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## Measuring Commodity-Level Trade Costs in Asia: The Basis for Effective Trade Facilitation Policies in the Region

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## ADB Working Paper Series on Regional Economic Integration



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Shintaro Hamanaka and Romana Domingo

No. 95 | April 2012

Asian Development Bank





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Shintaro Hamanaka<sup>+</sup> and Romana Domingo<sup>++</sup>

No. 95 | April 2012

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Asian Development Bank

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## **Abstract**

As tariffs are increasingly being reduced, trade economists and policymakers have begun to emphasize the importance of reducing non-tariff trade costs to facilitate international trade flows. However, the measurement of trade costs and transport costs, in particular, is not an easy task. For developing country policymakers, it is important to accurately understand their country's trade facilitation status (improvement as well as deterioration) at the commodity level, to be able to design appropriate trade facilitation policies. However, in reality, the majority of policymakers and researchers tend to overuse data from the World Bank's Doing Business Report, despite the fact that data on costs to export and import under its trading-across-borders component have several inherent weaknesses. In this paper, we suggest that the use of trade statistics calculated in conjunction with Doing Business data is helpful in understanding overall as well as detailed commodity-level trade costs. The two can be regarded as alternative indicators of trade efficiency, because both indicators improve when the trade transaction is streamlined. Moreover, by using trade statistics, we can compute not only long-term trade costs but also trade costs for each commodity group, unlike the case of Doing Business data where the assumption of a standardized 20-foot, 10-ton dry cargo of a country's leading export or import product is employed. Based on commodity-level trade costs, more concrete trade facilitation policies targeting specific sectors can be developed.

*Keywords:* transport costs, commodity level, trade statistics, c.i.f.–f.o.b., trade facilitation

*JEL Classification:* F13, F14, and F15





## 1. Introduction

Due to substantial reductions in tariff rates over the last 60 years, they are no longer considered the most critical tool for trade policymaking. This is especially true for many Asian countries that have significantly reduced tariff rates through trade negotiations at both the multilateral and regional levels. Using World Bank data on trade and import barriers, the average most favored nation (MFN) tariff rate in Asia declined to 8.4% in 2009 from 12.4% in 2000.<sup>1</sup> In recent studies on tariff policies in Asia, one of the striking findings has been the declining use of preferential tariffs under free trade agreements (FTAs) over time because of the considerable reduction in MFN tariff rates, and correspondingly, the preferential margin.

In contrast, there is growing consensus among trade economists and policymakers that the reduction in non-tariff-related barriers to trade is becoming increasingly important in facilitating international trade flows (Anderson and van Wincoop 2004). Some econometric literature suggests that non-tariff trade costs<sup>2</sup> are a much larger barrier to trade than tariffs (Pomfret and Sourdin 2009; Hummels 2007; and Clark, Dollar, and Micco 2004). For countries that desire to facilitate trade, the reduction of trade costs is the most important policy agenda. This is especially true for export competitiveness since some developing countries are unable to export products not because their products are uncompetitive but because trade costs are too high. This, in turn, means that international trade cannot be facilitated even if tariffs are reduced as long as the level of trade costs, including transport costs, remains high.

However, it is not easy to obtain and accurately measure the actual costs of trading goods across borders for several reasons. Trade costs have various aspects, including financial costs and time costs (Dee, Findley, and Pomfret 2008). Administrative burdens, such as paperwork for trade transactions, affect both financial and time costs, while administrative inefficiency is in itself considered to be one form of trade cost. Even if we limit our argument to financial costs, which is the focus of this paper, their measurement is not always straightforward. Financial trade costs include various types of costs, such as freight rates, insurance, as well as transit and other pre-shipment costs, for which data is hard to obtain. While econometric analyses mostly estimate the variation in and impact of a range of trade costs on trade, it is not easy to measure the actual size of trade costs, which include various costs such as transport costs. Although there are

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<sup>1</sup> Data is extracted from Ng (2010). All tariff rates are based on unweighted averages for all goods, primarily based on the United Nations Conference on Trade and Development (UNCTAD) Trade Analysis and Information System (TRAINS) database and World Trade Organization (WTO) Integrated Database (IDB) data for gap filling. The Asia average for 2009 is based on the latest available data, which include 2008 data for some countries. Available at <http://siteresources.worldbank.org/INTRES/Resources/469232-1107449512766/tar2009.xls>

<sup>2</sup> For the remainder of this paper, the term “non-tariff trade costs” will be referred to as simply “trade costs,” which includes but is not limited to transportation and handling costs (both freight and time costs), information costs, contract enforcement costs, customs clearance and technical controls, administrative and documentation fees, and behind-the-border and all other associated non-tariff-related costs in moving goods across borders. Trade policy-related barriers such as quotas, antidumping measures, countervailing duty investigations, standards and licensing requirements, embargoes and prohibitions, customs surcharges, and foreign exchange taxes and stamps are not included.

attempts to identify the impacts of various trade facilitation initiatives on trade (Wilson, Mann, and Otsuki 2005), little effort has been made to assess the status of trade facilitation per se.

The World Bank's annual release of the Doing Business Report is an annual report features the most widely used indicators on the various aspects of trading across borders, including time, number of documents, and costs. This is in spite of the fact that recent studies find that Doing Business indicators are not consistent with firm-level responses from the World Bank's Enterprises Survey, which is deemed to more accurately reflect the actual status of trade facilitation (Behar 2010). Doing Business is survey-based; its trade cost indicators are not based on actual costs. Thus, users of these indicators need to be very careful in interpreting policy implications for several reasons. First, the survey questionnaire sent to policymakers and corporate executives is based on several assumptions: most importantly, that the good being traded is a hypothetical dry cargo, 20-foot, 10-ton full container load of the country's leading import or export good worth \$20,000. Second, it covers only the domestic sector of exports and imports as ocean transport is excluded; trade is assumed to be conducted from the most populous city in the country through the main port. Third, changes in Doing Business trade costs over time are subject to exchange rate fluctuations because costs are denominated in United States (US) dollars. Despite its weaknesses, Doing Business has remained very influential and is often used as a benchmark because of its usefulness in making international comparisons.

This paper suggests that the use of trade costs calculated based on trade statistics and Doing Business data overcomes the shortcomings of relying only on Doing Business data, and is thus helpful in understanding overall and commodity-level trade costs. Statistics-based trade costs and Doing Business trade cost indicators are considered complementary as well as alternative indicators of transport costs. First, the two are complementary because the former accounts for international trade costs (e.g., transport costs) while the latter accounts for the domestic costs of trade, excluding the actual price or value of the good itself. The simplest way to obtain an overall indicator of trade costs is to add the two indicators. Second, the two can be regarded as alternatives because both indicators improve when the efficiency of the trade transaction increases, which is suggestive of the correlation between trade costs and trade efficiency. (For a detailed discussion on the complementarity and alternativity of the two indicators, see section 4). In addition, statistics-based trade costs have two distinctive strengths vis-à-vis Doing Business data. Long-term time-series data is available for statistics-based trade costs, while Doing Business data is only available beginning in 2006, and commodity-level trade costs are calculable using trade statistics.

The paper is structured as follows. The next section reviews the World Bank's measurement of trade costs as reported in Doing Business, with special reference to its compilation methodology, and points out both the strengths and weaknesses of its trade cost indicator. Section 3 explains the methodology of calculating trade costs drawn from trade statistics, which is the basis for the empirical assessment of trade costs of Asian countries conducted in the second half of this paper. Section 4 compares statistics-based trade costs and Doing Business data and considers how best to use the two types of trade cost data in a consistent manner. This section examines the "complementarity"

and “alternativity” of the two indicators. Using statistics-based trade costs, Section 5 conducts a cross-country analysis of trade costs in Asia. Section 6 provides a cross-country analysis of trade costs of specific commodities traded by developing Asian countries. Specifically, we compare trade costs for Thailand, Viet Nam, and Cambodia for textiles, footwear, and vegetable products. Section 7 concludes.

## 2. Review of Doing Business (Cost to Export per Container)

Since 2006, Doing Business has included indicators on trading across borders—accounting for the number of documents, time, and cost to import and export a standardized cargo of goods by ocean transport—in its annual reporting of quantitative indicators of regulations that enhance or constrain business activity. The most recent release is Doing Business 2011, with data collection for the report completed in June 2010 and responses to the questionnaire submitted by respondents in February 2010. Information on time, procedures, and cost were collected from survey contributors, which include local freight forwarders, shipping lines, customs brokers, port and customs officials, and banks. Exporting firms themselves do not contribute any information to Doing Business. Doing Business data is based on a detailed survey about a stylized trade transaction, wherein contributors are required to provide the value of costs in US dollars. As such, it does not provide a direct measurement of trade costs such as transport costs. The methodology used in collecting data for Doing Business’ trade across borders indicators is adopted from Djankov, Freund, and Pham (2010).<sup>3</sup>

Every official procedure for exporting and importing is recorded, which includes the contractual agreement between the two parties for the delivery of goods, including the time and cost necessary for completion. For exports, these procedures involve the packing of goods at the warehouse to departure from the port of exit. For imports, these involve the vessel’s arrival at the port of entry to the delivery of the cargo to the warehouse. The time and cost for ocean transport are not included. The cost to export or import measures domestic charges and fees made on a standardized cargo. This includes costs for all documentation, administrative fees for customs clearance and technical controls, customs broker fees, port and terminal handling fees, and inland transport. Inland transport includes loading and unloading in addition to transportation costs. The cost excludes customs tariffs and duties, as well as costs related to ocean transport. Only official costs are recorded, no bribes or other informal facilitation payments to clear the goods are included.<sup>4</sup> Payment is made by letter of credit, and the time, cost, and documents required for the issuance or advising of a letter of credit are taken into account.

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<sup>3</sup> The authors use a sample of landlocked countries to identify the effects of trade costs on trade. Export time from the border and onto the ship in neighboring countries is used, excluding all domestic time costs, as the instrument for the time of exporting since landlocked countries are small and their exports tend to constitute only a fraction of trade going through the foreign port.

<sup>4</sup> Double-checking with existing rules and regulations is conducted by Doing Business, while fees that cannot be traced to a specific written rule are not recorded. However, the extent to which survey responses to questions regarding import and export costs reflect rules and regulations on official fees and charges is not clearly stated in Doing Business.

Survey contributors provide information based on several assumptions about the business<sup>5</sup> and the traded goods (Table 1). A standardized cargo is a dry cargo, 20-foot, 10-ton full container load of goods valued at \$20,000. The good being traded is based on the country's leading export or import product, which is chosen by responders from among 6 commodity groups.<sup>6</sup> Doing Business covers time and costs associated with the domestic sector only. Trade is assumed to be conducted with the country's largest overseas trading partner via ocean transport from the most populous city through the main port. This is a critical weakness of Doing Business; the distance between the largest city and the main port may be typical of all trade in city states such as Singapore, but this is not the case in large countries such as the US. Moreover, the main port may be located in another city or even another country in the case of landlocked countries.

**Table 1: Summary of Doing Business Assumptions**

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Cargo	<ul style="list-style-type: none"> <li>• Dry cargo</li> <li>• 20-foot container</li> <li>• 10-ton container</li> <li>• Value of \$20,000</li> <li>• Leading trading item chosen from six commodity groups</li> </ul>
Trading firms	<ul style="list-style-type: none"> <li>• More than 60 employees</li> <li>• Exports comprise at least 10% of sales</li> <li>• Domestically-owned</li> </ul>
Trade routes	<ul style="list-style-type: none"> <li>• Ocean transport</li> <li>• From most populated city</li> <li>• Through the main port</li> <li>• To the country's largest overseas trading partner</li> </ul>

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Source: Authors' compilation.

These limiting assumptions make the data applicable only for the standardized case. Yet, customs procedures and other associated costs of trading across borders often vary at the disaggregated, commodity-specific level. Export or import costs may also vary depending on the country of destination or origin. These variations are not captured in Doing Business precisely because it is the standardized case that is used in collecting data on trading across borders.

Doing Business indicators' primary purpose is for international comparison. This in turn means that the indicators may not be suitable for analyzing changes across time. Doing

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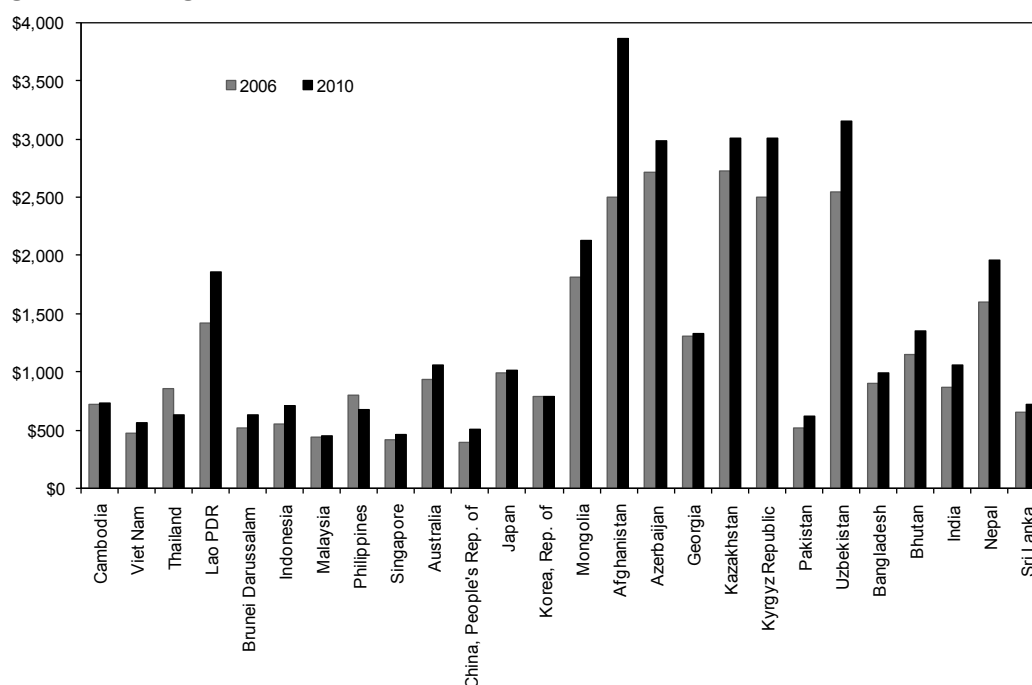
<sup>5</sup> The business is a company that employs 60 workers or more, is domestically-owned with no foreign ownership, and exports over 10% of its sales.

<sup>6</sup> The leading export or import product is limited to a choice among six commodity groups: Textiles, Apparel, and Clothing (SITC 65, 84); Coffee, Tea, Cocoa, and Tobacco (SITC 07, 12); Electrical Equipment (SITC 77); Industrial Equipment (SITC 74); Telecommunication Equipment (SITC 76); and Metal Manufactures (SITC 69). The product should not require refrigeration or any other special environment, or any special phytosanitary or environmental safety standards other than accepted international standards.

Business methodology and historical data have been revised over the years.<sup>7</sup> Although on its website data from earlier years are back-calculated to adjust for these changes in the methodology or any revisions in the data, continually changing the methodology may render the dataset unsuitable for time-series analysis. Consequently, data made available on the website differ from those found in the annual Doing Business reports.

Figure 1 compares the values of the cost to export a standard cargo of goods for most Asian countries in 2006 and 2010. Both in 2006 and 2010, countries in Central and West Asia had the highest trade costs, followed by South Asia, and lastly, East and Southeast Asia. While all Asian countries aside from Thailand and the Philippines experienced an increase in export costs from 2006 to 2010, Southeast Asia remained the region with the lowest export costs in 2010. It is also evident that landlocked countries' trade costs are much higher than those of their neighbors. In 2006, the average export cost of the 10 landlocked countries<sup>8</sup> was slightly above \$2,000, which rose to almost \$2,500 in 2010. This latest figure is \$1,700 higher than the 2010 average of export costs in other countries. Landlocked countries incur additional costs associated with the added distance and number of land borders crossed before goods reach the main seaport.

**Figure 1: Doing Business' Cost to Export of Asian Countries in 2006 and 2010**



Source: World Bank. Doing Business Historical Data Sets and Trends Data.

<sup>7</sup> See Common Misconceptions about Doing Business. Available at <http://www.doingbusiness.org/methodology/common-misconceptions>

<sup>8</sup> These include Mongolia (East Asia); Lao PDR (Southeast Asia); Bhutan and Nepal (South Asia); and Afghanistan, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, and Uzbekistan (Central West Asia). Turkmenistan is not included in the World Bank's Doing Business Report. Although Doing Business data is available for Armenia and Tajikistan, they are excluded because of problems with data quality and availability of trade statistics used to compute transport statistics for the next section.

It is interesting to note that export costs rose from 2006 to 2010. This does not seem to reflect the reforms in Asia that have been reported by Doing Business. The principal reason for this, perhaps, is the depreciation of the US dollar in the recent years. Survey contributors are queried on customs-related fees, inland transportation and handling charges, as well as other port fees valued in US dollars. All things equal, a depreciation of the US dollar can lead to survey contributors perceiving these charges and fees as rising in value.

### **3. Trade Cost Measurement using Trade Statistics**

Most studies that utilize the gravity model highlight the importance of trade costs, but these studies only estimate the impact of components of trade costs on trade, rather than provide a measure of the size of trade costs. These empirical studies usually employ the use of bilateral trade flows (reported as the difference between the import cost, insurance, and freight [c.i.f.] and export freight on board [f.o.b.] values of a traded good) in mirror analysis as a way to measure the cost of transporting goods from the importer country to the exporter country (Limão and Venables 2001; Federico and Tena 1991). Based on International Monetary Fund (IMF) Direction of Trade Statistics (DOTS) and United Nations (UN) Commission on Trade (COMTRADE) data, import c.i.f. data of the importing country and export f.o.b. data of the exporting country are used to calculate the c.i.f.– f.o.b. ratio.

However, numerous studies have shown that these mirror statistics are unreliable in assessing the magnitude of and variation in the costs of transporting goods across borders. The main limitation of using mirror statistics is the assumption that the trade volume of a good imported by a country should be equal to the trade volume of the same good exported by the country's trading partner; however, trade flows reported by importing and exporting countries never match (Pomfret and Sourdin 2010). Because mirror statistics rely on independent reports of the same trade flows, discrepancies exist beyond shipping and customs clearance costs. Ferrantino and Wang (2008) enumerate various sources of discrepancies in mirror statistics, which include but are not limited to misclassification (coding or direction misclassification); differences in rules of direction (country of origin or destination); differences in timing (time lag between reporting of export and import data); differences in type of valuation used (c.i.f. vs. f.o.b.); costs associated with currency conversion; coverage (returned goods, smuggling, general vs. special trade system); and false reporting. Matched partner c.i.f.–f.o.b. data have also been found to contain a significant amount of noise (Yeats 1978). As such, the mirror statistics method has been scrutinized as having limited use for analyzing trade costs.

An alternative approach, which also utilizes bilateral trade data in measuring trade costs, is to use import data exclusively for both c.i.f. and f.o.b. values to derive the c.i.f.–f.o.b. ratio. By using same-side c.i.f. and f.o.b. import data, inconsistencies among different statistics reported by the customs offices of partner countries, such as those related to coverage and definition of trade costs, can be reduced (Hummels and Lugovskyy 2006).

### 3.1. Methodology of Computing Statistics-Based Trade Costs

An alternative way of measuring trade costs more directly is to use trade statistics of countries that report both the c.i.f. and f.o.b. import values. By using same-side c.i.f. and f.o.b. import data, the aforementioned discrepancies between the c.i.f. import data reported by the importer and the f.o.b. export data reported by the exporter are worked out because c.i.f. and f.o.b. import data are based solely on the valuation of a single reporting agency (country). By definition, the c.i.f. value is the cost to the importer of buying the goods and bringing them into the country. It is the value of the cost of goods at the port of entry plus shipping and insurance, as declared by the importer to customs officials. The f.o.b. value is the current market value of goods in the country of origin, including all costs necessary to get these on board the ship or aircraft.

Using c.i.f. and f.o.b. import data reported by one statistical agency (same-side data), the c.i.f.–f.o.b. ratio is calculated by taking the difference between the two import values (c.i.f. and f.o.b.) and dividing this by the f.o.b. value. This yields the trade cost ratio. The formula is as follows:

$$\text{Trade cost ratio} = [ (\text{c.i.f. value} - \text{f.o.b. value}) / \text{f.o.b. value} ]$$

The formula is applied to obtain both the total trade cost ratio (sections 4 and 5) and the aggregated trade cost ratio (section 6) used in this paper. The total trade cost ratio is derived by using c.i.f. and f.o.b. import values of total import data, while the disaggregated trade cost ratio is derived by using c.i.f. and f.o.b. values of commodity-level import data (see following section).<sup>9</sup> For the disaggregated trade cost ratio, the commodity-level c.i.f.–f.o.b. ratio is calculated for each of the 21 sections as classified under the World Customs Organization's (WCO) Harmonized Commodity Description and Coding System (HS) for each year. For each country, this commodity-level ratio is derived by adding up the c.i.f. values for all commodities included under each HS section separately from the f.o.b. values first, and then calculating the c.i.f.–f.o.b. ratio by using the formula. For each 5-year period average (section 7), the 2001–2005 c.i.f. data for all included commodities are added separately from their f.o.b. values before calculating the c.i.f.–f.o.b. ratios.

### 3.2. Data

Not all countries release f.o.b. import data. In most countries' trade statistics, the export data is based on f.o.b., while the import data is based on c.i.f. Only a limited number of countries collect and publish import values in f.o.b. For example, countries such as the US, Australia, New Zealand, and several South American countries provide both c.i.f. and f.o.b. import data.

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<sup>9</sup> New Zealand trade statistics data on total imports by country of origin is less than the sum of disaggregated commodity-level import data based on the Harmonized Commodity Description and Coding System (HS) reported for each trading partner under New Zealand's Infoshare database (Harmonised Trade). Such a situation is common to all countries and New Zealand is not an exception. For the discrepancy between the total trade and the sum of disaggregated data, see Rozanski and Yeats (1994).



This study utilizes New Zealand's c.i.f. and f.o.b. (using value for duty [v.f.d.] values as a proxy) import data obtained from its Infoshare database (Statistics New Zealand). Import values in both c.i.f. and f.o.b. are available from 1988. We use New Zealand data because New Zealand is a group of islands and, therefore, all imports enter via ocean or air transport. Similar to Australia, no imports from other countries arrive by land, rail, or road so that the choice of mode of transport is less of an issue. There is also no need to control for costs associated with sharing borders with other countries. New Zealand's national statistics office provides annual c.i.f. and v.f.d. import data on all its trade partners.<sup>10</sup> Imports are all material goods that enter New Zealand from abroad and are valued in c.i.f. and v.f.d. The c.i.f. value is the cost to New Zealand of buying the goods and bringing them to the wharf side in New Zealand. The v.f.d. value is the value on which the customs duty is passed. It approximates<sup>11</sup> the f.o.b. cost of the goods in the exporting country. In this paper, the period from 2001 to 2010 is chosen because the trade volume between New Zealand and developing Asian countries covered in the study was very small in earlier years and is deemed unsuitable for calculating c.i.f.–f.o.b. ratios.

In sections 6 of this paper, total import data on selected partner countries are used, as well as 2-digit commodity-level data. The latter is classified according to the WCO's HS, which is disaggregated into 21 sections and 98 chapters. Total import data is based on the value of New Zealand imports by country of origin. Commodity-level import data is based on HS code data for all commodities classified under HS, as reported in Infoshare's Harmonised Trade, including only those commodities that have been regularly and continuously traded with selected partners on an annual basis from 2001 to 2010. Commodities with missing data for at least 1 year between 2001 and 2010 are excluded. Disaggregated c.i.f.–f.o.b. ratios are thus calculated using only those commodities with complete data for all years.

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<sup>10</sup> While other countries that provide data for both the c.i.f. and f.o.b. value of imports charge fees to access their database, New Zealand provides access to the Infoshare database at no cost.

<sup>11</sup> According to New Zealand's Customs Service, the usual method for calculating the v.f.d. of imported goods, or the customs value, is by using the transaction value, which is the actual price paid or payable for the imported goods as specified in the invoice or contract between the buyer and seller, with certain additions and deductions (based on the WTO Agreement on Customs Valuation). Additions include commissions and brokerage (preparation of documents and invoices), packing and container costs and charges, assists (materials supplied by the buyer), proceeds of resale accruing to the seller, royalties and license fees, and inland transport and freight charges paid to or for the benefit of the seller (<http://www.customs.govt.nz/features/charges/freetypes/Pages/default.aspx?s=21>). The f.o.b. value, on the other hand, is the statistical value in international merchandise trade, which is also based on the customs value. This includes the transaction value of the goods and the value of services performed to deliver goods to the border of the exporting country, which also takes into account the aforementioned additions to the actual price paid to derive the v.f.d. value of New Zealand's imported goods. Thus, the f.o.b. and v.f.d. value of imported goods are close approximates, differing only in that v.f.d. is the term used by New Zealand's Customs Services for the customs value of its imports, while f.o.b. is the term of delivery used under INCOTERMS (United Nations, 2011).

## 4. Complementarity and Alternativity of Doing Business and Trade Costs

### 4.1. Overall Trade Costs: “Domestic” plus “International” Trade Cost

Statistics-based trade costs and Doing Business export costs are complementary, because the former accounts for international trade costs (transport costs) while the latter accounts for the domestic costs of trade, excluding the actual price or value of the good itself. Under the WTO Agreement on Valuation, f.o.b.-type values include “the transaction value of the traded good and the value of services performed to deliver goods to the border of the exporting country,” while c.i.f.-type values include “the transaction value, the value of services performed to deliver goods to the border of the exporting country, and the value of services performed to deliver the goods from the border of the exporting country to the border of the importing country.”<sup>12</sup> It follows then that the gap between the two valuations in trade statistics is the value of the services performed in delivering goods from the border of the exporting country (when goods have cleared customs) to the border of the importing country. That is, this gap encompasses all costs (financial and otherwise) of international trade. Doing Business’ export costs, on the other hand, include all documentation, administrative, customs and terminal clearing, as well as inland transport and handling costs in the exporting country, which includes behind-the-border costs (financial and otherwise). Theoretically, if one considers only the financial costs of trading goods across borders, there is no overlap between the two indicators. Thus, they are complementary indicators of trade costs, with the c.i.f.–f.o.b. ratio as the measure of international trade costs, and Doing Business’ exports costs as the measure of domestic trade costs of bringing the goods to the port of exit.

Summing up the Doing Business indicator and c.i.f.–f.o.b. trade costs indicator provides a clearer picture of overall trade costs that include both domestic and international sectors. Because the units of measurement of the two indicators are different, we need to employ the assumption of a standardized cargo, which is valued at \$20,000, in order to calculate total costs. For the domestic sector, we use the Doing Business data on the cost of exporting a standardized cargo of goods (20-foot, 10-ton dry cargo valued at \$20,000). For the international sector, we derive the nominal value of the trade cost of exporting a cargo worth \$20,000 by multiplying the c.i.f.–f.o.b. ratio obtained from New Zealand trade statistics by \$20,000 (value of the standardized cargo). For example, Afghanistan’s domestic trade cost in 2010 was \$3,865, which is obtainable via Doing Business (Figure 1). Meanwhile, its international trade cost is \$1,500, because its trade cost ratio (c.i.f.–f.o.b ratio) is 0.075 in 2010 ( $0.075 * \$20,000$ ).

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<sup>12</sup> United Nations (2011).

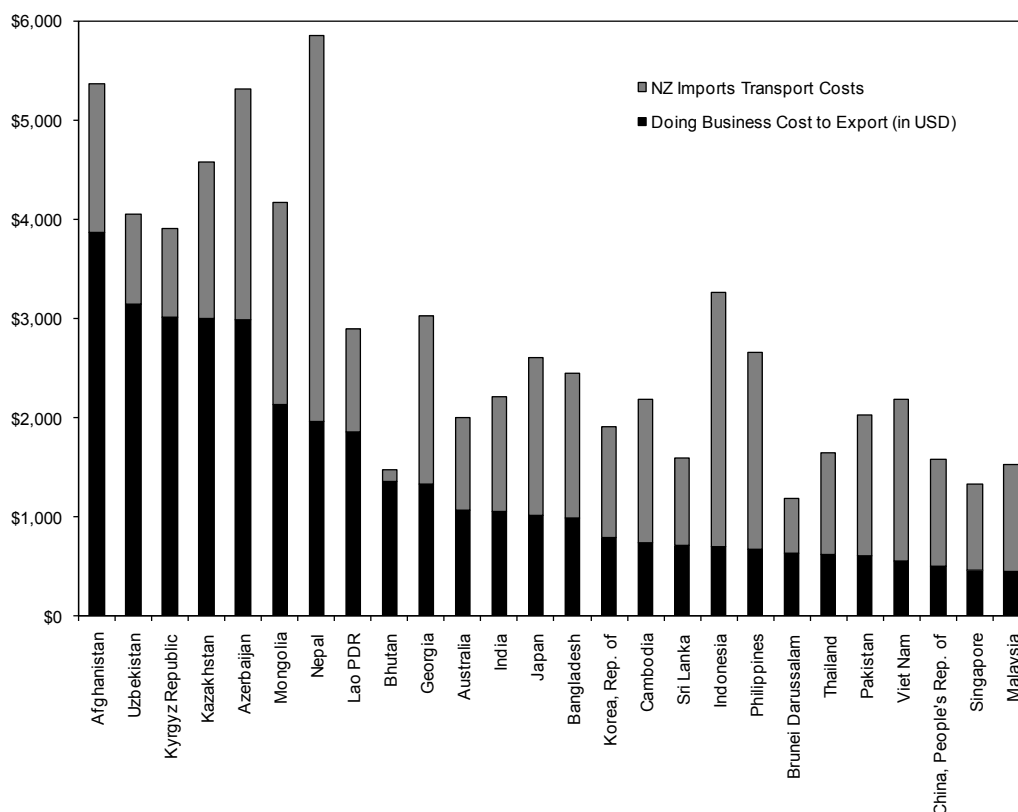
**Table 2: Comparison of Doing Business Export Costs and Statistics-Based Trade Costs**

	Doing Business	Statistics-Based Transport Cost (c.i.f.–f.o.b.)
Processes	Pre-shipment activities such as <ul style="list-style-type: none"> <li>• packing of goods in seller's warehouse;</li> <li>• inland carriage and handling;</li> <li>• terminal (port) handling, including storage if a storage period is required;</li> <li>• customs, inspections, and technical control; and</li> <li>• all other services performed until departure from port of exit.</li> </ul>	Post-customs clearance activities in exporting country such as <ul style="list-style-type: none"> <li>• the point from which the goods have already been handed over and cleared for export, and have "passed over the ship's rail at the named port of shipment" until the point where the goods have reached the point or place of importation; and</li> <li>• all other services performed to deliver goods from the border of the exporting country to the border (port) of the importing country.</li> </ul>
Costs	<ul style="list-style-type: none"> <li>• Documentation fees</li> <li>• Administrative fees for customs clearance and technical control</li> <li>• Customs broker fees</li> <li>• Terminal handling fees</li> <li>• Inland transport costs</li> <li>• Other costs of required services until departure from port of exit</li> </ul>	<ul style="list-style-type: none"> <li>• International transport (freight) costs</li> <li>• Shipping insurance charges</li> <li>• All associated loading and handling charges until the port or place of importation</li> <li>• Excludes inland transport and freight charges after the point or place of importation</li> </ul>

c.i.f. = cost, insurance, and freight; f.o.b. = freight on board.

Source: Authors' compilation based on Djankov, Freund, and Pham (2010), United Nations (2011), and Rosenow and O'Shea (2010).

It can be gleaned from Figure 2 that in 2010 countries with the highest (lowest) export costs were not necessarily the same countries with the highest (lowest) trade cost ratios. Central and West Asian countries, which generally had higher export costs in 2010, actually ranged in the middle together with other countries in terms of trade costs. The three countries that had consistently high trade costs and export costs were Nepal (highest trade costs among all countries), Azerbaijan, and Mongolia, which are all landlocked countries. The three countries that had high trade costs but ranked low in terms of export costs include Indonesia (second highest trade costs among all), the Philippines, and Viet Nam. As a region, Southeast Asian countries, which generally had lower export costs in 2010 as reported by Doing Business, did not have the lowest trade costs in 2010.

**Figure 2: Total Trade Costs to New Zealand from Asia, 2010**


c.i.f. = cost, insurance, and freight; f.o.b. = freight on board; Lao PDR = Lao People's Democratic Republic.

Source: Statistics New Zealand. Infoshare Database; World Bank. Doing Business Historical Data Sets and Trends Data.

## 4.2. Alternative Indicators of Trade Facilitation Reforms

In general, there are factors that affect trade costs of both the international and domestic sectors, and factors that affect only one of them. The streamlining of trade procedures is expected to affect the efficiency of both the international and domestic sectors (see below for details). Global economic recessions also seem to lead to the reduction of both domestic and international trade costs. However, several factors have substantial impacts on the international sector only. A modal change, such as a shift from maritime to air transport,<sup>13</sup> mainly affects the costs of the international sector, while there is no impact on the trade costs of the domestic sector as far as the Doing Business indicators are concerned.<sup>14</sup> The construction of international infrastructure (e.g., international highways) and the decline in international freight affect mainly the international sector as well. Moreover, if both c.i.f. and f.o.b. increase due to a positive price shock, the gap

<sup>13</sup> D. Hummels (2007).

<sup>14</sup> Doing Business assumes that goods are traded via ocean transport (see Table 1).

between the c.i.f. and f.o.b. declines in relative terms, which leads to a smaller c.i.f.–f.o.b. trade cost, even while there is little or no impact on domestic trade costs.<sup>15</sup> In contrast, some factors affect only the domestic sector. The fluctuation of the US dollar affects mainly the domestic sector according to Doing Business.<sup>16</sup> Domestic deregulation in, for example, logistics services also mostly reduces the domestic costs of trade, while not impacting the international sector as significantly.

**Table 3: Factors Affecting Trade Costs**

<b>Across-the-Board or Country-Specific International or Domestic Sector</b>	<b>Affecting All Countries</b>	<b>Affecting Limited Countries</b>
Factors that Affect both Doing Business Indicators and Trade Costs	<ul style="list-style-type: none"> <li>• Global recession</li> </ul>	<ul style="list-style-type: none"> <li>• Trade facilitation reform</li> </ul>
Factors that Affect Trade Costs Only	<ul style="list-style-type: none"> <li>• Changes in international freight rate</li> <li>• Price shock</li> </ul>	<ul style="list-style-type: none"> <li>• Modal shift in transport</li> <li>• Construction of international highways</li> </ul>
Factors that Affect Doing Business indicators Only	<ul style="list-style-type: none"> <li>• US dollar fluctuation (change)</li> </ul>	<ul style="list-style-type: none"> <li>• Domestic deregulation</li> <li>• US dollar fluctuation (level)</li> <li>• Methodological change in Doing Business indicators</li> </ul>

Source: Authors' compilation.

The two indicators can be regarded as alternative indicators of assessing the impact of trade facilitation reforms because both indicators improve when the efficiency of the trade transaction increases and trade procedures are simplified. When the trade transaction is streamlined, it is obvious that Doing Business' export costs will decline. Simplifying trade procedures lessens both the costs and the amount of time it takes for traded goods to reach the buyer, which is captured by Doing Business (e.g., lower cargo handling costs due to a shortened period of time). However, when trade facilitation reforms are made, the improvement in trade costs is captured not only by Doing Business, but also by trade costs as measured by the c.i.f.–f.o.b. ratio. While one may tend to consider that the c.i.f.–f.o.b. gap is only able to capture the financial side of trade costs directly, and not the time costs of international trade, time costs also affect the c.i.f.–f.o.b. gap, though indirectly, since time may also interact with other variables

<sup>15</sup> The price shock factor seems to be a very important variable in explaining the decline in transports costs of mineral products. Because the price of mineral products such as oil has increased in terms of both c.i.f. and f.o.b., the ratio of the difference between the two becomes smaller. In fact, in terms of statistics-based transport costs, the decline in transport costs of mineral products is the most significant among all sectors in recent years (see Appendix and footnote 22).

<sup>16</sup> The fluctuation of the US dollar has similar impacts on many countries as far as change is concerned, although the magnitude of the impact varies across countries depending on the initial level of trade costs.

related to cost, such as distance, choice of mode of transport, policy, and infrastructure quality (Christ and Ferrantino 2011, Pomfret and Sourdin 2010). Shipping costs may decline when trade procedures are streamlined because the idling time of freight carriers at the port of entry is lessened as well. Even if the distance to one of the importer's ports is shorter, because of port inefficiencies another port may be chosen instead, which adds costs. In effect, trade facilitation reforms are also captured by changes (worsening or improving) in trade costs as measured by the c.i.f.–f.o.b. ratio.

If the two indicators are indeed alternatives in assessing the impact of trade facilitation on trade costs, both Doing Business and statistics-based trade costs should improve due to streamlining procedures, suggesting a correlation between trade costs and trade efficiency. We direct our focus to country-specific factors, not across-the-board factors (e.g., global recession), by conducting a cross-country comparison of trade costs. In other words, if trade facilitation reform is a critical factor of change in trade costs, a good performer in one indicator should be a good performer in another indicator. However, we should be reminded that there are also country-specific factors, such as a modal shift, that affect only one of the indicators and may explain why some countries emerge as good performers in only either of the indicators.

We compare the change over time between 2006 and 2010 trade costs of 32 Asia–Pacific countries for both the cost to export in US dollars as reported by the Doing Business Report and the trade cost measure (c.i.f.–f.o.b. ratio using same-side data). Figure 3 shows whether the trend is consistent between Doing Business' export cost measure and the trade cost measure based on each country's c.i.f.–f.o.b. ratios. The upper two figures describe the absolute change between 2006 and 2010, while the lower two figures describe the percentage change in the same period. At first glance, there seems to be no trend in terms of the consistency between the two cost indicators when comparing absolute and percentage changes across Asian countries. However, if we distinguish between landlocked and non-landlocked countries, some important observations can be made. The 32 Asia–Pacific countries<sup>17</sup> are split into two groups: 10 landlocked and 22 non-landlocked. Three landlocked countries—Afghanistan, Georgia, and Azerbaijan—are deemed outliers because of the unstable status of their land borders due to political tensions. Thus, they are excluded from the analysis.<sup>18</sup>

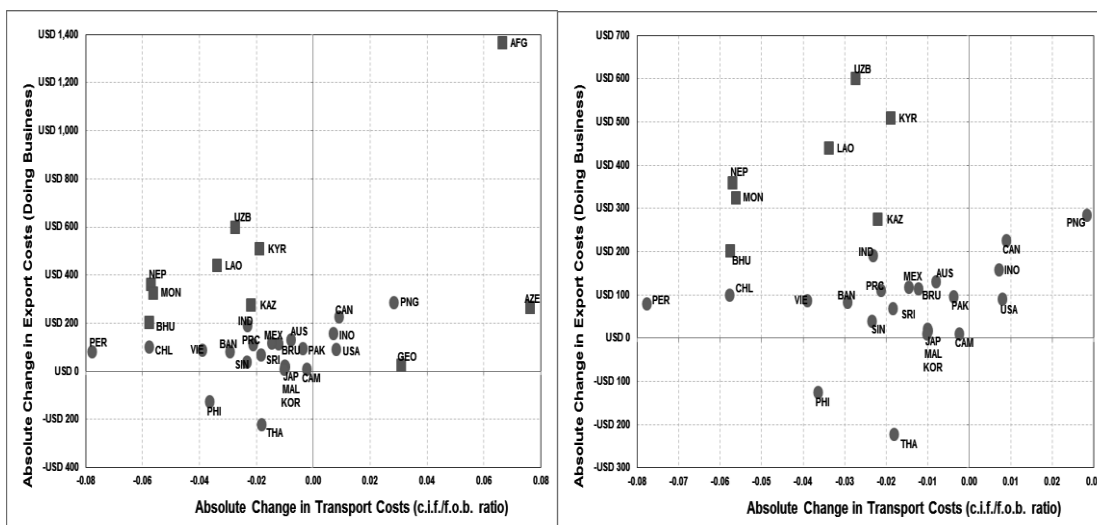
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<sup>17</sup> This includes 26 Asian countries and 6 Pacific countries (Canada, Chile, Mexico, Papua New Guinea, Peru, and the US). The 26 Asian countries are the countries analyzed in section 5 (28 Asian countries) excluding the two countries for which Doing Business data is not available (Myanmar and Armenia).

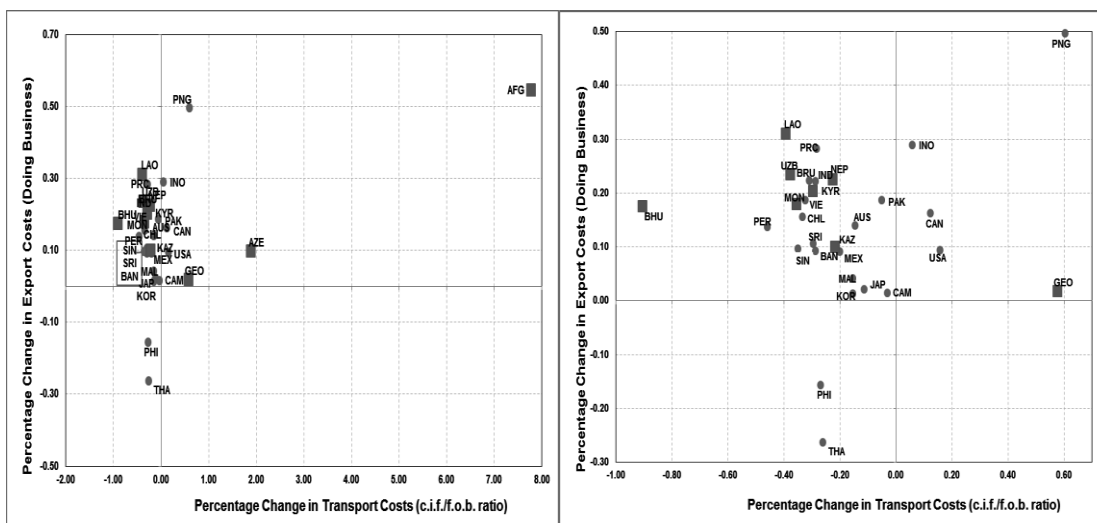
<sup>18</sup> The two are excluded from the landlocked trend line due to the unstable status of the two countries' external trade, which is not reflected substantially in the Doing Business export cost indicator. Landlocked countries conduct trade via neighboring countries that serve as transit countries for goods. In October 2006, all direct transportation links between Georgia and Russian Federation (its major trading partner) were closed by the latter, which impacted Georgia's overall external trade. Azerbaijan has had several border disputes with neighboring countries Armenia, Georgia, Iran, and Turkey in recent years.

**Figure 3: Change in Doing Business Export Costs and c.i.f./f.o.b. Ratios between 2006 and 2010**

**Absolute Changes**



**Percentage Changes**



c.i.f. = cost, insurance, and freight; f.o.b. = freight on board.  
 AFG=Afghanistan, AUS=Australia, AZE=Azerbaijan, BAN=Bangladesh, BHU=Bhutan, BRU=Brunei Darussalam, CAM=Cambodia, CAN=Canada, CHL=Chile, GEO=Georgia, IND=India, INO=Indonesia, JAP=Japan, KAZ=Kazakhstan, KOR=Republic of Korea, LAO = Lao People’s Democratic Republic, KYR=Kyrgyz Republic, MAL=Malaysia, MEX=Mexico, MON=Mongolia, NEP=Nepal, PAK=Pakistan, PER=Peru, PHI=Philippines, PNG=Papua New Guinea, PRC=People’s Republic of China, SIN=Singapore, SRI=Sri Lanka, THA=Thailand, USA=United States, UZB=Uzbekistan, and VIE=Viet Nam.  
 Note: Landlocked countries are shown as square data points, while non-landlocked countries are shown as circle data points.  
 Source: Statistics New Zealand. Infoshare Database. World Bank. Doing Business Historical Data Sets and Trends Data.

The overall trend for non-landlocked countries is that both indicators increase in terms of both absolute and percentage changes, which signifies the overall consistency between the two cost indicators.<sup>19</sup> Therefore, a good performer in terms of Doing Business' export costs is also considered a good performer in terms of reducing trade costs (statistics-based). This supports the view that the two trade cost indicators are alternative measures of improvements in trade costs due to trade facilitation. Any reform that is captured in an improvement in or lowering of Doing Business' export costs is also captured (albeit indirectly) by improvements in the c.i.f.– f.o.b. ratio, which measures the international component of trade costs.

Unlike the case of the non-landlocked country group, it is not easy to identify the trend for the landlocked country group. Looking at the absolute change, it seems that the trend is positive, which signifies the overall consistency between the two cost indicators. In this case, the distribution of data points of landlocked countries seems to imply a positively-sloped line. However, looking at the percentage change, the trend for the non-landlocked country group is unclear. Taking into account all countries, the distribution of data points of landlocked countries seems to imply a positively-sloped line. But if we exclude outliers, the distribution of data points of landlocked countries in terms of percentage change seems to imply a negatively-sloped line. Although it is beyond the scope of this paper to identify the correlation between the two cost indicators, particularly for landlocked countries, a possible negative correlation between the two for landlocked countries implies that landlocked countries that make improvements in the international/domestic sector (trade costs/Doing Business) may experience deterioration in the domestic/international sector (Doing Business/trade costs). For example, suppose a situation where the transiting procedures previously conducted at the first border between the country of origin (e.g., Lao People's Democratic Republic [Lao PDR]) and transit country (e.g., Thailand) are now conducted at the port of exit in the final transit country (Thailand) before shipping to the country of destination (e.g., New Zealand). As a result, the time and/or procedures at the first border would be reduced, while the time and/or procedures at the final border would increase. Thus, policy reforms should be comprehensive and not cover only a single part of the trade transaction.

We find that most of the data points for the landlocked countries are located to the upper left of data points for the non-landlocked countries. In the case of an absolute change, it can be interpreted that the increase from 2006 to 2010 in Doing Business export costs of the landlocked country group is larger than that of the non-landlocked country group. As we have seen, because trade costs are valued in US dollars by Doing Business, the depreciation of the US dollar adds to the costs landlocked countries incur in exporting their goods. Because landlocked countries have larger absolute values of the cost to export (Doing Business), the US dollar's depreciation leads to a larger absolute change in cost to export compared with non-landlocked countries. For example, when a certain landlocked country's cost to export is \$2,000, a 10% US dollar depreciation would lead to a \$200 increase in export costs; while a certain non-landlocked country's cost to export would rise by only \$100 if its cost to export was initially \$1,000.

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<sup>19</sup> We confirmed that there are some correlations between Doing Business and statistics-based trade cost, though the statistical significance is not that high. In the case of absolute change, the correlation between the two is 0.32 (0.14), for non-landlocked countries (t-statistic in parenthesis). For more on the future research agenda on this topic, see section 7.



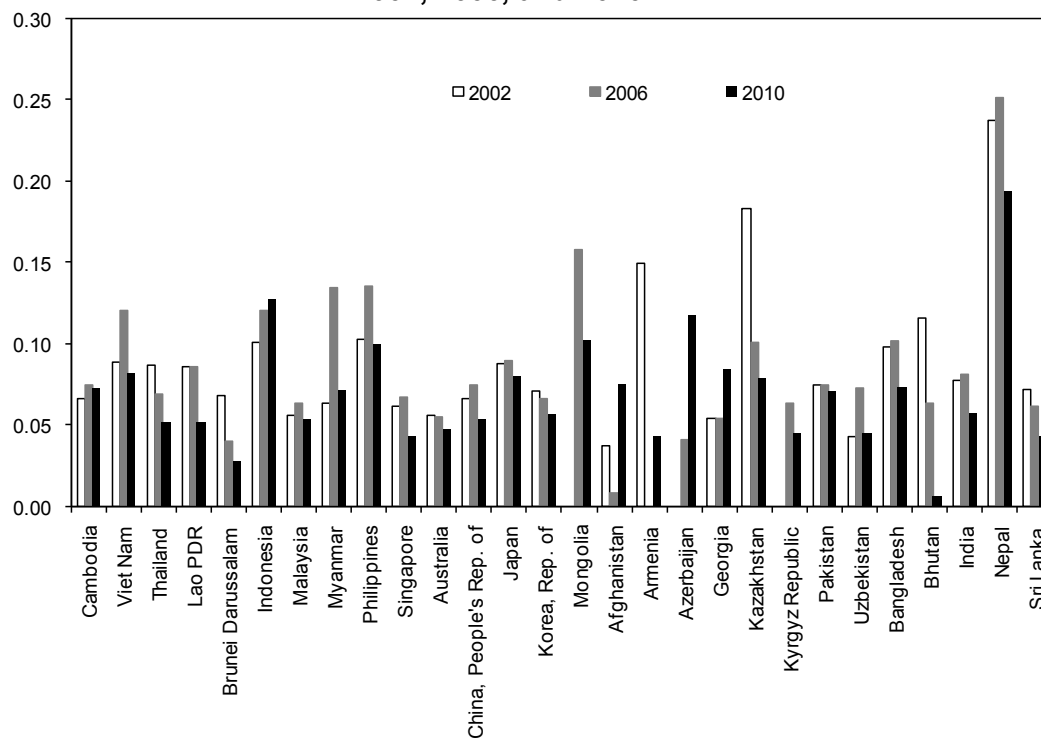
However, the US dollar depreciation does not explain the difference between the landlocked country group and non-landlocked country group in terms of positions relative to each other. Their positions are still different from one another in terms of percentage change. The increase from 2006 to 2010 in Doing Business export costs of the landlocked country group in terms of percentage change is still larger than that of the non-landlocked country group. If US dollar depreciation were the only factor that explained the difference in the position of the two country groups, then the position of the two country groups should have been the same in terms of percentage because depreciation of the US dollar affects both country groups to the same degree. It is plausible to assume that landlocked countries experience a larger reduction in statistics-based trade costs due to improvements related to some other external factor besides policy reforms. Without such external factors, not only Doing Business' cost to export but also statistics-based trade costs should have increased. For instance, a road development project leads to a reduction of trade costs, which has little impact on Doing Business' cost to export indicator. Another plausible explanation for why statistics-based trade costs fall for landlocked countries while Doing Business indicators remain unchanged would be a modal shift of transport from land or sea to air. While Doing Business' standardized trade transactions always assume ocean transport, in reality, the use of air transport has become more frequent as a result of the recent decline in air transports costs relative to shipping rates.

## 5. Recent Developments in Trade Costs of Asian Countries

Figure 4 represents statistics-based trade costs of New Zealand's imports from 28 Asian countries for the years 2002, 2006, and 2010, as measured by their individual c.i.f.–f.o.b. import ratios (using same-side data). Unlike the Doing Business trade cost indicator, data for c.i.f. and f.o.b. import values are available for extended time-series analysis.

There is a clear declining trend in most Asian countries in the 3 years covered (9 out of 28 countries) (Table 4). If the trend is considered only between 2006 and 2010, there is a large number of countries (9 out of 29 countries) whose trade costs declined, which is in sharp contrast to the 2006–2010 trend in Doing Business. Between 2006 and 2010, there were at least 21 countries for which New Zealand experienced a decline in import trade costs. Nevertheless, four countries experienced a rise in trade costs between 2006 and 2010. Central and West Asian countries Afghanistan, Azerbaijan, and Georgia had the largest increases in trade costs in terms of percentage change. Indonesia was the only Southeast Asian country whose trade cost ratio rose between 2006 and 2010, from 12.1% in 2006 to 12.8% in 2010. While the three Central and West Asian countries' trade costs increased more considerably between 2006 and 2010, Indonesia still had higher trade costs in both years in terms of levels.

**Figure 4: c.i.f.–f.o.b. Ratios of Asian Countries' Exports to New Zealand  
2002, 2006, and 2010**



c.i.f. = cost, insurance, and freight; f.o.b. = freight on board; Lao PDR = Lao People's Democratic Republic.  
Source: Statistics New Zealand. Infoshare Database.

**Table 4: c.i.f.–f.o.b. Import Ratios of Asian Countries to New Zealand  
2002, 2006, and 2010**

2002	2006	2010	No. of Countries
Highest	2 <sup>nd</sup> highest	Lowest	9
Highest	Lowest	2 <sup>nd</sup> highest	0
2 <sup>nd</sup> highest	Highest	Lowest	9
2 <sup>nd</sup> highest	Lowest	Highest	2
Lowest	2 <sup>nd</sup> highest	Highest	1
Lowest	Highest	2 <sup>nd</sup> highest	3
No data in at least 1 year			4
<b>Total</b>			<b>28</b>

c.i.f. = cost, insurance, and freight; f.o.b. = freight on board.

Note: Countries include Afghanistan, Armenia, Azerbaijan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, People's Republic of China, Georgia, India, Indonesia, Japan, Kazakhstan, Kyrgyz Republic, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, Uzbekistan, Viet Nam, and Australia.

Source: Statistics New Zealand. Infoshare Database.

## 6. Cross-Country Comparison of Trade Costs of Specific Commodities: Textile, Footwear, and Vegetable Products

As we have seen in Section 4, statistics-based trade costs are also affected by improvements resulting from trade facilitation efforts. It follows that an in-depth examination of trends in trade costs at both the total and commodity group levels—which is not possible with Doing Business data since these are based on a standardized trade transaction under very specific assumptions—will be useful in drawing up trade facilitation policies and measures. In addition, a longer-term trend can be examined using trade statistics because time-series data is available for trade statistics unlike the case of Doing Business indicators.

In this section, we first compare trade costs of three Southeast Asian countries—Cambodia, Thailand, Viet Nam—at the total level. Then, three specific commodities will be discussed—textile products, footwear and related products, and vegetable products.<sup>20</sup> Textiles and footwear are important export commodities, being one of the leading export earners for all three countries. We also examine the trade costs of vegetables in each of the three countries, because special consideration should be made for vegetable products due to the nature of trade for this commodity group. Transport is critical for vegetable products because they are perishable goods for which cost is not the only important element, but time as well.

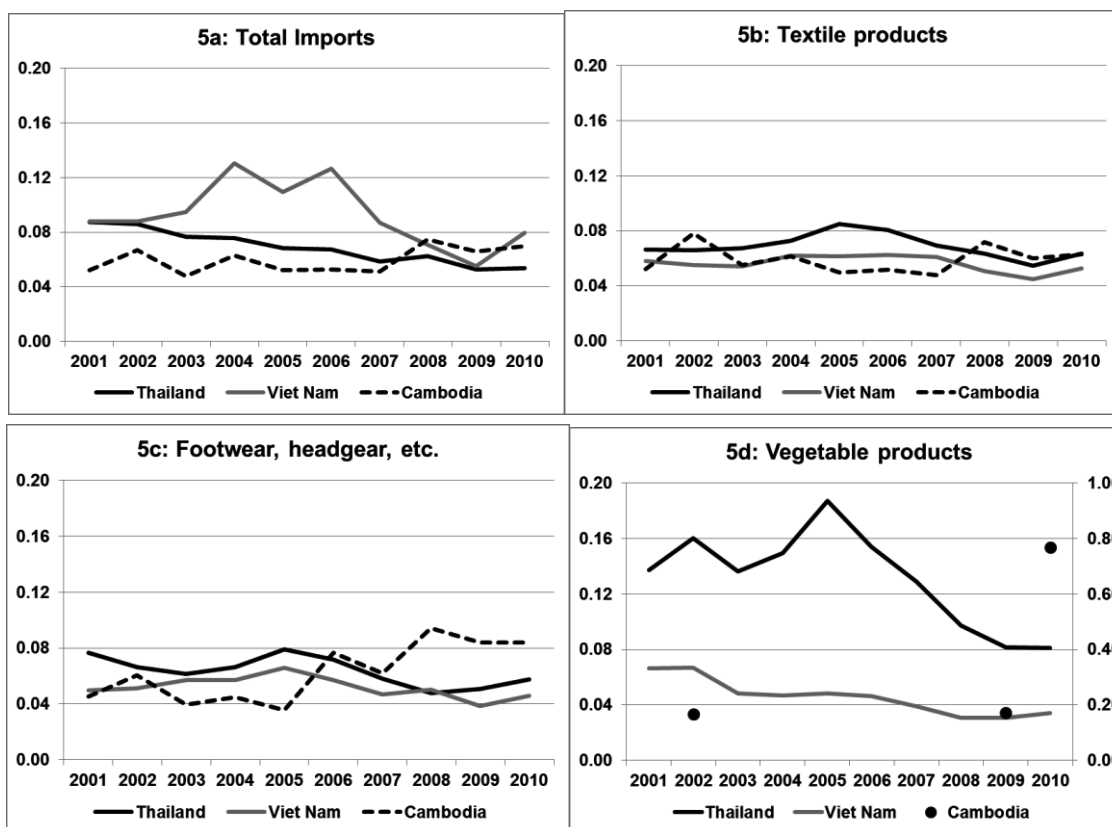
We will use the same data source as above (Statistics New Zealand) in computing trade cost ratios at the commodity group level based on the formula introduced in section 3. If the trade amount under a certain commodity group is zero, no trade cost ratio is computed.

### 6.1. Total Level

Figure 5a illustrates total c.i.f.–f.o.b. ratios for Cambodia, Thailand, and Viet Nam. The trade costs of imports from Thailand declined continuously from 2001 to 2010. In terms of total imports, the trend has been declining with the exception of trade costs in 2005, which rose to 7.5% of the import value from 7.2% in 2004. For Viet Nam, there is also a general declining trend, but the fluctuations are considerable. Trade costs of total imports were notably high between 2004 and 2007, with the c.i.f.–f.o.b. ratio exceeding 10%, before declining for several years and then rising moderately in 2010. For Cambodia, the overall trend for trade costs is increasing.

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<sup>20</sup> Textile products are covered in one group of commodities by Doing Business surveys—Textiles, Apparel, and Clothing (SITC 65, 84). Another commodity group that is covered by Doing Business—Coffee, Tea, Cocoa, and Tobacco (SITC 07, 12)—is also studied in this section, that of vegetable products.

**Figure 5: Cross-Country Comparison of Annual c.i.f.–f.o.b. Ratios**


c.i.f. = cost, insurance, and freight; f.o.b. = freight on board.

Note: Cambodia's figures in 5d (vegetable products) are on the right axis. Data is available only in 2002, 2009, and 2010.

However, such trends in the trade costs of total trade of the three countries are not necessarily reflected in the trends of each country's commodity-level trade costs.

## 6.2. Textile Products (Section XI)

First, from Figure 5a and Figure 5b, it can be observed that the overall trends in trade costs of total imports from the three countries differ from each country's commodity-level trends in trade costs of the textile sector. Thailand's overall trend was clearly on a steady decline for its total imports between 2001 and 2010, but the commodity-level trend in trade costs of textiles, while also declining, experienced a huge spike between 2005 and 2006. For Viet Nam, it was the overall trend for its total imports that experienced a huge spike between 2004 and 2006, while the trend in its textile sector's trade costs was on a relatively steady decline over the 10-year period. For Cambodia, while the overall trend in trade costs of total imports was rising steadily over the years, the same cannot be said

of the trend of its textile sector's trade costs. While there was only a slight increase<sup>21</sup> in trade costs of textiles from 2001 to 2010, the trend in trade costs of Cambodia's textiles was very erratic during the period (Figure 5b).

The annual trend in the trade costs of Thailand and Viet Nam's textile sectors were very similar, unlike the case of the trends in trade costs of the two countries' total trade, though the levels are not the same. The two countries both have declining trends in trade costs in the textile sector overall. While Thailand has higher trade costs than Viet Nam, this does not seem to imply that Viet Nam is more efficient. Rather, the composition of trade between New Zealand and Thailand, and that between New Zealand and Viet Nam, are different. It may be the case that Thailand exports more high-value textiles than Viet Nam and that insurance costs for Thai goods are higher. To this extent, the analysis will focus on the comparison of trends rather than levels.

### **6.3. Footwear, Headgear, Umbrellas, Feathers, and Hair Articles (Section XII)**

From Figure 5a and Figure 5c, it can be observed that the trends in trade costs of total imports from the three countries differ from each country's commodity-level trends in the footwear sector. Thailand's overall trend in trade costs was clearly on a steady decline for total imports, but the commodity-level trend in trade costs of the footwear sector, while also declining, experienced a huge spike between 2005 and 2006 (similar to Thailand's textile sector). For Viet Nam, while the trend in trade costs for its total imports experienced a huge spike between 2004 and 2006, the trend for its footwear sector's trade costs was on a steady decline over the 10-year period. For Cambodia, while the trend in trade costs for its total imports was rising steadily over the years, the trend for its vegetable sector's trade costs was not only erratic, but the increase was also very dramatic between 2001 and 2010, rising by almost 4%.

Similar to the observations made above in the trade costs of textile products, while the overall trends in trade costs of total imports from Thailand and Viet Nam are very different, the declining trend is somewhat similar in the trade costs of the two countries' footwear sector. Similarities in the trends not only between Thailand and Viet Nam, but also in the trade costs of textiles and footwear products, may be due to production links between the two industries (e.g., similar or overlapping supply chains for inputs such as leather goods).

### **6.4. Vegetable Products (Section II)**

From Figure 5a and Figure 5d, it can be observed that the trends in trade costs of total imports from the three countries differ from each country's commodity-level trends in the vegetable products sector. Thailand's overall trend in trade costs was clearly on a steady decline for its total imports, but the commodity-level trend in trade costs of the vegetable products sector, while also declining, experienced a huge spike in 2002 and 2005. The decline in trade costs in Thailand's vegetable products sector was also very large, with

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<sup>21</sup> The rise in transport costs over the years has not been dramatic, with only about a 1% increase between 2001 and 2010.

trade costs falling from around 14% in 2001 to around 8% in 2010. For Viet Nam, while the trend in trade costs for its total imports experienced a huge spike between 2004 and 2006, the trend for its vegetable products sector's trade costs was one of general decline over the 10-year period. As for Cambodia, there were only 3 years for which data were available: 2002, 2009, and 2010. For all 3 years, trade costs of vegetable products were more than 15%, with trade costs exceeding 75% of the import value in 2010. The trend in trade costs for Cambodia's total imports rose steadily over the years. In contrast, the increase was very dramatic for its vegetable sector's trade costs, at least for the 3 years in which data were available.

Unlike the case of textiles and footwear where the trade costs of Thailand and Viet Nam are more or less similar, the trade costs of vegetable products of Thailand and Viet Nam are very different in terms of recent changes. This is perhaps because while there are some production networks for textile and footwear products in the Indochina region and multinationals are involved in exporting these products (and therefore the movement of trade costs of the two countries are similar), the vegetable production and related exports of the two countries are not linked, due to the lack of production networks for vegetables. Second, unlike footwear and textile products, the composition of trade in vegetable products may be heterogeneous between Thailand and Viet Nam.

In summary, we can say that trade costs at the commodity-level are very different from those at the total level, and detailed commodity-level data on trade costs is useful in drawing up specific trade facilitation reforms targeting each sector. One implication of the analysis above is that it is possible to have a case wherein the change in trade costs at the commodity-level does not differ much across countries, even if trade costs at the total level differ substantially due to the varying composition of traded items among these countries. At the same time, the higher the level of disaggregation, the more likely it is that data are unavailable (particularly for time-series data). This implies that we are comparing trade costs of different items belonging to the same commodity group (e.g., trade costs of potatoes and lettuce). Thus, while the commodity group level trade cost data is useful, we should carefully examine the consistency of data and commodities across time and countries when conducting trade cost analysis for particular commodity groups. Also, when the volume of traded goods is limited (just like the trade between New Zealand and Cambodia), trade costs computed based on trade statistics become unreliable. Detailed analysis on trends in trade costs for each commodity group imported from Thailand, Viet Nam, and Cambodia to New Zealand between 2001 and 2010 can be found in the Appendix.<sup>22</sup>

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<sup>22</sup> The Appendix compares the c.i.f.–f.o.b. ratios of the first 5 years (2001–2005) and the second half (2006–2010). For computing the ratio of each 5-year period, the total c.i.f. import data of continuously traded commodities for each 5 years and the total f.o.b. import data of the same products for the same period are used. We include only continuously traded commodities for all 10 years in order to control for commodity-specific effects on changes in transport costs due to composition of trade (Pomfret and Sourdin, 2009, p. 263). Among the sections that are common in the datasets of all three countries, the section with one of the largest declines in transport costs for both Viet Nam and Thailand over the two periods is Section V (mineral products).

## 7. Conclusion

In this paper we suggest that the use of statistics-based trade costs in conjunction with Doing Business data on costs to export is helpful in examining commodity-level trends in trade costs that reflect the efficiency of trade. First, Doing Business and statistics-based trade costs are complimentary because the former mainly covers domestic sectors while the latter covers international sectors. If we add the two, we can grasp a broader concept of trade costs. Second, the two are alternative indicators to measure trade efficiency. Doing Business indicators and statistics-based trade costs improve when the trade transaction is streamlined. For example, if the administration of importation transactions is shortened and the idle time of off-shore activities are reduced, statistics-based trade costs also improve. In this paper, we have confirmed that a good performer in terms of improvement in Doing Business data is also a good performer in terms of improvement in statistics-based trade costs.

Statistics-based trade has two distinctive strengths vis-à-vis Doing Business. First, while the Doing Business data is available only after 2006, it is possible to calculate time-series using statistics-based trade costs. Thus, it is possible to examine the long term-trend (in addition, statistics-based trade costs are not variable subject to foreign exchange fluctuations, unlike Doing Business data). Second, and more importantly, we can calculate commodity-level trade costs using trade statistics. While Doing Business compiles survey-based data on trade costs of a hypothetical cargo—a 20-foot, 10-ton dry cargo of a country's leading import or export—using same-side trade statistics, we can identify trade costs for each commodity group. In this paper we found that commodity-level trade is different from trade costs at the total level, based on detailed analysis of trade costs of textile, footwear, and vegetables for three developing countries in Asia: Thailand, Viet Nam, and Cambodia.

While this research analyzes trade costs of Asian countries using New Zealand statistics, further research is required. It is important to examine the trade costs of a larger set of countries including non-Asian countries (for this purpose, statistics other than New Zealand are more suitable, given that New Zealand is a small trading nation). In particular, the examination of the correlation between Doing Business and statistics-based trade cost (in terms of improvement) using a larger set of countries is worth conducting. Because several countries other than New Zealand publish both f.o.b. and c.i.f. import data, the use of these countries' trade statistics is also an interesting exercise. These statistics should be used not only to compare against Doing Business, but also to make the comparison among trade costs based on those statistics (Pomfret and Sourdin 2010). If these countries' statistics-based trade costs are compared at the commodity group level, it can be useful for drawing up trade facilitation policies specific to each commodity.

Because tariffs are increasingly being reduced, especially in Asia, the removal of non-tariff barriers has become critical in facilitating international trade in Asia. Effective trade facilitation measures have not yet been adopted partly because of the lack of accurate trade cost data at the commodity level. The use of statistics-based trade cost data, which are available at both the total and commodity group levels, is an effective method

to identify the current status of efficiency and inefficiency of trade transactions, which can lead to necessary commodity-specific trade facilitation measures in the future.



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### Appendix 1: Period Averages of c.i.f./f.o.b. Ratios of New Zealand's Imports from Thailand by Commodity Group

HS Section		2001–2005 (%)	2006–2010 (%)	Absolute Change
Section I	Live animals (1.9%)	4.8	4.4	–0.4
Section II	Vegetable products (3.0%)	15.7	10.0	–5.7
Section III	Animal or vegetables fats and oils (0.6%)	5.8	4.1	–1.7
Section IV	Prepared foodstuffs, beverages, tobacco (9.0%)	8.1	7.9	–0.1
Section V	Mineral products (2.8%)	11.1	6.8	–4.3
Section VI	Chemicals and allied industries (7.4%)	7.3	4.3	–3.1
Section VII	Plastics, rubber (14.4%)	8.1	5.9	–2.2
	Raw hides, skins, leather, saddlery, travel goods, animal gut (0.1%)	8.1	7.5	–0.5
Section IX	Wood, charcoal, cork, straw, basketware and wickerware (0.1%)	13.9	9.9	–4.0
Section X	Pulp of wood, paper (1.1%)	8.7	7.2	–1.6
Section XI	Textiles (2.2%)	7.1	6.6	–0.5
Section XII	Footwear, headgear, umbrellas, feathers, hair (0.3%)	7.0	5.6	–1.4
Section XIII	Stone, plaster, ceramic, glass (1.6%)	24.1	21.4	–2.6
Section XIV	Pearls, precious metals, jewelry, coins (2.4%)	2.1	01.6	–0.5
Section XV	Base metals (3.5%)	14.7	10.8	–3.8
	Machinery, electrical equipment, sound and television recorders (28.8%)	4.2	4.3	0.1
Section XVII	Vehicles, aircraft, vessels (31.1%)	6.2	4.8	–1.3
Section XVIII	Optical, photographic, measuring, medical, clocks, musical instruments (0.8%)	3.3	4.3	1.0
Section XX	Miscellaneous manufactures (1.3%)	10.5	8.3	–2.3
Section XXI	Works of art, collectors' pieces (< 0.0%)	6.0	13.9	7.9
<b>Aggregate of continuously traded commodities (112.4%)</b>		7.7	5.9	–1.8
<b>Aggregate of non-continuously traded commodities (0.5%)</b>		12.4	6.0	–6.4
<b>Sum of all traded commodities (112.9%)</b>		8.0	6.0	–2.0

c.i.f. = cost, insurance, and freight; f.o.b. = freight on board.

Note: Values in parenthesis are shares in 2010 of total f.o.b. imports based on the share of disaggregated commodity-level HS data on continuously traded commodities under each HS Section (commodity group) as a fraction of the total import value of New Zealand's imports by country of origin, and not of the aggregate of all (continuously or non-continuously traded) commodity-level HS data. Aggregate commodity-level data exceed that of total import values for Thailand. As a result, the sum of shares of all traded commodities relative to the total import value exceeds 100%.

Source: Statistics New Zealand. Infoshare Database.

## Appendix 2: Period Averages of c.i.f.–f.o.b. Ratios of New Zealand’s Imports from Viet Nam by Commodity Group

HS Section	2001–2005 (%)	2006–2010 (%)	Absolute Change
Live animals (6.7 %)	3.5	3.6	0.1
Vegetable products (17.2%)	5.4	3.5	–1.8
Prepared foodstuffs, beverages, tobacco (3.3%)	5.8	4.4	–1.5
Mineral products (11.9%)	10.2	2.1	–8.0
Chemicals and allied industries (2.2%)	10.4	12.6	2.2
Plastics, rubber (5.2%)	10.1	7.3	–2.8
Raw hides, skins, leather, saddlery, travel goods, animal gut (3.1%)	5.8	5.9	0.1
Wood, charcoal, cork, straw, basketware and wickerware (0.9%)	14.2	13.3	–0.9
Pulp of wood, paper (4.6%)	11.3	8.8	–2.6
Textiles (10.8%)	5.8	5.3	–0.5
Footwear, headgear, umbrellas, feathers, hair (14.2%)	5.5	4.7	–0.8
Stone, plaster, ceramic, glass (2.6%)	24.9	19.2	–5.7
Pearls, precious metals, jewelry, coins (0.3%)	2.1	3.1	1.0
Base metals (1.9%)	7.6	5.6	–2.0
Section XVI Machinery, electrical equipment, sound and television recorders (22.8%)	15.2	13.3	–1.9
Vehicles, aircraft, vessels (0.6%)	6.7	3.6	–3.1
Section XVIII Optical, photographic, measuring, medical, clocks, musical instruments (0.9%)	3.8	2.6	–1.3
Section XX - Miscellaneous manufactures (18.4%)	14.9	11.6	–3.2
Section XXI - Works of art, collectors’ pieces (< 0.0%)	10.8	14.9	4.1
<b>Aggregate of continuously traded commodities (118.8%)</b>	10.5	8.2	–2.3
<b>Aggregate of non-continuously traded commodities (16.3%)</b>	26.4	20.9	–5.5
<b>Sum of all traded commodities (135.1%)</b>	10.3	9.1	–1.2

c.i.f. = cost, insurance, and freight; f.o.b. = freight on board.

Note: Values in parenthesis are shares in 2010 of total f.o.b. imports based on the share of disaggregated commodity-level HS data on continuously traded commodities under each HS Section (commodity group) as a fraction of the total import value of New Zealand imports by country of origin, and not of the aggregate of all (continuously or non-continuously traded) commodity-level HS data. Aggregate commodity-level data exceed that of total import values for Viet Nam. As a result, the sum of shares of all traded commodities relative to the total import value exceeds 100%.

Source: Statistics New Zealand. Infoshare Database.

### Appendix 3: Period Averages of c.i.f.–f.o.b. Ratios of New Zealand’s Imports from Cambodia by Commodity Group

HS Section	2001– 2005 (%)	2006– 2010 (%)	Absolute Change
Section VIII Raw hides, skins, leather, saddlery, travel goods, animal gut (0.8%)	24.3	19.8	–4.5
Section XI Textiles (81.3%)	5.6	6.0	0.5
Section XII Footwear, headgear, umbrellas, feathers, hair (32.2%)	5.2	8.4	3.2
<b>Aggregate of continuously traded commodities (106.8%)</b>	5.6	6.5	0.9
<b>Aggregate of non-continuously traded commodities (20.8%)</b>	11.9	19.3	7.3
<b>Sum of all traded commodities (127.6%)</b>	6.3	8.6	2.3

c.i.f. = cost, insurance, and freight; f.o.b. = freight on board.

Note: Values in parenthesis are shares in 2010 of total f.o.b. imports based on the share of disaggregated commodity-level HS data on continuously traded commodities under each HS Section (commodity group) as a fraction of the total import value of New Zealand imports by country of origin, and not of the aggregate of all (continuously or non-continuously traded) commodity-level HS data. Aggregate commodity-level data exceed that of total import values for Cambodia. As a result, the sum of shares of all traded commodities relative to the total import value exceeds 100%.

Source: Statistics New Zealand. Infoshare Database.

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## **Measuring Commodity-Level Trade Costs in Asia**

The Basis for Effective Trade Facilitation Policies in the Region

Despite several inherent weaknesses, the World Bank's Doing Business Report is still the most widely used assessment of trade facilitation status by developing country policymakers and economists. In this paper, we suggest that the use of trade statistics in conjunction with Doing Business trade cost data is helpful in designing sector-specific trade facilitation policies. Unlike the use of Doing Business data alone, our methodology allows policymakers and economists to obtain long-term commodity-level trade costs.

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