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Clemens Recker

February 2019

JEL - Classification: J44, F13, F14, F15

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Abstract

This paper shows that evidence from existing research results on positive trade effects of a more homogeneous professional regulation cannot be transferred without restrictions to intra-European trade with professional services in the sectors of accounting, architectural, engineering and legal activities. In line with the related literature, this paper uses regulatory indicators on trade restriction to capture potential trade effects of heterogeneous occupational regulation between the Member States of the EU within a gravity framework. If the OECD "Services Trade Restrictiveness Index for cross-border trade in services" (OECD-STRI) is used to capture remaining regulatory differences between the Member States, there is no indication for such positive trade effects. However, this lack of findings may be due to the fact that the OECD-STRI indicator simply does not cover the relevant professional regulation for trade in Europe. Nevertheless, also the inclusion of the recently updated modified version of this indicator for intra-European trade (intra-EEA STRI) does not hint to extensive trade barriers due to the remaining national regulatory differences in professional services.

As an alternative to the composite indicators of the OECD, I propose a simple measure of regulation, which divides the countries according to whether membership in a professional chamber is mandatory or not. This indicator captures the central dividing lines of professional regulation in the Member States of the EU between direct state supervision and indirect professional supervision in professional self-administration. Under this specification it is shown that there are indeed some interface problems in the trade of professional services in the EU internal market. However, the results do also indicate that a mandatory chamber system itself has no negative impact on intra-EU trade in professional services.

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1 Introduction

The EU Commission – in line with its mandate given by the Member States – places an emphasis on the enhancement of the internal market for services. Through further harmonization of national rules in the field of regulated professions such as accounting, architectural, engineering or legal services, the EU Commission intends to intensify the competition and to strengthen the cross-border provision of regulated services (see e.g. EU-COM GROW/E-5 27-10-15).

The European Single Market allows liberal professionals to carry out projects in other Member States without a permanent or temporary change of location. In contrast to trade in goods, the so-called destination principle applies to such exports of services to another Member State. Professionals therefore have to comply with the regulations of the respective target country of their service, even if their profession may be subject to different professional regulations in their home country.

The stated objective of these regulations is usually to protect public interests – such as legal certainty, integrity of the tax system, construction safety, consumer and environmental protection as well as cultural or historical concerns. In order to achieve their goals, the Member States have chosen occupational-specific different regulatory measures like, for example, the definition of minimum qualification requirements, training obligations, compulsory insurance, licensing, mandatory memberships in a professional chamber system or even price regulation.

The aim of this research is to provide evidence for the EU internal market to what extend differences in national regulations are actually a barrier to trade in regulated services. To do so, this research ties to existing literature that analyses potential barriers in services trade within a gravity framework. Subject of this paper is cross-border trade in the four main sectors of regulated (or: liberal) professions in Europe; accounting, architectural, engineering or legal services. Apart from the political relevance, this subject seems interesting since other research with a different geographic scope (trade between OECD-countries) suggests a possible link between less uniform or very restrictive professional regulation and a low volume of cross-border trade in the case of many regulated professions (see Nordås and Rouzet 2017, Nordås 2016)). Similar empirical analyses for trade between OECD countries in other service sectors have come to comparable conclusions according to which regulatory heterogeneity has a negative impact

on trade flows (Kox and Lejour, 2005, 2006; Kox and Nordås, 2007). The same applies to empirical analyses of worldwide service trade that include even more countries (van der Marel and Shepherd, 2013).

Most parts of this existing literature refer to the fact that trade within the European internal market - as the most advanced regional integration project in services - is one decisive factor of the finding that more homogeneous regulation can lead to more cross-border trade (see e.g. van der Marel and Shepherd, 2013). It remains unclear, however, to what extent a further harmonisation of still remaining regulatory differences within the already quite widely integrated European single market can lead to even more trade. To fill this gap, the research question of this article is whether the policy implication of existing research according to which further harmonisation may lead to more trade does also hold for intra-EU trade in services.

The results of this research suggest that implications from existing research do not seem to apply without restrictions to intra-EU trade in services - at least not to the professional sectors covered here. The existing literature mentioned above uses sector-specific regulatory indicators, such as the OECD "Services Trade Restrictiveness Index for cross-border trade in services" (OECD-STRI), on the basis of which bilateral measures of regulatory heterogeneity can be computed. However, if the same OECD-STRI is used within a similar framework with a geographic scope of the European internal market, there is no correlation between a higher homogeneity of regulation and more cross-border trade in the respective professional services sectors. Neither is there any correlation between lower, supposedly trade-friendly OECD-STRI index values of the respective trading partners and a higher volume in intra-EU trade in architectural services.

Nevertheless, there are reasonable concerns if the OECD-STRI reflects the relevant level of regulation for intra-EU trade in services in an undistorted manner. This is mainly due to the fact that major subcategories of the OECD-STRI cover aspects that are only relevant in trade with third countries (e.g. questions referring to temporary business visas in the target country). To address this issue, the OCED has recently released an additional version of the STRI ("IntraEEA Services Trade Restrictiveness Index") specifically redesigned for services trade within the European Economic Area (see Benz and Gonzales (2019)). Though, even when

using this additional EEA-STRI regulatory indicator, which has been specifically adapted for intra-European services trade, there is little evidence of positive trade effects from a greater regulatory homogeneity measured on this basis.

However, both variants of the "OECD Services Trade Restrictiveness Index" do not cover aspects that appear to be very relevant for cross-border trade in professional services. As a consequence, this research discusses and applies the regulatory characteristic of a compulsory chamber system in the EU Member States as an alternative measure for regulatory differences. The characteristic of a compulsory chamber system captures the central dividing lines of national professional regulation in the EU between direct state supervision and indirect professional supervision in professional self-administration. If this alternative indicator for the respective country-specific regulatory approach is used, the empirical findings point to some interface problems between the two systems. Trade rates between two countries of which one has a chamber system and the other does not are significantly lower in the sectors of accounting and architectural services. However, for all included professional services sectors, there is no empirical evidence that countries which both have a chamber system trade with each other more or less than countries which both have no chamber system.

This paper is organized as follows. Section 2 describes the general regulatory background of professional services in Europe and discusses national differences in professional regulation as a possible explanation for low trade rates. Section 3 discusses different indicators that attempt to capture these regulatory differences in the Member States and ways to derive measures for regulatory heterogeneity based on these indicators. Section 4 describes the specification of the empirical model, gives an overview of the data, discusses the empirical results and outlines some potential policy implications. Section 5 offers a brief conclusion.

2 Professional regulation as a potential barrier to trade in professional services

At present, cross-border services play only a minor role in all four included professional services sectors. In absolute terms and in relation to the size of domestic sector output, the volume of cross-border trade is lowest in architectural services. Higher exchange rates can be found in the

other sectors considered (accounting, legal and engineering services), but if one compares these rates with the exchange rates of other, barely regulated occupations in the area of business-related services, trade is also much lower here. This section discusses professional regulation itself and national differences in professional regulation as a possible explanation for the rather low level of cross-border trade in these professional services.

2.1 General regulatory background of professional services

The Member States of the EU operate different regulatory systems to achieve a certain quality in the field of professional services. In general, two different regulatory approaches or philosophies can be observed and distinguished: The first system (ex-ante), mainly pursued in continental Europe, reaches guarantee of quality by way of precautionary quality control. The second system (ex-post), mainly pursued in northern and Anglo-Saxon influenced parts of Europe, pursues the idea that quality should be mainly guaranteed by compensating occurred damage. To reach this objective, the liability system must be strict enough so providers are no longer inclined to offer faulty quality. This second approach is also known as a system of subsequent control.

Member States that follow the ex-ante system traditionally feature a higher degree of entry and conduct regulation. In many cases, specific requirements for vocational training and admission to the profession, obligations of further training as well as regulations governing professional practice are put in place. In many cases, compliance with these regulations is monitored by a professional chamber, which is organized in professional self-administration (see Arentz et al. (2017)).

Member States that follow the ex-post system usually regulate by means of a stricter responsibility of the expert that carries out a specific task ”¹ as well as more surveillance of the entire building process.

Despite the diversity of different national rules, the Member States can be grouped based

¹One example for such a stricter responsibility through liability rules form the architectural sector is the deposit of a security that is common in Denmark (all contracts that apply AB92 or ABT93). After conclusion of a contract, the contractor usually deposits a security of 15 percent of the contract volume. After the acceptance of the work, the deposit is paid back in several stages. For more information, see also the database on country-specific regulation of the architectural department of the University of Siegen (in German language only) <http://export.architektur.uni-siegen.de/index.php/europe/9-daenemark>.

on the introduced criteria (ex-ante vs. ex-post regulation), at least to some extent. One main feature of the ex-ante approach of precautionary control is the existence of exclusive rights. These exclusive rights should guarantee that quality-relevant activities are only carried out by registered and approved experts. To provide a task that is defined as exclusive right, a professional has to register at a professional chamber that supervises the specific requirements. Since the destination country principle applies to cross-border services in the EU (see section 1), such registration (which includes the fulfilment of respective national requirements) is required for temporary projects in these countries as well.

In the remaining Member States, theoretically everybody is usually free to offer professional services. The northern Member States such as Sweden, Finland and Denmark often have no specific entry regulation that includes compulsory educational requirements. The United Kingdom and the Netherlands, for example, are somewhat in between. Although not granting specific exclusive rights, these countries grant title protection. In this case a lawyer, architect, accountant or civil engineer usually needs to register at a professional association in order to carry the actual title "architect" and so on. For a registration, these professional associations do have educational requirements that are comparable to the professional chambers in other Member States. At least to some extent, this title protection can be seen as an element of precautionary quality control. The main difference is that more responsibility lays with the consumer as he is free to choose an educated expert with the respective title or not.

The related literature discusses mainly two impact channels, how these differences in regulation can influence cross-border trade (see e.g. Nordås and Rouzet, 2017). On the one hand, the lack of uniform professional regulation itself may be a decisive obstacle to cross-border provision of services. On the other hand, restrictive professional regulation in some Member States may make it difficult to export architectural services to these markets.

2.2 Lack of uniform professional regulation as a barrier to trade

The basic idea of this hypothesis is that regulatory differences raise the cost of servicing the market in another Member State. The decisive factor therefore would not be so much the absolute level of supposedly restrictive regulations but rather their heterogeneity between trading

partners. The following example illustrates the intuition behind this argument: If an architect or accountant from country A has to comply with certain (perhaps restrictive) training or insurance requirements the existence of these regulatory rules should not create an obstacle to export if the target country B has similar requirements. However, if different requirements have to be met for a project in another Member State, this may create an additional obstacle to export. Nordås and Rouzet (2017) provide empirical evidence that this hypothesis could apply to trade between OCED countries based on a pooled regressions that includes a lot of professional services such as accounting, architecture, engineering or legal services besides other services like telecommunication or freight services. In addition, Nordås (2016) reports additional sector specific results for trade between OECD countries which point to a possible link between more homogeneous regulation and more cross-border activities in professional services.

2.3 Restrictive professional regulation itself as a barrier to trade

In contrast to the hypothesis of heterogeneity, this explanatory approach assumes that high regulatory requirements are in themselves a decisive barrier to cross-border service provision. The work of Nordås and Rouzet (2017, 2015) indicates that services trade restrictions are negatively associated with both imports and exports in several services sectors, among them professional services in the field of legal services and accounting”². One explanation for the negative impact on imports is that high regulatory requirements in the target market could increase both the fixed costs of market entry as well as variable costs of servicing that market. One explanation for the negative effect of high regulatory requirements on the export activities of a country may be that restrictive national regulations affect the international competitiveness of that particular sector. Other related empirical studies try to infer the existence of trade cost by comparing observed trade relations in services to an hypothetical free-trade benchmark (e.g. Anderson et al., 2014; Gervais and Jensen, 2013; Guillin, 2013; Miroudot et al., 2013). This draw conclusions about potential influence of (unspecified) regulations that may constitute trade barriers. The main result of these studies is that trade cost seems to play an even bigger

²Due to lack of sector specific data for architectural services in a broad OECD-Setting, architectural and engineering services are only addressed in a pooled regression with other services. (in the Extended Balance of Payments Services Classification (EBOPS), the services of architects are combined with the services of civil engineers, sector code EBOPS 2002, 280).

role in services compared to trade in goods. Methodically, however, these studies do not allow to distinguish between different reasons of these trade costs. For policy implication, though, it seems particularly relevant whether trade barriers exist due to politically adjustable restrictions (professional regulation, free-trade agreements) or due to natural barriers (distance, cultural differences such as language) that can hardly be influenced (for a more detailed classification of this literature see also Nordås and Rouzet (2017, 2015)).

3 Measures for the intensity and homogeneity of professional regulation

This section discusses the OECD "Services Trade Restrictiveness Index Services" (STRI), the just released OECD "IntraEEA Services Trade Restrictiveness Index" (EEA-STRI) as well as the indicator of a compulsory chamber system as possible measures for the scope and intensity of regulation. This is followed by a description of how indicators of heterogeneity can be constructed on the basis of these measures. Additionally, this section contains descriptive statistics on the respective indicators.

3.1 Measures for regulatory intensity

In order to assess the impact of regulation on the cross-border provision of services, the relevant regulation has to be captured accurately in a numeric value. Therefore, a lot of complex aspects of the national regulation have to be transformed into an indicator. The OECD, among others, works on such complex indicators on behalf of its Member States. The OECD recently presented a "Services Trade Restrictiveness Index for cross-border trade in services" (OECD-STRI) with a special focus on regulatory aspects of cross-border trade in services. This new indicator complements the OECD "Indicators of Product Market Regulation", which has been available for some time for professional services and relates exclusively to the respective national occupational regulation.^{3 4}

³For further information on the OECD PMR for professional services, see <http://www.oecd.org/eco/growth/indicatorsofproductmarketregulationhomepage.htm>.

⁴A discussion of the OCED PMR indicator in relation to the architectural profession can be found in Arentz and Recker (2017).

OECD Services Trade Restrictiveness Index (STRI)

The above mentioned studies on cross-border trade in services by Nordås and Rouzet (2017, 2015) and Nordås (2016) are all based on the OECD-STRI. The OECD published the first version of the STRI in 2014. The OECD claims that it is the first comprehensive measure of trade restrictiveness for a large number of services sectors, including the services of regulated professions such as the services of accountants, architects, lawyers or civil-engineers. The STRI regulatory database brings together information from more than 16,000 laws and regulations for 22 services sectors in 40 countries, including 23 EU Member States, that are also members of the OECD. The OECD has compiled the database into the STRI based on a common methodology agreed by the OECD-Members. For each services sector, the database captures country-specific regulatory aspects with a specific focus on cross-border services trade in the following five policy areas:⁵

▷ **Regulation on foreign entry.** The STRI-database captures information on foreign equity restrictions, restriction on the legal form of a business that want to serve a national market, restriction on commercial association between different professionals (Are joint partnerships between lawyers and accountants, or architects and engineers and so on forbidden?), regulation on majority requirements (e.g. Does the majority have to be held by a professional?) and qualification of the manager of a company (May "non-experts" also manage a company, e.g. business managers?) that wants to serve a national market, the question if commercial presence is required in order to provide cross-border services, or conditions on transfer of capital.

▷ **Restrictions on movement of people.** The STRI-database captures information on quotas and/or limitation on duration of stay for the employees of a services-company as well as its possible subcontractors, the questions if a certain nationality or citizenship, or if prior or permanent residency is required to carry out a project in this country, if there are laws or regulations that define a process for recognising qualifications gained abroad, if foreign professionals are re-

⁵A detailed overview of the STRI regulatory database and the methodology of the OECD STRI is given by: Geloso Grosso, M. et al. (2015).

quired to take a local examination to carry out a project in this country, if foreign professionals are required to practice locally for at least one year before they are allowed to serve this market form abroad and if there is a temporary licensing system for the duration of a project is in place.

▷ **Other discriminatory measures.** The STRI-database captures information on how foreign suppliers are treated in comparison to domestic suppliers regarding taxes and eligibility to subsidies, if there is an explicit preference for local suppliers in public procurement, if the rules of public procurement explicitly prohibit discrimination of foreign suppliers, if the procurement process affects the conditions of competition in favour of local firms, the thresholds above which tender is mandated or if the use of foreign firm names is restricted.

▷ **Barriers to competition.** The STRI-database captures information if decisions by the regulatory body can be appealed, if there are mandatory minimum and/or maximum fees that have to be respected by foreign suppliers as well, if there are recommended minimum and/or maximum fees or restrictions on advertising and if there are minimum capital requirements that have to be met by a foreign supplier.

▷ **Regulatory transparency.** The STRI-database mainly captures information if there is a legal obligation to communicate regulations to the public within a reasonable time prior to entry into force, the average visa processing time, the cost to obtain a business visa, the number of documents needed to obtain a business visa, as well as some other aspects that are not directly related to the question of cross-border provision of services such as the number of working days to complete all mandatory procedures to register a company or the number of mandatory procedures to register a company.

The computation of the actual STRI-indices from this regulatory database consists of the following steps in which the OECD scores and assigns weights to the different aspects of regulation. Firstly, all individual policy measures are assigned a score of 0 (not restrictive) or 1 (restrictive). Then average values are generated for each of the five policy areas described

Table 1: Summary Statistics I: measures for regulatory intensity

Variables	Description	Mean	SD	Min	Max
#Acc. STRI _{<i>i</i>}	STRI accounting country <i>i</i>	0.288	0.090	0.101	0.642
#Acc. EEA-STRI _{<i>i</i>}	EEA-STRI acc. country <i>i</i>	0.084	0.019	0.051	0.128
#Acc. STRI _{<i>ij</i>} joint _{<i>w</i>}	Combined STRI acc. trade partners <i>ij</i> (GDP-weighted)	0.306	0.078	0.140	0.638
#Acc. EEA-STRI _{<i>ij</i>} joint _{<i>w</i>}	Combined EEA-STRI acc. trade partners <i>ij</i> (GDP-w.)	0.086	0.016	0.053	0.127
#Acc. chamber _{<i>i</i>}	1 if country <i>i</i> has acc. chamber system	0.704	0.457	0	1
#Acc. chamberpair _{<i>ij</i>}	1 if both trade partners <i>ij</i> have acc. chamber system	0.452	0.498	0	1
#Arc. STRI _{<i>i</i>}	STRI architecture country <i>i</i>	0.285	0.111	0.105	0.567
#Arc. EEA-STRI _{<i>i</i>}	EEA-STRI arc. country <i>i</i>	0.075	0.030	0.032	0.134
#Arc. STRI _{<i>ij</i>} joint _{<i>w</i>}	Combined STRI arc. trade partners <i>ij</i> (GDP-weighted)	0.282	0.083	0.129	0.536
#Arc. EEA-STRI _{<i>ij</i>} joint _{<i>w</i>}	Combined EEA-STRI arc. trade partners <i>ij</i> (GDP-w.)	0.078	0.026	0.033	0.132
#Arc. chamber _{<i>i</i>}	1 if country <i>i</i> has arc. chamber system	0.666	0.472	0	1
#Arc. chamberpair _{<i>ij</i>}	1 if both trade partners <i>ij</i> have arc. chamber system	0.405	0.491	0	1
#Eng. STRI _{<i>i</i>}	STRI engineering country <i>i</i>	0.245	0.105	0.105	0.573
#Eng. EEA-STRI _{<i>i</i>}	EEA-STRI eng. country <i>i</i>	0.044	0.031	0	0.112
#Eng. STRI _{<i>ij</i>} joint _{<i>w</i>}	Combined STRI eng. trade partners <i>ij</i> (GDP-weighted)	0.236	0.073	0.121	0.512
#Eng. EEA-STRI _{<i>ij</i>} joint _{<i>w</i>}	Combined EEA-STRI eng. trade partners <i>ij</i> (GDP-w.)	0.047	0.028	0	0.108
#Eng. chamber _{<i>i</i>}	1 if country <i>i</i> has eng. chamber system	0.500	0.500	0	1
#Eng. chamberpair _{<i>ij</i>}	1 if both trade partners <i>ij</i> have eng. chamber system	0.206	0.405	0	1
#Leg. STRI _{<i>i</i>}	STRI legal country <i>i</i>	0.409	0.242	0.078	1
#Leg. EEA-STRI _{<i>i</i>}	EEA-STRI leg. country <i>i</i>	0.082	0.035	0.013	0.151
#Leg. STRI _{<i>ij</i>} joint _{<i>w</i>}	Combined STRI leg. trade partners <i>ij</i> (GDP-weighted)	0.285	0.111	0.015	1
#Leg. EEA-STRI _{<i>ij</i>} joint _{<i>w</i>}	Combined EEA-STRI leg. trade partners <i>ij</i> (GDP-w.)	0.080	0.027	0.014	0.148
#Leg. chamber _{<i>i</i>}	1 if country <i>i</i> has chamber system	0.852	0.355	0	1
#Leg. chamberpair _{<i>ij</i>}	1 if both trade partners <i>ij</i> have leg. chamber system	0.669	0.471	0	1

(1) No. observation STRI-based country *i* scores: 69 (EU23 and OECD members 2014-2016)

(1) No. observation STRI-based country-pair_{*ij*} scores: 1518 (EU23 and OECD country-pairs 2014-2016)

(2) No. observation chamber-system-based country *i* scores: 84 (EU28 members 2014-2016)

(4) No. observation chamber-system-based country-pair_{*ij*} scores: 2268: (EU28 country-pairs 2014-2016)

above. All measures in each of the five areas are assigned the same weight. In the last step, a common value from all five areas is created. To do so, the five policy areas are weighted according to their relative importance. The weights are the result of an expert consultation process for every sector. Thus, the same policy area could take a different weight in different sectors. For the four sectors of regulated professions considered here, however, the weights are very similar. For all these professional services, the OECD weights the policy areas “Restrictions on foreign entry” (around 40 percent) and “Restrictions to movement of people” (around 35 percent) much more strongly than the other areas. The areas of “Regulatory transparency”, “Barriers to competition” and “Other discriminatory measures” therefore play only a very minor role in the resulting overall indices. These resulting, sector specific, final indices can then take values between zero and one, where lower values should reflect regulation with fewer barriers to trade. Table 1 provides some summary statistics of the STRIs for the sectors of interest, accounting, architecture, engineering and legal services (see $\# \text{ *STRI}_i$). Among all sectors, the variation between the Member States is quite large. An illustrative ranking of the Member States by STRI can be found in figure 1 for the architecture sector and in the appendix for the other three sectors (see figures 4, 5 and 6).

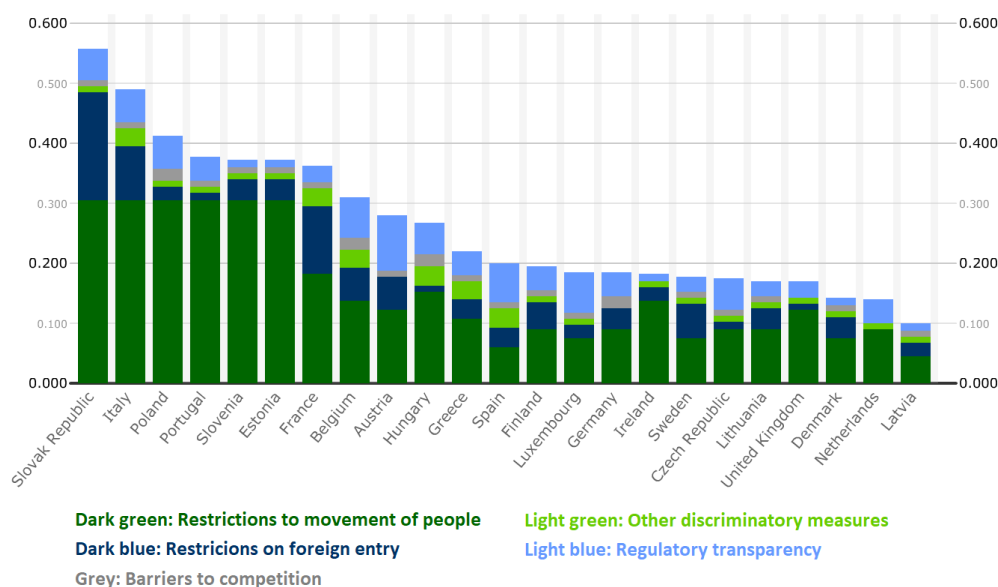
Shortcomings of the STRI for Intra-EU trade and new EEA-STRI

In principle, the STRIs cover a lot of relevant aspects of cross-border provision of professional services. Methodically problematic, however, is the fact that major parts of the captured regulation do not apply for Intra-EU trade due to the rules of the EU-internal market. For example, the fundamental freedom of free movement of workers excludes some of the possible restrictions that are covered in the section “Restrictions on movement of people”, mainly in questions of quotas or limitation on duration of stay for employees from other Member States. As a result, major parts of the captured regulation do only apply to trade with third countries outside the European Economic Area, nevertheless, they are included in the respective STRIs.

Figure 1 also shows how the final indices are composed of the respective subcategories in the case of the STRI for architectural services (figures 4, 5 and 6 of the other sectors in appendix, see above). In the case of all four professions of interest, the greatest absolute differences

in the respective country-specific total scores result from different valuations in the area of “Restrictions to movement of people”. This is, of course, partly due to the fact that this area is clearly more strongly weighted, among the area of “Restrictions on foreign entry. More importantly, this weighting raises some questions in the application of the aggregated STRI values to intra-European trade relations. At least, when interpreting existing research based on the STRI one must keep in mind that the greatest differences in national scores stem from a category, which has little impact on trade in services in the single market due to the freedom of movement of people in the EU. And since 25 out of 36 Members States of the OECD are also Member States of the EU or associated partners of the European internal market, trade relations between these 25 states do also play a major role in research settings that address trade between all OECD-Members and rely on the STRI. ⁶

Figure 1: OECD Services Trade Restrictiveness Index for cross-border trade in architectural services, year 2016



Source: OECD, Services Trade Restrictiveness Index, generated via STRI-database, Online access to the database <https://stats.oecd.org/Index.aspx?DataSetCode=STRI>

⁶To be clear: Nordås and Rouzet (2017) of course mentioned that the OECD-STRI might not be a perfect fit for intra-European trade.

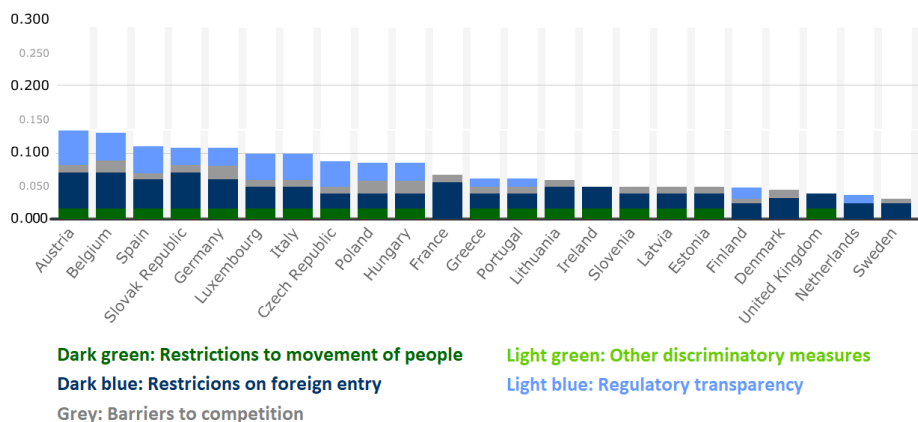
It is worth to mention that the other categories also contain a lot of regulations that should not apply to intra-European trade. The "free movement of capital" excludes some restrictions that are covered in the section "Regulation on foreign entry" of the OECD database. The EU state aid law should prevent some of the discriminatory elements for professional from another Member State that are covered in the section "Other discriminatory measures" - even if very restrictive regulations towards third countries could also indicate an implicit discrimination against EU providers. In addition, professional from other Member States are not bound by mandatory minimum and/or maximum fees captured on the section "Barriers to competition" if they do not have their office in the target country and only export services there (for example, the mandatory fees for architects and engineers in Germany). The section "Regulatory transparency" also covers aspects that seems to be not very important for intra-European trade, e.g. the processing time for business visas. However, long processing times in this area may also indicate longer processing times for other relevant applications for intra-European trade such as the recognition of qualification, building applications and so on.

For example, the fundamental freedom of free movement of workers excludes some of the possible restrictions that are covered in the section "Restrictions on movement of people", mainly in questions of quotas or limitation on duration of stay for employees from other Member States. The free movement of capital in the internal market excludes some restrictions that are covered in the section "Regulation on foreign entry" of the OECD database. However, regulations that do not affect intra-European trade are also included in the less strongly weighted categories of STRI. The EU state aid law should prevent some of the discriminatory elements for architects from another Member State that are covered in the section "Other discriminatory measures" - even if very restrictive regulations towards third countries could also indicate an implicit discrimination against EU providers. In addition, architects from other Member States are not bound by mandatory minimum and/or maximum fees captured on the section "Barriers to competition" such as the HOAI in Germany if they do not have their office in the target country and only export architectural services there. The section "Regulatory transparency" also covers aspects that do not seem to be very important for intra-European trade, e.g. the processing time for business visas. However, long processing times in this area may also indicate

longer processing times for other relevant applications for intra-European trade in architectural services such as the recognition of qualification or building applications.

In early 2019, the OECD published an additional version of the STRI to address these shortcomings. The so-called Intra-EEA Services Trade Restrictiveness Index (Intra-EEA STRI) follows the same methodology as the original STRI, however, the captured national regulations have been corrected for all those rules that do not play a role in intra-European trade. The OECD draws on both national and European legal sources for the compilation of this new Intra-EEA STRI. Benz and Gonzales (2019) provide a detailed overview of the construction of this new indicator. As expected, the total indicator values as well as the variation between the Member States are much smaller for all four professions of interest (see $\#^*EEA-STRI_i$ in the summary statistics in table 1). Again, an illustrative ranking of the Member States according to the new EEA-STRI can be found in figure 2 for the architecture sector and in the Appendix for the other three sectors (see figures 7, 8 and 9).

Figure 2: OECD IntraEEA Services Trade Restrictiveness Index for cross-border trade in architectural services, year 2016



Source: OECD, IntraEEA Services Trade Restrictiveness Index, generated via IntraEEA STRI-database, Online access to the database https://stats.oecd.org/Index.aspx?DataSetCode=STRI_INTRAEEA

Mandatory chamber system as alternative indicator

Both variants of the "OECD Services Trade Restrictiveness Index" do not cover aspects that appear to be very relevant for cross-border trade in professional services - mainly in the area of exclusive rights that allow certain tasks to be performed only by appropriately trained and registered experts. Instead of a different composite measure⁷, I suggest the binary indicator of a mandatory chamber system. The strength of this indicator is that it captures the main relevant regulatory differences between the Member States of the EU when it comes to professional services such as architectural services.

As outlined in section 2.1, the Member States of the European Single Market can be divided into two fundamentally different regulatory philosophies. Some part of the Member States have transferred central aspects of quality assurance from state administration to a professional chamber system. These countries try to ensure the desired minimum quality level through education requirements and further training combined with these exclusive professional rights. The monitoring itself is organized within this framework of professional self-administration in a mandatory chamber system. Other Member States follow a different approach and organize central aspects of quality control by a model consumer protection and other aspects of public interest are not primarily ruled by preventive provisions against abuse or improper performance, but a more 'compensatory' model which means to guarantee consumer protection mainly by way of liability mechanisms. This approach is often accompanied by stronger direct state control. For example, the statics of construction projects in countries without a chamber system are usually not prepared and approved by self-employed professional civil engineers, but by civil engineers employed by the state.⁸

Trade to Member States with a chamber system that monitors exclusive professional rights could be more difficult insofar as a temporary membership in the respective chamber and compliance with the respective national requirements is necessary for each project. However, it

⁷A possible alternative indicator would be the OECD indicator for sector regulation in professional services (OECD-PMR). However, this indicator, which is composed of many individual categories that are weighted equally at the end, is also associated with methodological weaknesses. For a detailed discussion of the strengths and weaknesses of the OECD-PRM-indicators for professional services see Arentz and Recker (2017).

⁸For additional background information on the two different regulatory philosophies in Europe, see Arentz, Recker, Michel, Pommerening, Rieger (2017).

would be expected that the four services examined here would be affected to different degrees by such a hurdle. This is due to the fact that even in countries with a chamber system for certain sectors, not all fields of activity of a profession fall under exclusive rights: In the case of architectural services, almost all areas of activity are usually covered by exclusive professional rights, including building designs, the preparation of construction plans and various consulting activities. As a rule, only the activities of interior and landscape architects are exempt from exclusive occupational rights. In the case of engineering services, a larger share of activities do not fall under exclusive professional rights and are therefore not subject to a chamber compulsion. In a lot of Member States exclusive professional rights only exist for the work of civil engineers. Engineering development services for companies, however, are usually excluded. In the case of accounting services, most core areas of the profession again fell under exclusive professional rights in countries with a chamber system, including the examination of accounts and certification of their accuracy and the preparation of personal and business income tax returns. In the area of legal services, however, important services are usually excluded from exclusive professional rights: While a membership in a local chamber is usually required for advice and representation in civil or criminal cases, such a local membership is not required for the whole area of (extra-judicial) legal consulting, for example in the area of merger and acquisition.⁹

Even though not all fields of activity of the professions fall under chamber obligation (in Member States that run a chamber system), the inclusion of this criterion appears interesting both for studying the trade effects of the homogeneity of regulation and for studying the trade effects of intensity of regulation.¹⁰ On the one hand, interface problems between both systems are quite likely (e.g. recognition of mandatory training requirements in a state with ex-ante regulation that are not embedded in the ex-post system). On the other hand, the high

⁹A detailed overview of the respective national sector-specific occupational regulations and exclusive tasks can be found in the Calp-database (Comparative Analyses of Liberal Profession) of the European Center for Liberal professions <https://calp.uni-koeln.de/> as well as in Henssler et al. (2013).

¹⁰The problem of demarcation also exists, of course, in the case of the OECD indicators: as a rule, the professional regulation covered there (e.g. price regulation) applies equally only to those fields of activity that fall under specific regulation. The trade statistics, like almost all other official statistics, however, do not allow for an even more precise delimitation of the different activities of each of the profession, e.g. a further subdivision into the services of civil engineers and consulting engineers.

requirements for professional registration and exercise of the profession in Member States with a mandatory chamber system itself may constitute as a barrier to trade.

Information about the existence of a binding chamber system in each sector can be taken, for example, from the database of the OECD Product Market Regulation Indicator (PMR). Table 1 provides some summary statics for the indicator of a mandatory chamber system (see $\#*chamber_i$). In the area of legal, accounting and architectural services, the majority of Member States have implemented a mandatory chamber system. In the field of engineering services, at least half of the Member States do not have such an obligatory system.

3.2 Measures for regulatory heterogeneity

Based on the regulatory database described above, one can construct indicators for the homogeneity of the national regulations in the respective sectors. In order to ensure the comparability of the empirical results of existing research, the identical method as in Nordås and Rouzet (2017) and Nordås (2015) is used.

The underlying concept of an indicator for regulatory heterogeneity is to compare countries pairwise (respective trade partner) for each relevant regulatory measure in the sectors of interest. If both Member States have the same regulation, heterogeneity equals zero for this measure. If the two countries have a different regulation, it equals one. The necessary information about the regulation in the countries of interest stems from the OECD database for the STRI respectively the intra-EEA STRI.

The scores on individual measures are then combined in an overall heterogeneity score. Within the five policy areas described above, the mean of the respective scores is calculated; across policy areas, the same weights as for the STRI respectively EEA-STRI are used. Just like the STRI and EEA-STRI, the regulatory heterogeneity index takes on values between zero and one. If two Member States have the same entry on all regulatory measures in the database, their bilateral heterogeneity index is zero; if they have different answers on all measures, their heterogeneity index is one. It does not matter whether the answers imply a trade restriction or not. A hypothetical country pair where both Member States are completely closed to foreign trade may have a heterogeneity index of zero.

Nordås and Rouzet (2017) and Nordås (2015) use two slightly different versions of a heterogeneity index (answer and score based). Although closely related, the two methodologies are not the same. Differences can occur if no binary answers are stored in the database for a measure (e.g. is there any price regulation, yes or no), but continuous variables are queried (e.g. how many working days does a visa application take?). In the latter case, it is less likely that two Member States in a country pair reported exactly the same number of days. For better comparability, the OECD has assigned scores to such continuous variables, each of which describes a specific range (e.g. 0-5 days: score of zero, 5-8 days, score of one, etc.). With the score based variant of the heterogeneity index, one only checks whether both Member States have the same score for such continuous variables. With the answer based variant, one would compare the exact answers. The score based procedure leads, as expected, to slightly lower index values (e.g. a little less heterogeneity between the country specific regulations). For this research I am working with the score-based indicator because the answer-based version artificially constructs differences in places that in my opinion cannot be described as relevant differences of interest.

Table 2: Summary Statistics II: measures for regulatory heterogeneity

Variables	Description	Mean	Std.Dev.	Min	Max
#Acc. STRI _{ij} het	reg. heterogeneity <i>ij</i> accounting (score-based STRI)	0.240	0.081	0.045	0.537
#Acc. EEA-STRI _{ij} het	reg. heterogeneity <i>ij</i> acc. (score based EEA-STRI)	0.043	0.023	0	0.109
#Acc. chamber _{ij} het	reg. heterogeneity <i>ij</i> acc. chamber (1=heterogeneous)	0.474	0.499	0	1
#Arc. STRI _{ij} het	reg. heterogeneity <i>ij</i> architecture (score-based STRI)	0.274	0.095	0.011	0.511
#Arc. EEA-STRI _{ij} het	reg. heterogeneity <i>ij</i> arc. (score based EEA-STRI)	0.055	0.025	0	0.139
#Arc. chamber _{ij} het	reg. heterogeneity <i>ij</i> arc. chamber (1=heterogeneous)	0.500	0.501	0	1
#Eng. STRI _{ij} het	reg. heterogeneity <i>ij</i> engineering (score-based STRI)	0.254	0.098	0.037	0.534
#Eng. EEA-STRI _{ij} het	reg. heterogeneity <i>ij</i> eng. (score based EEA-STRI)	0.051	0.026	0	0.132
#Eng. chamber _{ij} het	reg. heterogeneity <i>ij</i> eng. chamber (1=heterogeneous)	0.587	0.492	0	1
#Leg. STRI _{ij} het	reg. heterogeneity <i>ij</i> legal (score-based STRI)	0.395	0.166	0	0.874
#Leg. EEA-STRI _{ij} het	reg. heterogeneity <i>ij</i> leg. (score based EEA-STRI)	0.094	0.037	0.007	0.195
#Leg. chamber _{ij} het	reg. heterogeneity <i>ij</i> leg. chamber (1=heterogeneous)	0.315	0.465	0	1

(1) No. observation OECD-STRI-based heterogeneity-scores: 1518 (EU23 and OECD country-pairs 2014-2016)

(2) No. observation chamber-system heterogeneity-scores: 2268 (EU28 country-pairs 2014-2016)

As discussed above, I also use a measure based on the existence of mandatory chamber system in the respective country. With the same logic as with the STRI, this additional indicator

is also zero (no heterogeneity) if both Member States in a country pair have either a chamber system or have both have no chamber system. If a chamber system exists in just one Member State this binary indicator has the value 1.

Table 2 provides summary statistics for the different measures for regulatory heterogeneity. As expected, the measures based on the intra-European STRI (see $\#*EEA-STRI_{ij}$ het) lead to way smaller scores and less variance across the Member States compared to the measure based on the original version of the STRI (see $\#*STRI_{ij}$ het). When it comes to the indicator of the chamber system (see $\#*chamber_{ij}$ het), the heterogeneity across Member States is lowest in legal services as most countries in Europe regulate this profession via exclusive rights under supervision of a chamber.

4 Empirical analysis

The aim of the empirical analysis is to investigate at first whether regulatory heterogeneity – measured by the heterogeneity scores constructed from the OECD’s STRI or the alternative indicator based on the regulatory characteristic of the mandatory chamber system – have an impact on the cross-border provision of architectural services within the European Union. In a second step, I address the question whether the absolute level of regulation has an impact. For this second analysis, I use again both the OECD STRI and the characteristic of the mandatory chamber system as measures for regulatory intensity.

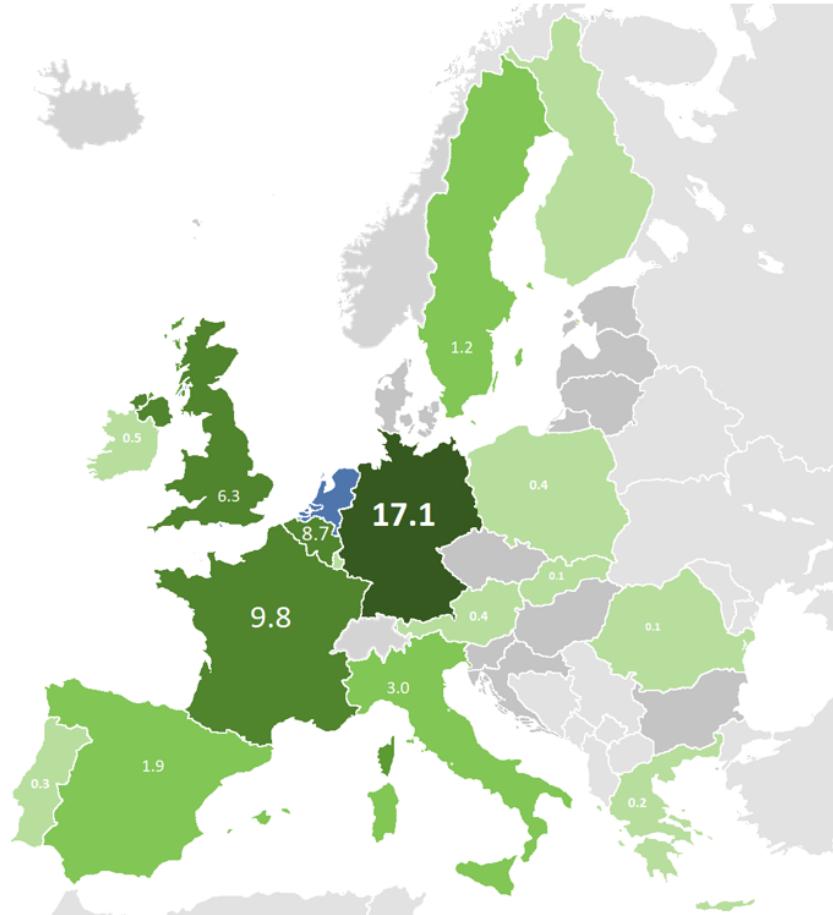
(insert some remarks regarding structure of this section)

4.1 Advantages of the gravity approach in regard to the research question

This research follows the related literature and uses a gravity model to assess the impact of regulatory heterogeneity on intra-European trade flows in accounting, architectural, engineering and legal services. The idea behind the underlying gravity equation is that the size of the two trading countries (often measured in terms of GDP) and the distance between the two trading countries can explain international trade very well. Although firstly developed by Tinbergen (1962) to describe trade of goods, the model can as well accurately predict trade flows between

countries for services.¹¹

Figure 3: Illustration of the gravity approach: Dutch exports of architectural services, export volume in million Euro, year 2015



Source: Source: Eurostat: “International trade in services (since 2010) (BPM6)”, Sector architectural activities NACE M711. No export data to Denmark, Croatia and Czech Republic. Basic map form Europe under free public Wikimedia Commons licensing.

Within such a calibrated base model, it can now be tested whether other influencing factors such as cultural (e.g. same language) or regulatory differences have an additional impact on cross-border service trade. The advantage of the gravity method lies in the fact that politically controlled barriers to trade can be investigated in a targeted manner and detached from other

¹¹I would like to refer here to the work carried out by Kimura and Lee (2006) or Head et al. (2009), who extensively examined and documented the transferability of the model to services trade.

(natural) conditions, which also have an expected influence on the cross-border trade volume. For such an analysis within the gravity framework, however, appropriate measures for the regulations to be investigated are required - which can, though, be subject to methodological difficulties (see previous section 3).

Figure 3 illustrates the basic concept of the gravity approach and gives a first insight into potential explanatory power of the model assumptions for the application case of trade in professional services. This map shows Netherlands' exports of architectural services to different European trading partners in the year 2015. The influence of the two central explanatory variables of the gravity equation (distance and size of the trading partner in terms of GDP) is obvious: Trade with direct neighbours such as Belgium and Germany as well as trade with larger economies such as Italy or Spain, even though they are not very close, appears to be larger in volume. When comparing the volume of exports to the neighbouring countries of Belgium and Germany, it becomes also very clear that the combination of proximity and the size of the neighbouring country plays a decisive role in the explanatory approach of the gravity equation.

4.2 Trade and structural data

For the empirical analysis, I use data on 23 EU Member States that are also members of the OECD for the period 2014-2016. The OECD trade restrictiveness index (STRI) and the OECD Intra-EEA trade restrictiveness index (EEA-STRI) are available for the period 2014-2018 only for these 23 EU Member States. Together with the currently available trade data (2010-2016), this results in a period of three years (2014-2016) for the empirical analysis based on both OECD indicators. The analyses based on the alternative measure of the chamber system includes all 28 EU Member States of for the same time period.

Data basis for the sector trade data are Eurostat "International Trade in Services data" for the accounting (BOPS2010 sector SJ212), architectural (SJ311), engineering (SJ312) and legal services sector (SJ211). While the data available from Eurostat are quite extensive, there are still missing observations. Bilateral trade data between all 28 EU Member States for three years includes $n(n-1)3 = 2268$ observations for each sector. For the analysis, I use trade flows

reported by exporters where available. Where exports are missing, I use mirror flows reported by the respective importer. By using this method, one can reduce the share of missing values to 8 to 19 percent, depending on the sector. (see table 3 for information on missing and zero trade flows in our data). This substitution is not perfect because of slight asymmetric trade data. Exports from i to j reported by i often do not match exactly imports from i to j reported by j. This may be due to differences between the countries' systems of reporting. Still, this method is widespread and recognized in the literature and allows to at least approximate trade flows where observations would otherwise be missing. Where zero trade flows are reported, some authors decide to treat them as missing values. However, very low and even zero trade flows seem plausible for the professional services in question. Therefore, I treat zero observations, as such. In line with the general assumption of the gravity approach, these zero trade flows occur mainly in trade between smaller, non-neighbouring Member States.

Table 3: Missing and zero observations in regulated professions trade data

	No. missing		share missing		No. zero		share zero	
	reported	incl. mirror	reported	incl. mirror	reported	incl. mirror	reported	incl. mirror
Acc. imports	672	171	0.30	0.08	469	437	0.21	0.19
Acc. exports	659	171	0.29	0.08	423	437	0.19	0.19
Arc. imports	988	423	0.44	0.19	856	1175	0.38	0.52
Arc. exports	1021	423	0.45	0.19	853	1175	0.38	0.52
Eng. imports	834	298	0.37	0.13	506	544	0.22	0.24
Eng. exports	852	298	0.36	0.13	464	544	0.20	0.24
Leg. imports	650	171	0.29	0.08	541	503	0.24	0.22
Leg. exports	652	171	0.29	0.08	522	503	0.23	0.22

(1) No. observation for bilateral trade for each sector: 2268 (EU28 country-pairs 2014-2016)

In addition, I use data on distance, language and common legal systems from the CEPII distance and gravity data sets. Sectoral production data are taken from Eurostat, country GDP from the World Bank World Development Indicators¹².

Average cross-border provision of professional services is by far the lowest for architectural

¹²I use this GDP-data instead of data from Eurostat because the OECD also uses this data for GDP-weighted heterogeneity variables.

services. The average national exports to one other EU-Member State have an annual volume of just under one million Euro (see $\#Arc. \text{ exports}_i$). In part, this may be due to the fact that the respective domestic architectural sectors are also smaller than the other sectors considered (see $\#*sectorGDP_i$). But also in relation to the volume of the respective national sectors, exports in architectural services account for a much smaller share. In absolute terms, export rates are highest in the field of engineering services. In relation to the size of the respective national sectors, export rates are highest for engineering and accounting services.

As measures of regulation and regulatory heterogeneity, I use the OECD's STRI and EEA-STRi scores and regulatory heterogeneity measures constructed from the STRi data, as discussed in corresponding chapter 3. I also use information on compulsory national chamber systems from the OECD Product Market Regulation Indicator (PMR). For summary statistics of the respective regulatory variables, see tables 1 and 2.

Table 4: Summary Statistics III: Trade and structural data

Variables	Description	Mean	Std.Dev.	Min	Max
$\#Acc. \text{ exports}_{ij}$	country i 's annual accounting exports to j (million Euro)	9.5	29.2	0	326.6
$\#Acc. \text{ sectorGDP}_i$	country i 's annual acc. sector production (million Euro)	5,500.0	8,426.0	135.5	3,3464.3
$\#Arc. \text{ exports}_{ij}$	country i 's annual architectural exports to j (million Euro)	0.7	2.7	0	50.5
$\#Arc. \text{ sectorGDP}_i$	country i 's annual arc. sector production (million Euro)	1,682.4	2,683.0	31.8	10,195.0
$\#Eng. \text{ exports}_{ij}$	country i 's annual engineering exports to j (million Euro)	19.5	71.5	0	1,000.0
$\#Eng. \text{ sectorGDP}_i$	country i 's annual eng. sector production (million Euro)	10,130.4	16,063.3	40.5	62,105.3
$\#Leg. \text{ exports}_{ij}$	country i 's annual legal exports to j (million Euro)	7.0	28.9	0	519.3
$\#Leg. \text{ sectorGDP}_i$	country i 's annual leg. sector production (million Euro)	5,493.9	9,423.5	4.2	44,473.2
$\#distance_{ij}$	distance between ij in km (population-weighted, km)	1,418.4	724.8	160.9	3,779.7
$\#\ln(distance)_{ij}$	Log distance ij (population-weighted, km)	7.105	0.594	5.081	8.237
$\#\ln(GDP)_i$	Log country i 's annual GDP (current US-Dollar)	26.052	1.557	23.082	28.990
$\#comlang_{ij}$	1 for common official language ij	0.037	0.189	0	1
$\#comlang \text{ ethno}_{ij}$	1 if language is spoken by >9 percent in both countries ij	0.034	0.182	0	1
$\#comlegal_{ij}$	1 for common legal origin ij	0.307	0.461	0	1

(1) No. observation country- i -specific data: 84 (EU28 members 2014-2016)

(2) No. observation country-pair $_{ij}$ data: 2268 (EU28 country-pairs 2014-2016)

4.3 Specification of the empirical model

To estimate the potential effects of heterogeneous national occupational regulation within the gravity framework, I use Poisson Pseudo Maximum Likelihood estimation as supposed by Santos Silva and Tenreyro (2006), which allows to include zero trade flows in the analysis. This is useful because the data set contains a decent amount of zero trade flows, mainly between smaller, non-neighbouring Member States. The baseline regression model for each sector of interest is given as

$$\begin{aligned} sector*exports_{ij,t} = \exp[(\beta_0 + \beta_1 \ln(distance_{ij,t}) + \beta_2 heterogeneity_{ij,t} \\ + \gamma Z_{ij,t} + \varphi_{i,t} + \mu_{j,t}] + \epsilon_{ij,t} \end{aligned} \quad (1)$$

where the dependent variable $sector*exports_{ij,t}$ is the value of cross-border exports in the respective services sectors from country i to country j at time t . The variable $\ln(distance_{ij,t})$ is the log distance between countries i and j . The variable $heterogeneity_{ij,t}$ captures the measures for regulatory differences of interest for two trading partners i and j at time t . The vector $Z_{ij,t}$ stores additional similarities of two trading partners i and j which may provide a further explanation for the bilateral trade volume because they could facilitate trade or the conclusion of contracts (e.g. common language or common legal tradition in the dimensions of civil or common law). $\varphi_{i,t}$ is an exporter-year fixed effect, $\mu_{j,t}$ is an importer-year fixed effect and $\epsilon_{ij,t}$ is the error term.

While the distance, the regulatory heterogeneity or additional factors such as language are factors that apply or do not apply equally to both trading partners, it is obvious that country-specific factors such as GDP or the size of the respective national professional services sectors also influence cross-border trade. Therefore, we follow the current literature in the field of gravity trade analysis and work with country-year fixed effects, which should capture such country-specific features for the respective years of analysis. In addition, these fixed effects should also capture other relevant country-specific characteristics in the field of cross-border provision of professional services, such as difficult national building regulation, cumbersome building permits procedures or requirements for tax accounts, and so on.

For undistorted results, these country-specific fixed effects are also necessary because the

Member States are likely to have different trading opportunities with third countries outside the EU. When exporting professional services such as engineering services or architectural services, existing connections to former colonies or good trade relations of the respective country, e.g. in the Arab region, can also play a relevant role. In the peripheral countries of the European Union, trade relations with neighbouring countries outside the EU can play a more important role. Furthermore, in the model variants based on the regulatory indicators of the OECD, not all Member States of the EU can be taken into account because a few Member States are not yet members of the OECD and no corresponding indicators are available. However, trade with these excluded EU Members also plays a different role for the included states. In the trade literature, these country-specific outside-options are discussed under the terminology of outward and inward multilateral resistance.

Methodological problems arise, however, when evaluating the influence of country-specific regulation within the framework of a gravity model. This can be of importance, for example, if one is also interested in the influence of different regulatory levels or intensities on bilateral trade. If one would include country-specific variables like the country-specific index value of the OECD-STRI as regulatory indicators in such a model, one would not be able to work with country fixed effects. A somewhat messy solution in this case would be to use additional country-specific control variables such as national GDP or sector GDP instead, which have an expected effect and which would otherwise be captured by the fixed effects. However, unless one controls all (even unknown) relevant country-specific conditions, there is always the risk that the unilateral variables taken into account in the model are overestimated. This would be a particular problem if the model would overestimate the relevance of the target variable of interest, for example, the respective national regulatory level.

If one does not want to work without fixed effects for these reasons, one solution is to use bilateral variables for the different regulatory intensities as well. In order to additionally assess the possible influence of regulatory intensity in this research, I work with such bilateral indicators for the regulatory level. Such weighted average indicators can then be used, for example, to check whether two supposedly highly regulated trading partners (with a high joint score in the respective regulatory indicator) trade significantly less. In the same logic, it can be

examined whether the existence of a chamber system is a trade barrier and whether Member States with a chamber system trade less between themselves than pairs of countries where only one or no trading partner chooses this regulatory approach. In the model, these bilateral variables for the regulation level can be used instead of the bilateral variables that capture the heterogeneity of regulation.

4.4 Results

In contrast to related research mentioned above, I find no robust empirical connection between a higher homogeneity of regulation and more intra-EU cross-border trade of accounting, architectural, engineering or legal services if the original OECD-STRI-indicators are used as a measure for homogeneity of national regulations. Nor do I find any robust correlation between lower OECD-STRI values of the respective trading partners and higher trading volumes in intra-European trading of professional services.

Table 5: Results I: Impact of regulatory heterogeneity / OECD STRI / PPML

	Accounting	Architecture	Engineering	Legal
$\# \ln(\text{distance})_{ij}$	-0.345* (0.158)	-1.361*** (0.154)	-0.701*** (0.159)	-0.542*** (0.128)
$\# \text{comlanguage}_{ij}$	0.122 (0.235)	0.831** (0.297)	-0.098 (0.267)	0.397 (0.210)
$\# \text{comlegal}_{ij}$	0.300* (0.120)	0.371* (0.149)	0.623*** (0.178)	0.172 (0.131)
$\# \text{STRI}_{ij} \text{ het}$	-1.401 (1.039)	0.664 (1.164)	-1.670 (0.901)	-0.445 (0.294)
Importer-year fixed effects	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Exporter-year fixed effects	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Geographic scope	EU+OECD MS	EU+OECD MS	EU+OECD MS	EU+OECD MS
Observations	1398	1249	1353	1395
Pseudo R-squared	0.854	0.675	0.889	0.918

(1) Dependent variable: value of cross-border exports from country i to country j at time t .

(2) Robust standard errors clustered by country-pair ij in round brackets

(3) pseudo-maximum likelihood estimator, country-year fixed effects

(4) ***, ** and * denote statistical significance at at 0.1, 1 and 5 percent levels, respectively.

These findings remain largely valid even if the updated version of the OECD-STRI specially adapted for intra-European trade is used. In this case, there are only slight indications

that regulatory differences could be an obstacle to trade in engineering services. However, if the existence of a chamber system is used as an indicator for the respective country-specific regulatory approach, the empirical findings may point to some interface problems between the two systems in some sectors. Trade between two countries that differ on this characteristic is somewhat lower in accounting and architectural services. However, there is no empirical evidence that countries with a chamber system trade with each other more or less than countries without a chamber system. This tends to indicate that none of the two historically evolved regulatory approaches in the EU seems superior in principle in the case of cross-border provision of professional services.

Table 5 reports the empirical results for the model based on the original OECD-STRI. For each professional services sector, the results show no significant relationship between regulatory heterogeneity in terms of the OECD-STRI and cross-boarder services trade among the 23 EU countries in our sample.¹³ The connection between more homogeneous regulation and higher trade, which Nordås and Rouzet (2015) and Nordås and Rouzet (2017) find in their analysis of trade between OCED countries for several services sectors, thus would not be apparent for intra-EU trade in architectural services. In part, this may be due to the fact that the results of these existing studies are mainly driven by the higher volume of trade between the comparatively homogeneously regulated Member States of the EU (compared with country pairs outside the EU or inside and outside the EU). In this case, it would not be unlikely that further homogeneity would not have additional positive trade effects. However, since the original OECD-STRI is not a particularly suitable measure for the actual level of regulation intra-European trade for the reasons explained in this article (see section 3), the results from this variant of the model should be taken with caution. The lack of correlation may also be due to the fact that this regulatory indicator simply does not cover the relevant regulation for trade in Europe.

Therefore, the results of the model variant based on the modified Intra-EEA STRI reported in table 6 appear more interesting. However, even in this case there is little evidence that more heterogeneous regulation has negative trade effects in intra-European trade. An exception

¹³These findings remain unchanged even if the requirement for statistical significance is reduced to a 10 percent level, as sometimes reported in related research.

Table 6: Results II: Impact of regulatory heterogeneity / OECD EEA-STRI / PPML

	Accounting	Architecture	Engineering	Legal
$\# \ln(\text{distance})_{ij}$	-0.306* (0.149)	-1.329*** (0.152)	-0.675*** (0.168)	-0.546*** (0.127)
$\# \text{comlanguage}_{ij}$	0.162 (0.259)	0.746** (0.322)	-0.126 (0.265)	0.408 (0.217)
$\# \text{comlegal}_{ij}$	0.343** (0.120)	0.275 (0.144)	0.626*** (0.178)	0.150 (0.135)
$\# \text{EEA-STRI}_{ij}$ het	1.124 (4.294)	-7.537 (3.866)	-5.260* (2.616)	-2.045 (1.932)
Importer-year fixed effects	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Exporter-year fixed effects	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Geographic scope	EU+OECD MS	EU+OECD MS	EU+OECD MS	EU+OECD MS
Observations	1398	1249	1353	1395
Pseudo R-squared	0.854	0.675	0.889	0.918

- (1) Dependent variable: value of cross-border exports from country i to country j at time t .
(2) Robust standard errors clustered by country-pair ij in round brackets
(3) pseudo-maximum likelihood estimator, country-year fixed effects
(4) ***, ** and * denote statistical significance at 0.1, 1 and 5 percent levels, respectively.

might be engineering services, where is slight indication for negative trade effects.¹⁴ In line with the gravity literature, there is a strongly significant negative relationship between professional services trade and distance while a common legal origin (civil law and common law) appear to have a positive effect on trade at least in some sectors.

The slight positive influence of the same legal origin is not entirely surprising in the context of the also slightly positive effect of the same regulatory system as measured by the criterion of a chamber system. There are overlaps between the two categories, as more Member States in the tradition of a civil law use chamber systems to regulate professional services. Table 7 reports the empirical results for the model based on the regulatory indicator of a chamber system. In the case of accounting and architecture services, there might be some interface problems between the two different regulatory systems.¹⁵ It is, however, not unlikely that interface problems occur in these two sectors, provided that in these sectors the majority of (tradable) services in

¹⁴If the requirement for statistical significance is reduced to a 10 percent level, there would be hints to negative trade effects of heterogeneous national regulation in architectural services as well.

¹⁵To check the robustness of these finding, the model was also estimated without the control-variable of a common legal origin. The findings do not change in this case.

countries with a chamber system are subject to exclusive professional rights.

Table 7: Results III: Impact of regulatory heterogeneity / Chamber-system / PPML

	Accounting	Architecture	Engineering	Legal
$\# \ln(\text{distance})_{ij}$	-0.337** (0.131)	-1.214*** (0.156)	-0.763*** (0.179)	-0.659*** (0.109)
$\# \text{comlanguage}_{ij}$	0.141 (0.232)	0.679* (0.301)	-0.096 (0.270)	0.359 (0.202)
$\# \text{comlegal}_{ij}$	0.261* (0.122)	0.341* (0.142)	0.690*** (0.168)	0.121 (0.118)
$\# \text{chamber}_{ij}$ het	-0.403*** (0.122)	-0.303* (0.127)	0.054 (0.135)	-0.072 (0.097)
Importer-year fixed effects	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Exporter-year fixed effects	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Geographic scope	EU 28	EU 28	EU 28	EU 28
Observations	2097	1716	1970	2097
Pseudo R-squared	0.856	0.588	0.882	0.919

(1) Dependent variable: value of cross-border exports from country i to country j at time t .
(2) Robust standard errors clustered by country-pair ij in round brackets
(3) pseudo-maximum likelihood estimator, country-year fixed effects
(4) ***,** and * denote statistical significance at 0.1, 1 and 5 percent levels, respectively.

Tables 8, 9 and 10 report additional results where I consider how the level of regulation might affects intra-EU trade in professional services. As mentioned above, I include only bilateral measures of regulation in these regression, to allow for using fixed effects. In contrast to the implications of related empirical work with a different geographic scope, GDP-weighted average OECD-STRI scores show insignificant effects for trade within the common internal market in each professional services sector.¹⁶

However, even for the adjusted OECD intra-EEA STRI, there are no robust indications that a higher regulatory intensity measured in this way could constitute a barrier to trade in professional services. At first glance, there may be an impact in the case of architectural services, but this result is not particularly robust: If the bilateral average score is weighted with the respective sectoral GDPs instead of the national GDPs, there is no longer any significant correlation. The same is true for a non-weighted average score for the respective country pairs.

¹⁶These findings remain unchanged even if the requirement for statistical significance is reduced to a 10 percent level.

Table 8: Results IV: Impact level of regulation / OECD STRI / PPML

	Accounting	Architecture	Engineering	Legal
$\# \ln(\text{distance})_{ij}$	-0.304* (0.149)	-1.357*** (0.152)	-0.657*** (0.188)	-0.572*** (0.131)
$\# \text{comlanguage}_{ij}$	0.153 (0.242)	0.790*** (0.298)	-0.054 (0.265)	0.391 (0.209)
$\# \text{comlegal}_{ij}$	0.334** (0.120)	0.366* (0.149)	0.738*** (0.208)	0.161 (0.129)
$\text{STRI}_i \text{ joint}_w$	0.230 (2.013)	-0.806 (1.801)	1.713 (2.372)	-0.556 (0.572)
Importer-year fixed effects	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Exporter-year fixed effects	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Geographic scope	EU+OECD MS	EU+OECD MS	EU+OECD MS	EU+OECD MS
Observations	1398	1249	1353	1395
Pseudo R-squared	0.852	0.671	0.886	0.918

- (1) Dependent variable: value of cross-border exports from country i to country j at time t .
(2) Robust standard errors clustered by country-pair ij in round brackets
(3) pseudo-maximum likelihood estimator, country-year fixed effects
(4) ***, ** and * denote statistical significance at 0.1, 1 and 5 percent levels, respectively.

When it comes to the possible trade effects of a (perhaps more restrictive) chamber system, it is interesting, however, that neither of the two subsystems seems to lead to significantly more trade in professional services within the Member States of either system when compared to the other¹⁷. To check the robustness of these findings, I have used either used a dummy that indicates if both trading-partners have a chamber system or a dummy that indicates if both trading-partners have no chamber system. In an additional setting, I worked with a sub sample of the data and exclude all country pairs of mixed systems from the respective control group to exclude potential negative trade effects of regulatory differences from this analyses.¹⁸

4.5 Implications

The Member States of the European Union have chosen different approaches to ensure the quality of professional services. Indicators such as the OECD “Services Trade Restrictiveness Index

¹⁷If the requirement for statistical significance is reduced to a 10 percent level, there would be hints that a chamber system with exclusive professional rights might even support cross-border trade in architectural and accounting services.

¹⁸For further robustness of these finding, tall versions of the model were also estimated without the control-variable of a common legal origin with similar results.

Table 9: Results V: Impact level of regulation / OECD EEA-STRI / PPML

	Accounting	Architecture	Engineering	Legal
$\# \ln(\text{distance})_{ij}$	-0.345* (0.158)	-1.357*** (0.152)	-0.701*** (0.159)	-0.542*** (0.128)
$\# \text{comlanguage}_{ij}$	0.122 (0.235)	0.593** (0.298)	-0.098 (0.267)	0.397 (0.210)
$\# \text{comlegal}_{ij}$	0.300* (0.120)	0.416* (0.145)	0.623*** (0.178)	0.172 (0.131)
EEA-STRI _i joint _w	-1.401 (1.039)	-14.331* (6.495)	-1.670 (0.901)	-0.445 (0.294)
Importer-year fixed effects	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Exporter-year fixed effects	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Geographic scope	EU+OECD MS	EU+OECD MS	EU+OECD MS	EU+OECD MS
Observations	1398	1249	1353	1395
Pseudo R-squared	0.854	0.693	0.889	0.918

(1) Dependent variable: value of cross-border exports from country i to country j at time t .
(2) Robust standard errors clustered by country-pair ij in round brackets
(3) pseudo-maximum likelihood estimator, country-year fixed effects
(4) ***, ** and * denote statistical significance at at 0.1, 1 and 5 percent levels, respectively.

Table 10: Results VI: Impact level of regulation / Chamber-system / PPML

	Accounting	Architecture	Engineering	Legal
$\# \ln(\text{distance})_{ij}$	-0.349** (0.130)	-1.228*** (0.158)	-0.801*** (0.174)	-0.660*** (0.109)
$\# \text{comlanguage}_{ij}$	0.147 (0.234)	0.686* (0.305)	-0.117 (0.266)	0.361 (0.203)
$\# \text{comlegal}_{ij}$	0.269* (0.107)	0.359* (0.143)	0.671*** (0.186)	0.107 (0.178)
chamberpair _{ij} .	0.464 (0.247)	0.478 (0.462)	-0.263 (0.270)	0.107 (0.179)
Importer-year fixed effects	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Exporter-year fixed effects	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Geographic scope	EU 28	EU 28	EU 28	EU 28
Observations	2097	1716	1970	2097
Pseudo R-squared	0.854	0.664	0.882	0.918

(1) Dependent variable: value of cross-border exports from country i to country j at time t .
(2) Robust standard errors clustered by country-pair ij in round brackets
(3) pseudo-maximum likelihood estimator, country-year fixed effects
(4) ***, ** and * denote statistical significance at at 0.1, 1 and 5 percent levels, respectively.

for cross-border trade in services” (OECD-STRI) and the updated version of this indicator for trade within the European Economic Area attempt to reflect these differences. Methodologically, this is not always easy. Nevertheless, at least the updated version of this indicator covers relevant aspects that could constitute a barrier to the cross-border provision of professional services.

Since the OECD-STRI plays a relevant role in the regulatory literature, I used this indicator as a starting point for the analysis to link to this academic research. Contrary to the results of existing research using this indicator, I find no evidence of positive trade effects for intra-European trade in different professional services as a result of more homogeneous regulation. The limited relevance of some of the policy areas covered by the original OECD-STRI for the EU may be able to partly explain this. However, also the inclusion of the recently updated version of this indicator (OECD EEA-STRI) does not hint to extensive trade barriers due to the remaining national regulatory differences in professional services. If one assumes that the updated indicator tends to represent correctly the nature of relevant national regulation, these results would at least not argue in favour of abolishing the different regulatory regimes that have evolved over time within the EU.

In addition to the composite indicators of the OECD, I used the regulatory aspect of the chamber system in order to capture the central dividing lines of professional regulation in the Member States of the EU between direct state supervision and indirect professional supervision in professional self-administration. The results based on this indicator point indeed to some interface problems between the two different regulatory approaches in accounting and architectural services. The finding that this fundamental heterogeneity in the historically evolved regulatory systems constitutes a slight disturbance to the cross-border provision of professional services is not entirely surprising. The same seems to apply to other evolved cultural differences between the Member States such as different legal traditions, and to minor extend, language barriers. However, there is no empirical evidence that one of the two historically developed regulatory approaches seems superior in principle in the case of cross-border trade in professional services. It is therefore not possible to deduce from these results which direction a further standardization, which is subject to ongoing political debates, should follow.

5 Conclusion

In this paper, two possible impact channels were tested through which regulation could influence the intra-European trade of professional services in four different sectors. The first one is the heterogeneity of regulation in trade relations, where it is assumed that higher heterogeneity negatively affects trade due to friction. The second one is the level of regulation, where it is assumed that more restrictive regulations have negative impact on bilateral trade. Based on existing research, the effects of heterogeneity on trade in accounting, architectural, engineering and legal services were initially estimated using bilateral heterogeneity-measures based on the OECD "Services Trade Restrictiveness Index for cross-border trade in services (OECD-STRI) within a gravity model. In contrast to the general findings of the related literature with a different geographic scope, these model specifications did not reveal any influence of heterogeneity on trade in professional services in the EU internal market. The same applies to possible effects of regulatory intensity on intra-European trade.

However, parts of these results may be due to the fact that the OECD-STRI does not capture the relevant level of national regulation for intra-European trade. For this reason, I have also included a recently published additional version of this indicator that is modified for domestic European trade (OECD-EEA-STRI) to the analyses. But even in this case there is hardly any empirical evidence that a more homogeneous or supposedly trade-friendly regulation (as captured by this updated indicators) leads to more cross-border trade in professional services.

These results based on the OECD-indicators do not contradict the findings of the related literature. In particular, these results do not imply that trade benefits cannot, in principle, result from harmonized national regulations. The findings in this research do only indicate that there might not be additional positive trade effects of a further harmonization of professional regulation in the European single market, which is, by comparison, already very much harmonized.

As an alternative to the composite indicators of the OECD, I have proposed a simple measure of regulation, which divides the countries according to whether membership in a professional chamber is mandatory or not. Based on this proposition, I have derived a measure for the heterogeneity and intensity of regulation. Under these specifications it shows that there are

indeed some interface problems in the trade of professional services in the EU internal market. Here, in the case of accounting and architectural services, heterogeneous regulations also lead to less trade. However, the results do also indicate that a mandatory chamber system itself has no negative impact on intra-EU trade in professional services. This seems relevant for the ongoing political regulatory debate in Europe, as a mandatory chamber system is usually associated with a higher intensity of regulation and potential barriers to trade.

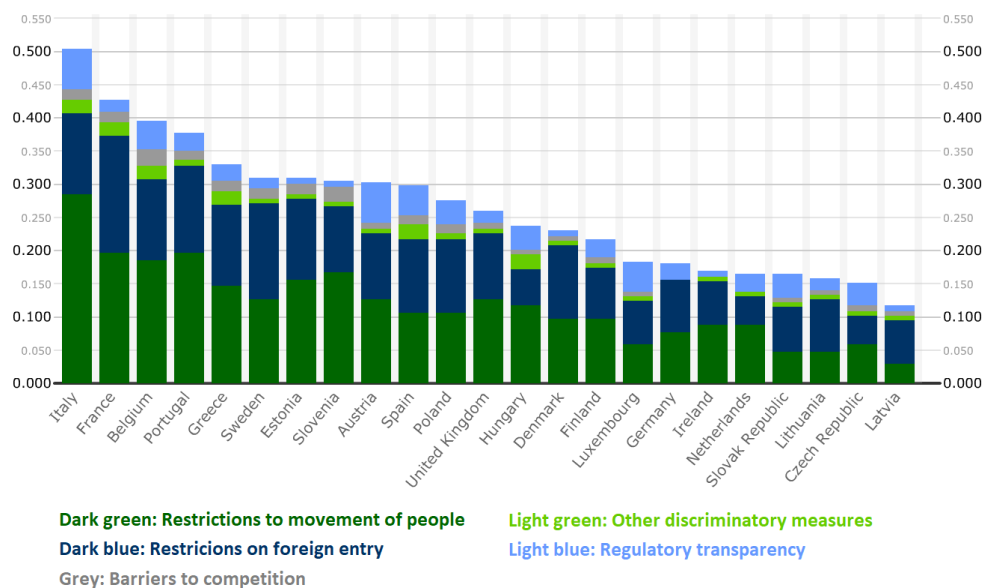
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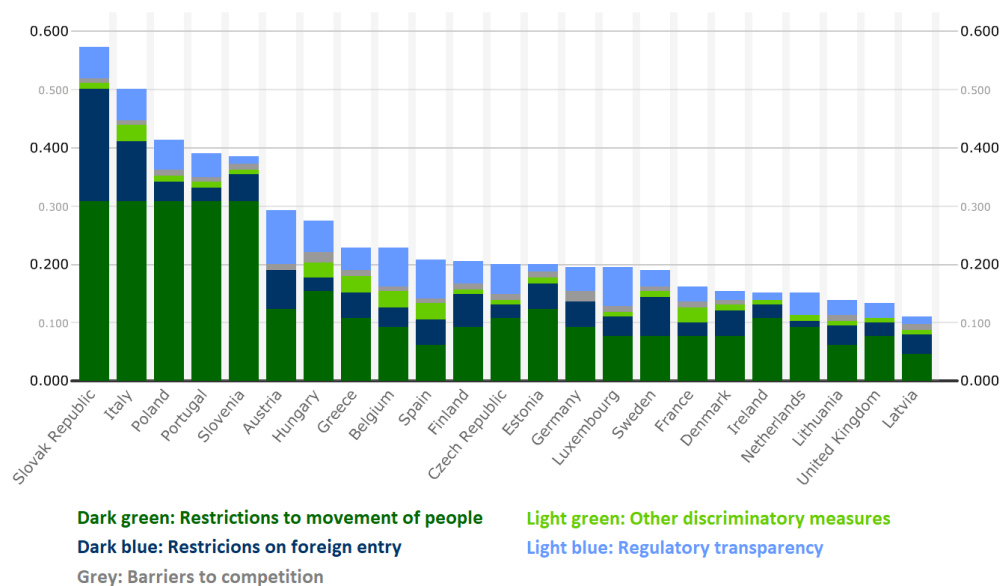
Appendix

Figure 4: OECD Services Trade Restrictiveness Index for cross-border trade in accounting services, year 2016



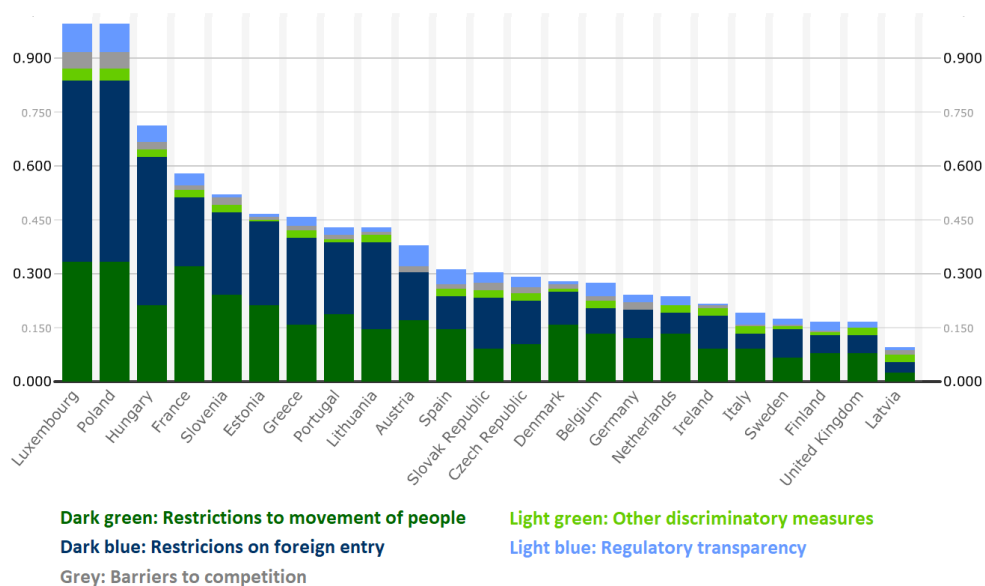
Source: OECD, Services Trade Restrictiveness Index, generated via STRI-database, Online access to the database <https://stats.oecd.org/Index.aspx?DataSetCode=STRI>

Figure 5: OECD Services Trade Restrictiveness Index for cross-border trade in engineering services, year 2016



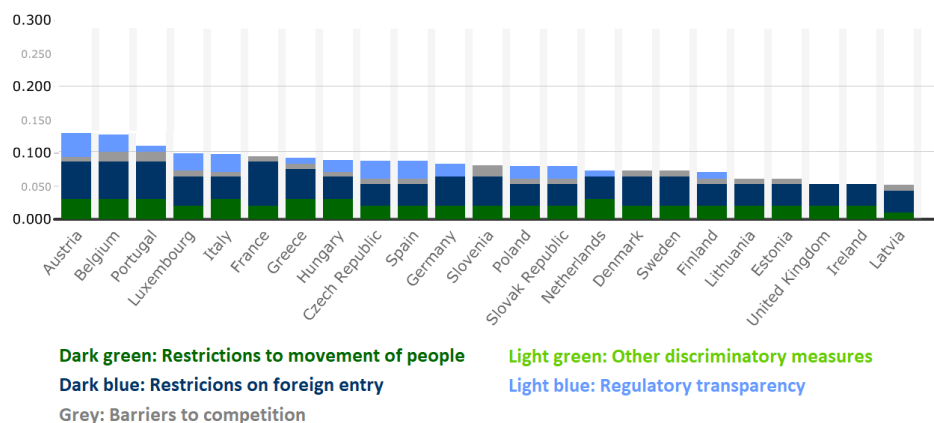
Source: OECD, Services Trade Restrictiveness Index, generated via STRI-database, Online access to the database <https://stats.oecd.org/Index.aspx?DataSetCode=STRI>

Figure 6: OECD Services Trade Restrictiveness Index for cross-border trade in legal services, year 2016



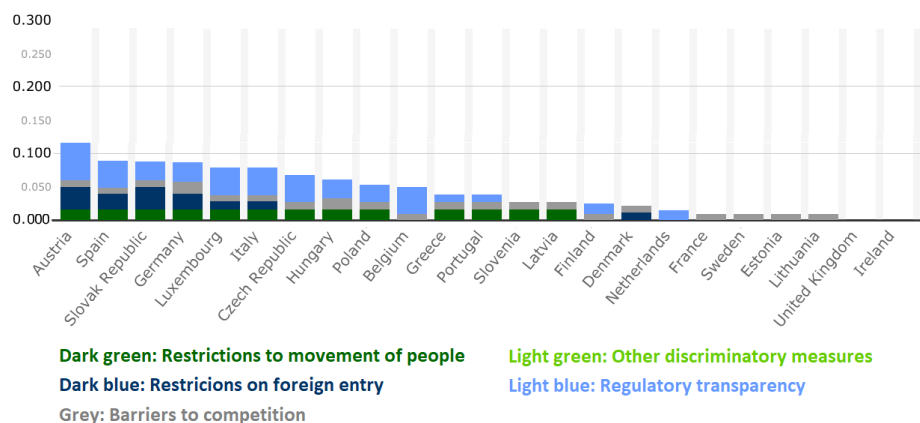
Source: OECD, Services Trade Restrictiveness Index, generated via STRI-database, Online access to the database <https://stats.oecd.org/Index.aspx?DataSetCode=STRI>

Figure 7: OECD IntraEEA Services Trade Restrictiveness Index for cross-border trade in accounting services, year 2016



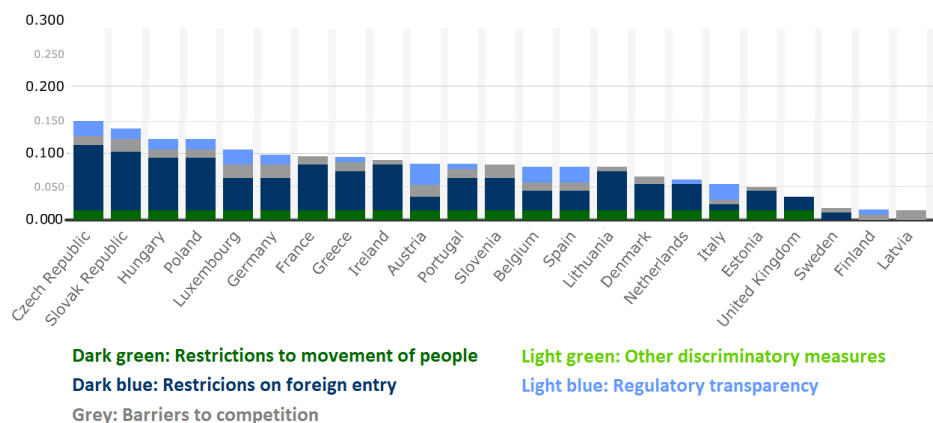
Source: OECD, IntraEEA Services Trade Restrictiveness Index, generated via IntraEEA STRI-database, Online access to the database https://stats.oecd.org/Index.aspx?DataSetCode=STRI_INTRAEEA

Figure 8: OECD IntraEEA Services Trade Restrictiveness Index for cross-border trade in engineering services, year 2016



Source: OECD, IntraEEA Services Trade Restrictiveness Index, generated via IntraEEA STRI-database, Online access to the database https://stats.oecd.org/Index.aspx?DataSetCode=STRI_INTRAEEA

Figure 9: OECD IntraEEA Services Trade Restrictiveness Index for cross-border trade in legal services, year 2016



Source: OECD, IntraEEA Services Trade Restrictiveness Index, generated via IntraEEA STRI-database,
 Online access to the database https://stats.oecd.org/Index.aspx?DataSetCode=STRI_INTRAEEA