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## **Services Trade Restrictiveness Index (STRI): Logistics Services**

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## Abstract

### SERVICES TRADE RESTRICTIVENESS INDEX (STRI): LOGISTICS SERVICES

by

Kazuhiro Sugie, Massimo Geloso Grosso, Hildegunn Kyvik Nordås,  
Sébastien Miroudot, Frederic Gonzales and Dorothée Rouzet, OECD

This paper presents the services trade restrictiveness indices (STRIs) for logistics services. The STRIs are composite indices taking values between zero and one, zero representing an open market and one a market completely closed to foreign services providers. The indices are calculated for 40 countries, the 34 OECD members and Brazil, the People's Republic of China, India, Indonesia, the Russian Federation and South Africa. The STRIs capture de jure restrictions. This report presents the first vintage of indicators for logistics services and captures regulations in force in 2014. The scores range from 0.08 to 1 for cargo-handling services, 0.04 to 1 for storage and warehouse services, 0.02 to 0.58 for freight transport agency services and 0.03 to 1 for customs brokerage services. It is observed that the regulatory profile differs across countries. In cargo-handling and storage and warehouse services, one country reserves all services provision to a statutory monopoly while another country reserves cargo-handling to a monopoly at port. Freight transport agency has the lowest average score among four subsectors while restrictions on foreign entry, restrictions on the movement of people and regulatory transparency significantly contribute to the results. One country is completely closed to foreign participation in customs brokerage services. The paper presents the list of measures included in the indices, the scoring and weighting system for calculating the indices and an analysis of the results.

**Keywords:** Services trade, services trade restrictions, logistics services, cargo-handling services, storage and warehouse services, freight transport agency services, customs brokerage services, regulation

**JEL classification:** F13, F14, K33, L87, L89, L91

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The STRI project for logistics services started with an expert meeting where the list of measures was discussed. The STRI team is grateful for the insights and advice that all the participants brought to the meeting. The STRI database has been put together by going through laws and regulation in each of the 40 countries included. Each entry is documented by the source and a web link to the law or regulation and each government has fact-checked the database. Needless to say this has been an enormous task and the OECD Secretariat would like to thank Member governments for reviewing and peer reviewing the databases. We will also like to thank Mariam Abdova, Beatriz Cano Buchholz, Ekaterina Burdina, Siu Fun Cheng, Stellina Galitopoulou, Ahmet Gulsen, Dora Hajdu, Anthony Halley, Anna Jankowska, Gimin Kang, Fatma Kayhan, Yunhee Kim, Maria Kopyta, Hendric Richter, Humberto Lopez Rizzo, Inese Rozenstein, Baron Sacharidis, Katharina Sass, Jonathan Senft, Marie Sudreau, Lucie Vondrackova, Jozefien Willemen and Aviad Ben Yehuda who provided excellent research assistance in creating the database. Also thanks to the University of Adelaide and project managers Christopher Findlay and Uwe Kaufman for creating the database for Key Partners. Special thanks to Rainer Lanz and Alexander Ragoussis for their contribution to the design of the STRI methodology. A special thanks also to Asako Ueno for her great leadership at the beginning of this study and to Kristina Jones, Maria Eugenia Le Gourrierec and Inese Rozenstein for their support. The weighting scheme for the STRI indices is derived from an online survey. Thanks to everybody that took time to do the survey. Finally, the

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## Executive summary

This paper presents results for the Services Trade Restrictiveness Index (STRI) for logistics services. The STRI indices are calculated for four subsectors, cargo-handling, storage and warehouse, freight transport agency and customs brokerage services. They cover all 34 OECD countries, the Russian Federation, Brazil, the People's Republic of China, India, Indonesia and South Africa. The logistics services account for a relatively small share of GDP, around 1.5% on average of OECD members for which information is available while they play a crucial role to enhance and facilitate the global value chains of manufactures, retailers and carriers. Trade in logistics services has mainly taken place through commercial presence (Mode 3) and the STRI results highlight the importance of impediments affecting trade via this mode.

The STRI indices take values between zero and one, one representing a totally closed and zero a fully open sector. The result of cargo-handling services shows that the overall level of restrictiveness varies among countries, ranging from 0.08 to 1, with a sample average of 0.22. One country reserves all services provision to a statutory monopoly and another country reserves cargo-handling to a monopoly at ports. *Barriers to competition* significantly contribute to the results. This is partly explained by pervasive state ownership in the sector. *Restrictions on foreign entry* also play a substantial role in more restrictive countries covered by the STRI.

For storage and warehouse services, the result indicates that, while the overall level of restrictiveness is low (with a sample average of 0.17), there is however large variation in the STRI indices among countries ranging from 0.04 to 1. Similar to cargo-handling services, services provision is reserved for a statutory monopoly in one country while another retains a monopoly at ports.

With respect to freight transport agency services, the result shows that the overall level of the restrictiveness ranges from 0.02 to 0.58 with a sample average of 0.14. Three policy areas that significantly contribute to the overall indices for freight transport agency services are *Restrictions on foreign entry*, *Restrictions on the movement of people* and *Regulatory transparency*. For more restrictive countries, a higher score in *Restrictions on foreign entry* is observed. This is partly explained by foreign equity restrictions, requirement for commercial presence, screening and restrictions on board of directors.

The STRI average for customs brokerage services is 0.18, ranging from 0.03 to 1. One country is completely closed to foreign participation in this sector. *Restrictions on the movement of people* and *Regulatory transparency* contribute significantly to the indices in many countries.

The STRI indices are also broken down according to market access and national treatment versus domestic regulation and other; by modes of supply and finally they are decomposed into discriminatory and non-discriminatory measures.

## I. Introduction

As part of the OECD Services Trade Restrictiveness Index (STRI) project, this paper presents the STRI indices for all 34 OECD countries, Russia, Brazil, China, India, Indonesia and South Africa for logistics services. The STRI project was launched by the Trade Committee in June 2007 as a tool for quantifying barriers to trade in services at the sector level (OECD, 2007). The major outputs from the project are:

- A regulatory database, providing detailed information on current laws and regulations affecting international trade in services.
- Trade restrictiveness indices which provide a snapshot of the trade policy stance at a particular point in time.

The STRI database contains information on market access, national treatment, relevant domestic regulation and administrative procedures in all 34 OECD member countries, Russia, Brazil, China, India, Indonesia and South Africa. The database records policy measures applied on a most-favoured nation (MFN) basis and does not consider preferential treatment entailed in regional trade agreements.<sup>1</sup> The sources of information for the database are laws and regulation in each country. Each entry is documented by reference to the source. The countries included have verified their data and subsequently the database has been subject to peer review assessing their factual accuracy.

The STRI indices transform the qualitative information contained in the database to numerical values that can be used for quantitative policy analysis, including impact assessment of policy reforms. The methodology for calculating the indices is described in a separate document (Geloso Grosso et al., 2014).

The index methodology to quantify services trade barriers was pioneered by the Australian Productivity Commission in the late 1990s and applied to a range of services sectors. A number of institutions, including the OECD (Dihel and Shepherd, 2007) and the World Bank (Borchert et al., 2012) have developed services trade restrictiveness indices since then.<sup>2</sup> Within the OECD, economy-wide indices of product market regulation (PMR), OECD foreign direct investment (FDI) regulatory restrictiveness index<sup>3</sup> (Kalinova et al., 2010) and Trade Facilitation Indicators (TFI)<sup>4</sup> (Moïse et al., 2011) have been developed, some of which partly overlap with the STRI for logistics services. The World Bank Logistics Performance Index (LPI)<sup>5</sup> and Enabling Trade Index of the World Economic Forum<sup>6</sup> measure the efficiency of logistics services.

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1. Some countries have different degrees of liberalisation towards different trade partners. In these cases, the STRI records the level of openness towards third countries and does not take into account preferential agreements. For instance, the database for European Union members records legal provisions applying to logistics services suppliers from outside the European Economic Area.
  2. The World Bank has developed services trade restrictiveness indices for 103 countries. Throughout this project there have been consultations with the World Bank.
  3. The 2012 FDI Regulatory Restrictiveness Index by country is available at [www.oecd.org/investment/fdiindex.htm](http://www.oecd.org/investment/fdiindex.htm).
  4. The TFIs by countries is available at [www.oecd.org/trade/facilitation/indicators.htm#About-TFI](http://www.oecd.org/trade/facilitation/indicators.htm#About-TFI).
  5. The World Bank LPI is available at <http://lpi.worldbank.org/>.
  6. The 2014 country indices are available on Hanouz et al. (eds), (2014).



The STRI indices are presented in aggregate form as well as decomposed into several classifications: by policy area, the General Agreement on Trade in Services (GATS) classification and modes of supply, discriminatory versus non-discriminatory measures, and restrictions on firms' establishment versus those on their on-going operations. These different classifications will facilitate the use of the indicators in policy analysis for multiple purposes at the national and multilateral levels.

The rest of paper is organised as follows: Section II defines logistics services and describes the main characteristics of this sector. Section III identifies measures to be included in the STRI<sup>7</sup> and Section IV presents the different classification schemes used in the analysis. Section V sets out a brief summary of the methodology for constructing the STRI and Section VI presents the results. Finally, Section VII gives sensitivity analysis, while Section VIII concludes.

## II. Definition and characteristics of the logistics services sector

This section defines the sector to which the STRI applies and briefly addresses the characteristics of logistics services. A practical definition provided by the US Coalition of Services Industries is: “the process of planning, implementing, managing and controlling the flow and storage of goods, services and related information from the point of origin to the point of consumption.”<sup>8</sup> Efficient delivery of logistics services is the ability to move products speedily, reliably and at low cost.

The logistics services sector does not appear as a discrete sector in the WTO Services Sectoral Classification List (MTN.GNS/W/120, hereafter referred to as W/120), which is based on the United Nations Provisional Central Products Classification (CPC Prov.), and used by most countries to schedule commitments under the GATS. Discussions at the WTO<sup>9</sup> and analytical work in this area<sup>10</sup>, however, indicate that the concept of logistics services has evolved beyond an initial narrow definition of physical networks for transport and distribution of goods. While it is difficult to draw a clear distinction between logistics services and their related services, it is generally accepted that the sector comprises a wide range of services for integrated supply management, from global network strategy design throughout the distribution and delivery stages.

These heterogeneous activities are typically divided into “core” and “non-core” or “related” logistics services. The STRI covers core logistics services (hereafter, referred to

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7. A “measure” within the context of this paper is not a term of art nor intended to have any legal significance.
  8. This definition was developed by the US Coalition of Services Industries; see: “Statement of the US Coalition of Services Industries to the US International Trade Commission”, 2004.
  9. See for example: “Logistics Services, Communication from Australia; Hong Kong, China; Liechtenstein; Mauritius; New Zealand; Nicaragua; Switzerland; and the Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu” (TN/S/W/20, 25 June 2004); and “Joint Statement on Liberalisation of Logistics Services, Communication from Australia; Canada; Chile; Djibouti; the European Communities; Hong Kong, China; Iceland; Japan; Korea; Liechtenstein; Mauritius; New Zealand; Nicaragua; Norway; Panama; Peru; Singapore; Switzerland; the Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu; and the United States” (TN/S/W/34, 18 February 2005).
  10. See for example: “Logistics Services: An Overview of the Global Market and Potential Effects of Removing Trade Impediments”, United States International Trade Commission (Investigation No. 332-463, USITC Publication 3770, May 2005).

logistics services).<sup>11</sup> Table 1 shows definitions of core logistics services covered by the STRI according to the W/120 classification. It also shows the correspondences with the Extended Balance of Payments Statistics (EBOPS) classification, which is commonly used for reporting trade in services, and with the International Standard Industrial Classification (ISIC), which is used for reporting foreign direct investment, foreign affiliate sales and production.

**Table 1. Definition of the logistics services sector**

Name	W/120	CPC Prov.	ISIC rev.4	EBOPS(2002)
Cargo-handling services	11.H.a	741	522*	232*
Storage and warehouse services	11.H.b	742	521	232*
Freight transport agency services	11.H.c, 11.H.d*	748, 749*	522*	232*
Customs brokerage services	11.H.c, 11.H.d*	748, 749*	522*	232*

Note: \* indicates that the identified services constitute only a part of overall scope of activities that the correspondent classification covers.

Source: WTO, OECD and UN.

Table 2 presents data on the economic importance of logistics services in OECD countries. These services represented 1.5% of total GDP and 2.2% of the value added in services sectors and 1.6% of total employment in 2009. Logistics services constitute less than 1% of trade in services while their import and export shares have both increased in recent years. Inward foreign direct investment stocks in logistics sector account for 1.2% of those in total services in 2012. All of these indicators show that the economic presence of logistics sector has been expanding in national economies.

**Table 2. Economic importance of the logistics services sector**

	2004	2009	2012
Share of value added (%)			
- Total GDP	1.23	1.53	-
- Total services value added	1.82	2.21	-
Share of total employment (%)	1.58	1.63	-
Share of Trade in services (%)			
- Import	0.68	0.66	0.81
- Export	0.35	0.48	0.51
Share of services inward FDI stocks (%)	0.73	0.50	1.20

Note: The figures are calculated from OECD STAN database for value added and employment, OECD Statistics on International Trade in Services for share of trade in services and Foreign Direct Investment database for inward FDI stocks. Share of value added, employment and services inward FDI stocks follow ISIC Rev.4 and share of trade in services follows EBOPS. Share of value added and employment covers 15 countries and 13 countries respectively, that of trade in services covers 17 countries and that of services inward FDI stocks covers 16 countries.

Source: OECD

With respect to modes of supply, broadly speaking, commercial presence (Mode 3) and cross-border trade (Mode 1) are predominant in logistics services. The latter is particularly relevant for freight forwarding services. Mode 3 and accompanying movement of personnel

11. Non-core activities cut across several services sectors, particularly transport, distribution and other business services. The core elements of transport and distribution services are already covered in the STRI project.

(Mode 4) are the primary mode of supply for logistics services provided at air ports, ports, and other facilities in foreign countries. Consumption abroad (Mode 2) plays a role when domestic firms use logistics services in a foreign country.

Logistics services play a crucial role in the development of global value chains. They connect production sites as well as manufacturers and consumers by moving goods speedily, reliably and economically.

The importance of logistics services has been increasing steadily since the 1980s when firms paid much more attention to reducing their stock-related costs and introduced lean inventory and just-in-time production systems. This required highly sophisticated logistics operations, which led to increased demand for professional suppliers of logistics services. This partly explains the rapid growth of outsourced logistics markets including third-party logistics providers (3PL). According to Armstrong & Associates, the revenue of global third-party logistics providers in 2013 amounted to USD 703.8 billion, which represents 8.2% increase over 2012.<sup>12</sup> The revenue of the Asia-pacific region accounts for over one third, the largest portion, of the total revenue. Users of third-party logistics providers report that 44% of their total logistics expenditure relates to outsourcing (Langley and Capgemini, 2014).

Logistics services are subject to strong economies of scale and scope. Logistics services suppliers have pursued scale economies by actively engaging in international mergers and acquisitions (M&A) since the 1990s. In Europe in particular this was partly a response to increased competition following the liberalisation of postal services, where large postal operators diversified into logistics (Darkow et al., 2008).

Three recent economic and social trends have influenced the practice of logistics services providers: increasing importance of supply chain management, proliferation of e-commerce and increase of environmental concerns.

Starting with supply chain management, logistics have become essential for the functionality and competitiveness of international production networks. Furthermore, the complexity of international production has generated demand for specialised supply chain management and logistics services.<sup>13</sup> To meet this demand, many logistics firms have evolved from providing just single-unit services like freight forwarding, warehousing, or customs brokerage to offering integrated solutions on behalf of their customers. Most top global third-party logistics providers now engage in all these services and combine them to provide solutions for efficient supply chain management (WTO, 2010).

In 2013, over USD 1.2 trillion was spent on business to consumer (BtoC) e-commerce purchases around the world. eMarketer (2014) predicts that the global BtoC e-commerce market will exceed USD two trillion in 2017.<sup>14</sup> Logistics firms are relied upon to offer reliable and timely door-to-door delivery. For that, they need to deal with small size orders, small parcel shipments, and same-day shipments (Cho et al., 2008). Considering cross-border transactions, the existence of a *de minimis* regime, and the cost and effectiveness of visa processing are important. One of the innovative approaches to the challenges of cross-border e-commerce is “co-opetition”, cooperation between competitors for effective service provision (PricewaterhouseCoopers, 2009). Reverse logistics is also gaining importance in e-commerce logistics as return policy occupies the substantial part of profit of e-retailers (Mukhopadhyay and Setoputro, 2004).

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12. See [www.3plogistics.com/3PLmarketGlobal.htm](http://www.3plogistics.com/3PLmarketGlobal.htm).

13. See for instance Bask and Juga, 2001.

14. See eMarketer, 2014 ([www.emarketer.com/Coverage/ConsumersEcommerce.aspx](http://www.emarketer.com/Coverage/ConsumersEcommerce.aspx)).

Finally, environment concerns have affected the practices of logistics services providers. A 2009 survey involving 40 CEOs of major global 3PL providers shows that 63% of the respondents expanded their existing sustainability programme in 2008 partly because shippers wanted to commit to environmental sustainability (Lieb and Lieb, 2010). According to the report of PricewaterhouseCoopers, industrial representative group has a view that carbon emission will be one of the key challenges over next 20 years and logistics firms might need to collect related documents and even consider eco-consultancy services for entire supply chains (PricewaterhouseCoopers, 2009).

The STRI index for logistics services captures some of these issues, such as service provision to third-party logistics providers, multimodal transport, and restrictions on practice of foreign freight forwarders.

Finally, as mentioned above, value-added integral service is a major trend in the logistics services sector. On the other hand, the state of regulatory regimes relating to logistics services in the countries covered by the STRI is not always even. This implies that logistics firms are sometimes faced with challenges in providing solutions to customers by integrating their services. As discussed later, it is the case that certain areas in logistics operation are significantly restrictive in some countries. It may be useful for STRI users to take a close look at restrictions in each composing service in order to identify critical issues for seamless logistics services. The STRI for logistics services therefore addresses four subsectors in Table 1 separately.

### III. Identifying measures to be included in the STRI

Although logistics services are a relatively competitive sector, these services are subject to a wide range of sector-specific regulatory measures. As with other sectors in the STRI project, the index should include information that is sufficiently specific and detailed that it can inform trade negotiations and regulatory reform. At the same time, however, the index should not be so detailed that the primary barriers are overshadowed by lesser restrictions that add little to the essence of trade restrictiveness.

ANNEX B presents the lists of measures included in cargo-handling services, storage and warehouse services, freight transport agency services and customs brokerage services, which constitute logistics services in the STRI. The selection of measures is based on the following criteria:

- Barriers and regulations that are mentioned explicitly in the GATS;
- Barriers and regulations that are mentioned explicitly in regional trade agreements; and
- Barriers and regulations that experts (during the November 2010 OECD Expert Meeting on Transport Services as well as in bilateral consultations) identified as relevant.

Governments apply a range of restrictions to logistics services. These can be specific to these services or can apply horizontally to all sectors in the economy. Regulations can explicitly discriminate against foreign services providers or, although non-discriminatory, can still affect trade in services by favouring local incumbents. Restrictions can also be often designed to meet social objectives, such as ensuring quality, protection of consumers and national security. Measuring their restrictiveness still can represent a useful input for policy evaluation, particularly with a view to explore the availability of more efficient ways to achieve the intended objectives.

The measures included in the STRIs for four subsectors of logistics services have been divided into five policy areas. This typology of measures forms the basis for the creation of the STRIs.

#### *Restrictions on foreign entry*

This category contains barriers to foreign ownership and other impediments to market entry for logistics services providers. Prominent examples of these measures include restrictions on foreign direct equity stakes, requirements for foreign investment only through joint ventures, limitations on mergers and acquisitions for foreign firms, and controlling the number of firms that may operate by economic needs tests or quotas. The imposition of nationality or residency requirements for board members represents another important regulation that restricts market entry for foreign firms, and impedes trade. Statutory monopolies providing logistics services also prevent market entry of any services provider other than the monopolist.

In freight transport agency services, there are cases where foreign freight forwarders are only allowed to participate in a limited range of activities. They are, for instance, restricted to the provision of certain services in the domestic market and only allowed to operate in limited geographical areas. Another regulation that is recorded under this heading is commercial presence requirement for providing cross-border freight forwarding services. These restrictions can limit foreign services suppliers' ability to provide efficient freight forwarding services since they need to connect various international and domestic transportation services to ensure efficient door-to-door delivery.

#### *Restrictions on the movement of people*

Limitations on the temporary movement of people can hinder trade in services. For instance, restricting the number of foreign professionals permitted to practice by labour market needs test or quotas may delay establishment of commercial presence, impose costs on foreign services providers and discourage local services providers from using e.g. foreign consultants. In the case of cross-border logistics services (Mode 1), restrictions on temporary movement of crew may influence business operations. These restrictions include duration of visa for crew, availability of visas on arrival or visa exemption for temporary entry or transit of crew and multiple entry visas for crew.

In customs brokerage services, some countries grant a licence to operate only to nationals or residents. This obviously hinders market entry for foreign firms.

#### *Other discriminatory measures*

Discriminatory taxes and other forms of subsidies further apply as important measures to include in the STRI. In addition, discrimination in government procurement and eligibility for Authorised Economic Operators (AEO) schemes are included.<sup>15</sup> Another impediment included in the STRI is deviation of transport packages' sizes from international standards since it may prevent logistics services suppliers from efficient cross-border transportations.

In storage and warehouse services, there are cases in which regulations provide preferential access for domestic carriers to storage and warehouse services. Domestic carriers for instance may have priority in the use of warehouse facilities, precluding adequate access to foreign carriers, or foreign firms may be prevented from leasing warehouse and storage facilities or be subject to higher fees for lease.

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15. AEO refers to logistics services providers approved by the national customs administration as complying with the World Customs Organisation (WCO) or equivalent supply chain security standards.

Foreign freight forwarders may be required to produce proof of financial responsibility beyond the amount required for domestic suppliers in order to practice. This requirement sometimes takes the form of a surety bond, insurance or guarantee. Such discriminatory treatment in financial responsibility may also affect trade.

#### *Barriers to competition*<sup>16</sup>

Restrictions on competition lead to the distortion of the level playing field and thus can discourage foreign participants in the market. Measures that allow publicly-controlled firms some types of exemption from the general competition law reduce competition in the sector. Further, the policy area captures to what extent foreign firms have access to dispute settlement mechanism and to subsequent appeal procedures. In the logistics services sector, the regulations on business practices may have significant influence on competition between services providers. Those relate to self-handling, services provision to third-parties and multimodal transport.

Additional measures to avoid anti-competitive practices relate to competitive bidding schemes for selection of services providers authorised to provide cargo-handling services and storage and warehouse services. Further, the managing body of airports, ports or other facilities may provide cargo-handling services. Where the managing body subsidises its cargo-handling activities, other cargo-handling suppliers are at disadvantage. The prohibition of cross-subsidisation is one tool to prevent this problem. The measures under this heading also include accounting separation as a tool to monitor the enforcement. For storage and warehouse services, limitations on working hours of operation for storage and warehouse facilities are included as an additional measure. Finally, there are cases where laws and regulations limit the geographical scope of activities in customs brokerage services by licencing.

#### *Regulatory transparency*

Measures concerning regulatory transparency and administrative procedures are also included in the STRI. These regulations involve publication and communication of the regulatory and licensing regimes as well as the administrative procedures of allocation and renewal of licences. Excessive processing time, cost and number of required documents for a business visa represent additional administrative burdens of business operation and these are included under this heading.

Customs procedures are particularly important to trade in logistics services. Because provision of such services is often time sensitive, reduction and elimination (where possible) of complex and time-consuming customs procedures are desirable. Thus, in addition to measures related to the time required for customs clearance and an advance ruling system, four measures capturing general “simplification principles” are included in this area, i.e. a single window for customs procedures, pre-arrival processing, a *de minimis* regime, and the release of goods before determination and payment of duties. Availability of appeal or review procedures against customs decisions is also included.

## **IV. Classifying restrictions**

Classifying barriers and regulations under different typologies can increase the usefulness of the STRI by highlighting different dimensions of the data specifically for negotiators, regulators and industry analysts. Detailed lists of the measures included in the STRIs by policy area are found in ANNEX B. The annex tables also include information on

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16. The policy area includes public ownership, which may have the effect of market access restriction.

which category according to GATS classification the measure belongs to; to which mode of supply the restriction applies; whether the measure applies to the establishment of a services supplier or to ongoing operations; and finally whether or not the measure is discriminatory.

The GATS terminology should increase the relevance of the STRI for the World Trade Organization (WTO) and regional trade agreement (RTA) negotiators. However, as with any classification, it is not always possible to clearly identify to which category certain restrictions belong and there are overlaps in the classification of some barriers. For example, quotas belong to both market access and national treatment when they are discriminatory against foreign providers. Therefore, *market access* and *national treatment* measures are classified together. This grouping also allows a distinction to be made between restrictions subject to scheduling under the GATS, and consequently to negotiations for their removal; and domestic regulatory measures that usually do not need to be scheduled.

Restrictions not captured by either market access or national treatment are classified under *domestic regulation and other*. Domestic regulatory measures are subject to both existing disciplines and further negotiations with a view to reinforcing them. Examples of domestic regulatory measures are those relating to lack of adoption of international standards, and licensing requirements and procedures.

Indices according to the GATS modes of supply can provide useful information for negotiators. These Modes include: Mode 1: Cross-border supply; Mode 2: Consumption abroad; Mode 3: Commercial presence; and Mode 4: Temporary movement of natural persons. Separate indices according to modes of service delivery have already been constructed for other services sectors (Nguyen-Hong and Wells, 2003; Dihel and Shepherd, 2007; and Marouani and Munro, 2008). Some regulations are mainly behind the border and potentially affect all modes of supply. They are therefore combined into one category *All modes*. For example, lack of transparency of regulations can have an impact across different modes of supply.

The STRI further classifies measures according to regulations that apply to the establishment of firms versus those affecting their on-going operations; and measures that are discriminatory versus non-discriminatory. Establishment restrictions can generally be regarded as impediments to the movement of factors of production, while those applying to firms' operations constrain service provision after establishment. Non-discriminatory measures may raise the cost for all services providers, resulting in higher prices and lower demand for services, whereas discriminatory ones shift demand towards local suppliers. These classifications could prove useful in helping regulators and industry analysts identify priority areas for reform given defined economic policy objectives.

## V. Methodology for developing the STRI

The STRI is derived by aggregating regulations that are potentially trade restricting into a composite measure of restrictiveness. The construction of the index involves decisions concerning three main issues: scoring, weighting and aggregation. Scoring relates to how regulatory measures are transformed from qualitative to quantitative information. Weighting captures the relative importance of impediments in terms of trade restrictiveness (the higher the weight the more restrictive a category of measures is considered relative to other categories). The aggregation method determines how weights are applied to scores for calculating the index number. Geloso Grosso et al. (2014) explains the methodology in detail, while a technical paper explaining the alternative methodologies, their advantages and disadvantages and the robustness of the chosen methodology is available for interested readers (OECD, 2009). Here a brief non-technical summary is presented.

The approach taken to scoring in the STRI is to transform qualitative information on regulation into binary variables.<sup>17</sup> A majority of the questions included in the regulatory database are Yes/No questions. Regulatory information of a more complex nature (e.g. foreign equity limits) can easily be transformed to binary variables by introducing multiple thresholds. Therefore, for each type of impediment in a given country a score is assigned either zero or one, with the former representing the absence and the latter the presence of the restriction. This method ensures that all variables are measured on the same scale such that comparison across different countries and over time is possible.

It is important that the STRI captures as much of the variance in the underlying data as possible. The scoring of foreign equity limits, for instance, should reflect that an equity limit of, say 49% is more restrictive than a limit of 66%. This is obtained by introducing multiple thresholds. For foreign equity the thresholds are less than 33%, less than 50%, and less than 100%. A country with a limit of 49% will receive a score of one on the less than 50% threshold as well as less than 100% (i.e. two scores of one), while the country with a limit of 66% will receive one score of one (on the less than 100% threshold). The same approach is used for other variables for which more detailed information is available (e.g. duration of stay of inter-corporate transferees).

The scoring methodology should account for the hierarchy of regulations. Foreign equity limits will be scored the same way as for other sectors, with the same implications for other measures linked to ownership and control of a firm. In particular, if the maximum foreign equity allowed is below 50%, two measures on foreign investment screening (approval unless contrary to national interest and notification), residency of members of the board of directors and restrictions on cross-border mergers and acquisitions are automatically scored one.

#### *Scoring methodology specific to logistics services*

To grasp the restrictiveness specific to logistics services, some sector-specific scoring has been developed. These are divided into two groups: scoring common across subsectors (cargo-handling services, storage and warehouse services, freight transport agency services and customs brokerage services) and subsector-specific scorings.

##### *Scoring common across subsectors*

The subsectors of logistics services have some measures that are further split by type of facility (airports, ports, road facilities and rail facilities). Landlocked countries and Iceland warrant special attention for these measures since they have no seaports or rail infrastructure respectively in their own territory. Thus, in the STRI indices, measures related to ports and rail facilities in landlocked countries and Iceland respectively are irrelevant.

The treatment of missing facilities in the overall indices for landlocked countries and Iceland needs to be carefully considered. Excluding measures related to missing facilities causes a problem of compatibility with other countries. Scoring them zero or one creates a downward or upward bias respectively. The solution that minimizes such bias and secures the compatibility at the same time is the following: If facilities other than the missing facility have the same score, it is assumed that there is a common regulatory norm across facilities. Therefore, the same score is applied to the missing facility. On the other hand, if the scores vary across facilities, the missing facility is scored in the same manner as the most liberal of the existing facilities, i.e. zero. Figure C.1 in Annex C indicates measures relating to missing facilities in landlocked countries and Iceland.

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17. When compiling a composite indicator, it is not advisable to include both binary and continuous variables in the same dataset as the resulting indicator would not have a clear interpretation (see OECD, 2008).



In the logistics services sector, there are some cases where a statutory monopoly covers some or all activities in the market. Following the general scoring methodology, the STRI index is scored one if a statutory monopoly covers the entire sector. In cargo-handling services and storage and warehouse services, some countries have a statutory monopoly for services provision at specific facilities, such as ports, while services provision at other facilities are open to foreign and other domestic suppliers. In these cases, all measures related to the concerned facility are automatically scored one. Figure C.2 in the Annex C shows the hierarchy between these measures.

The STRI for logistics services includes sector-specific measures with regard to customs procedures. The time required for customs clearance is based on the World Bank Doing Business 2014, and the value of one working day has been chosen as the reasonable limit beyond which the administrative process would have a negative impact on the activity of the logistics services suppliers. Regarding a *de minimis* regime, the STRI index value is one if there is no such regime in place or *de minimis* thresholds are less than USD 100. Sector-specific measures with regard to crew visa are also incorporated into the STRI for logistics services. As for the duration of visa for crew, the STRI index value is one if the allowed duration is less than three months. The STRI indices for number of documents required and costs for visa are scored one respectively where the number of documents is more than nine and the cost for visa exceeds USD 93.<sup>18</sup>

Similar to some horizontal measures in other sectors in the STRI (Geloso Grosso et al., 2014), some subsector-specific measures in logistics are strongly affected by foreign equity restrictions. The STRI for logistics services additionally introduces hierarchies between foreign equity restrictions and these measures. Figure C.3 in the Annex C presents the linkages of each subsector between them.

#### *Subsector-specific scoring*

A scoring scheme specific to cargo-handling services is found in the policy category *Barrier to competition*. The managing body of an airport or port may provide cargo-handling services in some cases. Where the managing body subsidises its cargo-handling activities, other cargo-handling suppliers are at disadvantage in financial respects. In such instances, regulations are necessary to secure a level playing field in the market. In addition, the accounting separation of its cargo-handling activities of the managing body of airport or port from the accounts of its other activities is also effective to monitor possible cross-subsidisation. In the STRI for cargo-handling services, prohibition of cross-subsidisation and accounting separation are bundled together to reflect the complementarities between them. This means that the STRI indices of these two measures are zero only if both measures are in place.

In customs brokerage services, there are some instances where nationality or residency is required to practice. In the STRI scoring methodology for customs brokerage services, the market is completely closed if only nationals may provide services and foreign equity is prohibited. This means that the overall STRI score is one. The STRI for customs brokerage services includes a hierarchy where residency requirement for services provision is automatically scored one if nationality is required to operate.

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18. Three-month for the duration of visa, nine documents for the number of documents and USD 93 for visa cost as the thresholds has been selected respectively based on the simple average of the duration, the number of required documents, the cost of visa for truck driver in the 2006 survey by Group on Road Transport in European Conference of Ministers of Transport (CEMT/ITF(2007)8/FINAL).

### ***Weighting and aggregating***

Aggregating individual restrictions into the STRI consists of two steps. The first step involves assigning weights to the policy measures. The second step involves aggregation into the overall STRI. A number of weighting schemes have been explored to develop the STRI. These are equal weights, expert judgement and random weights. Equal weights are the most common weighting scheme applied for constructing composite indicators. It is a transparent way of creating an index in the absence of any clear alternative. Lack of clear alternatives could be due to insufficient knowledge of causal relationships, absence of an empirical basis for deciding which is more important, or lack of clarity of what the index is supposed to measure. Equal weights are, however, not as free of judgement as is often claimed. With equal weights, the relative importance of each measure depends on how many measures are included and how individual restrictions are organised into sub-indicators, leaving rather a lot to subjective judgement or arbitrariness.

As noted, equal weights are used when there is a lack of clear alternatives. For trade restrictiveness indices, however, it is clear that the measures should be weighted according to their contribution to trade costs, which in turn consist of entry costs and operational costs.<sup>19</sup> Services trade data are, however, not sufficiently detailed for estimating the trade cost equivalent of trade barriers and behind the border regulation that affects services trade. Nevertheless, there is a growing literature on measuring trade costs on the basis of observed trade patterns in services, but usually at a higher level of aggregation than what is required for the STRI (Miroudot et al., 2012). Furthermore, the different approaches to measuring trade costs on the basis of observed trade flows have strengths and weaknesses (Nordås, 2011) and as of yet a widely accepted methodology is not available.

Being constrained by lack of data, alternative ways of weighting the measures in a way that reflects contribution to trade costs have to be sought. Asking those directly and indirectly involved in services trade is one option. Such expert judgement has the advantage that relative importance can be captured in a realistic and meaningful way. One objection to using expert judgement is subjectivity. As argued above this objection also applies to other methodologies and the problem can be reduced, for instance, by asking a large group of experts.

A third methodology for weighting measures is principal component analysis (PCA). This is a statistical methodology that assigns the highest weight to the variables that contribute the most to the variation in the dataset. The disadvantage of PCA is that the assigned weights do not reflect the relative trade restrictiveness of a measure, and the weights are based on the sample of countries for which they are estimated. Thus, when the index is extended to new countries, the scores of countries already included may change. The OECD has therefore chosen not to use PCA.

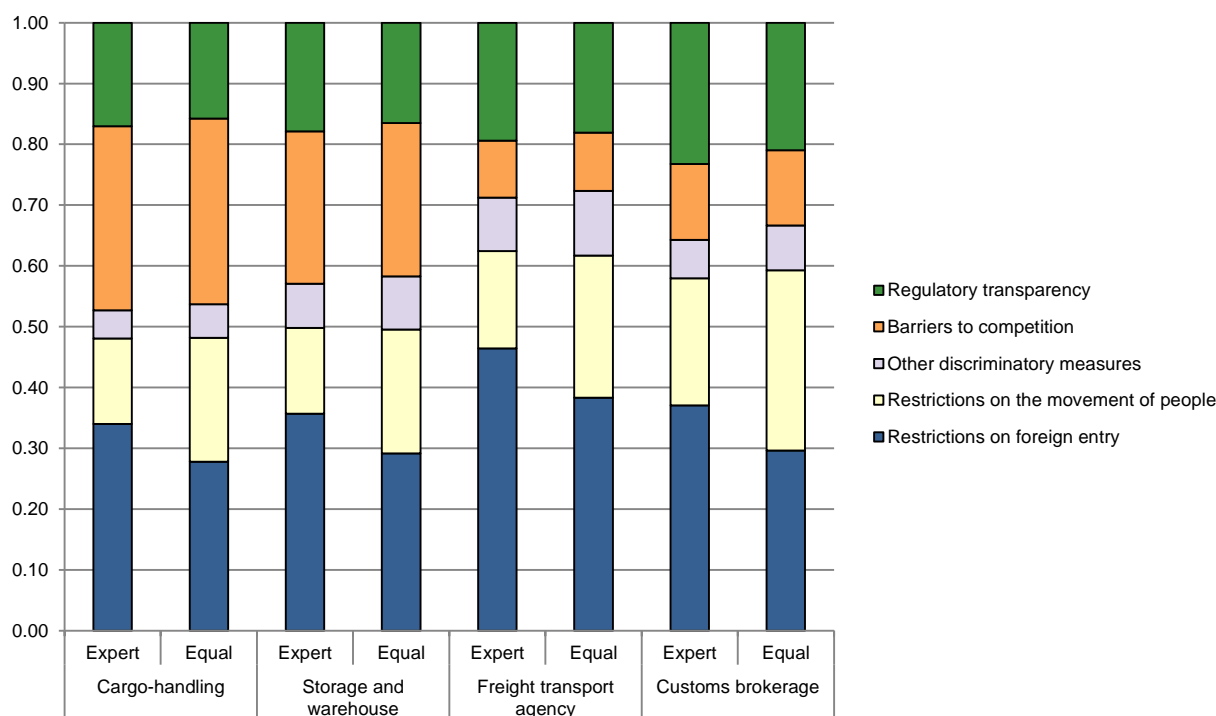
The weighting scheme used for the calculation of the STRI relies on expert judgment. A large number of experts were asked to allocate 100 points among the five policy areas presented above. These are translated into weights by assigning the weight experts allocated to the policy area to each measure that falls under it and correct for differences in the number of measures under the policy areas.<sup>20</sup> The sensitivity of the indices to the weighting scheme

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19. For trade in goods estimating the contribution of tariffs and non-tariff barriers is straight forward. The International Monetary Fund's Overall Trade Restrictiveness Index (OTRI), for instances makes such estimates by the tariff line (IMF, 2005).
20. The formula for measure  $j$  under category  $i$  is the following:  $w_{ji} = score_j w_i / \sum_i n_i w_i$  where  $n_i$  is the number of measures under category  $i$  and  $w_i$  is the share of the total number of points allocated to policy area  $i$  by the experts.

has been tested by experimenting with alternatives and by picking 3 000 weighting schemes at random (i.e. Monte Carlo simulations).

Figure 1 illustrates how expert judgment weights differ from equal weights in each logistics subsector.<sup>21</sup> It depicts the index for a hypothetical country in which all of the measures in the STRI take the most restrictive value. In logistics services, experts assign higher weight to *Restrictions on foreign entry*, *Barriers to competition* and *Regulatory transparency* than the equal weight scenario.<sup>22</sup>

**Figure 1. The composition of the STRI for logistics services in a totally restrictive country**



The method for aggregating the categories into one single index chosen is linear, taking the weighted average (using the expert judgement weights) of the scores. An advantage of assigning a unique weight to each measure is that measures can be aggregated in different ways into different classifications in a consistent manner as shown in the charts in the next section. The disadvantage is a high degree of compensation such that a high score in one category can be compensated by a low score on another category, with the result that there is less variation among countries in the aggregate index than in the sub-indicators. It may, however, well be the case that restrictions are complementary rather than additive. This problem has been dealt with through the scoring system creating hierarchies and bundles of complementary measures when they are logically linked as explained in the methodology paper (Geloso Grosso et al., 2014).

21. Equal weights are defined as  $w_i = 0.20$  for all  $i$  in the formula above.

22. Expert judgement was conducted on the basis of aggregated form as logistics services. This weight is uniformly applied to all subsectors of logistics services.

**VI. Results**

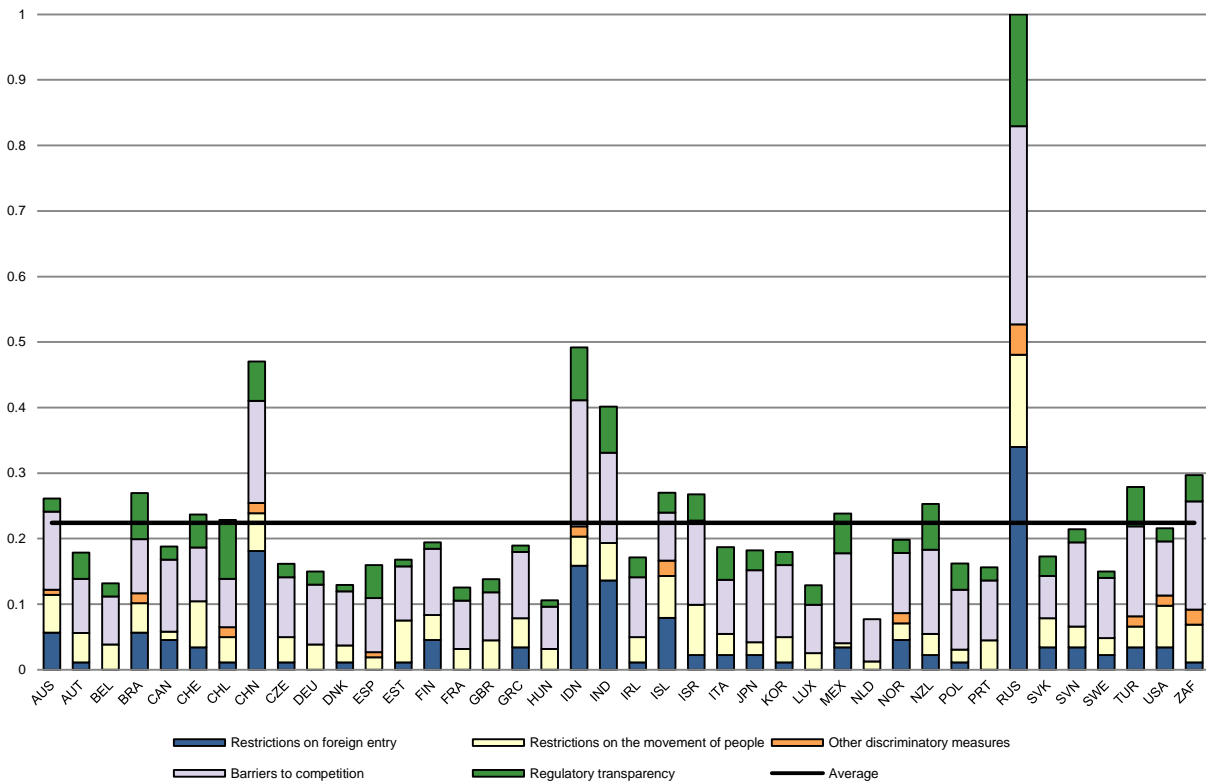
This section presents and analyses the result of the STRI calculation with expert judgement methodology and different classifications.

**Results with the expert judgement methodology**

*Cargo-handling services*

Figure 2 presents the results for cargo-handling services by policy area, together with a line indicating the average. The STRI values range from 0.08 to 1, with a sample average of 0.22 and standard deviation of 0.15. This shows significant variation in trade restrictiveness among the countries included. Netherlands, Hungary, France, Luxembourg and Denmark have the most liberal regimes, whereas Russia, which has a statutory state-monopoly, is the most restrictive market, followed by Indonesia, China and India.

**Figure 2. The STRI for cargo-handling services by policy area**



*Barriers to competition* significantly contribute to the overall results. In fact, these restrictions represent the most significant component of the indices in the case of 36 countries covered by the STRI. It is worth noting that three-quarters of countries covered by the STRI have at least one publicly-controlled firm at least at one facility while only a few countries provide privileged status in competition law for these firms. To avoid cross subsidisation, many countries prohibit cross subsidisation and, at the same time, require separation of accounts as a monitoring tool at airports and rail while these measures are hardly found at ports and road facilities. Over two-fifths of countries included in the STRI lacks competitive bidding scheme for selection of services providers at any facility. Minimum capital

requirement is observed in two-thirds of countries included, which is common to all subsectors.

*Restrictions on foreign entry* have also a substantial impact on many countries. For more restrictive countries, the share of this heading tends to be higher. Russia reserves cargo-handling services to a statutory monopoly. This explains the overall index value of one for Russia. China, India and Indonesia limit foreign equity participation in this sector up to 49%. In Slovenia, services provision at ports is reserved for statutory monopoly. Nine countries have foreign equity restrictions on publicly-controlled cargo-handling firms operating at one facility at least. Another feature under this heading is that ten countries (Australia, Canada, Finland, Ireland, Iceland, Israel, Japan, Norway, Slovak Republic and Sweden) require at least one resident on the board of directors. This applies to three other subsectors. On the other hand, nine countries, all of which are European countries, have no restriction on this category (Belgium, France, Germany, Hungary, Luxembourg, Netherlands, Portugal, Spain and United Kingdom).

The category of *Restrictions on the movement of people* is another area that has substantial influence on the indices. Three to six countries, depending on type of crew, have threshold of crew visa duration less than three months while about three-quarters of countries covered by the STRI have visa-on-arrival or visa exemption scheme for air crew and seamen. It is observed that most countries included in the STRI have multiple entry visas for crew or no requirement of crew visa. These regulations apply horizontally to all four subsectors.

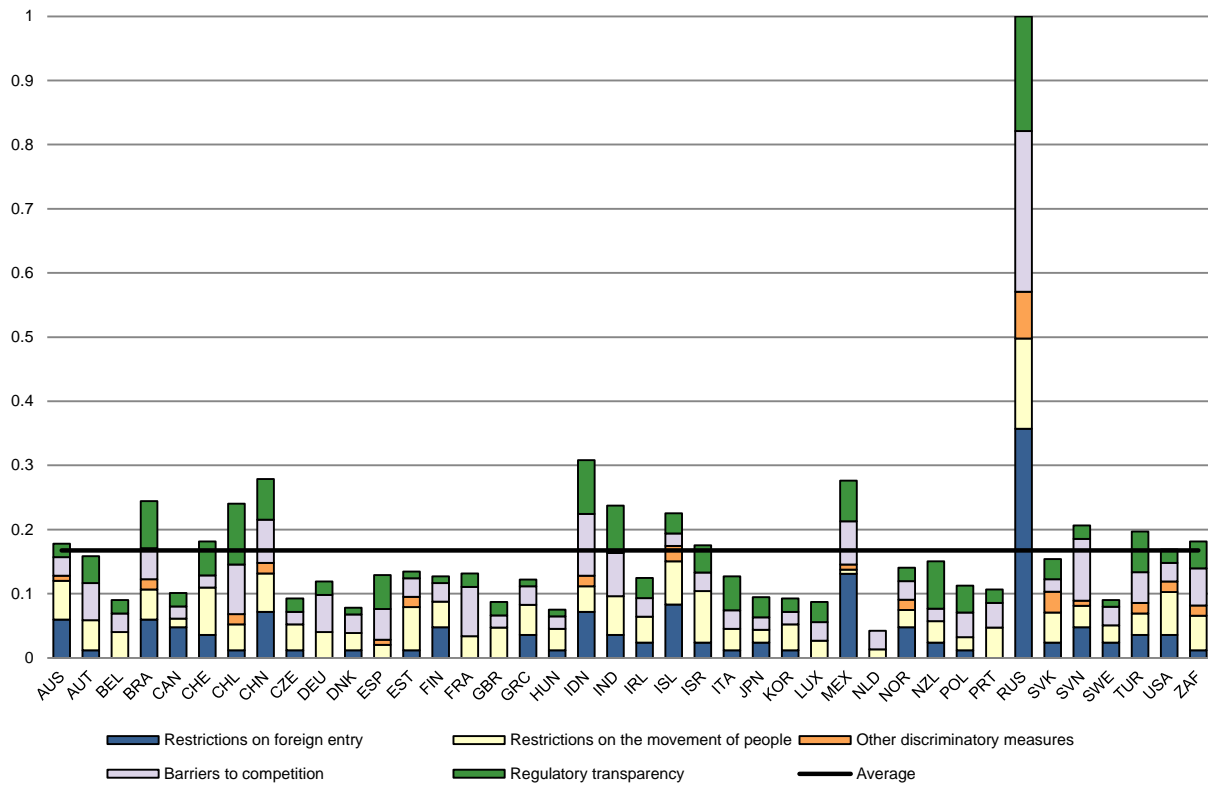
*Regulatory transparency* includes sector-specific measures with regard to custom procedures and visa processes. The majority of countries included in the STRI have appeal procedures against customs decision, an advance ruling system, a single window regime, pre-arrival processing, and a *de minimis* regime. Around a quarter of the countries have *de minimis* thresholds of less than USD 100 or do not have such regimes. Most countries have visa cost thresholds less than USD 93 while three-quarters of countries require more than nine documents for visa. These descriptions are common to all four subsectors.

The restrictions under the category of *Other discriminatory measures* do not have a significant impact on the overall indices. One explanation is that smaller weights are given to this heading. The other is that, in fact, around two-thirds of countries covered by the STRI do not have any restriction in this policy area. It is nevertheless worth mentioning that foreign firms are not eligible for Authorised Economic Operators scheme in three countries.

#### *Storage and warehouse services*

Figure 3 displays the indices for storage and warehouse services by policy area. The results show that the STRI value widely varies among countries included, ranging from 0.04 to 1, with a sample average of 0.17 and a standard deviation of 0.15. The most liberal market is Netherlands, followed by Hungary and Denmark. Russia retains a statutory monopoly in this sector, which explains the score of one. Indonesia, China and Mexico follow after Russia in terms of relative trade restrictiveness.

Figure 3. The STRI for storage and warehouse services by policy area



*Restrictions on foreign entry*, *Barriers to competition* and *Regulatory transparency* explain more than half of the overall indices in almost all countries included in the STRI. Since *Regulatory transparency* in this subsector has the same features as in cargo-handling services, they are not further discussed here. Under *Restrictions on foreign entry*, similar to cargo-handling services, two countries reserve services provision to a statutory monopoly. One is Russia where the reservation applies to all facilities, which results in the overall index of one. Slovenia is the other, where services provision at ports is reserved for statutory monopoly. Foreign equity restrictions are not found in countries covered by the STRI other than Mexico where foreign equity participation is limited up to 49%. Hungary, Ireland and Mexico have licensing regimes subject to economic needs tests. Eight countries that have no restriction under *Restrictions on foreign entry* are all European. (Belgium, France, Germany, Luxembourg, Netherlands, Portugal, Spain and United Kingdom)

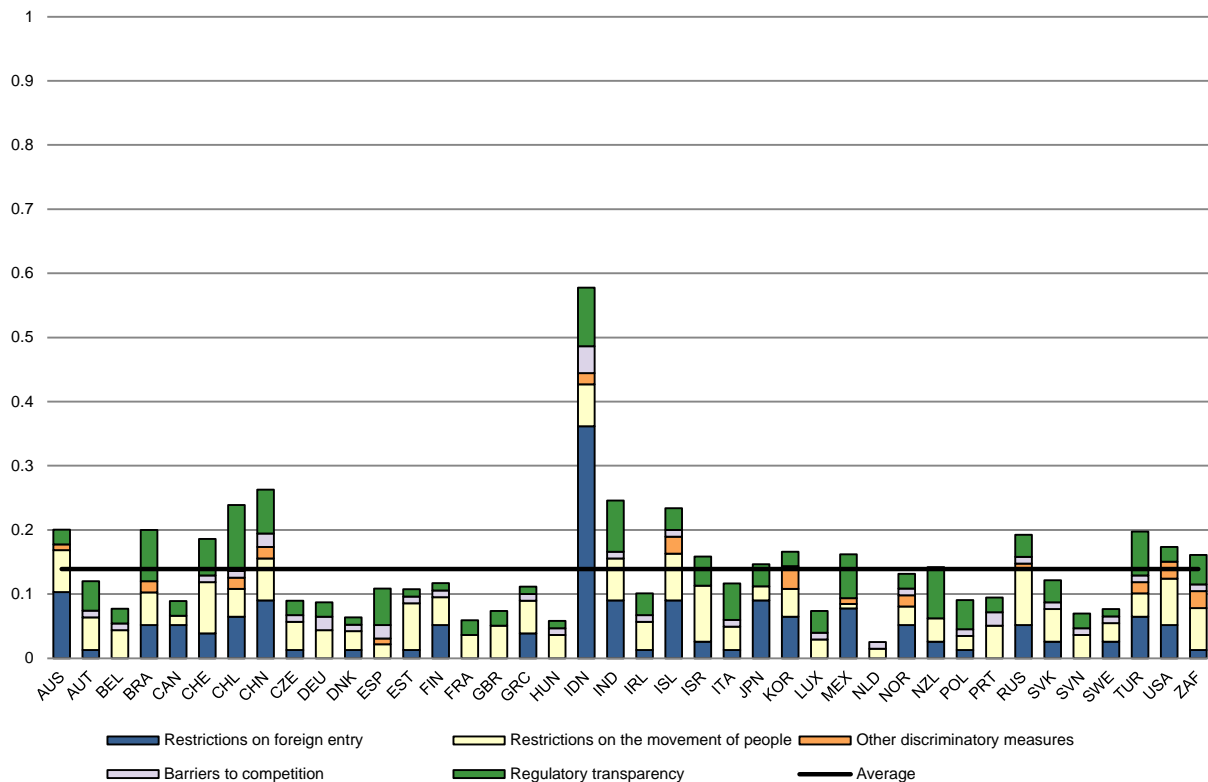
*Barriers to competition* have also a substantial influence on the overall indices. Sixteen countries have one publicly-controlled firm in this subsector but few countries granted any privileges to them. Around three-quarters of countries included in the STRI have minimum capital requirement on storage and warehouse services providers.

*Other discriminatory measures* contribute the least to the indices. This is both because no restriction is observed in two-third of the countries covered by the STRI and because the lowest weight is assigned by experts to this category. Nevertheless, discrimination in government procurement and access to storage and warehouse facilities affect the overall indices in some countries.

### Freight transport agency services

Figure 4 depicts the results for freight transport agency services by policy area as compared to a sample average, which is 0.14 with standard deviation of 0.09. The overall level of restriction is quite low, ranging from 0.02 to 0.58. Twenty-three countries are below the sample average and Netherlands is the most open market, followed by Hungary and France. The most restrictive economies are Indonesia, China and India.

**Figure 4. The STRI for freight transport agency services by policy area**



Three policy areas that significantly contribute to the overall indices for freight transport agency services are *Restrictions on foreign entry*, *Restrictions on the movement of people* and *Regulatory transparency*. Ten countries (Belgium, France, Germany, Hungary, Luxembourg, Netherlands, Portugal, Slovenia, Spain and United Kingdom), all of which are European countries, do not have any restrictions under *Restrictions on foreign entry* while this policy area has the largest impact on the overall indices in 11 countries (Australia, Canada, China, Finland, India, Indonesia, Iceland, Japan, Korea, Mexico and Norway), many of which have higher STRI index values than the sample average. This is explained partly by the requirement of commercial presence in some countries and investment screening. It is worth noticing that this area accounts for over half of Indonesia's score. This is because Indonesia is the only country covered by the STRI which prohibits foreign equity participation in freight transport agency services.

*Other discriminatory measures* and *Barriers to competition* have less influence on the overall indices in this subsector. Contrary to cargo-handling services and storage and warehouse services, only five countries have a publicly-controlled company in freight transport agency services. Twenty-six countries do not have any restriction under the category

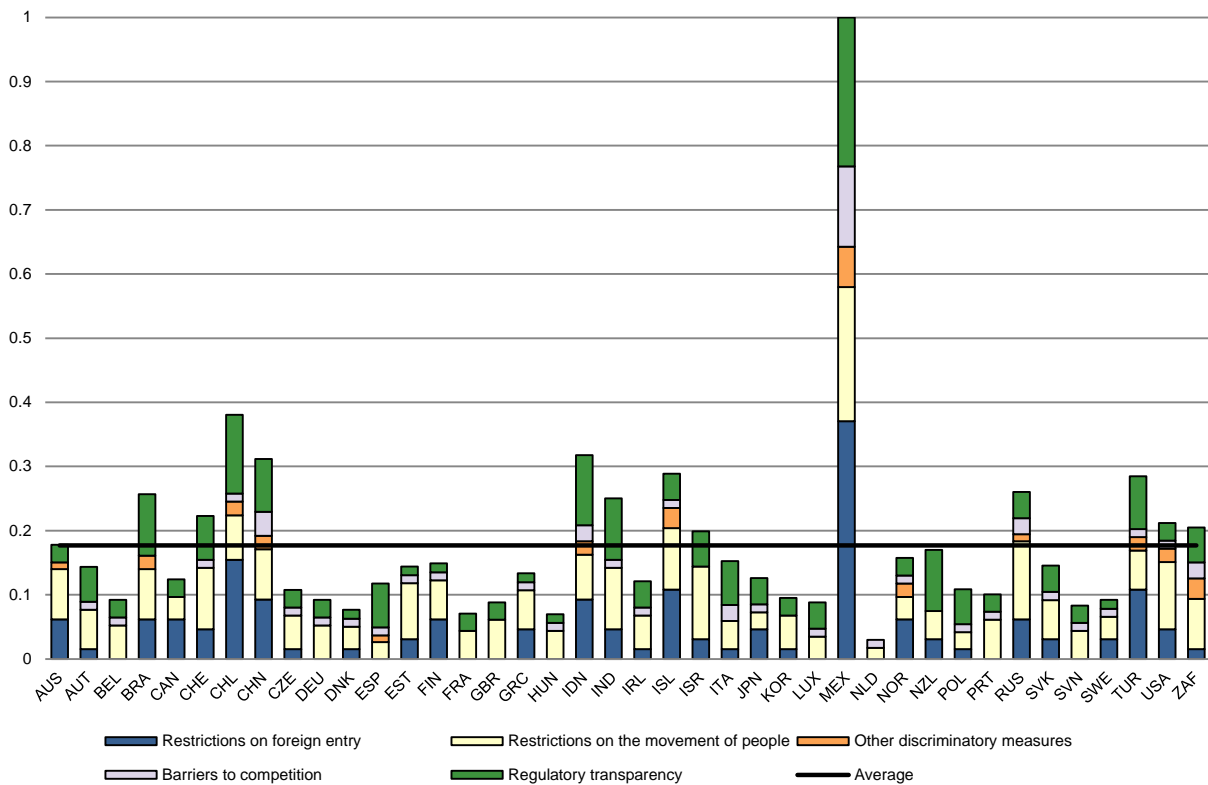
of *Other discriminatory measures* while no restriction under the category of *Barriers to competition* is found in 11 countries.

The categories of *Restrictions on the movement of people* and *Regulatory transparency* do not include any features specific to freight transport agency services. Nevertheless, measures common to all four subsectors under logistics services substantially affect the trade restrictiveness of these services. In fact, restrictions under *Restrictions on the movement of people* have the biggest contributions to the overall indices in the case of 21 countries while *Regulatory transparency* account for the largest contribution in eight countries.

*Customs brokerage services*

Figure 5 presents the results for customs brokerage services by policy area. The indices of countries covered by the STRI are widely different, ranging from 0.03 to 1, with a sample average of 0.18 and standard deviation of 0.16. Netherlands, Hungary and France have the most liberal regimes, whereas Mexico, Chile, Indonesia and China are the most restrictive markets for customs brokerage services.

**Figure 5. The STRI for customs brokerage services by policy area**



The measures under *Restrictions on foreign entry* and *Restrictions on the movement of people* significantly contribute to the overall results in the customs brokerage services. Two countries, Chile and Mexico have foreign equity restrictions in customs brokerage services. In Chile, foreign equity participation is allowed up to 49% if at least one Chilean national who are licensed as customs broker is within its partners. Mexico prohibits foreign equity participation altogether in customs brokerage. Further, under the category of *Restrictions on the movement of people*, Mexico also requires nationality for customs brokers to operate. This implies that the Mexican market is completely closed, with a score of one. Similar to freight transport agency, ten countries (Belgium, France, Germany, Hungary,



Luxembourg, Netherlands, Portugal, Slovenia, Spain and United Kingdom) have no restriction under this category.

*Restrictions on the movement of people* account for the largest portion of the overall indices of 24 countries. Nevertheless, it is worth mentioning that eight countries have nationality requirement to operate customs brokerage services.

*Barriers to competition* contribute less to the overall index in this sector. There is no restriction under this category in eight countries (Australia, Brazil, Canada, France, Israel, Korea, New Zealand and United Kingdom). On the other hand, it is worth noticing that only two countries have at least one major state controlled firm in this sector. State ownership is thus less common in customs brokerage than in the other logistics subsectors.

The categories of *Other discriminatory measures* and *Regulatory transparency* do not include any subsector-specific measures. But the measures common to the four subsectors under logistics services affect the trade restrictiveness indices also for customs brokerage. Finally, *Regulatory transparency*, have the biggest contributions to the overall indices in eight countries covered by the STRI.

#### ***The STRIs according to other classifications***

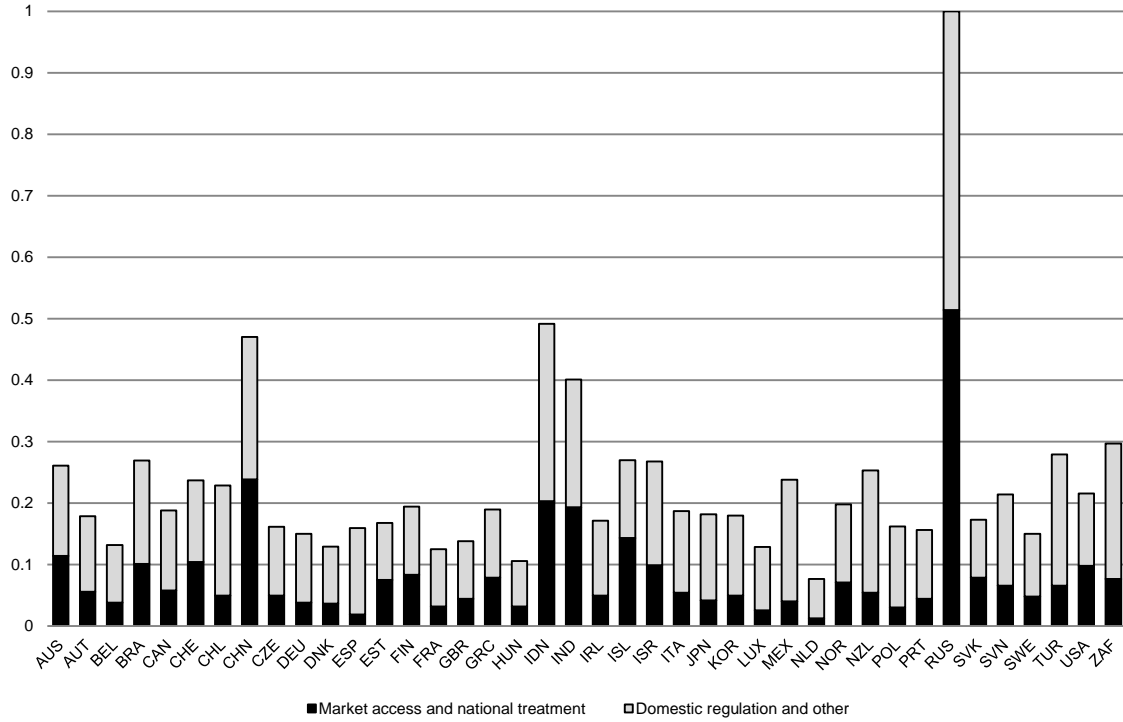
A breakdown of the STRIs according to the GATS framework and modes of supply for logistics services is presented in Figure 6 and Figure 7 respectively. As noted, individual regulatory measures are classified in several ways in order to highlight different aspects of trade restrictiveness.

Figure 6 shows that domestic regulations and other measures are, in general, more important in cargo-handling, storage and warehouse services, though market access and national treatment do play a role. This is partly because measures under *Barriers to competition* such as existence of publicly-controlled firms, minimum capital requirement, and competitive bidding schemes substantially contribute to the indices. For more restrictive countries, market access and national treatment have substantive impacts because of foreign equity restrictions, screening and restrictions on boards of directors. In contrast, market access and national treatment account for a larger part of the restrictiveness indices in freight transport agency and customs brokerage services, although some countries are affected more by domestic regulations and other measures.

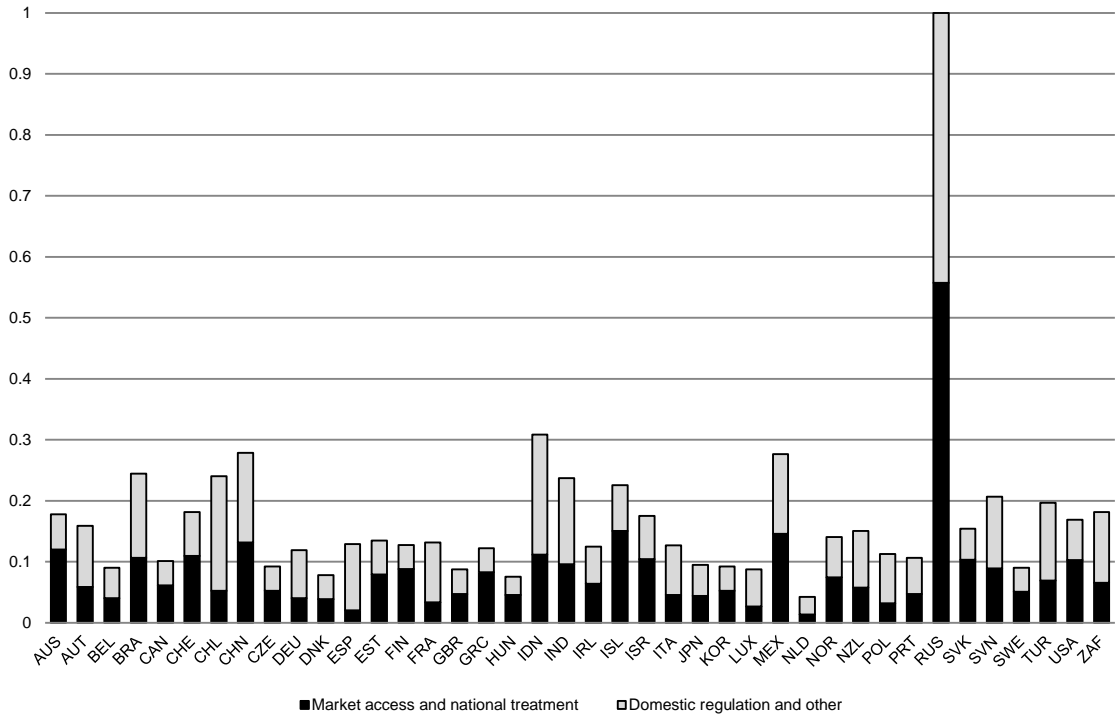
Figure 7 decomposes the STRIs by modes of supply. Overall, both Mode 3 and Mode 4 play an important role in the indices for all subsectors in logistics services. For more restrictive countries included in the STRI, there is a tendency for Mode 3 to account for a larger part of the indices. Again, foreign equity restrictions, screening and restrictions on board of directors explain this. Many restrictions under *Barriers to competition* and *Regulatory transparency* are classified under *All modes*, which lead to a considerable impact of *All modes* in many countries.

Figure 6. The STRIs for logistics services by other classifications: GATS category

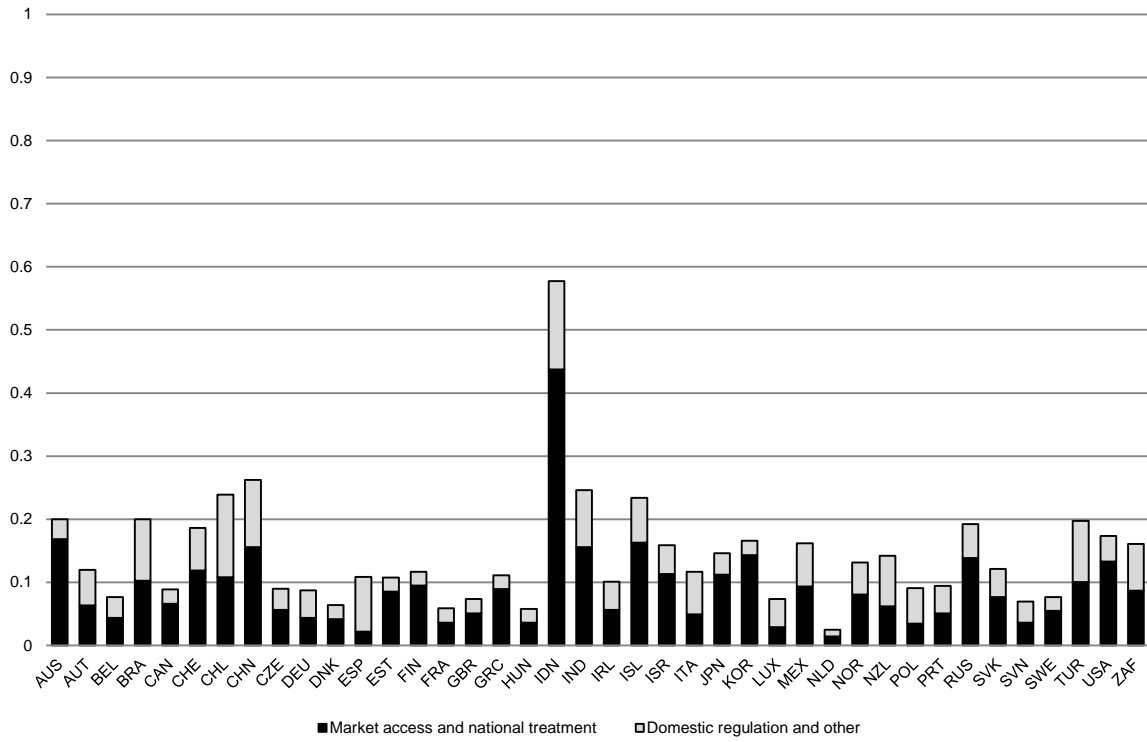
Panel A. Cargo-handling services



Panel B. Storage and warehouse services



Panel C. Freight transport agency services



Panel D. Customs brokerage services

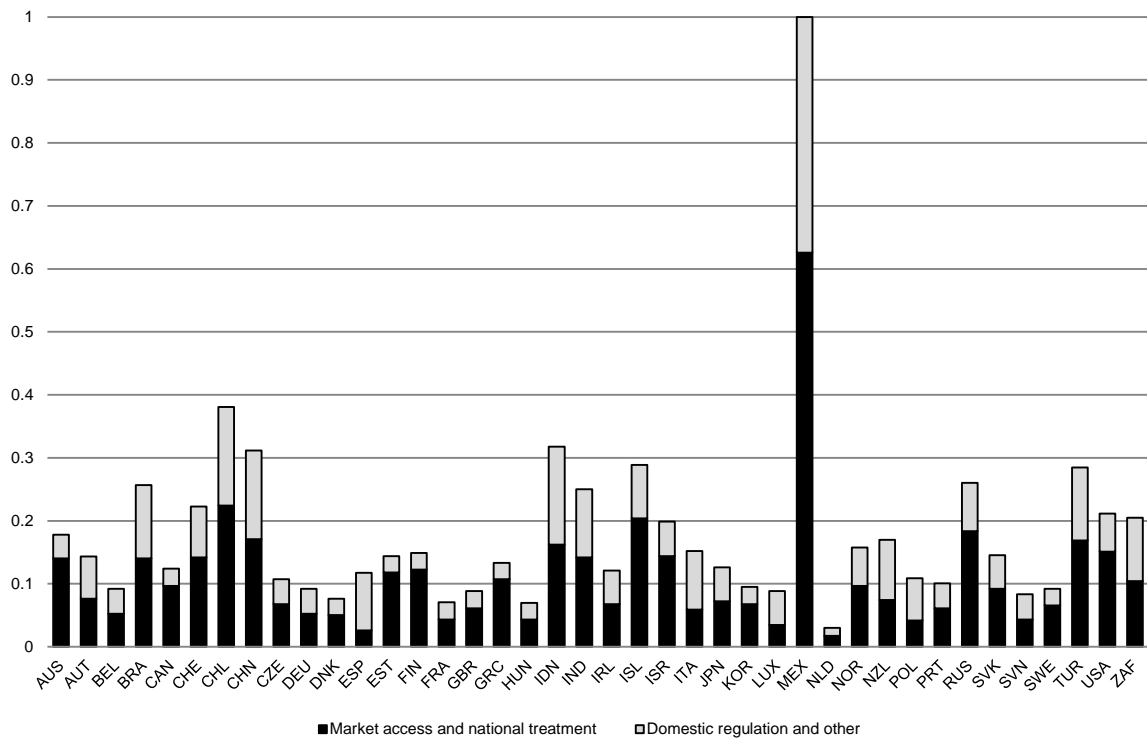
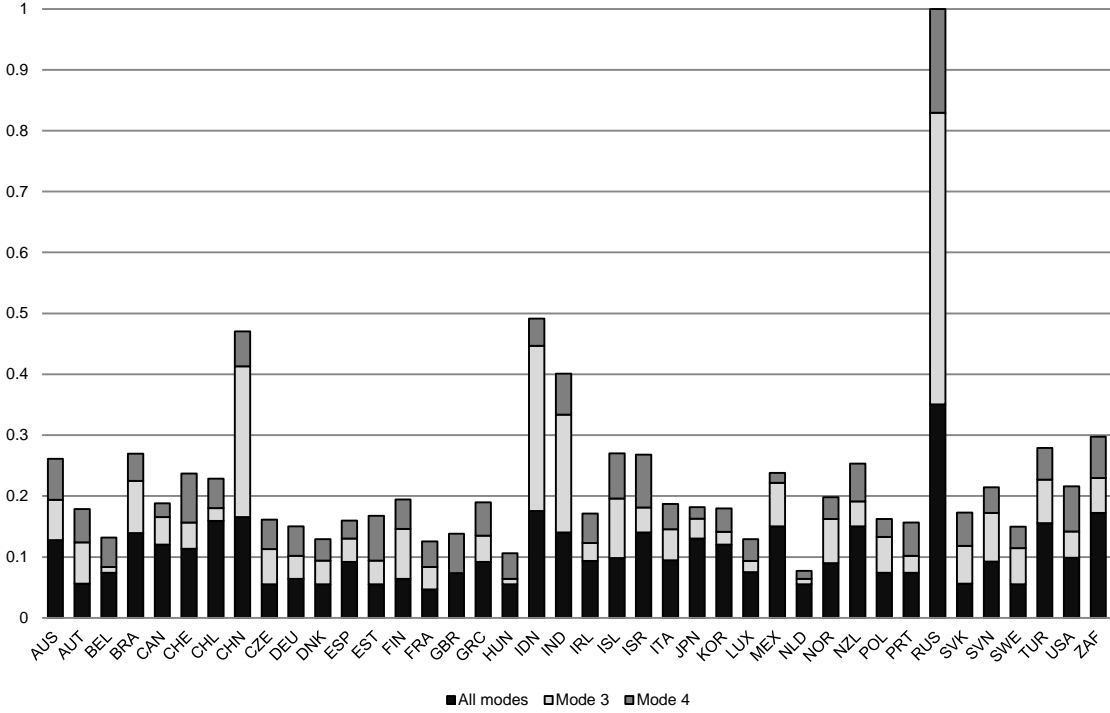
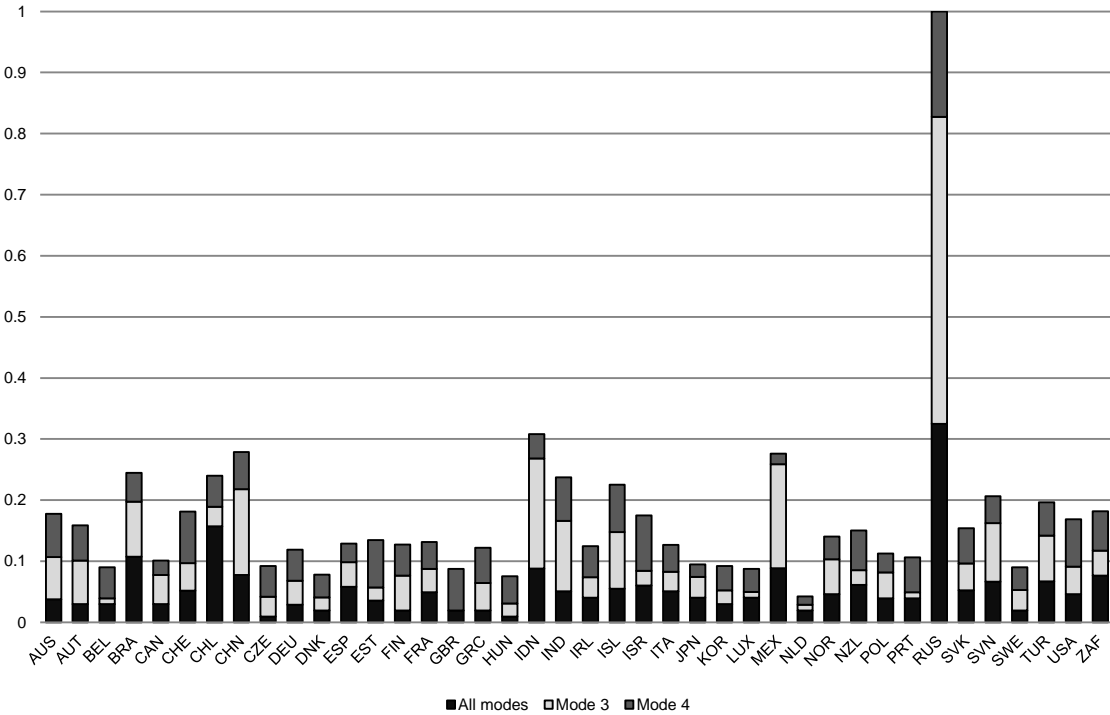


Figure 7. The STRIs for logistics services by other classifications: Modes of supply

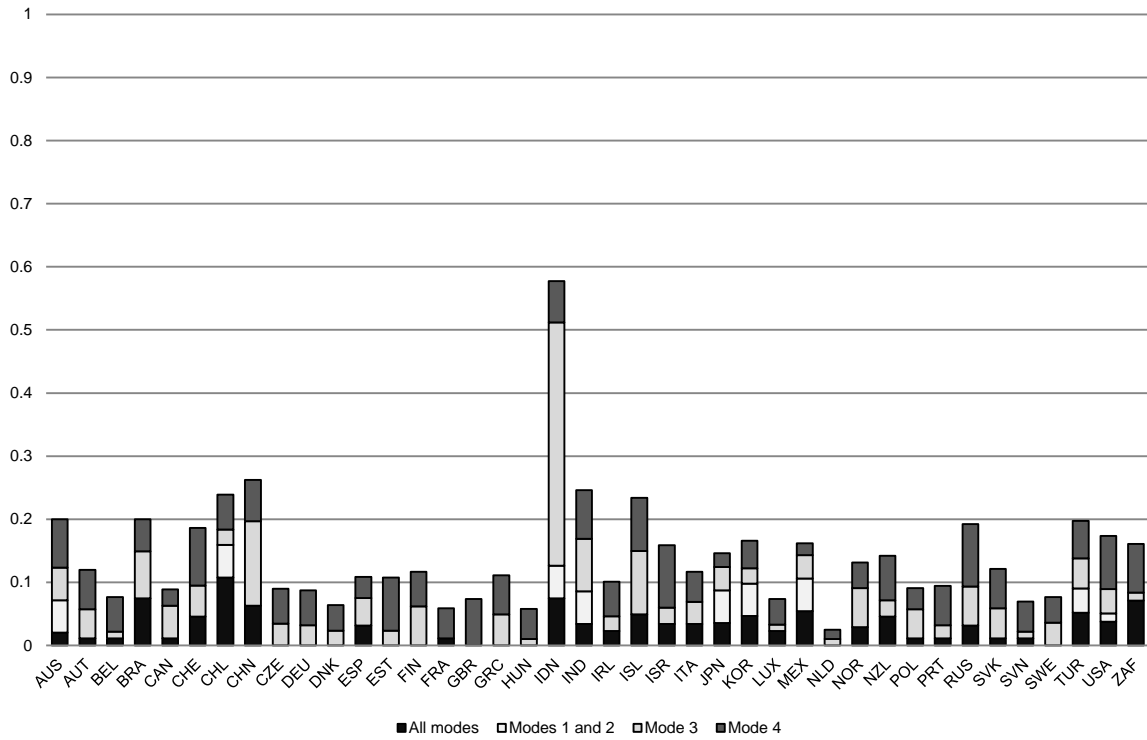
Panel A. Cargo-handling services



Panel B. Storage and warehouse services



Panel C. Freight transport agency services



Panel D. Customs brokerage services

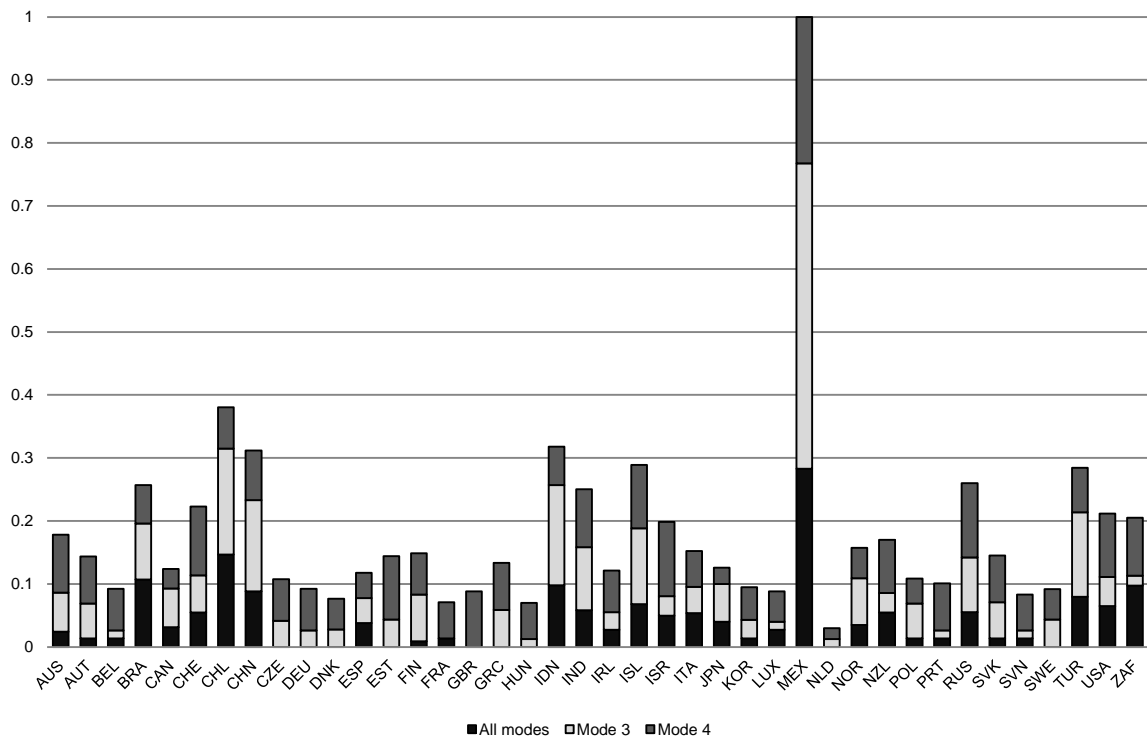
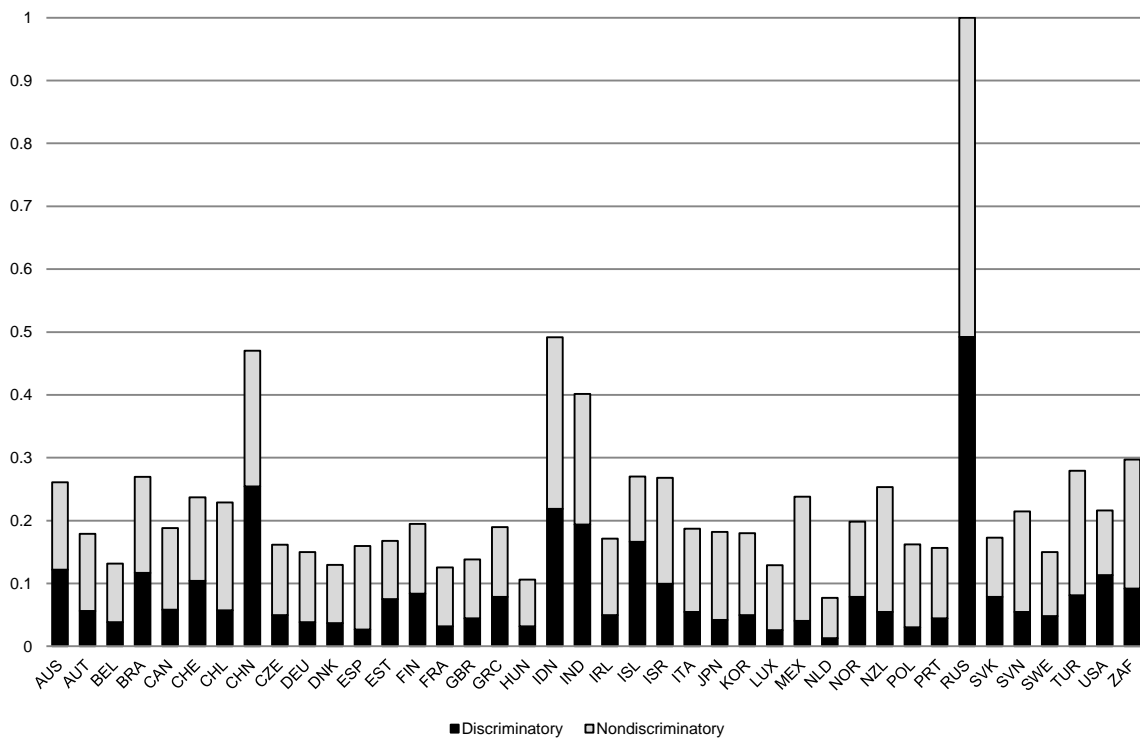


Figure 8 presents the STRIs decomposed into discriminatory and non-discriminatory measures. Discriminatory measures have a significant impact on the result for freight transport agency and customs brokerage services. In light of the importance of *Barriers to competition*, the contribution of non-discriminatory measures is substantial in cargo-handling services. For storage and warehouse services, both discriminatory and non-discriminatory measures are important.

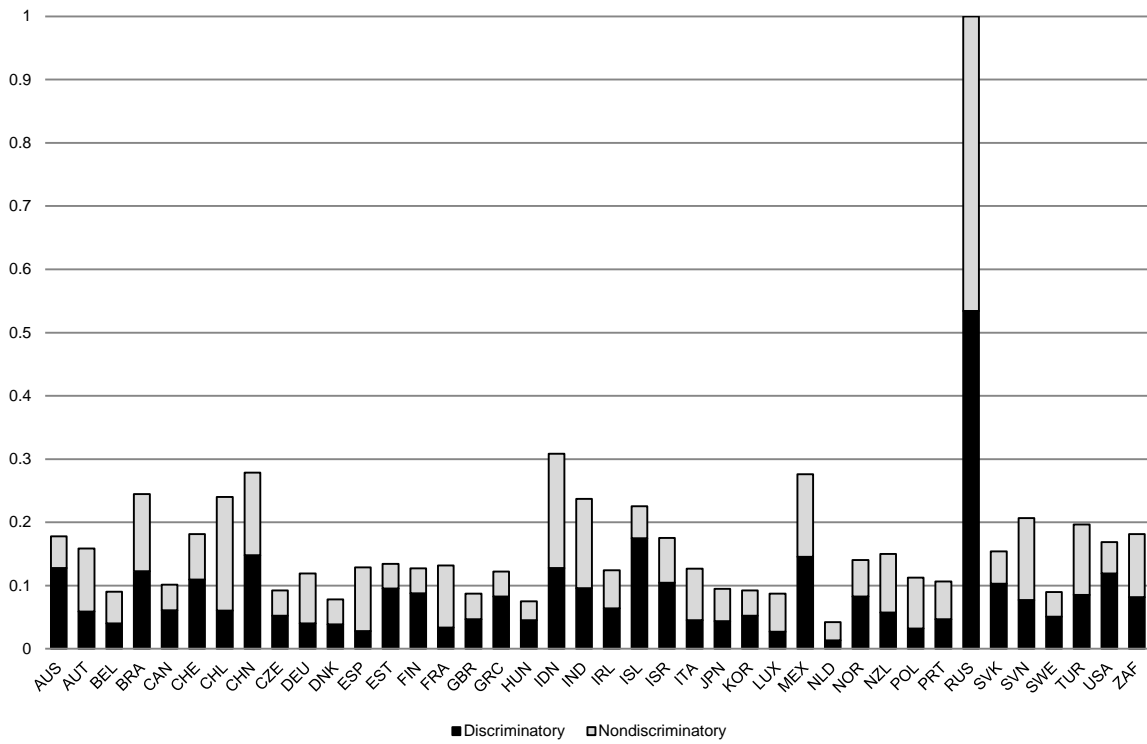
Figure 9 distinguishes between restrictions on establishing a commercial presence and on ongoing operations. Overall, both elements play a substantial role in the STRIs in all subsectors. Restrictions on ongoing operations contribute more to the indices than those on firms’ establishment in cargo-handling and storage and warehouse services.

**Figure 8. The STRIs for logistics services by other classifications: Discriminatory versus non-discriminatory**

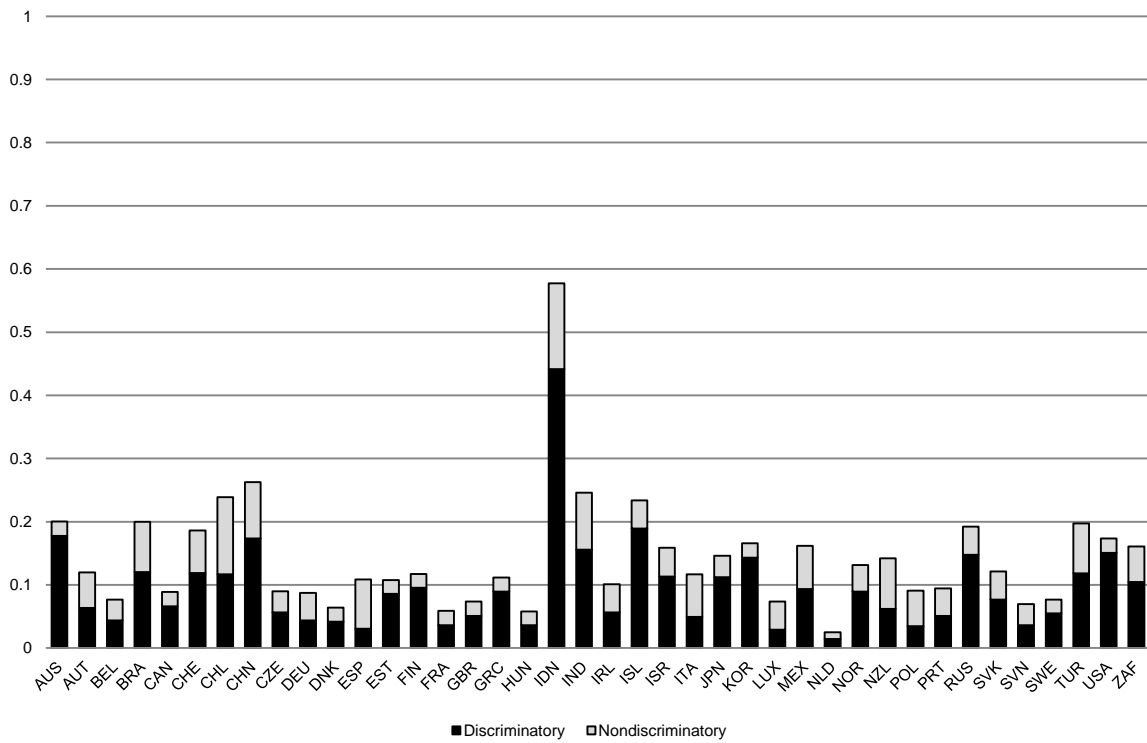
Panel A. Cargo-handling services



Panel B. Storage and warehouse services



Panel C. Freight transport agency services



Panel D. Customs brokerage services

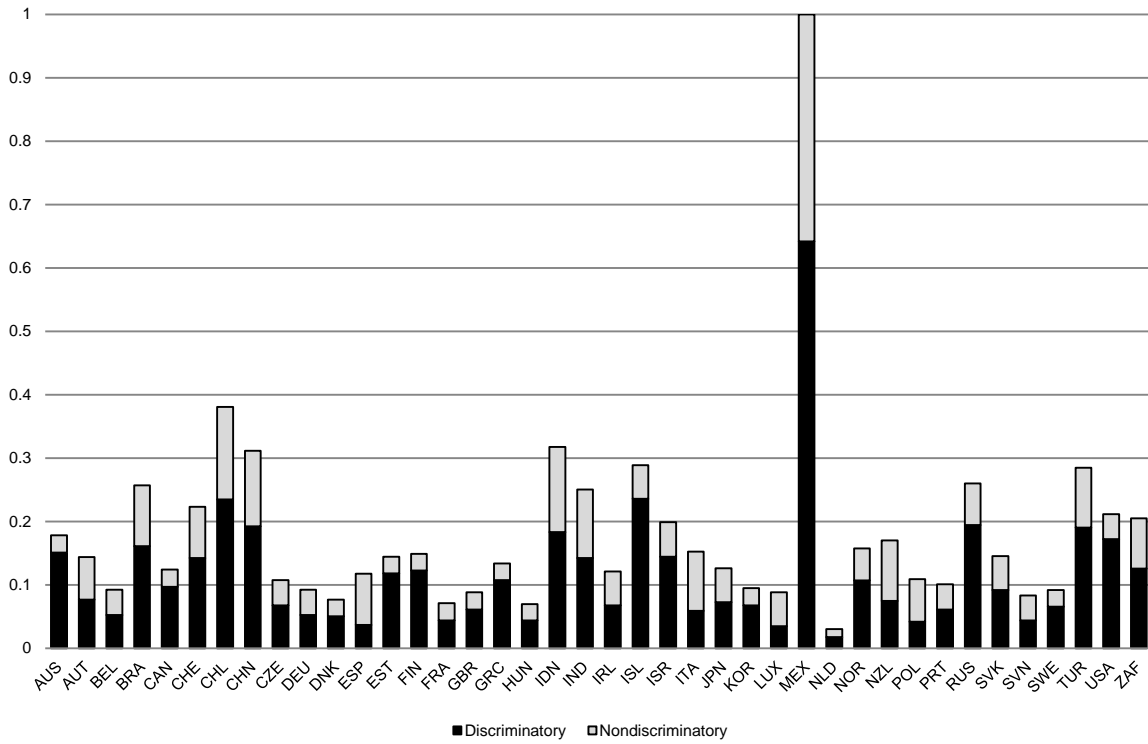
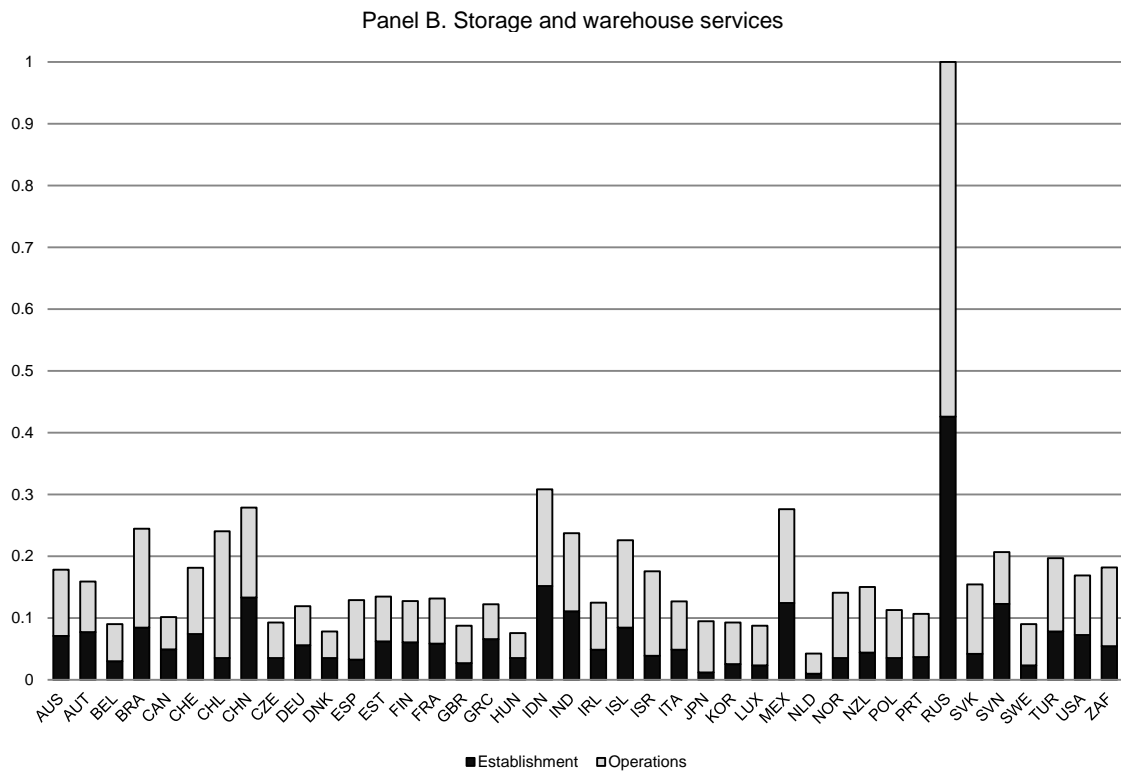
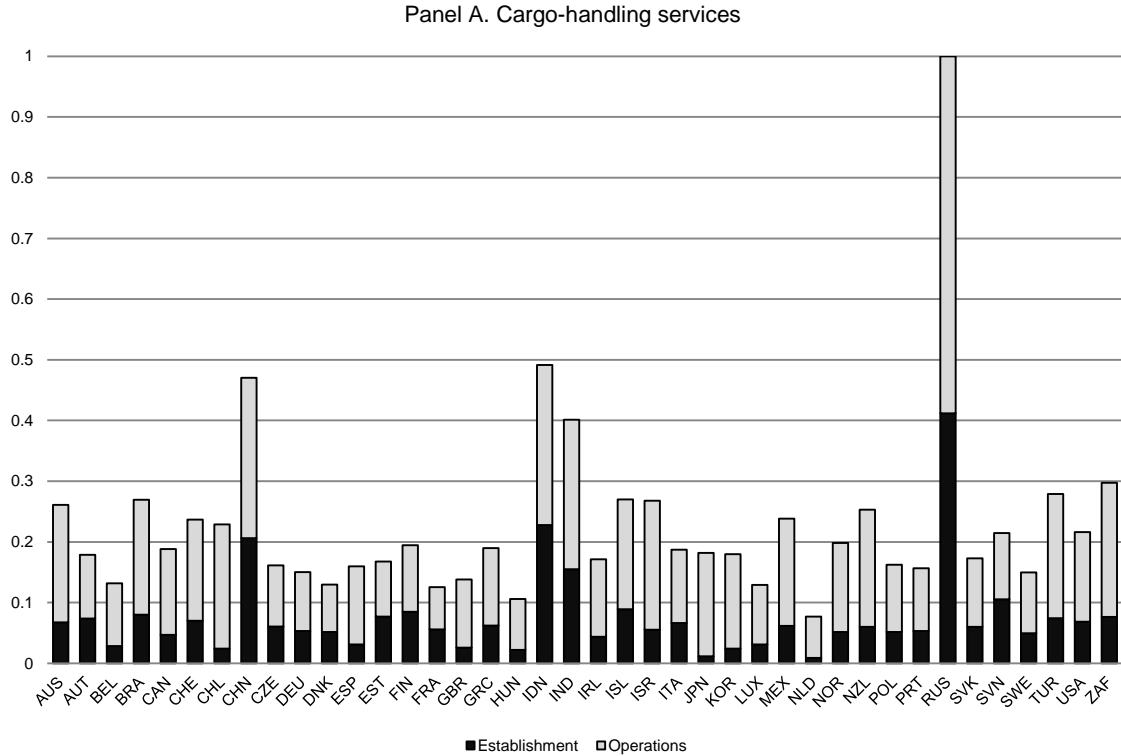
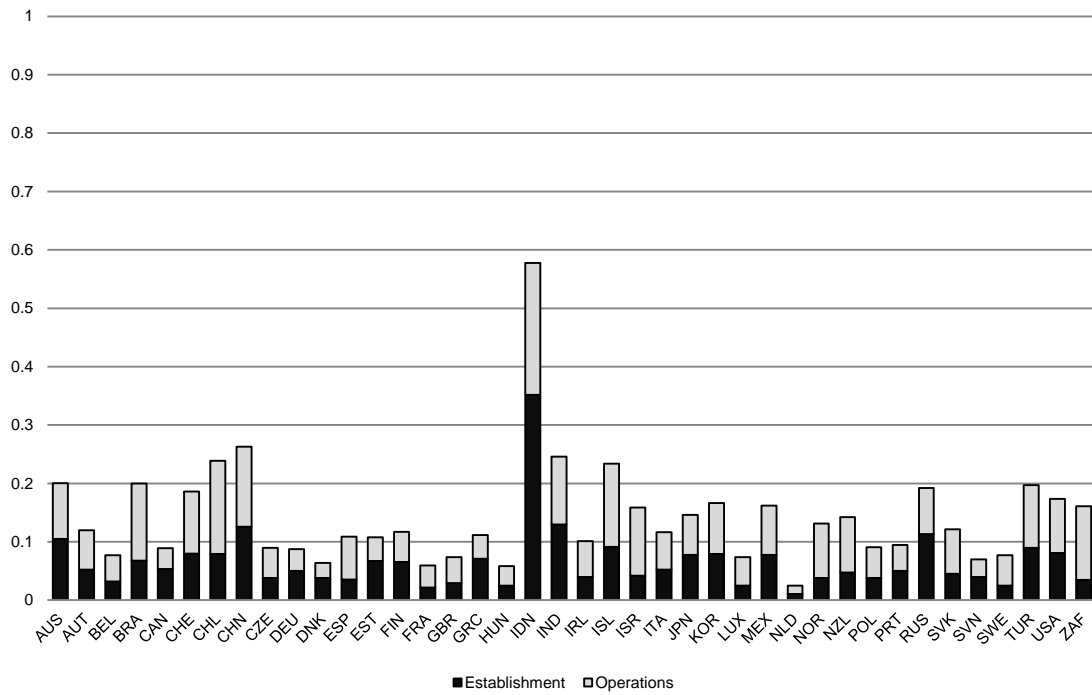




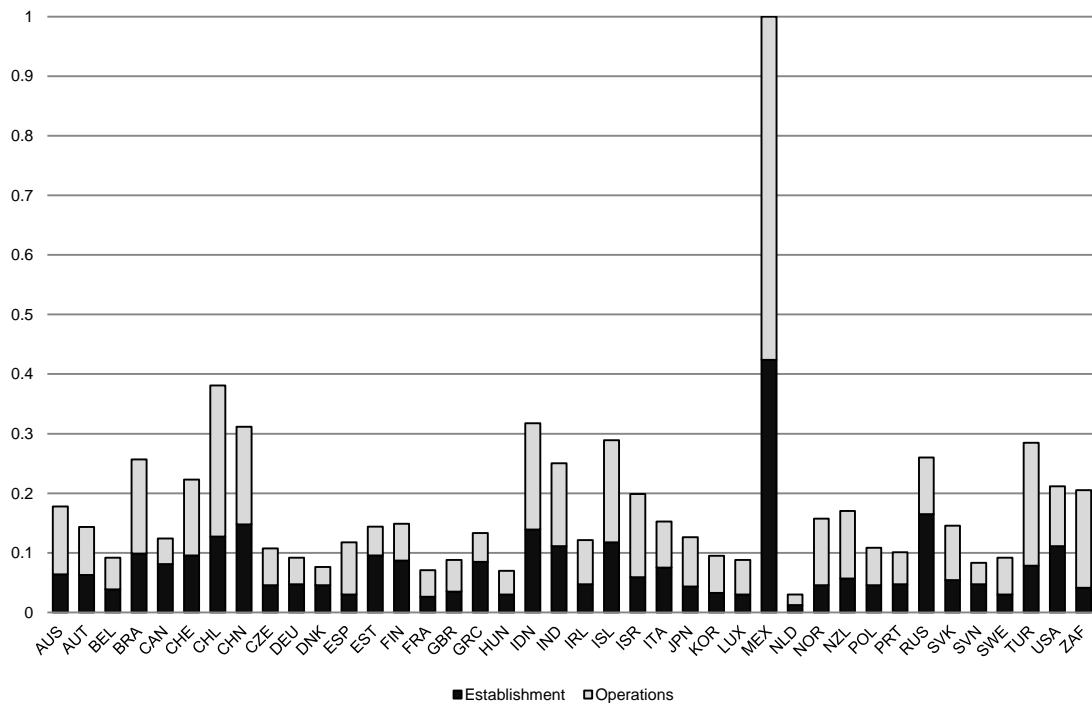
Figure 9. The STRIs for logistics services by other classifications: Establishment versus on-going operations



Panel C. Freight transport agency services



Panel D. Customs brokerage services

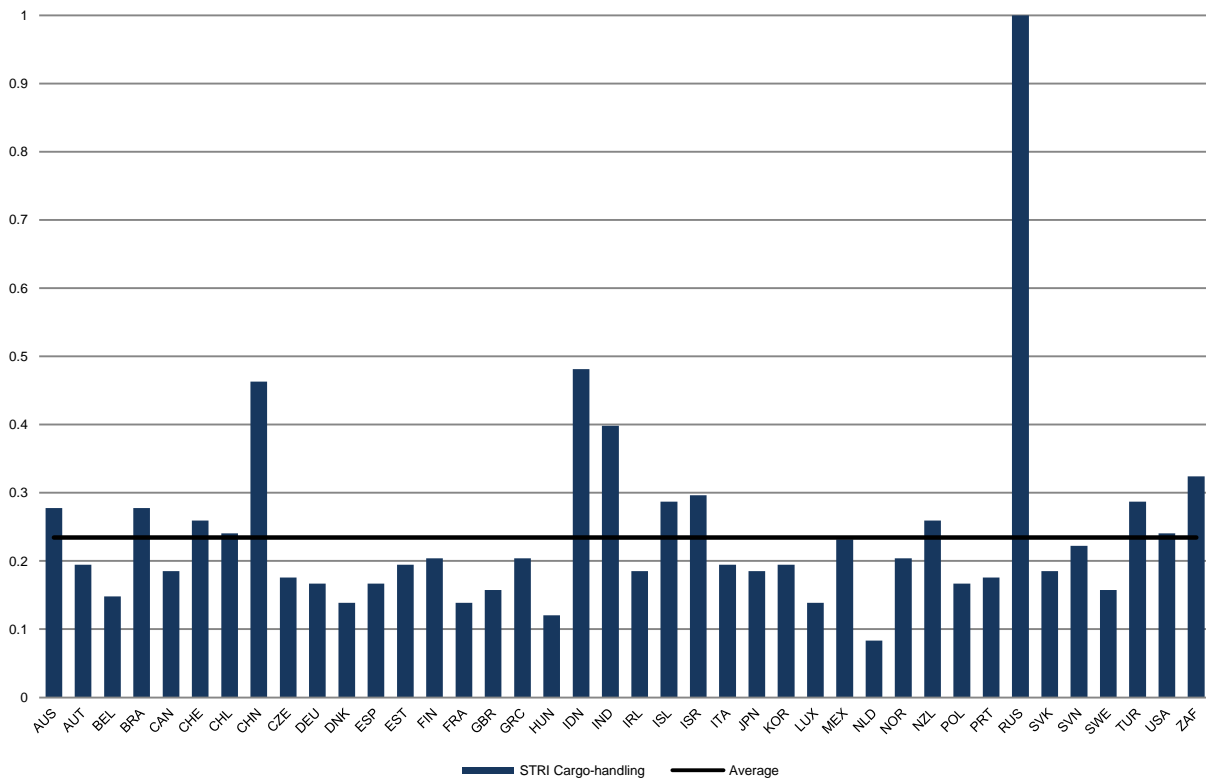


## VII. Sensitivity analysis

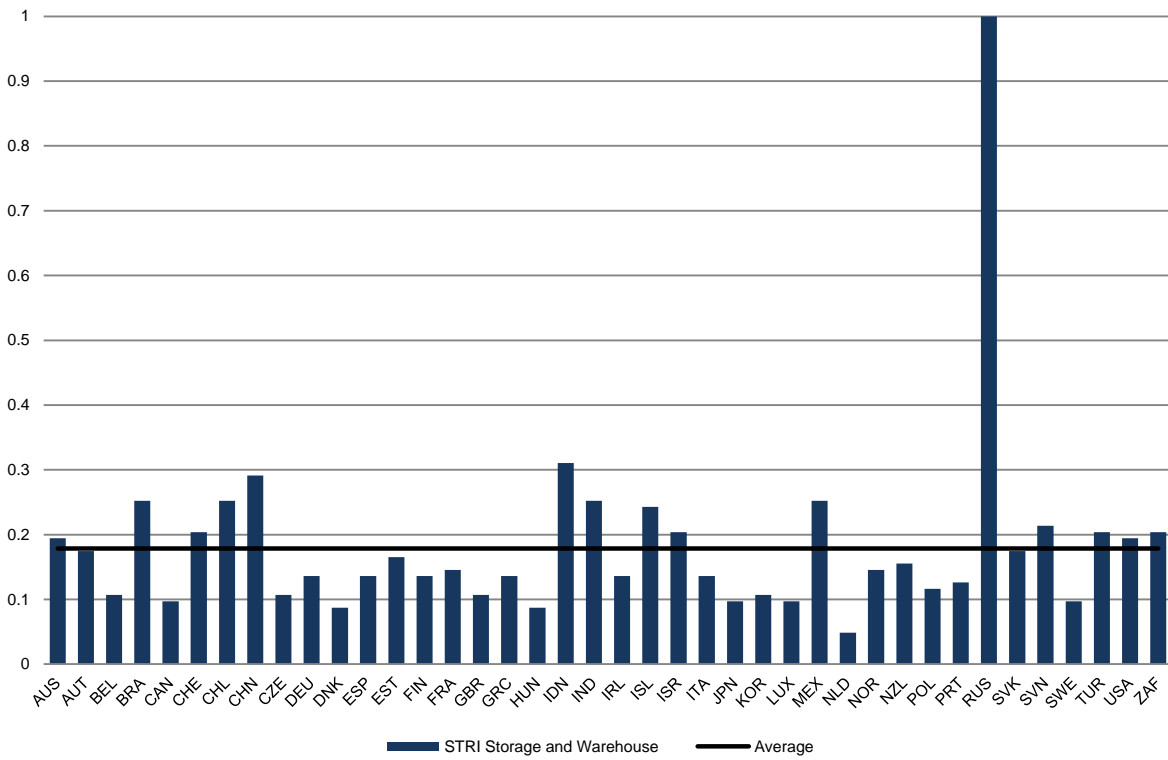
This section tests the sensitivity of results to the weighting scheme that has been chosen in this project. Figure 10 shows the STRIs for the four logistics subsectors when equal weights are applied (the horizontal lines represent the simple averages of countries covered by the STRI). As illustrated by Figure 1 above, the difference between expert judgement and equal weights are significant, but not very large. Equal weights yield slightly higher average indices in all four subsectors. This is because of the higher weight assigned to *Restrictions on the movement of people* in the equal weighting scheme. The Spearman rank correlations between the STRIs calculated with expert judgement and equal weights are 0.99 for cargo-handling services, 0.99 for storage and warehouse services, 0.98 for freight transport agency services, and 0.99 for customs brokerage services.

**Figure 10. The STRIs for logistics services with equal weights**

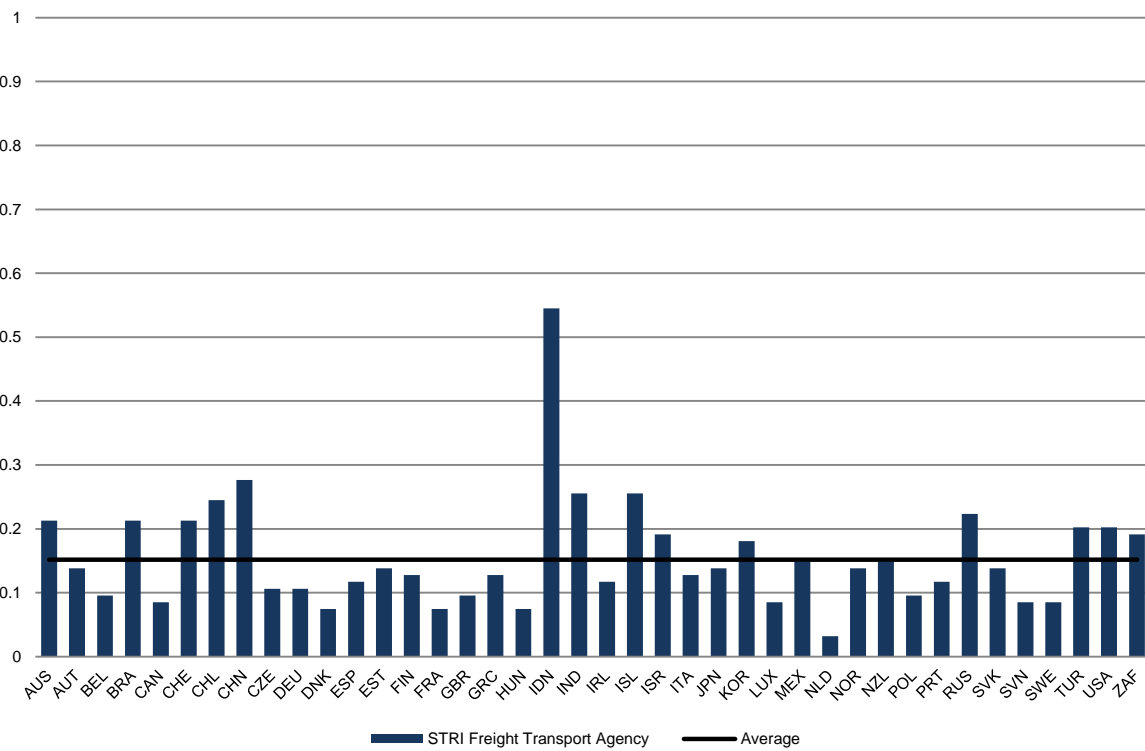
Panel A. Cargo-handling services



Panel B. Storage and warehouse services



Panel C. Freight transport agency services



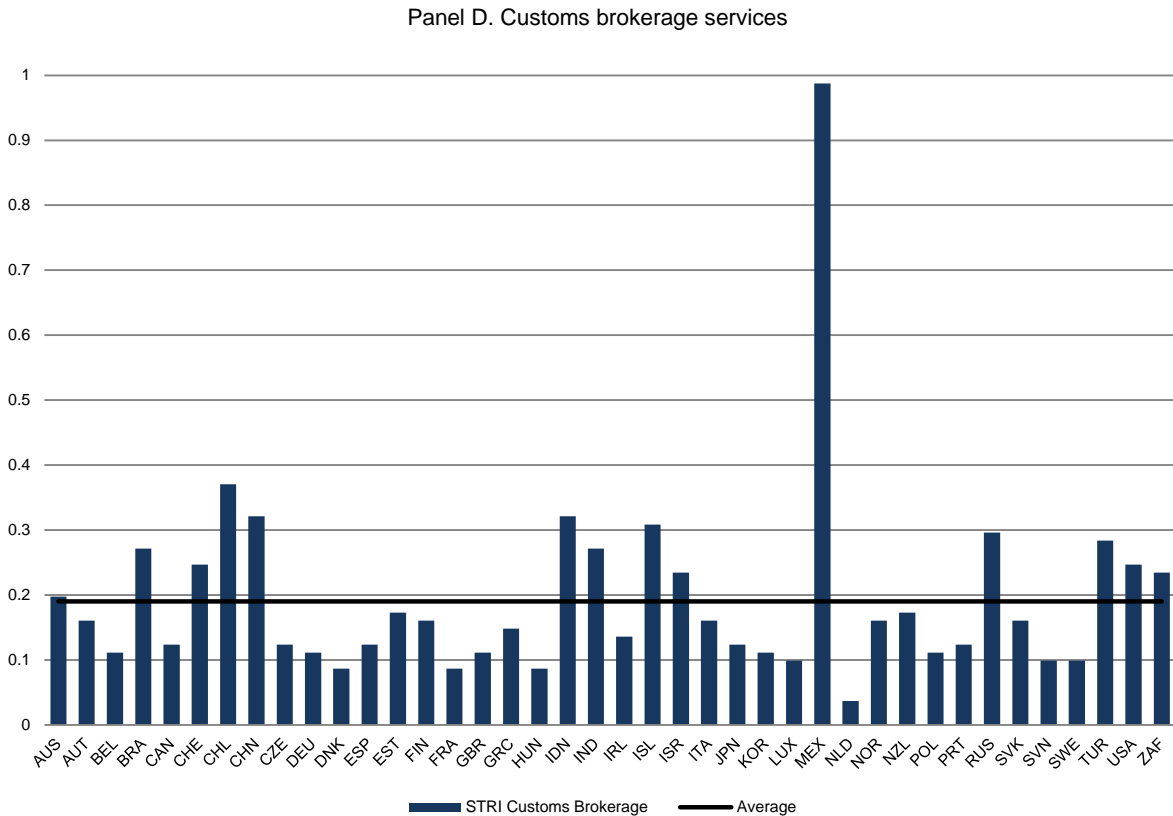
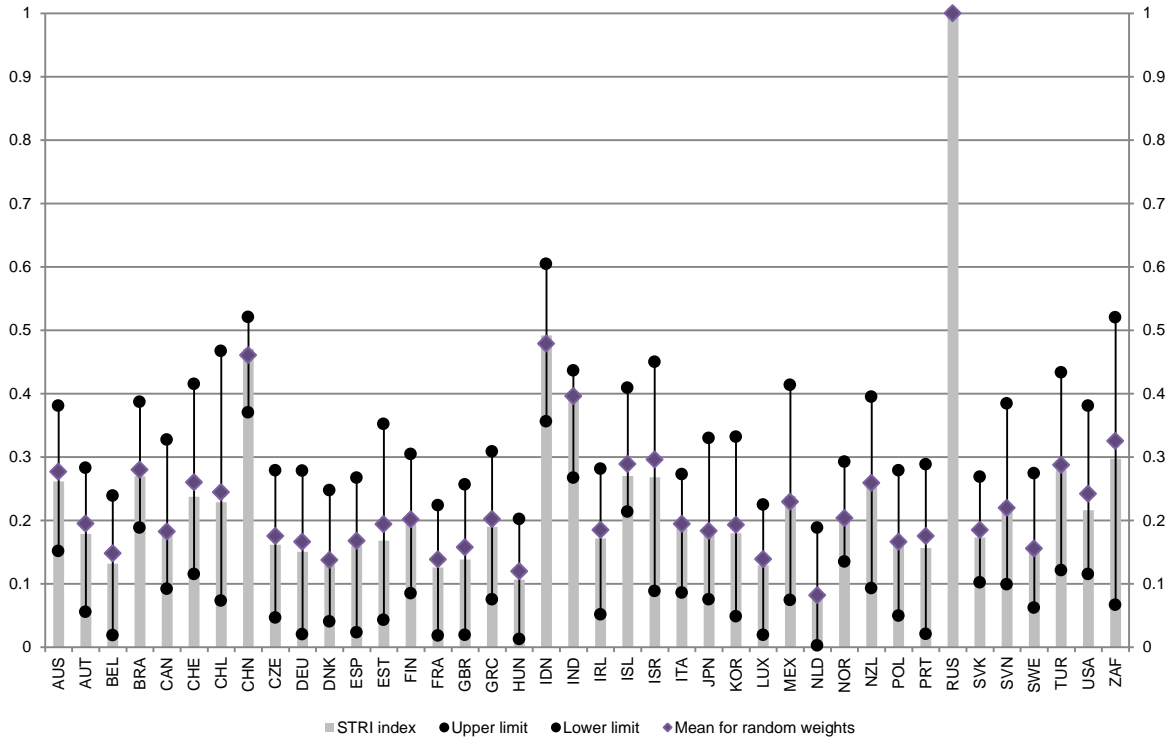


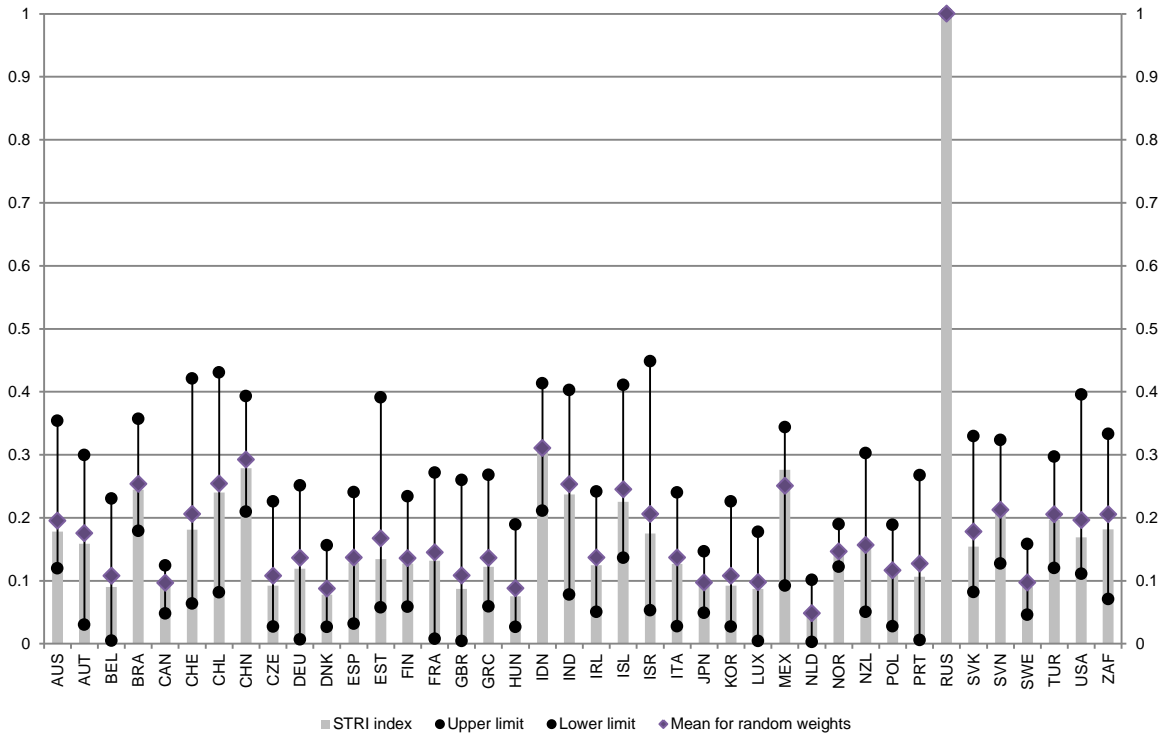
Figure 11 illustrates the results of the random weights simulation in the four logistics subsectors, including the mean for all simulations and the lowest and the highest simulation results, from 3 000 weighting schemes chosen at random (Monte Carlo simulations). The mean from random weights also aligns closely with the STRIs calculated using expert judgement in all subsectors in logistics services. In general, the STRI indices based on expert judgement weights are slightly lower than the mean for the random weights-based indices. Countries with a relatively even regulatory profile in all policy areas have a smaller spread between the lowest and the highest value. This spread shows to what extent the country's index value is sensitive to the weighting scheme. Russia for cargo-handling and storage and warehouse services, and Mexico for customs brokerage services are not affected by the weighting scheme. The least sensitive country in freight transport agency is Norway. The most sensitive country to the weighting system is South Africa in cargo-handling, Israel in storage and warehouse and customs brokerage, and Indonesia in freight transport agency. Note that Netherlands, which score is the lowest in all subsectors, is much less sensitive to the weighting scheme in storage and warehouse, freight transport agency, and customs brokerage services.

Figure 11. The STRIs for logistics services with random weights

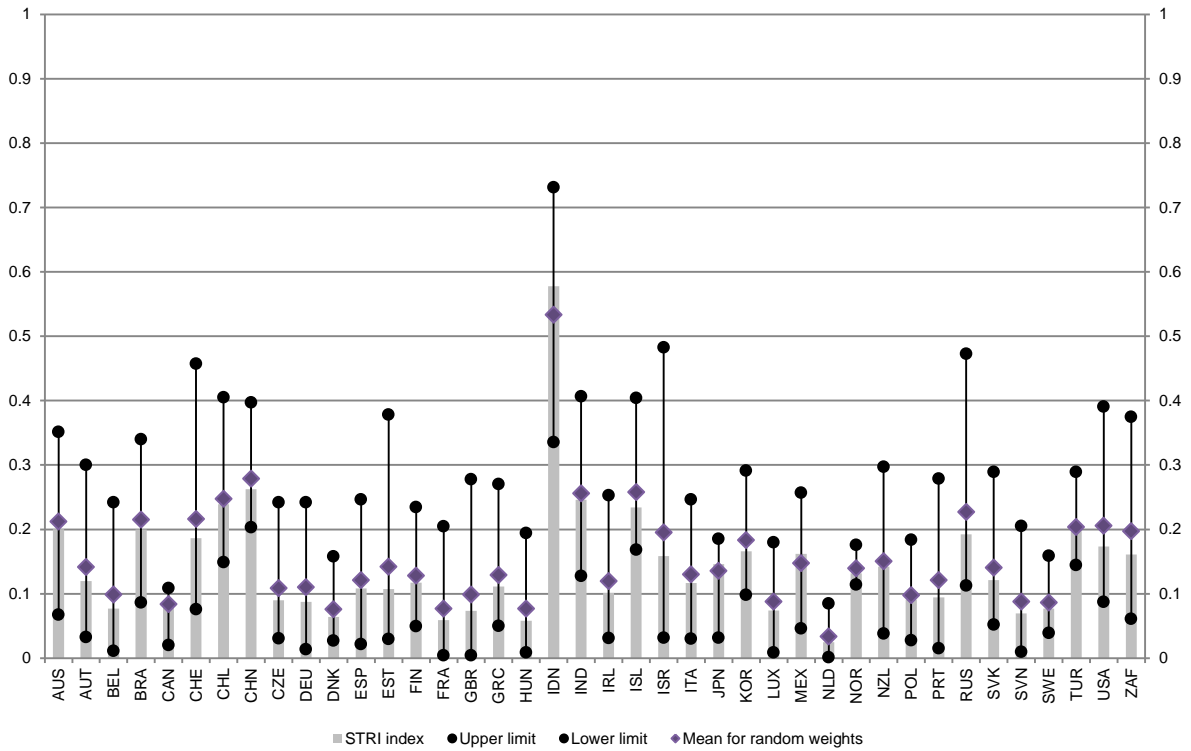
Panel A. Cargo-handling services



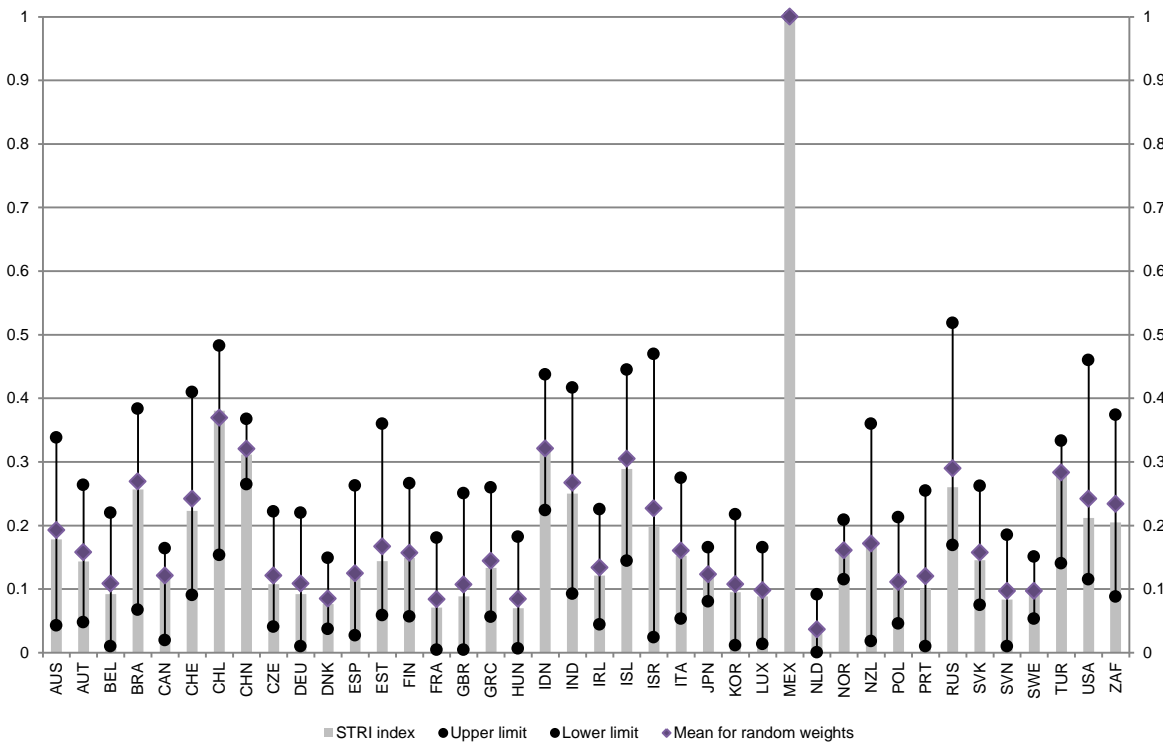
Panel B. Storage and warehouse services



Panel C. Freight transport agency services



Panel D. Customs brokerage services



## VIII. Summary and conclusions

This paper has presented the STRI for logistics services on the basis of the regulatory database of 34 OECD countries, Russia, Brazil, China, India, Indonesia and South Africa. The sector covers cargo-handling, warehouse and storage, freight transport agency and customs brokerage and the indices are calculated for each of these subsectors. Logistics services play a crucial role in the facilitation of global value chains. Trade in logistics services mainly takes place through commercial presence (Mode 3) and the STRI results highlight the importance of impediments affecting trade via this mode.

The result of cargo-handling services shows that the overall level of restrictiveness varies among countries, ranging from 0.08 to 1, with a sample average of 0.22. One country reserves all services provision to statutory monopoly and another country has a monopoly only at ports. *Barriers to competition* significantly contribute to the results. This is partly explained by pervasive state ownership in the sector. *Restrictions on foreign entry* also play a substantial role in more restrictive countries covered by the STRI.

For storage and warehouse services, the result indicates that the overall level of restrictiveness is low with a sample average of 0.17. There is however large variation in the STRI indices among countries ranging from 0.04 to 1. Similar to cargo-handling services, services provision is reserved for statutory monopoly in one country while another retains a monopoly at ports.

With respect to freight transport agency services, the result shows that the overall level of restrictiveness is quite low, ranging from 0.02 to 0.58 with a sample average of 0.14. Three policy areas significantly contribute to the overall indices for freight transport agency services: *Restrictions on foreign entry*, *Restrictions on the movement of people* and *Regulatory transparency*. For more restrictive countries, a higher score in *Restrictions on foreign entry* is observed. This is partly explained by foreign equity restrictions, requirement for commercial presence, screening and restrictions on boards of directors.

In the customs brokerage sectors the level of restrictiveness varies from 0.03 to 1 with an average of 0.18. One country both prohibits of foreign equity participation and imposes nationality requirement on customs brokers, which implies that the sector is completely closed to foreign services providers. *Restrictions on the movement of people* and *Regulatory transparency* also contribute significantly to the indices in many countries.

These results provide useful policy insights, in particular, for identifying in which policy areas reforms are most needed. They also provide a tool for identifying priorities for trade negotiations.



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## Annex A. Index values by policy area

Table A.1. Cargo-handling services

Country	Restrictions on foreign entry	Restrictions on the movement of people	Other discriminatory measures	Barriers to competition	Regulatory transparency	Overall indicator
AUS	0.06	0.06	0.01	0.12	0.02	0.26
AUT	0.01	0.04	0.00	0.08	0.04	0.18
BEL	0.00	0.04	0.00	0.07	0.02	0.13
BRA	0.06	0.04	0.02	0.08	0.07	0.27
CAN	0.05	0.01	0.00	0.11	0.02	0.19
CHE	0.03	0.07	0.00	0.08	0.05	0.24
CHL	0.01	0.04	0.02	0.07	0.09	0.23
CHN	0.18	0.06	0.02	0.16	0.06	0.47
CZE	0.01	0.04	0.00	0.09	0.02	0.16
DEU	0.00	0.04	0.00	0.09	0.02	0.15
DNK	0.01	0.03	0.00	0.08	0.01	0.13
ESP	0.00	0.02	0.01	0.08	0.05	0.16
EST	0.01	0.06	0.00	0.08	0.01	0.17
FIN	0.05	0.04	0.00	0.10	0.01	0.19
FRA	0.00	0.03	0.00	0.07	0.02	0.13
GBR	0.00	0.04	0.00	0.07	0.02	0.14
GRC	0.03	0.04	0.00	0.10	0.01	0.19
HUN	0.00	0.03	0.00	0.06	0.01	0.11
IDN	0.16	0.04	0.02	0.19	0.08	0.49
IND	0.14	0.06	0.00	0.14	0.07	0.40
IRL	0.01	0.04	0.00	0.09	0.03	0.17
ISL	0.08	0.06	0.02	0.07	0.03	0.27
ISR	0.02	0.08	0.00	0.13	0.04	0.27
ITA	0.02	0.03	0.00	0.08	0.05	0.19
JPN	0.02	0.02	0.00	0.11	0.03	0.18
KOR	0.01	0.04	0.00	0.11	0.02	0.18
LUX	0.00	0.03	0.00	0.07	0.03	0.13
MEX	0.03	0.01	0.00	0.14	0.06	0.24
NLD	0.00	0.01	0.00	0.06	0.00	0.08
NOR	0.05	0.03	0.02	0.09	0.02	0.20
NZL	0.02	0.03	0.00	0.13	0.07	0.25
POL	0.01	0.02	0.00	0.09	0.04	0.16
PRT	0.00	0.04	0.00	0.09	0.02	0.16
RUS	0.34	0.14	0.05	0.30	0.17	1.00
SVK	0.03	0.04	0.00	0.06	0.03	0.17
SVN	0.03	0.03	0.00	0.13	0.02	0.21
SWE	0.02	0.03	0.00	0.09	0.01	0.15
TUR	0.03	0.03	0.02	0.14	0.06	0.28
USA	0.03	0.06	0.02	0.08	0.02	0.22
ZAF	0.01	0.06	0.02	0.17	0.04	0.30

Table A.2. Storage and warehouse services

Country	Restrictions on foreign entry	Restrictions on the movement of people	Other discriminatory measures	Barriers to competition	Regulatory transparency	Overall indicator
AUS	0.06	0.06	0.01	0.03	0.02	0.18
AUT	0.01	0.05	0.00	0.06	0.04	0.16
BEL	0.00	0.04	0.00	0.03	0.02	0.09
BRA	0.06	0.05	0.02	0.05	0.07	0.24
CAN	0.05	0.01	0.00	0.02	0.02	0.10
CHE	0.04	0.07	0.00	0.02	0.05	0.18
CHL	0.01	0.04	0.02	0.08	0.09	0.24
CHN	0.07	0.06	0.02	0.07	0.06	0.28
CZE	0.01	0.04	0.00	0.02	0.02	0.09
DEU	0.00	0.04	0.00	0.06	0.02	0.12
DNK	0.01	0.03	0.00	0.03	0.01	0.08
ESP	0.00	0.02	0.01	0.05	0.05	0.13
EST	0.01	0.07	0.02	0.03	0.01	0.13
FIN	0.05	0.04	0.00	0.03	0.01	0.13
FRA	0.00	0.03	0.00	0.08	0.02	0.13
GBR	0.00	0.05	0.00	0.02	0.02	0.09
GRC	0.04	0.05	0.00	0.03	0.01	0.12
HUN	0.01	0.03	0.00	0.02	0.01	0.08
IDN	0.07	0.04	0.02	0.10	0.08	0.31
IND	0.04	0.06	0.00	0.07	0.07	0.24
IRL	0.02	0.04	0.00	0.03	0.03	0.12
ISL	0.08	0.07	0.02	0.02	0.03	0.23
ISR	0.02	0.08	0.00	0.03	0.04	0.18
ITA	0.01	0.03	0.00	0.03	0.05	0.13
JPN	0.02	0.02	0.00	0.02	0.03	0.09
KOR	0.01	0.04	0.00	0.02	0.02	0.09
LUX	0.00	0.03	0.00	0.03	0.03	0.09
MEX	0.13	0.01	0.01	0.07	0.06	0.28
NLD	0.00	0.01	0.00	0.03	0.00	0.04
NOR	0.05	0.03	0.02	0.03	0.02	0.14
NZL	0.02	0.03	0.00	0.02	0.07	0.15
POL	0.01	0.02	0.00	0.04	0.04	0.11
PRT	0.00	0.05	0.00	0.04	0.02	0.11
RUS	0.36	0.14	0.07	0.25	0.18	1.00
SVK	0.02	0.05	0.03	0.02	0.03	0.15
SVN	0.05	0.03	0.01	0.10	0.02	0.21
SWE	0.02	0.03	0.00	0.03	0.01	0.09
TUR	0.04	0.03	0.02	0.05	0.06	0.20
USA	0.04	0.07	0.02	0.03	0.02	0.17
ZAF	0.01	0.05	0.02	0.06	0.04	0.18

Table A.3. Freight Transport agency services

Country	Restrictions on foreign entry	Restrictions on the movement of people	Other discriminatory measures	Barriers to competition	Regulatory transparency	Overall indicator
AUS	0.10	0.07	0.01	0.00	0.02	0.20
AUT	0.01	0.05	0.00	0.01	0.05	0.12
BEL	0.00	0.04	0.00	0.01	0.02	0.08
BRA	0.05	0.05	0.02	0.00	0.08	0.20
CAN	0.05	0.01	0.00	0.00	0.02	0.09
CHE	0.04	0.08	0.00	0.01	0.06	0.19
CHL	0.06	0.04	0.02	0.01	0.10	0.24
CHN	0.09	0.07	0.02	0.02	0.07	0.26
CZE	0.01	0.04	0.00	0.01	0.02	0.09
DEU	0.00	0.04	0.00	0.02	0.02	0.09
DNK	0.01	0.03	0.00	0.01	0.01	0.06
ESP	0.00	0.02	0.01	0.02	0.06	0.11
EST	0.01	0.07	0.00	0.01	0.01	0.11
FIN	0.05	0.04	0.00	0.01	0.01	0.12
FRA	0.00	0.04	0.00	0.00	0.02	0.06
GBR	0.00	0.05	0.00	0.00	0.02	0.07
GRC	0.04	0.05	0.00	0.01	0.01	0.11
HUN	0.00	0.04	0.00	0.01	0.01	0.06
IDN	0.36	0.07	0.02	0.04	0.09	0.58
IND	0.09	0.07	0.00	0.01	0.08	0.25
IRL	0.01	0.04	0.00	0.01	0.03	0.10
ISL	0.09	0.07	0.03	0.01	0.03	0.23
ISR	0.03	0.09	0.00	0.00	0.05	0.16
ITA	0.01	0.04	0.00	0.01	0.06	0.12
JPN	0.09	0.02	0.00	0.00	0.03	0.15
KOR	0.06	0.04	0.04	0.00	0.02	0.17
LUX	0.00	0.03	0.00	0.01	0.03	0.07
MEX	0.08	0.01	0.01	0.00	0.07	0.16
NLD	0.00	0.01	0.00	0.01	0.00	0.02
NOR	0.05	0.03	0.02	0.01	0.02	0.13
NZL	0.03	0.04	0.00	0.00	0.08	0.14
POL	0.01	0.02	0.00	0.01	0.05	0.09
PRT	0.00	0.05	0.00	0.02	0.02	0.09
RUS	0.05	0.09	0.01	0.01	0.03	0.19
SVK	0.03	0.05	0.00	0.01	0.03	0.12
SVN	0.00	0.04	0.00	0.01	0.02	0.07
SWE	0.03	0.03	0.00	0.01	0.01	0.08
TUR	0.06	0.04	0.02	0.01	0.07	0.20
USA	0.05	0.07	0.03	0.00	0.02	0.17
ZAF	0.01	0.07	0.03	0.01	0.05	0.16

Table A.4. Customs brokerage services

Country	Restrictions on foreign entry	Restrictions on the movement of people	Other discriminatory measures	Barriers to competition	Regulatory transparency	Overall indicator
AUS	0.06	0.08	0.01	0.00	0.03	0.18
AUT	0.02	0.06	0.00	0.01	0.05	0.14
BEL	0.00	0.05	0.00	0.01	0.03	0.09
BRA	0.06	0.08	0.02	0.00	0.10	0.26
CAN	0.06	0.03	0.00	0.00	0.03	0.12
CHE	0.05	0.10	0.00	0.01	0.07	0.22
CHL	0.15	0.07	0.02	0.01	0.12	0.38
CHN	0.09	0.08	0.02	0.04	0.08	0.31
CZE	0.02	0.05	0.00	0.01	0.03	0.11
DEU	0.00	0.05	0.00	0.01	0.03	0.09
DNK	0.02	0.03	0.00	0.01	0.01	0.08
ESP	0.00	0.03	0.01	0.01	0.07	0.12
EST	0.03	0.09	0.00	0.01	0.01	0.14
FIN	0.06	0.06	0.00	0.01	0.01	0.15
FRA	0.00	0.04	0.00	0.00	0.03	0.07
GBR	0.00	0.06	0.00	0.00	0.03	0.09
GRC	0.05	0.06	0.00	0.01	0.01	0.13
HUN	0.00	0.04	0.00	0.01	0.01	0.07
IDN	0.09	0.07	0.02	0.02	0.11	0.32
IND	0.05	0.10	0.00	0.01	0.10	0.25
IRL	0.02	0.05	0.00	0.01	0.04	0.12
ISL	0.11	0.10	0.03	0.01	0.04	0.29
ISR	0.03	0.11	0.00	0.00	0.05	0.20
ITA	0.02	0.04	0.00	0.02	0.07	0.15
JPN	0.05	0.03	0.00	0.01	0.04	0.13
KOR	0.02	0.05	0.00	0.00	0.03	0.10
LUX	0.00	0.03	0.00	0.01	0.04	0.09
MEX	0.37	0.21	0.06	0.12	0.23	1.00
NLD	0.00	0.02	0.00	0.01	0.00	0.03
NOR	0.06	0.03	0.02	0.01	0.03	0.16
NZL	0.03	0.04	0.00	0.00	0.10	0.17
POL	0.02	0.03	0.00	0.01	0.05	0.11
PRT	0.00	0.06	0.00	0.01	0.03	0.10
RUS	0.06	0.12	0.01	0.02	0.04	0.26
SVK	0.03	0.06	0.00	0.01	0.04	0.15
SVN	0.00	0.04	0.00	0.01	0.03	0.08
SWE	0.03	0.03	0.00	0.01	0.01	0.09
TUR	0.11	0.06	0.02	0.01	0.08	0.28
USA	0.05	0.10	0.02	0.01	0.03	0.21
ZAF	0.02	0.08	0.03	0.02	0.05	0.21

## Annex B. List and classification of measures

Table B.1. Cargo-handling services

Measures	MA&NT/ DR&Other	Mode	Establishment/ operations	Discr./ non- discr.
<i>Restrictions on foreign entry</i>				
Foreign equity restrictions: maximum foreign equity share allowed (%)	MA&NT	3	E	D
There are limits to the proportion of shares that can be acquired by foreign investors in publicly controlled firms (if any): at airports	MA&NT	3	E	D
There are limits to the proportion of shares that can be acquired by foreign investors in publicly controlled firms (if any): at ports	MA&NT	3	E	D
There are limits to the proportion of shares that can be acquired by foreign investors in publicly controlled firms (if any): at road facilities	MA&NT	3	E	D
There are limits to the proportion of shares that can be acquired by foreign investors in publicly controlled firms (if any): at rail facilities	MA&NT	3	E	D
Legal form: only joint ventures are allowed	MA&NT	3	E	D
Legal form: foreign companies are prohibited from establishing branches	MA&NT	3	E	D
Legal form: other restrictions	MA&NT	3	E	D
Board of directors: majority must be nationals	MA&NT	3	O	D
Board of directors: majority must be residents	MA&NT	3	O	D
Board of directors: at least one must be national	MA&NT	3	O	D
Board of directors: at least one must be resident	MA&NT	3	O	D
Manager must be national	MA&NT	3	O	D
Manager must be resident	MA&NT	3	O	D
Screening: foreign investors must show net economic benefits	MA&NT	3	E	D
Screening: approval unless contrary to national interest	MA&NT	3	E	D
Screening: notification	MA&NT	3	E	D
Acquisition of land and real estate by foreigners is prohibited or restricted	MA&NT	3	E	D
Restrictions on the type of shares or bonds held by foreign investors	MA&NT	3	E	D
Conditions on subsequent transfer of capital and investments	MA&NT	3	E	D
Restrictions on cross-border mergers and acquisitions	MA&NT	3	E	D
Service provision is reserved for statutory monopoly or granted on an exclusive basis: at airports	MA&NT	3	E	ND
Service provision is reserved for statutory monopoly or granted on an exclusive basis: at ports	MA&NT	3	E	ND
Service provision is reserved for statutory monopoly or granted on an exclusive basis: at road facilities	MA&NT	3	E	ND
Service provision is reserved for statutory monopoly or granted on an exclusive basis: at rail facilities	MA&NT	3	E	ND
Licences are subject to quotas or economic needs tests	MA&NT	3	E	D
Other restrictions	MA&NT	3	E	D

<i>Restrictions on the movement of people</i>				
Quotas: intra-corporate transferees	MA&NT	4	O	D
Quotas: contractual services suppliers	MA&NT	4	E	D
Quotas: independent services suppliers	MA&NT	4	E	D
Labour market tests: intra-corporate transferees	MA&NT	4	O	D
Labour market tests: contractual services suppliers	MA&NT	4	E	D
Labour market tests: independent services suppliers	MA&NT	4	E	D
Limitation on duration of stay for intra-corporate transferees (months)	MA&NT	4	O	D
Limitation on duration of stay for contractual services suppliers (months)	MA&NT	4	E	D
Limitation on duration of stay for independent services suppliers (months)	MA&NT	4	E	D
Duration of visa for crew (months): air crew	MA&NT	4	O	D
Duration of visa for crew (months): seamen	MA&NT	4	O	D
Duration of visa for crew (months): truck drivers	MA&NT	4	O	D
Visas on arrival or visa exemption are available for temporary entry/transit of crew: air crew	MA&NT	4	O	D
Visas on arrival or visa exemption are available for temporary entry/transit of crew: seamen	MA&NT	4	O	D
Visas on arrival or visa exemption are available for temporary entry/transit of crew: truck drivers	MA&NT	4	O	D
Multiple entry visas are allowed for crew: air crew	MA&NT	4	O	D
Multiple entry visas are allowed for crew: seamen	MA&NT	4	O	D
Multiple entry visas are allowed for crew: truck drivers	MA&NT	4	O	D
Other restrictions	MA&NT	4	E	D
<i>Other discriminatory measures</i>				
Foreign suppliers are treated less favourably regarding taxes and eligibility to subsidies	MA&NT	All	O	D
Public procurement: explicit access discrimination in favour of local firms	DR&Other	All	O	D
Public procurement: the procurement process affects the conditions of competition in favour of local firms	DR&Other	All	O	D
Foreign firms are eligible for Authorised Economic Operators Schemes	DR&Other	All	O	D
National standards on transport packages deviate from international standards	DR&Other	All	O	ND
Other restrictions	MA&NT	3	O	D
<i>Barriers to competition</i>				
Decisions by the regulatory body can be appealed	MA&NT	3	O	D
Foreign firms have redress when business practices are perceived to restrict competition	MA&NT	3	O	D
National, state or provincial government control at least one major firm in the sector: at airport	DR&Other	3	E	ND
National, state or provincial government control at least one major firm in the sector: at ports	DR&Other	3	E	ND
National, state or provincial government control at least one major firm in the sector: at road facilities	DR&Other	3	E	ND
National, state or provincial government control at least one major firm in the sector: at rail facilities	DR&Other	3	E	ND
Publicly-controlled firms are fully or partly exempted from the application of the general competition law: at airports	DR&Other	3	E	ND
Publicly-controlled firms are fully or partly exempted from the application of the general competition law: at ports	DR&Other	3	E	ND
Publicly-controlled firms are fully or partly exempted from the application of the general competition law: at airports: at road facilities	DR&Other	3	E	ND



Publicly-controlled firms are fully or partly exempted from the application of the general competition law: at airports: at rail facilities	DR&Other	3	E	ND
Minimum capital requirements	DR&Other	3	E	ND
Separation of accounts is required: at airports	DR&Other	All	O	ND
Separation of accounts is required: at ports	DR&Other	All	O	ND
Separation of accounts is required: at road facilities	DR&Other	All	O	ND
Separation of accounts is required: at rail facilities	DR&Other	All	O	ND
Cross-subsidisation is prohibited: at airports	DR&Other	All	O	ND
Cross-subsidisation is prohibited: at ports	DR&Other	All	O	ND
Cross-subsidisation is prohibited: at road facilities	DR&Other	All	O	ND
Cross-subsidisation is prohibited: at rail facilities	DR&Other	All	O	ND
Self-handling is prohibited: at airports	DR&Other	All	O	ND
Self-handling is prohibited: at ports	DR&Other	All	O	ND
Self-handling is prohibited: at road facilities	DR&Other	All	O	ND
Self-handling is prohibited: at rail facilities	DR&Other	All	O	ND
Service provision to third parties is prohibited: at airports	DR&Other	All	O	ND
Service provision to third parties is prohibited: at ports	DR&Other	All	O	ND
Service provision to third parties is prohibited: at road facilities	DR&Other	All	O	ND
Service provision to third parties is prohibited: at rail facilities	DR&Other	All	O	ND
Contracts for service provision are awarded through competitive bidding: at airports	DR&Other	All	O	ND
Contracts for service provision are awarded through competitive bidding: at ports	DR&Other	All	O	ND
Contracts for service provision are awarded through competitive bidding: at road facilities	DR&Other	All	O	ND
Contracts for service provision are awarded through competitive bidding: at rail facilities	DR&Other	All	O	ND
Multimodal transport is prohibited	DR&Other	All	O	ND
Other restrictions	DR&Other	All	O	ND
<i>Regulatory transparency</i>				
There is a legal obligation to communicate regulations to the public prior to entry into force	DR&Other	All	O	ND
There is a public comment procedure open to interested persons, including foreign suppliers	DR&Other	All	O	ND
Range of visa processing time (days)	DR&Other	4	O	ND
Number of documents needed to obtain a business visa	DR&Other	4	O	ND
Costs to obtain a business visa (USD)	DR&Other	4	O	ND
Time to complete all official procedures required to register a company (in calendar days)	DR&Other	3	O	ND
Total cost to complete all official procedures to register a company (in USD)	DR&Other	3	O	ND
Number of official procedures to register a company	DR&Other	3	O	ND
Individual licensing/registration requirements are imposed on warehousing, freight forwarding and customs brokerage services	DR&Other	All	O	ND
Appeal/review procedures against decisions by customs are available	DR&Other	All	O	ND
Time taken for customs clearance (days)	DR&Other	All	O	ND
An advance ruling system is available	DR&Other	All	O	ND
A single window for customs procedures is available	DR&Other	All	O	ND
Pre-arrival processing is possible	DR&Other	All	O	ND
A de minimis regime is in place (USD)	DR&Other	All	O	ND
The release of goods is possible before determination and payment of duties	DR&Other	All	O	ND
Other restrictions	DR&Other	All	O	ND

Table B.2. Storage and warehouse services

Measures	MA&NT/ DR&Other	Mode	Establishment/ operations	Discr./ non- discr.
<i>Restrictions on foreign entry</i>				
Foreign equity restrictions: maximum foreign equity share allowed (%)	MA&NT	3	E	D
There are limits to the proportion of shares that can be acquired by foreign investors in publicly controlled firms (if any): at airports	MA&NT	3	E	D
There are limits to the proportion of shares that can be acquired by foreign investors in publicly controlled firms (if any): at ports	MA&NT	3	E	D
There are limits to the proportion of shares that can be acquired by foreign investors in publicly controlled firms (if any): at road facilities	MA&NT	3	E	D
There are limits to the proportion of shares that can be acquired by foreign investors in publicly controlled firms (if any): at rail facilities	MA&NT	3	E	D
Legal form: only joint ventures are allowed	MA&NT	3	E	D
Legal form: foreign companies are prohibited from establishing branches	MA&NT	3	E	D
Legal form: other restrictions	MA&NT	3	E	D
Board of directors: majority must be nationals	MA&NT	3	O	D
Board of directors: majority must be residents	MA&NT	3	O	D
Board of directors: at least one must be national	MA&NT	3	O	D
Board of directors: at least one must be resident	MA&NT	3	O	D
Manager must be national	MA&NT	3	O	D
Manager must be resident	MA&NT	3	O	D
Screening: foreign investors must show net economic benefits	MA&NT	3	E	D
Screening: approval unless contrary to national interest	MA&NT	3	E	D
Screening: notification	MA&NT	3	E	D
Acquisition of land and real estate by foreigners is prohibited or restricted	MA&NT	3	E	D
Restrictions on the type of shares or bonds held by foreign investors	MA&NT	3	E	D
Conditions on subsequent transfer of capital and investments	MA&NT	3	E	D
Restrictions on cross-border mergers and acquisitions	MA&NT	3	E	D
Service provision is reserved for statutory monopoly or granted on an exclusive basis: at airports	MA&NT	3	E	ND
Service provision is reserved for statutory monopoly or granted on an exclusive basis: at ports	MA&NT	3	E	ND
Service provision is reserved for statutory monopoly or granted on an exclusive basis: at road facilities	MA&NT	3	E	ND
Service provision is reserved for statutory monopoly or granted on an exclusive basis: at rail facilities	MA&NT	3	E	ND
Licences are subject to quotas or economic needs tests	MA&NT	3	E	D
Other restrictions	MA&NT	3	E	D
<i>Restrictions on the movement of people</i>				
Quotas: intra-corporate transferees	MA&NT	4	O	D
Quotas: contractual services suppliers	MA&NT	4	E	D
Quotas: independent services suppliers	MA&NT	4	E	D
Labour market tests: intra-corporate transferees	MA&NT	4	O	D
Labour market tests: contractual services suppliers	MA&NT	4	E	D

Labour market tests: independent services suppliers	MA&NT	4	E	D
Limitation on duration of stay for intra-corporate transferees (months)	MA&NT	4	O	D
Limitation on duration of stay for contractual services suppliers (months)	MA&NT	4	E	D
Limitation on duration of stay for independent services suppliers (months)	MA&NT	4	E	D
Duration of visa for crew (months): air crew	MA&NT	4	O	D
Duration of visa for crew (months): seamen	MA&NT	4	O	D
Duration of visa for crew (months): truck drivers	MA&NT	4	O	D
Visas on arrival or visa exemption are available for temporary entry/transit of crew: air crew	MA&NT	4	O	D
Visas on arrival or visa exemption are available for temporary entry/transit of crew: seamen	MA&NT	4	O	D
Visas on arrival or visa exemption are available for temporary entry/transit of crew: truck drivers	MA&NT	4	O	D
Multiple entry visas are allowed for crew: air crew	MA&NT	4	O	D
Multiple entry visas are allowed for crew: seamen	MA&NT	4	O	D
Multiple entry visas are allowed for crew: truck drivers	MA&NT	4	O	D
Other restrictions	MA&NT	4	E	D
<i>Other discriminatory measures</i>				
Foreign suppliers are treated less favourably regarding taxes and eligibility to subsidies	MA&NT	All	O	D
Public procurement: explicit access discrimination in favour of local firms	DR&Other	All	O	D
Public procurement: the procurement process affects the conditions of competition in favour of local firms	DR&Other	All	O	D
Discriminatory access to storage and warehouse facilities: at airports	MA&NT	All	O	D
Discriminatory access to storage and warehouse facilities: at ports	MA&NT	All	O	D
Discriminatory access to storage and warehouse facilities: at road facilities	MA&NT	All	O	D
Discriminatory access to storage and warehouse facilities: at rail facilities	MA&NT	All	O	D
Foreign firms are eligible for Authorised Economic Operators Schemes	DR&Other	All	O	D
National standards on transport packages deviate from international standards	DR&Other	All	O	ND
Other restrictions	MA&NT	3	O	D
<i>Barriers to competition</i>				
Decisions by the regulatory body can be appealed	MA&NT	3	O	D
Foreign firms have redress when business practices are perceived to restrict competition	MA&NT	3	O	D
National, state or provincial government control at least one major firm in the sector: at airports	DR&Other	3	E	ND
National, state or provincial government control at least one major firm in the sector: at ports	DR&Other	3	E	ND
National, state or provincial government control at least one major firm in the sector: at road facilities	DR&Other	3	E	ND
National, state or provincial government control at least one major firm in the sector: at rail facilities	DR&Other	3	E	ND
Publicly-controlled firms are fully or partly exempted from the application of the general competition law: at airports	DR&Other	3	E	ND
Publicly-controlled firms are fully or partly exempted from the application of the general competition law: at airports: at ports	DR&Other	3	E	ND

Publicly-controlled firms are fully or partly exempted from the application of the general competition law: at airports: at road facilities	DR&Other	3	E	ND
Publicly-controlled firms are fully or partly exempted from the application of the general competition law: at airports: at rail facilities	DR&Other	3	E	ND
Minimum capital requirements	DR&Other	3	E	ND
Self-handling is prohibited: at airports	DR&Other	All	O	ND
Self-handling is prohibited: at ports	DR&Other	All	O	ND
Self-handling is prohibited: at road facilities	DR&Other	All	O	ND
Self-handling is prohibited: at rail facilities	DR&Other	All	O	ND
Service provision to third parties is prohibited: at airports	DR&Other	All	O	ND
Service provision to third parties is prohibited: at ports	DR&Other	All	O	ND
Service provision to third parties is prohibited: at road facilities	DR&Other	All	O	ND
Service provision to third parties is prohibited: at rail facilities	DR&Other	All	O	ND
Contracts for service provision are awarded through competitive bidding: at airports	DR&Other	All	O	ND
Contracts for service provision are awarded through competitive bidding: at ports	DR&Other	All	O	ND
Contracts for service provision are awarded through competitive bidding: at road facilities	DR&Other	All	O	ND
Contracts for service provision are awarded through competitive bidding: at rail facilities	DR&Other	All	O	ND
Limitations on working hours of operation for storage and warehouse facilities	DR&Other	All	O	ND
Multimodal transport is prohibited	DR&Other	All	O	ND
Other restrictions	DR&Other	All	O	ND
<i>Regulatory transparency</i>				
There is a legal obligation to communicate regulations to the public prior to entry into force	DR&Other	All	O	ND
There is a public comment procedure open to interested persons, including foreign suppliers	DR&Other	All	O	ND
Range of visa processing time (days)	DR&Other	4	O	ND
Number of documents needed to obtain a business visa	DR&Other	4	O	ND
Costs to obtain a business visa (USD)	DR&Other	4	O	ND
Time to complete all official procedures required to register a company (in calendar days)	DR&Other	3	O	ND
Total cost to complete all official procedures to register a company (in USD)	DR&Other	3	O	ND
Number of official procedures to register a company	DR&Other	3	O	ND
Individual licensing/registration requirements are imposed on warehousing, freight forwarding and customs brokerage services	DR&Other	All	O	ND
Appeal/review procedures against decisions by customs are available	DR&Other	All	O	ND
Time taken for customs clearance (days)	DR&Other	All	O	ND
An advance ruling system is available	DR&Other	All	O	ND
A single window for customs procedures is available	DR&Other	All	O	ND
Pre-arrival processing is possible	DR&Other	All	O	ND
A de minimis regime is in place (USD)	DR&Other	All	O	ND
The release of goods is possible before determination and payment of duties	DR&Other	All	O	ND
Other restrictions	DR&Other	All	O	ND

Table B.3. Freight transport agency services

Measures	MA&NT/ DR&Other	Mode	Establishment/ operations	Discr./ non-discr.
<i>Restrictions on foreign entry</i>				
Foreign equity restrictions: maximum foreign equity share allowed (%)	MA&NT	3	E	D
There are limits to the proportion of shares that can be acquired by foreign investors in publicly controlled firms (if any)	MA&NT	3	E	D
Legal form: only joint ventures are allowed	MA&NT	3	E	D
Legal form: foreign companies are prohibited from establishing branches	MA&NT	3	E	D
Legal form: other restrictions	MA&NT	3	E	D
Board of directors: majority must be nationals	MA&NT	3	O	D
Board of directors: majority must be residents	MA&NT	3	O	D
Board of directors: at least one must be national	MA&NT	3	O	D
Board of directors: at least one must be resident	MA&NT	3	O	D
Manager must be national	MA&NT	3	O	D
Manager must be resident	MA&NT	3	O	D
Screening: foreign investors must show net economic benefits	MA&NT	3	E	D
Screening: approval unless contrary to national interest	MA&NT	3	E	D
Screening: notification	MA&NT	3	E	D
Acquisition of land and real estate by foreigners is prohibited or restricted	MA&NT	3	E	D
Restrictions on the type of shares or bonds held by foreign investors	MA&NT	3	E	D
Conditions on subsequent transfer of capital and investments	MA&NT	3	E	D
Restrictions on cross-border mergers and acquisitions	MA&NT	3	E	D
Service provision is reserved for statutory monopoly or granted on an exclusive basis	MA&NT	3	E	ND
Licences are subject to quotas or economic needs tests	MA&NT	3	E	D
Foreign freight forwarders are restricted from undertaking business in the domestic market for air transport	MA&NT	All	O	D
Foreign freight forwarders are restricted from undertaking business in the domestic market for maritime transport	MA&NT	All	O	D
Foreign freight forwarders are restricted from undertaking business in the domestic market for road transport	MA&NT	All	O	D
Foreign freight forwarders are restricted from undertaking business in the domestic market for rail transport	MA&NT	All	O	D
Foreign freight forwarders are only allowed to provide services in limited geographical areas for air transport	MA&NT	All	O	D
Foreign freight forwarders are only allowed to provide services in limited geographical areas for maritime transport	MA&NT	All	O	D
Foreign freight forwarders are only allowed to provide services in limited geographical areas for road transport	MA&NT	All	O	D
Foreign freight forwarders are only allowed to provide services in limited geographical areas for rail transport	MA&NT	All	O	D
Commercial presence is required to provide cross-border freight forwarding services for air transport	MA&NT	1	E	D
Commercial presence is required to provide cross-border freight forwarding services for maritime transport	MA&NT	1	E	D
Commercial presence is required to provide cross-border freight forwarding services for road transport	MA&NT	1	E	D
Commercial presence is required to provide cross-border freight forwarding services for rail transport	MA&NT	1	E	D

Other restrictions	MA&NT	3	E	D
<i>Restrictions on the movement of people</i>				
Quotas: intra-corporate transferees	MA&NT	4	O	D
Quotas: contractual services suppliers	MA&NT	4	E	D
Quotas: independent services suppliers	MA&NT	4	E	D
Labour market tests: intra-corporate transferees	MA&NT	4	O	D
Labour market tests: contractual services suppliers	MA&NT	4	E	D
Labour market tests: independent services suppliers	MA&NT	4	E	D
Limitation on duration of stay for intra-corporate transferees (months)	MA&NT	4	O	D
Limitation on duration of stay for contractual services suppliers (months)	MA&NT	4	E	D
Limitation on duration of stay for independent services suppliers (months)	MA&NT	4	E	D
Duration of visa for crew (months): air crew	MA&NT	4	O	D
Duration of visa for crew (months): seamen	MA&NT	4	O	D
Duration of visa for crew (months): truck drivers	MA&NT	4	O	D
Visas on arrival or visa exemption are available for temporary entry/transit of crew: air crew	MA&NT	4	O	D
Visas on arrival or visa exemption are available for temporary entry/transit of crew: seamen	MA&NT	4	O	D
Visas on arrival or visa exemption are available for temporary entry/transit of crew: truck drivers	MA&NT	4	O	D
Multiple entry visas are allowed for crew: air crew	MA&NT	4	O	D
Multiple entry visas are allowed for crew: seamen	MA&NT	4	O	D
Multiple entry visas are allowed for crew: truck drivers	MA&NT	4	O	D
Other restrictions	MA&NT	4	E	D
<i>Other discriminatory measures</i>				
Foreign suppliers are treated less favourably regarding taxes and eligibility to subsidies	MA&NT	All	O	D
Public procurement: explicit access discrimination in favour of local firms	DR&Other	All	O	D
Public procurement: the procurement process affects the conditions of competition in favour of local firms	DR&Other	All	O	D
Foreign freight forwarders are treated less favourably regarding financial responsibility for air transport	MA&NT	All	O	D
Foreign freight forwarders are treated less favourably regarding financial responsibility for maritime transport	MA&NT	All	O	D
Foreign freight forwarders are treated less favourably regarding financial responsibility for road transport	MA&NT	All	O	D
Foreign freight forwarders are treated less favourably regarding financial responsibility for rail transport	MA&NT	All	O	D
Foreign firms are eligible for Authorised Economic Operators Schemes	DR&Other	All	O	D
National standards on transport packages deviate from international standards	DR&Other	All	O	ND
Other restrictions	MA&NT	3	O	D
<i>Barriers to competition</i>				
Decisions by the regulatory body can be appealed	MA&NT	3	O	D
Foreign firms have redress when business practices are perceived to restrict competition	MA&NT	3	O	D
National, state or provincial government control at least one major firm in the sector	DR&Other	3	E	ND
Publicly-controlled firms are fully or partly exempted from the application of the general competition law: at airports	DR&Other	3	E	ND
Minimum capital requirements	DR&Other	3	E	ND
Self-handling is prohibited	DR&Other	All	O	ND

Service provision to third parties is prohibited	DR&Other	All	O	ND
Multimodal transport is prohibited	DR&Other	All	O	ND
Other restrictions	DR&Other	All	O	ND
<i>Regulatory transparency</i>				
There is a legal obligation to communicate regulations to the public prior to entry into force	DR&Other	All	O	ND
There is a public comment procedure open to interested persons, including foreign suppliers	DR&Other	All	O	ND
Range of visa processing time (days)	DR&Other	4	O	ND
Number of documents needed to obtain a business visa	DR&Other	4	O	ND
Costs to obtain a business visa (USD)	DR&Other	4	O	ND
Time to complete all official procedures required to register a company (in calendar days)	DR&Other	3	O	ND
Total cost to complete all official procedures to register a company (in USD)	DR&Other	3	O	ND
Number of official procedures to register a company	DR&Other	3	O	ND
Individual licensing/registration requirements are imposed on warehousing, freight forwarding and customs brokerage services	DR&Other	All	O	ND
Appeal/review procedures against decisions by customs are available	DR&Other	All	O	ND
Time taken for customs clearance (days)	DR&Other	All	O	ND
An advance ruling system is available	DR&Other	All	O	ND
A single window for customs procedures is available	DR&Other	All	O	ND
Pre-arrival processing is possible	DR&Other	All	O	ND
A de minimis regime is in place (USD)	DR&Other	All	O	ND
The release of goods is possible before determination and payment of duties	DR&Other	All	O	ND
Other restrictions	DR&Other	All	O	ND



Table B.4. Customs brokerage services

Measures	MA&NT/ DR&Other	Mode	Establishment/ operations	Discr./ non-discr.
<i>Restrictions on foreign entry</i>				
Foreign equity restrictions: maximum foreign equity share allowed (%)	MA&NT	3	E	D
There are limits to the proportion of shares that can be acquired by foreign investors in publicly controlled firms (if any)	MA&NT	3	E	D
Legal form: only joint ventures are allowed	MA&NT	3	E	D
Legal form: foreign companies are prohibited from establishing branches	MA&NT	3	E	D
Legal form: other restrictions	MA&NT	3	E	D
Board of directors: majority must be nationals	MA&NT	3	O	D
Board of directors: majority must be residents	MA&NT	3	O	D
Board of directors: at least one must be national	MA&NT	3	O	D
Board of directors: at least one must be resident	MA&NT	3	O	D
Manager must be national	MA&NT	3	O	D
Manager must be resident	MA&NT	3	O	D
Screening: foreign investors must show net economic benefits	MA&NT	3	E	D
Screening: approval unless contrary to national interest	MA&NT	3	E	D
Screening: notification	MA&NT	3	E	D
Acquisition of land and real estate by foreigners is prohibited or restricted	MA&NT	3	E	D
Restrictions on the type of shares or bonds held by foreign investors	MA&NT	3	E	D
Conditions on subsequent transfer of capital and investments	MA&NT	3	E	D
Restrictions on cross-border mergers and acquisitions	MA&NT	3	E	D
Service provision is reserved for statutory monopoly or granted on an exclusive basis	MA&NT	3	E	ND
Licences are subject to quotas or economic needs tests	MA&NT	3	E	D
Other restrictions	MA&NT	3	E	D
<i>Restrictions on the movement of people</i>				
Quotas: intra-corporate transferees	MA&NT	4	O	D
Quotas: contractual services suppliers	MA&NT	4	E	D
Quotas: independent services suppliers	MA&NT	4	E	D
Labour market tests: intra-corporate transferees	MA&NT	4	O	D
Labour market tests: contractual services suppliers	MA&NT	4	E	D
Labour market tests: independent services suppliers	MA&NT	4	E	D
Limitation on duration of stay for intra-corporate transferees (months)	MA&NT	4	O	D
Limitation on duration of stay for contractual services suppliers (months)	MA&NT	4	E	D
Limitation on duration of stay for independent services suppliers (months)	MA&NT	4	E	D
Duration of visa for crew (months): air crew	MA&NT	4	O	D
Duration of visa for crew (months): seamen	MA&NT	4	O	D
Duration of visa for crew (months): truck drivers	MA&NT	4	O	D
Visas on arrival or visa exemption are available for temporary entry/transit of crew: air crew	MA&NT	4	O	D
Visas on arrival or visa exemption are available for temporary entry/transit of crew: seamen	MA&NT	4	O	D
Visas on arrival or visa exemption are available for temporary entry/transit of crew: truck drivers	MA&NT	4	O	D
Multiple entry visas are allowed for crew: air crew	MA&NT	4	O	D



Multiple entry visas are allowed for crew: seamen	MA&NT	4	O	D
Multiple entry visas are allowed for crew: truck drivers	MA&NT	4	O	D
Nationality or citizenship required to practice	MA&NT	All	E	D
Residency required to practice	MA&NT	All	E	D
Other restrictions	MA&NT	4	E	D
<i>Other discriminatory measures</i>				
Foreign suppliers are treated less favourably regarding taxes and eligibility to subsidies	MA&NT	All	O	D
Public procurement: explicit access discrimination in favour of local firms	DR&Other	All	O	D
Public procurement: the procurement process affects the conditions of competition in favour of local firms	DR&Other	All	O	D
Foreign firms are eligible for Authorised Economic Operators Schemes	DR&Other	All	O	D
National standards on transport packages deviate from international standards	DR&Other	All	O	ND
Other restrictions	MA&NT	3	O	D
<i>Barriers to competition</i>				
Decisions by the regulatory body can be appealed	MA&NT	3	O	D
Foreign firms have redress when business practices are perceived to restrict competition	MA&NT	3	O	D
National, state or provincial government control at least one major firm in the sector	DR&Other	3	E	ND
Publicly-controlled firms are fully or partly exempted from the application of the general competition law: at airports	DR&Other	3	E	ND
Minimum capital requirements	DR&Other	3	E	ND
Self-handling is prohibited	DR&Other	All	O	ND
Service provision to third parties is prohibited	DR&Other	All	O	ND
Geographical restrictions on customs brokerage services	DR&Other	All	O	ND
Multimodal transport is prohibited	DR&Other	All	O	ND
Other restrictions	DR&Other	All	O	ND
<i>Regulatory transparency</i>				
There is a legal obligation to communicate regulations to the public prior to entry into force	DR&Other	All	O	ND
There is a public comment procedure open to interested persons, including foreign suppliers	DR&Other	All	O	ND
Range of visa processing time (days)	DR&Other	4	O	ND
Number of documents needed to obtain a business visa	DR&Other	4	O	ND
Costs to obtain a business visa (USD)	DR&Other	4	O	ND
Time to complete all official procedures required to register a company (in calendar days)	DR&Other	3	O	ND
Total cost to complete all official procedures to register a company (in USD)	DR&Other	3	O	ND
Number of official procedures to register a company	DR&Other	3	O	ND
Individual licensing/registration requirements are imposed on warehousing, freight forwarding and customs brokerage services	DR&Other	All	O	ND
Appeal/review procedures against decisions by customs are available	DR&Other	All	O	ND
Time taken for customs clearance (days)	DR&Other	All	O	ND
An advance ruling system is available	DR&Other	All	O	ND
A single window for customs procedures is available	DR&Other	All	O	ND
Pre-arrival processing is possible	DR&Other	All	O	ND
A de minimis regime is in place (USD)	DR&Other	All	O	ND
The release of goods is possible before determination and payment of duties	DR&Other	All	O	ND
Other restrictions	DR&Other	All	O	ND

## Annex C. Scoring methodology for logistics services

**Figure C.1. Measures relating to missing facilities in landlocked countries and Iceland**

Services provision is reserved for statutory monopoly or granted on an exclusive basis

There are limits to the proportion of shares that can be acquired by foreign investors in publicly-controlled firms

Discriminatory access to storage and warehouse facilities (for storage and warehouse services)

The government controls at least one major firm in the sector

Publicly-controlled firms are subject to an exclusion or exemption from the general competition law

Self-handling is prohibited

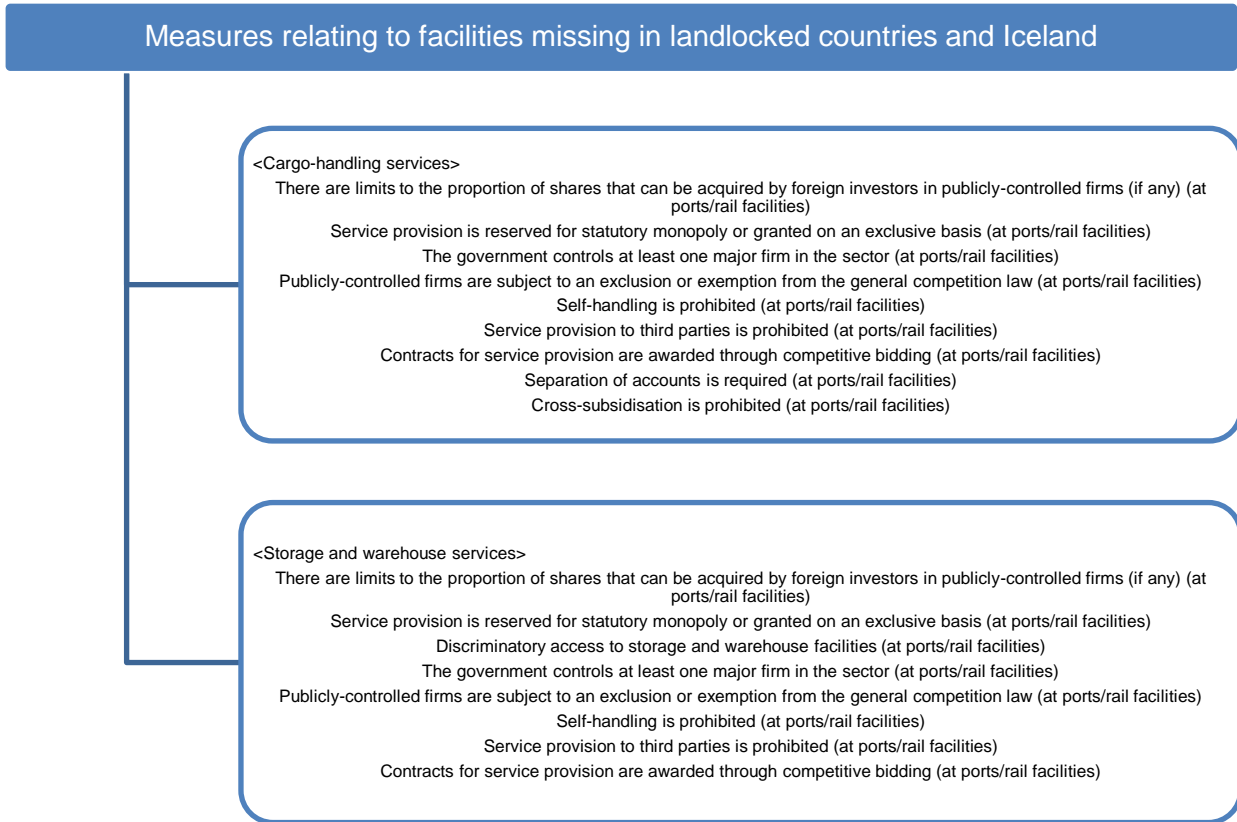
Services provision to third parties is prohibited

Contracts for service provision are awarded through competitive bidding

Separation of accounts is required (for cargo-handling services)

Cross-subsidisation is prohibited (for cargo-handling services)

Figure C.2. Measures that are automatically scored one as a consequence of a statutory monopoly



**Figure C.3. Subsector-specific measures that are automatically scored one as a consequence of foreign equity prohibition**