

Professor Jun Du, Dr Oleksandr Shepotylo, Dr Mustapha Douch and Ms Uzoamaka Nduka -Written evidence (PBS0027).

This evidence is provided by Jun Du, [Professor of economics](#), an expert on business dynamism and firm productivity and growth, Dr Oleksandr Shepotylo, [Lecturer of economics](#) and Dr Mustapha Douch, Research Fellow, experts on international trade, all academics of [Lloyds Banking Group Centre for Business Prosperity](#) (LBGCBP) and Economics, Finance and Entrepreneurship Department at [Aston Business School](#), and Ms Uzoamaka Nduka PhD candidate. This evidence draws on a series of ongoing work LBGCBP conducts in assessing UK's global value chains position post Brexit, economic impact of Covid-19, [dynamics of the UK's global value chains](#) and implications on the UK [productivity and skills challenges](#).

Summary

This document provides fresh evidence on the UK Profession and Business Sectors (PBS) and Financial services Sectors and their international trade patterns. Set in a context of rising services and service trade globally, where the UK is a major contender, the evidence first describes the contribution of PBS in the UK economy in value generation and job creation, and as a main supplier and consumer of international services trade. The evidence further positions UK PBS sectors in the global value chains, and evaluates their network positions globally and the competitiveness achieved by their centrality in the global networks. By reviewing the services trade patterns, characteristics and delivery modes of PBS sectors services across borders, the evidence highlights the growth patterns, revealed opportunities and fragility facing the challenges of Brexit. We also present a statistical map of the current service restrictions cross borders between EEA and other countries and quantify its impact on trade in services of the UK as a whole and the PBS sectors.

This evidence addresses the questions raised in the enquiry:

- 1. How important are the different UK professional and business services sectors to the UK's economy and trade in services? Please include data where possible.*
- 2. What are the UK's different professional and business services sectors' key priorities for the future UK-EU relationship? What are the key priorities of smaller professional and business services providers and providers from the UK's regions and devolved nations in particular?*
- 3. What provisions should the Government seek to negotiate to minimise potential barriers to trade, particularly for smaller professional and business services providers? What steps should the Government take to preserve the competitiveness and innovation capacity of the UK's different professional and business services sectors?*

The key messages are:

- PBS are a significance contributor of the UK economy in terms of value generation and job creation. Between 1998-2017, PBS sectors make up for 23% of all firms, 19% of firms, generate 10% turnover and 18% of value added.
- PBS tend to cluster SMEs (92.5% firms have less than 250 employees) and young firms (on average 9-10 years).
- PBS take a lion's share of UK international trade in services. Between 1998-2017, 8% international service traders among all firms across sectors in the economy, with more than one in four are PBS firms.
- There are about 4.6% PBS firms are international traders between 2011-2017, lower than other services (10.4%) and manufacturing sectors (5.9%), however, they supply 41% of all service exported and consume 32% of all service imported in the UK. PBS international traders account for 8.6% of the jobs, 10.8% of value added, and 6.2% of turnover, disproportionally higher than the number of firms and produce high value-adding services.
- A small percentage (<1%) of PBS firms also trade in goods.
- Between 2015-2017, UK PBS services traders export more to outside EU than within EU, while EU remains a main destination, with a high annual 20% growth on average, faster than outside EU markets. Imports from outside EU by PBS firms grow faster than from inside EU, which shows that UK PBS traders have been sourcing increasingly more from outside EU. There are noticeable differences in patterns between different sectors and for different types of services.
- PBS traders on average export one type of service per year and import 3 types of services.
- UK sectors appear to enjoy the most central position in the global networks of PBS and Financial services, providing "eco-system" of interlinked services, alongside those of the USA, Germany, the Netherland among others. The strong competitiveness and close links with the rest of world also mean great reliance to the partners and customers, which relies on frictionless barriers to trade to maintain it.
- The similar services industrial structure and global central positions between UK PBS and Financial sectors with that of other European competitors such as

Germany, Netherland and France also suggest a certain degree of mutual reliance and substitutability.

- All services in PBS trade through GATS mode 1 cross-border transaction, and enjoy trade surplus. Firms trade this type of services are likely to sustain success which is not subject to mobility restriction, but likely to be restricted by regulation and other restrictions of knowledge flow such as data protection.
- Technical, trade-related, and other business services (TTB) and Audio-visual and related services (ICT-av) are the main service consumers and suppliers through GATS mode 2 Consumption abroad. TTB services exports grow fast over time and this type of services may be subjective to restrictiveness of people movement and barriers to competition among other measures.
- Financial services traders tend to deliver through GATS mode 3 commercial presence than through cross-border transaction. This type of services may not be affected by restrictions of movement and information directly or straight away post Brexit, but mainly through depression in foreign investments in the UK.
- Historically, trade in services within EEA is more open than trade from the outside of EEA. The barriers outside EEA may be high and unpredictable.
- Within EEA, Air transport, Legal services, and Accounting are the top 3 most protected services sectors, while telecom is the most open.
- Among countries within EEA, Iceland, Italy and Poland have the highest levels of protection against foreign services providers.
- The differences in the level of restrictiveness within and outside EEA markets differ considerably, ranging from minimum differences in Barriers to competition to bigger differences in Regulations and procedures and other discriminatory measures, to the biggest differences in restriction on foreign entry and movement of people. Emphases should be put on in the UK-EU negotiations for an agreement to reduce, if not eliminate, the negative impact of erected restrictions on some most key PBS and financial sectors in the UK (and the EU too) for which global connections are key to their competitiveness.
- Our gravity model analysis shows that in most sectors service trade restrictiveness of importing country has a negative effect on services export, which means that if EU countries increase their trade restrictiveness

measures against the UK firms, the services trade from the UK to EU will decline significantly.

1. Context

Globally, international trade in services already created more value than trade in good. It grows at an annual average rate of 8% and reached \$5.28 trillion in [2018 according to TWO](#). The UK is the second largest service market in the world and remains the second cross-border service provider behind the US. However, the global competition has grown fierce in recent years from both developed and emerging economies; the fast-changing technologies and the regional supply chains development in developing world disrupt the existing structure of the global value chains (GVCs). As shown in Figure 1, while US and UK lead in international trade in services, there are strong competitors existing and continue to emerge globally.¹

The UK services industries, PBS and Financial Sectors in particular, contribute significantly in the UK economy, in terms of outputs and value-added generation and job creation. These services sectors are important to other services sectors by cross-supplying important high-quality intermediate inputs to help maintain their competitive edge. Further, service sectors are increasingly crucial to manufacturing firms' participation of GVCs through competing on adding value to product sales with customised solutions and integrated "product-service systems" (i.e. servitization processes). The capability to servitize globally, building on firm's exporting platforms, will strengthen the UK traders' international value proposition. However, Brexit creates major disruptions. There is now clear evidence that the uncertainty in post-Brexit UK-EU trade relationship has caused decline and redirection of UK trade in goods.² There is limited systematic evidence available for UK trade in services. However, given the distinct nature and the ways of services delivery compared to merchandise, barriers to disallow proximity between

¹ This is based on International Monetary Fund, Balance of Payments Statistics Yearbook and data files.

² [Douch, Du and Vanino \(2019\)](#) "Defying Gravity? Policy Uncertainty and Trade Diversion", documents the recent trend in the UK international trade diversion from EU markets to outside EU markets following the Brexit Referendum, based on granular firm level trade analysis.

suppliers and consumers across borders and restrictions of information flow would be expected to reduce international trade in services.

2. Our approach and source of evidence

We compile multiple sources of data and information, as up to date as possible, utilise statistical tools and network analysis, as well as regression analysis to provide a description of the UK PBS and Financial services sectors in the UK economy, their interlinks with each other and with their global partners.

We use data from different sources from the UK official statistics in this study. First, we make use of the [Annual Respondents Database \(ARD\)](#) and the [Annual Business Survey \(ABS\)](#) which are both representative samples and span the period of 1998 to 2017. This dataset contains information on the international service trade of the firms i.e. the value of their imports and exports of services. Also, this database contains information from 2011 on the goods trading status of the firm, i.e. whether they export or import goods or not. For information the age of firms, we make use of the [Business Structure Database \(BSD\)](#).

For detailed information the types of services traded, destinations and values, we use the [International Trade in Services](#) database which spans from 1998 to 2017. We define the Professional and Business services sectors in line with the UK Parliament [Professional and Business Services Sector Report](#):

- a. 69-Legal activities/accounting, bookkeeping and audit;
- b. 70-Activities of head offices, management consultancy;
- c. 71-Architectural and engineering activities, technical testing and analysis;
- d. 72-Scientific research and development;
- e. 73-Advertising and market research;
- f. 74-Other professional, scientific and technical activities;
- g. 77-Rental and leasing activities;
- h. 78-Employment activities;
- i. 82-Office administration and other business support activities.

To ease the discussion, we aggregate these sectors into two: The Professional and Technical Services Sector (69-77) and the Administration and Support Services Sector (78-82).

In addition, we also employ [World Bank](#) Global Trade Statistics 2018, WIOD input-output table 2014, OECD Service Database, the WTO-UNCTAD-ITC trade in services database and OECD Services Trade Restrictiveness Index (STRI).

3. Evidence

3.1 *PBS are a significance contributor of the UK economy*

Based on the Annual Respondents Database and Annual Business Surveys over the period of 1998-2017, which cover a big proportion of the UK economy, PSB Sectors have a significant share of the number of firms, job creation, total outputs and value added and international trade participation in the UK economy, as shown in Figure 2. More specifically,

- In terms of the number of firms, PSB sectors make up 23% of all firms in the UK economy, accounting for 47,700 jobs (19%) and generating 10% of turnover and 18% of value added. The significance of PSB in the economy is not as high as that of the rest of the service sectors, but it is higher than the whole manufacturing sectors. Manufacturing sector firms for example account for 5.3% of the economy in terms of number of firms, 10% of jobs, 11% for both value-added and turnover. The other service sectors are the largest contributors to the economy with 70% share of turnover and 60% share of value added.
- PBS sector firms tend to be younger than average, around 9-10 years.
- Majority of PBS firms (92.5%) are SMEs with less than 250 employees. This is a higher percentage than what's reported in the [recent report](#) for the House of Commons Committee.

3.2 *PBS take a lion's share of UK international trade in services*

Traders are rare. Firms that engage in international trade is rare, irrespective of trade in goods or services. The stylised facts suggest that the traders tend to be more productive firms.

Based on ARD/ABS, between 1998-2017, as in Table 1, there are 8% international service traders among all firms across sectors in the economy. More than **one in four** are PBS firms (accounting for 2.7% of all traders).

According to ABS 2011-2017, as shown in Table 2, 4.6% of PBS firms either trade in goods, or services, or both, compared to 10.4% in other services sectors and 5.9% in manufacturing sectors.

However, PBS firms supply 41% of all service exported and consume 32% of all service imported in the UK. The rest of service exports are supplied by other services sectors (47%) and manufacturing sectors (9%).

A small percentage (<1%) of firms in these sectors also trade in goods. Shown in Table 1, compared to the firms that trade just in services or in both goods and service, the firms that trade just in goods are older and significantly smaller.

Compared to the number of firms in the economy, PBS international traders account for 8.6% of the jobs, twice the contribution than the numbers of firms, 10.8% of value added, and 6.2% of turnover, also disproportionally higher than the number of firms, and produce high value-adding services.

3.3 PBS firms international services trade patterns and trade partners

Focusing on international traders in the UK, based on 39,068 ITIS establishment level observations over 2015-17 in Table 3, we find:

- UK PBS traders services export more to outside EU than within EU, while EU remains a main destination, with a high annual 20% growth on average, faster than outside EU markets.
- Imports from outside EU grow faster than from inside EU, which shows that UK PBS traders have been sourcing increasingly more from outside EU.

More specifically growth

Over 2015-17, total exports to EU grow from 34.4 billion in 2015, to 40.9 billion in 2016 and to 50.3 billion in 2017, growing at about 20% year-on-year.

The volumes of exports are larger to non-EU countries, at 66.5 billion in 2015, to 72.2 billion in 2016 and to 83.3 billion in 2017, at on average 12% year-on-year.

Total imports from EU grow from 20.7 billion in 2015, to 24.6 billion in 2016 and to 27.4 billion in 2017, growth 15% but declining; from non-EU countries, 27.2

billion in 2015, to 31.3 billion in 2016 and to 38.4 billion in 2017, on average 19% annual growth. (Table 3)

SME PBS traders

Overall, PBS traders export 32% of all services exports to EU, and 34% of all services exports to non-EU. They also import 26% of all services imports from EU, and 35% of all service imports from non-EU.

Among all PBS traders, SME traders export 9% of all services exports to EU, and 12% of all services exports to non-EU. They also import 8% of all services imports from EU, and 17% of all service imports from non-EU.

This comparison suggests that large traders in PBS sectors play a major role in international trade in services of the PBS sectors. (Table 3)

Types of traded services

- With regards to the types of services traded, traders in PBS sectors have a large share of the Professional Service (60% yearly), R&D (70% yearly) and Technical services (30% yearly) exported. On the Imports side, they account for Professional Service (51% yearly), R&D (80% yearly) and Technical services (40% yearly) on average.
- PBS traders on average export one type of service per year and import 3 types of services.

Trade partners in and outside EU

Turning to the trade destination between EU and Non-EU, we study the extensive margins of trade between 2015 and 2017. These sectors account for 31% of the EU and Non-EU exports on average per year. On the imports side, they account for about 25% of EU imports and 33% of Non-EU imports on average, per year.

For the extensive margins, the plants in these sectors export to an average of 15 destinations per year and import from an average of 13 destinations per year.

We gain a more detailed picture by visualising the service exports by services types and destinations in Figure 3a and 3b. We see interesting trends of uneven growth in services by Professional, Scientific and Technical Sectors in the EU and outside the EU markets. Some types of services grow persistently and fast (e.g.

R&D) while others less so or declining (e.g. Technical services). Some services grow globally in both EU and outside EU (e.g. Professional Services, R&D services and Telecommunication services), while others see a shift from EU focus to outside-EU markets (e.g. Construction services, Technical services).

3.4 UK PBS and Financial services sectors as a global hub in the global value chains (GVCs)

Overall globally

To understand the competitiveness of the UK PBS and financial sectors globally and their reliance on the global value chains, we visualise a global service production networks linking all the suppliers and consumers of PBS and Financial Services sectors, using the global Input-Output table (WIOD) 2014 in Figure 4. The first observation of this map is that the global supply chains built over the recent decades are very complex networks. PBS and financial service sectors of many countries are well ingrained in this web. UK sectors appear to enjoy a great centrality in the network alongside those of the USA, Germany, the Netherlands, Belgium and Luxembourg, etc. This is consistent with the [view](#) that these sectors provide “eco-system” of interlinked services.

The size of the nodes shows the centrality of the sectors, or how these sectors connected and positioned in the web of connection around the world,³ whereas the links (edges) is the value of intermediate inputs between two nodes. Hence, the larger the nodes in the figure, the more central positions these sectors and countries stand in the global services supply chains, by connecting strategically to more of other sectors. In this case, the UK PBS and financial services are noticeably competitive, showing strong presence and centrality in the map. What we can also observe from this figure is that the USA, the Netherlands, Belgium, France, Germany and Luxembourg are also very central within the network, illustrating their hub roles in the professional, business and financial services markets. Relatively less central are Hungary, Canada, Italy and Austria although

³ Here we use the concept of Eigenvalue Centrality as a measure of connectedness of the node. Thus, nodes are ranked according to the eigenvalue centrality scores.

still strategic in the network, but they are less crucial compared to the previous country set.

Globally sector view

Zooming into the global networks of individual services sectors in Figure 5, we are able to visualise more clearly the international links of each UK PBS and financial sectors with their domestic and global trading partners.

Comparing these networks gives a closer view of the competitiveness of individual sectors in the world, in terms of their centrality compared with the same sector in other countries (i.e. the size of the node). The UK financial service sectors (GBR41) has a clearly central position in the network, suggesting that it is a crucial hub of global financial services. However, the financial hubs in Germany and US are in a similarly central positions, while less centrally, financial services sectors in Netherlands, Luxemburg, Belgium, France are also very well connected to the global services networks.

Similar comparisons can be made for other sectors, to gain a view of their relevant positions in the global value chains. For example, while all UK PBS sectors have a strong presence in the global networks, especially central positions in the global networks can be observed for Legal and accounting activities; activities of head offices; management consultancy activities (45) and Architectural and engineering activities; technical testing and analysis (46) and Administrative and support service activities (50).

Domestic sector view

To take a closer look at the links between financial services and PBS sector in the UK in the context of global value chains, we isolate each country separately in Figure 6. The first observation is that in the countries where PBS and financial services sectors are globally competitive, the UK, the US, Germany and France, these sectors are tightly linked by supplying and consuming intermediate inputs to each other. This implies that the interlinks between the UK PBS and financial sectors, jointly as hubs, are really important to their global positions. The disruption in one sector would impact on all.

The size of the node indicates how essential these sectors are in the global services supply chains, showing their relative positions in the global value chains which are less clear from the previous figures. In the case of the UK, Financial services (41), Legal and accounting activities; activities of head offices; management consultancy activities (45) and Administrative and support (50) are the most central, compared to the rest, indicating their most strategic network positions in the network. Further, the edge linking 41 and 45 is the thickest⁴, illustrating the large volume of their transactions and therefore the strong reliance to each other.

Moreover, a comparison between countries shows that slightly different service industrial structure. The US Other professional, scientific and technical activities; veterinary activities (49) sectors presides a strong central position alongside its Financial services sectors (41) and Legal and accounting activities; activities of head offices; management consultancy activities (45). In particular, the USA's Financial Sector show a great connectedness with Other professional, scientific and technical activities; veterinary activities (49); and to a less extent to Legal and accounting activities; activities of head offices; management consultancy activities (45). This is different from the UK.

Germany has a similar structure of services sectors with the UK, with Legal and accounting activities; activities of head offices; management consultancy activities (45) are highly connected with other Administrative and support service activities (50), Financial sectors (41) and Architectural and engineering activities; technical testing and analysis (46), all are very central in the global network.

Also, similarly in France, Administrative and support service activities (50) and with Legal and accounting activities; activities of head offices; management consultancy activities (45) are tightly linked, alongside Financial service (41) and Scientific research and development (47) holding central position in the global value chains.

⁴ Note, the size of the edge is weighted by the value between the two sectors derived from global Input-Output table (WIOD).

Finally, we rank all PBS and Financial Services in different countries based on their centrality scores.⁵ Table 4 reports the top ranked sectors and countries. Four of the UK sectors are ranked in the top 20 sectors for their centrality in the global network. Furthermore, the Financial Services (GBR41) and Administrative and support service activities (50) are ranked as the top sectors globally. When focusing on Financial services sectors only, the UK is undoubtedly world-leading, as topped in Table 5.

Taken together, this analysis highlights the strategic importance of UK PBS and Financial services sectors in the world. At the same time, the strong competitiveness and close links with the rest of world does come with great reliance to the partners and customers, which relies on frictionless barriers to trade to maintain it. In addition, the similar services industrial structure and global central positions between UK PBS and Financial sectors with that of other European competitors such as Germany, Netherland and France also suggest a certain degree of mutual reliance and substitutability.

3.5 Mode of PBS trade in services, trend and implications

Services differ from merchandise in their nature and delivery. Services are often intangible, invisible, perishable and usually delivered by a service provider while consumed by its consumer simultaneously. Hence the required proximity of the producer and the consumer implies that often one party has to move across border to make the international transaction. Statistically, GATS adopted in Article I four modes of supply of an interactional service:

Cross-border (mode 1): services supplied from the territory of one Member into the territory of another. An example is an online training course offered by a UK firm sold to learners in France is UK' export.

Consumption abroad (mode 2): services supplied in the territory of one Member to the consumers of another. Examples of exports are German visitors' expenses in booking flights and hotels in Wales, or Chinese students' fee for coming to the

⁵ We analyse FS and PBS importance on global trade by ranking their input relationship with various partners-sectors based on their eigenvector scores of centralities that measure how connected they are to other important trading nations. A higher score, suggests a higher dependence on trade with other sectors.

UK to study. Also covered are activities such as ship-repair abroad, where only the property of the consumer moves.

Commercial presence (mode 3): services supplied through any type of business or professional establishment of one Member in the territory of another. This type of service is usually delivered through entities established by foreign direct investment (FDI). An example is KPMG, a Swiss management consultancy firm offering auditing service to a UK firm through KPMG UK branch is UK's import of the service.

Presence of the natural persons (mode 4): services supplied by national of one Member in the territory of another. This mode includes those independent service suppliers and employees of the services supplier of another Member. Examples are an UK heart surgeon performing an operation service in France, or a US engineer being hired to fix an equipment belonging to a UK firm.

Drawing on the Global Trade in Services Data by sector and by mode of supply, compiled from the WTO-UNCTAD-ITC trade in services dataset, one can quickly form an impression of the ways in which the PBS services are usually supplied and consumed and how they evolve over time. [Figure 7a and 7b]

- All services in PBS trade through mode 1, cross-border transaction.
- UK has trade surplus of all types of services through cross-border trades, by exporting more and importing less, despite of varying degrees. Financial, insurance and IP services have the most noticeable trade surplus. However, Financial and Insurance services show signs of declining in recent years.
- The persistent growth in cross-border service exports is seen in Professional and management consulting services (PM), Telecommunications, computer and information services, as well as IP services.

Firms trade this type of services are likely to sustain success which is not subject to mobility restriction, but likely to be restricted by regulation and other restrictions of knowledge flow such as data protection, etc.

- Within PBS sectors, Technical, trade-related, and other business services (TTB) and Audio-visual and related services (ICT-av) are the main service

consumers and suppliers through Consumption abroad (mode 2). TTB is growing fast over time, while ICT-av is on the decline.

- Financial services trade more through Commercial presence (mode 3) than through cross-border transaction, possibly mainly due to foreign subsidiaries of UK financial firms outside the UK.

This type of services may not be affected by restrictions of movement and information directly or straight away post Brexit, but mainly through depression in foreign investments in the UK, which is [expected](#).

- The second most popular supply mode for UK service traders is Presence of national person (mode 4). This is also the main supply mode for R&D, PM, Telecommunications and computer services (ICT_comput) services, showing fast growth over time.

This type of services is subject to restrictions of movement and regulations on professional qualification recognition and data protection, etc. This is the area that UK needs to seek agreements in the Brexit deal to ensure frictionless trade using this mode.

These services trade modes that are potentially affected by restrictions of movement and regulations of information post Brexit can also be corroborated by using a different set of statistics on services trade restrictiveness index, shown in Figure 8. In the range of services that feature PBS sectors, the historical records demonstrate that among the trade barriers firms face, restriction on entry of foreign firms, movement of people and barriers to competition remain the highest threat.

3.6 Service trade restrictiveness: in or out of EU?

This section documents and analyzes differences in services trade policies for traders located within and outside of European Economic Area (EEA). It is based on Services Trade Restrictiveness Index (STRI) and its subcategories (restrictions on foreign entry, restrictions to movement of people, other discriminatory measures, barriers to competition, and regulatory transparency) computed by OECD in 2014-2019. The OECD STRI is an evidence-based tool that collects information on services trade restrictions across 19 major services sectors. It

collects regulations and laws from 45 countries (36 OECD members and 9 partners) into a services trade regulatory database. Based on the qualitative information in the database, composite indices quantify the identified restrictions across five standard policy categories, with values between zero and one. Complete openness to trade and investment gives a score of zero, while being completely closed to foreign services providers yields a score of one.⁶ The intra-EEA Services Trade Restrictiveness Index (EEA STRI) identifies and catalogues policy measures that restrict trade within the European Economic Area (EEA) for 25 OECD EU member countries. The differences between the two indices -- STRI and EEA STRI -- quantify protectionist measures in the market access for firms trading with EEA from the outside.

STRI vs EEA STRI: overall assessment

Figure 9 compares distribution of STRI outside and inside EEA. Average STRI for EU countries is 0.23, while EEA STRI is 0.06 on average. It means that trade in services within EEA is more open than trade from the outside of EEA. Almost all countries and services sectors within EEA have trade restrictiveness less than 0.2, while only for half country-sector pairs it is less than 0.2. STRI also has higher standard deviation of 0.1 as compared with 0.04 for EEA STRI, which means that trade protection against non-EEA firms has more variation and may be subject to higher unpredictability.

STRI vs EEA STRI: assessment by services sectors

Figure 10 compares STRI and EEA STRI by services sectors. Air transport, Legal services, and Accounting are the top 3 most protected services sectors in EEA, while telecom is the most open. Looking at EEA STRI, air transport remains the most protected, but at much lower level (0.15 vs 0.42), while both legal and accounting services protection drop to the levels slightly above the average for the EEA.

STRI vs EEA STRI: assessment by countries

Figure 11 compares STRI outside and inside EEA by countries. Iceland, Italy and Poland have the highest levels of protection against foreign services providers

⁶ For the regulatory transparency, 0 means full transparency and 1 represents lack of transparency.

(albeit Poland and Italy are not statistically different from a large group of EEA countries with the range of protection 0.25-0.28).

STRI by policy components

Figures 12-16 compares components of STRI by services sectors and different countries by type of restrictions. Barriers to competition are the highest in air transport sector and they are applied equally strictly to both EEA and non-EEA countries (Figure 12). Overall, there is no much difference in barriers to competition applied to EEA vs non-EEA services providers.

Other discriminatory measures, including policies regulating taxes and subsidies and public procurement, are higher in broadcasting, moving picture, and sound recording sectors and in construction (Figure 13). Moreover, these measures are applied very differently to EEA vs non-EEA services providers. Given this category has a mixture of measures that might vary to a large degree and can lack transparency, the UK should seek for agreements of specific terms of the post-Brexit UK-EU trades in these sectors.

Regulations and procedures are more transparent for EEA services providers (Figure 14). These measures include clarity in getting business visa and registering a company. Austria has the most non-transparent rules, while Spain and Luxembourg also having some lack of transparency. This category can cause considerable trade disruptions and UK needs to consider alignments with EU regulations. However, the relevant terms should be fairly explicit and unambiguous, hence appropriate attentions in trade negotiations should minimise the potential disagreement post Brexit.

Restriction on foreign entry has considerable variations across sectors, with air transport, legal services, and broadcasting the most restrictive (Figure 15). The restrictions for EEA services providers are considerably lower than for non-EEA services providers. Among EEA countries, Iceland and Sweden are the most restrictive to foreign entry.

Finally, restrictions to movement of people are the most severe in legal, architecture, engineering, and accounting sectors (Figure 16). Again, as for the most other dimensions these restrictions are applied to non-EEA services providers. Clearly, this area could be the most disparate between the current UK

and EU positions, but every effort should be made to reach an agreement to reduce, if not eliminate, the negative impact of erected restrictions on some most key PBS and financial sectors in the UK (and indeed for such sectors in the EU too) for which global connections are key to their competitiveness.

Impact of STRI on services trade: regression analysis

In order to evaluate potential impact of Brexit on services trade of UK with EU countries, we estimate impact of higher trade barriers in services towards the UK exports to EU countries. The assumption is that the barriers applied after Brexit are in line with the barriers applied to non-EEA countries. We use services trade data from WTO-UNCTAD-ITC annual trade in services dataset with data available for 2014-2019 and combine it with STRI data for the same period and for the same services sectors.

Applying a standard gravity model approach, controlling for productive capacity of exporting country, market size of importing country, bilateral costs, which include distance, policy barriers, and language barriers, we find that in the majority of sectors STRI of importing country has a negative effect on services export, which means that if EU countries increase their STRI against the UK firms, the services trade from the UK to EU will decline significantly

FIGURES

Figure 1: Global Trade in Services, 2018



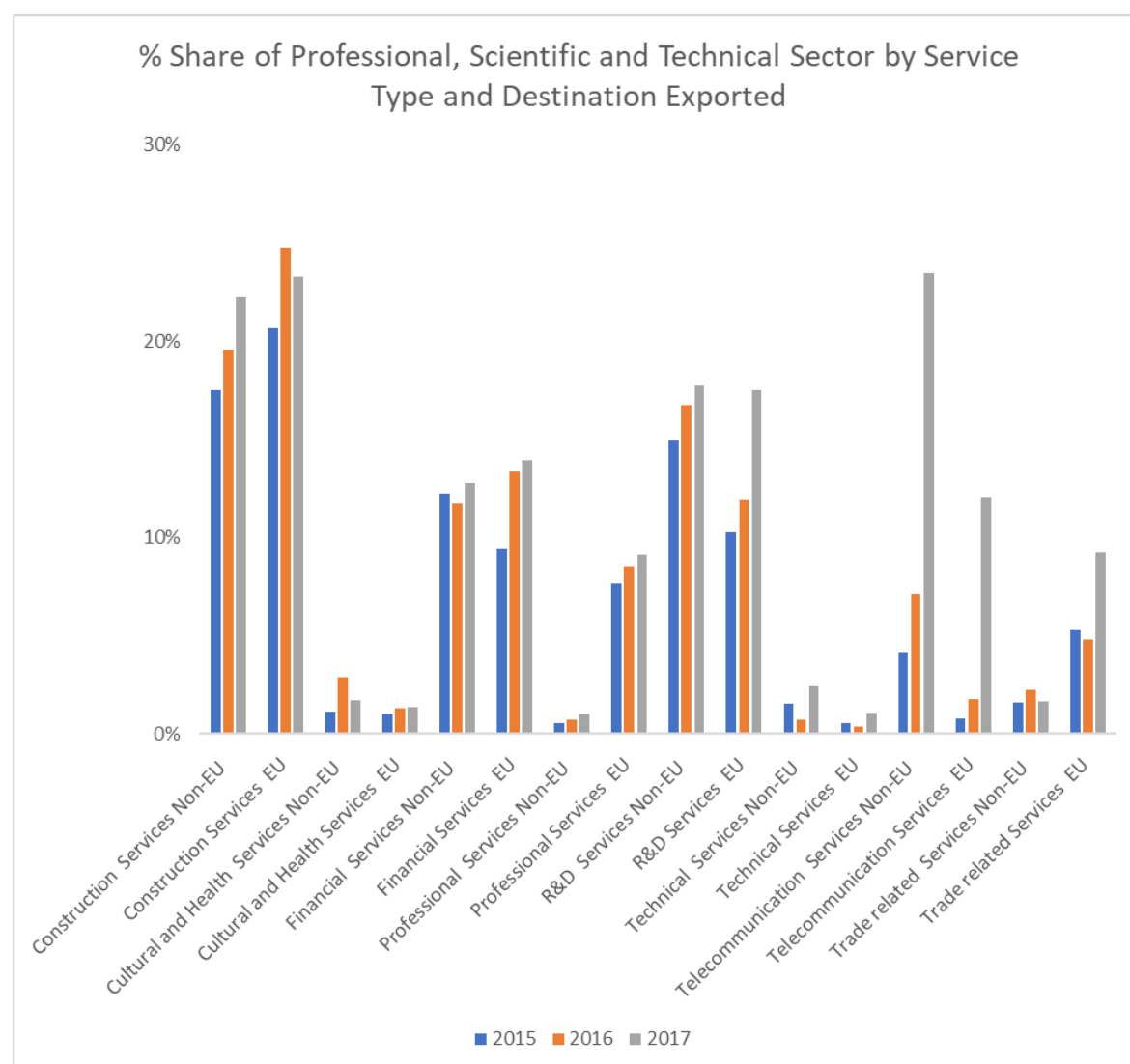
Source: International Monetary Fund, Balance of Payments Statistics Yearbook and data files.

Figure 2: PBS: a significance contributor of the UK economy



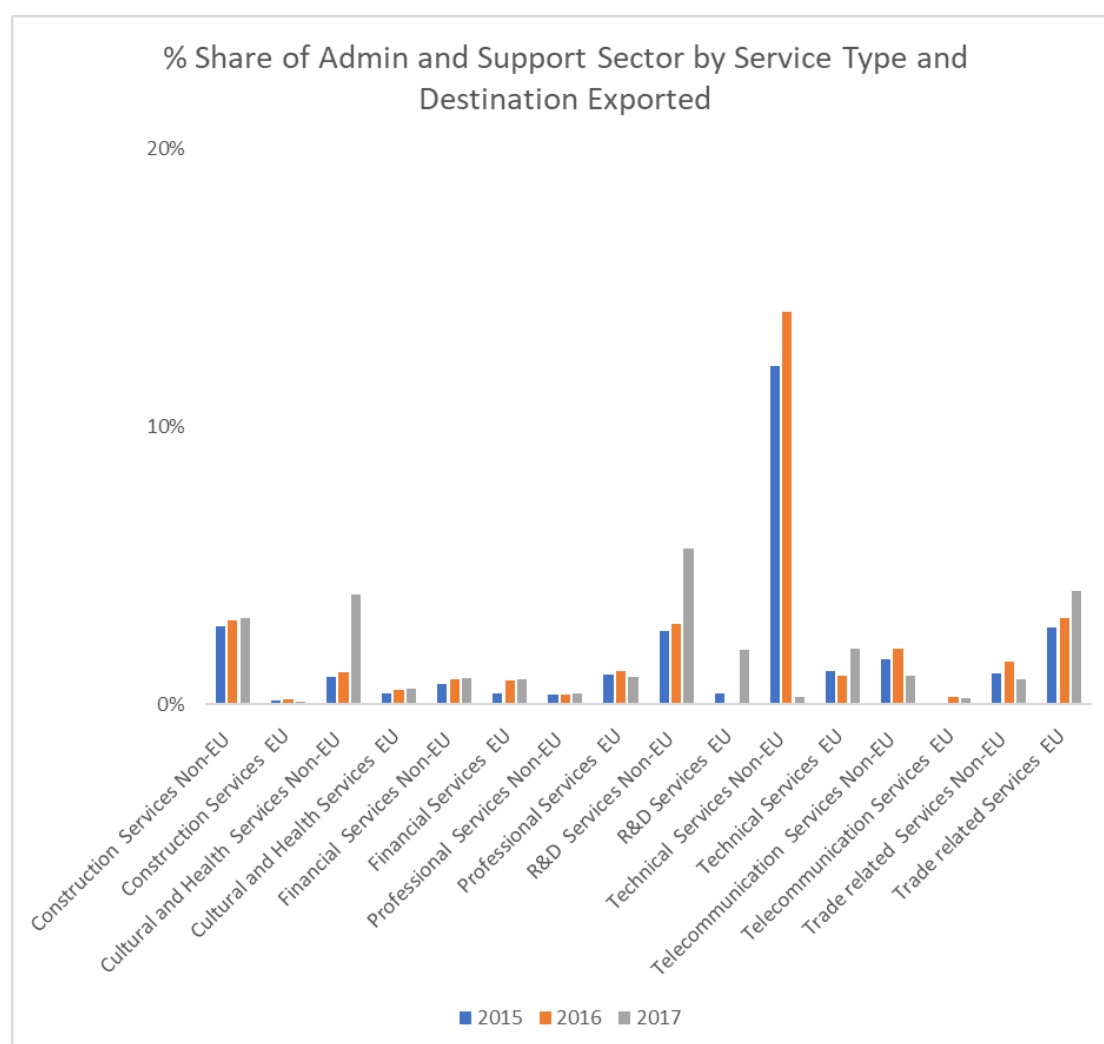
Source: Authors complied the data based on the UK Office of National Statistics the Annual Respondents Database and Annual Business Surveys over the period of 1998-2017.

Figure 3a: PBS sectors international trade patterns: EU vs non-EU



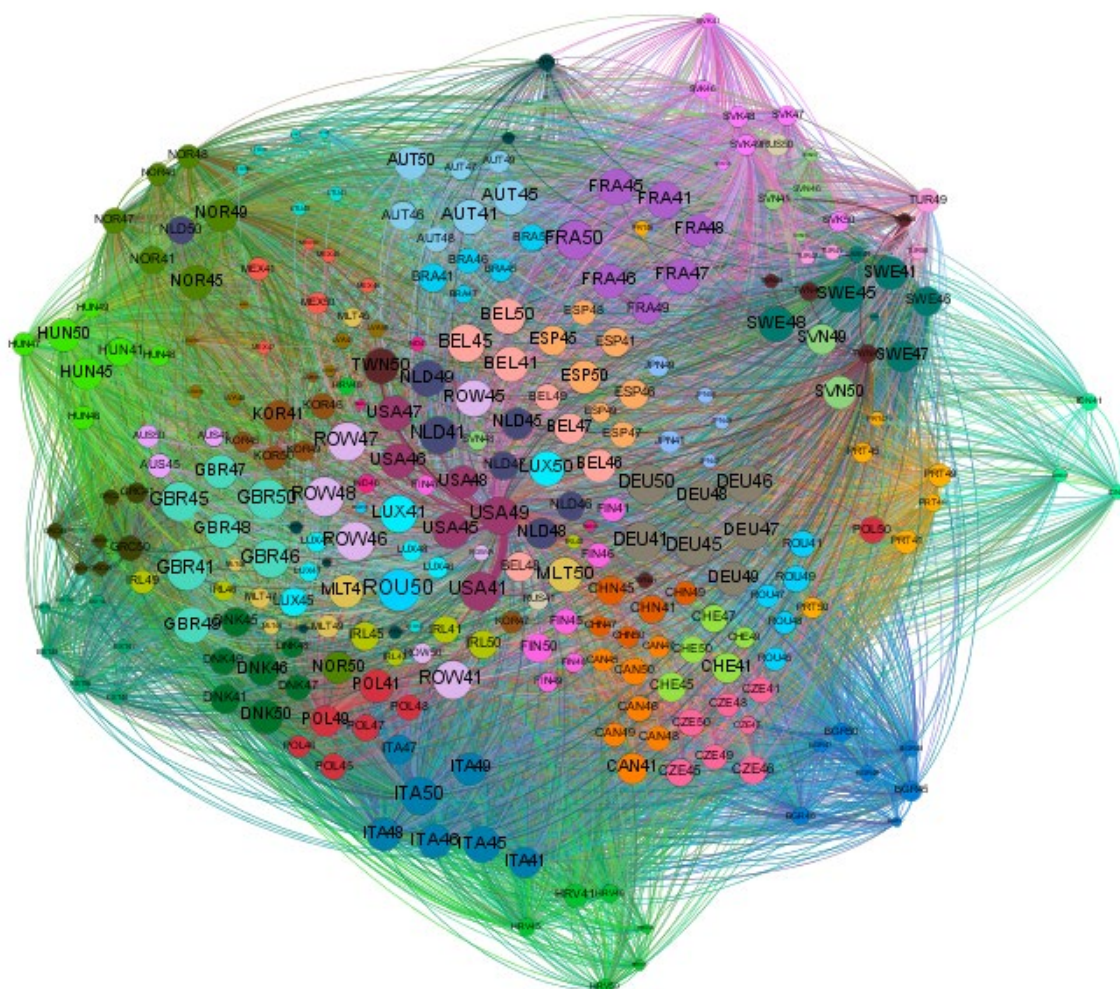
Source: Authors compiled based on Office of National Statistics *International Trade in Services, 2015-2017*.

Figure 3b: PBS sectors international trade patterns: EU vs non-EU



Source: Authors compiled based on Office of National Statistics *International Trade in Services, 2015-2017*.

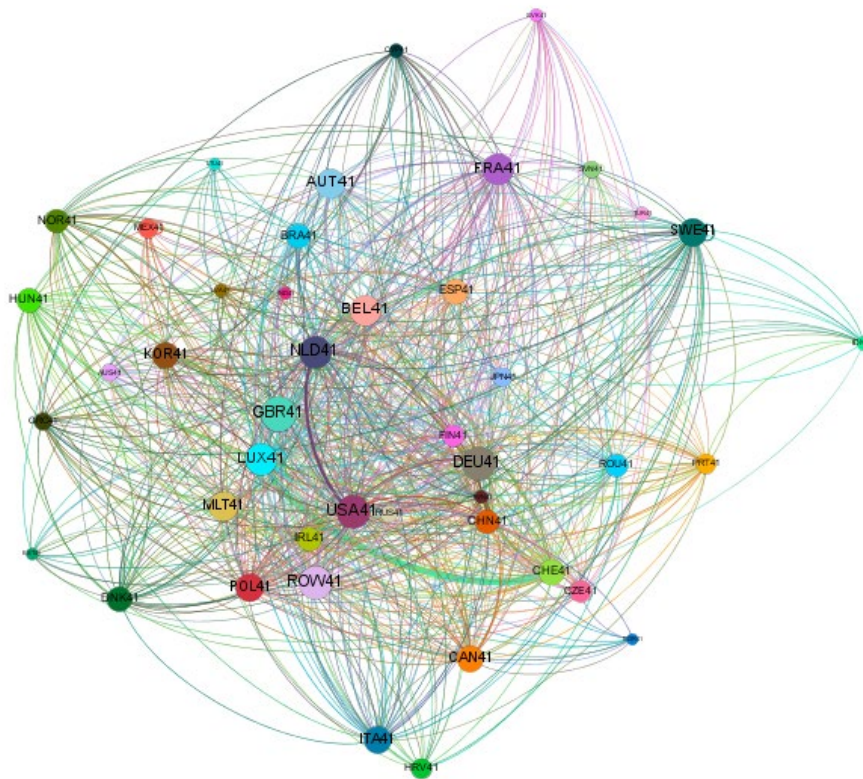
Figure 4: Global Network of PBS and Financial Service



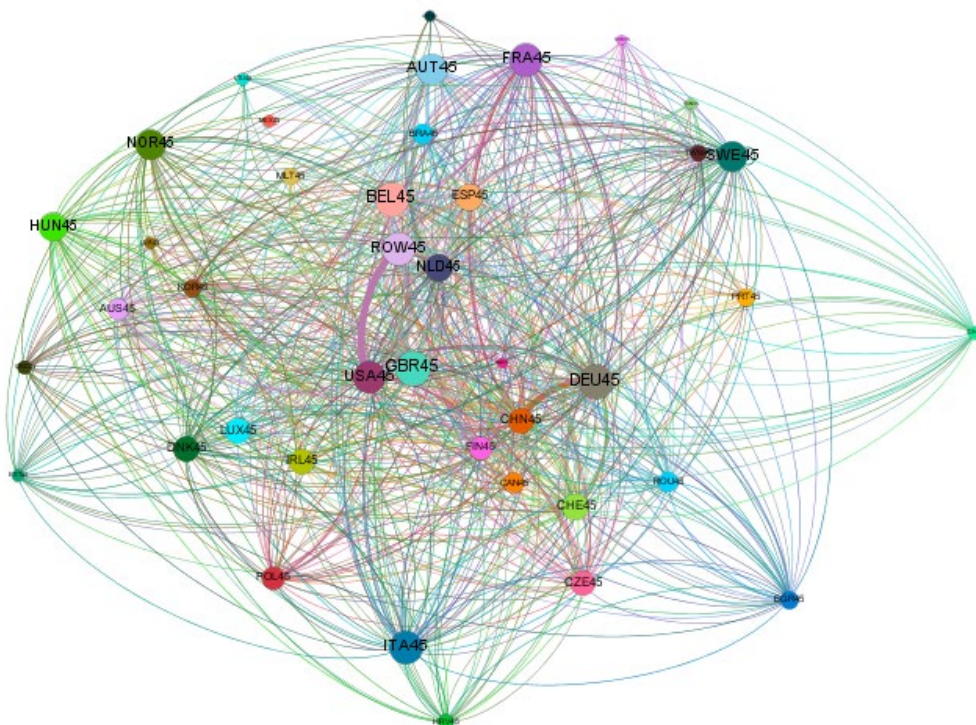
Source: WIOD input-output table 2014, Authors' calculation. The major countries with prominent presence in this map include the UK (GBR), USA (USA), Netherland (NLD), Belgium (BEL), Luxemburg (LUX) and Germany (DEU), Romania (ROU) among others. Rest of world (ROW) bundles all other countries in the world. Financial service activities, except insurance and pension funding (41); Legal and accounting activities; activities of head offices; management consultancy activities (45); Architectural and engineering activities; technical testing and analysis (46); Scientific research and development (47); Advertising and market research (48); Other professional, scientific and technical activities; veterinary activities (49); Administrative and support service activities (50).

Figure 5: Global network of individual PBS and Financial sectors

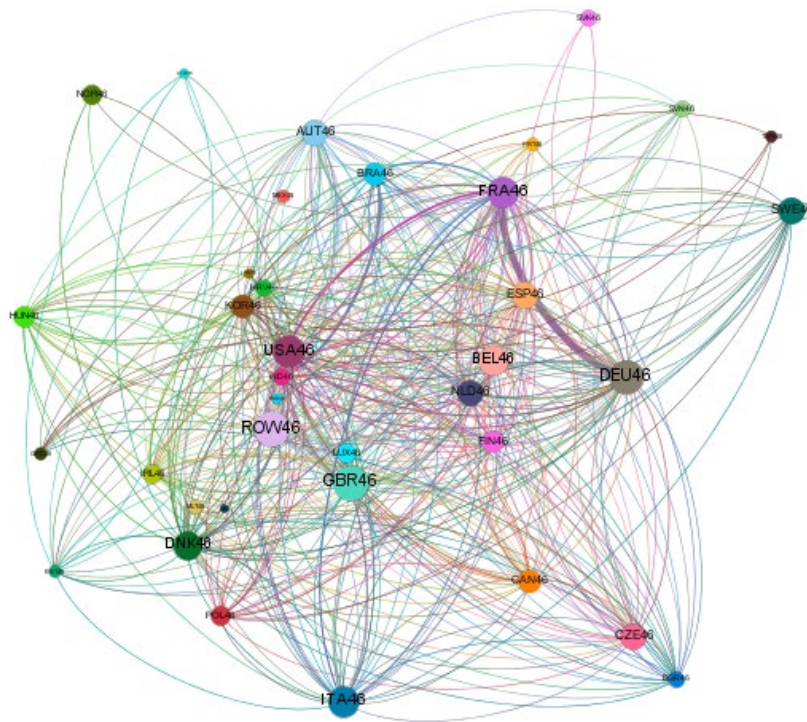
Financial service activities, except insurance and pension funding (41)



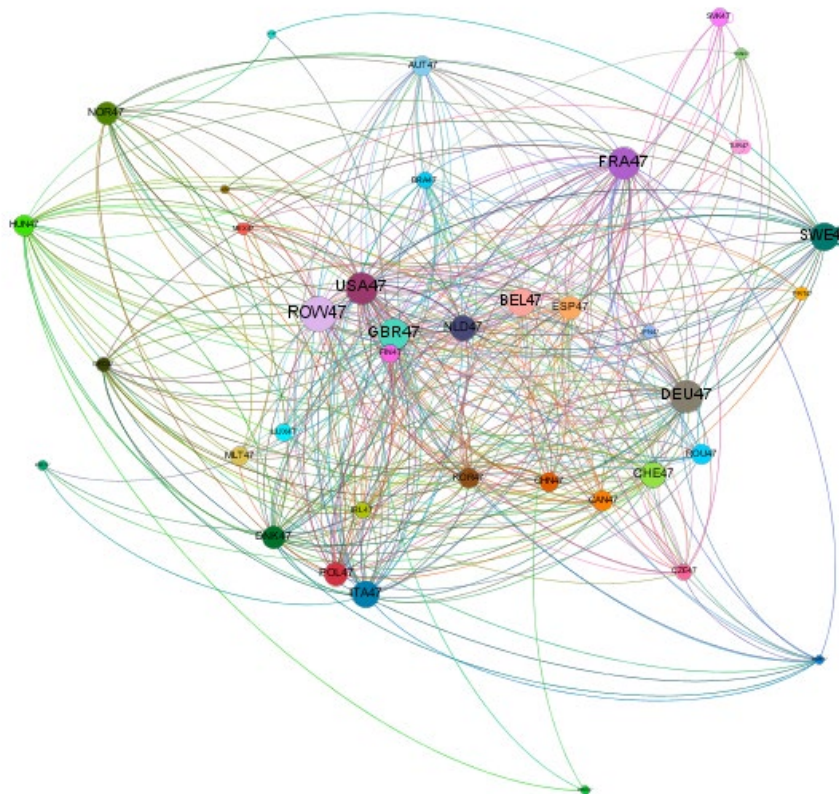
Legal and accounting activities; activities of head offices; management consultancy activities (45)



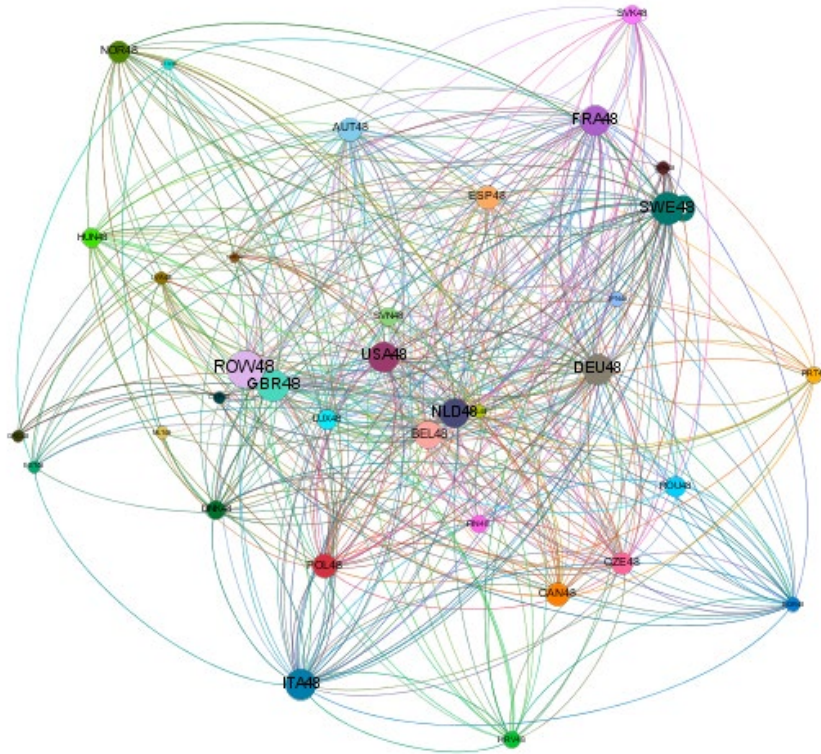
Architectural and engineering activities; technical testing and analysis (46)



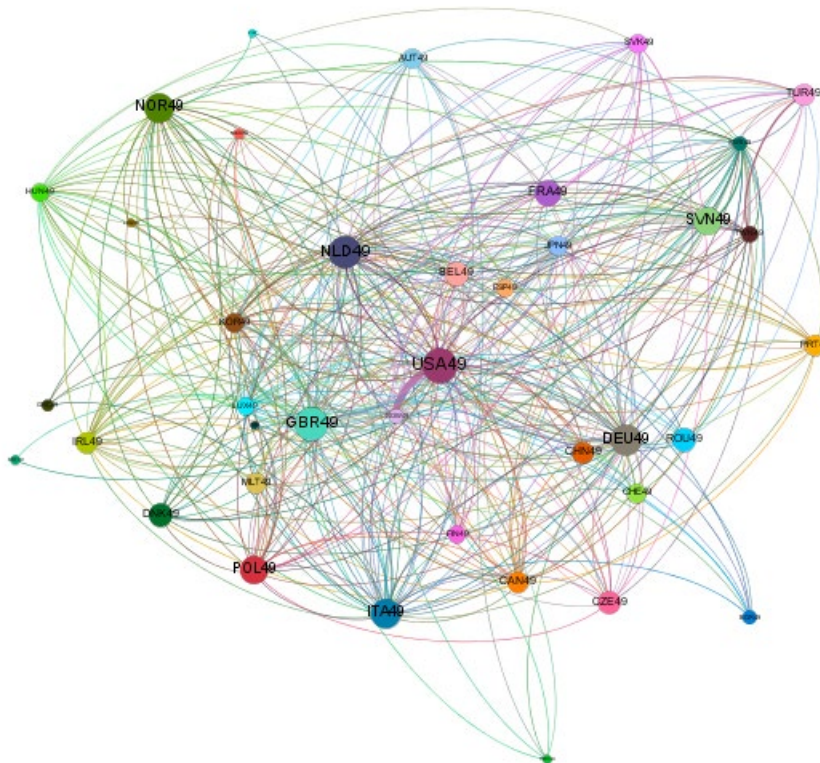
Scientific research and development (47)



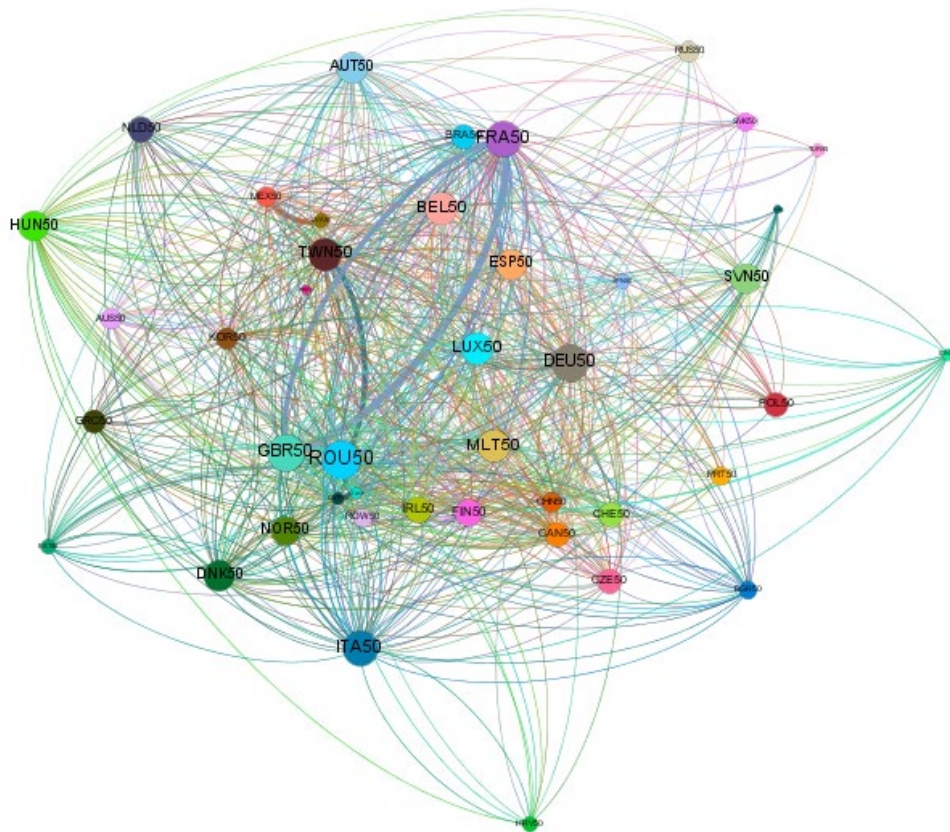
Advertising and market research (48)



Other professional, scientific and technical activities; veterinary activities (49)

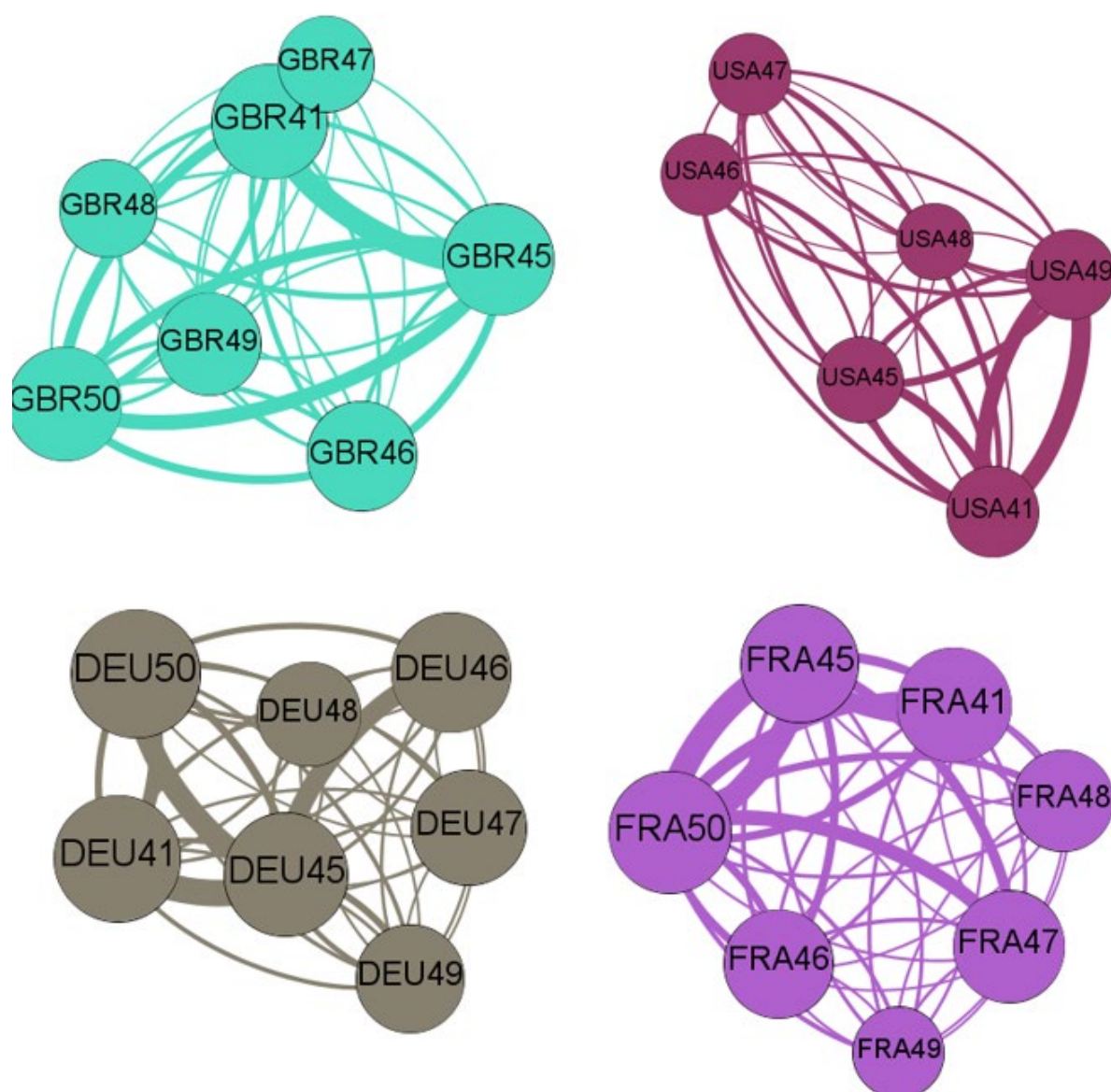


Administrative and support service activities (50)



Source: WIOD input-output table 2014, Authors' calculation.

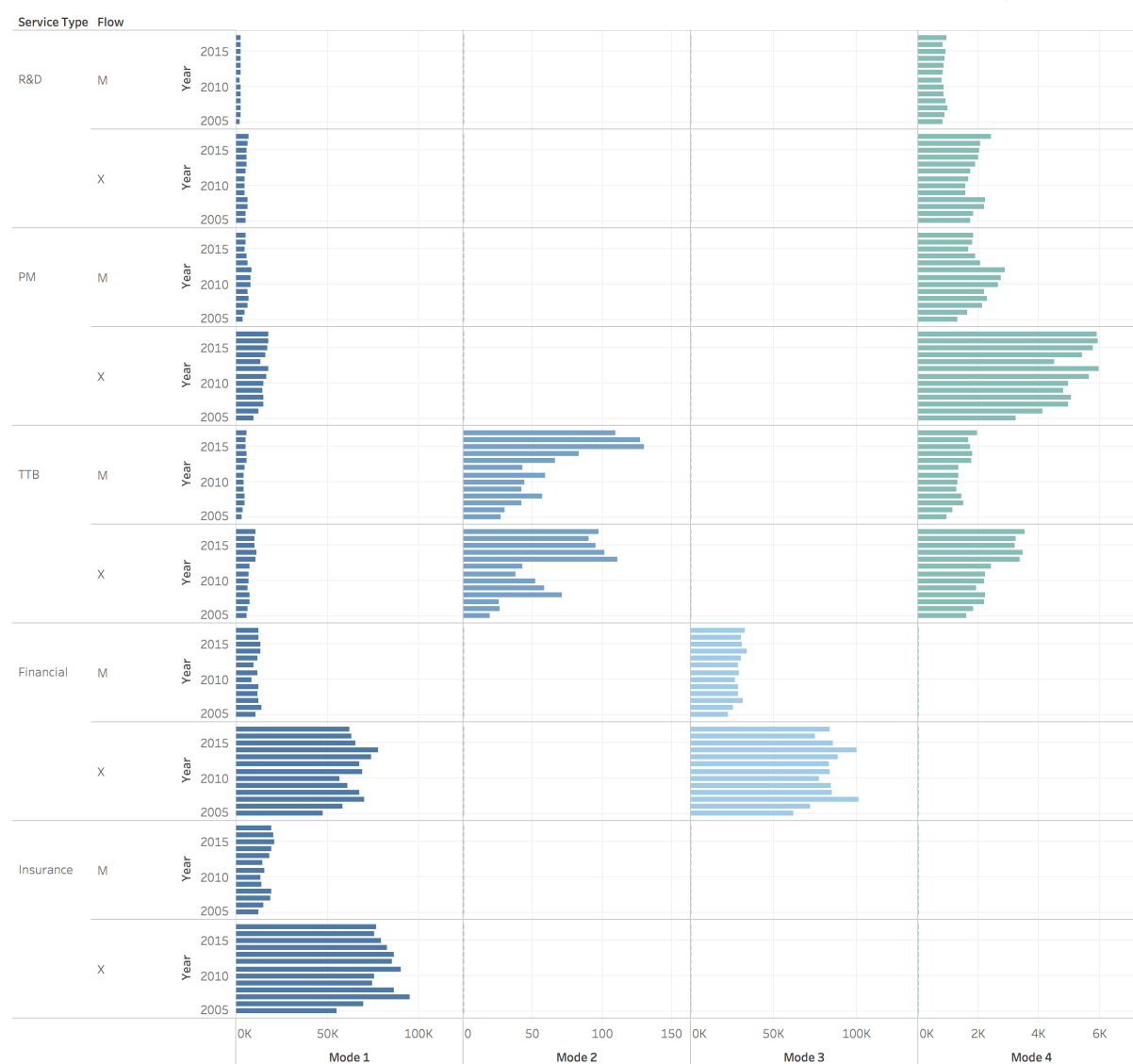
Figure 6: Global Values Chain, Financial Services vs PBS in the UK, USA, Germany and France



Source: WIOD input-output table 2014, Authors' calculation. Financial service activities, except insurance and pension funding (41); Legal and accounting activities; activities of head offices; management consultancy activities (45); Architectural and engineering activities; technical testing and analysis (46); Scientific research and development (47); Advertising and market research (48); Other professional, scientific and technical activities; veterinary activities (49); Administrative and support service activities (50).

Figure 7a: UK Trade in services: Business and Professional, Financial, ICT and IP Services, Types and Modes, 2005-2017, 1/2

UK Trade in Services, Business, Professional, Financial, ICT and IP Services, Types and Modes, 2005-2017, 1/2

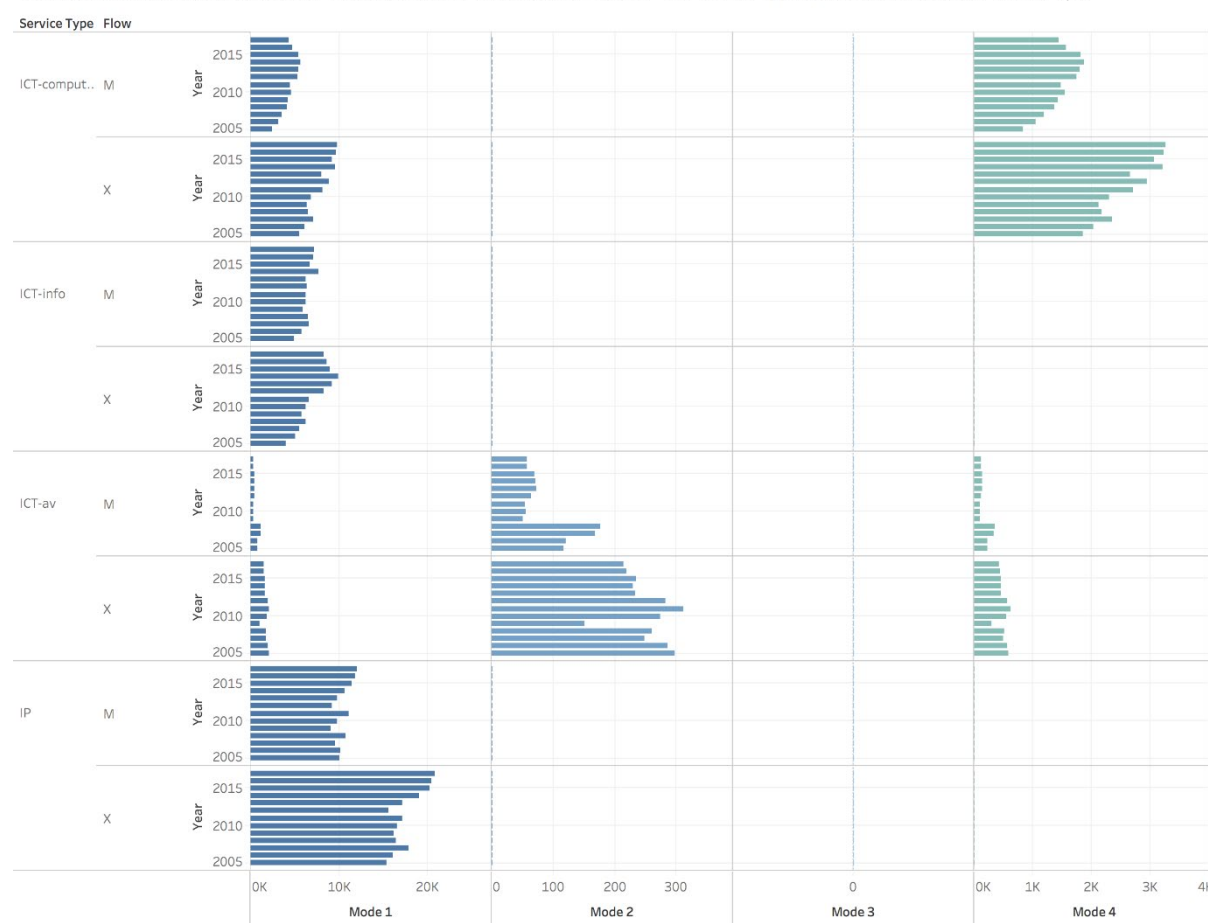


The plots of sum of Mode 1, sum of Mode 2, sum of Mode 3 and sum of Mode 4 for Year broken down by Service Type and Flow. The view is filtered on Service Type, which keeps Financial, Insurance, PM, R&D and TTB.

Note: **R&D**: Research and development services; **PM**: Professional and management consulting services (including legal and advertising); **TTB**: Technical, trade-related, and other business services; **Financial**: Financial services; **Insurance**: Insurance and pension services. **M**: Imports; **X**: Exports. GATS Mode 1: cross-border; Mode 2: Consumption abroad; Mode 3: Commercial presence; Mode 4: Presence of natural persons.

Figure 7b: UK Trade in services: Business and Professional, Financial, ICT and IP Services, Types and Modes, 2005-2017, 2/2

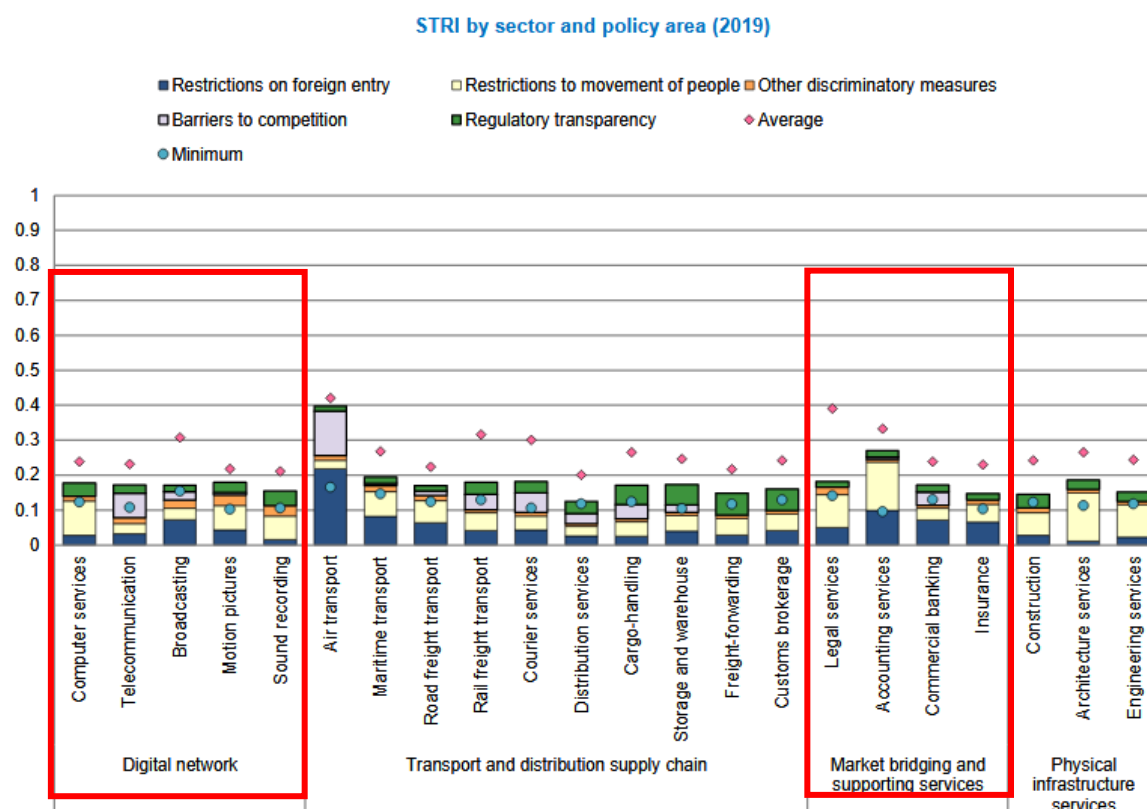
UK Trade in Services, Business, Professional, Financial, ICT and IP Services, Types and Modes, 2005-2017, 2/2



The plots of sum of Mode 1, sum of Mode 2, sum of Mode 3 and sum of Mode 4 for Year broken down by Service Type and Flow. The view is filtered on Service Type, which keeps ICT-av, ICT-computer, ICT-info and IP.

Note: **ICT_comput:** ; **ICT_info:** Information services; **ICT_av:** Audio-visual and related services; **IP:** The use of intellectual property services. **M:** Imports; **X:** Exports. GATS Mode 1: cross-border; Mode 2: Consumption abroad; Mode 3: Commercial presence; Mode 4: Presence of natural persons.

Figure 8: Services Trade Restrictiveness Index, UK 2019



Note: The STRI indices take values between zero and one, one being the most restrictive. They are calculated on the basis of the STRI regulatory database which contains information on regulation for the 36 OECD Members, Brazil, China, Colombia, Costa Rica, India, Indonesia, Malaysia, Russia, South Africa, and Thailand. The STRI database records measures on a Most Favoured Nations basis. Preferential trade agreements are not taken into account. Air transport and road freight cover only commercial establishment (with accompanying movement of people). The indices are based on laws and regulations in force on 31 October 2019.

Source: OECD Services Trade Restrictiveness Index (STRI): United Kingdom 2019

Figure 9: STRI vs EEA STRI: overall assessment, 2019

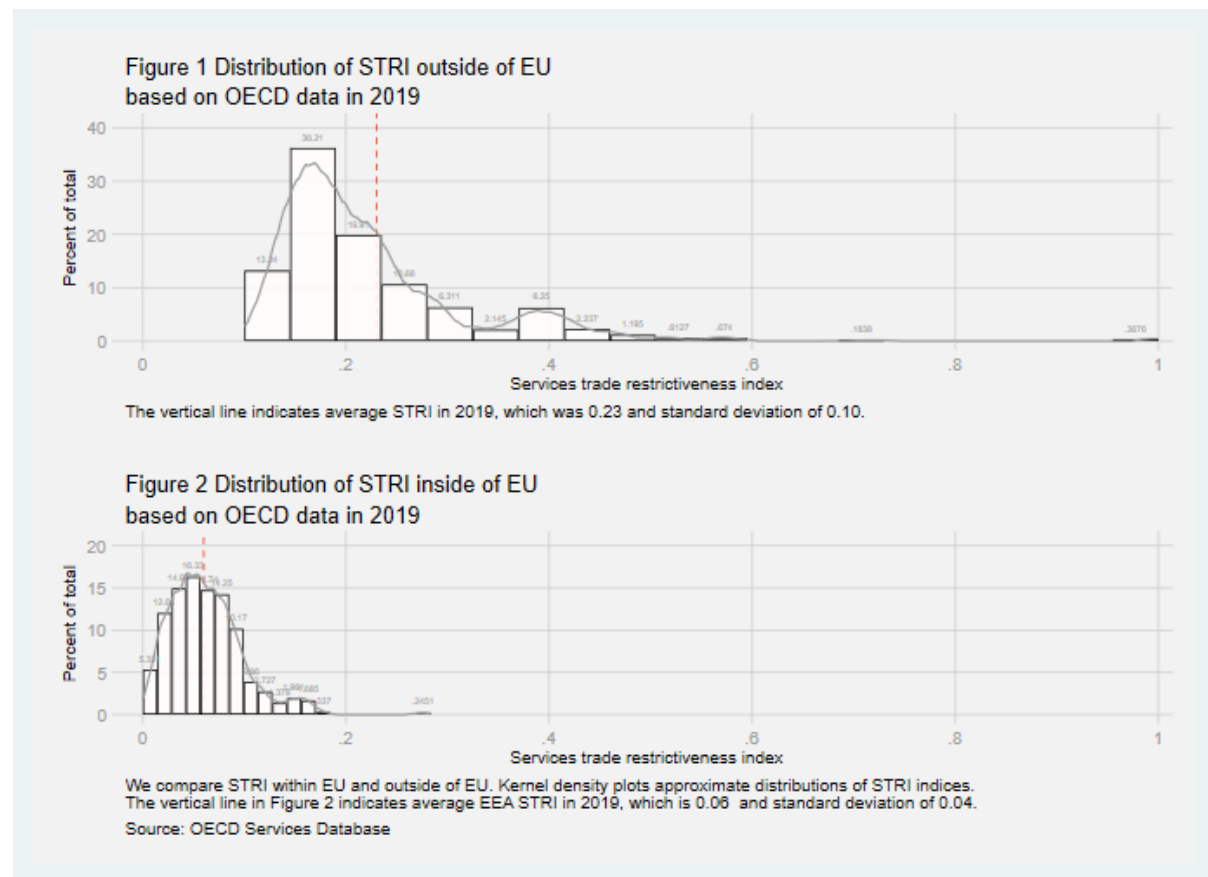


Figure 10: STRI vs EEA STRI: assessment by services sectors, 2019

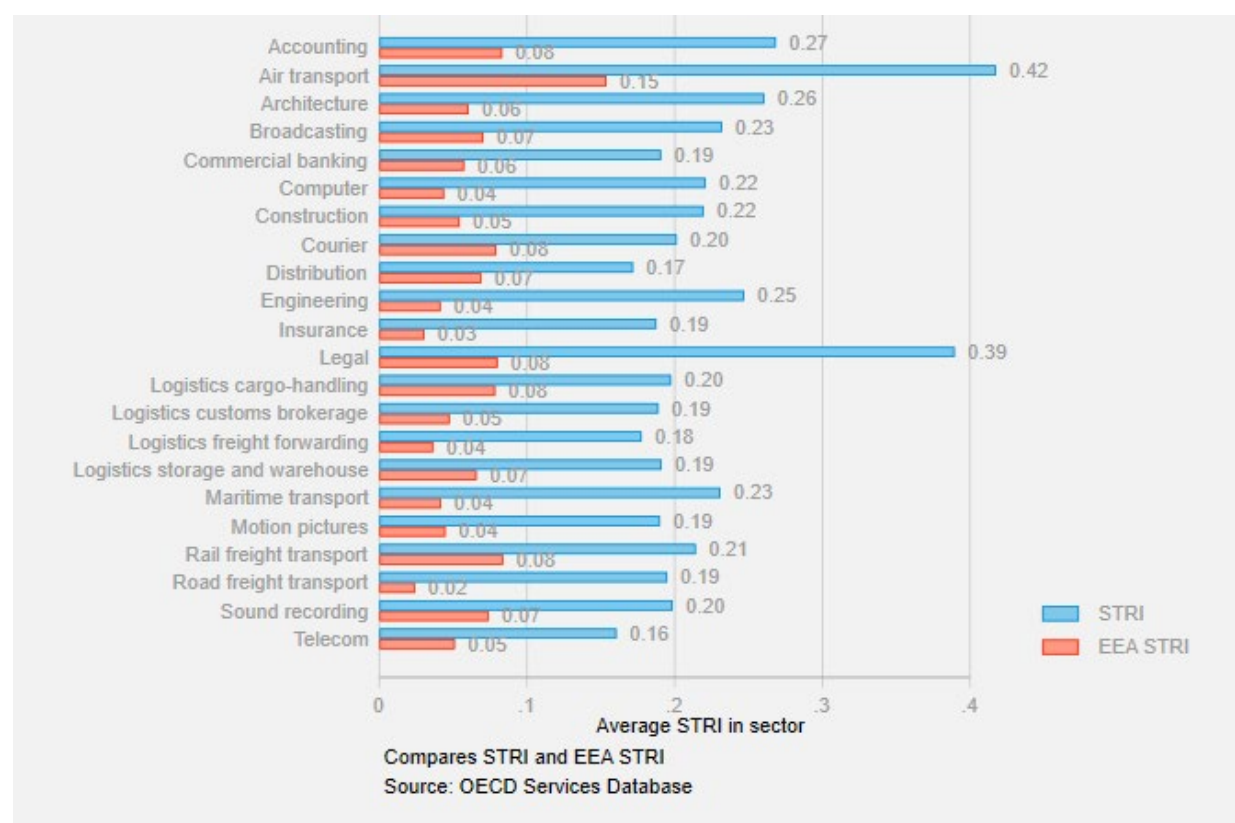


Figure 11: STRI vs EEA STRI: assessment by country in and out of EEA, 2019

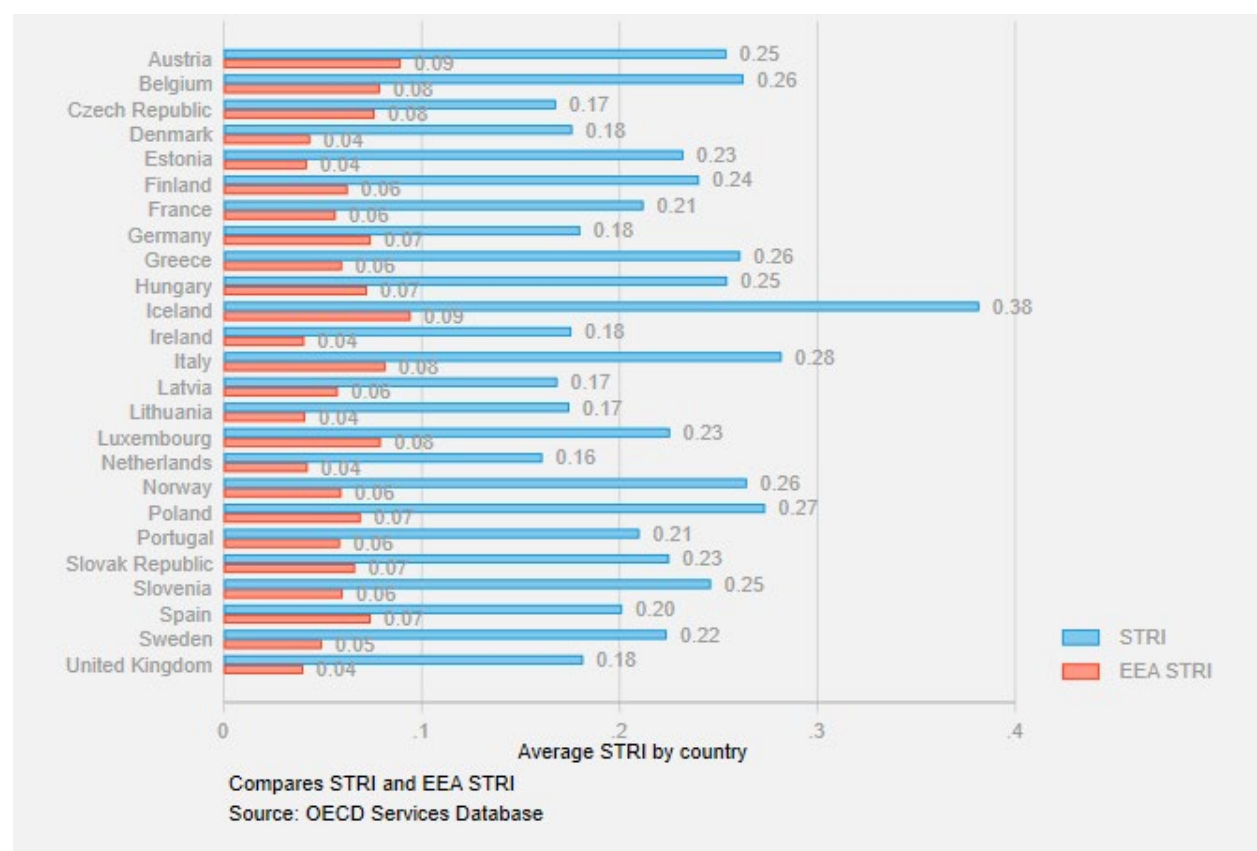


Figure 12: STRI vs EEA STRI: Barrier to competition in and out of EEA, 2019

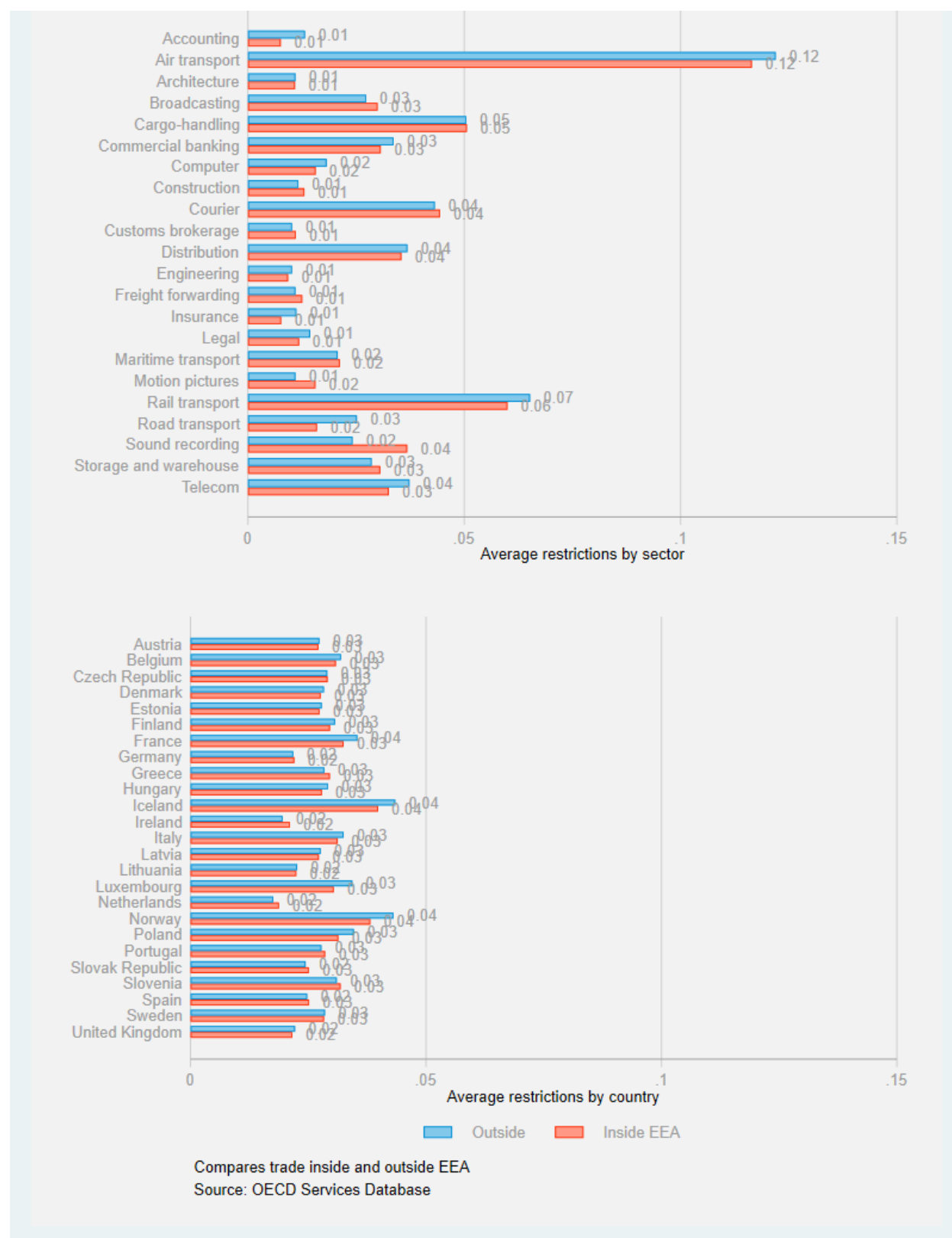


Figure 13: STRI vs EEA STRI: Other discriminatory measures in and out of EEA, 2019

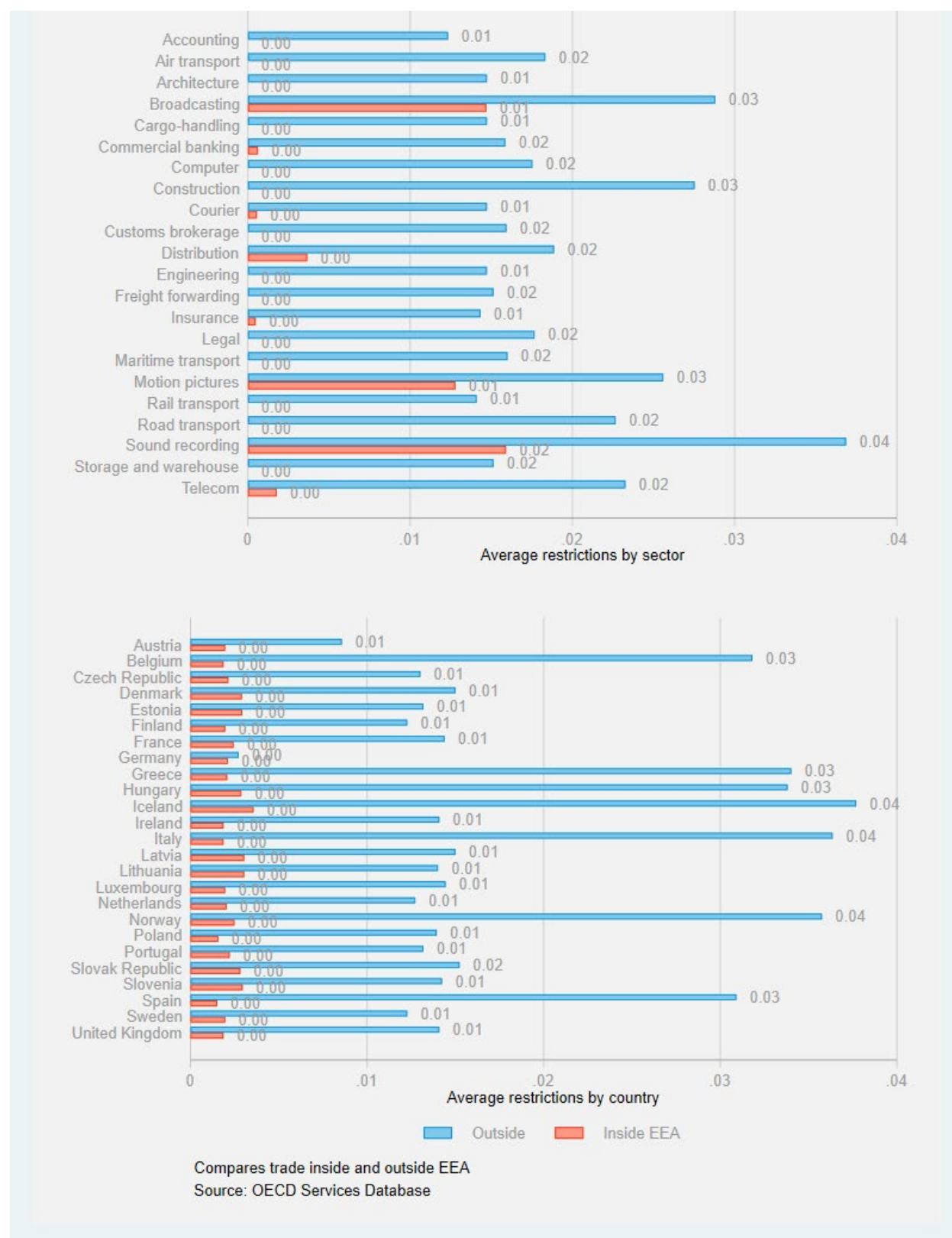


Figure 14: STRI vs EEA STRI: Regulatory transparency in and out of EEA, 2019

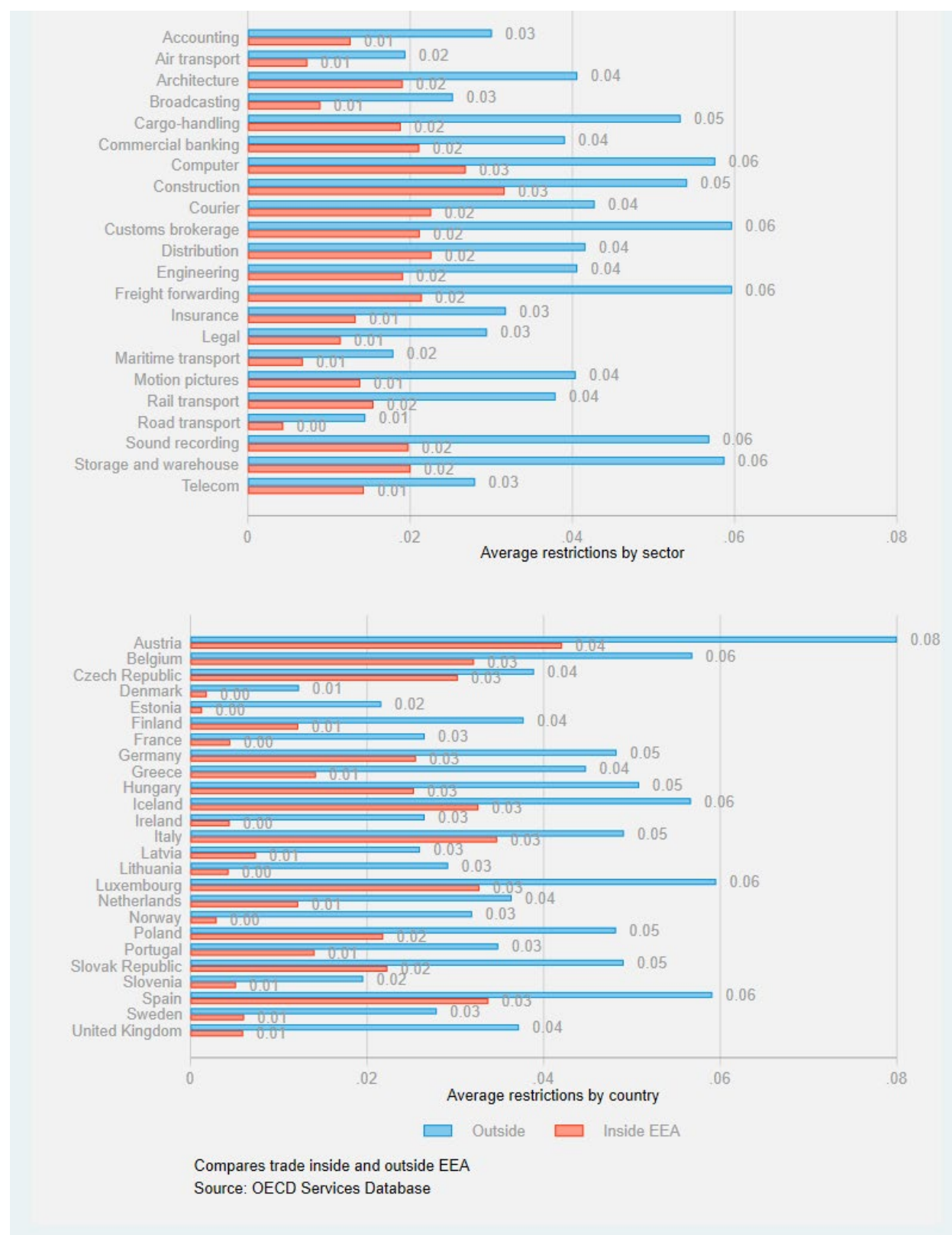


Figure 15: STRI vs EEA STRI: Restrictions on foreign entry in and out of EEA, 2019

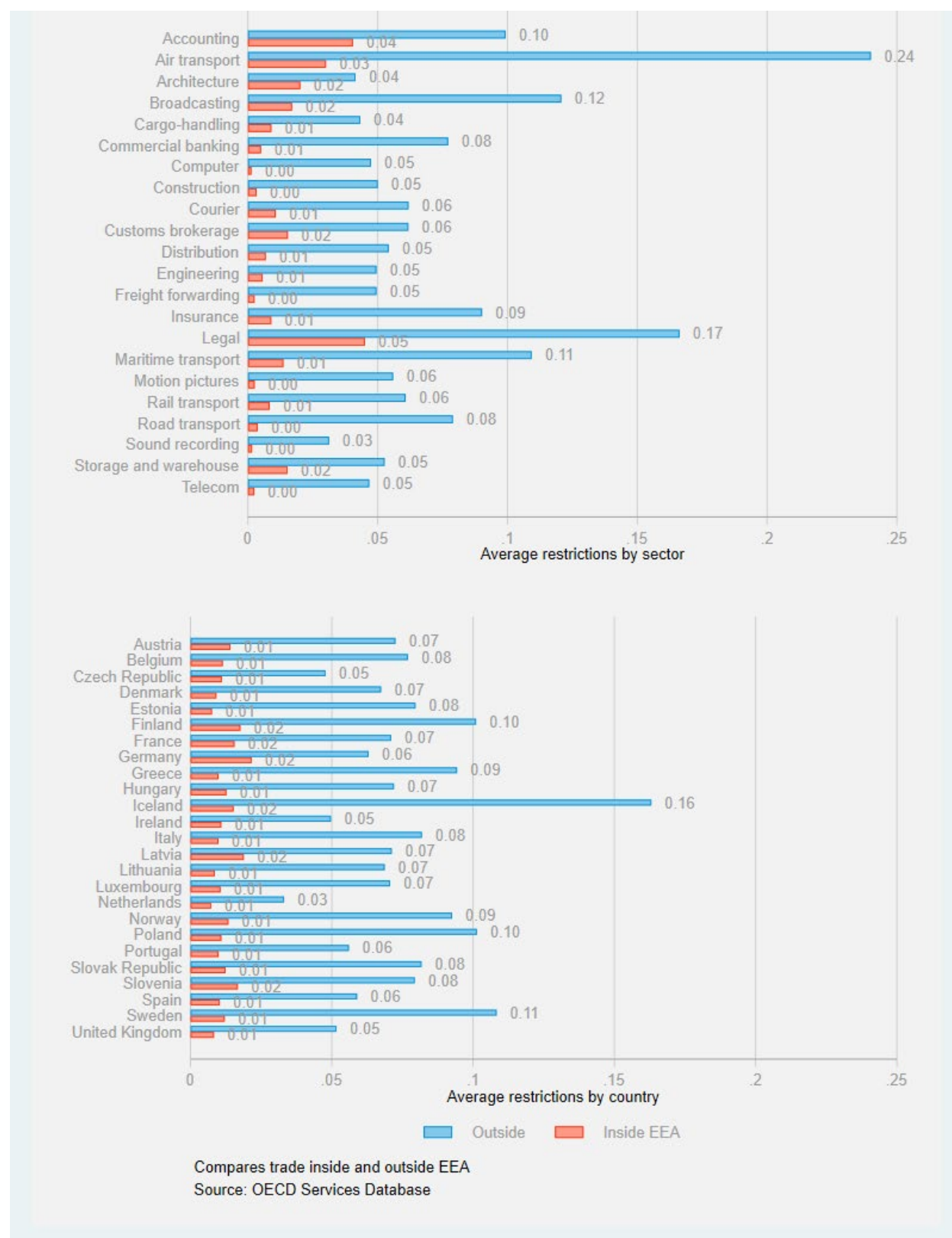


Figure 16: STRI vs EEA STRI: Restrictions to movement of people in and out of EEA, 2019

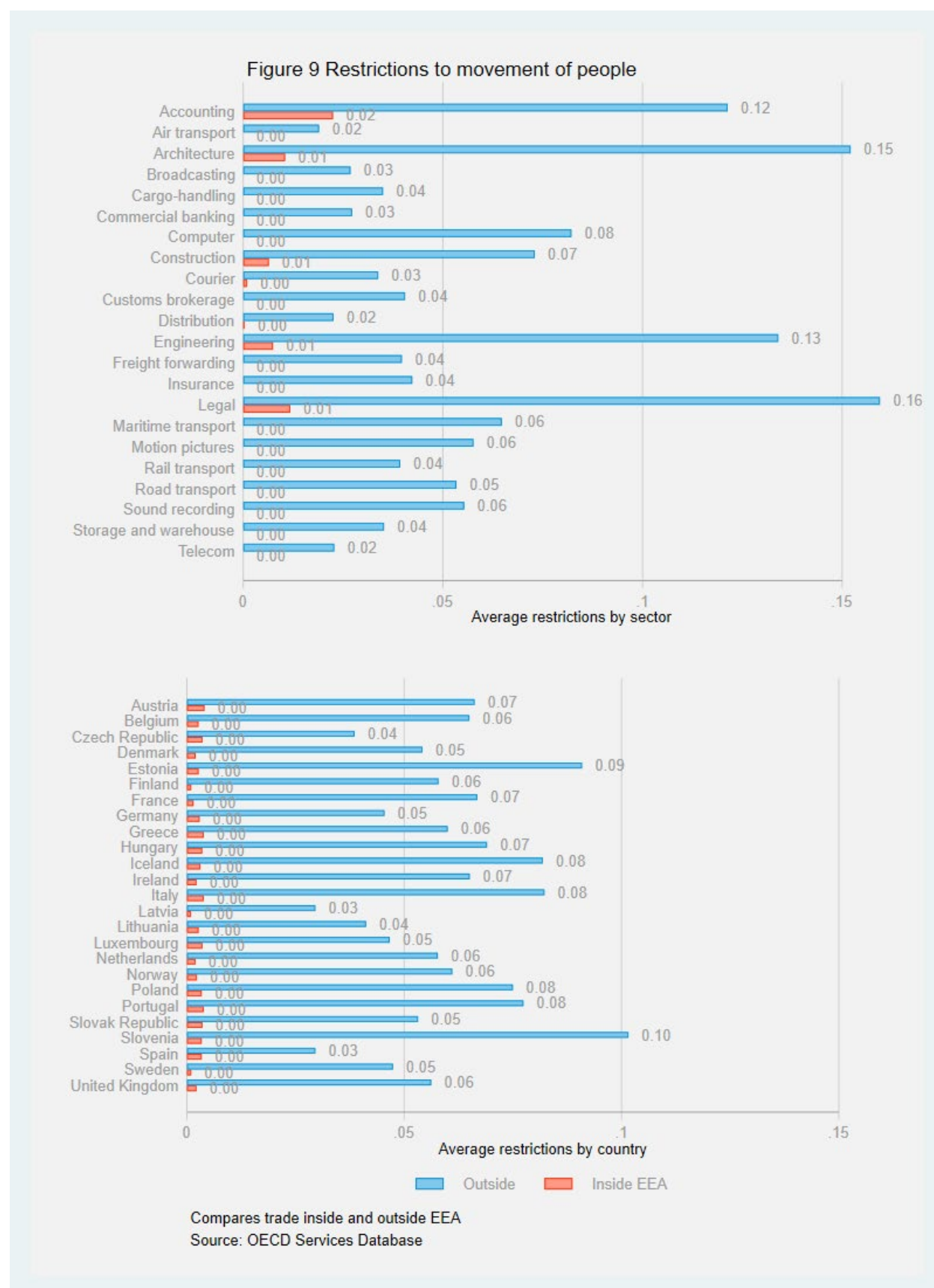


Table 1: Contribution to the UK economy and characteristics of participation of international trade in services (1998-2017)

Characteristics	All Industries	Professional and Technical Services Sector		Administration and Support Services Sector		Other Services Sector		Manufacturing Sector	
Number of Observations (903,064)		All firms	SMES	All firms	SMES	All firms	SMES	All firms	SMES
Number and Share of firms	570,518 (100%)	103,403 18%	95,638 17%	26,608 5%	22,785 4%	339,131 59%	319,676 56%	30,342 5.3%	29,043 5%
Share of international traders of services	45,669	12,899	11,674	3,187	2,616	22,482	20,303	5,306	4,711
Mean Age	8% 16 years	2.2% 9 years	2% 9 years	0.5% 10 years	0.4% 11 years	4% 12 years	3.5% 12 years	1% 19 years	0.8% 21 years
Number and Share of Employment (Thousands and %)	248,000 100%	31,000 12%	5,278 2%	16,700 7%	1,872 0.7%	157,000 63%	20,300 8%	25,900 10%	5,083 2%
Value and Share of Value Added (million pounds and %)	9,060,000 100%	1,090,000 12%	208,000 2.3%	532,000 6%	104,000 1.1%	5,410,000 60%	682,000 7.5%	1,040,000 11.5%	159,000 1.8%
Value and Share of total Service Exports (million pounds and %)	912,000 100%	314,000 34%	59,800 7%	61,300 7%	22,900 2.5%	433,000 47%	140,000 15%	82,300 9%	10,300 1.1%
Value and Share of total Service Imports (million pounds and %)	549,000 100%	131,000 24%	24,800 4.5%	43,000 8%	17,800 3%	302,000 60%	110,000 20%	49,700 9%	7,232 1.3%
Value and Share of turnover (million pounds and %)	30,700,000 100%	2,000,000 6.5%	530,000 1.7%	936,000 3%	256,000 0.8%	21,600,000 70%	5,180,000 17%	3,300,000 11%	498,000 1.6%

Source: Authors' compiled data at firm level statistics based on the UK Office of National Statistics *Annual Respondents Database, 1998-2008*, and *Annual Business Survey, 2008-2017*.

Note 1: **Professional and Technical Services Sectors** include Legal activities/accounting, bookkeeping and audit (SIC2007-69), Activities of head offices, management consultancy (SIC2007-70), Architectural and engineering activities, technical testing and analysis (SIC2007-71), Scientific research and development (SIC2007-72), Advertising and market research (SIC2007-73), Other professional, scientific and technical activities (SIC2007-74), Rental and leasing activities (SIC2007-75). **Administration and Support Services Sectors** include Employment activities (SIC2007-78), Office administration and other business support activities (SIC2007-82).

Note 2: The data are aggregated based on the whole period to reflect the overall contribution of Professional and Business Sectors in the economy, in contrast to other service sectors and manufacturing sectors.

Table 2: Characteristics of Goods and Services Traders in Relevant Sectors (2011 to 2017)

Characteristics	All Industries	Professional and Technical Services Sector			Administration and Support Services Sector			Other Services Sector			Manufacturing Sector		
		Only Service Traders	Only Goods Traders	Goods and Service Traders	Only Service Traders	Only Goods Traders	Goods and Service Traders	Only Service Traders	Only Goods Traders	Goods and Service Traders	Only Service Traders	Only Goods Traders	Goods and Service Traders
Number of Observations: (328,845)													
Number and Share of firms	178,389 (100%)	4,011 (2.3%)	667 (0.4%)	670 (0.4%)	1,666 (1%)	556 (0.3%)	327 (0.2%)	5,603 (3%)	9,587 (5.4%)	3,241 (2%)	508 (0.3%)	6,900 (4%)	2,872 (1.6%)
Mean Age	19 years	10 years	11 years	11 years	10 years	13 years	12 years	11 years	13 years	13 years	16 years	22 years	22 years
Number and Share of Employment (Thousands and %)	115,000 (100%)	4,285 (3.7%)	264 (0.2%)	1,056 (1%)	3,245 (2.8%)	416 (0.4%)	513 (0.5%)	9,063 (8%)	13,800 (12%)	12,500 (11%)	1,985 (1.7%)	8,890 (7.7%)	6,650 (5.7%)
Value and Share of Value Added (million pounds and %)	4,790,000 (100%)	262,000 (5.5%)	11,900 (0.2%)	63,300 (1.3%)	129,000 (3%)	15,600 (0.3%)	25,100 (0.5%)	470,000 (10%)	565,000 (12%)	561,000 (12%)	79,600 (1.6%)	301,000 (6%)	369,000 (7.7%)
Value and Share of turnover (million pounds and %)	17,000,000 (100%)	489,000 (3%)	25,500 (0.2%)	160,000 (1%)	257,000 (1.5%)	29,800 (0.2%)	50,500 (0.3%)	1,940,000 (11.5%)	2,450,000 (14.5%)	2,450,000 (14%)	216,000 (1.3%)	936,000 (5.5%)	1,200,000 (7%)
Value and Share of total Exports (million pounds and %)	609,000 (100%)	123,000 (20%)	NA	45,400 (7.5%)	41,400 (7%)	NA	11,700 (2%)	152,000 (25%)	NA	154,000 (25%)	9,409 (1.5%)	NA	55,000 (9%)
Value and Share of total Imports (million pounds and %)	374,000 (100%)	66,600 (18%)	NA	18,800 (5%)	30,200 (8%)	NA	6351 (2%)	110,000 (30%)	NA	83,400 (22%)	5,436 (1.5%)	NA	32,500 (9%)

Source: Authors' compiled data at firm level statistics based on the UK Office of National Statistics *Annual Business Survey, 2011-2017*.

Note 1: **Professional and Technical Services Sectors** include Legal activities/accounting, bookkeeping and audit (SIC2007-69), Activities of head offices, management consultancy (SIC2007-70), Architectural and engineering activities, technical testing and analysis (SIC2007-71), Scientific research and development (SIC2007-72), Advertising and market research (SIC2007-73), Other professional, scientific and technical activities (SIC2007-74), Rental and leasing activities (SIC2007-75). **Administration and Support Services Sectors** include Employment activities (SIC2007-78), Office administration and other business support activities (SIC2007-82).

TABLE 3: Services Traders in EU and Non-EU by sector and by year (2011 to 2017)

All Industries	2015	2016	2017
N=39,068	12,023	12,677	14,368
Total EU Exports (millions)	34,400	40,900	50,300
Total Non-EU Exports (millions)	66,500	72,200	83,100
Total EU Imports (millions)	20,700	24,000	27,400
Total Non-EU Imports (millions)	27,200	31,300	38,400

	Professional, Scientific and Technical			Administrative and Support			Other Services			Manufacturing		
	2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017
N=39,068	3341	3528	3,870	978	1,052	1,187	4,951	5,274	6,121	2,374	2,406	2,704
Total EU Exports (millions)	8,468	10,100	12,700	2,390	2,883	3,929	19,400	23,000	27,100	3,585	4,405	6,344
<i>Total EU Exports (%)</i>	<i>24.6%</i>	<i>24.7%</i>	<i>25.2%</i>	<i>7.0%</i>	<i>7.0%</i>	<i>7.8%</i>	<i>56.5%</i>	<i>56.3%</i>	<i>53.7%</i>	<i>10.4%</i>	<i>10.8%</i>	<i>12.6%</i>
Total Non-EU Exports (millions)	21,100	22,100	24,100	2,641	2,627	2,754	35,800	38,300	47,000	5,597	7,837	8,147
<i>Total Non-EU Exports (%)</i>	<i>31.76%</i>	<i>30.63%</i>	<i>29.05%</i>	<i>3.97%</i>	<i>3.64%</i>	<i>3.31%</i>	<i>53.81%</i>	<i>52.98%</i>	<i>56.59%</i>	<i>8.41%</i>	<i>10.85%</i>	<i>9.80%</i>
Total EU Imports (millions)	4,824	5,180	5,320	961	1,211	1,389	10,700	12,800	14,300	3,329	3,962	5,063
<i>Total EU Imports (%)</i>	<i>23.3%</i>	<i>21.6%</i>	<i>19.4%</i>	<i>4.6%</i>	<i>5.0%</i>	<i>5.1%</i>	<i>51.7%</i>	<i>53.2%</i>	<i>52.2%</i>	<i>16.1%</i>	<i>16.5%</i>	<i>18.5%</i>
Total Non-EU Imports (millions)	8	10,000	11,200	1,007	1,000	1,196	14,700	16,300	20,400	3	3	5
<i>Total Non-EU Imports (%)</i>	<i>29.5%</i>	<i>32.0%</i>	<i>29.1%</i>	<i>3.7%</i>	<i>3.2%</i>	<i>3.1%</i>	<i>53.9%</i>	<i>52.2%</i>	<i>53.1%</i>	<i>9.9%</i>	<i>10.2%</i>	<i>13.1%</i>

Source: Authors' compiled data at firm level statistics based on the UK Office of National Statistics *Annual Business Survey, 2011-2017*.

Note 1: **Professional and Technical Services Sectors** include Legal activities/accounting, bookkeeping and audit (SIC2007-69), Activities of head offices, management consultancy (SIC2007-70), Architectural and engineering activities, technical testing and analysis (SIC2007-71), Scientific research and development (SIC2007-72), Advertising and market research (SIC2007-73), Other professional, scientific and technical activities (SIC2007-74), Rental and leasing activities (SIC2007-75). **Administration and Support Services Sectors** include Employment activities (SIC2007-78), Office administration and other business support activities (SIC2007-82).

Table 4: Ranking of PBS and Financial Services network centrality score

Label	Eigen. centrality	Rank
ROU50	1	1
GBR41	0.963514	2
GBR50	0.951585	3
DEU50	0.948387	4
ROW48	0.93578	5
DEU41	0.931268	6
ROW46	0.919289	7
GBR45	0.917589	8
USA41	0.911655	9
ROW41	0.906513	10
FRA50	0.90321	11
GBR46	0.901032	12
ROW47	0.900816	13
DEU45	0.899196	14
ITA50	0.898449	15
USA49	0.892539	16
BEL45	0.888194	17
DEU46	0.871563	18
NLD41	0.870661	19
FRA45	0.857321	20

Source: WIOD input-output table 2014, Authors' calculation. Financial service activities, except insurance and pension funding (41); Legal and accounting activities; activities of head offices; management consultancy activities (45); Architectural and engineering activities; technical testing and analysis (46); Scientific research and development (47); Advertising and market research (48); Other professional, scientific and technical activities; veterinary activities (49); Administrative and support service activities (50). The sectors that play the most prominent role in this network include those from UK (GBR), USA (USA), Netherland (NLD), Belgium (BEL), Luxemburg (LUX) and Germany (DEU), Romania (ROU) and France (FRA). Rest of the World (RoW) refers to a bundle of countries that are not captured individually by the WIOD country statistics.

Table 5: Ranking of Financial Services according to network centrality score, I-O Table 2014

Label	Eigen centrality	Rank
GBR41	0.963514	1
DEU41	0.931268	2
USA41	0.911655	3
NLD41	0.870661	4
LUX41	0.85488	5
FRA41	0.837739	6
BEL41	0.809742	7
AUT41	0.774205	8
MLT41	0.750962	9
SWE41	0.732538	10
POL41	0.722707	11
ITA41	0.691624	12
CAN41	0.667547	13
KOR41	0.66543	14
CHE41	0.64151	15

Source: WIOD input-output table 2014, Authors' calculation. Financial service activities, except insurance and pension funding (41). The countries that play the most prominent role in this network include those from UK (GBR), Germany (DEU), USA (USA), Netherland (NLD), Luxemburg (LUX), France (FRA), Belgium (BEL), Canada (CAN), Korea (KOR) and Italy (LTA).

Table 6: Impact of STRI on services trade: regression analysis

Variable	All	Accounting	Air	Architecture	AudioVisual	Computer	Construction	Courier	Engineering
Exporter STRI	-5.172***	-3.924***	5.638***	-1.899	-3.256***	-2.044*	-1.580	-2.352***	4.192***
Importer STRI	-0.954**	-2.957***	-0.843	0.220	-3.758***	-0.885	1.795	0.566	2.380***
Pref. trade agreement	-0.160*	-0.520***	0.015	-0.651**	0.637*	0.177	-0.457	0.619*	-0.012
Log GDP in exporting country	0.744***	0.503***	0.901***	0.174***	0.563***	0.519***	0.358***	0.584***	0.619***
Log GDP in importing country	0.786***	0.787***	0.853***	0.749***	1.276***	0.802***	0.643***	1.068***	0.934***
Log of distance	-0.724***	-1.316***	-0.693***	-1.341***	-0.674***	-0.568***	-1.063***	-0.918***	-0.987***
Common border	-0.049	-0.505***	-0.226	0.000	0.539	-0.095	0.298*	0.558***	0.178
Common spoken language	1.142***	0.454**	1.356***	1.003***	1.892***	2.104***	0.410*	1.314***	1.655***
Common legal system origin	0.304***	0.031	0.241**	0.484*	0.409**	-0.123	-0.226*	0.389***	-0.014
N	8325	6660	6660	6660	6660	6660	8325	6660	6660
r2_p	0.795	0.537	0.663	0.400	0.655	0.556	0.385	0.610	0.534

Table 6 continued

Variable	Finance	Insurance	Legal	Logistic	Maritime	Rail	Road	Telecom
Exporter STRI	-4.392***	-4.885***	-2.489***	-0.735	-4.560***	0.774***	-0.585	-3.649***
Importer STRI	-2.258**	-3.083***	0.528*	-0.430	-0.026	0.336	-0.822	-2.115***
Pref. trade agreement	-0.775***	0.236	-0.247	0.858***	-0.564***	-0.322	0.690***	-0.350
Log GDP in exporting country	0.533***	0.938***	1.153***	0.504***	0.532***	0.289***	0.308***	0.815***
Log GDP in importing country	0.602***	0.959***	0.909***	0.757***	0.726***	0.447***	0.677***	0.743***
Log of distance	-0.752***	-0.520***	-0.598***	-0.872***	-0.557***	-1.295***	-1.508***	-0.852***
Common border	0.050	0.174	0.090	0.244	0.072	1.565***	0.328**	-0.089
Common spoken language	2.206***	1.697***	2.272***	1.745***	0.942***	0.294	0.180	0.994***
Common legal system origin	0.202	0.136	-0.079	-0.018	-0.489***	-0.214	-0.017	0.353***
N	8325	8325	6660	6660	4836	6336	6660	6660
r2_p	0.483	0.606	0.711	0.559	0.490	0.617	0.687	0.582

Source: The WTO-UNCTAD-ITC annual trade in services dataset with data available for 2014-2019.

Note: This set of regressions are estimated by PPML (Silva, J. S. and Tenreyro, S., 2006, The log of gravity. The Review of Economics and Statistics, 88(4):641-658). The dependent variable is Export value (in million USD).