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Measuring Regulatory Restrictions in Logistics Services*

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Abstract: This study measures the extent of restrictions on trade in logistics services in the ASEAN+6 economies by constructing a logistics regulatory restrictiveness index for each economy that quantifies the extent of government regulations faced by logistics service providers. This is the first study of its kind to construct a regulatory index of the entire logistics sector, which includes the main modes of international transport and customs restrictions. The indices show that large differences exist in the logistics regulatory environment of ASEAN+6 economies. Many of these economies are open to trade in logistics services, while others are relatively restrictive. Malaysia, China, Indonesia, Lao PDR, the Philippines and Vietnam are the most restrictive economies of logistics services in this region. Relatively, Singapore and Australia are the most open economies for trade in logistics services, along with Japan and New Zealand. Preliminary investigations find evidence of negative relationships between logistics regulatory restrictiveness and logistics sector performance, as measured by the World Bank's Logistics Performance Index and its sub-components. These findings support that notion that a less restricted trade environment results in better performance for the logistics sector.

Keywords: Logistics, Transport, Government Regulation, Trade, East Asia

JEL Classification: F13, F15, L51, L91

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1. Introduction

Logistics is defined as “the part of the supply chain process that plans, implements, and controls the efficient, effective flow and storage of goods, services, and related information from the point of origin to the point of consumption in order to meet consumers’ requirements”(de Souza *et al.* 2007). Efficient delivery of logistics services is the ability to move goods expeditiously, reliably and at low cost. A competitive and efficient logistics sector is vital for all economies and is an imperative component of trade. In the logistics industry, time is money. The costs of delays are high and ultimately passed on to the consumers. Government restrictions imposed on logistics services providers (LSPs) can adversely affect the price, reliability and quality of these services, and are considered restrictions to trade. It is the time as much as the cost of complying with all the rules and regulations. The importance of this area has long been recognized, but recently has attracted significant attention from academics, governments, international organizations and private logistics firms.

This study measures the extent of restrictions on trade in logistics services in the ASEAN+6 economies, through the construction of a logistics regulatory restrictiveness index. It will also conduct a preliminary exploration of the correlation between logistics regulatory restrictiveness and logistics sector performance, as measured by the World Bank’s Logistics Performance Index.

Logistics involves a range of sub-sectors, which can be classified into three tiers according to the US International Trade Commission (2005). Tier 1 logistics services are transport management and supply chain consulting services, which include network design, the development of distribution strategies, storage, warehousing, cargo handling, transport agency services and customs brokerage. Tier 2 services are comprised of related freight logistics services, including the sub-sectors of maritime, inland waterways, air, rail and road transport services. Tier 3 services include a large number of other inputs or value added services, including wholesale and retail trade services, packaging services, real estate services, and management consulting services. These may or may not be associated

directly with revenue flows to logistics providers, but this tier includes services that must be available to logistics firms. This study focuses on government regulations relating to the provision of Tier 1 and Tier 2 logistics services, which, as the main modes of international transport, are the most relevant aspects of logistics services, and critical inputs to the efficient supply of logistics services across borders.

The paper proceeds as follows: Section 2 reviews the types of restrictions faced by the logistics sector. Section 3 details the index methodology used to construct the logistics sector restrictiveness index. Section 4 analyses the results for the ASEAN+6 economies. Section 5 examines the relationship between regulatory restrictions and logistics performance. Section 6 concludes.

2. Types of Restrictions

Restrictions to trade in logistics services are barriers that inhibit LSPs from entering or operating in a market. Although restrictions to trade can arise from many sources, for example poor quality of infrastructure can act to slow the transport of goods, this study focuses on government-imposed restrictions through regulation of entry and operations of the logistics sector.

Government-imposed regulations can be discriminatory or non-discriminatory against foreign service suppliers. Discriminatory regulations apply only to foreign suppliers and treat foreign service suppliers less favorably than domestic service suppliers. Some economies prohibit foreign logistics service suppliers from providing their own port-related services such as cargo handling, and are thus discriminatory in nature. Non-discriminatory regulations are regulatory processes that apply to both domestic and foreign providers, but can still restrict activity. Restrictions that limit the hours of operations in road transport in major cities are non-discriminatory.

Regulatory restrictions can act to reduce competition in logistics services and reduce market efficiency. Sometimes, though, government-imposed regulations that limit

competition are in place to deal with market failures or to help meet a particular social objective. Nevertheless, in doing so, they restrict trade in logistics services and fall within the scope of this study.

The list of government regulations or restrictions faced by LSPs is long. Some restrictions may only apply in one economy or are too narrow to identify. For example, the phrasing of a few words on a document may be interpreted as restrictive for a LSP. Many LSPs deal one-on-one with governments to reduce such barriers to trade, lobbying to change, for example, the phrasing of a document. Identifying all such regulatory restrictions in logistics services is out of the scope of this study.

The types of restrictions that this study identifies and uses to develop the restrictiveness index are restrictions that have been identified in previous studies by actors within the logistics industry. As a starting point, a list of government regulations or restrictions on the entry and operations of logistics service suppliers was compiled from the Regional Economic Policy Support Facility (REPSF) Project of the ASEAN Secretariat and the Logistics Institute of Asia Pacific, “An investigation into the Measures Affecting the Integration of ASEAN’s Priority Sectors: The Case of Logistics” (de Souza *et al.* 2007). The project identified in-country policies, measures and regulations, that directly and indirectly influence the efficient door-to-door delivery of good with ASEAN. Supported by a survey questionnaire of interviews of various players in the logistics supply chain, the project constructed a database of policies and performance measures that impede free trade in logistics services worldwide.

The identified regulatory barriers form the framework for the methodology of this study. This paper then proceeded to survey other studies that report barriers to trade in the logistics services sectors, primarily maritime and air transport (Doove *et al.* 2001, Zhang and Findlay 2008, McGuire *et al.* 2000). Information on other regulatory barriers was also gathered from the World Bank’s “Connecting to Compete” (2007) and the APEC “Survey on Customs, Standards, and Business Mobility in the APEC Region” (2000) studies.

The approach taken is to quantify restrictions on LSPs regardless of whether the restrictions are specific to logistics or not. Thus, restrictions specific to logistics services

and major horizontal restrictions on all services are included in the list of restrictions, such as restrictions on movement of people and restrictions relating to direct investment. Table 1 outlines some common policies that might impose restrictions on the supply of logistics services.

Table 1. Examples of Restrictions on (and Definitions of) Logistics Services

Restriction	Description of restriction
Customs documentation	Submit import/export documentation at the customs border of the respective economy.
Customs broker	Limitations on a person or firm, licensed by the treasury department of their country when required, to engaged in entering and clearing goods through Customs for a client (importer).
Electronic Data Interface (EDI)	Generic term for transmission of transaction data between computer systems. EDI is typically via a batched transmission, usually conforming to consistent standards.
Harmonized System (HS) Codes	An international goods classification system for describing cargo in international trade under a single commodity-coding scheme.
DeMinimis level	The threshold value for waiver of duty on imported goods below which the tax will not be collected.
Local employment requirements	Regulations that require firms to hire local labor for their operations.
Cabotage	Restrictions that restrict the domestic movement of cargo or persons by a foreign service supplier, and applies to maritime, aviation and road transport services.
Fifth freedom rights	Commercial aviation rights granting a country's airlines the privilege to enter and land in another country's airspace.
Cargo reservation laws	Policies that constrain the type of cargoes that may be carriers by the carriers.
Freight forwarder	A person whose business is to act as an agent on behalf of the shipper. A freight forwarder frequently makes the booking reservation.
Cargo-handling	Policies that restrict the loading and discharging of cargo off and on a ship, plane or truck.
Hours of operation	Restrictions that prohibit operation on certain days of a week or hours of the day.
Restrictions on foreign direct investment	Government regulation that impedes foreign firms from investing locally. This regulation prohibits any foreign direct investment or limits foreign direct investment to a maximum proportion.

Source: de Souza et al. (2007).

3. Restrictiveness Index Methodology

An index methodology¹ has been used to quantify the overall logistics restrictiveness environment faced by LSPs in each of the 16 economies of ASEAN+6: Australia, Brunei Darussalam, Cambodia, China, India, Indonesia, Japan, Republic of Korea, Lao PDR, Malaysia, Myanmar, New Zealand, Philippines, Singapore, Thailand, and Vietnam. After identifying the different types of restrictions faced by LSPs, as outlined in Section II, a dataset was compiled of the existing policies of each restriction category in each economy. The dataset of restrictions dates from 2006 to the end of 2008, and is as comprehensive as data allows to reflect the existing restrictions that apply to LSPs in practice, not just their stated limits.² Using this dataset, a logistics sector restrictiveness index was constructed that quantifies the overall extent of restrictions on trade and investment in logistics services, by both domestic and foreign providers. This restrictiveness index is then used to assess the overall restrictiveness environment between economies and identify correlations between logistics regulation and logistics sector performance.

3.1. Restriction Categories

The logistics sector restrictiveness index groups the types of restrictions under six primary headings: customs, investment, movement of people, and sector-specific restrictions for maritime, aviation, and road transport. The full list of restriction categories used in the construction of the restrictiveness index is presented in Figure 1.

¹ The methodology employed in this paper follows previous studies. See Doove *et al.* (2001), Kalirajan (2000), and McGuire *et al.* (2000).

² Thus GATS was not used as a source of information as it only gives stated limits, and does not necessarily reflect the practices imposed.

Figure 1. Restriction Categories

Logistics sector restrictiveness index					
<p>Customs</p> <ul style="list-style-type: none"> •Customs documents •Customs signatures •Import licensing •Local language •Customs inspections •Import restrictions •Customs Electronic Data Interchange •Harmonized Commodity Description and Coding System •Possibility of a review •Customs operating hours •Customs brokerage services •Customs clearance •Customs procedures time •Customs charges or fees •Improper penalties or fees •Discriminatory fees or inspection practices •DeMinimis levels 	<p>Investment</p> <ul style="list-style-type: none"> •Commercial presence •Foreign equity participation •Licensing •Discriminatory licensing •Factors affecting investment 	<p>Movement of People</p> <ul style="list-style-type: none"> •Licensing requirements on management •Movement of people – Permanent •Movement of people – Temporary •Local employment requirements •Difficulty in firing 	<p>Maritime Transport</p> <ul style="list-style-type: none"> •Cabotage restrictions •Cargo reservation •Cargo handling •Storage and warehousing •Container station and depot services •General competition legislation •Monopolized handling of port-related services 	<p>Aviation Transport</p> <ul style="list-style-type: none"> •Take-off and landing slots •Ground-handling •Cargo-handling and warehousing •Foreign investment in domestic airlines •Open skies agreement •Seventh freedom rights •Cabotage restrictions •Multiple designation on international routes 	<p>Road Transport</p> <ul style="list-style-type: none"> •Equipment usage •Hours of operation

Burdensome customs procedures are reported to pose the most significant barrier to trade (de Souza *et al.* 2007). Regulatory customs procedures include time consuming

documentation, customs inspections, and lack of border coordination and clearance. Trade barriers to investment arise due to licensing requirements for the provision of transportation services and cross-sectoral investment regulations that either limit the equity ownership in the firm or regulate the form of establishment. Labor regulations refer to policies or measures that limit the movement or hiring of key personnel. For example, most countries require the hiring of local residents by foreign firms.

Whereas customs, investment, and movement of people generally apply to all LSPs, other sector-specific regulatory barriers only affect LSPs dealing specifically with maritime, aviation or road transport. These barriers may impede the operational efficiency and the quality of services provided by these LSPs.

3.2. Scoring and Weighting Restriction Categories

A restrictiveness index value is calculated for each economy employing a methodology of both scores and weightings.

Each restriction category identified in Figure 1 receives a score that ranges from 0 (least restrictive) to 1 (most restrictive) based on the stringency of the existing policy: the more stringent the restriction, the higher the score. For example, an economy whose customs facilities are open 24 hours receives a score of 0 for the category “customs operating hours”, whereas an economy whose customs facilities are not open 24 hours but agree to work overtime upon request receives a score of 0.5 in that category.

The categories “import restrictions” and “factors affecting investment” are scored differently. These categories cover a number of restrictions that are mutually exclusive, and the total restriction on these categories are the addition of separate restrictions. For example, an economy that imposes restrictions on weight (0.25), value of shipment (0.25) and certain goods (0.25) that can be imported receives a score of 0.75 for the category “import restrictions”.

Each restriction category’s score is then weighted to reflect how restrictive that category is relative to other types of restrictions: the more restrictive the category, the higher the weighting. The degree of restrictiveness varies for each restriction category,

since some regulations are more restrictive than others. For example, substantial amounts of customs documentation to be filled out at a border is considered very burdensome to trade, whereas insufficient allocation of air takeoff and landing slots is considered substantially less burdensome. Each restriction category's weight reflects its restrictiveness as a proportion of the total restrictiveness index, where the sum of the weights total 1. The weights take six different values, ranging from 0.0065 (least restrictive) to 0.0388 (most restrictive). These values are normalized values that correspond to a scale of 1 to 6 that the REPSF Report (de Souza *et al.* 2007) uses to classify the restrictiveness of a regulation. Each restriction category was assigned a score of between 1 and 6. Restriction categories not included in the REPSF Report are assigned a score using best judgment. Then the sum of all the restriction category scores was obtained, and each restriction category's weight was calculated as a proportion of the total. The scores and weights associated with the full list of restriction categories are given in Table 2.

Table 2. Restrictiveness Index for Logistics Services

Category Weightings ^a			Score	Restriction category
R ^b	MFN ^c	Total ^d		
				RESTRICTION ON CUSTOMS:
0.0388	n.a.	0.0388		Customs documents
				The score will be proportional to the average number of customs documents required for exports and imports over the number of customs documents of the economy with the greatest number.
0.0388	n.a.	0.0388		Customs signatures
				The score will be proportional to the average number of customs signatures required for exports and imports over the number of customs signatures of the economy with the greatest number.
0.0388	n.a.	0.0388		Import licensing
			0.00	Import licenses are not required.
			0.50	Some goods require import licenses.
			1.00	All goods require import licenses.
0.0065	n.a.	0.0065		Local language
			0.00	Local language is not used on customs documents.
			1.00	Local language is used on customs documents.
0.0388	n.a.	0.0388		Customs inspections
				The score will be equivalent to the average percentage of goods inspected during shipment. For example, an average rate of physical inspection of 25 percent of goods receives a score of 0.25.

0.0065	n.a.	0.0065		Import restrictions
			0.25	Restrictions on weight.
			0.25	Restrictions on value of shipment.
			0.25	Restrictions on certain goods.
			0.25	Requirement that imports and exports be balanced.
0.0388	n.a.	0.0388		Customs Electronic Data Interchange (EDI)
			0.00	EDI processing for customs documentation is fully functional.
			0.50	EDI processing for customs documentation is available but not fully functional.
			1.00	EDI processing for customs documentation is not available.
0.0356	n.a.	0.0356		Harmonized Commodity Description and Coding System (HS)
			0.00	HS for customs classification is fully functional.
			0.50	Use HS for customs classification, but customs officials can change the classification codes arbitrarily and intentionally.
			1.00	HS for customs classification is not used.
0.0324	n.a.	0.0324		Possibility of a review for imports
				The score will be equivalent to the probability that a simple and inexpensive review procedure for imports is available.
0.0194	n.a.	0.0194		Customs operating hours
			0.00	Customs facilities are open 24 hours.
			0.50	Limited hours of operation at customs facilities, but open extended hours if requested.
			1.00	Limited hours of operation at customs facilities, such as closure on weekends or public holidays.
0.0129	n.a.	0.0129		Customs brokerage services
			0.00	Firms are allowed to freely provide customs brokerage services.
			0.50	Customs brokerage services can only be provided in restricted areas or limited to individual citizens or a few firms.
			1.00	Regulations do not allow firms to freely provide customs brokerage services.
0.0324	n.a.	0.0324		Customs clearance
				The score will be proportional to the average number of days of border waiting time required to clear customs over the number of days of the economy with the highest number.
0.0324	n.a.	0.0324		Customs procedures time
				The score will be proportional to the average number of days necessary to comply with all customs procedures to import or export goods over the number of days of the economy with the highest number.
0.0194	n.a.	0.0194		Customs charges or fees
				The score will be proportional to the average customs charges or fees per container to import or export goods over the cost of the economy with the highest value.
0.0259	n.a.	0.0259		Improper penalties or fees
			1.00	Improper penalties or fees are common.
			0.50	Improper penalties or fees are noted.
			0.00	Improper penalties or fees are rare or nonexistent.

0.0194	n.a.	0.0194		Discriminatory fees or inspection practices
			0.00	Discriminatory fees or inspection practices are common.
			0.50	Discriminatory fees or inspection practices are noted.
			1.00	Discriminatory fees or inspection practices are rare or nonexistent.
0.0388	n.a.	0.0388		DeMinimis level
				The score will be 1 minus the proportion of the DeMinimis level over the DeMinimis level of the economy with the highest value.
				RESTRICTIONS ON INVESTMENT:
0.0259	n.a.	0.0259		Commercial presence
			0.00	No restrictions on establishment.
			0.50	Logistics service suppliers must be represented by a local agent.
			1.00	Form of commercial presence is restricted through a specific type of legal entity or joint venture arrangement.
0.0246	0.0013	0.0259		Foreign equity participation
				The score will be inversely proportional to the maximum foreign equity participation permitted in a domestic logistics firm.
0.0194	n.a.	0.0194		Licensing
			0.00	No licensing requirements for the provision of transportation services.
			1.00	Licensing requirements for the provision of transportation services.
0.0259	n.a.	0.0259		Discriminatory licensing
			0.00	No discriminatory licensing for the provision of transportation services.
			1.00	Discriminatory licensing for the provision of transportation services.
0.0259	n.a.	0.0259		Factors affecting investment
			0.30	Takeovers are hindered by regulation.
			0.30	Investors must meet performance requirements.
			0.20	Establishment subject to an economic needs test.
			0.20	Government screening of investment.
				RESTRICTIONS ON MOVEMENT OF PEOPLE:
0.0123	0.0006	0.0129		Licensing requirements on management
			0.00	No licensing requirements on directors and managers.
			0.25	Directors and managers must be domiciled in the foreign economy.
			0.50	Directors and managers must be locally licensed.
			0.75	At least 1 director or manager must be a national or resident.
			1.00	All directors or managers or at least a majority of them must be nationals or residents.
0.0123	0.0006	0.0129		Movement of people – Permanent
			0.00	Executives, senior managers or staff can stay a period of more than 4 years.
			0.20	Executives, senior managers or staff can stay a period of up to 4 years.
			0.40	Executives, senior managers or staff can stay a period of up to 3 years.
			0.60	Executives, senior managers or staff can stay a period of up to 2 years.
			0.80	Executives, senior managers or staff can stay a period of up to 1 year.
			1.00	No entry of executives, senior management or staff.

0.0123	0.0006	0.0129		Movement of people - Temporary
			0.00	Temporary entry of executives, senior managers and/or specialists over 90 days.
			0.25	Temporary entry of executives, senior managers and/or specialists up to 90 days.
			0.50	Temporary entry of executives, senior managers and/or specialists up to 60 days.
			0.75	Temporary entry of executives, senior managers and/or specialists up to 30 days.
			1.00	No temporary entry of executives, senior managers and/or specialists.
0.0129	n.a.	0.0129		Local employment requirements
			0.00	No local employment requirements of hiring of local residents.
			1.00	Local employment requirements of hiring of local residents.
0.0194	n.a.	0.0194		Difficulty in firing
			0.00	No noted burdensome practices required to layoff, severance packages, etc.
			1.00	Noted burdensome practices required to layoff, severance packages, etc.
				RESTRICTIONS ON MARITIME TRANSPORT:
0.0184	0.0010	0.0194		Cabotage restrictions
			0.00	No cabotage restrictions.
			0.50	Restrictions on length of time cargoes can be carried.
			0.75	Foreigners that fly the national flag can provide domestic maritime services.
			1.00	Foreigners generally cannot provide domestic maritime services.
0.0123	0.0006	0.0129		Cargo reservation
			0.00	No restrictions on types of cargo that may be carried.
			1.00	Restrictions on types of cargo that may be carried.
0.0129	n.a.	0.0129		Cargo handling
			0.00	No restrictions on foreign maritime firms to provide own or third-party cargo handling services.
			0.50	Foreign maritime firms are subject to foreign equity, nationality or licensing requirements to provide cargo handling services.
			1.00	Foreign maritime firms have no access to provide cargo handling services.
0.0123	0.0006	0.0129		Storage and warehousing
			0.00	No restrictions on foreign maritime firms to provide own or third-party storage and warehousing services.
			0.50	Foreign maritime firms are subject to foreign equity, nationality or licensing requirements to provide storage and warehousing.
			1.00	Foreign maritime firms have no access to provide storage and warehousing services.
0.0123	0.0006	0.0129		Container station and depot services
			0.00	No restrictions on foreign maritime firms to provide own or third-party container station and depot services.
			0.50	Foreign maritime firms are subject to foreign equity, nationality or licensing requirements to provide container station and depot services.
			1.00	Foreign maritime firms have no access to provide container station and depot services.

0.0194	n.a.	0.0194		General competition legislation
			0.00	Existence of a legislative framework to regulate the behavior of shipping conferences or domestic shipping lines.
			1.00	Absence of a legislative framework to regulate the behavior of shipping conferences or domestic shipping lines.
0.0129	n.a.	0.0129		Monopolized handling of port-related services
			0.00	No existence of port monopoly of port-related services.
			0.50	Licenses granted to limit number of cargo handlers.
			1.00	Ports controlled by one authority.
				RESTRICTIONS ON AVIATION TRANSPORT:
0.0065	n.a.	0.0065		Take-off and landing slots
			0.00	Sufficient allocation of take-off and landing slots.
			1.00	No or limited allocation of take-off and landing slots.
0.0065	n.a.	0.0065		Ground-handling
			0.00	No restrictions on foreign aviation firms to provide own or third-party ground-handling services such as aircraft parking, refueling or passenger handling.
			0.50	Foreign aviation firms are subject to foreign equity, nationality or licensing requirements to provide ground-handling services such as aircraft parking, refueling or passenger handling.
			1.00	Foreign aviation firms have no access to provide ground-handling services such as aircraft parking, refueling or passenger handling.
0.0259	n.a.	0.0259		Cargo-handling and warehousing
			0.00	No restrictions on foreign aviation firms to provide own or third-party cargo-handling and warehousing facilities.
			0.50	Foreign aviation firms are subject to foreign equity, nationality or licensing requirements to provide cargo-handling and warehousing facilities.
			1.00	Foreign aviation firms have no access to provide cargo-handling and warehousing facilities.
0.0065	n.a.	0.0065		Foreign investment in domestic airlines
			0.00	Investment in domestic airlines by foreign airlines is allowed.
			1.00	Investment in domestic airlines by foreign airlines is not allowed.
0.0259	n.a.	0.0259		Open skies agreement
			0.00	Have signed an open skies agreement with more than 5 countries.
			0.50	Have signed an open skies agreement with 3 to 5 countries.
			1.00	Have signed an open skies agreement with 2 or fewer countries.
0.0259	n.a.	0.0259		Seventh freedom rights
			0.00	Seventh freedom rights are granted to some foreign carriers.
			1.00	The open skies policy does not include seventh freedom rights.
0.0259	n.a.	0.0259		Cabotage restrictions
			0.00	Cabotage or eighth freedom rights are granted to some foreign carriers.
			1.00	The open skies policy does not include eighth freedom rights.

0.0259	n.a.	0.0259		Multiple designation on international routes
			0.00	Two or more carriers including the private carriers roughly have equal rights in being designated for flying international routes.
			0.50	The national carrier has the priority in gaining international rights over the domestic private carriers, or domestic private carriers are not eligible to fly international routes before fulfilling some conditions such as servicing domestic market for a certain period of time.
			1.00	The national carrier is predominantly the designated airline servicing international routes.
				RESTRICTIONS ON ROAD TRANSPORT:
0.0307	0.0016	0.0324		Equipment usage
			0.00	No restrictions on equipment usage, rental of vehicles or fleet size.
			1.00	Restrictions on equipment usage, rental of vehicles or fleet size.
0.0324	n.a.	0.0324		Hours of operation
			0.00	No restrictions on hours of operation.
			1.00	Restrictions on hours of operation.
				OTHER:
0.0129	n.a.	0.0129		Statutory government monopolies
				The score for an economy is taken from a table of 5 categories, in which logistics services occur through statutory government monopolies.
0.9922	0.0078	1.00		Total

Notes:

n.a. = not applicable

a) Totals may not add due to rounding.

b) R is the restriction category weighting.

c) MFN is the most-favored-national category weighting.

d) Total of restriction category and most-favored-national category weightings.

3.3. Government Monopolies

If selected logistics services are controlled by a statutory government-owned monopoly, this limits other domestic and foreign firms from entering the market. The statutory government monopolies category score is based on the presence of government monopolies in five logistics services categories as given in Table 3.

Table 3. Logistics Services Categories Scored for the Presence of Government Monopolies

Product Categories
Monopolized handling of cargo
Monopolized postal service
State trading rights
Container trucking
Ground handling services

The presence of a government monopoly in any category receives a score of 1, and the scores from each category are totaled and divided by 5 to show the extent of the restrictions for all categories. Table 4 outlines the scoring for the category “statutory government monopolies”.

Table 4. Scores for Statutory Government Monopolies

Score	Presence of government monopolies
0.00	Logistics service is not controlled by a statutory government-owned monopoly.
1.00	Logistics service is controlled by a statutory government-owned monopoly.

3.4. MFN Exemptions

An issue arises when scoring economies that allow reciprocal or preferential treatment with a particular set of partner economies through most-favored-nation (MFN) exemptions. If the details of the reciprocal or preferential treatment were known, this information could be built directly into the computation of the restrictiveness index on a bilateral basis. For example, if an economy granted preferential treatment on the temporary movement of people with a partner economy, and the extent of the preferential treatment was known, its restrictiveness index score for this restriction category could be computed separately for that partner economy and would be lower than against other economies. However, such details are not available.

Information on MFN exemptions for any relevant restriction category is drawn from the GATS Article II MFN Exemptions, accessed from the WTO Services Database. These exemptions specify the sector coverage, the economies to which they apply and the intended duration, but not the nature or extent of the reciprocal or preferential treatment needed to disentangle such details.

The approach taken in this study to scoring economies that have MFN exemptions is similar to that in McGuire *et al.* (2000) and Kalirajan (2000). Each type of exemption is scored rather than adjusting each restriction category for any reciprocal or preferential arrangement between two economies. The scoring still recognizes that an economy that

applies an MFN exemption to one or a number of economies has lower restrictions overall than an economy without such an arrangement. Thus, economies with MFN exemptions receive a lower score than economies without these arrangements. The relevant categories are: foreign equity participation, licensing requirements on management, movement of people – permanent, movement of people – temporary, maritime cabotage, maritime cargo reservation, maritime storage and warehousing, and road equipment usage. The scores for the MFN exemptions are outlined in Table 5.

Table 5. Scores for MFN exemptions

Score	Type of MFN exemption
1.00	No MFN exemption
0.50	MFN exemption with reciprocity with selected or all economies
0.00	MFN exemption with preferential treatment with selected or all economies

MFN exemptions are assigned scores in a matrix to measure how the 16 economies treat each other. For example, Brunei Darussalam has a preferential treatment MFN exemption with Indonesia, Malaysia and Singapore on entry and temporary stay of workers. In the matrix for temporary movement of people, Indonesia, Malaysia and Singapore receive a score of 0 and the 12 remaining economies receive a score of 1. The total score of 12 is divided by 15 to obtain a pro rata score for the number of economies to which the MFN exemption is not applicable. The denominator of 15 reflects the number of economies in the sample that Brunei Darussalam can potentially trade with, since it cannot have a MFN exemption with itself. Thus, Brunei Darussalam scores 0.8 for temporary movement of people. This score is then multiplied by the respective MFN weighting in Table 2, where the MFN weighting represents five percent of the total category weighting.³

3.5. Foreign and Domestic Indices

The methodology of the logistics sector restrictiveness index has been developed to assess the overall restrictiveness environment of differing degrees of restriction between

³ The MFN weighting follows McGuire *et al.* (2000).

economies. The greater the restrictions on LSPs, the greater the logistics sector restrictiveness index score. But governments do not apply the same set of restrictions to foreign and domestic logistics firms, and these restrictions are discriminatory in nature. Thus a score has been calculated separately for domestic and foreign service suppliers. The foreign restrictiveness index covers restrictions that are relevant to foreign logistics service suppliers and the domestic restrictiveness index covers restrictions relevant to all logistics service suppliers. Because foreign suppliers face more restrictions, fewer restriction categories are relevant for the domestic restrictiveness index than for the foreign restrictiveness index. Categories that are relevant for the foreign and domestic restrictiveness indices are presented in Table 6.

Table 6. Relevance of Restriction Categories for Foreign and Domestic Restrictiveness Indices

Restriction category	Relevant for foreign index	Total weight ^a	Relevant for domestic index	Total weight ^a
Restrictions on customs				
Customs documents	Yes	0.0388	Yes	0.0388
Customs signatures	Yes	0.0388	Yes	0.0388
Import licensing	Yes	0.0388	Yes	0.0388
Local language	Yes	0.0065	Yes	0.0065
Customs inspections	Yes	0.0388	Yes	0.0388
Import restrictions	Yes	0.0065	Yes	0.0065
Customs Electronic Data Interchange (EDI)	Yes	0.0388	Yes	0.0388
Harmonized Commodity Description and Coding System (HS)	Yes	0.0356	Yes	0.0356
Possibility of a review for imports	Yes	0.0324	Yes	0.0324
Customs operating hours	Yes	0.0194	Yes	0.0194
Customs brokerage services	Yes	0.0129	Yes	0.0129
Customs clearance	Yes	0.0324	Yes	0.0324
Customs procedures time	Yes	0.0324	Yes	0.0324
Customs charges or fees	Yes	0.0194	Yes	0.0194
Improper penalties or fees	Yes	0.0259	Yes	0.0259
Discriminatory fees or inspection practices	Yes	0.0194	No	n.a.
DeMinimis level	Yes	0.0388	Yes	0.0388

Restrictions on investment				
Commercial presence	Yes	0.0259	No	n.a.
Foreign equity participation	Yes	0.0259	Yes	0.0259
Licensing	Yes	0.0194	Yes	0.0194
Discriminatory licensing	Yes	0.0259	No	n.a.
Factors affecting investment	Yes	0.0259	Yes	0.0259
Restrictions on movement of people				
Licensing requirements on management	Yes	0.0129	No	n.a.
Movement of people – Permanent	Yes	0.0129	No	n.a.
Movement of people – Temporary	Yes	0.0129	No	n.a.
Local employment requirements	Yes	0.0129	Yes	0.0129
Difficulty in firing	Yes	0.0194	Yes	0.0194
Restrictions on maritime transport				
Cabotage restrictions	Yes	0.0194	No	n.a.
Cargo reservation	Yes	0.0129	Yes	0.0129
Cargo handling	Yes	0.0194	No	n.a.
Storage and warehousing	Yes	0.0129	No	n.a.
Container station and depot services	Yes	0.0129	No	n.a.
General competition legislation	Yes	0.0129	Yes	0.0129
Monopolized handling of port-related services	Yes	0.0129	Yes	0.0129
Restrictions on aviation transport				
Take-off and landing slots	Yes	0.0065	Yes	0.0065
Ground-handling	Yes	0.0065	No	n.a.
Cargo-handling and warehousing	Yes	0.0259	No	n.a.
Foreign investment in domestic airlines	Yes	0.0065	Yes	0.0065
Open skies agreement	Yes	0.0259	No	n.a.
Seventh freedom rights	Yes	0.0259	No	n.a.
Cabotage restrictions	Yes	0.0259	No	n.a.
Multiple designation on international routes	Yes	0.0259	No	n.a.
Restrictions on road transport				
Equipment usage	Yes	0.0324	No	n.a.
Hours of operation	Yes	0.0324	Yes	0.0324
Other				
Statutory government monopolies	Yes	0.0129	Yes	0.0129
Total weighting or highest possible score		1.00		0.6634

Notes: n.a. = not applicable

a) Totals may not add due to rounding.

A domestic and foreign restrictiveness index score has been calculated for each of the 16 economies by summing the relevant weighted scores of each restriction category. The foreign restrictiveness index score for an economy will always be greater than the domestic index score. The maximum possible foreign restrictiveness index score is 1 and the maximum possible domestic restrictiveness index score is 0.6634. The difference between

the foreign and domestic restrictiveness indices represents a measure of discrimination against foreigners.

3.6. Data Sources and Caveats

A consolidated listing and description of restrictions on logistics services in the ASEAN+6 economies has been compiled from a number of sources, including:

- *REPSF Project No. 06/001d,*
- *WTO Trade Policy Reviews,*
- *US State Department Country Commercial Guides,*
- *The National Trade Estimate Report on Foreign Trade Barriers from the Office of the United States Trade Representative,*
- *APEC Investment Guide,*
- *APEC Individual Action Plans,*
- *UPS Trade Barrier Survey Reports,*
- *APEC Business Travel Handbook,*
- *ASEAN Customs for Business reports,*
- *ASEAN Express Delivery Services Regulatory Matrix,*
- *The World Bank Doing Business,*
- *The World Bank's Connecting to Compete, and*
- *Country-specific sources.*

The information reflects, as best as possible, restrictions applying to logistics services as of December 2008. The validity and reliability of the restrictiveness index score for different economies depends in part on the depth and quality of information. The sources used here are the best-known sources of data on logistics services.

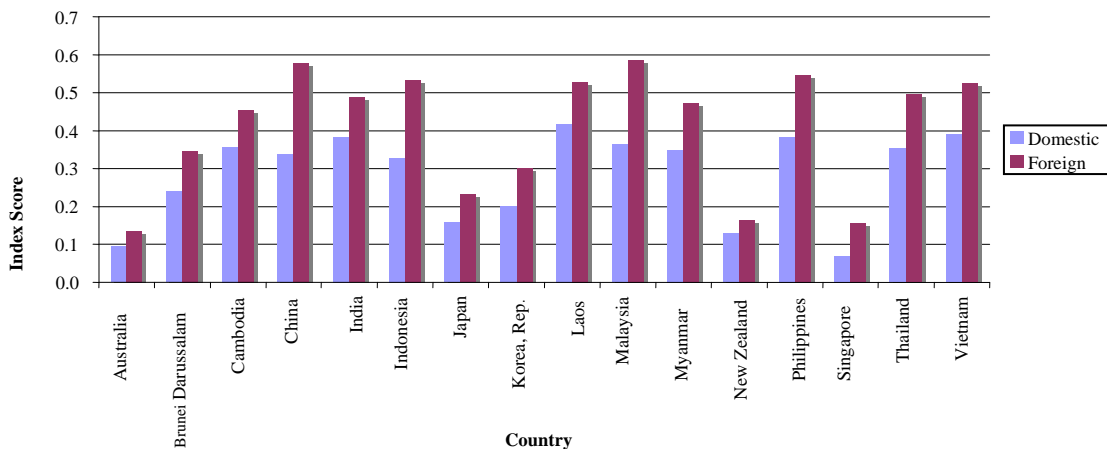
Some restrictions may not necessarily fit within a restriction category. This may be because, for example, certain restrictions apply only in one economy and are not covered by a restriction category in the restrictiveness index. These restrictions are not directly assigned a score but are used as background information in assigning appropriate scores in some restriction categories.

The weights allocated to the restriction categories in the construction of the restrictiveness index are based primarily on the classification of restrictiveness in de Souza *et al.* (2007), which in turn is based on survey responses. As such, the weighting, although based on informed judgment, is subjective. An alternative, as adopted in OECD regulatory work (for example, in Dihel and Shepherd 2007), is to derive a weighting scheme using factor analysis. However, some authors (Doove *et al.* 2001 and Deardorf and Stern 2004) have pointed out that this purely statistical technique may not represent a major improvement on the use of judgmental weights since high cross-country variation in restrictions may have little or no relationship with the true economic importance of those restrictions. This study has constructed foreign and domestic restrictiveness indices using weights derived from factor analysis as a sensitivity test. The results are given in Appendix A. It is found that these indices yield similar results on the relative regulatory restrictiveness in the logistics sectors across the ASEAN+6 economies as the indices that are based on subjective weights.

4. Results for ASEAN+6 Economies

Restrictions on LSPs vary significantly among the ASEAN+6 economies. Some economies have few restrictions while other economies have a broad range of restrictions. Results of this study are presented in Figure 2.

Figure 2. Restrictiveness Indices for ASEAN+6 Economies



Malaysia, China, Indonesia, Lao PDR, the Philippines and Vietnam are the most restricted economies for logistics services in this region, for both the domestic and foreign indices. These economies have a broad range of restrictions imposed on LSPs.

- In Lao PDR, a number of licenses are required for the importation of all goods, and the importer must apply for an import license from the Ministry of Commerce. Lao PDR also has the highest costs associated with all procedures to import and export.
- Vietnam maintains high restrictions within its maritime services. Port services are provided exclusively by Vietnamese enterprises, resulting in a high degree of discrimination. Cabotage restrictions exist where Vietnam shipping does not allow direct sailing of foreign flags, meaning foreign flags can only go to the gateway ports. Vietnam is also one of the few economies that practices cargo reservation, along with Indonesia, Malaysia and the Philippines.
- The network of public ports in the Philippines is controlled by the Philippines Ports Authority (PPA), which acts as both landlord and regulator. It leases selected berths and storage facilities to private operators and grants cargo-handling licenses to stevedoring companies that operate on common-user facilities. There is also a policy of limiting the number of cargo handlers to at most two in any port with the exception of Manila. The monopolization of cargo handling was formalized by the

previous administration under the Executive Order 59, which would have granted an exclusive contract for the handling of cargo in all ports.

- Heavy licensing requirements exist in Indonesia that also discriminates towards foreign logistics firms. For warehousing and transportation, more than three different licenses are required for all firms. Indonesia allows foreign investment in warehousing and distribution but not in transportation.
- In China trucks are not allowed daytime access in almost all major Chinese cities. It has been noted that China's enforcement efforts are often targeted at foreign transport and logistics firms, while local firms are permitted to operate without full compliance.
- The customs facilities of East Malaysia do not operate on Saturdays or Sundays. Goods arriving on Friday therefore have to wait until the following Monday, thus causing delays in shipment. On Fridays, since Malaysian customs do not operate 24 hours for religious reasons, a number of trucks have to queue overnight at the Singapore-Malaysian border.

Relatively, Singapore and Australia are the most open economies for trade in logistics services, along with Japan and New Zealand, for both the domestic and foreign indices. These economies have more liberal regulatory environments towards LSPs.

- Singapore has one of the most liberalized environments. Customs facilities are open around the clock in Singapore with fully functional EDI for customs documentation. Furthermore, licensing requirements are present in almost all countries excluding Singapore.
- Australia has the highest DeMinimis level of any economy in the region and does not require companies or individuals to hold import licenses.
- Japan maintains a highly liberalized open investment regime. It has, in principle, no performance requirement and no restriction on foreign exchange or repatriation of funds related to foreign investment. Foreign direct investment (FDI) in Japan

requires only the ex post reporting, except those in very limited sectors that require prior notification.

Malaysia, Indonesia and China are the economies that discriminate most against LSPs in this region, where foreign providers are treated less favorably than domestic providers.

- In most countries, except Singapore, foreign firms are not allowed to freely provide brokerage services. Malaysia, along with Indonesia, Thailand and Myanmar, do not allow foreign companies to own brokerage licenses. In Malaysia, customs brokerage is much sought after. This license, granted by the customs authorities, requires passing a 10-day course offered by the local customs and freight forwarders association. An applicant needs two referees. Once the certificate is granted, a firm can operate as a customs brokerage house.
- There is concern in China that a Postal Law includes language that could severely limit the ability of private express delivery firms to operate in China by reserving delivery of certain letters and other documents to China Post and Chinese domestic express delivery companies. The new Express Delivery Standards also may negatively affect foreign express delivery providers. In most economies express delivery is not regulated directly. On the related issue of air freight forwarding, wholly-foreign owned express delivery companies cannot qualify for an Air Transport Agency license and therefore do not have the ability to directly load cargo on Chinese domestic or international flights, but instead must work through a Chinese agent.

5. Regulatory Restrictiveness and Logistics Sector Performance

Using the results of the logistics sector restrictiveness index, it is possible to extend the analysis to conduct a preliminary investigation of the relationship between logistics regulatory restrictiveness and logistics sector performance. Section 5.1 explores this relationship by plotting the restrictiveness index against the World Bank's Logistics

Performance Index (LPI) – both the overall index, as well as selected components that form the LPI. Section 5.2 focuses on the relationship between customs regulations and the customs component of the LPI, as customs regulations are considered to pose the greatest barrier to trade in logistics services.

5.1. Logistics Performance Index

The World Bank’s Logistics Performance Index is used as the performance indicator. The LPI is a composite index based on information from a web-based questionnaire completed by more than 800 logistics professional worldwide on seven areas of performance (Arvis *et al.* 2007). These are: customs, infrastructure, international shipments, logistics competence, tracking and tracing, domestic logistics costs, and timeliness. A lower LPI score indicates a worse logistics sector performance. Unlike the restrictiveness index, which can be considered an objective indicator based on hard information, the LPI is a perceptions index.

This section assesses whether relationships exist between the performance of the logistics sector, as captured by the LPI, and the regulatory environment, as captured by the logistics sector restrictiveness index constructed in this study. Since the primary focus of this paper is on the regulatory barriers to international trade in logistics services, the foreign restrictiveness index is used in the analysis. Figure 3 supports that a general relationship exists between the two indices.

Because each of these indices is representative of the whole logistics industry, direct comparisons between the two indices may conceal the specific relationships that exist. Instead, each component of the LPI was plotted against the foreign restrictiveness index. The exception is the LPI component ‘quality transport and information technology infrastructure for logistics’, as the logistics sector restrictiveness index does not include regulations that affect the quality of infrastructure.

Figure 4 through Figure 8 plot five of the LPI components against the foreign logistics sector restrictiveness index.

Figure 3. Logistics Performance Index vs. Foreign Restrictiveness Index

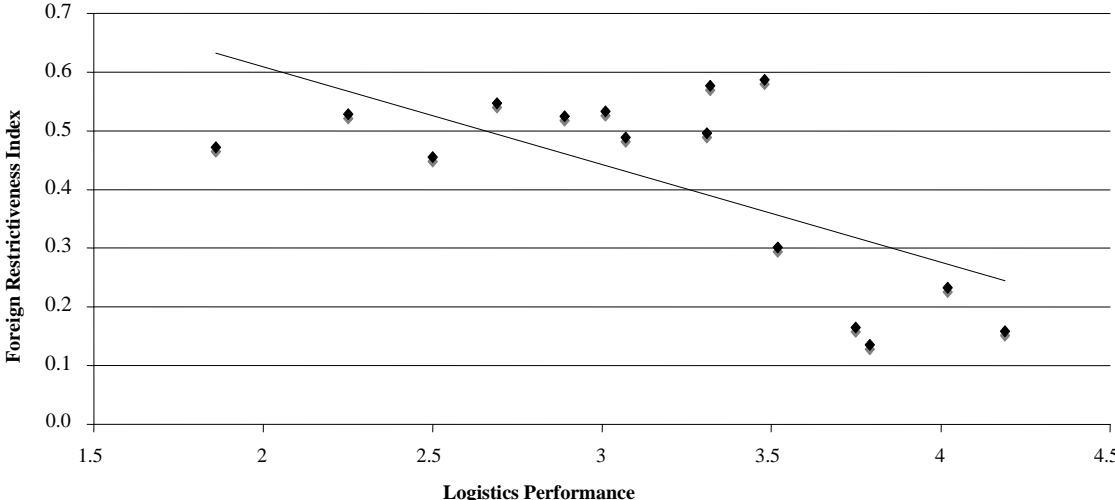


Figure 4. LPI International Shipment Index vs. Foreign Restrictiveness Index

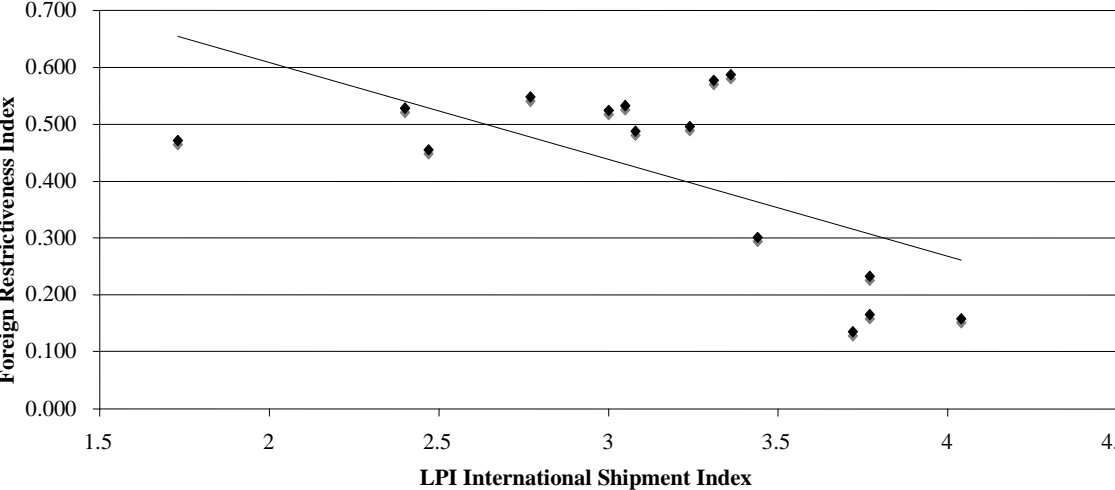


Figure 5. LPI Logistics Competence Index vs. Foreign Restrictiveness Index

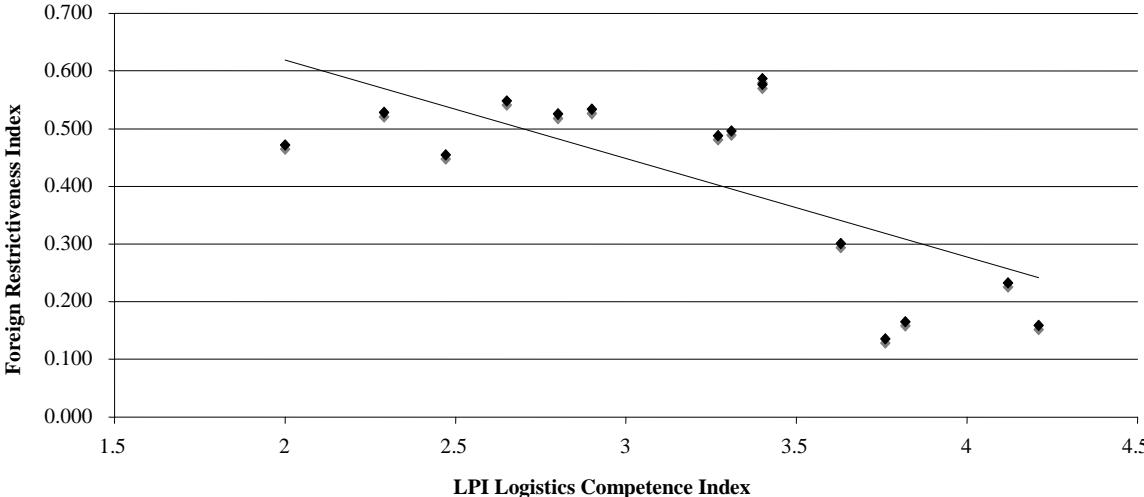


Figure 6. LPI Tracking and Tracing Index vs. Foreign Restrictiveness Index

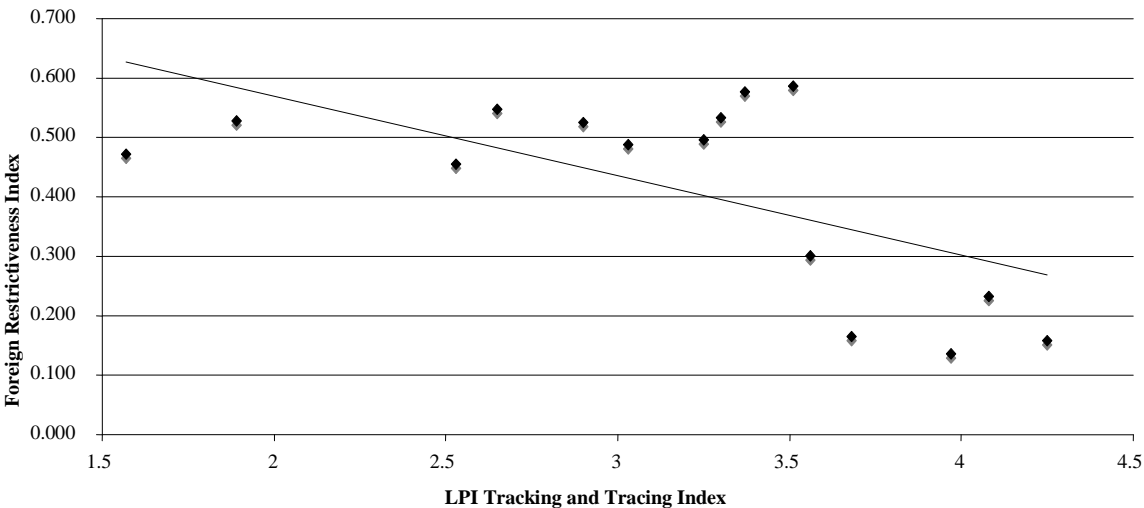


Figure 7. LPI Domestic Logistics Costs vs. Foreign Restrictiveness Index

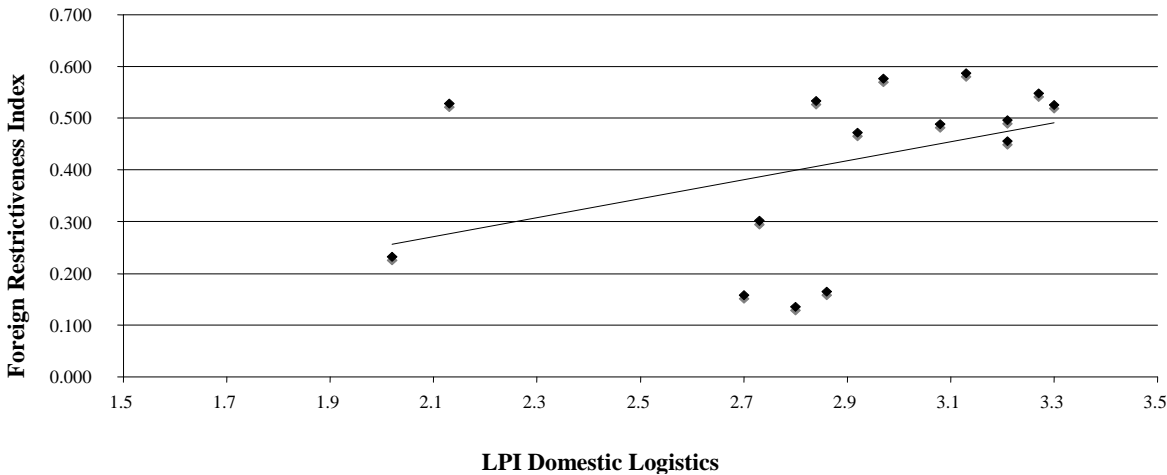
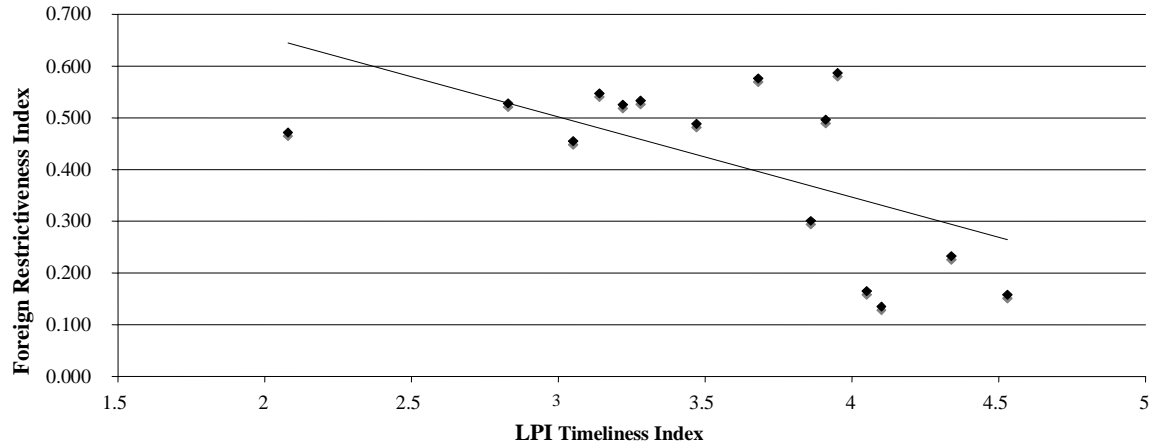


Figure 8. LPI Timeliness Index vs. Foreign Restrictiveness Index



Clear correlations exist between four LPI components and the logistics sector restrictiveness index constructed in this study. The only exception is the domestic logistics costs component of the LPI, which has a slight positive relationship, if any.⁴ Overall, the higher the LPI score for each component, indicating better overall logistics performance in that component, then the lower the logistics sector restrictiveness index score, indicating a

⁴ This result is unsurprising, as World Bank researchers have found that domestic logistics costs were uncorrelated to the other areas in the LPI, which could indicate data irregularities. This component was dropped from the composition of the LPI (Arvis *et al.* 2007).

less restrictive regulatory environment. The results indicate that the less restrictive the regulatory environment in which LSPs operate in each economy, then the better the perceived overall logistics performance within that economy.⁵

5.2. Customs Regulations and Efficiency

Customs regulations are considered to pose the greatest barrier to trade in logistics services. Furthermore, the customs component of this study has the greatest number of identified trade restrictions. A customs restrictiveness index was constructed using the same methodology as in Section III.⁶ Customs restriction categories and their appropriate weights for the foreign and domestic indices are presented in Table 7.

Table 7. Customs Restrictiveness Index Weights

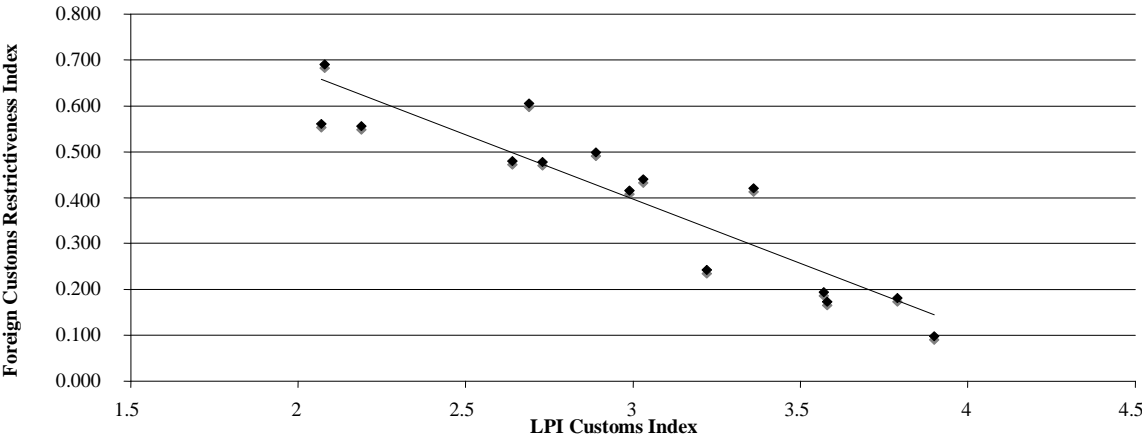
Restriction Category	Foreign index weightings^a	Domestic index weightings^a
Restrictions on customs		
Customs documents	0.0889	0.0889
Customs signatures	0.0889	0.0889
Import licensing	0.0889	0.0889
Local language	0.0148	0.0148
Customs inspections	0.0889	0.0889
Import restrictions	0.0148	0.0148
Customs Electronic Data Interchange (EDI)	0.0889	0.0889
Harmonized Commodity Description and Coding System (HS)	0.0815	0.0815
Possibility of a review for imports	0.0741	0.0741
Customs operating hours	0.0444	0.0444
Customs brokerage services	0.0296	0.0296
Customs clearance	0.0741	0.0741
Customs procedures time	0.0741	0.0741
Customs charges or fees	0.0444	0.0444
Improper penalties or fees	0.0593	0.0593
Discriminatory fees or inspection practices	0.0444	n.a.
Total weighting or highest possible score	1.00	0.9556

⁵ A non-linear correlation between the foreign logistics restrictiveness index and the different LPI components appears to exist in Figure 4 through Figure 8. One recognized extension of this paper would be to extend the analysis to test a non-linear relationship.

⁶ A customs restrictiveness index constructed using weights derived from factor analysis is presented in Appendix A.

Figure 9 plots the customs component of the LPI against the foreign customs restrictiveness index.

Figure 9. LPI Customs Index vs. Foreign Customs Restrictiveness Index



Again, a strong correlation exists between the customs components of the LPI and the newly constructed foreign customs restrictiveness index of this study. The less customs restrictions faced by LSPs, then the better the perceived customs performance within that economy.

6. Conclusion

Although past studies have explored the regulatory performance within specific logistics sub-sectors such as maritime and aviation (for examples see Doove *et al.* 2001 and McGuire *et al.* 2000), this is the first study of its kind to measure a regulatory index of the entire logistics sector. The results of this study have illustrated that large differences exist in the regulatory environment for logistics of the ASEAN+6 economies. Many of these economies are open to trade in logistics services, while others are relatively restrictive.

This study furthered this analysis by using the restrictiveness index to see what relationships may exist between regulatory restrictions and logistics sector performance,

with the latter measured by the World Bank's survey-based Logistics Performance Index (LPI). Clear relationships exist between the perceived performance of the logistics sector and the regulatory environment. There is evidence of negative correlations between the logistics restrictiveness index and the overall LPI, as well as various components that form the LPI, namely: international shipments, logistics competence, tracking and tracing, and timeliness. In addition, a customs restrictiveness index constructed using the sub-set of customs regulations is found to be strongly and negatively correlated with the customs component of the LPI. These findings support that notion that a less restricted trade environment results in better performance for the logistics sector. The results of this paper may aid in future research regarding logistics sector performance. Trade performance has been linked to the quality of logistics services. Future work could extend this analysis to explore the economy-wide impacts of regulations on LSPs.

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Appendix A. Factor Analysis

This section uses an alternative weighting method to the one outlined in Section III in computing the restrictiveness index. Factor analysis is applied to the dataset of regulations to derive restriction category weights. This involves estimating a series of factors that are combinations of the components. These factors explain the bulk of the variation in the scores in the component categories. The weights used in the formation of the first (or most powerful) factor can then be used to form the restrictiveness index. The weights of this factor are listed in Table 1A along with the previous weights for comparison. All other methodology for constructing the scores has not changed.

Table 1A. Factor Analysis Weights of Restriction Categories

Restriction category	Factor Analysis		Regular	
	Foreign index total weightings ^a	Domestic index total weightings ^a	Foreign index total weightings ^a	Domestic index total weightings ^a
Restrictions on customs				
Customs documents	0.0290	0.0290	0.0388	0.0388
Customs signatures	0.0326	0.0326	0.0388	0.0388
Import licensing	0.0451	0.0451	0.0388	0.0388
Local language	0.0169	0.0169	0.0065	0.0065
Customs inspections	0.0160	0.0160	0.0388	0.0388
Import restrictions	0.0055	0.0055	0.0065	0.0065
Customs Electronic Data Interchange (EDI)	0.0505	0.0505	0.0388	0.0388
Harmonized Commodity Description and Coding System (HS)	0.0611	0.0611	0.0356	0.0356
Possibility of a review for imports	0.0093	0.0093	0.0324	0.0324
Customs operating hours	0.0112	0.0112	0.0194	0.0194
Customs brokerage services	0.0561	0.0561	0.0129	0.0129
Customs clearance	0.0338	0.0338	0.0324	0.0324
Customs procedures time	0.0338	0.0338	0.0324	0.0324
Customs charges or fees	0.0001	0.0001	0.0194	0.0194
Improper penalties or fees	0.0179	0.0179	0.0259	0.0259
Discriminatory fees or inspection practices	0.0214	n.a.	0.0194	n.a.
DeMinimis level	0.0471	0.0471	0.0388	0.0388

Restrictions on investment				
Commercial presence	0.0005	n.a.	0.0259	n.a.
Foreign equity participation	0.0226	0.0226	0.0259	0.0259
Licensing	0.0338	0.0338	0.0194	0.0194
Discriminatory licensing	0.0414	n.a.	0.0259	n.a.
Factors affecting investment	0.0332	0.0332	0.0259	0.0259
Restrictions on movement of people				
Licensing requirements on management	0.0123	n.a.	0.0129	n.a.
Movement of people – Permanent	0.0025	n.a.	0.0129	n.a.
Movement of people – Temporary	0.0046	n.a.	0.0129	n.a.
Local employment requirements	0.0147	0.0147	0.0129	0.0129
Difficulty in firing	0.0378	0.0378	0.0194	0.0194
Restrictions on maritime transport				
Cabotage restrictions	0.0175	n.a.	0.0194	n.a.
Cargo reservation	0.0178	0.0178	0.0129	0.0129
Cargo handling	0.0483	n.a.	0.0194	n.a.
Storage and warehousing	0.0128	n.a.	0.0129	n.a.
Container station and depot services	0.0108	n.a.	0.0129	n.a.
General competition legislation	0.0177	0.0177	0.0129	0.0129
Monopolized handling of port-related services	0.0036	0.0036	0.0129	0.0129
Restrictions on aviation transport				
Take-off and landing slots	0.0053	0.0053	0.0065	0.0065
Ground-handling	0.0516	n.a.	0.0065	n.a.
Cargo-handling and warehousing	0.0157	n.a.	0.0259	n.a.
Foreign investment in domestic airlines	0.0071	0.0071	0.0065	0.0065
Open skies agreement	0.0243	n.a.	0.0259	n.a.
Seventh freedom rights	0.0005	n.a.	0.0259	n.a.
Cabotage restrictions	0.0042	n.a.	0.0259	n.a.
Multiple designation on international routes	0.0359	n.a.	0.0259	n.a.
Restrictions on road transport				
Equipment usage	0.0060	n.a.	0.0324	n.a.
Hours of operation	0.0203	0.0203	0.0324	0.0324
Other				
Statutory government monopolies	0.0096	0.0096	0.0129	0.0129
Total weighting or highest possible score	1.00	0.7202	1.00	0.6634

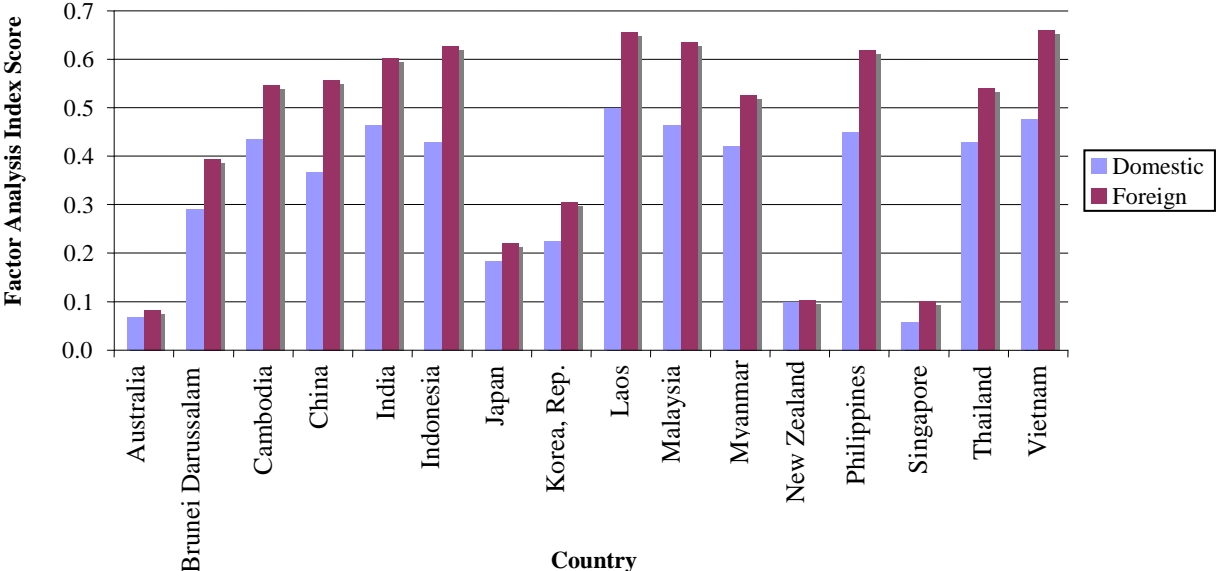
Notes:

n.a. = not applicable

a Totals may not add due to rounding.

The factor analysis weighted restrictiveness index scores are presented in Figure 2. The overall results are the same. Australia, Singapore, New Zealand and Japan are the most open economies, while Vietnam, Laos, Malaysia, Indonesia and India are the most restrictive. China, Myanmar and Thailand all have foreign index scores above 0.50.

Figure 1A. Restrictiveness Indices for ASEAN+6 Economies Employing Factor Analysis



Factor analysis was also used to construct the weightings for the customs regulatory index, as outlined in Section 5.2. Table 2A outlines the customs restriction categories and their appropriate weights for the foreign and domestic indices.

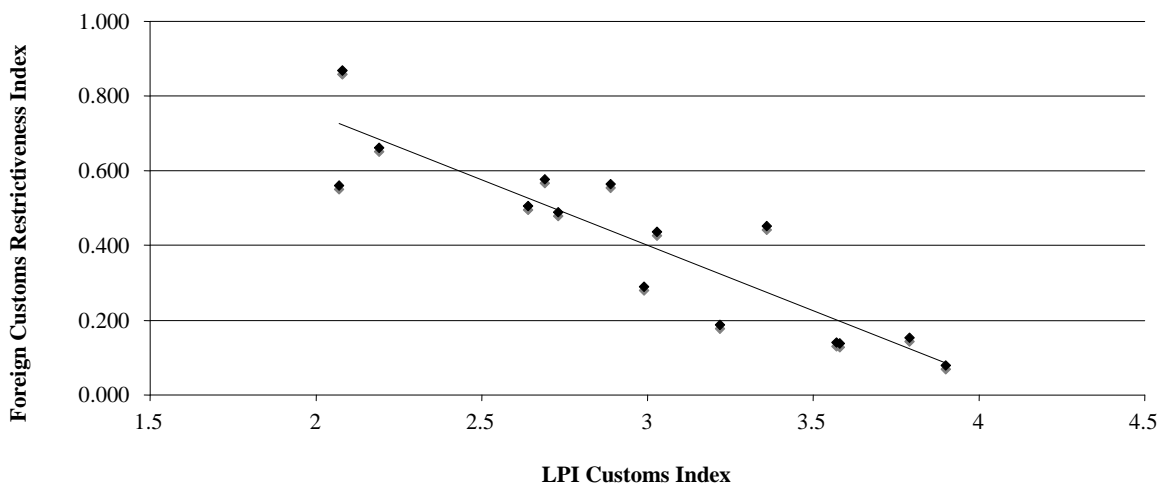
Figure 2A plots the customs component of the LPI against the foreign customs restrictiveness index using the factor analysis restriction category weightings.

Similar to Figure 8, a strong correlation exists between the customs components of the LPI and the foreign customs restrictiveness index weighted using factor analysis.

Table 2A. Customs Regulatory Index Weightings

Restriction category	Foreign index weightings ^a	Domestic index weightings ^a
Restrictions on customs		
Customs documents	0.0987	0.0987
Customs signatures	0.0864	0.0864
Import licensing	0.0666	0.0666
Local language	0.0661	0.0661
Customs inspections	0.0276	0.0276
Import restrictions	0.0138	0.0138
Customs Electronic Data Interchange (EDI)	0.1424	0.1424
Harmonized Commodity Description and Coding System (HS)	0.1039	0.1039
Possibility of a review for imports	0.0172	0.0172
Customs operating hours	0.0086	0.0086
Customs brokerage services	0.1026	0.1026
Customs clearance	0.1162	0.1162
Customs procedures time	0.1162	0.1162
Customs charges or fees	0.0114	0.0114
Improper penalties or fees	0.0154	0.0154
Discriminatory fees or inspection practices	0.0068	n.a.
Total weighting or highest possible score	1.00	0.9932

Figure 2A. LPI Customs Index vs. Foreign Customs Restrictiveness Index



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