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Services Trade Restrictiveness Index (STRI): Construction, Architecture and Engineering Services

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Abstract

SERVICES TRADE RESTRICTIVENESS INDEX (STRI): CONSTRUCTION, ARCHITECTURE AND ENGINEERING SERVICES

by

Massimo Geloso Grosso, Iza Lejarraga, Hildegunn Kyvik Nordås, Frederic Gonzales, Sébastien Miroudot, Asako Ueno, Dorothée Rouzet

This paper presents the services trade restrictiveness indices (STRI) for construction, architecture and engineering 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, China, India, Indonesia, Russia and South Africa. This report presents the first vintage of indicators for construction, architecture and engineering services and captures *de jure* regulations in force in 2013. The results for construction services indicate that the overall level of restrictiveness is relatively low, ranging from 0.05 to 0.32, with an average of 0.16. The more elevated levels of restriction can be largely attributed to general measures affecting all sectors of the economy. The STRI also supports the view that architecture and engineering services are less restrictively regulated than other accredited professional services, notably legal and accounting services. The average value for the STRI among the countries in the sample is 0.22 for architecture services, connoting a relatively low degree of regulatory restrictiveness; the corresponding value is only marginally lower, 0.2, for engineering services. The majority of regulations affecting trade in these sectors concern the movement of people.

Keywords: Services trade, services trade restrictions, construction services, architecture services, engineering services, regulation.

JEL classification: F13, F14, K33, L74, L84

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The STRI project for construction, architecture and engineering services started with an expert meeting where the list of measures was discussed. The STRI team is grateful for the insights and advice that 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, Stellina Galitopoulou, Ahmet Gulsen, Dora Hajdu, Anthony Halley, Anna Jankowska, Gimin Kang, Fatma Kayhan, Yunhee Kim, Maria Kopyta, Hendric Richter, Humberto Lopez Rizzo, 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, and to Chuan Chen and members of the International Global Network for International Construction (GloNIC) for sharing their expertise and experience. A special thanks also to Claudia Locatelli for very helpful comments. 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 authors would like to thank Dale Andrew, Crawford Falconer and Raed Safadi for useful comments and inputs. The paper benefitted from discussions in the OECD Working Party of the Trade Committee, which has agreed to make the study more widely available through declassification on its responsibility.

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Executive summary

This paper presents the Services Trade Restrictiveness Indices (STRIs) for construction, architecture and engineering services. The indices are developed for OECD countries and the Key Partners (Brazil, the People's Republic of China, India, Indonesia, the Russian Federation and South Africa). Construction services play an important role in the functioning of economies and account for a significant share of gross domestic product (GDP) and employment in most countries. Architecture and engineering services constitute the backbone of construction and provide essential inputs for other activities. Trade in construction, architecture and engineering services, though affected by the global economic downturn, has undergone significant growth in the past decade or so. Commercial presence (mode 3) and the movement of people (mode 4) are the predominant modes of supply in these services.

The STRI quantifies the variety of regulatory measures potentially affecting trade in services in one composite index of restrictiveness. The indices take values between zero and one, one representing a totally closed and zero a fully open sector. The results for **construction services** indicate that:

- The overall level of restrictiveness is relatively low with a sample average of 0.16. The STRI values range from 0.05 to 0.32, suggesting that there is significant variation in trade restrictiveness for construction services across the economies covered in the analysis.
- In terms of the five categories of measures which form the basis for the creation of the STRI, restrictions to movement of people and on foreign entry contribute the most to the results. These are followed by other discriminatory measures. Barriers to competition have a considerable impact on a few economies.
- The more elevated levels of restriction can in part be attributed to general measures affecting all sectors of the economy. These include investment screening, limitations on board members and managers of construction firms, impediments on acquiring land and real estate, as well as quotas and labour market tests on different categories of service providers. Restrictions in public procurement have a particular bearing on the construction sector in light of the importance of government demand for these services.
- In terms of sector-specific measures, one country limits foreign ownership in construction firms to 67% for advanced technology work. There are some local content restrictions, and residency and qualification requirements for construction engineers. Lack of adherence to international standards (e.g. building design codes) can be found in a few countries. Some cases also remain of government ownership in major construction firms, at times coupled with limitations on foreign ownership in such firms.

The STRI results for **engineering and architecture services** portray that:

- These services markets also tend to be relatively liberal, although they appear to be slightly more restrictive than construction services. The average value for the STRI among the countries reviewed is 0.2 for engineering services, connoting a relatively low degree of

restrictiveness; the corresponding value is only marginally higher, 0.22, for architectural services. Clearly, architecture and engineering are less restrictively regulated than other accredited professional services, notably legal and accounting services.

- Despite the generally low levels of restrictiveness, there is considerable variation among countries in the scope and intensity of regulations governing architecture and engineering. The lowest value of the STRI for both engineering and architecture is 0.06, indicating that some countries hardly restrict foreign participation in these services. The highest value, in contrast, amounts to 0.47 in architecture and 0.46 in engineering.
- The supply of architecture and engineering services relies heavily on the movement of professionals to supply their services abroad on a temporary basis. Correspondingly, measures categorised under the movement of persons have been assigned the highest weight in the expert judgement, and cast the strongest influence in the restrictiveness levels. Apart from labour market tests, architects and engineers are subject to licensing and other qualifications requirements as pre-conditions for practice.

The weighting scheme used for the calculation of the STRI for construction, architecture and engineering services relies on expert judgment. Alternative weighting schemes, particularly equal and random weights have been used as robustness checks. Comparison of the results across weighting methodologies and Spearman rank correlations of country rankings indicate that the STRI is robust in construction, as well as architecture and engineering services.

Finally, initial analysis of the complementarities between regulations in construction, architecture and engineering services, reveals that there is a statistical relationship between whether or not architecture or engineering are regulated professions and the administrative procedures related to obtaining a building permit. The results indicate that the cost of obtaining a building permit is systematically lower in countries that regulate architecture and/or engineering than those that do not, suggesting that the regulatory burden falls on the building permit.

1. Introduction

As part of the OECD project developing a services trade restrictiveness index (STRI), this paper constructs STRIs for construction, architecture and engineering 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 sectoral 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; and
- 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, Brazil, China, India, Indonesia, the Russian Federation and South Africa.¹ The database records policy measures applied on a most-favoured nation (MFN) basis and does not consider preferential treatment entailed in regional trade agreements.² The sources of information for the database are laws and regulations in each country.³ 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 qualitative information contained in the database is transformed into numerical values in the STRI indices.

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 (see e.g. McGuire and Schuele, 1999; Nguyen-Hong, 2000; and Kalirajan, 2000). It was subsequently adopted with some methodological improvements in Trade Committee work focusing on a number of services sectors in non-OECD economies (see e.g. Dihel and Shepherd, 2007). More recently, a similar approach was used to assess restrictiveness of services barriers by the World Bank.⁴ To our knowledge, this study represents the first attempt to apply the index methodology specifically to the construction sector.

The STRI project builds upon these efforts, but goes beyond them in several ways. First, it creates regulatory profiles and indices for a large number of countries with a harmonised dataset based on actual laws and regulations, which allows for cross-country and cross-sector comparisons of trade barriers. The STRI is also presented in aggregate form as well as broken

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1. It should be noted that the STRIs for OECD Members are based on regulation as it stood in early 2012, while for the Key Partners regulation is updated to the end of 2013. Also, to date, the Key Partners have not verified their data.
 2. Some countries have different degrees of liberalisation towards different trading partners, as a result of regional integration or of international agreements. 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 suppliers from outside the European Economic Area.
 3. For federal states, where the sector may be regulated at the sub-federal level in addition to federal laws and regulations, a representative state or province was chosen based on output, population and/or the location of the largest city: New South Wales (Australia), Sao Paulo (Brazil), Ontario (Canada), Province of Beijing (China), Bavaria (Germany), National Capital Territory of Delhi (India), Special Capital Region of Jakarta (Indonesia), Federal District of Mexico (Mexico), Oblast of Moscow (Russian Federation), Canton of Zürich (Switzerland), State of New York (United States).
 4. See Borchert et al. (2012). The World Bank has developed services trade restrictiveness indices for 103 countries. Throughout this project there have been consultations with the World Bank on the list of measures as well as the methodology.

down into several classifications. These include according to the General Agreement on Trade in Services (GATS) framework and modes of supply, discriminatory versus non-discriminatory measures, and restrictions on firms' establishment versus those on their on-going operations. This should increase the relevance of the indices for policy reforms at the national and multilateral levels.

Table 1 presents the definitions of construction, architecture and engineering services according to the World Trade Organization (WTO) Services Sectoral Classification List (W/120), which is based on the United Nations Provisional Central Product Classification (CPC Prov.). W/120 is used by most WTO member countries for GATS scheduling purposes. The coverage of these services is comparable in the Extended Balance of Payments Services classification (EBOPS) and the International Standard Industrial Classification (ISIC Rev. 3), which are commonly used to report statistics on trade in services and foreign direct investment (FDI) or foreign affiliates sales, respectively.

Table 1. Construction, architecture and engineering services in W/120 (CPC Prov.)

51. Construction and related engineering services	867. Architecture and engineering services
512. General construction work for buildings	8671. Architecture services
513. General construction work for civil engineering	8672. Engineering services
514+516. Installation and assembly work	8673. Integrated engineering services
517. Building completion and finishing work	8674. Urban planning and landscape architectural services
511+515+518. Other*	8675. Engineering related scientific and technical consulting services
	8676. Technical testing and analysis services

Note: * covers pre-erection work at construction sites; special trade construction work; and renting services related to equipment for construction or demolition of buildings or civil engineering works, with operator.

The next section of the paper describes the principal characteristics of construction, architecture and engineering services. Sections 3 and 4 present a description of the measures included in the indices and the different classification schemes used in the analysis, respectively. Section 5 then sets out the methodology for developing the STRI for these services and Section 6 presents the results along with sensitivity analysis. The last section concludes.

2. Characteristics of construction, architecture and engineering services

Construction services

Construction services have historically played an important role in the functioning of economies, providing the infrastructure for other industries. The industry has typically been considered strategic in light of its close links to public works and hence the allocation of fiscal resources. Increased spending on infrastructure and non-residential development is probably the most important driving force for construction activity in OECD economies (Butkeviciene, 2005). On the supply side, demographic changes have been significantly affecting the industry. In particular, the aging population in OECD countries represents a challenge for the sector, leading to increasing shortages of labour, which persist in a number of OECD countries notwithstanding the recent crisis of the real estate market (European Construction Industry Federation [FIEC], 2009).

Table 2 shows that the construction sector contributes between 4 and 6% of GDP in some of the largest OECD countries and between 6 and 9% of employment. The share of GDP has generally declined in the five countries since the 1980s. This trend is consistent with work by industry specialists suggesting that construction's share of GDP first grows and then decreases with the level of economic development (Bon and Crosthwaite, 2000). Still, the sector generates significant economic activity via linkages with other industries. Linkage analysis shows that construction has one of the highest backward linkages among all sectors in selected OECD

countries, reflecting its importance as a demander of inputs from other industries (Pietroforte and Gregory, 2003).

Table 2. Economic importance of construction services in selected OECD countries

	DEU		FRA		JPN		SWE		USA	
	1980	2007	1980	2007	1980	2007	1980	2007	1980	2007
Share of total value added										
Construction	7.4%	4.1%	7.7%	6.3%	9.4%	6.3%	6.4%	4.9%	5.1%	4.6%
Manufacturing	29.7%	23.6%	24.7%	12.3%	28.2%	21.2%	24.5%	20.0%	23.7%	13.3%
Share of total employment										
Construction	8.6%	5.6%	8.9%	6.9%	9.9%	8.6%	6.6%	6.0%	5.8%	6.3%
Manufacturing	30.6%	19.0%	22.9%	12.7%	23.3%	17.4%	23.8%	15.8%	19.6%	9.7%

Source: EU KLEMS database.

Construction services are a relatively labour-intensive sector (both skilled and un-skilled), which is reflected in a higher share in employment than in GDP for all five countries shown in Table 2. In light of the nature of construction activities, the potential for mechanisation and automation, and therefore capital-intensive production, remains limited. The local characteristics of construction output delivery (see below), and its high labour and material intensity, are also among the factors explaining why the industry remains mainly oriented towards domestic markets (European Foundation for the Improvement of Living and Working Conditions, 2005).

The sector is characterised by a large number of small firms generally specialising in certain fields or operating in small geographic areas. According to FIEC, for example, out of a total 2.9 million EU construction companies in 2007, 95% were small and medium enterprises (SMEs) with fewer than 20 employees (FIEC, 2008). In value terms, companies with fewer than 50 employees undertake around 60% of European construction work.⁵ Industry sources indicate a recent trend towards consolidation and the creation of larger firms, providing the whole array of construction-related activities. Furthermore, the international market for these services remains mostly dominated by a few large contractors which typically undertake large-scale projects (WTO, 2009).

For the most part, the nature of the construction business requires local production; it is the production process that is exported, the final output must be totally constructed in the host country (exceptions include off-shore oil platforms and some types of thermal plants). Establishment abroad is therefore generally necessary to conduct trade in these services. The manner in which construction firms enter a foreign market varies from the duration of a particular project to a more permanent presence in overseas markets. Recent literature has attempted to shed light on evolving patterns of permanent versus short-term commercial presence.

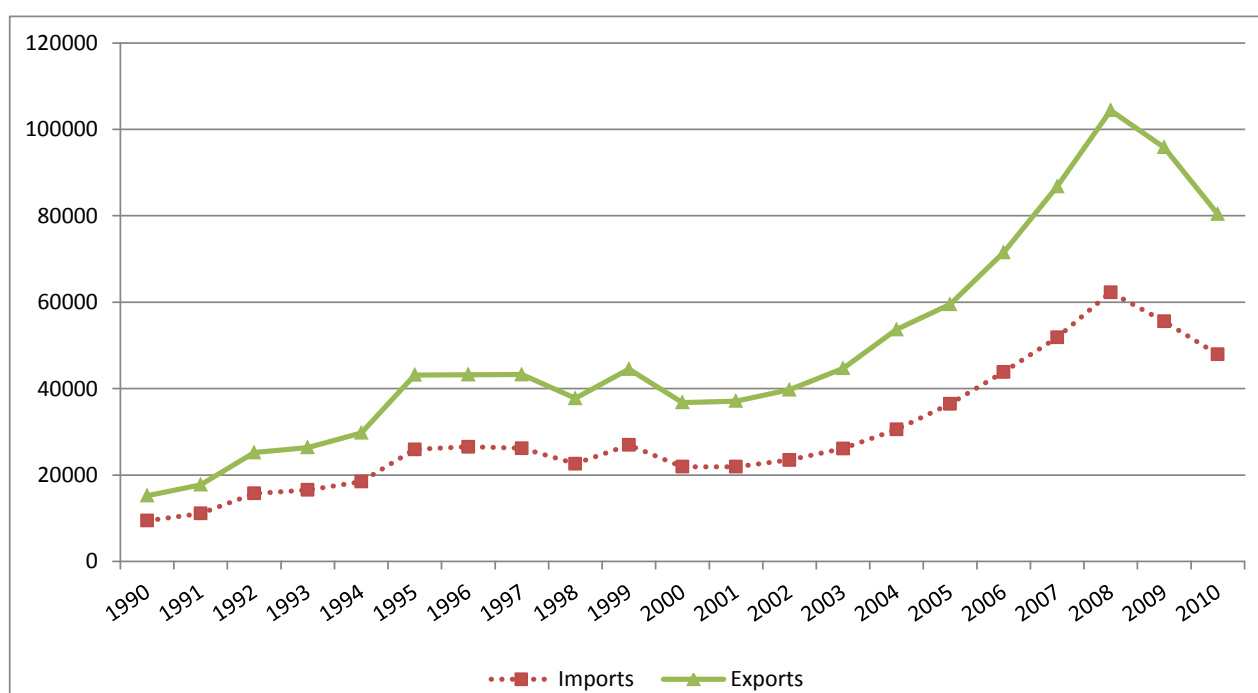
According to Chen (2008), from the 1990s there has been a tendency of market establishments aiming at a more permanent presence in new markets, although both entry strategies are widely used. One important difference between permanent and short-term entry is that in the former, entrants tend to source staff locally, while in short-term entry more expatriates are sent overseas. Hence, the significance of mode 4 may vary depending on the entry strategy used. Short versus long-term entry can also be differentiated by whether an entrant has ownership in a permanent organisation (e.g. a joint venture company). The study

5. Figure reported by the EC DG Enterprise & Industry Construction Unit.

finds empirical evidence indicating that when the host market entails high entry restrictions, contractors are more likely to use short-term than permanent entry.

The modal nature of trade in the sector is broadly reflected in trade statistics. In the OECD trade in services by partner country (TiSP) database, the construction services sector represents an exception in that the predominant mode of supply covered is establishment abroad, through short-term presence. Trade in these services has grown steadily in OECD countries from 2000 to 2008 and has then been significantly affected by the global economic downturn (see Figure 1).⁶ Foreign Affiliates Trade in Services (FATS) statistics and FDI stocks are regarded as the closest proxies for more permanent commercial establishment. It is likely that the latter is the preferred entry strategy by contractors in OECD countries, as indicated by an analysis of trade data and interviews with the private sector undertaken in recent OECD work (Geloso Grosso et al., 2008).

Figure 1. OECD trade in construction services via short-term commercial presence (USD millions)



Note: OECD countries for which data are available.

Source: OECD TiSP database.

Construction services trade is affected by a variety of regulations, including building and product standards, restrictions on establishment and on the movement of personnel. One source of market failure associated with their provision relates to externalities. Inadequate performance of these services can give rise to negative externalities to third parties and society in general, e.g. the pollution of a river or of an open public space resulting from the construction process. Asymmetric information represents a further potential concern. Purchasers of construction services may roughly know what they aim to accomplish, but they have to rely on the knowledge and experience of the builder to specify exactly what needs to be done (Myers, 2008).

6. Although an important sector in most economies, construction services trade accounts for a small share of total services trade. This supports the fact that the construction sector generally remains a local activity.

Government procurement is an important driver of demand for the sector, representing a considerable share of construction activity in OECD countries. In 2007, for example, it accounted for just below 35% in Germany and the United Kingdom and for over 40% in the United States.⁷ Procurement practices can thus have a significant impact on trade in construction services and they have therefore been included in the STRI. Together with other discriminatory measures and lack of international standards, restrictions in procurement play a considerable role in the index for construction services (see Section V).

Architecture and engineering services

Engineering and architectural services constitute the backbone of construction and provide essential inputs for the economy. Engineers participate in the construction of key infrastructure, such as buildings, roads, bridges, power plants, electricity and communication grids. Architects undertake the design of buildings and the development of urban planning. Taken together, these services underpin the infrastructural development of the economy and the smooth functioning of essential public services, such as electricity generation, urban planning, transportation, and water treatment. Engineering also plays a vital role in the development of production processes and the adoption of new technologies. Hence, promoting the efficiency, cost-effectiveness and quality of these services can be a source of economic growth and generate important spill-over effects.

To a large extent, architecture and engineering services are interconnected and complement each other. In many cases, these activities are combined into projects offered by one company, and are sometimes subsumed in the building and construction sector as well as other business services. As a result, it can be difficult to disassociate them and measure them separately. In some countries, such as France, construction firms often carry out the architectural and engineering components for a project; in other cases, like in the United Kingdom, the Netherlands or Nordic countries, engineers and architects operate independently (WTO, 2011). In either case, there are regulatory complementarities that operate between the construction, engineering and accounting sectors.

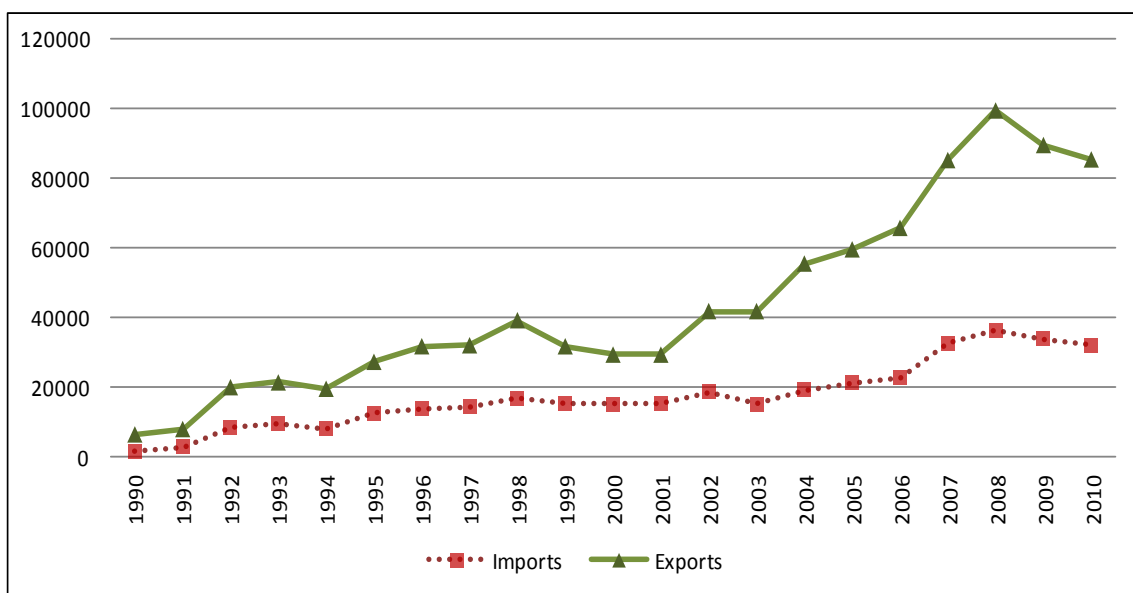
It is believed that architecture and engineering services have experienced steady growth over the last years. However, measuring the output of these activities is not straightforward, and data are scarce. Among OECD countries for which data are available, in 2007 architecture and engineering represented 1.8 and 2.3% of total turnover in services in the United Kingdom and Germany, respectively. Moreover, the sectors generated 3% of total employment in services in both countries for the same year. It may well be that the contribution of these services to the economy is under-stated, since sometimes they are subsumed in the construction sector and in a range of other business services.

The sector is characterised by the prevalence of micro- and small enterprises. A small number of large multinationals dominate the global landscape. Beyond these, micro- and small enterprises constitute the fabric of the architectural and engineering industry. According to data from Eurostat, 74% of European firms in the architecture, engineering and technical testing sector employed a single person, while 22% employed between 2 and 9 persons (WTO, 2011). According to the Architect's Council of Europe (ACE), representing architects in 32 countries, more than half of the firms were one-person firms, and only 1% of architectural practices employed more than 30 staff (WTO, 2011).

7. Government share of construction investment (EU KLEMS database). It refers to investment in the public administration, defence, compulsory social security, education, and health sectors in non-residential construction. For the latter two sectors the figures may include some private investment. The gross fixed capital formation figures also include purchases of "second-hand" assets, which may have been built prior to their acquisition.

Exports of architecture and engineering have soared in the OECD area, experiencing very high growth between 2001 and 2008, while imports have grown at a slower rate (see Figure 2). Advances in technology have played a pivotal role in facilitating the expansion of trade in the sector. In particular, new channels of electronic supply have made cross-border trade viable and decreased the costs of accessing foreign markets significantly. Engineering firms have a particularly strong export orientation, which has been partly explained by the prevalence of one-time projects, requiring lower reliance on permanent presence in the foreign market. Moreover, these services are of a highly technical and universal nature, making them less sensitive to contextual differences in each market. Architectural practices, in contrast, seem to be less active in international markets. According to a survey by the Architect’s Council of Europe, only 6% of revenues of affiliated practitioners and firms are derived from export markets.

Figure 2. OECD trade in architecture, engineering and other technical services (USD millions)



Source: OECD TiSP database.

Table 2 shows the trade of the top exporters and importers of engineering and agricultural services. The European Union (EU-27) is the largest exporter and importer; almost 70% of the European exports of architecture and engineering have extra-EU markets as a destination. The United States, Brazil, and Canada follow Europe as the largest exporters, whereas all of these countries with the exception of the United States, along with Algeria and India are among the large importers. If data were available for China and other countries of the Middle East, they would also be depicted among the largest traders of engineering and architectural services. Finally, it is important to note that architecture and engineering represent an important share of total trade of other business services. For instance, architecture and engineering represent 40% of Brazil’s other business services, 23% of Canada’s, and 16.2% of the European Union’s extra-EU trade in other business services.

Table 3. Top exporters and importers of architecture, engineering and other technical services (2009)

	Top Exporters			Top Importers	
	Value (USD millions)	Share of other business services		Value (USD millions)	Share of other business services
European Union	48 393	11.4	European Union	31 649	8.1
Extra-EU exports	33 085	16.2	Extra-EU imports	11 399	7.1
United States	5 652	6.0	Algeria	4 054	94.1
Brazil	5 588	40.3	Russian Federation	3 793	27.6
Canada	3 853	23.5	India	3 576	17.0
Russian Federation	3 209	28.7	Brazil	3 192	20.8
Norway	2 714	22.6	Canada	2 574	20.7
Singapore	2 622	6.8	Kazakhstan	2 272	58.5
India	1 684	5.9	Singapore	1 796	9.0
Ukraine	452	24.2	United States	1 052	1.7
Korea, Republic of	375	3.1	Colombia	852	53.4

Note: Data are not available for some economies, including Japan and China.

Source: Compiled from International Trade Statistics 2011 data, World Trade Organisation.

In terms of modes of supply, trade in engineering and architecture services takes place through various channels. As noted above, technological changes have rendered cross-border supply (mode 1) of engineering and architecture services increasingly viable via electronic communications and mail. Engineering and architecture services are also often supplied through the temporary movement of natural persons (mode 4). On-site inspection is essential to the installation, project management, and advice involved in these services, requiring the movement of the supplier to the infrastructure projects. The supply of engineering and architecture services by means of a commercial presence abroad (mode 3) also seems to be a significant form of supply, be it by subsidiaries, branch offices or strategic partnerships. A more permanent presence in the market enables architecture and engineering companies to have greater access to projects in host countries and supply after-sales support.

The regulatory environment plays an important role in facilitating trade in the industry. Like other professional services, architecture and engineering are prone to market failures that may justify regulatory action to ensure the quality and optimal provision of these services. Foremost, information asymmetries between the consumer and supplier can affect the quality assessment of services. Architects and engineers need to have a specialized level of technical knowledge, which the consumer will typically not possess, and hence find it difficult to judge the competence of the service provider. Hence, most regulations in the sector concern qualifications and licensing requirements that aim to curtail informational gaps in the quality assessment of architects and engineers.

Other motivations underlying regulatory intervention stems from the inability to fully internalize the externalities from the services rendered. Indeed, as for construction, there are externalities associated with the services of engineers and architects. For instance, a poorly constructed bridge or building can jeopardise public safety. Therefore, inappropriate performance or under-provision of the engineering services may affect third parties and society at large. Similarly, the work of architects greatly contributes to good urban development, generating positive spillovers. Hence, governments may enact regulations to ensure the optimal provision of engineering and architecture services from a societal standpoint.

In light of the fact that construction projects represent an important source of demand for architecture and engineering services, the regulations governing building and construction can

also affect the business performance of engineering and architectural providers. This is in part related to the fact that professional standards in the architectural and engineering services sectors are often controlled through object-related regulation, such as building standards and safety norms (WTO, 1998).

3. Identifying measures to be included in the STRI

The development of the STRI for construction, architecture and engineering services is no easy task since these services are subject to a wide range of regulatory measures. Although the index should include information sufficiently detailed to inform policy makers and trade negotiators, the primary barriers should not be overshadowed by less important restrictions that add little to the essence of trade restrictiveness. Annexes B, C and D show the restrictions included in the STRI for these services. Their identification has been carried out according to the following criteria:

- Regulations that are mentioned explicitly in the GATS;
- Regulations that are mentioned explicitly in regional trade agreements; and
- Regulations that experts identified as relevant (during the 2008 OECD Experts Meeting on Construction Services and the OECD Experts Meeting on Business Services).

Construction, architecture and engineering services are affected by a wide range of regulations. Some measures represent outright discrimination, while others, although non-discriminatory, are generally viewed to weigh more heavily on the ability of foreign providers to compete in a national market. In addition to sector-specific restrictions, several measures applicable to all sectors of the economy are relevant for these services. Restrictions are also often designed to meet social objectives, such as protecting health, safety or the environment. Nonetheless, measuring their restrictiveness represents 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 STRI for construction, architecture and engineering services have been divided into five categories. This typology of measures forms the basis for the creation of the STRI. For further detail see the methodology for deriving the STRI (OECD, 2012).

Restrictions to foreign entry

This category contains barriers to foreign ownership and other impediments to market entry for construction, architecture and engineering firms. Foreign equity restrictions (e.g. if only minority ownership is allowed for foreign providers) for construction services may be part of general investment legislation, or apply specifically to these services. In addition, some countries limit the shares of publicly owned firms that can be acquired by foreign investors. Nationality and residency requirements are also part of general investment restrictions when they apply to directors or board members of construction contractors.

Additionally, restrictions can take the form of limits on the types of legal entity allowed. As noted, a distinction can be made between short-term and long-term commercial establishment in the construction industry. The former can be significantly affected by restrictions on the establishment of branches and representative offices. Joint ventures can help foreign contractors overcome a number of regulatory hurdles since local firms are accustomed to work in the domestic environment; but requirements to do so can create a burden on foreign construction firms' ability to make their decisions based on market conditions. Foreign construction contractors may further be required to source personnel or goods locally.

Construction regulations and codes typically require that one or more permits be obtained before starting construction work. The requirements to qualify for permits include both financial guarantees and technical qualifications of contractors; such requirements may be more favourable to local suppliers. Restrictions on land and real estate use or ownership are generally applied to all sectors, but typically have direct bearing on the provision of construction services. For example, property developers may not be able to own real estate under construction until completion of the project. These measures may specifically target foreign providers.

In the case of engineering and architecture services, a few countries impose equity restrictions to not locally-licensed architects, and to a lesser extent, engineers. Overall, few restrictions to legal form remain in place: architects and engineers are largely free to organise their practise as sole practitioners, limited liability partnerships, public limited companies or private partners. Commercial association may also be prohibited or the requirement to associate with a locally-licensed practitioner stipulated. Residency or other requirements on the board of directors and management of engineering and architecture firms may also apply. Economic needs test may further restrict the number of foreign professionals or firms.

As noted above, there are strong complementarities between architecture and engineering with the building industry. In that regard, the measures for architecture and engineering services integrate regulations imposing limitations on land acquisition by foreigners.

Restrictions to movement of people

Given its intensive use of labour and the recent industry trend of labour scarcity, construction can be significantly affected by limitations on the movement of people. Short-term presence, in particular, requires frequent visits by managerial and professional staff, as well as longer stay for those implementing the physical construction. The movement of foreign qualified personnel may be subject to nationality, residency or non-recognition of qualifications, even for project-related work of short duration. In this context, the STRI project focuses on impediments for engineers as a proxy for highly-skilled construction personnel. Other restrictions relate to quotas and labour market tests, which are sometimes referred to as economic needs tests, though they focus on the likely impact of foreign providers on the local labour force.

The supply of architecture and engineering services relies heavily on the movement of natural persons to supply their services abroad on a temporary basis. Apart from labour market tests and other restrictions noted above, architects and engineers can be subject to licensing requirements and other measures designed to monitor the quality of professionals. These requirements vary, and often include procedures to recognise foreign university degrees, combined with minimum years of practice and examinations. Additional requirements for compulsory membership in a professional association may also be applied.

Other discriminatory measures

In light of the substantially public-funded demand for infrastructure and other large-scale projects, discriminatory impediments can significantly hamper foreign contractors' capacity for market entry and competition. Important restrictions in this category relate to discrimination in procurement against foreign providers, impediment arising from the procurement process, and tax and incentives granted only to local providers. Such incentives may be provided to promote construction work or to encourage the development of the national industry.

The construction sector is characterised by the prevalence of building regulations and technical requirements aimed at protecting the safety of the objects constructed, implementing urban and land use planning and preserving the environment. Lack of internationally harmonised standards can therefore represent a further constraint, both in relation to building design codes and to products used in the construction process.

Discriminatory regulations can also affect the services of architects and engineers. One of the most important sources of discrimination concerns limitation on the use of professional titles to foreign suppliers, as well as restrictions on the names of foreign firms. Other general measures noted for the case of construction also apply to architecture and engineering services, namely in relation to the use (or lack thereof) of international standards and to discriminatory treatment in taxes or subsidies.

*Barriers to competition*⁸

Another layer of restrictions limit effective competition, distorting the level playing field and discouraging foreign participation in construction, architecture and engineering markets. Public ownership and control are relevant for the construction sector: in some countries the government may own the construction firms that undertake most of the public work. Other measures involve dispute resolution, such as whether appropriate mechanisms are in place for foreign parties seeking redress when business practices are perceived to restrict competition, as well as whether firms are permitted to appeal regulatory decisions.

In architecture and engineering services, price control mechanisms and other measures may have detrimental effects to competition between services providers, thereby reducing the incentive to work efficiently, lower prices, and increase quality. The main sector-specific measures captured under this category include regulations on prices and fees as well as limitations on advertising or marketing. As in the case of construction, recourse to mechanisms for dispute resolution is also covered.

Regulatory transparency

Measures concerning regulatory transparency and procedures related to regulations are also included in the STRI. Opaque regulatory regimes increase the cost of compliance and uncertainty in business operations, and can increase opportunities for bribery in the construction sector. These measures are important as perception of the overall business climate in the host country can impact firms' willingness to establish a commercial presence. The number and complexity of procedures to obtain a construction permit can also have a detrimental impact on market entry and operation of contractors. Excessive visa processing time represents an additional constraint, affecting the movement of construction personnel, architects and engineers.

4. Classifying restrictions

Classifying 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. Annexes B, C and D list the measures included in the STRI by policy area. The first column indicates which category according to the GATS classification the measure belongs to; the second column to which mode of supply the restriction applies; the third column whether the measure applies to the establishment of a service supplier or to ongoing operations; whereas the subsequent column indicates whether or not the measure is discriminatory.

The GATS terminology should increase the relevance of the indices at the multilateral level. However, as with any classification, it is not always possible to clearly identify to which category of measures 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. Thus, *market access and national treatment* measures are classified together. This grouping also allows making a distinction between

8. Public ownership contained in this category of measures may have the effect of market access restrictions.

restrictions subject to scheduling under the GATS, and consequently to negotiations for their removal; and other largely domestic regulatory measures which do not need to be scheduled.⁹

As indicated in Annexes B, C and D, prominent examples of market access and national treatment measures in the context of construction, architecture and engineering services are limitations on foreign ownership and legal form, restrictions on acquisition of land, local content and other discriminatory requirements for building permits. Quotas on both construction firms and professionals and economic needs/labour market tests further apply, and so do discriminatory taxes and other forms of subsidies. While discrimination in government procurement and other related restrictions are currently excluded from main GATS disciplines, WTO Members have a mandate to negotiate disciplines in this area.

Restrictions not captured by either market access or national treatment are classified under *domestic regulation and other*. This category casts a broad net with the aim of capturing the wide range of possibly relevant measures. Domestic regulatory measures are subject to both existing disciplines and further negotiations with a view to strengthen them. This negotiating mandate includes further talks on increasing regulatory transparency beyond what is required in existing broader rules on transparency. Examples of domestic regulatory measures are those relating to lack of adoption of international standards, and non-recognition of qualifications for construction engineering.

Indices according to the GATS modes of supply can provide useful information for negotiators. Separate indices according to modes of service delivery have already been constructed for other services sectors (see Nguyen-Hong and Wells, 2003; Dihel and Shepherd, 2007; and Marouani and Munro, 2008). It has proved difficult to distinguish between regulations that apply to modes 1 and 2, and so these are combined with restrictions on modes 3 and 4 into one category of measures affecting all modes of delivery. A case in point is lack of transparency of regulations, which may have an adverse impact across different modes of supply in these services.

This study further classifies measures according to two distinctions often used in the literature on restrictiveness indices for services: regulations that apply to establishment of firms versus those affecting their ongoing operations; and measures that are discriminatory versus non-discriminatory ones. Establishment restrictions can generally be regarded as impediments to the movement of capital, while those applying to firms' operations constrain service provision after establishment. Non-discriminatory measures affect total demand whereas discriminatory ones typically distort the composition of demand in favour of local suppliers. These classifications could prove useful in helping regulators and industry analysts identifying priority areas for reform given defined economic policy objectives.

5. 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 recorded. 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 of regulations for calculating the index number. OECD (2012) 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.

9. This classification is without prejudice to WTO Members' commitments and obligations under the GATS.

The approach taken to scoring in the STRI is to transform qualitative information on regulation into binary variables.¹⁰ A majority of the measures 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 into binary variables by introducing multiple thresholds. Therefore, for each type of impediment in a given country a score is assigned either 0 or 1, with the former representing the absence and 1 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 captured 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 in the case of other variables for which more detailed information is available (e.g. duration of stay of intra-corporate transferees).

The scoring methodology should account also for the hierarchy of regulation. For instance, foreign equity restrictions will also have a bearing on the scoring of other measures. If, say, foreign equity is not allowed, lack of screening or restrictions on board members does not represent a liberal trade policy, but is rather made redundant by the equity restriction. When neither foreign equity nor foreign branches are allowed, all measures related to commercial presence will automatically be scored one. In the context of construction services, trade in these services through both long-term and short-term commercial presence would be prohibited in this case.

Other examples are nationality requirements for local licences in both architecture and engineering services, which render residency requirements and restrictions regarding the recognition of foreign qualifications irrelevant. Besides their hierarchical nature, some measures are linked to each other and have, when combined, a stronger effect on restricting trade as opposed to when each measure acts in isolation. Notably, if a nationality requirement to practice architecture and engineering services is combined with no possibility for limited or temporary licensing for foreign providers, these two impediments alone effectively prohibit market entry through the movement of people.

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.

10. 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).

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. 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 manner 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. We have 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.¹¹ The sensitivity of the indices to the weighting scheme has been tested by experimenting with alternatives and by picking 3 000 weighting schemes at random (i.e. Monte Carlo simulations).

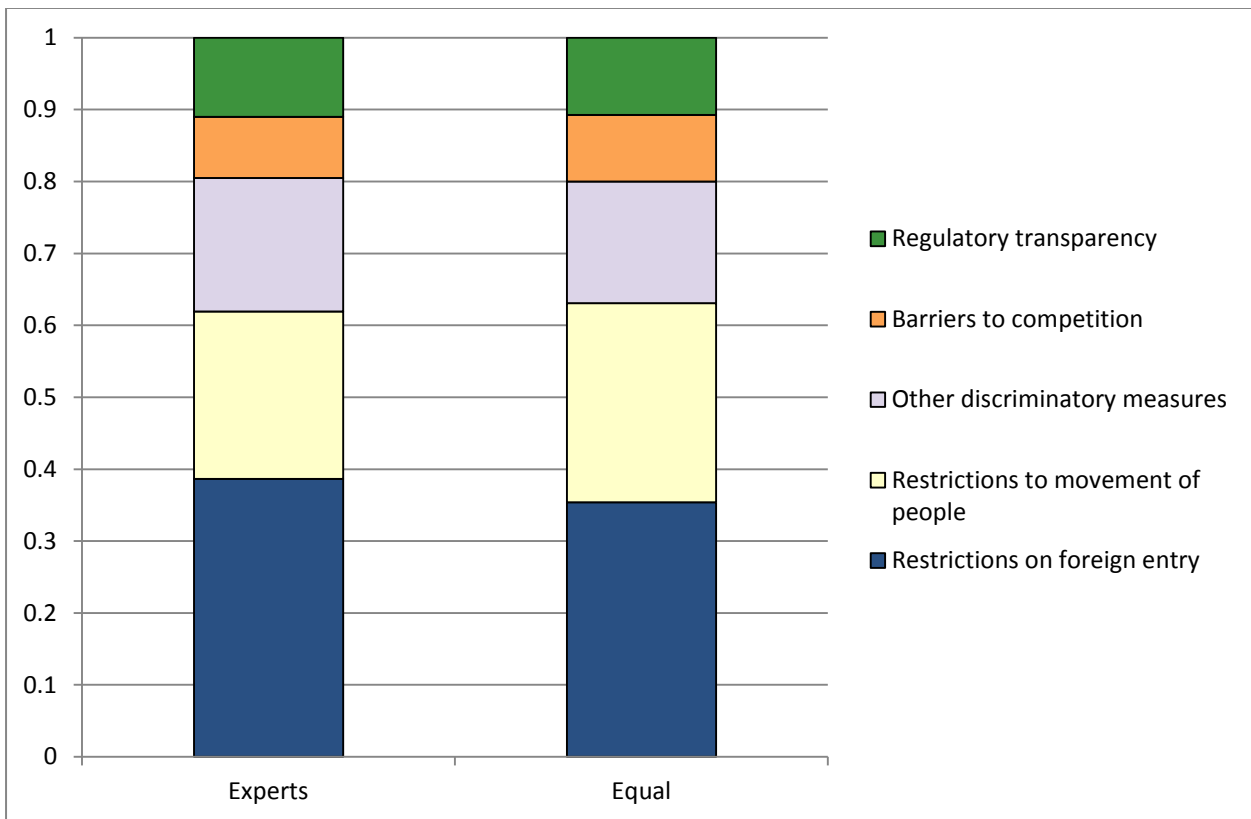
Figure 3 illustrates the difference the weighting scheme makes in construction services.¹² It depicts the STRI for a hypothetical country which scores one on all the regulations included in the index, thus having the most restrictive regime possible. Restrictions on foreign ownership and other market entry conditions contribute the most to the index when both expert judgment and equal weights are used. Other discriminatory measures and international standards have a higher impact with expert judgment weights, while restrictions on the movement of people are more important with equal weights.¹³ Both these categories, though, play a significant, while the other two categories of restrictions have a smaller impact on the STRIs for these services.

11. 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.

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

13. The fact that weighting schemes yield a different regulatory profile should not be confused with the impact of the weighting scheme on the overall restrictiveness index. Indeed the overall index value is one regardless of the weighting scheme in a closed economy and zero regardless of the weighting scheme in a totally open economy. The sensitivity of the value of the index to the weighting scheme depends on the extent to which countries have a similar level of regulation in all categories or an uneven regulatory profile. The weighting scheme matters much more for the overall index in the latter case.

Figure 3. The composition of the STRI in a totally restrictive country for construction services



Figures 4 and 5 display the weighting scheme for architectural and engineering services, respectively. In both of these sectors, measures concerning the movement of people are allocated the highest weight in the expert judgement exercise, followed closely by restrictions to foreign ownership and other market entry requirements. With equal weights, restrictions to foreign ownership are assigned a relatively higher weight. Measures in the other three categories (barriers to competition and public ownership,¹⁴ other discriminatory measures, and regulatory transparency and other administrative requirements) have a smaller impact on the overall score.

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 below. 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 (OECD, 2012).

14. Public ownership may have the effect of market access restrictions.

Figure 4. The composition of the STRI in a totally restrictive country for architecture services

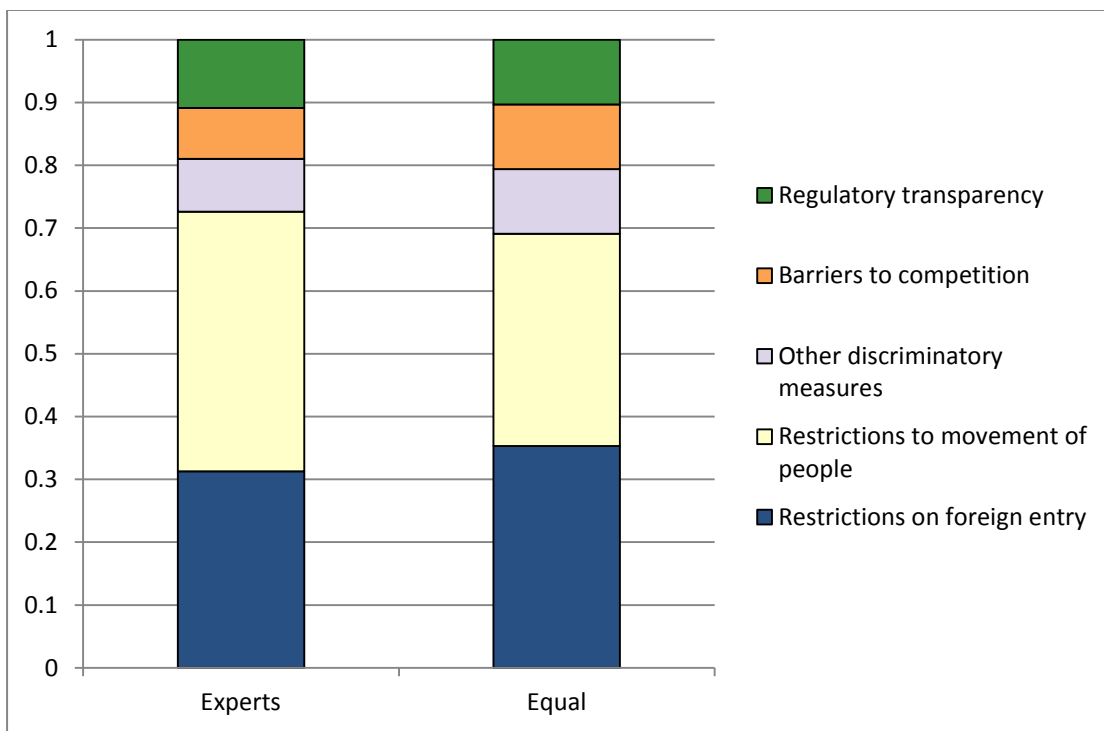
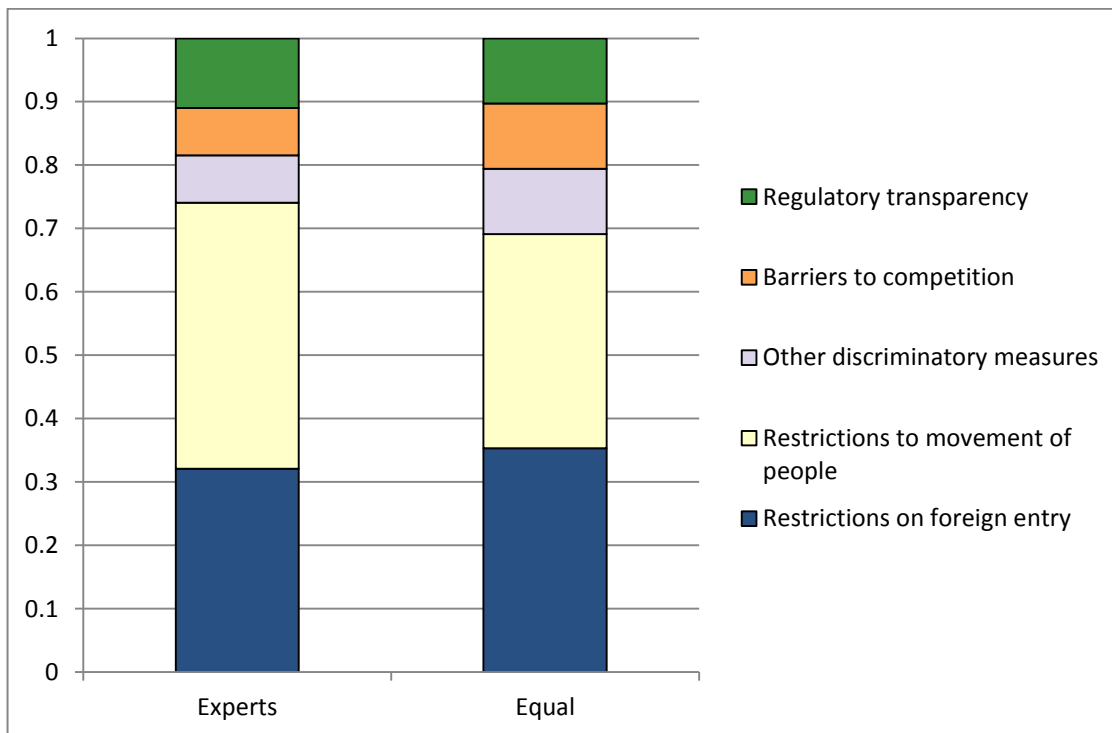


Figure 5. The composition of the STRI in a totally restrictive country for engineering services



6. STRI results¹⁵

Results with the expert judgment methodology

Construction services

Figure 6 presents the results for construction services using the expert judgment methodology, together with a line indicating the sample average. The overall level of restrictiveness is relatively low, ranging from 0.05 to 0.32, with an average of 0.16. The standard deviation is 0.07, indicating that the STRI captures variation in trade restrictiveness quite well. Iceland, Indonesia, the Russian Federation and China are the most restrictive countries, whereas the Netherlands, Germany, France and Luxemburg have the most liberal regimes.

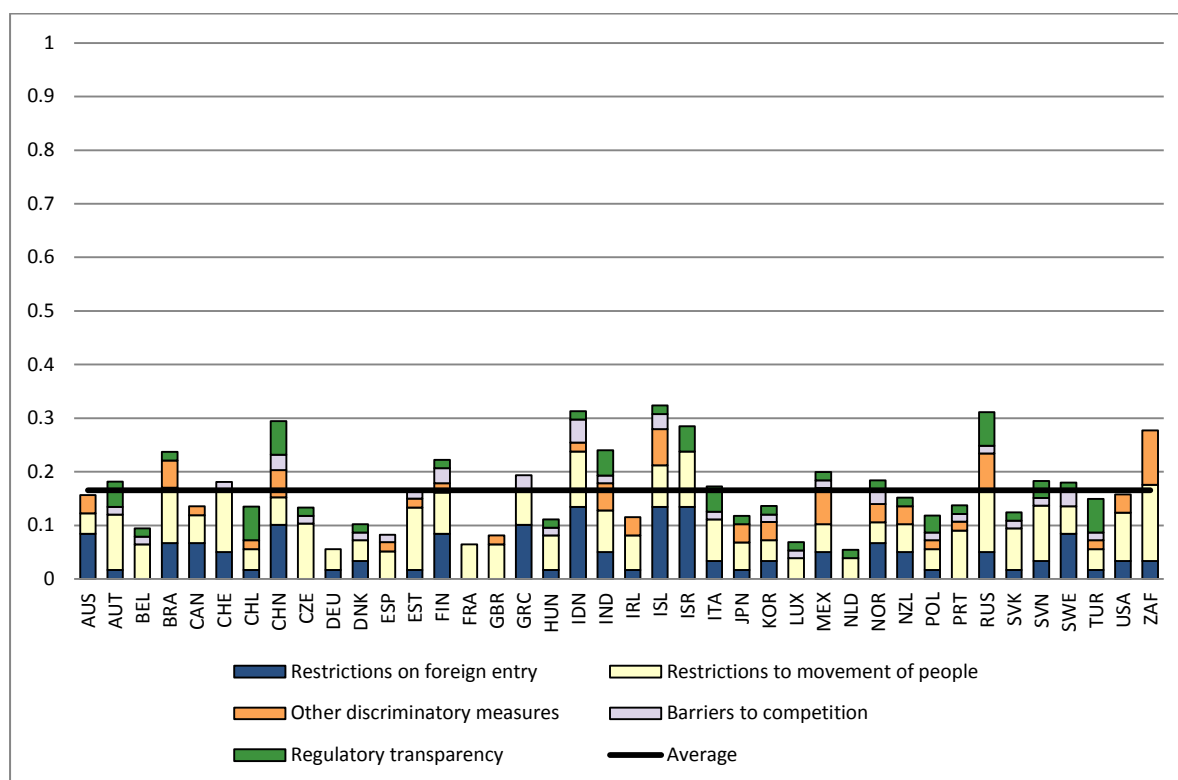
A breakdown of the indices for the sector by policy category is also shown in Figure 6. Restrictions to movement of people and on foreign entry contribute the most to the results, followed by other discriminatory measures. Barriers to competition have a considerable impact on a few economies, e.g. Indonesia and China, while measures relating to regulatory transparency are more evenly spread across countries.

The more elevated levels of restriction can in part be attributed to general measures affecting all sectors of the economy. These include investment screening, limitations on board members and managers of construction firms, impediments on acquiring land and real estate, as well as quotas and labour market tests on different categories of service providers. Restrictions in public procurement have a particular bearing on the construction sector in light of the importance of government demand for these services.

In terms of sector-specific measures, one country (Indonesia) limits foreign ownership in construction firms to 67% for advanced technology work. There are some local content restrictions, and residency and qualification requirements for construction engineers. Lack of adherence to international standards (e.g. building design codes) can be found in a few countries. Some cases also remain of government ownership in major construction firms, at times coupled with limitations on foreign ownership in such firms.

15. The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Figure 6. STRI for construction services



Architecture and engineering services

Figures 7 and 8 depict the STRIs for architecture and engineering services, respectively. Overall, the results portray that engineering and architecture services are relatively open, although they appear to be slightly more restrictive than the construction industry.¹⁶ The average value for the STRI among the countries in the sample is 0.2 for engineering services, connoting a relatively low degree of restrictiveness; the corresponding value is only marginally higher, 0.22, for architectural services. These services are less restrictively regulated than other accredited professional services, notably legal and accounting services.

Despite the generally low levels of restrictiveness, there is wide variation among countries in the scope and intensity of regulations governing these sectors. Indeed, the standard deviation is 0.1 for both architecture and engineering. The lowest value of STRI for both engineering and architecture is 0.06, indicating that some countries hardly restrict foreign participation in these services. The highest value, in contrast, amounts to 0.47 in architecture and 0.46 in engineering, which portrays a pretty high level of trade restrictiveness in these sectors.

Among the most open markets for engineering services, the Netherlands and Denmark register the lowest levels of restrictions, followed by Australia, Korea and New Zealand. Similarly, the Netherlands and Denmark are the most liberal economies in architectural services, along with Norway and Sweden. At the other end of the spectrum, Poland is the most

16. Comparison across sectors, however, requires some caution. Although the STRI has been standardised as far as possible, there are real idiosyncrasies among sectors and one cannot categorically say that a country is more or less restrictive in architecture and engineering services than in construction, for instance.

restrictive market for architecture and engineering services, while Estonia, the Slovak Republic and South Africa also display relatively high levels of restrictiveness in both sectors.

Figure 7. STRI for architecture services

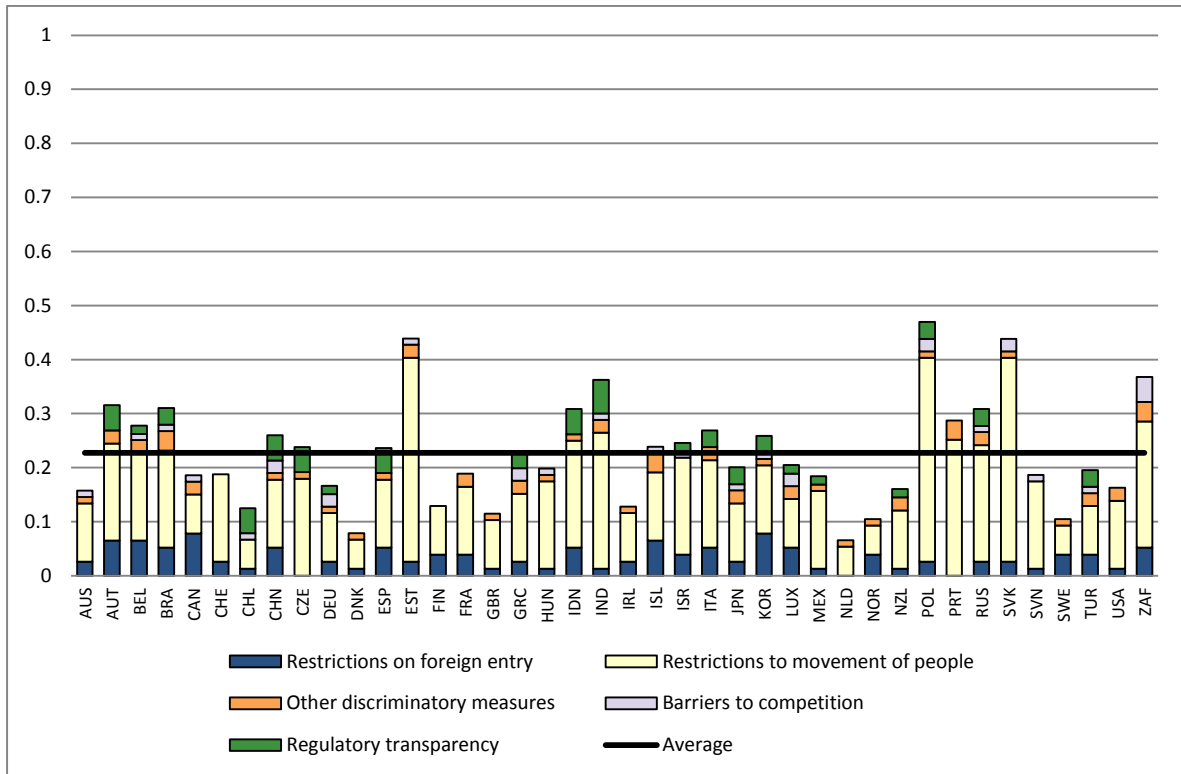
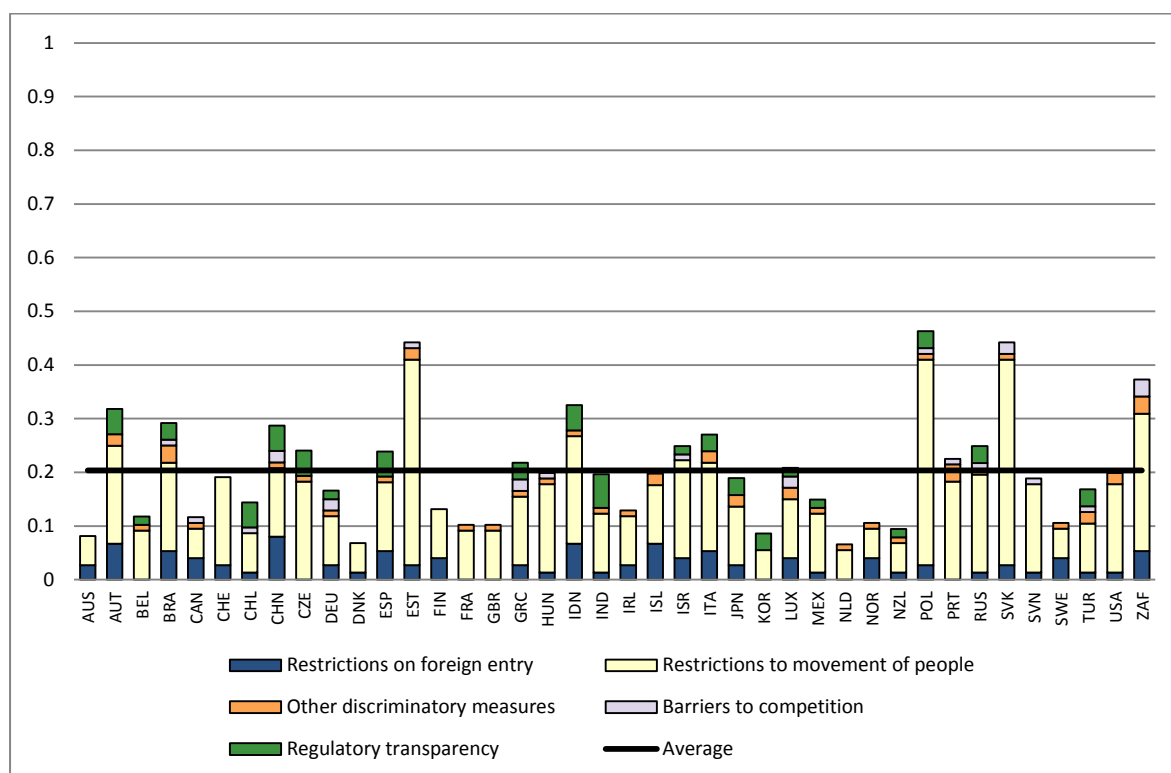


Figure 8. STRI for engineering services



Regulations concerning the movement of people are contributing the most to the level of restrictiveness in engineering and architecture services. As noted above, the supply of engineering and architecture services relies heavily on the temporary movement of suppliers aboard. The most prevalent quantitative pre-conditions for entry are labour market tests, which are maintained by around two-thirds of countries covered in the analysis. In about a third of the countries, a system of quotas is applied to limit the number of engineers and architects.

Architects and engineers are also subject to a host of qualitative preconditions of entry based on their qualifications. In this connection, around two-thirds of countries in the sample have licensing requirements to practice architecture and engineering in the country, while the rest of the countries don't require a license. Only in very few cases where a licensing is required is it associated with a nationality requirement. About half of the countries maintain a limited licensing system authorising foreigners to practice on a temporary or project-specific basis. Around a third of the countries have a procedure in place that allows them to recognise degrees from foreign universities, although examinations or/and at least one year of local practice are required in about a third of the countries reviewed.

The other main category that influences the degree of restrictiveness concerns foreign entry limitations. Around a quarter of the countries apply foreign equity restrictions to non-locally licensed architects, and fewer countries do so to engineers. Overall, few restrictions to legal form remain in place: architects and engineers are largely free to organise their practise as sole practitioners, limited liability partnerships, public limited companies or private partners. About a third of the countries impose residency or other requirements on the board of directors and management of engineering and architecture firms. Economic needs tests are only sparingly used to restrict the number of foreign professionals or firms.

As noted above, there are strong complementarities between architecture and engineering with the building industry. In this connection, about half of the countries covered in the analysis impose restrictions to the acquisition of land or real estate.

Some restrictions under other discriminatory measures are also reflected in the results. Notably, in around two-thirds of the countries in the sample, only locally-licensed architects can use the title of architect; the corresponding licensing requirement to use the title of engineer is found in about a third of the countries. Around two-thirds of the countries require that regulators consider comparable international standards before setting new standards.

Price control mechanisms are among the main measures that influence the level of restrictiveness under the barriers to competition. In about a third of the countries covered in the analysis, there are recommended minimum and/or maximum fees. In a smaller number of cases, countries maintain mandatory fee schedules. Architects have regulations governing advertising and marketing in some countries; legal restrictions on advertising are less frequently found in engineering services.

The category of regulatory transparency does not encompass sector-specific regulations. Notwithstanding, measures of a horizontal nature are shown to affect the trade restrictiveness of these services; in particular, lengthy visa requirements in some countries can pose significant hurdles given the reliance on the movement of persons to supply architectural and engineering services abroad.

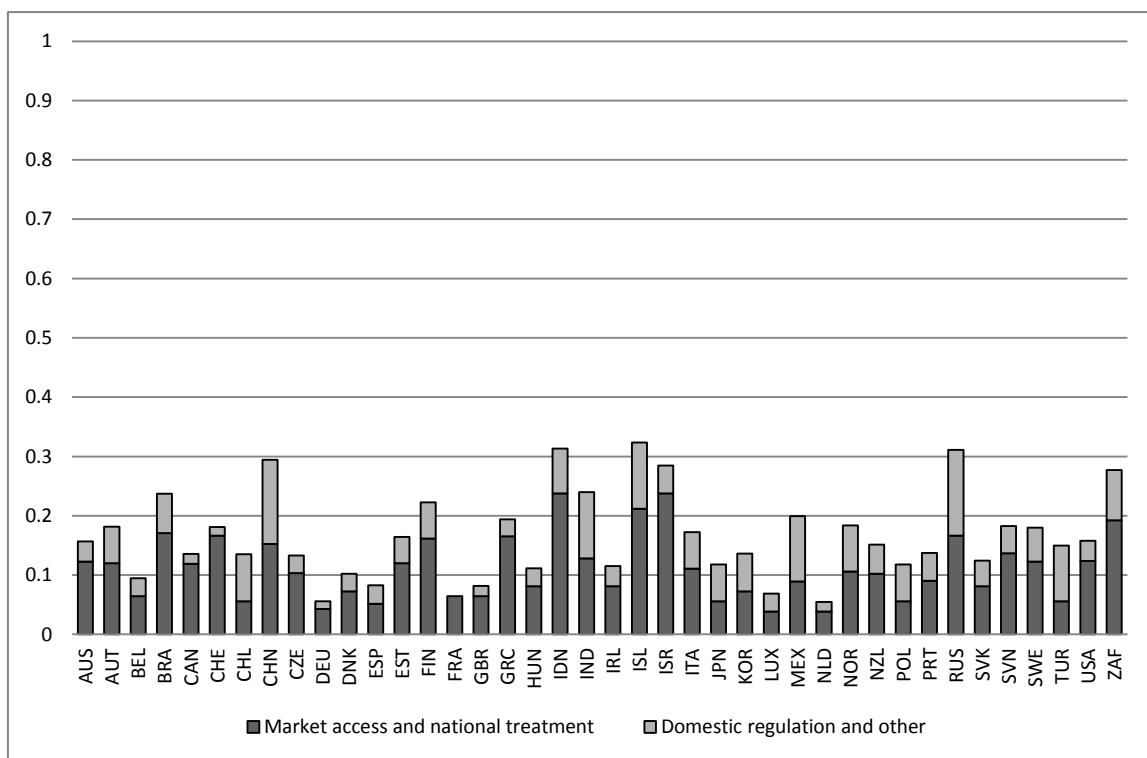
A breakdown of the STRI according to the GATS framework and modes of service supply for construction services is presented in Figure 9 below. As noted, the individual regulatory measures are classified in several ways in order to highlight different aspects of trade restrictiveness. Panel A shows that, in general, both market access and national treatment measures and domestic regulatory and other measures are important for the STRI, with the former being slightly more important for the most restrictive countries. From a modal standpoint, the results indicate that restrictions on mode 3 have a particularly strong bearing in the most restricted economies (see Panel B). Impediments on mode 4 and on all modes of supply are more evenly spread across countries.

Breaking down the measures by GATS categories and modes of supply yields additional results for architectural and engineering services (Figures 10 and 11). The majority of the restrictions underlying the STRI scores for engineering and architectural services relate to measures of market access and national treatment; in some countries, however, domestic regulations and others also play a significant role, more frequently so in the case of architectural services.

According to the breakdown by mode of supply, most of the restrictions found for architectural services relate to the temporary movement of natural persons (mode 4), although some countries also register many restrictions on commercial presence (mode 3). Likewise, most regulatory restrictions for engineering services are on mode 4, although measures relating to mode 3 and other modes of supply are also relevant.

Figure 9. STRI for construction services according to the GATS framework

Panel A: by GATS category



Panel B: by GATS mode of supply

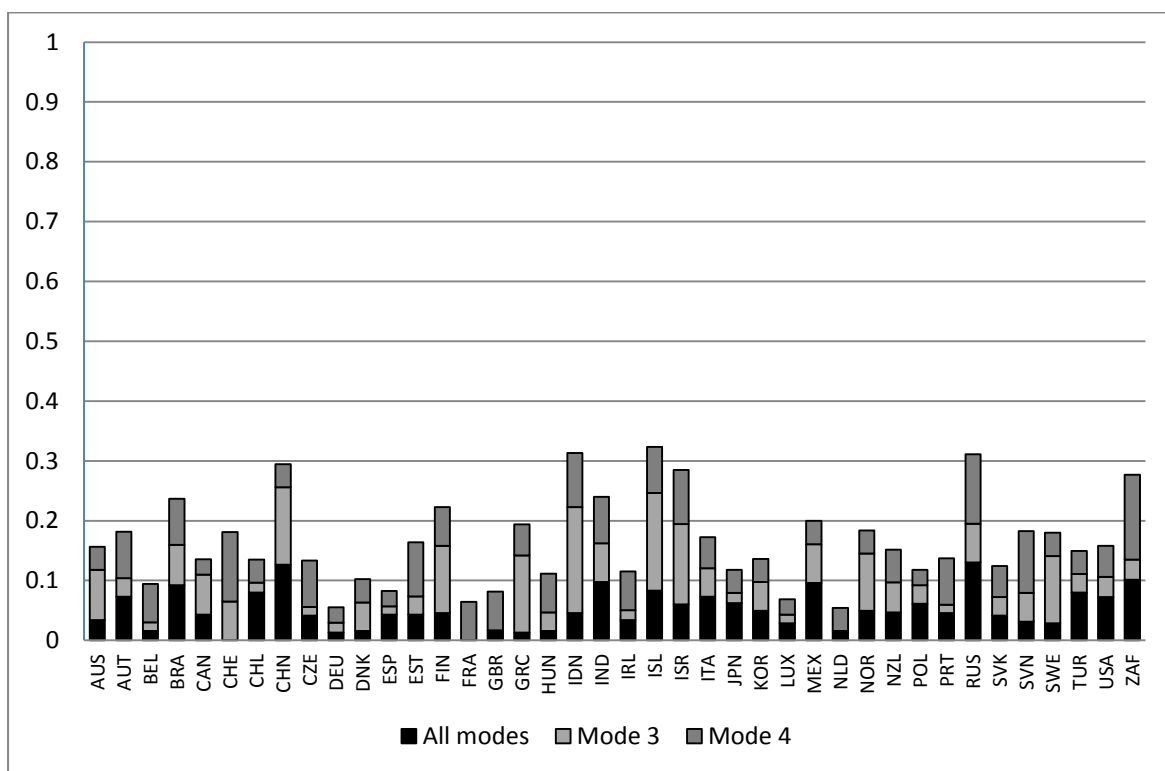
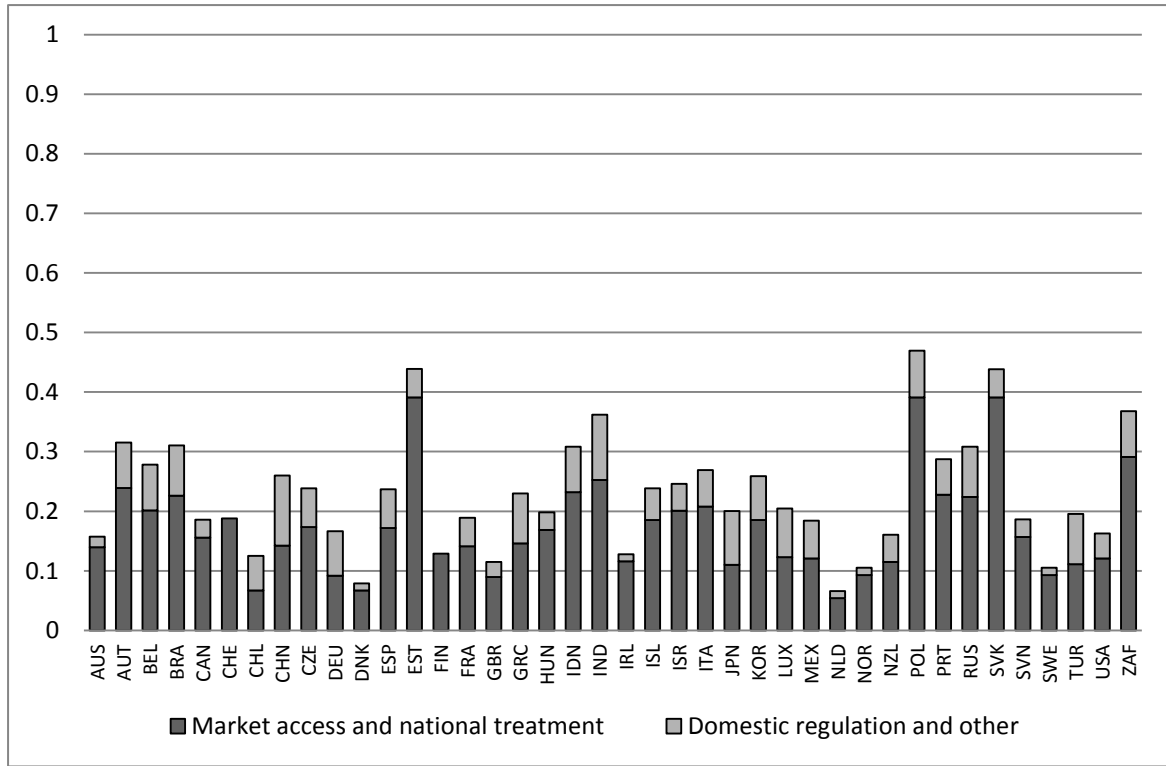


Figure 10. STRI for architecture services according to the GATS framework

Panel A: by GATS category



Panel B: by GATS mode of supply

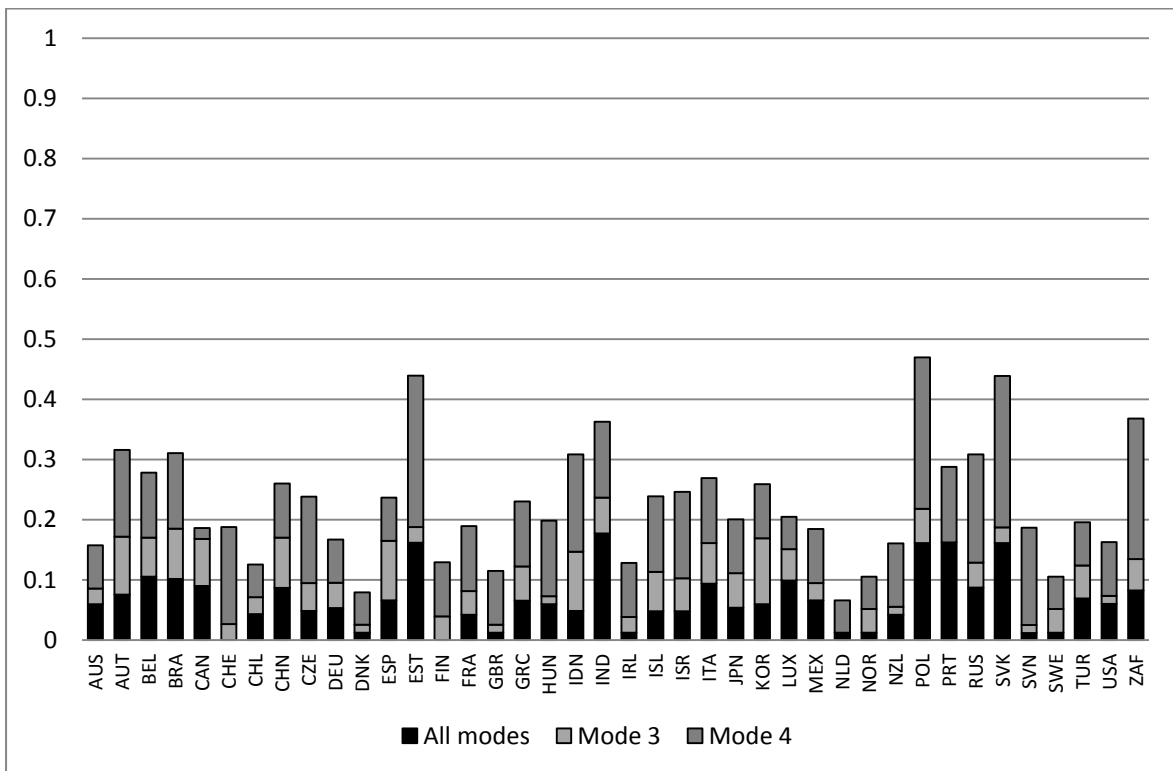
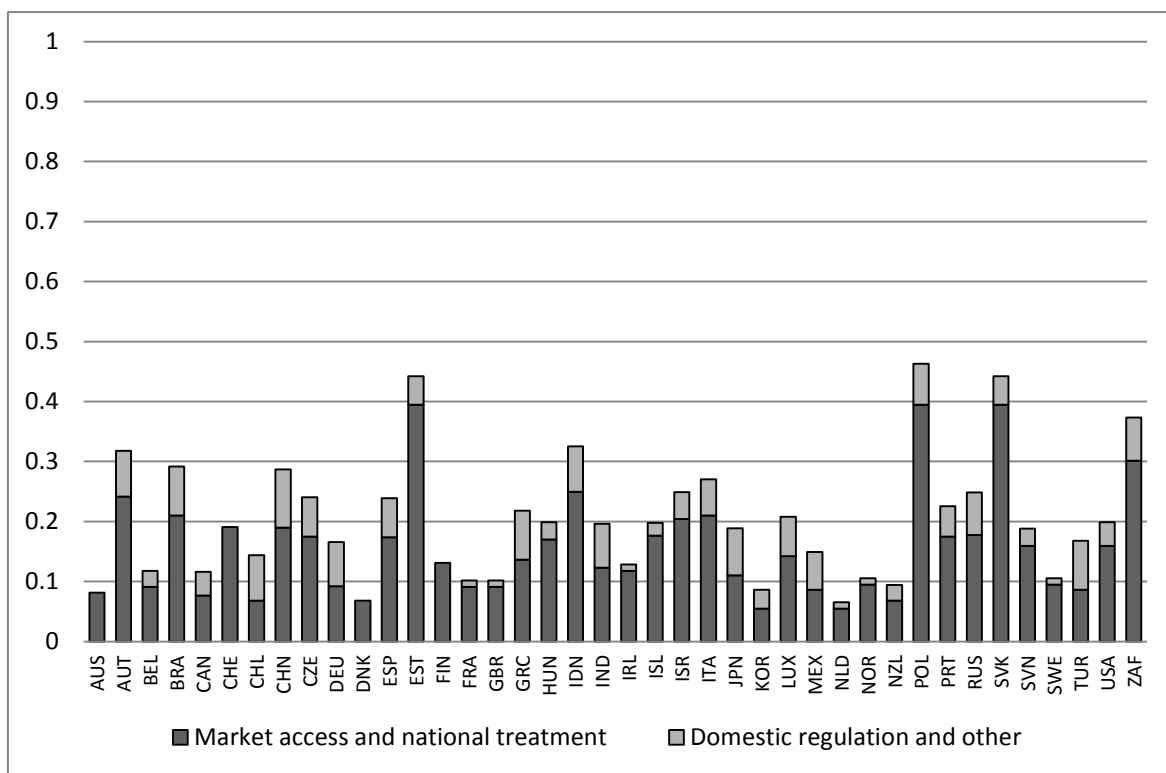
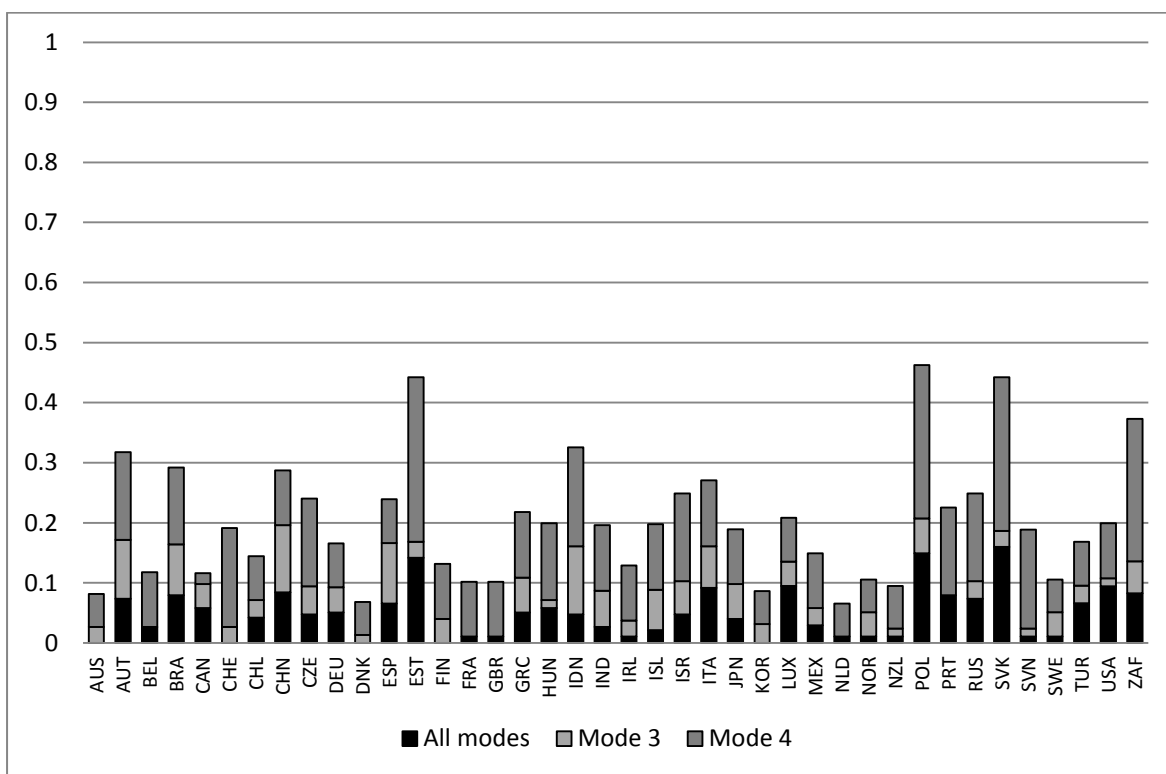


Figure 11. STRI for engineering services according to the GATS framework

Panel A: by GATS category



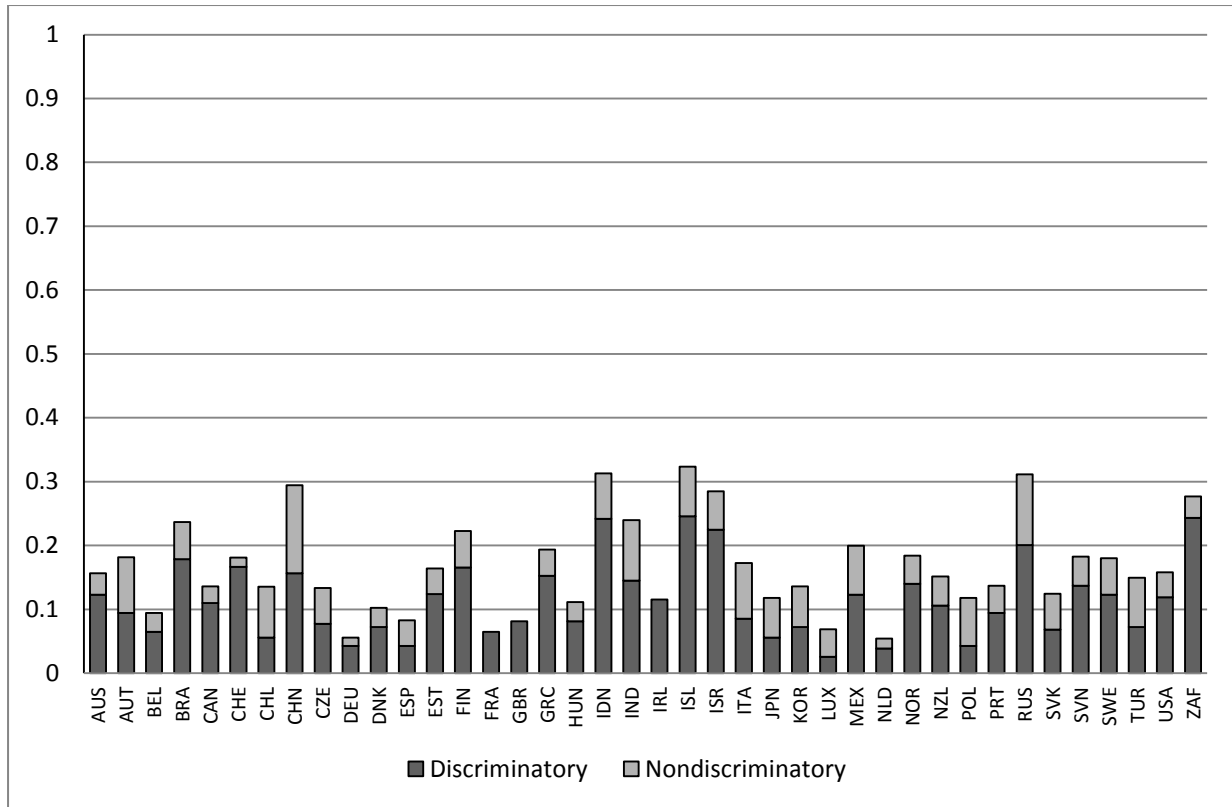
Panel B: by GATS mode of supply



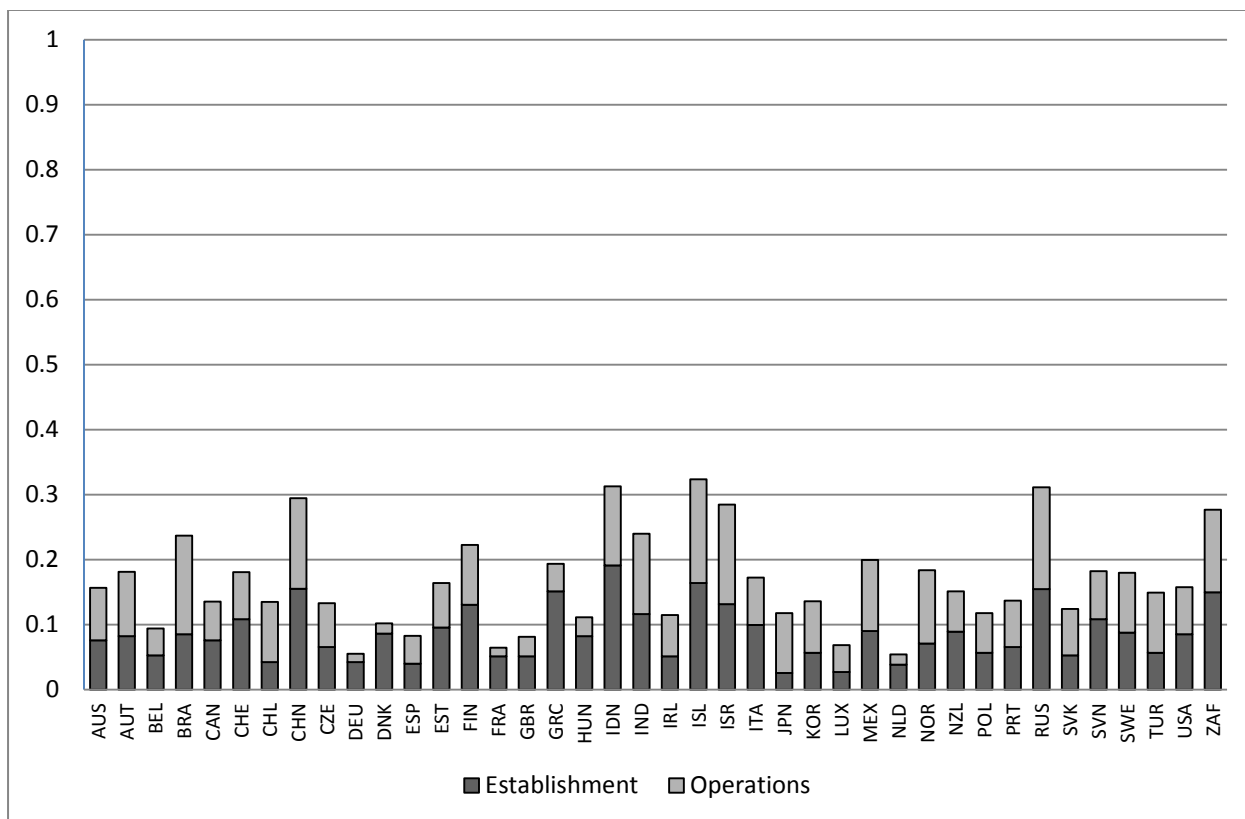
In accordance with results for the GATS framework, while discriminatory measures generally contribute more to the index in construction services, non-discriminatory ones play a non-negligible role (see Figure 12). In some cases, e.g. Italy and Spain, they are actually predominant. Panel B further indicates that impediments in the sector significantly affect both firms’ establishment and operations.

Figure 12. STRI by other classifications for construction services

Panel A: by discriminatory versus non-discriminatory measures



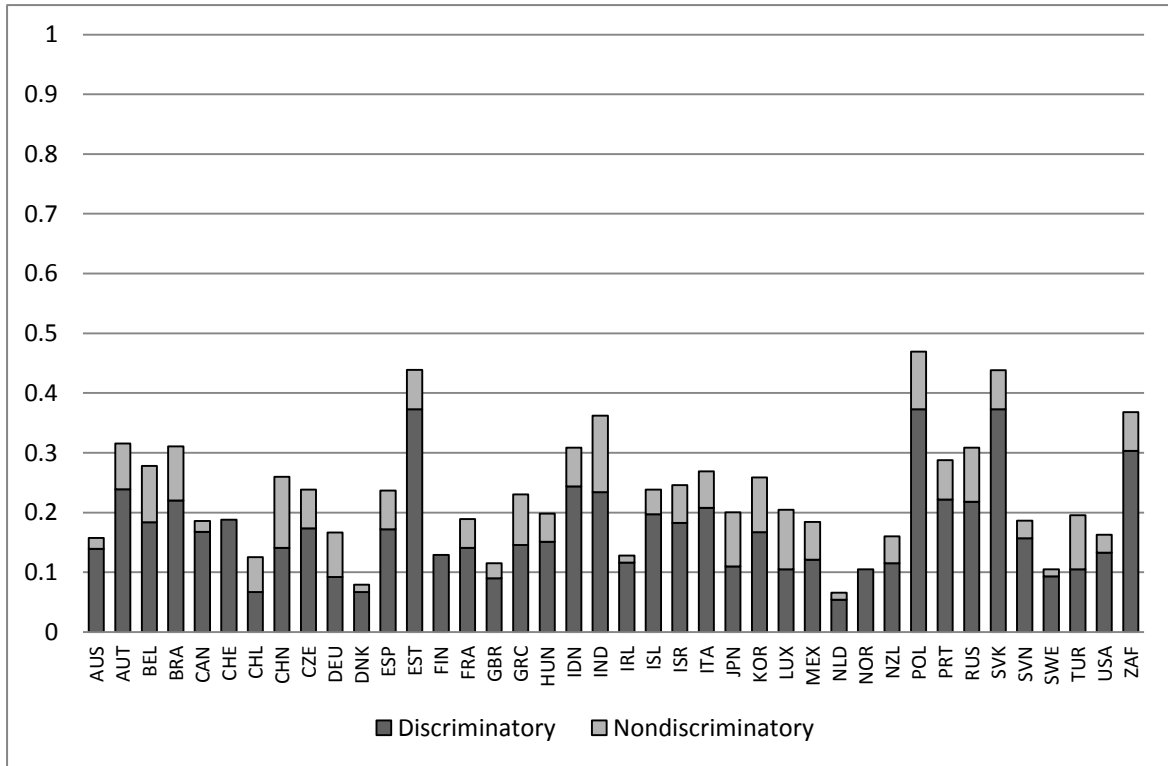
Panel B: by firms' establishment versus ongoing operations



The results for architecture and engineering are presented in Figures 13 and 14. They indicate that most of the measures are applied in a discriminatory basis, particularly in the case of architecture. In terms of the channels of internationalisation that may be affected by these measures, most of the restrictions are likely to have a greater impact in the phase of establishment; once the foreign supplier or firm has established, there are relatively fewer restrictions to ongoing operations in the foreign market.

Figure 13. STRI by other classifications for architecture services

Panel A: by discriminatory versus non-discriminatory measures



Panel B: by firms' establishment versus ongoing operations

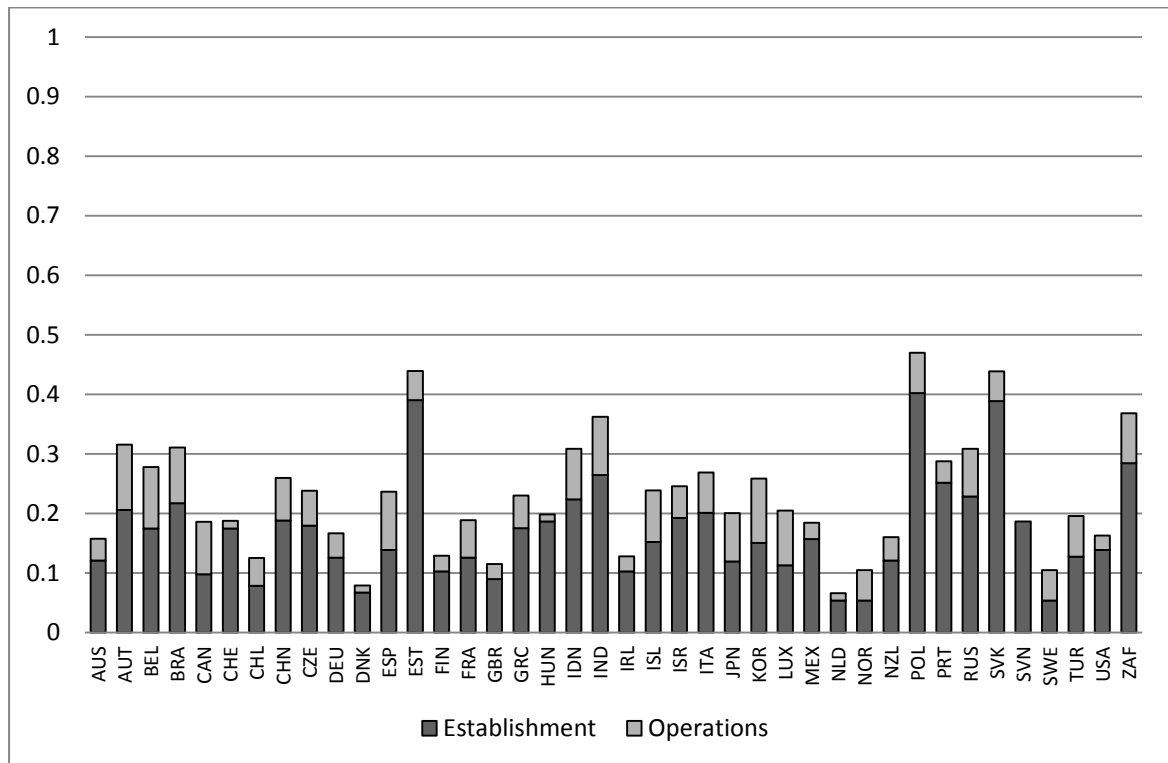
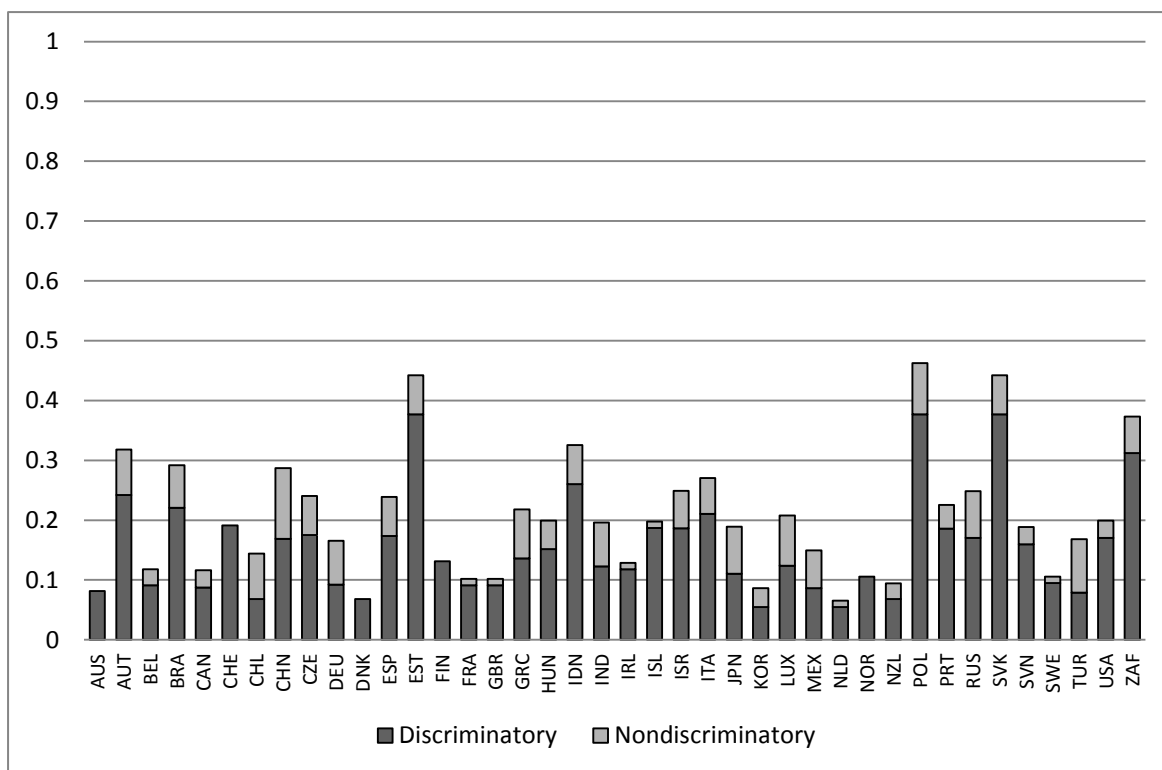
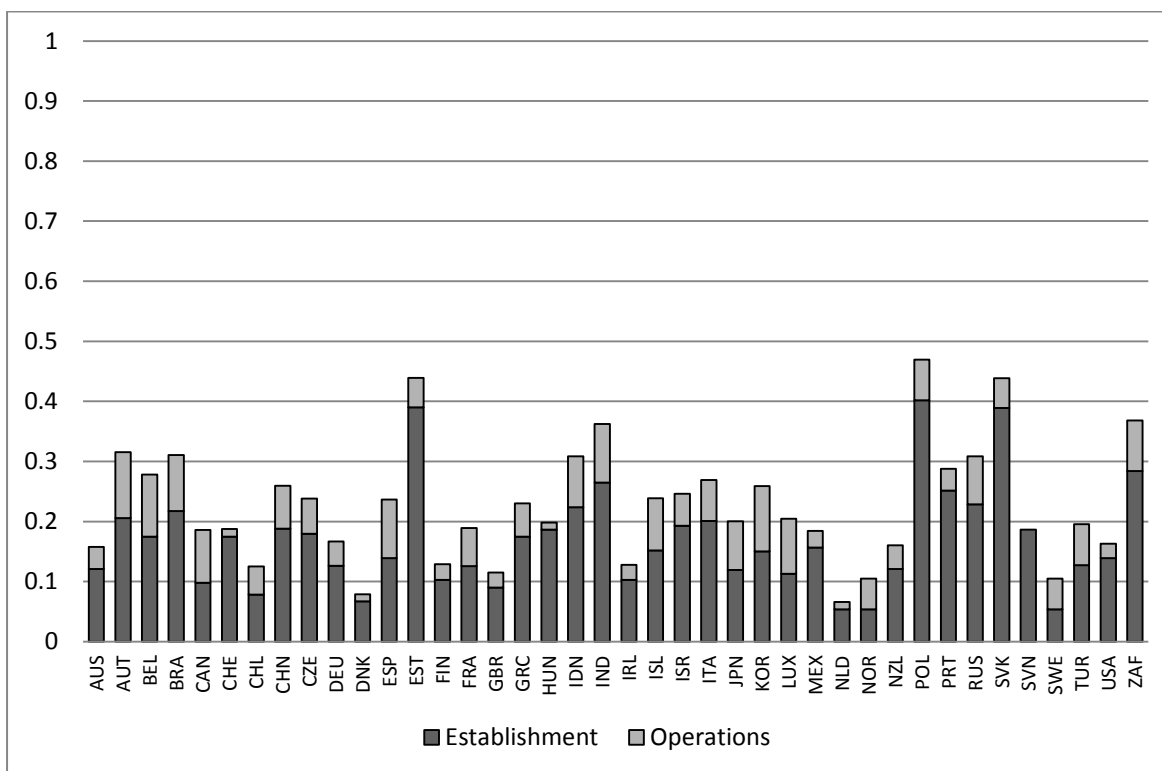


Figure 14. STRI by other classifications for engineering services

Panel A: discriminatory versus non-discriminatory measures



Panel B: by firms' establishment versus ongoing operations



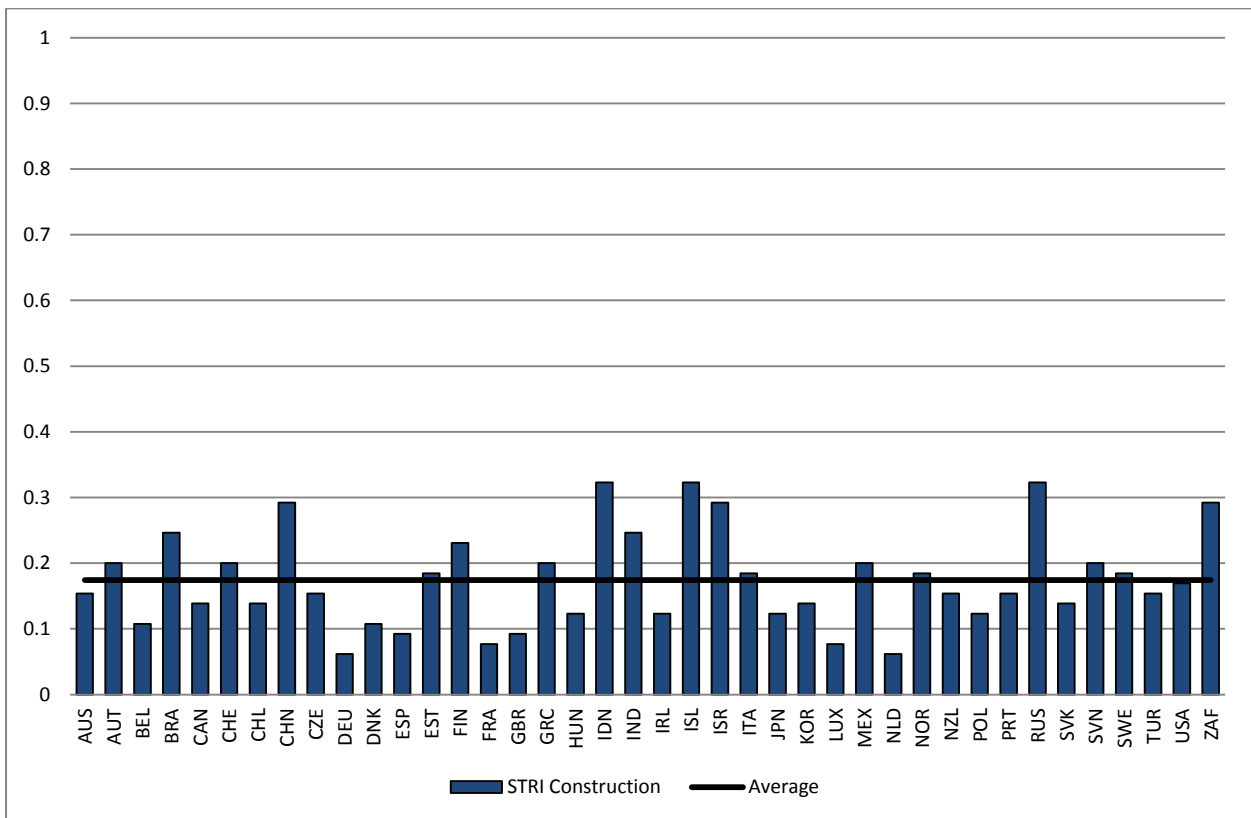
Sensitivity analysis

This section tests the sensitivity of results to the weighting scheme that has been chosen. A comparison of STRIs calculated from different weighting schemes (Figures 15-17 below) shows how much the chosen weighting scheme drives the STRI results for construction, architecture and engineering services. Panel A shows the overall index when equal weights are used, Panel B presents the results of random weights, including the mean for all simulations and the lowest and the highest simulation result, from 3000 Monte Carlo simulations.

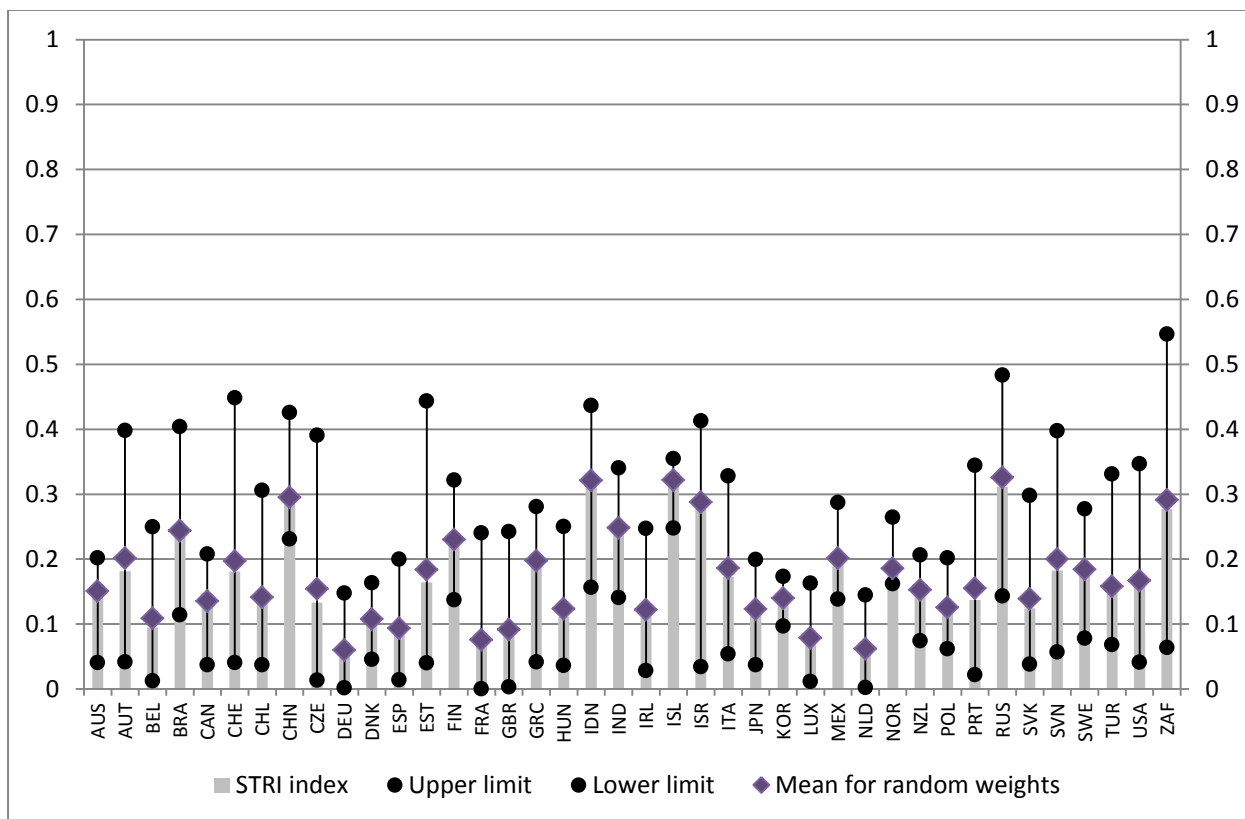
Indices for construction services using equal and random weights are shown in Figure 15. Both methods lead to similar rankings of countries and STRI values to those estimated with the expert judgment method. The Spearman rank correlation between the STRI calculated with expert judgment and equal weights is 0.99.

Figure 15. STRI for construction services using different weighting schemes

Panel A: equal weights



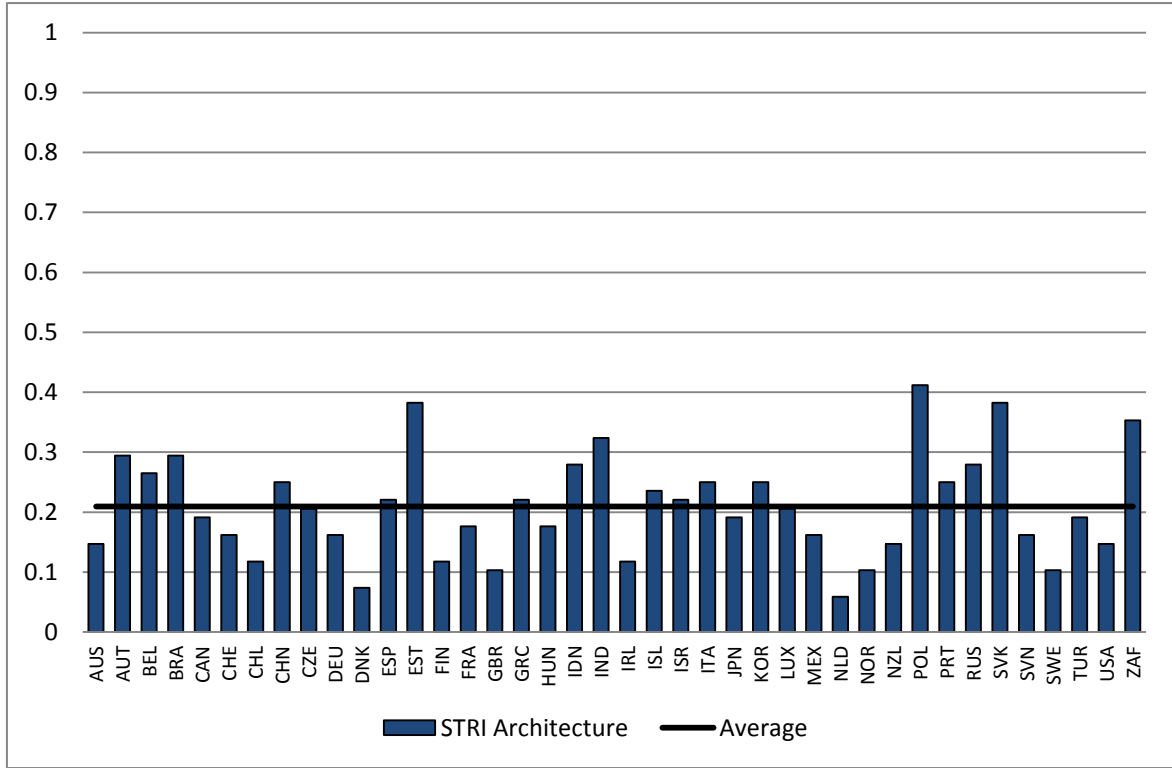
Panel B: random weights



Figures 16 and 17 display the STRI scores applying different weighting schemes to architectural and engineering services. The Spearman rank correlation between the indices computed with expert judgment and equal weights is 0.99 for both architecture and engineering. Overall, a high degree of correlation indicates that the STRI scores are robust to alternative weighting schemes.

Figure 16. STRI for architecture services using different weighting schemes

Panel A: equal weights



Panel B: random weights

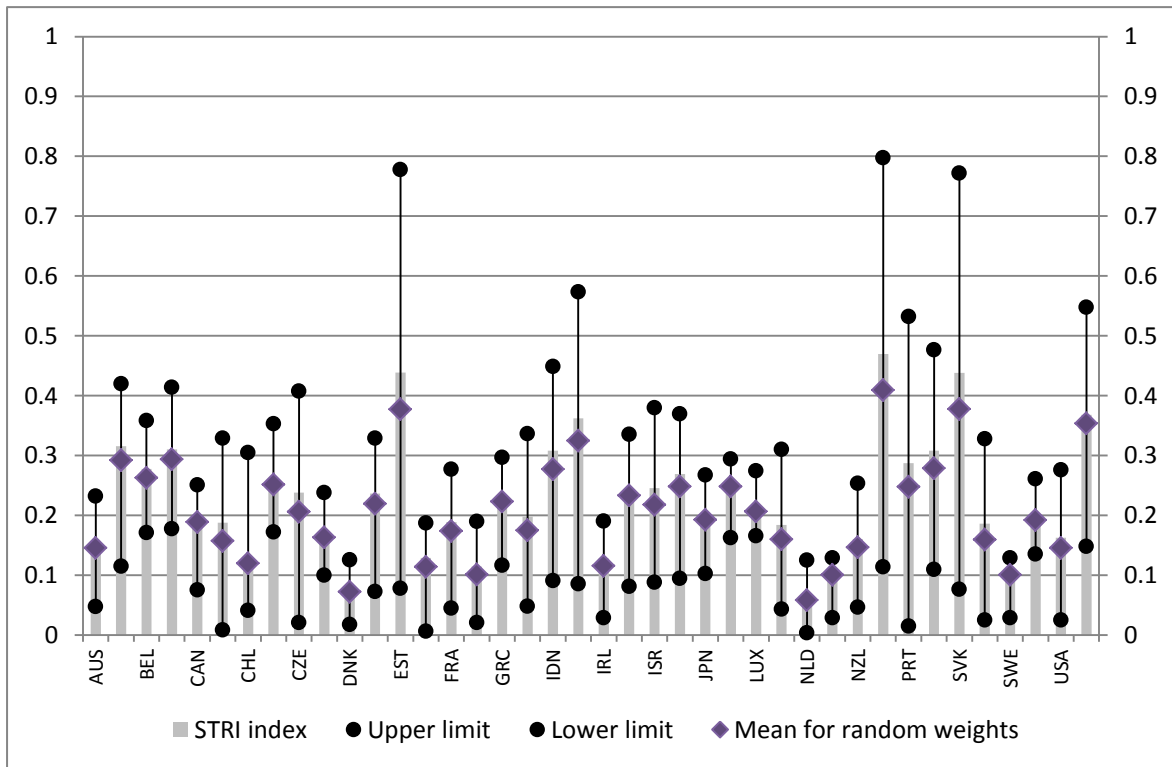
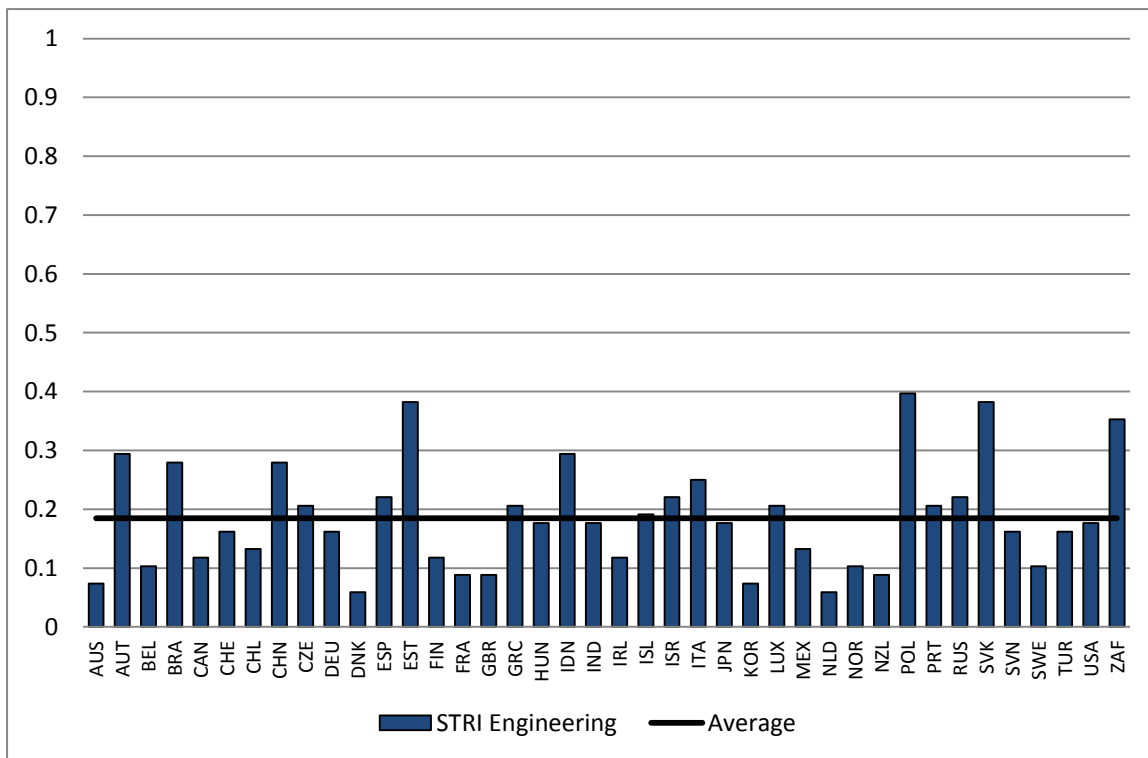
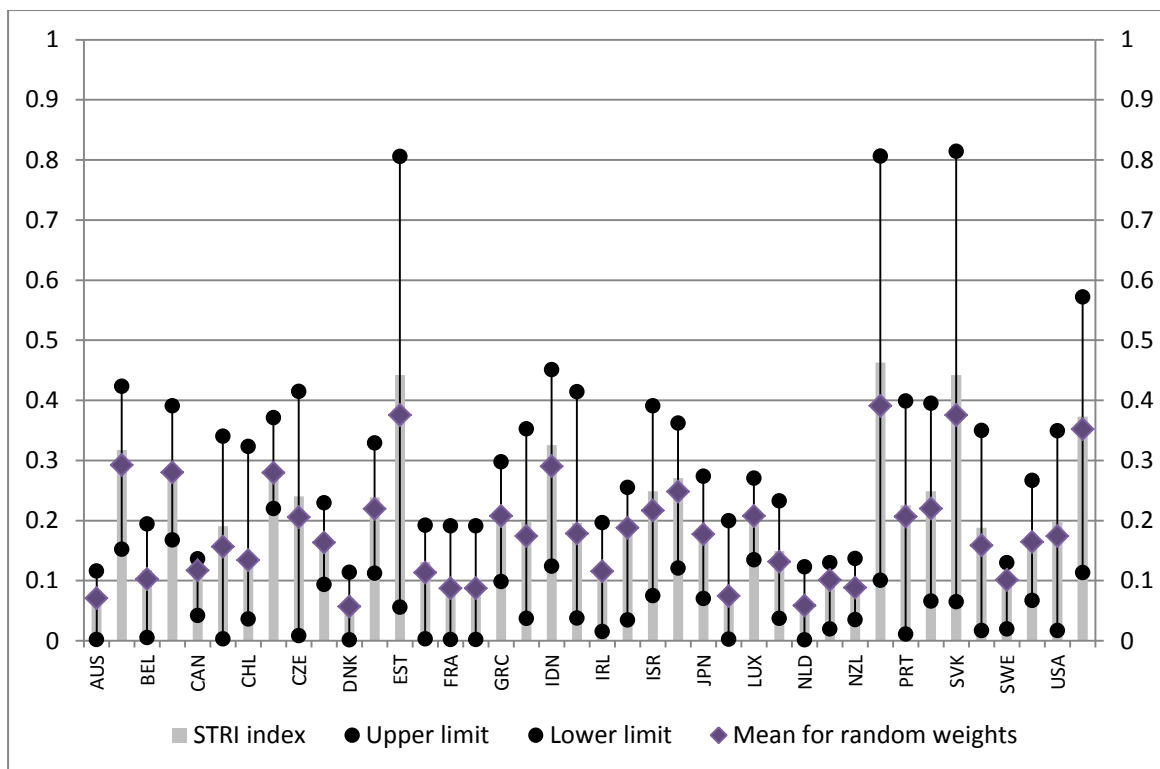


Figure 17. STRI for engineering services using different weighting schemes

Panel A: equal weights



Panel B: random weights



Linkages between regulation in construction, architecture and engineering services

Architects and engineers provide essential inputs into construction both of buildings and infrastructure. It is therefore important to analyse linkages between these three sectors. Member countries take different approaches to regulating architecture and engineering, and in some countries one or both are not regulated professions. This does not necessarily mean that there is less government control during the process of designing and constructing a building, a road or other infrastructure projects. Regulation may in some countries be entailed in building codes, technical standards and the enforcement of these.

To test this possibility we checked whether there is a statistical relationship between whether or not architecture or engineering are regulated professions and the administrative procedures related to obtaining a building permit. We found that there is such a relationship. As expected, the cost of obtaining a building permit is systematically lower in countries that regulate architecture and/or engineering than those that do not, suggesting that the regulatory burden falls on the building permit.¹⁷ An interesting question for further research is whether regulating inputs or outputs makes a difference for trade costs.

7. Conclusions

This paper has presented the STRI for construction, architecture and engineering services. These services play an important role in the functioning of economies and account for a significant share of GDP and employment in most countries. Trade in construction, architecture and engineering services, though affected by the global economic crisis, has undergone significant expansion in the past decade. Modes 3 and 4 are the predominant modes of supply in these services, and the STRI results highlight the importance of impediments affecting trade via these modes.

The results for construction services indicate that the overall level of restrictiveness is relatively low, ranging from 0.05 to 0.32 on a scale from 0 to 1. Restrictions to movement of people and on foreign entry contribute the most to the results, followed by other discriminatory measures. Barriers to competition have a considerable impact on a few economies.

The more elevated levels of restriction can in part be attributed to general measures affecting all sectors of the economy. These include investment screening, limitations on board members and managers of construction firms, impediments on acquiring land and real estate, as well as quotas and labour market tests on different categories of service providers. Restrictions in public procurement have a particular bearing on the construction sector in light of the importance of government demand for these services.

In terms of sector-specific measures, one country limits foreign ownership in construction firms to 67% for advanced technology work. There are some local content restrictions, and residency and qualification requirements for construction engineers. Lack of adherence to international standards (e.g. building design codes) can be found in a few countries. Some cases also remain of government ownership in major construction firms, at times coupled with limitations on foreign ownership in such firms.

The results portray that engineering and architecture services tend to be relatively liberal, albeit slightly more regulated than construction services. The average value for the STRI among

17. The partial correlation between regulating engineering and architecture and the cost of obtaining a building permit is -0.68 and -0.63 respectively, both significant at the 1% level. We also created an index geometrically aggregating cost, time and number of procedures after normalising to the same mean (unity). This index was also negatively correlated with regulation in architecture and engineering with a pair wise correlation of -0.54 and -0.51 respectively, again significant at a 1% level.

the countries in the sample is 0.2 for engineering services, connoting a relatively low degree of regulatory restrictiveness; the corresponding value is only marginally higher, 0.22, for architectural services. These services are less restrictively regulated than other accredited professional services, notably legal and accounting services. The majority of regulations affecting trade in these sectors concern the movement of people, including qualification requirements and other pre-conditions for architects and engineers to supply services abroad.

Finally, initial analysis of the complementarities between regulations in construction, architecture and engineering services, reveals that the cost of obtaining a building permit is systematically lower in countries that regulate architecture and/or engineering than those that do not, suggesting that the regulatory burden falls on the building permit. An interesting question for further research is whether regulating inputs or outputs makes a difference for trade costs.

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Annex A. Index values by policy area

Construction Services

Country	Restrictions on foreign entry	Restrictions to movement of people	Other discriminatory measures	Barriers to competition	Regulatory transparency	Overall indicator
AUS	0.08	0.04	0.03	0.00	0.00	0.16
AUT	0.02	0.10	0.00	0.01	0.05	0.18
BEL	0.00	0.06	0.00	0.01	0.02	0.09
BRA	0.07	0.10	0.05	0.00	0.02	0.24
CAN	0.07	0.05	0.02	0.00	0.00	0.14
CHE	0.05	0.12	0.00	0.01	0.00	0.18
CHL	0.02	0.04	0.02	0.00	0.06	0.14
CHN	0.10	0.05	0.05	0.03	0.06	0.29
CZE	0.00	0.10	0.00	0.01	0.02	0.13
DEU	0.02	0.04	0.00	0.00	0.00	0.06
DNK	0.03	0.04	0.00	0.01	0.02	0.10
ESP	0.00	0.05	0.02	0.01	0.00	0.08
EST	0.02	0.12	0.02	0.01	0.00	0.16
FIN	0.08	0.08	0.02	0.03	0.02	0.22
FRA	0.00	0.06	0.00	0.00	0.00	0.06
GBR	0.00	0.06	0.02	0.00	0.00	0.08
GRC	0.10	0.06	0.00	0.03	0.00	0.19
HUN	0.02	0.06	0.00	0.01	0.02	0.11
IDN	0.13	0.10	0.02	0.04	0.02	0.31
IND	0.05	0.08	0.05	0.01	0.05	0.24
IRL	0.02	0.06	0.03	0.00	0.00	0.12
ISL	0.13	0.08	0.07	0.03	0.02	0.32
ISR	0.13	0.10	0.00	0.00	0.05	0.28
ITA	0.03	0.08	0.00	0.01	0.05	0.17
JPN	0.02	0.05	0.03	0.00	0.02	0.12
KOR	0.03	0.04	0.03	0.01	0.02	0.14
LUX	0.00	0.04	0.00	0.01	0.02	0.07
MEX	0.05	0.05	0.07	0.01	0.02	0.20
NLD	0.00	0.04	0.00	0.00	0.02	0.05
NOR	0.07	0.04	0.03	0.03	0.02	0.18
NZL	0.05	0.05	0.03	0.00	0.02	0.15
POL	0.02	0.04	0.02	0.01	0.03	0.12
PRT	0.00	0.09	0.02	0.01	0.02	0.14
RUS	0.05	0.12	0.07	0.01	0.06	0.31
SVK	0.02	0.08	0.00	0.01	0.02	0.12
SVN	0.03	0.10	0.00	0.01	0.03	0.18
SWE	0.08	0.05	0.00	0.03	0.02	0.18
TUR	0.02	0.04	0.02	0.01	0.06	0.15
USA	0.03	0.09	0.03	0.00	0.00	0.16
ZAF	0.03	0.14	0.10	0.00	0.00	0.28

Architectural Services

Country	Restrictions on foreign entry	Restrictions to movement of people	Other discriminatory measures	Barriers to competition	Regulatory transparency	Overall indicator
AUS	0.03	0.11	0.01	0.01	0.00	0.16
AUT	0.07	0.18	0.02	0.00	0.05	0.32
BEL	0.07	0.16	0.02	0.01	0.02	0.28
BRA	0.05	0.18	0.04	0.01	0.03	0.31
CAN	0.08	0.07	0.02	0.01	0.00	0.19
CHE	0.03	0.16	0.00	0.00	0.00	0.19
CHL	0.01	0.05	0.00	0.01	0.05	0.13
CHN	0.05	0.13	0.01	0.02	0.05	0.26
CZE	0.00	0.18	0.01	0.00	0.05	0.24
DEU	0.03	0.09	0.01	0.02	0.02	0.17
DNK	0.01	0.05	0.01	0.00	0.00	0.08
ESP	0.05	0.13	0.01	0.00	0.05	0.24
EST	0.03	0.38	0.02	0.01	0.00	0.44
FIN	0.04	0.09	0.00	0.00	0.00	0.13
FRA	0.04	0.13	0.02	0.00	0.00	0.19
GBR	0.01	0.09	0.01	0.00	0.00	0.11
GRC	0.03	0.13	0.02	0.02	0.03	0.23
HUN	0.01	0.16	0.01	0.01	0.00	0.20
IDN	0.05	0.20	0.01	0.00	0.05	0.31
IND	0.01	0.25	0.02	0.01	0.06	0.36
IRL	0.03	0.09	0.01	0.00	0.00	0.13
ISL	0.07	0.13	0.04	0.01	0.00	0.24
ISR	0.04	0.18	0.00	0.01	0.02	0.25
ITA	0.05	0.16	0.02	0.00	0.03	0.27
JPN	0.03	0.11	0.02	0.01	0.03	0.20
KOR	0.08	0.13	0.01	0.01	0.03	0.26
LUX	0.05	0.09	0.02	0.02	0.02	0.20
MEX	0.01	0.14	0.01	0.00	0.02	0.18
NLD	0.00	0.05	0.01	0.00	0.00	0.07
NOR	0.04	0.05	0.01	0.00	0.00	0.11
NZL	0.01	0.11	0.02	0.00	0.02	0.16
POL	0.03	0.38	0.01	0.02	0.03	0.47
PRT	0.00	0.25	0.04	0.00	0.00	0.29
RUS	0.03	0.22	0.02	0.01	0.03	0.31
SVK	0.03	0.38	0.01	0.02	0.00	0.44
SVN	0.01	0.16	0.00	0.01	0.00	0.19
SWE	0.04	0.05	0.01	0.00	0.00	0.11
TUR	0.04	0.09	0.02	0.01	0.03	0.20
USA	0.01	0.13	0.02	0.00	0.00	0.16
ZAF	0.05	0.23	0.04	0.05	0.00	0.37

Engineering Services

Country	Restrictions on foreign entry	Restrictions to movement of people	Other discriminatory measures	Barriers to competition	Regulatory transparency	Overall indicator
AUS	0.03	0.05	0.00	0.00	0.00	0.08
AUT	0.07	0.18	0.02	0.00	0.05	0.32
BEL	0.00	0.09	0.01	0.00	0.02	0.12
BRA	0.05	0.16	0.03	0.01	0.03	0.29
CAN	0.04	0.05	0.01	0.01	0.00	0.12
CHE	0.03	0.16	0.00	0.00	0.00	0.19
CHL	0.01	0.07	0.00	0.01	0.05	0.14
CHN	0.08	0.13	0.01	0.02	0.05	0.29
CZE	0.00	0.18	0.01	0.00	0.05	0.24
DEU	0.03	0.09	0.01	0.02	0.02	0.17
DNK	0.01	0.05	0.00	0.00	0.00	0.07
ESP	0.05	0.13	0.01	0.00	0.05	0.24
EST	0.03	0.38	0.02	0.01	0.00	0.44
FIN	0.04	0.09	0.00	0.00	0.00	0.13
FRA	0.00	0.09	0.01	0.00	0.00	0.10
GBR	0.00	0.09	0.01	0.00	0.00	0.10
GRC	0.03	0.13	0.01	0.02	0.03	0.22
HUN	0.01	0.16	0.01	0.01	0.00	0.20
IDN	0.07	0.20	0.01	0.00	0.05	0.33
IND	0.01	0.11	0.01	0.00	0.06	0.20
IRL	0.03	0.09	0.01	0.00	0.00	0.13
ISL	0.07	0.11	0.02	0.00	0.00	0.20
ISR	0.04	0.18	0.00	0.01	0.02	0.25
ITA	0.05	0.16	0.02	0.00	0.03	0.27
JPN	0.03	0.11	0.02	0.00	0.03	0.19
KOR	0.00	0.05	0.00	0.00	0.03	0.09
LUX	0.04	0.11	0.02	0.02	0.02	0.21
MEX	0.01	0.11	0.01	0.00	0.02	0.15
NLD	0.00	0.05	0.01	0.00	0.00	0.07
NOR	0.04	0.05	0.01	0.00	0.00	0.11
NZL	0.01	0.05	0.01	0.00	0.02	0.09
POL	0.03	0.38	0.01	0.01	0.03	0.46
PRT	0.00	0.18	0.03	0.01	0.00	0.23
RUS	0.01	0.18	0.01	0.01	0.03	0.25
SVK	0.03	0.38	0.01	0.02	0.00	0.44
SVN	0.01	0.16	0.00	0.01	0.00	0.19
SWE	0.04	0.05	0.01	0.00	0.00	0.11
TUR	0.01	0.09	0.02	0.01	0.03	0.17
USA	0.01	0.16	0.02	0.00	0.00	0.20
ZAF	0.05	0.26	0.03	0.03	0.00	0.37

Annex B. Classification of trade barriers for construction services

Measures	MA&NT/ DR&Other	Mode	Establishment/ operations	Discr./ non- discr.
Restrictions on foreign entry				
Foreign equity restrictions: maximum foreign equity share allowed (%)	MA&NT	3	E	D
There are statutory or other legal limits to the number or proportion of shares that can be acquired by foreign investors in firms that are controlled by national, state or provincial governments	MA&NT	3	E	D
Legal form: branches or representative offices are prohibited	MA&NT	3	E	D
Legal form: joint venture required	MA&NT	3	E	D
The number of construction firms is restricted by quotas	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	MA&NT	3	E	D
Acquisition of land and real estate by foreigners is subject to restrictions	MA&NT	3	E	D
Conditions on subsequent transfer of capital and investments	MA&NT	3	E	D
Local content of personnel and/or goods	MA&NT	3	O	D
Discriminatory qualification requirements for building permits to undertake construction work	MA&NT	3	E	D
Restrictions to movement of people				
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 is limited to (months):	MA&NT	4	E	D

Measures	MA&NT/ DR&Other	Mode	Establishment/ operations	Discr./ non- discr.
Limitation on duration of stay for independent services suppliers is limited to (months):	MA&NT	4	E	D
Nationality or citizenship required for construction engineers	MA&NT	All	O	D
Residency required for construction engineers	MA&NT	All	O	D
Recognition of foreign qualifications for construction engineers: laws or regulations establish a process for recognising higher education degrees in engineering gained abroad	DR&Other	All	O	ND
Recognition of foreign qualifications for construction engineers: foreign engineers are required to undertake local examinations to qualify for membership of the profession	MA&NT	All	O	D
Recognition of foreign qualifications for construction engineers: foreign engineers are required to undertake at least 1 year of local practice to become a member of the profession	MA&NT	All	O	D
Other discriminatory measures				
Foreign suppliers are treated less favourably regarding taxes or eligibility to subsidies	MA&NT	All	O	D
Foreign participation in public procurement: explicit access discrimination in favour of local firms	DR&Other	All	O	D
Foreign participation in public procurement: domestic content of personnel and/or goods	DR&Other	All	O	D
Foreign participation in public procurement: technical specifications affect the conditions of competition in favour of local providers	DR&Other	All	O	D
Foreign participation in public procurement: discriminatory qualification processes and procedures	DR&Other	All	O	D
Foreign participation in public procurement: contract award on the basis of non-objective/discriminatory criteria	DR&Other	All	O	D
Foreign participation in public procurement: procurement laws, regulations and procedures are transparent	DR&Other	All	O	D
Foreign participation in public procurement: foreign suppliers are provided the opportunity to challenge the consistency of the conduct of a procurement with the laws and regulations	DR&Other	All	O	D
Laws or regulations encourage or require the use of international standards: building design code standards	DR&Other	All	O	ND
Laws or regulations encourage or require the use of international standards: construction product standards	DR&Other	All	O	ND
Barriers to competition				
When appeal procedures are available in domestic regulatory systems, they are open to affected or interested foreign parties as well	MA&NT	3	O	D
Foreign firms have redress when business practices are perceived to restrict competition in a given market	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 or undertakings are subject to an exclusion or exemption from the application of the general competition law	DR&Other	3	E	ND
Minimum capital requirement	DR&Other	3	E	ND

Measures	MA&NT/ DR&Other	Mode	Establishment/ operations	Discr./ non- discr.
Regulatory transparency				
Regulations are published or otherwise communicated to the public prior to entry into force	DR&Other	All	O	ND
There is a public comment procedure open to interested persons, and/or the regulator has a formal mechanism for consultation with stakeholders, including foreign suppliers	DR&Other	All	O	ND
Range of visa processing time (days)	DR&Other	All	O	ND
Construction permit: time to complete all the procedures necessary to build a warehouse, including obtaining necessary licenses and permits, completing required notifications and inspections, and obtaining utility connections (in calendar days)	DR&Other	All	O	ND
Construction permit: official costs associated with completing the procedures necessary to build a warehouse, including obtaining necessary licenses and permits, completing required notifications and inspections, and obtaining utility connectio	DR&Other	All	O	ND
Construction permit: all procedures that are necessary to build a warehouse, including obtaining necessary licenses and permits, completing required notifications and inspections, and obtaining utility connections	DR&Other	All	O	ND

Annex C. Classification of trade barriers for architectural services

Measures	MA&NT/ DR&Other	Mode	Establishment/op erations	Discr./ non- discr.
Restrictions on foreign entry				
Foreign equity restrictions: maximum foreign equity share allowed (%)	MA&NT	3	E	D
Equity restrictions applying to not locally-licensed architects	MA&NT	3	E	D
Legal form: sole proprietorship is prohibited	MA&NT	3	E	ND
Legal form: corporation is prohibited	MA&NT	3	E	ND
Legal form: partnership is prohibited	MA&NT	3	E	ND
Commercial association is prohibited between architects and other professionals	DR&Other	3	O	ND
Commercial association is required between not locally-licensed architects (or with limited license) and locally-licensed architects	MA&NT	3	O	D
The number of architectural firms permitted to practice is restricted by quotas	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: majority must be locally-licensed architects	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
Board of directors: at least one must be locally-licensed architects	MA&NT	3	O	D
Manager must be national	MA&NT	3	O	D
Manager must be resident	MA&NT	3	O	D
Manager must be locally-licensed architect	MA&NT	3	O	D
The establishment of foreign architectural firms is restricted by economic needs tests	MA&NT	3	E	D
Acquisition of land and real estate by foreigners is prohibited	MA&NT	3	E	D
Acquisition of land and real estate by foreigners is subject to restrictions	MA&NT	3	E	D
Restrictions to movement of people				
Quotas: intra-corporate transferees	MA&NT	4	E	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	E	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	E	D

Measures	MA&NT/ DR&Other	Mode	Establishment/op erations	Discr./ non- discr.
Limitation on duration of stay for contractual services suppliers is limited to (months):	MA&NT	4	E	D
Limitation on duration of stay for independent services suppliers is limited to (months):	MA&NT	4	E	D
Nationality or citizenship required for license to practice architectural services	MA&NT	All	E	D
Residency required for license to practice architectural services: prior or permanent residency	MA&NT	All	E	D
Residency required for license to practice architectural services: domicile	MA&NT	All	E	D
Recognition of foreign qualifications for architects: laws or regulations establish a process for recognising higher education degrees in architecture gained abroad	DR&Other	All	E	ND
Recognition of foreign qualifications for architects: foreign architects are required to undertake local examinations to qualify for full membership of the profession	MA&NT	All	E	D
Recognition of foreign qualifications for architects: foreign architects are required to undertake at least 1 year of local practice to become a full member of the profession	MA&NT	All	E	D
Recognition of foreign qualifications for architects: compulsory membership in a professional association for foreign architects is automatically granted if the architect has the required qualifications	MA&NT	All	E	ND
License/practice authorisation is required for architects authorised to practice in their home country	DR&Other	4	E	ND
Limited or temporary licensing system is available to practice architectural services	MA&NT	4	E	D
Foreign providers have to completely re-do the university degree, practice and exam in the domestic country	MA&NT	All	E	D
Other discriminatory measures				
Foreign suppliers are treated less favourably regarding taxes or eligibility to subsidies	MA&NT	All	O	D
Foreign participation in public procurement: foreign suppliers are prohibited from supplying architectural services to the government or preferences are given to local suppliers	DR&Other	All	O	D
There is a formal requirement that regulators consider comparable international standards and rules before setting new domestic standards	DR&Other	All	O	ND
Use of foreign/international firm names: the use of foreign firm names is prohibited	MA&NT	All	O	D
Use of foreign/international firm names: the use of foreign firm names is allowed only alongside that of a local partner	MA&NT	All	O	D
Use of foreign/international firm names: only locally-licensed architects may use the title Architect	MA&NT	All	O	D
Barriers to competition				
When appeal procedures are available in domestic regulatory systems, they are open to affected or interested foreign parties as well	MA&NT	3	O	D

Measures	MA&NT/ DR&Other	Mode	Establishment/op erations	Discr./ non- discr.
Foreign firms have redress when business practices are perceived to restrict competition in a given market	MA&NT	3	O	D
Fee-setting: mandatory minimum and/or maximum fees	DR&Other	All	E	ND
Fee-setting: : recommended minimum and/or maximum fees	DR&Other	All	E	ND
Advertising and marketing: architects are either prohibited to advertise or subject to restrictions on advertising	DR&Other	All	O	ND
Advertising and marketing: only locally-licensed architects are permitted to advertise and market these services	MA&NT	All	O	D
<i>Regulatory transparency</i>				
Regulations are published or otherwise communicated to the public prior to entry into force	DR&Other	All	O	ND
There is a public comment procedure open to interested persons, and/or the regulator has a formal mechanism for consultation with stakeholders, including foreign suppliers	DR&Other	All	O	ND
Range of visa processing time (days)	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 required to register a company (in USD)	DR&Other	3	O	ND
Number of official procedures required to register a company	DR&Other	3	O	ND

Annex D. Classification of trade barriers for engineering services

Measures	MA&NT/ DR&Other	Mode	Establishment/ operations	Discr./ non- discr.
Restrictions on foreign entry				
Foreign equity restrictions: maximum foreign equity share allowed (%)	MA&NT	3	E	D
Equity restrictions applying to not locally-licensed engineers	MA&NT	3	E	D
Legal form: sole proprietorship is prohibited	MA&NT	3	E	ND
Legal form: corporation is prohibited	MA&NT	3	E	ND
Legal form: partnership is prohibited	MA&NT	3	E	ND
Commercial association is prohibited between engineers and other professionals	DR&Other	3	O	ND
Commercial association is required between not locally-licensed engineers (or with limited license) and locally-licensed engineers	MA&NT	3	O	D
The number of engineering firms permitted to practice is restricted by quotas	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: majority must be locally-licensed engineers	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
Board of directors: at least one must be locally-licensed engineers	MA&NT	3	O	D
Manager must be national	MA&NT	3	O	D
Manager must be resident	MA&NT	3	O	D
Manager must be locally-licensed engineer	MA&NT	3	O	D
The establishment of foreign engineering firms is restricted by economic needs tests	MA&NT	3	E	D
Acquisition of land and real estate by foreigners is prohibited	MA&NT	3	E	D
Acquisition of land and real estate by foreigners is subject to restrictions	MA&NT	3	E	D
Restrictions to movement of people				
Quotas: intra-corporate transferees	MA&NT	4	E	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	E	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	E	D

Measures	MA&NT/ DR&Other	Mode	Establishment/ operations	Discr./ non- discr.
Limitation on duration of stay for contractual services suppliers is limited to (months):	MA&NT	4	E	D
Limitation on duration of stay for independent services suppliers is limited to (months):	MA&NT	4	E	D
Nationality or citizenship required for license to practice engineering services	MA&NT	All	E	D
Residency required for license to practice engineering services: prior or permanent residency	MA&NT	All	E	D
Residency required for license to practice engineering services: domicile	MA&NT	All	E	D
Recognition of foreign qualifications for engineers: laws or regulations establish a process for recognising higher education degrees in engineering gained abroad	DR&Other	All	E	ND
Recognition of foreign qualifications for engineers: foreign architects are required to undertake local examinations to qualify for full membership of the profession	MA&NT	All	E	D
Recognition of foreign qualifications for engineers: foreign architects are required to undertake at least 1 year of local practice to become a full member of the profession	MA&NT	All	E	D
Recognition of foreign qualifications for engineers: compulsory membership in a professional association for foreign architects is automatically granted if the engineer has the required qualifications	MA&NT	All	E	ND
License/practice authorisation is required for engineers authorised to practice in their home country	DR&Other	4	E	ND
Limited or temporary licensing system is available to practice engineering services	MA&NT	4	E	D
Foreign providers have to completely re-do the university degree, practice and exam in the domestic country	MA&NT	All	E	D
Other discriminatory measures				
Foreign suppliers are treated less favourably regarding taxes or eligibility to subsidies	MA&NT	All	O	D
Foreign participation in public procurement: foreign suppliers are prohibited from supplying architectural services to the government or preferences are given to local suppliers	DR&Other	All	O	D
There is a formal requirement that regulators consider comparable international standards and rules before setting new domestic standards	DR&Other	All	O	ND
Use of foreign/international firm names: the use of foreign firm names is prohibited	MA&NT	All	O	D
Use of foreign/international firm names: the use of foreign firm names is allowed only alongside that of a local partner	MA&NT	All	O	D
Use of foreign/international firm names: only locally-licensed engineers may use the title Engineer	MA&NT	All	O	D
Barriers to competition				
When appeal procedures are available in domestic regulatory systems, they are open to affected or interested foreign parties as well	MA&NT	3	O	D

Measures	MA&NT/ DR&Other	Mode	Establishment/ operations	Discr./ non- discr.
Foreign firms have redress when business practices are perceived to restrict competition in a given market	MA&NT	3	O	D
Fee-setting: mandatory minimum and/or maximum fees	DR&Other	All	E	ND
Fee-setting: : recommended minimum and/or maximum fees	DR&Other	All	E	ND
Advertising and marketing: engineers are either prohibited to advertise or subject to restrictions on advertising	DR&Other	All	O	ND
Advertising and marketing: only locally-licensed architects are permitted to advertise and market these services	MA&NT	All	O	D
Regulatory transparency				
Regulations are published or otherwise communicated to the public prior to entry into force	DR&Other	All	O	ND
There is a public comment procedure open to interested persons, and/or the regulator has a formal mechanism for consultation with stakeholders, including foreign suppliers	DR&Other	All	O	ND
Range of visa processing time (days)	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 required to register a company (in USD)	DR&Other	3	O	ND
Number of official procedures required to register a company	DR&Other	3	O	ND