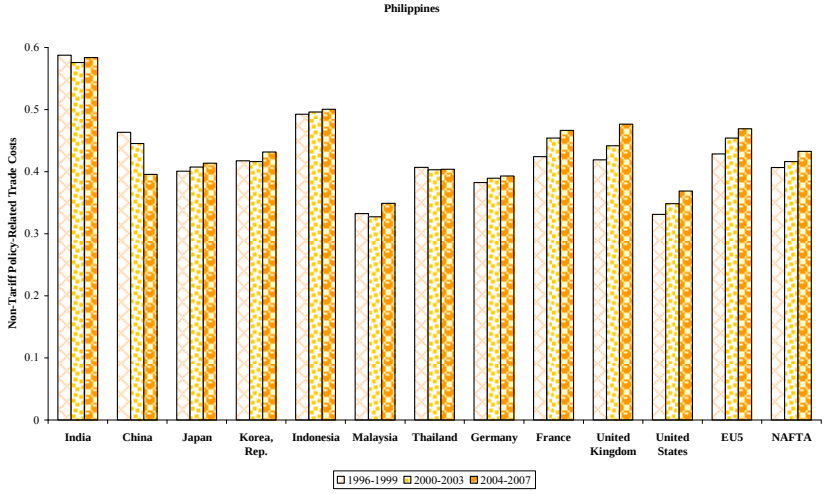
The Philippines' performance is clearly mixed. Its lowest bilateral non-tariff policy-related trade costs are with Malaysia and the United States, but those are high compared to the other ASEAN countries. Levels of trade facilitation of Philippines have stagnated or worsened with all thirteen countries in Figure 2 but with China and Thailand. Policy-related trade costs with India are also strikingly high, both relative to the trade costs of other ASEAN countries with India and to the trade costs of the Philippines with other countries from the region. Some of these results warrant more detailed investigation to verify and explain them.[16] At the same time, there have been reports that trade procedures in the Philippines, after having improved in the late 1990s as computerization and automation initiatives were implemented, subsequently worsened.[17]

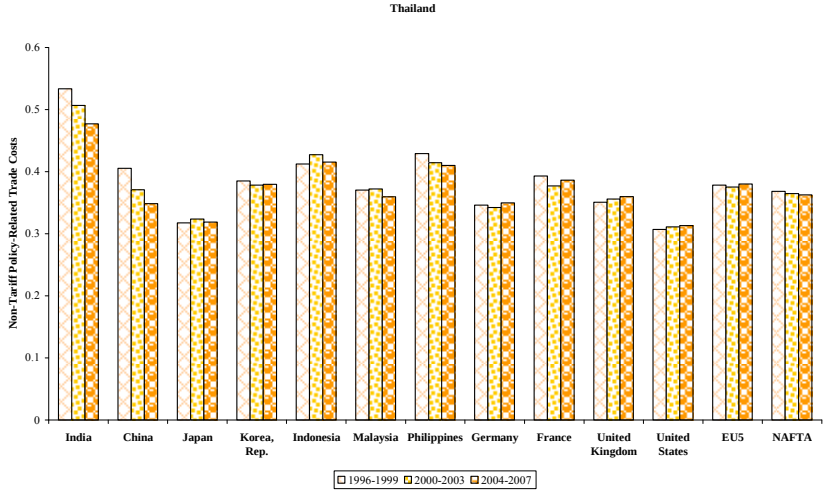
[16] Some of the reasons behind the lack of India-Philippines trade were discussed by Avrekha Sharma, Indian Ambassador to Philippines (see http://www.rediff.com/money/2005/oct/31inter.htm). India and the Philippines signed a bilateral trade agreement in 2007 to address some of these issues (see http://www.indiadaily.org/entry/india-philippines-sign-nine-agreements-to-boost-bilateral-trade/).
[17] De Dios, Loreli (2010; page 241), citing Abrenica and Tecson (2003).

Figure 2: Non-Tariff Policy-related Trade Costs of 4 ASEAN Countries with Selected Trade Partners







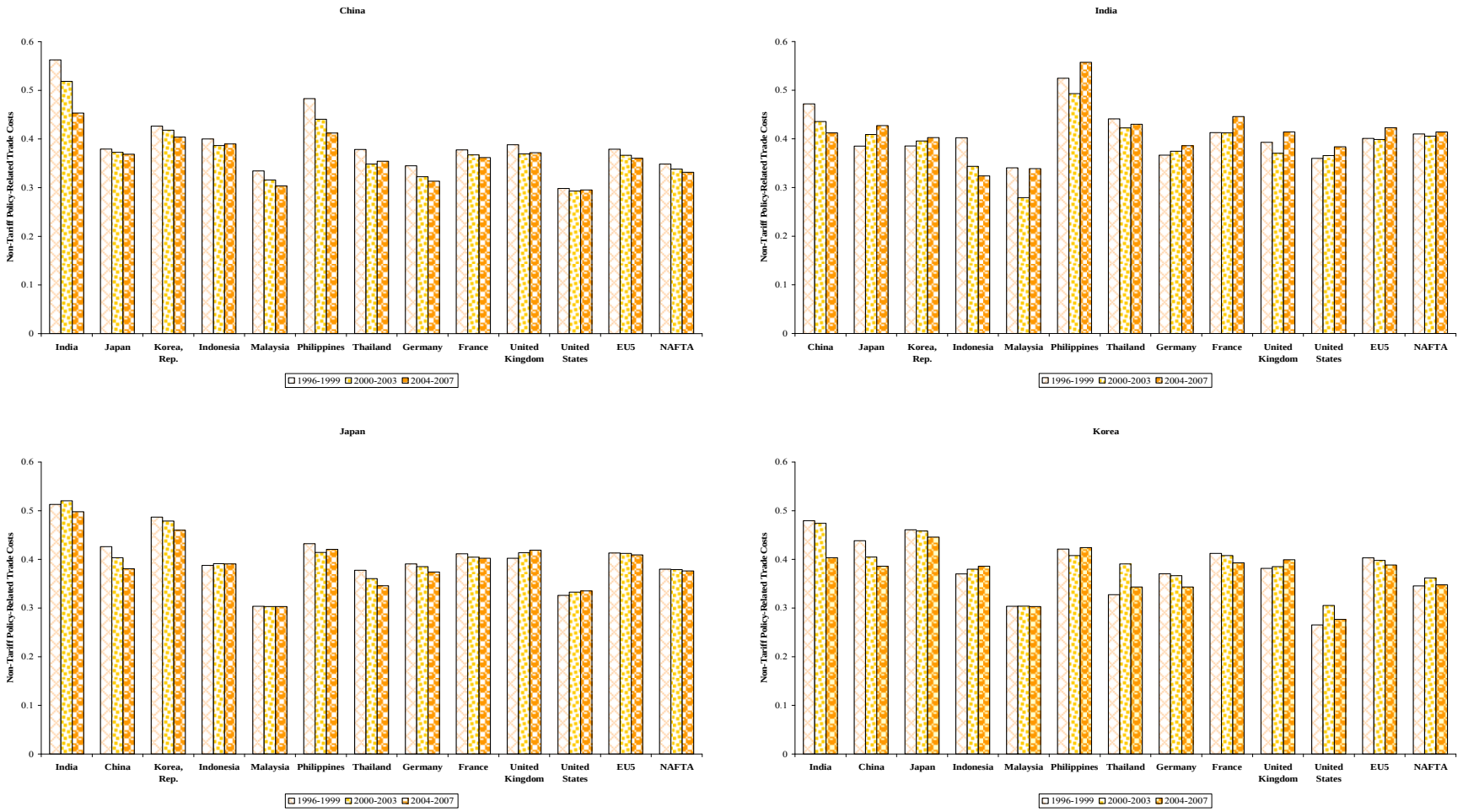


Non-Tariff Policy-Related Trade Costs of China, India, Japan, and Republic of Korea (1999-2007)

It is interesting to compare trade costs of the largest economies in Asia, particularly since they are at different stages of development. China impressively managed to reduce its trade costs with all of the 13 partner economies considered in Figure 3 over the last 10 years. Japan did so with 9 of the economies, Republic of Korea with 6, and India with only 4 of them.

Overall, China, Republic of Korea and Japan are found to have achieved similar levels of trade facilitation, with India lagging behind. India made most progress in reducing its trade costs with Indonesia and China. Figure 3 shows that the Republic of Korea has achieved a high level of trade facilitation with India compared with those achieved by both China and Japan. Non-tariff policy related trade costs between Japan and India have seen little improvements over the last 10 years, but those between China and India have decreased significantly.

Figure 3: Non-Tariff Policy-Related Trade Costs in East Asia and India



Which Policies Affect Non-tariff Policy-related Trade Costs Most?

As described earlier, we now have a measure of non-tariff policy-related trade costs. Based on Equation (2), that bilateral trade cost measure includes all costs related to factors other than bilateral cultural and physical distance between countries. In particular, it includes trade costs related to country-specific characteristics of importers and exporters, many of which can be influenced by a wide range of policies, notably those related to logistics and ICT infrastructure and services development, business environment, exchange rates, and including those affecting the cost of moving goods to and from the factory to the nearest sea port - including preparation of documents and inland transportation – and then onward to their final destination. In this section, we construct a simple model to test which of these policies may affect non-tariff policy-related trade costs the most.

The following double-log model of non-tariff policy-related trade costs is specified:

$$\ln(PC_{ijt}^{nt}) = \alpha_0 + \alpha_1 \ln(LSCI_{it}) + \alpha_2 \ln(INTNET_{it}) + \alpha_{3-5} DOINGBIZ_{it} + \alpha_6 \ln(MISALIGN_{it}) + \alpha_7 \ln(MCOST_{it})$$
$$+ \delta_1 \ln(LSCI_{jt}) + \delta_2 \ln(INTNET_{jt}) + \delta_{3-5} DOINGBIZ_{jt} + \delta_6 \ln(MISALIGN_{jt}) + \delta_7 \ln(XCOST_{jt}) + \varepsilon_{ijt}$$

where

$LSCI_t$	Liner shipping connectivity index (maximum value in 2004 = 100)	
$INTNET_t$	Number of internet users per 100 inhabitants	
$DOINGBIZ_t$	Ease of Doing business indicators, which consist of	
	$CREDITINF_{it}$	Getting Credit: Depth of credit information index (0-6)
	$DISC_{it}$	Protecting Investors: Extent of disclosure index (0-10)
	$CONT_{it}$	Enforcing Contracts: Procedures (number of steps)
$MISALIGN_t$	Undervaluation (-) or overvaluation (+) of currency against US Dollar (1 + %)	
$MCOST_{it}$	Cost to import (from ship deck to warehouse; US$ per container)	
$XCOST_{jt}$	Cost to export (from factory to ship deck; US$ per container)	

The Liner Shipping Connectivity Index (LSCI) is chosen as a proxy of trade infrastructure and services, since over 80% of international trade still takes place via sea ports (See Box 2). Inland transport and logistics services necessary to bring goods to or from the border or the sea port is modeled using the cost to import and cost to export indicators from the World Bank annual Doing

Business Reports. These two variables also account for the cost of preparing the relevant trade documents and clearing Customs – therefore also covering trade facilitation in its most narrow sense.

The quality and transparency of the business environment in both the importing and exporting countries are also included in the model, as an increasing number of studies have shown that they significantly affect trade flows. Building on prior work by Duval and Utoktham (2010b), indicators covering three important areas of business regulations - credit, investment, and rule of law - are included. [18]

Given the growing importance of information and communication technologies in trade and trade facilitation, we also include the number of internet users in the model as a proxy of the availability and ease of access to such technologies.[19] Finally, taking into account the current debate on under- and overvaluation of currencies and their effect on international trade, we also include this factor in the model (see Box 3). Definitions, data sources and expected signs of all variables are presented in table 8.

The model is estimated using ordinary least-square with time fixed effects using a panel data set of 92 countries for the period 2004-2007. A longer time period could not be used due to limited availability of data on regulatory and infrastructure indicators included in the model. To check the robustness of the results, the model was also run by (a) keeping the reporting country variables and replacing partner country variables by a partner dummy/fixed effect and (b) keeping the partner country variables and replacing the reporting country variables with a reporter dummy/fixed effect. Estimation results are presented in table 9.

[18] The choice and nature of these indicators are discussed in details in Duval and Utoktham (2010b).
[19] See the result of the Phase II ARTNeT study (ESCAP, 2010) for a discussion of the impact of information technology in trade facilitation on small and medium-sized enterprises.

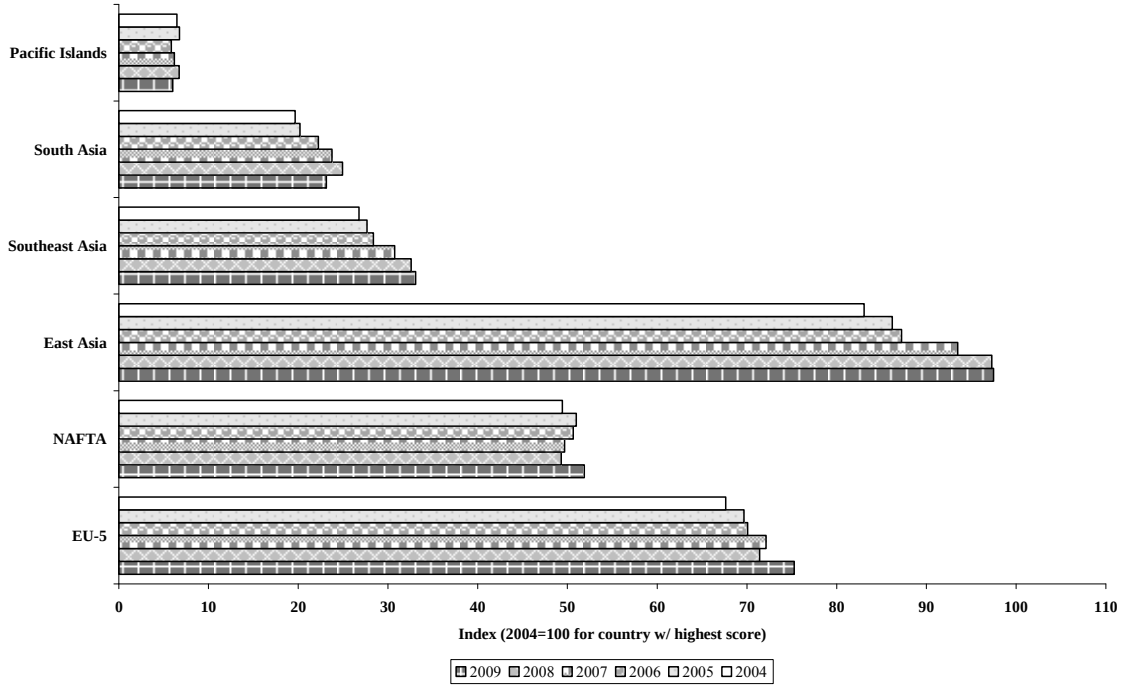
Box 2- Liner Shipping Connectivity Index (LSCI): An Overview

UNCTAD[20] has developed LSCI in order to reflect overall improvement in maritime connectivity of a country. The LSCI index is composed of the following five quantitative indicators: (a) number of ships providing services to and from a country, (b) combined TEU (20-foot equivalent unit: standard size container) carrying capacity of these ships, (c) number of services provided, (d) number of liner companies providing these services, and (e) maximum vessel size available in a country. These four indicators together provide a comprehensive view of the maritime services available, and the implied quality of the port infrastructure. Higher values of LSCI indicate better maritime connectivity and efficiency.

The figure below show the evolution of the LSCI for selected Asia-Pacific and other world subregions from 2004 to 2009. East Asia, and China in particular, has the highest port connectivity, ahead of countries of the European Union and North America. East Asia also made the most improvements over the period considered.

South-East Asia has achieved good port connectivity overall, although it remains significantly lower than East Asia on average due to the inclusion of Least Developed Countries. The largest economies in ASEAN indeed have better LSCI scores than many developed countries. In contrast, most South Asian economies still lag behind, although they have made significant improvements since 2004. Pacific islands countries together have the lowest liner shipping connectivity scores, with no improvements since 2004.

It is worth noting that landlocked countries are not included in the subregional averages as they have no maritime services of their own – and therefore no LSCI score.



Note: Asia-Pacific countries are classified as follows: (a) East Asia: China, including Hong Kong, Japan and Republic of Korea, (b) Southeast Asia: Brunei, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam, (c) South Asia: Bangladesh, India, Maldives, Pakistan, Sri Lanka, (d) Pacific Islands: Fiji, French Polynesia, Kiribati, New Caledonia, Papua New Guinea, Samoa, Tonga, Vanuatu.

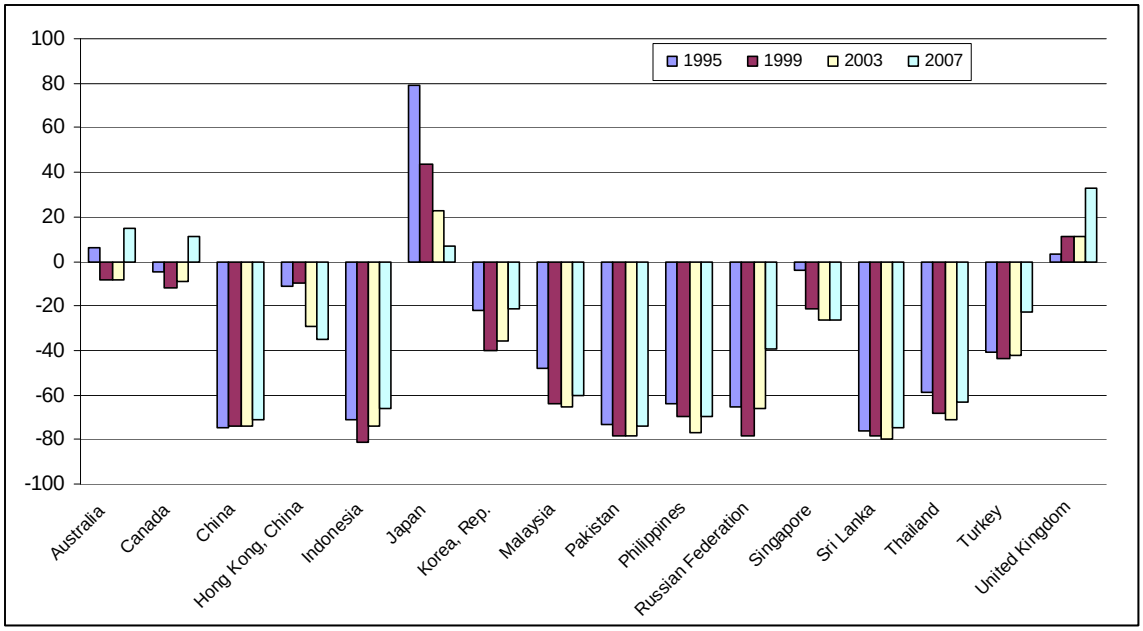
[20] The data can be found online in the World Development Indicator database maintained by the World Bank.

Box 3- Estimating Exchange Rate Misalignment

One of the basic concepts in international economics is that, in the long run, the exchange rate between two countries should really be the rate at which an identical basket of goods and services can be purchased for the same price in these two countries. One can therefore roughly estimate the undervaluation or overvaluation of a currency by measuring the difference between the actual exchange rate with the purchasing-power parity (PPP) estimates available in the Penn World Tables.[21]

The resulting exchange rate misalignment estimates suggest that most Asian developing country currencies were still significantly undervalued against the US dollars in 2007, although most of the region's currencies had strengthened since 1999 (i.e., post Asian crisis). Among the selected Asian countries presented in the figure below, China, Pakistan and Sri Lanka had the most "undervalued" currencies as of 2007, while Hong Kong, China, Republic of Korea and Singapore were least "undervalued". Japan and other developed countries in the figure have "overvalued" currencies against the US dollar as of 2007.

Exchange rate misalignment: Estimates of currency over/under valuation against the United States dollar in selected countries (%; 1995-2007)*



*Calculated as (PPP-Exchange rate)/Exchange Rate

Source: authors's own calculations

[21] The "Big Mac Index" reported regularly in The Economist is based on the same concept, but uses prices of Mac Donald "Big Mac" burgers instead of PPP estimates.

Table 8: Modeling Non-Tariff Policy-related Trade Costs: Definitions, Data Sources, and Expected Signs of Explanatory Variables

Variable Name (in STATA)	Source	Expected Sign	Description and Brief Explanation
ln_lsci	WB TI*	-	Natural log of liner shipping connectivity index (maximum value in 2004 = 100): The higher the LSCI, the better port connectivity, which implies lower trade costs.
ln_internetusers_per100ppl	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.
getloan_creditinfo	WB TI*/WB DB**	-	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.
investprotect_disclosure	WB TI*/ WB DB**	-	Protecting investors: extent of disclosure index (0-10): the more measures to protect investors (i.e., higher level of disclosure), the lower the risks, which implies lower trade (and business) costs.
contractenforce_steps	WB TI*/ WB DB**	+	Enforcing contracts: procedures (number of steps): the more steps and complicated the procedures, the more difficult to enforce contracts, which implies higher risks and higher trade costs.
ln_misalign	ESCAP/TID Trade Cost Database	+/-	Natural log of undervaluation (-) or overvaluation (+) against USD, defined as ln(1+misalignment rate), where misalignment rate is defined as (PPP - nominal exchange rate)/(nominal exchange rate). PPP[22] is acquired from Penn World Table. A country with an overvalued currency against the US dollar, will tend to have higher trade costs, although the net effect is ambiguous – since the more overvalued the currency, the higher the export cost, but the lower the import cost.
ln_importcost_usd	WB TI*	+	Natural log of Cost to import into country i (US$ per container): the higher the import cost, the higher trade costs.
ln_exportcost_usd	WB TI*	+	Natural log of Cost to export from country j (US$ per container): the higher the export cost, the higher 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

[22] Purchasing power parity (PPP) is defined as "the number of currency units required to buy goods equivalent to what can be bought with one unit of the base country". PPP in Penn World Table is calculated by the national currency value of GDP divided by the real value of GDP in international dollars. (Source: Penn World Table: http://pwt.econ.upenn.edu/php_site/pwt63/pwt63_form.php).

Table 9: Coefficient estimates of factors affecting non-tariff policy-related trade costs

Model:	(a)	(b)	(c)
Independent Variable:	PC^{nt}	PC^{nt}	PC^{nt}
Explanatory Variables			
ln_misalign1	0.110***	0.109***	
	[10.69]	[13.30]	
ln_lsci1	-0.0894***	-0.0901***	
	[-20.29]	[-24.45]	
ln_internetusers_per100ppl1	-0.0549***	-0.0603***	
	[-9.436]	[-12.74]	
getloan_creditinfo1	-0.0148***	-0.0155***	
	[-5.122]	[-6.257]	
investprotect_disclosure1	-0.00780***	-0.00776***	
	[-4.950]	[-6.227]	
contractenforce_steps1	0.00381***	0.00408***	
	[4.921]	[6.576]	
ln_importcost_usd1	0.0208**	0.0129*	
	[2.219]	[1.752]	
ln_misalign2	0.0987***		0.0983***
	[9.472]		[11.60]
ln_lsci2	-0.0973***		-0.0945***
	[-21.66]		[-24.91]
ln_internetusers_per100ppl2	-0.0650***		-0.0691***
	[-11.11]		[-14.09]
getloan_creditinfo2	-0.0249***		-0.0248***
	[-8.503]		[-9.569]
investprotect_disclosure2	-0.00940***		-0.00914***
	[-5.923]		[-7.179]
contractenforce_steps2	0.00406***		0.00437***
	[5.339]		[7.061]
ln_exportcost_usd2	0.0242**		0.0156*
	[2.434]		[1.834]
Constant	0.113	-0.309***	-0.330***
	[0.734]	[-5.086]	[-3.901]
Observations	10,123	12,229	12,188
Reporter FE	No	No	Yes
Partner FE	No	Yes	No
Year FE	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes
Adj. R-squared	0.429	0.580	0.559

*** p<0.01, ** p<0.05, * p<0.1

t-stat. in square brackets

The model performs reasonably well and can explain about half of the variations in the bilateral non-tariff policy-related trade costs in our sample. All the variables in the model are found to be significant and have the expected signs. [23] The results suggest than bilateral trade costs are most elastic to the change in exchange rate misalignment to the US dollar of the currencies of either trade partners, followed closely by change in liner shipping connectivity. The impact on trade costs of a country increasing the number of its internet users by one percent is found to be half of what may be expected from a one percent increase in liner shipping connectivity. Similarly, the impact on trade costs of a country reducing its direct behind-the-border export costs is found to be half of what may be expected from a one percent increase in internet users.

Variables with larger estimated (and statistically significant) coefficients in principle have more potential to change trade costs – in particular since they can be interpreted as elasticities in our double-log model. In practice, however, these coefficients alone are not enough to assess how a variable actually contributes to overall changes in trade costs in a given country –or sample of countries. Following Fields (2003), we therefore quantify the actual contribution of explanatory variables to total variation of non-tariff policy-related trade costs trade costs in our sample as:

$$\kappa_h = \frac{\beta_h \operatorname{cov}(x_h, PC_{ijt}^{nt})}{\operatorname{var}(PC_{ijt}^{nt})}$$

where κ_h denote contribution (in percentage) of explanatory variable x_h to PC^{nt}

β_h denotes the estimated coefficient associated with x_h

The estimated contributions are reported in table 10. We find that about 25% of the changes in non-tariff policy-related trade costs can be explained by the liner shipping connectivity index, i.e., by access to effective maritime services - and related port infrastructure. Liner shipping connectivity in the exporting country is also found to be generally more important than connectivity in the importing country in affecting bilateral trade costs in our sample. These results suggest that policies

[23] While coefficients of variables expressed in natural logarithm can readily be interpreted as elasticities, coefficients for other variables (i.e., in this model, the business environment variables) need to be interpreted in terms of a percentage change in the value of the bilateral trade cost index resulting from a one unit change in that variable. Using model (a) estimates, addition of one additional step to the contract enforcement procedure in one of the partner countries may increase the bilateral trade cost index by 0.003 to 0.004. On average, a 10% increase in the valuation of a currency against the US dollar of a given country only increase that country's overall bilateral trade cost index by 0.9 to 1.1%. Similarly, a 10% increase in a country's liner shipping connectivity index value reduces its trade cost index by 0.89 to 0.97%.

and measures aimed at developing these services should be given highest priority for implementation in those countries that want to reduce trade costs.

Table 10: Contribution of each explanatory variable to the model

Model:	(b)	(d)	(f)
Explanatory Variables			
ln_misalign1	-[24]	-	
ln_lsci1	10.56%	9.50%	
ln_internetusers_per100ppl1	3.91%	3.93%	
getloan_creditinfo1	1.60%	1.45%	
investprotect_disclosure1	1.42%	1.23%	
contractenforce_steps1	0.57%	0.57%	
ln_importcost_usd1	0.25%	0.11%	
ln_misalign2	-		-
ln_lsci2	14.26%		11.93%
ln_internetusers_per100ppl2	7.56%		6.98%
getloan_creditinfo2	4.29%		3.53%
investprotect_disclosure2	2.19%		1.78%
contractenforce_steps2	1.09%		1.05%
ln_exportcost_usd2	0.27%		0.13%
reporter fe			33.76%
partner fe		43.01%	
year fe	-	-	-
Variation Explained by the Model	43.03%	58.27%	56.20%
Residual	56.97%	41.73%	43.80%
Total	100.00%	100.00%	100.00%

The second most important factor identified in reducing trade costs, accounting for 10% of changes in non-tariff policy-related trade costs, is access and usage of information and communication technologies (ICT). In particular, the level of usage of the internet in the exporting country is found to account for 7% of bilateral trade cost changes. This implies that policies and measures aimed at enhancing ICT infrastructure and services – and their usage through, e.g., education – should receive special attention in countries that want to facilitate trade. These results are generally consistent with the results of Wilson, Mann and Otsuki (2005), although IT services were identified as the most important trade facilitation factor affecting bilateral trade flows in that study - among the four they considered –, followed by port efficiency.

[24] Following Fields (2003), negative contribution estimates are interpreted as no contribution.

The three indicators of behind-the-border business regulatory environment together also account for about 10% of the changes in non-tariff policy-related trade costs. Half of the trade cost effect is accounted for by the credit indicator, providing support for the prioritization of behind-the-border policies and measures aimed at increasing the availability of trade finance, in particular through increasing transparency and availability of information on creditworthiness of exporters and trade partners. The importance of contract enforcement, while significant, is found to have a limited effect on trade costs. This is somewhat in contrast with the past gravity-based analyses, where improving contract enforcement was found to have an important effect on bilateral trade flows.[25]

Interestingly, the direct cost of moving goods from/to factory to/from ship deck, including inland transportation, customs clearance and preparing documents is significant but found to ultimately only account for 0.5% of the variation in non-tariff policy-related trade cost overall. While the direct cost indicator used here has been used as a proxy for trade facilitation in general in gravity model exercises – due to its high correlation with other trade facilitation indicators (including trade time) - it can only reasonably be interpreted as direct trade cost in our trade cost modeling exercise. In that context, this finding is not fully surprising as these costs have been found to account for less than 1% of the value of goods in developing countries of the region.[26] The sample of countries on which our results are based also do not include landlocked countries, for which the cost of moving goods to or from a sea port located in a transit country can be extremely high.

The contribution analysis presented in table 10 finally suggests that local currency under- and overvaluation against the US dollar does not contribute to the total variation of non-tariff policy-related trade costs in our sample.[27] This may be explained by the fact that our trade cost measure is a highly aggregated measure of import and export costs - with currency overvaluation lowering import cost but increasing export cost for a given country -, as well as the fact that trade partners may be trading in local or other currencies. While this result primarily suggests that the trade cost measure used in this study is not well suited to analyzing the effect of exchange rates among countries, it also provides a useful reminder of the growing interdependence between imports and exports. Indeed, the

[25] See Duval and Uthoktham (2010) for a brief review of that literature.
[26] See ARTNeT Working Papers No. 88, 89, 92, and 93 on improving regional trade procedures in various developing countries, December 2010 onward; available at www.artnetontrade.org.
[27] In other words, the covariance of our trade cost and currency misalignment indices is negative, suggesting that the two indices tend to change in opposite directions in our sample.

significant and growing import content of exports, particularly in value-added manufactured goods, makes the net effect of a change in exchange rate on trade flows increasingly uncertain.[28]

In addition to the three model specifications reported here, a number of alternative models were estimated to check the robustness of the results, as well as to deepen our understanding of the initial results. Modeling non-tariff trade costs (by adding geographic and cultural distance variables to the model) and comprehensive trade costs (by also adding tariff to the trade cost model) confirmed the stability of the results presented here for the non-tariff policy-related trade costs.[29] Alternative explanatory variables were also used. Substituting LSCI by the World Bank Logistics Performance Index (LPI) – an index broader in scope than the LSCI and measuring the overall performance of logistics infrastructure and services in a country - did not significantly alter the results. Substituting the World Bank Doing Business behind-the-border import/export cost variable by the its export/import time variable - or by the Customs Performance component of the LPI – did not change the result that behind-the-border time and cost of procedures had a significant effect but contributed to non-tariff policy-related trade cost changes of non-landlocked countries only on the margin. This later result is somewhat in contrast with a number of earlier gravity-based studies, who have attributed large potential bilateral trade gains to reduction in the time associated with behind-the-border trade procedures. This may be explained in part by the fact that other factors – such as the ones included in this study – had been omitted from these studies.[30]

Conclusion, limitations and needs for future research

Trade facilitation performance may be affected by a wide range of policies and government actions. A database of bilateral comprehensive trade costs developed by the ESCAP Trade and Investment Division was used to evaluate the evolution of non-tariff trade costs over time in Asia, as well as to examine the importance of various determinants on such costs. Although non-tariff trade costs account for most of trade costs between countries, tariff cuts accounted for a very significant portion of trade costs reduction between 1996-99 and 2004-07. The scope for further reduction in

[28] Import content is difficult to calculate due to data constraints. However, evidence from Europe clearly point to significant increase in import contents (accounting for 42% of the export value, in the case of manufactured products). See Breda et al. (2008), or OECD (2006). See also ARTNeT Policy Brief No. 30, December 2010, by Shunli Yao on the relevance of import content for China processing exports.
[29] Results from modeling non-tariff trade costs (instead of its policy-related component) are shown in Annex 6.
[30] See for example, Djankov et al. (2008). Many of the trade facilitation, infrastructure and logistics indicators used simultaneously are often highly correlated with each other, making it hard to decisively attribute changes to one over another.

trade costs will clearly depend on how effectively countries can tackle non-tariff trade costs in the future, hence the importance of determining policy-related factors that made affect them.

Non-tariff trade costs, as defined in our study, include costs that cannot be easily (or at all) influenced by policy changes, i.e., essentially the geographic distance between countries and cultural distances. These bilateral "natural" trade costs between trade partners are found to account for nearly one third of non-tariff trade costs explained by our model, roughly the same as each partner country-specific characteristics – some of which may be altered by policy and trade facilitation measures. This clearly highlights their significance and the need for policy makers and development professionals to have realistic expectation with regard to the ability of countries with high natural trade costs to compete in the global markets for goods.

Most countries are found to have reduced their non-tariff policy-related trade costs between 1996 and 2007. Among the top trade facilitating economies are Malaysia, the United States, China, Republic of Korea and Thailand, with Japan and Germany following closely.[31] The dominance of Asian countries in the ranking is fully consistent with the trade-led growth strategies of these economies and their emphasis on reducing international trade costs.

The more detailed analysis of bilateral non-tariff policy-related trade costs suggests that, although a developing country typically faced higher such costs when trading with another developing country than with the United States or Japan as of 2007, the trade costs of that developing country with these developed countries have remained roughly unchanged since 1996. In contrast, its trade costs with other developing countries have often sharply decreased. Assuming that this catch-up phenomenon continued in ASEAN along the same trend in 2008-10, non-tariff policy-related trade costs of middle-income ASEAN countries with each other are today very similar to those they face with developed countries. A closer look at the bilateral trade costs of large Asian economies revealed that China, Republic of Korea and Japan have achieved similar levels of trade facilitation, but that India has lagged behind. China impressively reduced its trade costs with all 13 partner economies examined in our study. Non-tariff policy-related trade costs between China and India decreased significantly over the past 10 years.

The econometric analysis, aimed at determining which trade facilitation measures and policies could be most effective at reducing non-tariff policy-related trade costs, strongly suggest that

[31] Singapore and Hong-Kong, China are not included in the study.

improving port efficiency (liner shipping connectivity) and access to information and communication technology facilities are essential to reducing trade costs. This may be difficult to do in many developing countries, at least in the short-term, given the financial cost associated with the development of the required hard infrastructure. However, policies aimed at liberalizing logistics and information technology services and increasing competition among service providers should be readily considered, with a view to maximizing efficiency at any given level of hard infrastructure development. Establishment of public-private partnerships to accelerate the development of the national information technology transport and logistics infrastructure may also be actively pursued. The analysis also confirms that, given limited resources available, focusing on improving the overall business environment may be often more effective in facilitating trade than implementing soft measures solely targeted at speeding up movement of goods between factory and the port (or vice-versa). Undervaluation of the local currency against the US dollar was found to generally have a significant and positive effect on trade costs, although additional analysis showed that the actual contribution of currency misalignment to variations in trade costs across country and time was negligible as it affected import and export costs in opposite ways.

This study and the results and data presented are naturally subject to a number of limitations, some of which may be addressed in future research. First, the comprehensive bilateral trade cost measure presented in this study is by definition a highly aggregated measure. While we believe it has several advantages over other trade cost metrics available elsewhere – e.g., its theoretical foundation, its comprehensiveness, the fact that it is not based on perception data, and its availability at the bilateral level for many countries over time-, the fact that CTC is a composite of import and export costs that exist between two trading partners make interpretation of the raw measure difficult at times.[32] This trade cost measure may also be affected by the underlying composition of trade of each country, such that calculating sectoral-level trade costs may be needed in order to increase comparability of CTC across countries. Identifying alternatives to using GDP (as done here in the absence of gross output) and/or refining ways to adjust for the related measurement bias against countries with large service sectors should also be considered in future research. The possible inherent bias of the measure against countries with low internal trade costs also may deserve further attention.

[32] Although this may have made interpretation more difficult, we also avoided presenting the trade cost data in tariff-equivalent form, as we feel that the tariff-equivalent estimates may be misleading if compared with estimates in other studies using even slightly different methodologies and assumptions. Comprehensive trade costs and related measures are most useful to compare evolution of trade cost over time or across countries.

Second, non-tariff trade costs of a given country were derived from CTC by removing only the average import tariff of that country from CTC. Removing the geometric average of tariffs prevailing in the two countries for which the bilateral trade cost is calculated may be more consistent with the theoretical model on which CTC is based. Although we expect this would have only a minor impact on our trade cost estimates, future studies may adopt this alternate non-tariff trade cost specification.

Third, alternative ways to decompose non-tariff trade costs into "natural" and non-tariff policy-related trade costs may need to be explored. Estimated non-tariff trade cost elasticities of geographic and cultural distance were used for the decomposition in this study, implicitly assuming that they remained constant for any given level of trade cost and distance. In addition, we calculated the non-tariff policy-related trade costs as the residual trade cost after removing costs associated with natural country-pair specific characteristics; The non-tariff policy-related trade cost could possibly be made even more policy-related by removing the natural country-specific characteristics, e.g., whether a country is or not landlocked. Both these issues should be addressed in future work to the extent possible. Decomposing CTC in various cost components can be expected to remain challenging but is essential to deriving policy relevant implications.

Fourth, the econometric analysis presented here should be extended. Much more remains to be done in deepening our understanding of policy-related trade costs, by including additional or alternative explanatory variables to the trade cost models developed here, and by examining how these variables may contribute differently to trade costs across groups of countries or world regions. The results also do not directly apply to landlocked countries as data for some of the variables used to explain our aggregate measure of non-tariff policy-related trade costs were not available for these countries.

Finally, much remains to be done in terms of understanding and making best use of the bilateral trade cost data generated as part of this study. The size of the dataset and issues related to missing data (where bilateral trade cost data for each country is available for different years and with different partners over time) make the meaningful presentation of aggregate data particularly challenging. A unique feature of the trade cost dataset is its bilateral nature, providing new insights on bilateral and intra-(sub)regional trade facilitation. As such, development of a user-friendly online interface to download bilateral trade cost profile of individual countries may be considered.

In terms of the broader trade facilitation research agenda, the results highlighted the importance of logistics and information technology services regulation as important "soft infrastructure" issues. More research on how these sectors are regulated, and how they may best be liberalized in countries at various stages of development, is needed as part of the development of integrated trade facilitation strategies aimed at delivering significant trade cost reductions.

Bibliography

Anderson, J. E., and, van Wincoop, E. (2003), *"Gravity with Gravitas: A Solution to the Border Puzzle"*, The American Economic Review, Vol. 93, No. 1, pp. 170-192.

Anderson, J. E., and, van Wincoop, E. (2004), *"Trade Costs"*, NBER Working Paper No. 10480.

Breda, Emanuele, Rita Cappariello and Roberta Zizza (2008) "Vertical specialisation in Europe: Evidence from the import content of exports", Bank of Italy Working Papers No. 682. August. Available at: www.bancaditalia.it/pubblicazioni/econo/temidi/td08/td682_08/en_td682/en_tema_682.pdf.

Bergstrand, J. H., Egger, P., and, Larch, M. (2007), *"Gravity Redux: Structural Estimation of Gravity Equations with Asymmetric Bilateral Trade Costs"*, Journal of International Economics 2008.

Brooks, Douglas H. (2008), *"Regional Cooperation, Infrastructure and Trade Costs in Asia"*, ADB Institute Working Paper No. 123.

Brooks, Douglas and Benno Ferrarini (2010) "Changing Trade Costs between People's Republic of China and India", ADB Economics Working Paper Series, No. 203, May. Available at: http://www.adb.org/Documents/Working-Papers/2010/Economics-WP203.pdf .

Chen, Natalie, (2004), "*Intra-national versus international trade in the European Union: why do national borders matter?*" Journal of International Economics, Volume 63, Issue 1, May, Pages 93-118.

Chen, N., and Novy, D. (2009), "*International Trade Integration: A Disaggregated Approach"*, CEP Discussion Paper No. 908, January 2009, Center for Economic Performance, London School of Economic and Political Science.

Coughlin, C. C., and, Novy, D. (2009), *"Is the International Border Effect Larger than the Domestic Border Effect? Evidence from the US Trade"*, Research Paper 2009/29, Research Paper Series: Theory and Methods, University if Nottingham.

Carsten Fink & Aaditya Mattoo & Ileana Cristina Neagu (2002), "*Trade in International Maritime Services: How Much Does Policy Matter?*", World Bank Economic Review, Oxford University Press, vol. 16(1), pages 81-108, June.

De, Prabir (2006a), *"Why Trade Costs Matter?"*, Asia-Pacific Research and Training Network on Trade, Working Paper Series No. 7

_____ (2007), "*Impact of Trade Costs on Trade: Empirical Evidence from Asian Countries"*, Asia-Pacific Research and Training Network on Trade, Working Paper Series No. 27.

De, Prabir, Khan, A. R., and, Chaturvedi, S. (2008), *"Transit and Trade Barriers in Eastern South Asia: A Review of the Transit Regime and Performance of Strategic Border-Crossings"*, Asia-Pacific Research and Training Network on Trade, Working Paper Series No. 56.

Dios (de), Loreli C*., (2010) "The Impact of Information Technology in Trade Facilitation on Small and Medium Enterprises in the Philippines"*, in ESCAP, the Development Impact of Information Technology in Trade Facilitation, a Study by the Asia-Pacific Research and Training Network on Trade, ESCAP Studies in Trade and Investment Series, No. 69. Available at: http://www.unescap.org/tid/artnet/publication.asp.

Djankov, Simeon, Caroline Freund and Cong Pham (2008), "*Trading on Time*", Review of Economics and Statistics, November.

Duval, Yann, and Utoktham, C. (2010), *"Intraregional Trade Cost in Asia: A Primer"*, Trade and Investment Division, ESCAP Staff Working Paper 01/10.

_____ (2010b), *"Beyond Trade Facilitation: Impact of the Domestic Business Environment on Export Competitiveness in Asia and the Pacific"*, in ESCAP, Rising Non-tariff Protectionism and Crisis Recovery, (ST/ESCAP/2587). United Nations. Available at: http://www.unescap.org/tid/artnet/pub/tipub2587.pdf .

ESCAP (2010), The Development Impact of Information Technology in Trade Facilitation, ESCAP Trade and Investment Studies No. 69. United Nations.

Fields, G. S., (2003), *"Accounting for Income Inequality and Its Change: A New Method, with Application to the Distribution of Earnings in the United States"*, Research in Labor Economics 22, pp.1-38.

Hillberry, R., and, Hummels, D. (2005), *"Trade Responses to Geographic Frictions: A Decomposition Using Micro-Data"*, NBER Working Paper No. 11339.

Jacks, D. S., Meissner, C. M., and, Novy, D. (2006), *"Trade Costs in the First Wave of Globalization"*, NBER Working Paper No. 12602.

Jacks, D. S., Meissner, C. M., and, Novy, D. (2008), *"Trade Costs, 1870-2000"*, The American Economic Review, Vol. 98, No. 2, pp. 529-534.

Jacks, D. S., Meissner, C. M., and, Novy, D. (2009), *"Trade Booms, Trade Busts, and Trade Costs"*, NBER Working Paper No. 15267.

Kee, Hiau Looi, Alessandro Nicita and Marcelo Olarreaga (2009). "Estimating trade restrictiveness indices", Economic Journal, vol. 119, p. 172--199.

Limão, N., and, Venables, A. J. (2001), *"Infrastructure, Geographical Disadvantage, Transport Costs and Trade"*, The World Bank Economic Review, Vol. 15, No. 3, pp. 451-479.

Lozano, V. H. A., and Martin-Mayoral, F. (2009), *"Gravity and Friction: The Micro Foundations of Trade Costs"* (August 20, 2009). Available at SSRN: http://ssrn.com/abstract=1458167.

Novy, D. (2008), *"Gravity Redux: Measuring International Trade Costs with Panel Data"*, Warwick Economic Research Paper No. 861.

OECD (2006), "National Accounts and Economic Statistics - International Trade Statistics Item 7 a): Import Content of Exports" STD/NAES/TASS/ITS (2006)16, 31 August. Available at: http://www.oecd.org/dataoecd/60/7/37342897.pdf .

Pomfret, R., and, Sourdin, P. (2010), *"Trade Facilitation and the Measurement of Trade Costs"*, Journal of International Commerce, Economics and Policy, Vol. 1 No. 1 pp.145-163.

Rodrik, D., ed. (2003). "*In Search of Prosperity: Analytic Narratives on Economic Growth"*. Princeton: Princeton University Press.

Rodrik, D., A. Subramanian, and F. Trebbi (2002), *Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development,* NBER Working Paper 9305. Cambridge: NBER.

———. (2004) "*Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development",* Journal of Economic Growth 9(2): 131–165.

Shepherd, B., and Dennis, A. (2007), *"Trade Costs, Barriers to Entry, and Export Diversification in Developing Countries"*, Policy Research Working Paper 4368, The World Bank.

Shepherd, B. (2010), *"Trade Costs and Facilitation in APEC and ASEAN: Delivering the Goods?"*, in ESCAP, Rising Non-tariff Protectionism and Crisis Recovery, (ST/ESCAP/2587). United Nations. Available at: http://www.unescap.org/tid/artnet/pub/tipub2587.pdf .

Annex 1 - Derivation of Trade Cost Equation

Anderson and vanWincoop (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 country 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 country 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 term 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:

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

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

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

$$\Pi_i P_i = \left(\frac{x_{ii}/y_i}{y_i/y^w}\right)^{\frac{1}{\sigma-1}} t_{ii} \quad (3)$$

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

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

Multiply (1) and (4) together and get

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

Substitute the result from (3)

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

$$x_{ij}x_{ji} = \left(\frac{y_i y_j}{y^w}\right)^2 \left(\frac{1}{t_{ij}t_{ji}}\right)^{\sigma-1} \left(\frac{x_{ii}/y_i}{y_i/y^w}\right) t_{ii}^{\sigma-1} \left(\frac{x_{jj}/y_j}{y_j/y^w}\right) t_{jj}^{\sigma-1}$$

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

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

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

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

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

Therefore, geometric average of bilateral trade costs is defined as

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

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

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

Annex 2 – Additional Regression Results for CTC and CTC^{nt}

CTC was modeled using a standard tariff dataset downloaded from WITS, as well as using a modified version to reduce the number of missing values. Regression results for CTC^{nt} calculated using the tariff data with no missing value adjustment is also shown below (third column).

Variable Name (in STATA)	Source	Expected Sign	Description
ln_tariff_wa	WITS*	+	Natural log of trade-weighted effective import tariff applied by reporter on partner
ln_tariff_wa2	WITS	+	Natural log of trade-weighted effective import tariff applied by reporter on partner, with the application of preceding year data if current values are missing.

*World Integrated Trade Solution, Joint collaboration between the United Nations and the World Bank (http://wits.worldbank.org/witsweb).

	1988-2008		
Independent variable:	CTC	CTC	CTC^{nt}
ln_dist	0.166***	0.174***	0.165***
	[29.28]	[31.72]	[29.27]
contig	-0.0449**	-0.0608***	-0.0430*
	[-1.979]	[-2.696]	[-1.901]
comlang_off	-0.0788***	-0.0783***	-0.0791***
	[-5.742]	[-5.571]	[-5.836]
samebloc	-0.00957	-0.0107	-0.00427
	[-0.929]	[-1.044]	[-0.418]
ln_tariff_wa	0.337***		
	[10.79]		
ln_tariff_wa2		0.193***	
		[7.877]	
Constant	-0.102	-0.911***	-0.222**
	[-1.030]	[-9.682]	[-2.117]
Observations	41,746	61,500	41,746
Reporter FE	Yes	Yes	Yes
Partner FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Clustered SE	Country pair	Country pair	Country pair
Adj. R-squared	0.781	0.760	0.758

*** p<0.01, ** p<0.05, * p<0.1

t-stat. in square brackets

Coefficients on reporter, partner and year dummy are omitted

Annex 3 - Ranking of Countries based on their bilateral Non-Tariff Comprehensive and Non-Tariff Policy-Related Trade Costs with selected trade partners

Trade cost rank of:	Non-Tariff Comprehensive Trade Cost Ranking								Non-tariff Policy-related Trade Cost Ranking							
	with Japan		with China		with Germany		with United States		with Japan		with China		with Germany		with United States	
	2003	**2007**	2003	2007	2003	2007	2003	2007	2003	2007	2003	2007	2003	2007	2003	2007
Malaysia	1	**1**	2	**1**	5	8	2	**3**	1	**5**	1	**1**	1	**1**	1	**1**
China	3	**2**			10	10	5	**5**			2	**2**	9	12	3	**3**
Thailand	2	**3**	3	**4**	20	26	7	7	12	11	3	**5**	2	**2**	4	**4**
Vietnam	5	**4**	5	**3**	36	30	22	12	28	26	13	7	13	8	10	6
Korea, Rep.	4	**5**	1	**2**	26	21	4	**2**	13	24	4	**3**	34	34	2	**2**
Australia	7	**6**	9	9	48	48	24	32	6	9	10	10	4	7	14	17
Indonesia	9	**7**	15	20	49	46	31	31	23	27	18	16	10	13	12	10
Japan			4	**5**	37	36	10	8	18	21	12	8			6	**5**
United States	8	**8**	6	7	23	24			2	**1**	9	9	3	**4**		
Oman	12	**9**	39	25	68	63	58	42	41	31	68	59	16	9	49	28
Belgium	10	**10**	10	6	1	**1**	9	6	8	6	60	52	5	6	9	7
Philippines	6	**11**	13	10	41	49	13	21	29	33	14	18	21	29	7	11
Germany	11	**12**	8	8			12	10	7	8			8	11	13	8
South Africa	22	**13**	20	14	33	28	32	28	10	7	6	**4**	11	**3**	24	19
Chile	23	**14**	18	19	51	45	21	22	3	**4**	19	13	7	**5**	15	15
Russian Federation	27	**15**	11	11	16	14	29	27	19	23	20	19	29	17	23	22
Canada	15	**16**	16	17	45	42	3	**1**	11	10	21	22	12	14	52	50
New Zealand	16	**17**	29	35	52	55	34	38	15	19	11	12	17	15	28	30
Austria	19	**18**	25	24	6	**4**	30	24	22	20	40	39	19	18	32	20
Netherlands	25	**19**	19	15	4	**3**	19	13	16	12	62	62	23	20	18	13
France	20	**20**	22	22	9	9	20	20	17	15	51	54	18	19	20	18
Mexico	18	**21**	17	27	34	41	1	**4**	9	13	8	15	15	16	5	9
Pakistan	17	**22**	30	34	47	54	38	34	44	48	28	31	26	30	37	34
India	13	**23**	7	12	22	33	11	19	27	35	7	14	22	31	8	14
Hungary	26	**24**	26	23	3	**5**	28	33	24	18	17	20	24	23	27	33
Ireland	14	**25**	31	33	14	19	6	11	25	30	39	38	14	21	16	24
Brazil	24	**26**	21	16	32	29	15	18	5	**3**	5	6	6	10	11	12
United Kingdom	21	**27**	27	28	13	13	16	17	20	22	47	48	20	24	30	31
Switzerland	30	**28**	38	39	8	6	26	25	36	36	56	53	28	25	29	26
Czech Republic	38	**29**	34	30	2	**2**	39	35	34	28	31	29	37	28	39	37
Italy	28	**30**	28	26	12	12	23	26	21	17	26	24	25	26	22	25
Finland	29	**31**	14	13	30	20	35	37	14	14	38	30	32	33	35	38
Sweden	31	**32**	24	29	18	15	27	29	26	29	36	28	33	35	31	32
Spain	32	**33**	36	31	15	16	36	36	30	25	27	25	31	32	40	39
Israel	35	**34**	33	37	38	43	18	16	33	37	32	37	35	36	17	16
Colombia	37	**35**	48	38	57	53	17	15	38	16	22	21	30	27	25	23
Argentina	40	**36**	23	18	46	38	25	30	4	**2**	16	11	27	22	19	21
Bangladesh	39	**37**	43	41	53	50	44	43	53	53	24	23	48	46	26	27
Sri Lanka	33	**38**	53	56	59	58	42	45	60	58	35	32	39	44	21	29
Norway	36	**39**	41	43	31	23	41	39	40	43	45	43	38	40	41	43
Denmark	34	**40**	37	40	17	17	45	40	37	38	55	58	36	38	43	42
Slovak Republic	46	**41**	45	32	7	7	47	46	43	32	23	26	47	37	47	47
Kazakhstan	41	**42**	12	21	27	34	50	49	35	44	15	17	49	51	42	41
Poland	48	**43**	40	36	11	11	46	44	39	34	37	34	51	43	45	44
Maldives	42	**44**	68	65	67	65	51	63	68	67	64	50	42	45	36	59
Malta	43	**45**	35	44	40	47	40	48	31	40	44	55	40	42	46	52
Estonia	50	**46**	50	51	39	40	53	55	49	51	50	56	55	48	54	57
Bahamas, The	57	**47**	67	67	54	59	8	9	66	65	25	36	56	41	44	48
Dominican Republic	51	**48**	60	48	62	66	14	14	52	39	52	57	41	39	33	35
Romania	49	**49**	32	46	19	25	43	47	32	46	29	33	50	47	38	46

Trade cost rank of:	Non-Tariff Comprehensive Trade Cost Ranking								Non-tariff Policy-related Trade Cost Ranking							
	with Japan		with China		with Germany		with United States		with Japan		with China		with Germany		with United States	
	2003	**2007**	2003	2007	2003	2007	2003	2007	2003	2007	2003	2007	2003	2007	2003	2007
Turkey	44	**50**	42	42	29	27	37	41	42	42	30	27	46	49	34	36
Azerbaijan	65	**51**	47	68	56	52	66	51	50	68	42	41	65	53	66	45
Iceland	53	**52**	55	57	50	51	56	54	55	55	49	49	52	50	64	62
Croatia	45	**53**	56	54	42	37	57	60	56	52	59	64	44	54	57	61
Portugal	52	**54**	52	53	28	31	49	50	48	50	33	35	43	52	55	51
Slovenia	54	**55**	49	50	21	18	48	52	46	49	43	42	53	57	50	49
Cyprus	61	**56**	64	62	58	57	64	66	65	62	57	51	62	59	62	66
Bulgaria	56	**57**	46	47	25	32	52	57	45	47	34	40	59	60	51	54
Nicaragua	63	**58**	65	63	66	67	33	23	63	56	61	61	60	55	48	40
Greece	47	**59**	54	55	44	39	54	58	54	54	46	46	45	61	53	53
Mozambique	60	**60**	51	52	60	64	68	67	47	45	41	45	57	56	67	67
Namibia	59	**61**	59	49	64	60	65	59	51	41	54	44	54	58	68	60
Luxembourg	55	**62**	58	58	24	22	60	53	57	57	67	68	58	62	61	56
Latvia	64	**63**	61	61	43	44	59	62	61	63	53	60	64	63	59	63
Lithuania	58	**64**	57	60	35	35	55	56	58	61	48	47	61	64	56	55
Armenia	66	**65**	66	59	63	61	62	65	67	60	65	65	66	66	60	65
Moldova	67	**66**	62	66	55	56	63	64	62	66	58	63	67	65	63	64
Georgia	68	**67**	63	64	61	62	61	61	64	64	63	66	68	67	58	58
Kyrgyz Republic	62	**68**	44	45	65	68	67	68	59	59	66	67	63	68	65	68

Annex 4 - J-Index of Bilateral Non-tariff Comprehensive Trade Cost with Selected Countries ($I_{JPN,j,1996-1999} = 100$)

The J-index scores presented below show whether the Non-tariff CTC of a reporter country with a given partner country – or its natural or policy-related component - are lower or higher than that of Japan with that same partner country during the period 1996-99. For example, the table shows that India trade cost with China were 15.52% higher than those between Japan and China in 1996-99. However, by 2004-2007, India-China trade costs were only 0.98% higher than Japan-China trade costs in 1996-99. Japan-China trade costs however decreased by about 10% between 1996-97 with the related index value falling from 100 to 89.3, indicating that India-China cost in 2004-07 are still significantly (at least 10%) higher than the Japan-China non-tariff trade costs.

Reporter\Partner	Period	Data	IND	CHN	JPN	KOR	IDN	MYS	PHL	THA	DEU	FRA	GBR	USA	EU5	NAFTA
India (IND)	1996-1999	CTC^{nt}		115.52		100.79	101.19	106.08	121.56	107.91	87.55	93.79	85.02	103.47	89.01	105.65
		Natural		104.27		127.37	97.49	94.51	100.18	92.40	93.32	93.51	87.02	93.80	91.78	97.62
		Policy-related (nt)		110.79		79.13	103.80	112.24	121.35	116.78	93.82	100.31	97.70	110.32	96.96	108.07
	2000-2003	CTC^{nt}		106.60		103.49	86.38	86.90	114.25	103.37	89.39	93.67	80.11	105.11	88.64	104.64
		Natural		104.27		127.37	97.49	94.51	100.18	92.40	93.32	93.51	87.02	93.80	91.78	97.62
		Policy-related (nt)		102.24		81.25	88.61	91.95	114.05	111.87	95.80	100.17	92.06	112.06	96.49	106.83
	2004-2007	CTC^{nt}		100.98		105.33	81.43	105.51	129.21	105.28	92.14	101.31	89.58	110.33	93.91	106.80
		Natural		104.27		127.37	97.49	94.51	100.18	92.40	93.32	93.51	87.02	93.80	91.78	97.62
		Policy-related (nt)		96.85		82.70	83.53	111.65	128.98	113.93	98.74	108.34	102.94	117.63	102.29	109.07
China (CHN)	1996-1999	CTC^{nt}	95.79			84.75	101.30	98.35	110.71	94.66	85.60	89.15	93.82	91.72	89.04	92.68
		Natural	87.35			96.76	98.22	89.34	99.12	94.40	96.98	97.15	97.26	100.22	97.09	100.77
		Policy-related (nt)	109.67			87.59	103.13	110.09	111.69	100.28	88.27	91.76	96.46	91.52	91.70	91.81
	2000-2003	CTC^{nt}	88.30			83.08	97.89	93.00	100.98	87.14	80.08	86.77	89.20	90.07	86.11	89.92
		Natural	87.35			96.76	98.22	89.34	99.12	94.40	96.98	97.15	97.26	100.22	97.09	100.77
		Policy-related (nt)	101.09			85.87	99.67	104.10	101.88	92.31	82.57	89.31	91.71	89.87	88.67	89.16
	2004-2007	CTC^{nt}	77.21			80.31	98.73	89.34	94.53	88.55	77.68	85.36	89.88	90.72	84.64	88.08
		Natural	87.35			96.76	98.22	89.34	99.12	94.40	96.98	97.15	97.26	100.22	97.09	100.77
		Policy-related (nt)	88.40			83.00	100.52	100.00	95.37	93.81	80.10	87.86	92.42	90.52	87.17	87.37
Japan (JPN)	1996-1999	CTC^{nt}	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
		Natural	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
		Policy-related (nt)	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	2000-2003	CTC^{nt}	101.46	94.68		98.32	100.92	99.87	95.83	95.51	98.49	98.29	102.86	101.96	99.74	99.82
		Natural	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
		Policy-related (nt)	101.46	94.68		98.32	100.92	99.87	95.83	95.51	98.49	98.29	102.86	101.96	99.74	99.83
	2004-2007	CTC^{nt}	97.07	89.30		94.45	100.75	99.81	97.31	91.56	95.75	97.74	104.15	102.80	99.01	99.07
		Natural	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
		Policy-related (nt)	97.07	89.30		94.45	100.75	99.81	97.31	91.56	95.75	97.74	104.15	102.80	99.01	99.10
Korea, Rep. (KOR)	1996-1999	CTC^{nt}	89.93	89.83			93.97	97.54	95.13	83.61	93.41	98.78	93.57	81.56	96.20	91.55
		Natural	96.27	87.30			98.45	97.54	97.66	96.37	98.55	98.63	98.70	100.33	98.60	100.63
		Policy-related (nt)	93.42	102.90			95.44	100.00	97.41	86.75	94.79	100.15	94.80	81.29	97.56	90.94
	2000-2003	CTC^{nt}	88.95	83.00			96.43	97.73	92.18	99.74	92.39	97.71	94.44	93.96	94.88	95.87
		Natural	96.27	87.30			98.45	97.54	97.66	96.37	98.55	98.63	98.70	100.33	98.60	100.63
		Policy-related (nt)	92.40	95.07			97.94	100.19	94.38	103.49	93.75	99.07	95.69	93.65	96.22	95.26
	2004-2007	CTC^{nt}	75.71	79.09			98.04	97.39	95.84	87.63	86.55	94.14	97.93	85.14	92.71	92.12
		Natural	96.27	87.30			98.45	97.54	97.66	96.37	98.55	98.63	98.70	100.33	98.60	100.63
		Policy-related (nt)	78.64	90.60			99.58	99.85	98.14	90.93	87.82	95.45	99.22	84.86	94.02	91.54

Reporter\Partner	Period	Data	IND	CHN	JPN	KOR	IDN	MYS	PHL	THA	DEU	FRA	GBR	USA	EU5	NAFTA
Indonesia (IDN)	1996-1999	CTC^{nt}	92.67	117.19		93.30		107.21	117.03	109.22	97.18	103.71	101.92	111.71	100.81	115.57
		Natural	97.33	117.05		130.04		72.51	98.77	88.78	103.31	103.07	103.55	107.14	102.73	107.29
		Policy-related (nt)	95.22	100.11		71.75		147.86	118.49	123.03	94.06	100.63	98.43	104.27	98.17	107.71
	2000-2003	CTC^{nt}	90.05	111.52		100.20		105.62	114.53	102.01	103.87	108.25	107.35	118.73	106.07	121.29
		Natural	97.33	117.05		130.04		72.51	98.77	88.78	103.31	103.07	103.55	107.14	102.73	107.29
		Policy-related (nt)	92.52	95.27		77.06		145.65	115.96	114.90	100.55	105.03	103.66	110.82	103.29	113.05
	2004-2007	CTC^{nt}	84.87	105.97		99.76		96.54	114.46	97.63	104.26	108.35	112.91	120.75	107.49	122.07
		Natural	97.33	117.05		130.04		72.51	98.77	88.78	103.31	103.07	103.55	107.14	102.73	107.29
		Policy-related (nt)	87.20	90.53		76.71		133.13	115.88	109.97	100.92	105.12	109.03	112.71	104.66	113.78
Malaysia (MYS)	1996-1999	CTC^{nt}	70.51	91.44		80.37	85.02		83.19	79.00	76.40	77.20	73.13	82.21	79.18	86.15
		Natural	93.00	104.94		127.00	71.48		96.71	74.48	101.39	101.23	101.71	105.90	100.90	106.40
		Policy-related (nt)	75.81	87.14		63.28	118.94		86.03	106.06	75.36	76.27	71.91	77.63	78.49	80.94
	2000-2003	CTC^{nt}	71.64	81.19		77.20	82.45		75.43	74.13	75.86	81.00	77.38	83.38	81.62	85.88
		Natural	93.00	104.94		127.00	71.48		96.71	74.48	101.39	101.23	101.71	105.90	100.90	106.40
		Policy-related (nt)	77.03	77.36		60.79	115.36		78.00	99.53	74.82	80.02	76.08	78.73	80.89	80.71
	2004-2007	CTC^{nt}	65.54	76.83		76.55	75.56		79.54	70.65	75.57	83.79	82.85	84.82	83.13	85.83
		Natural	93.00	104.94		127.00	71.48		96.71	74.48	101.39	101.23	101.71	105.90	100.90	106.40
		Policy-related (nt)	70.47	73.21		60.28	105.71		82.25	94.85	74.54	82.78	81.46	80.10	82.40	80.67
Philippines (PHL)	1996-1999	CTC^{nt}	102.30	114.75		98.70	112.00	95.96		94.94	99.61	104.85	98.27	97.81	103.74	106.48
		Natural	89.26	105.44		115.14	88.16	87.57		88.06	101.82	101.75	94.37	96.28	100.05	98.96
		Policy-related (nt)	114.60	108.84		85.72	127.04	109.58		107.81	97.84	103.05	104.13	101.59	103.67	107.12
	2000-2003	CTC^{nt}	100.24	110.25		98.42	112.85	94.37		94.01	101.49	112.32	103.63	102.92	110.00	108.93
		Natural	89.26	105.44		115.14	88.16	87.57		88.06	101.82	101.75	94.37	96.28	100.05	98.96
		Policy-related (nt)	112.30	104.57		85.48	128.01	107.77		106.75	99.68	110.39	109.81	106.89	109.91	109.68
	2004-2007	CTC^{nt}	101.58	97.91		102.13	113.82	100.66		94.28	102.36	115.35	111.78	108.88	113.55	112.99
		Natural	89.26	105.44		115.14	88.16	87.57		88.06	101.82	101.75	94.37	96.28	100.05	98.96
		Policy-related (nt)	113.79	92.87		88.70	129.11	114.95		107.06	100.53	113.37	118.45	113.09	113.54	113.94
Thailand (THA)	1996-1999	CTC^{nt}	92.26	102.92		96.75	90.82	88.66	94.18		88.25	95.01	87.12	98.35	90.83	102.06
		Natural	88.69	108.16		122.39	85.36	72.65	94.86		99.56	99.51	99.95	104.42	99.23	105.07
		Policy-related (nt)	104.02	95.15		79.05	106.40	122.04	99.28		88.64	95.47	87.16	94.19	91.57	97.08
	2000-2003	CTC^{nt}	87.64	94.14		95.14	94.04	89.11	91.01		87.26	91.18	88.39	99.64	90.09	100.98
		Natural	88.69	108.16		122.39	85.36	72.65	94.86		99.56	99.51	99.95	104.42	99.23	105.07
		Policy-related (nt)	98.81	87.04		77.74	110.17	122.66	95.94		87.64	91.62	88.44	95.43	90.80	96.07
	2004-2007	CTC^{nt}	82.52	88.49		95.47	91.46	86.02	90.04		89.13	93.38	89.42	100.34	91.26	100.33
		Natural	88.69	108.16		122.39	85.36	72.65	94.86		99.56	99.51	99.95	104.42	99.23	105.07
		Policy-related (nt)	93.04	81.82		78.01	107.15	118.40	94.91		89.52	93.84	89.46	96.09	91.98	95.48
Germany (DEU)	1996-1999	CTC^{nt}	91.64	112.53		112.18	110.77	113.63	116.74	116.14		75.79	80.80	106.39	77.96	103.23
		Natural	101.10	125.42		141.26	112.11	111.62	123.79	112.38		55.16	59.96	90.36	63.95	92.89
		Policy-related (nt)	90.65	89.72		79.42	98.80	101.80	94.30	103.35		137.39	134.76	117.74	123.12	111.05
	2000-2003	CTC^{nt}	91.83	105.32		110.51	115.98	113.09	113.38	111.48		73.91	79.58	103.97	76.31	101.18
		Natural	101.10	125.42		141.26	112.11	111.62	123.79	112.38		55.16	59.96	90.36	63.95	92.89
		Policy-related (nt)	90.83	83.97		78.23	103.45	101.31	91.59	99.20		133.98	132.73	115.07	120.53	108.86
	2004-2007	CTC^{nt}	84.93	96.37		103.48	117.70	109.76	114.90	110.23		72.56	78.27	102.26	75.08	99.17
		Natural	101.10	125.42		141.26	112.11	111.62	123.79	112.38		55.16	59.96	90.36	63.95	92.89
		Policy-related (nt)	84.01	76.84		73.26	104.98	98.33	92.82	98.09		131.54	130.54	113.17	118.56	106.75

Reporter\Partner	Period	Data	IND	CHN	JPN	KOR	IDN	MYS	PHL	THA	DEU	FRA	GBR	USA	EU5	NAFTA
France (FRA)	1996-1999	CTC^{nt}	102.04	121.76		124.47	124.05	123.71	131.94	123.11	80.44		82.05	112.08	77.24	109.83
		Natural	102.10	126.62		142.48	112.72	112.31	124.67	113.20	55.59		56.27	89.84	59.92	90.21
		Policy-related (nt)	99.94	96.16		87.36	110.05	110.15	105.83	108.76	144.71		145.82	124.76	129.66	121.83
	2000-2003	CTC^{nt}	100.49	118.02		123.01	128.80	125.05	133.32	121.10	78.45		82.32	111.44	76.24	110.40
		Natural	102.10	126.62		142.48	112.72	112.31	124.67	113.20	55.59		56.27	89.84	59.92	90.21
		Policy-related (nt)	98.42	93.21		86.33	114.26	111.35	106.94	106.98	141.11		146.31	124.04	128.00	122.42
	2004-2007	CTC^{nt}	93.66	110.23		120.16	130.16	127.00	137.48	121.17	77.01		83.80	112.93	76.43	111.42
		Natural	102.10	126.62		142.48	112.72	112.31	124.67	113.20	55.59		56.27	89.84	59.92	90.21
		Policy-related (nt)	91.74	87.06		84.34	115.47	113.08	110.27	107.04	138.54		148.94	125.70	128.29	123.65
United Kingdom (GBR)	1996-1999	CTC^{nt}	87.60	128.56		114.78	117.55	112.98	120.13	120.15	83.61	79.99		105.87	82.02	105.55
		Natural	94.76	126.42		142.19	112.95	112.54	115.32	113.38	60.26	56.11		82.44	64.39	87.34
		Policy-related (nt)	92.45	101.70		80.72	104.08	100.39	104.18	105.97	138.74	142.54		128.43	128.36	120.33
	2000-2003	CTC^{nt}	88.30	118.38		116.94	123.63	119.01	119.67	117.93	82.35	80.25		107.52	81.78	105.14
		Natural	94.76	126.42		142.19	112.95	112.54	115.32	113.38	60.26	56.11		82.44	64.39	87.34
		Policy-related (nt)	93.19	93.64		82.24	109.46	105.75	103.78	104.01	136.65	143.02		130.43	127.95	119.93
	2004-2007	CTC^{nt}	86.59	113.71		119.31	132.10	125.56	130.41	118.16	80.99	81.70		109.52	82.33	106.38
		Natural	94.76	126.42		142.19	112.95	112.54	115.32	113.38	60.26	56.11		82.44	64.39	87.34
		Policy-related (nt)	91.38	89.95		83.91	116.96	111.57	113.09	104.21	134.40	145.59		132.86	128.78	121.48
United States (USA)	1996-1999	CTC^{nt}	90.61	103.67		98.45	106.13	102.22	97.54	105.75	91.39	90.82	88.04		90.87	71.57
		Natural	104.37	133.12		147.71	119.42	119.75	120.23	121.05	92.81	91.56	84.24		90.47	64.49
		Policy-related (nt)	86.81	77.87		66.65	88.87	85.36	81.12	87.35	98.48	99.20	104.50		100.52	114.88
	2000-2003	CTC^{nt}	90.43	100.81		99.37	110.37	102.23	96.21	103.60	89.05	90.40	89.23		90.80	72.22
		Natural	104.37	133.12		147.71	119.42	119.75	120.23	121.05	92.81	91.56	84.24		90.47	64.49
		Policy-related (nt)	86.64	75.73		67.27	92.42	85.37	80.02	85.58	95.95	98.73	105.92		100.47	115.82
	2004-2007	CTC^{nt}	85.89	95.10		100.03	112.73	104.08	101.27	104.10	87.85	91.61	90.88		91.53	73.01
		Natural	104.37	133.12		147.71	119.42	119.75	120.23	121.05	92.81	91.56	84.24		90.47	64.49
		Policy-related (nt)	82.29	71.44		67.72	94.39	86.91	84.23	86.00	94.65	100.05	107.88		101.29	117.08
EU5	1996-1999	CTC^{nt}	98.16	125.07		122.09	120.14	125.36	132.52	125.74	83.29	77.74	84.69	113.91	79.90	109.61
		Natural	100.41	126.80		142.72	112.58	112.18	122.84	113.11	64.57	60.04	64.69	88.95	65.34	91.04
		Policy-related (nt)	97.65	98.59		85.51	106.71	111.73	107.79	111.16	130.21	130.20	131.85	128.09	123.16	120.33
	2000-2003	CTC^{nt}	97.91	119.04		121.06	125.88	128.94	132.59	122.00	81.53	76.74	84.44	113.96	78.86	109.27
		Natural	100.41	126.80		142.72	112.58	112.18	122.84	113.11	64.57	60.04	64.69	88.95	65.34	91.04
		Policy-related (nt)	97.42	93.83		84.79	111.81	114.92	107.84	107.84	127.47	128.53	131.44	128.18	121.55	119.97
	2004-2007	CTC^{nt}	91.79	110.87		118.32	129.36	128.69	137.56	120.55	80.21	76.93	85.01	114.51	78.72	109.27
		Natural	100.41	126.80		142.72	112.58	112.18	122.84	113.11	64.57	60.04	64.69	88.95	65.34	91.04
		Policy-related (nt)	91.38	87.40		82.87	114.90	114.69	111.97	106.56	125.39	128.82	132.29	128.83	121.33	120.05
NAFTA	1996-1999	CTC^{nt}	101.36	119.46		110.76	120.93	120.86	121.18	122.80	99.22	99.53	97.99	79.97	98.17	77.11
		Natural	108.60	133.82		148.10	119.55	120.27	123.54	121.77	95.38	91.91	89.23	64.47	92.57	70.09
		Policy-related (nt)	93.17	89.18		74.76	101.13	100.44	97.78	100.80	104.06	108.54	109.70	129.04	106.17	112.61
	2000-2003	CTC^{nt}	100.02	110.02		110.46	124.94	120.64	119.07	118.28	96.07	99.18	96.47	79.60	96.88	75.88
		Natural	108.60	133.82		148.10	119.55	120.27	123.54	121.77	95.38	91.91	89.23	64.47	92.57	70.09
		Policy-related (nt)	91.96	82.19		74.57	104.48	100.29	96.09	97.11	100.84	108.27	108.22	129.00	104.87	111.26
	2004-2007	CTC^{nt}	94.92	104.26		110.90	128.88	122.05	124.62	119.47	97.46	103.72	101.65	84.95	100.64	79.38
		Natural	108.60	133.82		148.10	119.55	120.27	123.54	121.77	95.38	91.91	89.23	64.47	92.57	70.09
		Policy-related (nt)	87.41	77.89		74.87	107.78	101.44	100.64	98.07	102.18	113.00	113.71	136.22	108.79	115.84

Annex 5 - Contribution of each explanatory variables[33]

VARIABLES	1996-2007 **CTC**	1996-2007 **CTC**	1996-2007 **CTCnt**	1996-2007 **CTC nt**	1996-1999 **CTC nt**	2000-2003 **CTC nt**	2004-2007 **CTC nt**
ln_dist	22.47%	21.80%	21.16%	20.08%	20.77%	21.17%	20.40%
contig	0.67%	0.89%	0.66%	0.88%	0.79%	0.94%	0.64%
comlang_off	0.56%	0.53%	0.56%	0.51%	0.52%	0.61%	0.44%
ln_tariff_wa	1.67%						
ln_tariff_wa2		0.85%					
reporter fe	22.09%	22.85%	20.79%	21.72%	22.90%	22.70%	24.22%
partner fe	30.47%	29.13%	32.87%	30.53%	29.97%	28.65%	30.43%
year fe	-0.21%	-0.34%	-0.30%	-0.30%	0.04%	0.02%	0.00%
Variation explained by the Model	78.16%	76.12%	75.92%	73.54%	75.35%	74.47%	76.47%
Variation explained by reporter and partner fixed effect	**52.56%**	**51.98%**	**53.66%**	**52.26%**	**52.87%**	**51.35%**	**54.65%**
Residual	21.84%	23.88%	24.08%	26.46%	24.65%	25.53%	23.53%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Observations	41,746	61,500	41,746	61,500	41,886	8,412	9,836

[33] Negative value of contribution is interpreted as no contribution to the variation of the dependent variable. See Fields (2003) for a detailed discussion.

Annex 6: Robustness Check of CTC^{nt} on Time-Invariant factors and Policy Determinants

VARIABLES	CTC^{nt} w/ fixed effects	w/ partner fixed effect	w/ reporter fixed effect	without country fe
ln_dist	0.176***	0.174***	0.191***	0.175***
	[28.06]	[35.53]	[36.87]	[25.31]
contig	-0.0574**	-0.0976***	-0.0915***	-0.103***
	[-2.327]	[-4.192]	[-3.894]	[-3.875]
comlang_off	-0.0925***	-0.0627***	-0.0217	-0.0159
	[-5.968]	[-4.293]	[-1.433]	[-0.939]
ln_lsci1		-0.0903***		-0.0904***
		[-24.20]		[-20.50]
ln_internetusers_per100ppl1		-0.0587***		-0.0523***
		[-12.34]		[-8.959]
getloan_creditinfo1		-0.0158***		-0.0156***
		[-6.311]		[-5.423]
investprotect_disclosure1		-0.00771***		-0.00795***
		[-6.096]		[-4.956]
contractenforce_steps1		0.00418***		0.00407***
		[6.687]		[5.218]
ln_dxrat1		0.136***		0.0690
		[3.255]		[1.345]
ln_misalign1		0.107***		0.106***
		[12.73]		[10.22]
ln_importcost_usd1		0.0126*		0.0186**
		[1.696]		[1.997]
ln_dxrat_ij				
ln_lsci2			-0.0965***	-0.0980***
			[-25.18]	[-21.81]
ln_internetusers_per100ppl2			-0.0650***	-0.0619***
			[-13.22]	[-10.53]
getloan_creditinfo2			-0.0263***	-0.0253***
			[-10.07]	[-8.666]
investprotect_disclosure2			-0.00927***	-0.00937***
			[-7.171]	[-5.807]
contractenforce_steps2			0.00455***	0.00429***
			[7.302]	[5.596]
ln_dxrat2			0.0861**	0.0110
			[1.977]	[0.210]
ln_misalign2			0.0976***	0.0940***
			[11.35]	[8.974]
ln_exportcost_usd2			0.0137	0.0236**
			[1.615]	[2.380]
Constant	-1.013***	-0.309***	-0.507***	0.109
	[-18.47]	[-4.309]	[-5.512]	[0.674]
Observations	19,633	12,229	12,188	10,123
R-squared	0.753	0.666	0.651	0.552
Reporter FE	Yes	No	Yes	No
Partner FE	Yes	Yes	No	No
Year FE	Yes	Yes	Yes	Yes
Clustered SE	Country pair	Country pair	Country pair	Country pair
Adj. R-squared	0.751	0.663	0.648	0.551

*** p<0.01, ** p<0.05, * p<0.1

t-stat. in square brackets