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Regulatory barriers to trade in services: A new database and composite indices

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composite indicators, services trade restrictions, trade policy

1 | INTRODUCTION

Although services have always been an important part of international trade, they were brought into international trade agreements only with the Canada US Free Trade Agreement in 1991 followed by North American Free Trade Agreement 3 years later. At about the same time, with the establishment of the World Trade Organization (WTO) the General Agreement on Trade in Services (GATS) became one of the pillars of the organisation. Since services are intangible and cannot be stored, services trade agreements typically include rules making on investment, movement of people and disciplines on domestic regulation. Trade policymakers, however, had little comparable information across countries and sectors about which trade restricting policies were actually in place, let alone precise estimates of what could be the impact of lifting them.

The Australian Productivity Commission made a first attempt at cataloguing and quantifying services trade restrictions across countries and sectors in the mid-1990s. Their restrictiveness indices covered eight services sectors and between 35 and 135 countries depending on the sector (Findlay & Warren, 2000). A second set of services trade restrictiveness indices with a global coverage was developed by the World Bank in the late 2000s. Their survey covers 103 countries and five broad sectors for the year 2008, with an update of 77 countries in 2016, using a survey for 34 of them and the OECD STRI database for the rest.[1]

This paper presents the database and services trade restrictiveness indices, hereafter STRI, developed by the OECD. It currently covers 46 countries, 22 sectors and 6 years. Like the two predecessors, it collects qualitative information on trade policy measures, which are scored and weighted to create composite indices. Unlike the predecessors, the qualitative policy information constitutes a database of its own with factual and documented information on de jure regulation. And unlike the

[1]See http://i-tip.wto.org/services/default.aspx.

predecessors, the information is updated each year since its launch in 2014, currently covering a time series of 6 years (2014–2019). The OECD project started in 2007 with a pilot phase covering the OECD countries and seven sectors (computer services, construction, four professional services and telecommunications). After a period of testing and revision, the sector and country coverage was extended and the first database and indicators were released to the general public in 2014.

The rest of the paper is organised as follows: The regulatory database is presented in Section 2. In the interest of space, three sectors (commercial banking, legal services and telecommunications) are portrayed. The weighting and scoring methodology is explained in Section 3 and the indicators, including developments over time are presented in Section 4. The STRIs are related to trade and other performance indicators in Section 5, while Section 6 summarises and concludes.

2 | DATA

2.1 | Construction of the database

Creating a regulatory database and composite indices involves a number of decisions. The first step is to develop the list of measures to include in the database. Drawing up such a list involves a trade-off between making the data comparable across sectors and capturing sector-specific features and idiosyncrasies. For example, telecommunications and transport are subject to network effects and sector-specific pro-competitive regulation. Asymmetric information and systemic risks are considerations that govern trade policy as well as domestic regulation in financial services. Finally, regulation of professional services is typically delegated to professional bodies such as the bar association. To balance such trade-offs, the STRI database contains a set of core measures common to all 22 sectors and sector-specific measures that differ in number and complexity across sectors. The measures are drawn from the provisions in the GATS as well as a host of free trade agreements. In addition trade policy-makers, analysts and scholars have been consulted when developing the list of measures.[2]

The STRI database records the presence or absence of specific policies. Each entry is documented by a reference and web-link to the source, which must be a document with legal force. Thus, the database captures de jure regulations and is not survey-based. It is compiled by the OECD Secretariat based on a set of guidelines to make sure that the policy measures are interpreted the same way across countries and different legal systems. To further strengthen the accuracy of the information, the governments of all the countries covered by the STRI database verify and peer review the data. Only corrections of factual errors are considered in the review process.

A complex pattern of free trade agreements and investment treaties is a challenge for the creation of any trade policy database as trade barriers may vary considerably across trading partners. However, it turns out that with the notable exception of the European Union, FTAs rarely offer new market access or national treatment beyond the actual policies that apply on a most favoured nation (MFN) basis in services (Adlung & Roy, 2005; Geloso Grosso et al., 2015; Lamprecht & Miroudot, 2018; Miroudot & Pertel, 2015). The STRI database therefore reflects MFN regulations currently in force. For EU countries, it reflects the trade barriers facing third countries, while a complementary database and indicators reflecting intra-EEA openness have been added (Benz & Gonzales, 2019).

The policy measures in the STRI regulatory database are organised under five policy areas:

[2]The development of the STRI for each sector started with an expert meeting with participants from the business sector in question, trade policy analysts, scholars, and policy makers where the list of measures was discussed.

- *Restrictions on foreign entry* include information on foreign equity limitations, foreign investment screening, restrictions on cross-border mergers and acquisitions, and regulations on cross-border data flows, among others.
- *Restrictions on movement of people* include information on licensing of professions, entry visa quotas, economic needs tests and duration of stay for foreign natural persons providing services as intra-corporate transferees, contractual services suppliers, or independent service providers.
- *Other discriminatory measures* include discrimination of foreign services suppliers as far as taxes, subsidies and public procurement are concerned.
- *Barriers to competition* include information on anti-trust policy, government ownership of major firms and the extent to which government-owned enterprises enjoy privileges and are exempt from competition laws and regulations.
- *Regulatory transparency* includes information on transparency in law-making procedures, administrative procedures related to establishing a company and conditions for obtaining business visas.

2.2 | Definitions of variables

A core set of measures are common for all sectors (Table 1), although the restrictiveness of such measures may vary across sectors within a country. For instance, information on foreign equity limits is included for all sectors, but the equity limits, if any, vary from one sector to the next.

In the following, we focus in greater detail on three services sectors: telecommunications, legal services and commercial banking services. These sectors are subject to sector-specific regulation motivated by correcting for different kinds of market failure. Telecommunications are subject to network externalities and switching costs that warrant pro-competitive, sometimes ex-ante regulation. Most countries also have a specific regulatory body enforcing the regulations.[3] Asymmetric information and systemic risk motivate prudential regulation as well as sector-specific consumer protection provisions in commercial banking. As for telecommunications, financial services are governed by one or more regulatory and supervisory bodies. Asymmetric information is also a justification for regulation in the professional services, and most countries have specific laws governing entry to and conduct of legal services. The three sectors thus represent the diversity of regulatory frameworks captured by the STRI database.

Table 2 depicts the sector-specific measures in telecommunications. Most are under the *barriers to competition* heading and reflect the network features of the sector. Thus, pro-competitive regulation is considered necessary in the sector when there is an incumbent with significant market power (SMP). Starting with the 1998 WTO Basic Telecommunication Agreement and accompanying reference paper, obligations to ensure that operators from other countries have access to and can interconnect with public telecommunications networks are included in most trade agreements which cover telecommunications. Trade agreements often have specific sections on approaches to regulation including a tentative list of obligations to be imposed on major suppliers. Most leave it to signatory countries to decide whether or not these should be in the form of ex-ante obligations or regulatory forbearance combined with ex post-anti-trust policy.

The STRI contains symmetric regulation that applies to all services suppliers as well as asymmetric regulatory obligations imposed on SMPs. Among the symmetric regulations are number portability and

[3]The regulator responsible for telecommunications often also covers postal services and/or broadcasting.

TABLE 1 Measures common across all sectors

Restrictions on foreign entry
Foreign equity restrictions: maximum foreign equity share allowed
There are limits to the proportion of shares that can be acquired by foreign investors in publicly-controlled firms
Legal form: only joint ventures are allowed
Legal form: other restrictions
Board of directors: majority or at least one must be nationals or residents
Managers must be national or resident
Screening (explicit consideration of economic interests and without exclusion of economic interests)
Acquisition and use of land and real estate by foreigners is restricted
Restrictions on the type of shares or bonds held by foreign investors
Conditions on subsequent transfer of capital and investments
Restrictions on cross-border mergers and acquisitions (M&A)
Cross-border transfer of personal data is possible when certain private sector safeguards are in place
Cross-border data flows: Cross-border transfer of personal data is possible to countries with substantially similar privacy protection laws
Cross-border data flows: Cross-border transfer is subject to approval on a case-by-case basis
Cross-border data flows: Certain data must be stored locally
Cross-border data flows: Transfer of data is prohibited
Performance requirements
Commercial presence is required in order to provide cross-border services
Local presence is required for cross-border supply
Restrictions on movement of people
Quotas (intra-corporate transferees, contractual services suppliers, independent services suppliers)
Labour market tests (intra-corporate transferees, contractual services suppliers, independent services suppliers)
Limitation on duration of stay (months) (intra-corporate transferees, contractual services suppliers, independent services suppliers)
Laws or regulations establish a process for recognising qualifications gained abroad
Other discriminatory measures
Foreign suppliers are treated less favourably regarding taxes and eligibility to subsidies
Public procurement: Explicit preferences for local suppliers
Public procurement: Procurement regulation explicitly prohibits discrimination of foreign suppliers
Public procurement: The procurement process affects the conditions of competition in favour of local firms
Barriers to competition
Decisions by the regulatory body can be appealed
Firms have redress when business practices restrict competition in a given market
National, state or provincial government control at least one major firm in the sector
Publicly-controlled firms are exempted from the application of the general competition law
Restrictions on advertising
Minimum capital requirements

(Continues)

TABLE 1 (Continued)

Regulatory transparency
There is a legal obligation to communicate regulations to the public within a reasonable time prior to entry into force
There is an adequate public comment procedure open to interested persons, including foreign suppliers
Range of visa processing time (days)
Multiple entry visa for business visitors
Cost to obtain a business visa (USD)
Number of documents needed to obtain a business visa
Number of working days to complete all mandatory procedures to register a company*
Total cost to complete all official procedures required to register a company (in % of income per capita)*
Number of mandatory procedures to register a company*

Note: In the interest of space, some measures have been combined into one row. * The raw data for these three measures are taken from the World Bank Doing Business Indicators (Djankov et al., 2002).

Source: OECD STRI database.

porting conditions.[4] Such regulation aims at keeping consumers' switching costs in check and can be important for lowering entry barriers for new operators. Examples of asymmetric regulations imposed on SMPs are obligations to offer a reference interconnection or access agreement and access to leased lines. The reference offer must typically contain cost-based access prices, which in many cases are set by the regulator. Accounting separation is included as a means to provide the regulator with the information it needs to enforce asymmetric obligations on SMPs. Transparency obligations on the part of the regulator are found under the regulatory transparency heading in the STRI list of measures.

The STRI for commercial banking focuses on activities performed by credit institutions: deposit-taking, loans, payment services, financial leasing as well as guarantees and commitments. The regulatory framework for financial services often requires the establishment of a commercial presence and the grant of a local license with subsequent supervision by local authorities. While such a procedure is not trade restrictive per se, best practice implies full neutrality of the banking supervisor, transparency and non-discrimination in the allocation of licenses, as well as sufficient conditions for fair competition between foreign and local banks, including state-owned banks. In some cases, regulation is required to ensure a level playing field between banks of different sizes, for example with respect to early repayment conditions or product tying, see Table 3.

With the emergence of exclusively electronically operating banks and the development of digital platforms for financial services, there exists considerable potential for cross-border trade in financial services (mode 1). Consequently, a requirement to establish a commercial presence is also considered a trade restriction, even though it is acknowledged that robust prudential regulation and banking supervision, including collaboration with foreign supervisors, is essential for cross-border trade in financial services.

Legal services are one of the four professional services covered in the STRI, along with accounting, architecture and engineering services. The STRI covers advisory and representation services, and differentiates between domestic and international or foreign law practices. Table 4 depicts the sector-specific measures covered. Under restrictions on foreign entry, the framework covers requirements

[4]See for instance chapter 12 in the US Australia free trade agreement https://ustr.gov/sites/default/files/australian_FTA_telecom.pdf, or subsection D under section E in the EU-Korea Free trade agreement http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2011:127:FULL&from=EN accessed 02.02.2018.

TABLE 2 Sector-specific measures, telecommunications

Other discriminatory measures
Foreign operators seeking interconnection benefit from regulated termination rates on a non-discriminatory basis (fixed, mobile)
Barriers to competition
Symmetric regulation
The government can overrule the decision of the regulator
Contracts for universal services obligations are assigned on a competitive basis (mobile, fixed)
Number portability is required (mobile, fixed)
Time and conditions for porting are regulated (mobile, fixed)
Resale of public telecommunications services is allowed (mobile, fixed)
'Use it or lose it' applies to spectrum
Secondary spectrum trading is allowed
Wholesale international roaming rates are regulated (mobile)
Retail international roaming rates are regulated (mobile)
Interconnection is mandated (fixed, mobile)
Asymmetric regulation on suppliers with significant, non-transitory market power
Access to wholesale products is mandated (passive, active products)
Wholesale access prices are regulated (passive, active products)
A reference offer is mandated for wholesale access (passive, active products)
Access to wholesale leased lines is mandated
Wholesale access prices are regulated, leased lines
A reference offer is mandated for wholesale access to leased lines
Termination rates are regulated (fixed, mobile)
A reference offer is mandated for termination and interconnection (fixed, mobile)
Call origination rates are regulated (fixed, mobile)
A reference offer is mandated for call origination (fixed, mobile)
Access to mobile networks is mandated
Retail prices are regulated (fixed, mobile)
Vertical separation is required (fixed, mobile)
Regulatory transparency
Licensing agreements are publicly available
Information on spectrum (regulations, spectrum management table, spectrum fees etc.) are publicly available

Note: In the interest of space some measures have been combined into one row.

Source: OECD STRI database

that only licensed lawyers form, own or control law firms, prohibitions related to commercial association among professionals and hiring of locally licensed lawyers, as well as localisation requirements for professional liability insurance. Legal services are typically highly regulated through professional bodies that issue licenses, monitor conduct of professionals and set and uphold professional standards. Hence, under the policy area on movement of people, sector-specific measures capture the conditions and requirements for foreign lawyers to obtain a license to practice, including requirements to demonstrate familiarity with local legislation through education, training and examinations. Nationality requirements may ab initio preclude foreigners from obtaining a license, whereas prior or permanent residency and domicile requirements significantly hinder cross-border supplies. The existence of a temporary licensing scheme would be relevant for foreign lawyers who may need to practice temporarily in the host country as incidental to the regular practice in their home country. Other policy areas cover sector-specific measures related to the use of foreign firm names and barriers to competition resulting from regulations on fee-setting.

3 | SCORING METHODOLOGY

The STRI indices are derived by aggregating trade restricting regulations into a composite measure of restrictiveness. The approach taken to scoring is to transform qualitative information on regulation into binary scores where 1 records the presence and 0 the absence of a restriction. To reconcile the complexity of services trade restrictions with binary scoring, the non-binary measures are broken down to multiple thresholds and complementary measures are grouped and scored zero only if no measures in the bundle are restrictive. In cases where one restriction renders others irrelevant, those measures that are rendered irrelevant are automatically scored one. The weighting scheme used for the calculation of the STRI relies on expert judgment where a large number of experts allocated 100 points among the five policy areas (Geloso Grosso et al., 2015).

Figure 1 illustrates the contribution of each policy category to the STRI indices in a hypothetical case where the scores are one on all regulatory measures included in the index, indicating the most restrictive regime possible. For example, *Restrictions on foreign entry* account for the largest share of the indices in all sectors, amounting to about 44% of the overall score. The contributions of *Restrictions to movement of people*, *Barriers to competition* and *Regulatory transparency* are about the same at 15% each.

The sector-specific scoring in telecommunications is found under the barriers to competition policy area. The STRI scoring distinguishes between three different types of market structures: monopoly, services-based competition and facilities-based competition.

Services-based competition is usually the outcome of pro-competitive regulation and rarely appears in unregulated markets. When an incumbent controls essential facilities, regulated access to such facilities is needed to make entry possible. Best practice regulation in such cases is for the regulator to undertake a market analysis at regular intervals, identify markets susceptible to significant and non-transitory market power and suppliers that controls such markets. If such suppliers are identified, ex-ante access and interconnection obligations should be imposed on it. The obligations should include non-discriminatory access to essential facilities at regulated conditions and transparency obligations. The latter involves obligations to provide both the market and the regulator with information.[5]

The STRI scoring system includes a memo whether or not an SMP has been identified. If yes, lack of one or more of the three regulatory elements (access, access conditions and transparency) results in a score of one on all measures in the bundle. If no, facilities-based competition has been established and intrusive ex-ante regulation is no longer needed. In this scenario, each measure is scored on its own merit and price caps and vertical separation are considered a burden and scored accordingly. However, obligations to interconnect upon reasonable request should be in place also with facilities-based competition. In cases where independent regulators undertake regular market analysis, their decision forms the basis for the memo. When this is not the case, typically in

[5]Common requirements for transparency relative to the market are standard interconnection or access offers, while transparency measures to facilitate regulation are accounting separation and cost accounting.

TABLE 3 Sector-specific measures, commercial banking

Restrictions on foreign entry
Legal form: Foreign branches are prohibited
Legal form: restrictions on foreign branches
Quotas or economic needs tests are applied in the allocation of licences
Criteria to obtain a licence are more stringent for foreign companies
Restrictions on the branch network
Restrictions on ATM networks
Some financial products are reserved for statutory monopolies
Some banking services are reserved for domestic suppliers
Commercial presence is required (deposit-taking, lending, payment services)
Limitations on cross-border transfers by customers
Restrictions on Internet banking
Other discriminatory measures
Restrictions on extending loans or taking deposits in foreign currency
Restrictions on lending to non-residents for domestically licensed banks
Restrictions on raising capital domestically for foreign banks
Discrimination in the access of foreign-owned banks to the central bank discount window
Non-discriminatory access to payment systems (wholesale payment systems, retail payment systems)
Deviation from international standards (risk weighting—BCBS, accounting rules—IFRS, transparency and AML/CFT rules—FATF 40)
Barriers to competition
Interest rates on loans are regulated (contractual interest rates, default interest rates)
Interest rates on deposits are regulated
Approval by the regulatory authority required (for new products or services, for new rates or fees)
Directed credit schemes
Early repayment conditions and fees are regulated
Product tying is regulated
Existence of a registry with equal access of all lending institutions (collateral registry, credit registry)
The supervisor has full authority over licensing and the enforcement of prudential measures
The government can overrule the decisions of the supervisor
Length of term of heads of the supervisory authority
The government has discretionary control over funding of the supervisory agency
Regulatory transparency
Licences are allocated according to publicly available criteria
Applicants must be informed of the reasons for denial of licences
There is a maximum time allowed to the regulator for decisions on applications
Time of resolving insolvency (in years)
Cost of resolving insolvency (in % of the estate's value)

Note: In the interest of space, some measures have been combined into one row.

Source: OECD STRI database.

TABLE 4 Sector-specific measures, legal services

Restrictions on foreign entry
Equity restrictions applying to not licensed individuals or firms domestic law, international law
Commercial association is prohibited between locally and not locally licensed lawyers; and between lawyers and other professionals
Prohibitions on hiring locally licensed lawyers
Board of directors: majority or at least one must be licensed professionals: domestic law, international law
Manager must be a licensed professional: domestic law, international law
Localisation requirements for professional liability insurance
Restrictions on the movement of people
Nationality or citizenship required for Licence to practice: domestic law, international law
Prior or permanent residency is required for Licence to practice: domestic law, international law
Domicile required for Licence to practice: domestic law, international law
Laws or regulations establish a process for recognising qualifications gained abroad
Foreign professionals are required to take a local examination
Foreign professionals are required to practice locally for at least 1 year
Foreign providers have to completely re-do the university degree, practice and examination in the domestic country: domestic law, international law
A temporary licensing system is in place
Other discriminatory measures
Use of foreign firm names is restricted
Barriers to competition
Fee-setting: mandatory minimum and/or maximum fees
Fee-setting: recommended minimum and/or maximum fees

Source: OECD STRI database.

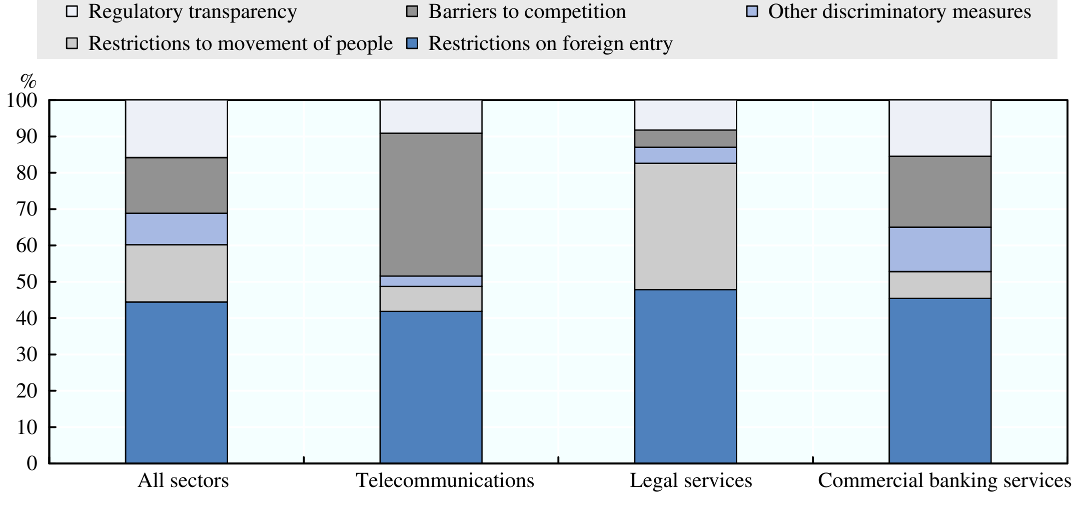

FIGURE 1 Contribution to the STRIs by policy area

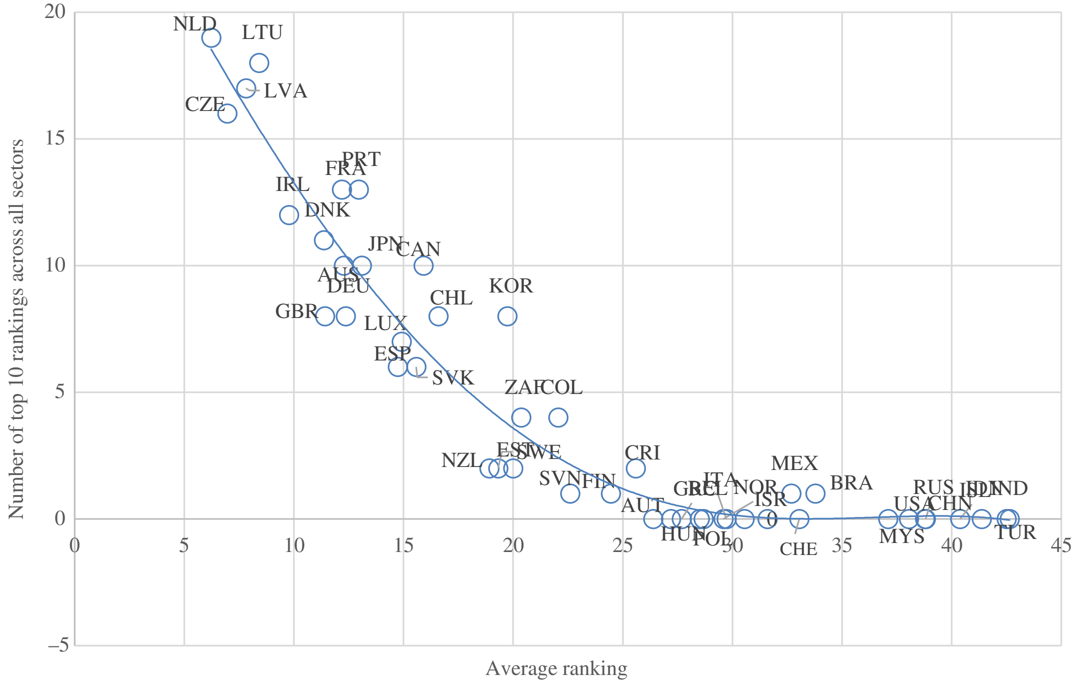

FIGURE 2 Overall STRI performance, 2019
Source: STRI data base (http://oe.cd/stri-db)

developing countries, market shares and development of retail prices over time are used to identify SMPs.

A defining characteristic of legal services is the high level of technical knowledge that professionals must have which is ensured by a licence to practice. Hence, the requirement to have a license is not considered restrictive. Restrictions arise due to discriminatory conditions and processes for obtaining it. In addition, foreign lawyers may have limited market access through temporary licenses allowing them to practice for specific judicial matters or cases particularly in international and foreign law. Lastly, law firms are often subject to specific regulations limiting ownership and control of law firms to locally licensed professionals.

While each of these measures represents a significant hindrance to trade on its own, their combined effect has far stronger implications. For instance, the domestic market for legal services would be completely closed in a regulatory environment where only nationals or citizens can obtain a license to practice, no temporary licensing scheme is in place for foreign lawyers, and ownership of equity in domestic law firms is limited to locally licensed lawyers only. The presence of such regulatory conditions results in a score of 1 in the STRI.

4 | RESULTS

4.1 | STRI performance in 2019

Figure 2 ranks the overall STRI performance for 46 countries in 2019, based on sectoral results and rankings. The trend line depicts the extent to which countries' indices perform well compared to top sectoral performers, on the one hand, and the entire sample on the other. Closer proximity to the trend

TABLE 5 Bilateral correlations between average STRI score and score of horizontal measures

Average STRI	Simple	GDP-weighted
Public procurement: Explicit preferences for local suppliers	0.686	0.686
Restrictions on cross-border mergers and acquisitions (M&A)	0.597	0.592
Cross-border transfer of personal data is possible when certain private sector safeguards are in place	0.537	0.535

Note: The table reports bilateral correlations between the average STRI score in 2019 and specific horizontal trade restrictions based on 46 countries. Three measures with the highest correlation according to both metrics are shown in decreasing order. For the calculation of correlations, individual measures are characterised either by binary scoring or by a specific value of the equity threshold between 0 and 1, where 0 means no equity restriction. GDP-weighted STRI averages are calculated using average sector shares for all OECD countries from OECD STAN.

line indicates a more balanced performance, whereas a position closer to the upper left corner of the figure is associated with better overall results.

In some cases, countries might rank lower on the sectoral average but still have a high number of sectors with low scores, which is the case when indices are low in most but a few sectors (e.g., outlier scores may exist due to a completely closed market in one sector but open across the others). The top three countries with the highest overall performance in the 2098 STRI were the Netherlands, Lithuania and Latvia.

Based on STRI scores from all sectors, it is possible to identify which types of horizontal services trade barriers are the most closely related to overall services trade restrictiveness. Results shown in Table 5 rely on detailed information for all horizontal STRI measures, as well as simple averages and GDP-weighted averages of the sector-level STRI scores for each country. By a clear margin, explicit preferences for local suppliers in public procurement depicts the highest correlation with average STRIs. This finding indicates that a country's public procurement regulation can be a good proxy for its general position towards foreign services suppliers. Other measures characterised by a high correlation with average STRIs are restrictions on cross-border mergers and acquisitions and restrictions to the cross-border transfer of personal data.

4.2 | Sectoral results

Figure 3 reports detailed results for services trade restrictions in telecommunications services. Countries are ranked in ascending order, from least restrictive to most restrictive. Scores for telecommunications services range between 0.11 and 0.68 with an average of 0.23. The results are driven by two policy areas: Restrictions on foreign entry and barriers to competition. Seven countries included in the STRI maintain foreign equity limits. Six countries allow foreign investment only if a screening process finds that they bring net economic benefits to the host economy. A total of 38 countries have stricter conditions on the transfer of personal data than recommended in the OECD Guidelines for Protection of Privacy and Transborder Flow of Personal Data.

The analysis of correlations between the scoring of individual measures and the STRI score for the sector reveals that the existence of conditions on the transfer of capital and investments is the measure, which exhibits the highest correlation with the STRI score in telecommunications. Other restrictions which can most often be found in more restrictive economies are related to a missing requirement for number portability in the fixed telephony segment, foreign equity restrictions and restrictions to the cross-border transfer of personal data, as shown in Table 6.

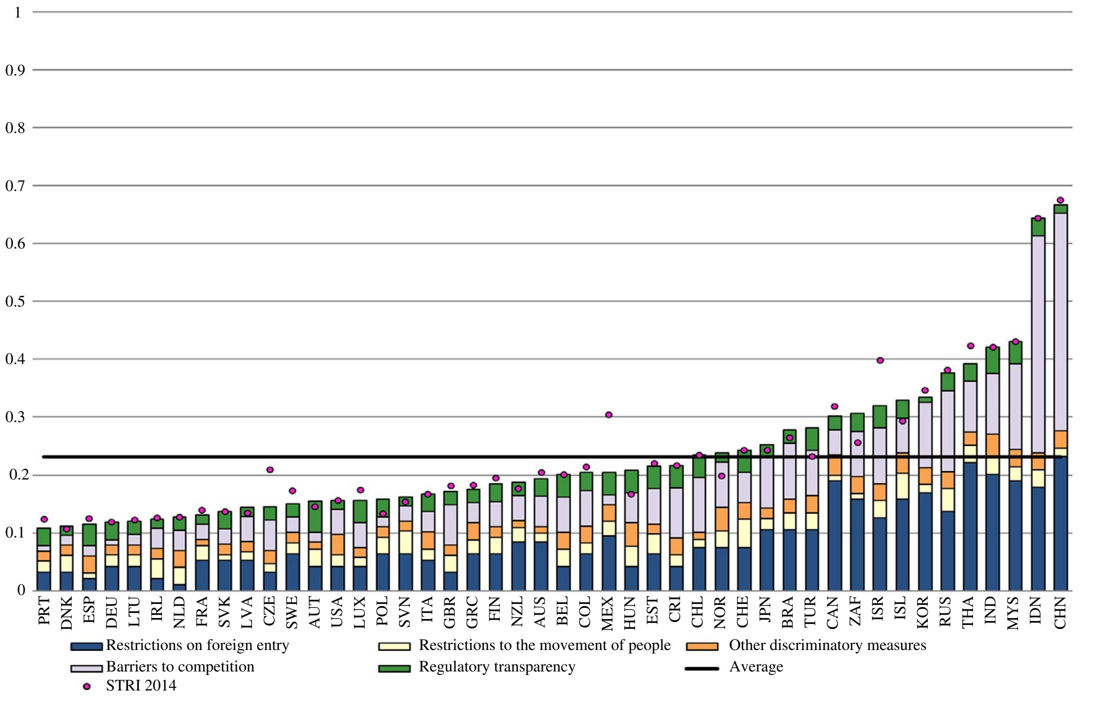

FIGURE 3 STRI for telecommunications services 2019

Source: OECD.Stat: Services Trade Restrictiveness Index (http://oe.cd/stri-stat)

TABLE 6 Telecommunications: bilateral correlations between STRI score and measure score

Conditions on subsequent transfer of capital and investments	0.663
Number portability is required	0.659
Foreign equity restrictions: maximum foreign equity share allowed (%)	0.617
Cross-border transfer of personal data is possible when certain private sector safeguards are in place	0.597

Note: The table reports bilateral correlations between the STRI score for telecommunications in 2019 and specific trade restrictions based on 46 countries. Four measures with the highest correlation are shown in decreasing order. For the calculation of correlations, individual measures are characterised either by binary scoring or by a specific value of the equity threshold between 0 and 1, where 0 means no equity restriction.

Results for the commercial banking sector are shown in Figure 4. Scores range between 0.13 and 0.52 with an average of 0.24. Out of the 46 countries in the database, 16 countries restrict the establishment of foreign bank branches, 12 countries impose more stringent requirements to grant a license to foreign-owned banks than domestic ones, and eight countries restrict cross-border bank mergers and acquisitions. Lastly, 17 countries require at least one member of a commercial bank's Board of Directors to be a national or permanent resident, among which nine countries impose this condition on a majority of the Board.

Analysis based on detailed answers for each individual measure reported in Table 7 reveals that restrictions to the cross-border transfer of personal data are most strongly correlated with the STRI score for this sector, indicating that such policies are frequently observed in more restrictive economies. Also, discriminatory licensing criteria, restrictions on lending to non-residents for domestically licensed banks, and the application of quotas or economic needs tests in the allocation

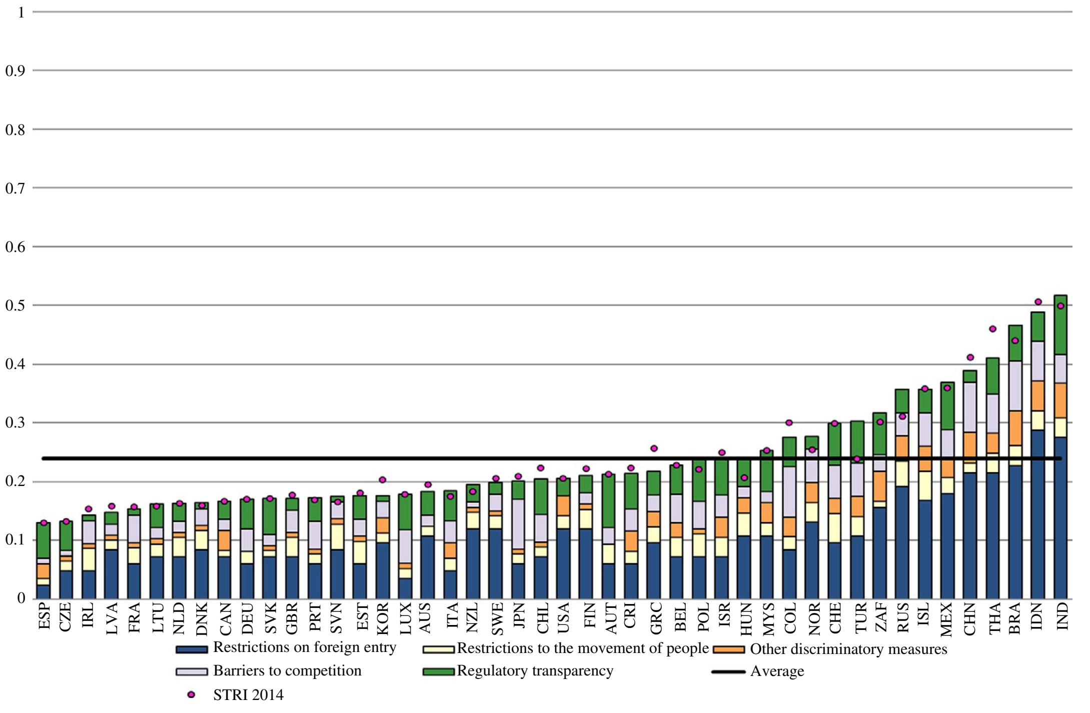

FIGURE 4 STRI for commercial banking services 2019
Source: OECD.Stat: Services Trade Restrictiveness Index (http://oe.cd/stri-stat)

TABLE 7 Commercial banking: bilateral correlations between STRI score and measure score

Cross-border transfer of personal data is possible when certain private sector safeguards are in place	0.738
Criteria to obtain a licence are more stringent for foreign companies	0.721
Restrictions on lending to non-residents for domestically licensed banks	0.690
Quotas or economic needs tests are applied in the allocation of licences	0.645

Note: The table reports bilateral correlations between the STRI score for commercial banking in 2019 and specific trade restrictions based on 44 countries. Four measures with the highest correlation are shown in decreasing order. For the calculation of correlations, individual measures are characterised either by binary scoring or by a specific value of the equity threshold between 0 and 1, where 0 means no equity restriction.

of licenses are good evidence for an overall restrictive regulatory regime for commercial banking services.

Legal services are among the most restrictive sectors in the STRI database, with an average score of 0.39, displayed in Figure 5. The sector is completely closed to non-EEA foreign competition in Poland and Luxembourg, while the lowest score in the sector is 0.15 in Australia. Market access for foreign suppliers is largely determined by the requirements for obtaining a license to practice and the activities reserved for licensed professionals. Most countries restrict the ownership of law firms to locally qualified lawyers, often coupled with requirements that the majority of the board (or equity partners in the case of partnerships) and the manager of law firms be locally qualified.

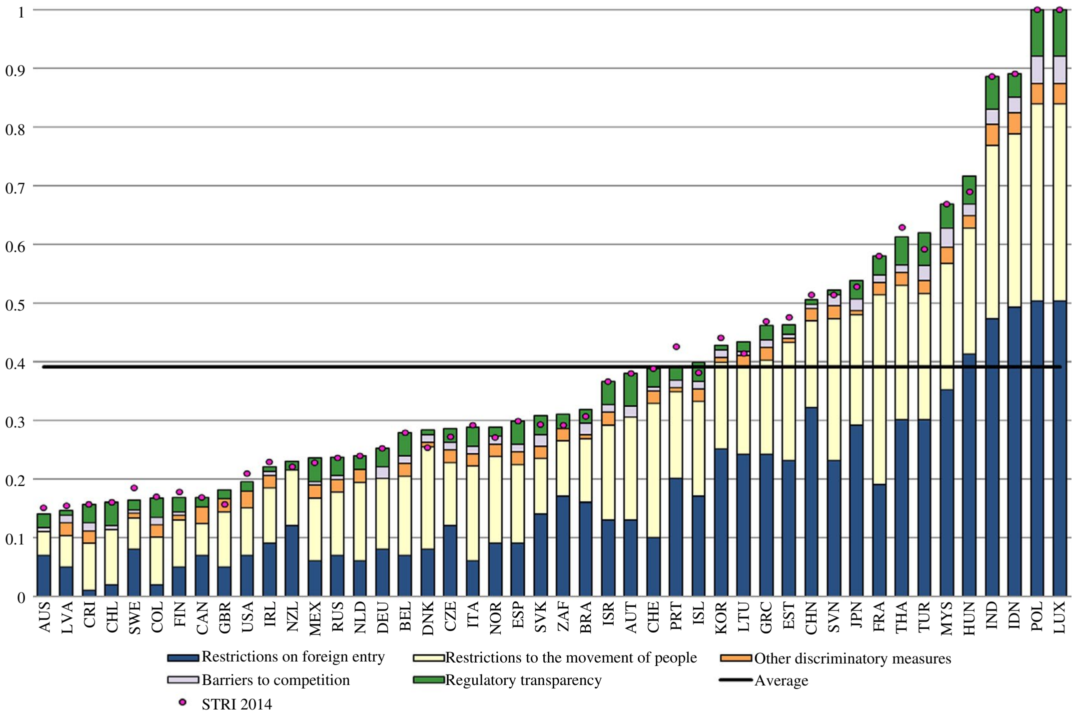

FIGURE 5 STRI for legal services 2019

Source: OECD.Stat: Services Trade Restrictiveness Index (http://oe.cd/stri-stat)

TABLE 8 Legal services: bilateral correlations between STRI score and measure score

Nationality or citizenship required for licence to practice	0.602
Equity restrictions applying to not licensed individuals or firms	0.541
Board of directors: at least one must be national	0.527
Foreign equity restrictions: maximum foreign equity share allowed	0.518

Note: The table reports bilateral correlations between the STRI score for legal services in 2019 and specific trade restrictions based on 46 countries. Four measures with the highest correlation are shown in decreasing order. For the calculation of correlations, individual measures are characterised either by binary scoring or by a specific value of the equity threshold between 0 and 1, where 0 means no equity restriction.

In line with the sector-specific scoring methodology outlined above, it is no surprise that a requirement for local nationality or citizenship to obtain a licence is the indicator with the highest correlation to the scores in legal services (Table 8). Moreover, equity restrictions applying to individuals or firms without local licence or to foreigners are highly correlated with overall STRI scores. A nationality requirement for at least one board member is the measure with the third highest correlation with the sector's STRI.

4.3 | Policy changes

The annual update of the STRI tracks changes in applied regulatory regimes over time. There were close to 60 policy changes identified across all countries in 2019. These changes include both

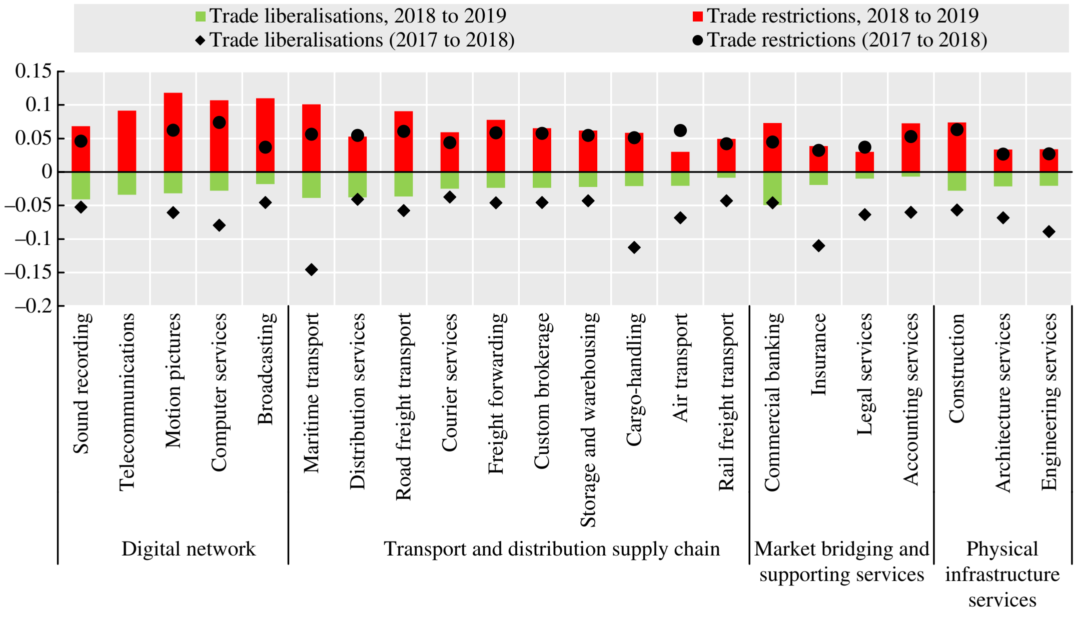

FIGURE 6 Impact of policy changes on the STRI results, 2018–2019. Cumulative changes in results across countries
Source: STRI data base (http://oe.cd/stri-db)

policies that restrict and policies that liberalise services trade. Looking at the STRI results through a sectoral lens, the net effect of trade restricting measures has been significant in terms of cumulative changes in the value of the indices across all countries during 2018–19 (Figure 6). This is mainly due to the fact that most trade restrictive changes recorded in this period were horizontal in nature, and, as such, they affect the indices of all sectors. For instance, tightening measures affecting the temporary movement of people contributes to raising the score across all sectors. The largest overall increase at the sectoral level was in motion pictures, while the largest overall decrease was in commercial banking services.

4.4 | Regulatory heterogeneity

Based on the full set of measures included in the STRI database, it is possible to calculate indices for regulatory heterogeneity. These indices are bounded between zero and one, with a score of zero if all measures are answered identically in two economies and a score of one if all measures are answered differently.[6] Table 9 reports the seven most similar pairs and the three most heterogeneous pairs of economies for legal services, telecommunications and commercial banking. For telecommunications and commercial banking, the most similar regimes are dominated by European countries. This is not surprising, given the legislative competences of the European Union in these sectors. However, the

[6]Nordås (2016) presents a more detailed description of the methodology and results. Moreover, she shows that regulatory heterogeneity is a significant barrier for cross-border trade in services, particularly when levels of restrictiveness are already low.

TABLE 9 Most similar and most heterogeneous regulatory regimes 2019

Legal services			Telecommunications			Commercial Banking		
Czech Republic	Slovakia	0.103	Latvia	Lithuania	0.059	Czech Republic	Slovakia	0.085
Australia	Finland	0.112	Czech Republic	Portugal	0.105	Latvia	Lithuania	0.099
Netherlands	Portugal	0.137	Greece	Spain	0.106	Denmark	Greece	0.127
Belgium	Netherlands	0.157	Lithuania	Portugal	0.118	Czech Republic	Lithuania	0.130
France	Lithuania	0.161	France	Lithuania	0.123	Lithuania	Slovenia	0.133
Lithuania	Spain	0.164	Austria	France	0.126	Czech Republic	Slovenia	0.134
Canada	United States	0.164	France	Greece	0.127	Portugal	Slovenia	0.139
China (People's Republic of)	Italy	0.507	Malaysia	United States	0.533	Indonesia	Germany	0.555
China (People's Republic of)	Slovakia	0.524	Israel	South Africa	0.536	Indonesia	Czech Republic	0.562
China (People's Republic of)	Poland	0.539	China (People's Republic of)	Israel	0.575	Indonesia	Luxembourg	0.578

Source: OECD.Stat: STRI Heterogeneity Indices (http://oe.cd/stri-stat).

list of most similar regimes in commercial banking also includes pairs such as Canada and the United States, the Netherlands and New Zealand or Mexico and Indonesia.

5 | SERVICES TRADE POLICY AND PERFORMANCE

The standard tool for analysing the relationship between trade restrictions and trade is the gravity model. It was originally applied to merchandise trade, but several authors have shown that it also applies to services trade (e.g., Head & Mayer, 2014). The policy dimension is, however, less prominent in the services trade literature for the simple reason that comparable information on policy-induced trade costs in services is scarce. Nordås and Rouzet (2017) presented first estimates of the impact of the country-specific STRIs on services trade by sector. Acknowledging the identification problem when policy indicators are country and sector-specific, a number of robustness checks were applied. One striking result from this study is that a high score on a country's STRI restricts its services exports at least as much as its imports.

For robust results, bilateral policy-induced trade cost measures are preferable. However, beyond dummies for free trade areas, such measures are non-existent. Scholars have proposed different ways of overcoming this problem. For example, Van der Marel and Shepherd (2013) bilateralised the World Bank restrictiveness indicators as follows: $\tau_{ij} = \ln((1+STRI_i)(1+STRI_j))$. They found a statistically significant and negative effect on total services and business services imports, but also report statistically insignificant results at the sector level. Another approach to identify country-specific trade restrictions is to add intra-national trade to the data and interacting country-specific trade barriers with an international trade dummy (Benz, 2017; Benz & Jaax, 2020) or an FTA dummy (Ariu et al., 2017).[7]

With a full set of STRI indicators for 6 years, which overlaps with time series of bilateral services trade data for 3 years, the problem of identifying the trade effects of services trade restrictions has eased as our regression results in Table 10 suggest. It reports the results of standard gravity regressions for total services trade for a panel of all countries included in the STRI database for the period 2014–2016. The first column depicts a baseline with the standard gravity variables and year fixed effects. The second regression introduces an interaction term between the STRIs and FTAs and adds country fixed effects both for exporters and importers.[8] The third regression follows van der Marel and Shepherd (2013)'s approach.

The standard gravity variables take the expected sign and are in line with other gravity analysis of services trade. The parameter on the variable of interest, the STRI, is negative and statistically significant at a 5% level or better in all the regressions and the parameter values are robust to the specification. The parameters suggest that a one basis point reduction in the STRI is associated with 3%–4% more services trade. As in previous analysis, the impact on exports appears to be strongest. The positive interaction term with FTAs in the second regression suggests that raising MFN barriers leads to trade diversion towards FTA partners and that preferences are more valuable the higher the MFN barriers, as one would expect.

The strong negative relationship between the STRIs and services exports could be explained by the fact that the STRIs capture barriers to competition and also that lack of foreign competition may reduce the incentives of local firms to innovate and expand beyond high-margin local markets (Rouzet & Spinelli, 2016). As a preliminary assessment of a possible link between market openness and performance in the sector, we regressed relevant performance indicators from the World Development

[7]Benz (2017) and Benz and Jaax (2020) used the OECD STRI indicators and interacted them with the border effect to distinguish internal and external trade while Ariu et al. (2017) used the OECD Product Market Regulation indicators interacted with FTAs.

[8]Although the panel is relatively short with only three years, the country fixed effects are not perfectly collinear with the STRIs and none of them are dropped in the second regression.

TABLE 10 Gravity regressions, bilateral total services exports 2014–2016

	Baseline		With interaction terms		Bilateral STRI	
Ln distance	−0.633***	(0.056)	−0.524***	(0.043)	−0.521***	(0.043)
Ln exporter GDP	0.680***	(0.035)				
Ln importer GDP	0.671***	(0.039)				
Exporter STRI	−4.001***	(0.945)	−4.067**	(1.494)		
Importer STRI	−3.109***	(0.744)	−4.243***	(1.234)		
FTA	−0.166	(0.158)	−1.306*	(0.525)	0.243*	(0.104)
Common land border	−0.163	(0.157)	0.204*	(0.101)	0.178	(0.108)
Common language	0.777***	(0.147)	0.335**	(0.115)	0.406***	(0.118)
Common colonial history	0.111	(0.151)	0.094	(0.12)	0.08	(0.121)
Same country	0.460*	(0.187)	0.368**	(0.142)	0.408**	(0.151)
Exporter STRI × FTA			7.173**	(2.245)		
Importer STR × FTA			1.033	(1.341)		
Bilateral STRI					−3.270**	(1.239)
Year fixed effects	Yes		Yes		Yes	
Country fixed effects	No		Yes		Yes	
Pseudo R^2	.832		.927		.925	
N	3,548		3,548		3,548	

Note: Trade data are from OECD.stat, the standard gravity variables from CEPII and the STRIs are the GDP-weighted geometric average STRIs for all sectors. The GDP weights are calculated as the average for all countries included in the OECD STAN database for 2014. The regressions are run using the Poisson pseudo-maximum likelihood estimator. Robust standard errors clustered on country pairs are reported in parentheses. ***, ** and * indicate statistical significance at a 1%, 5% and 10% level, respectively.

Indicators on the STRI scores controlling for GDP per capita and GDP. The results are reported in Table 11. As expected, there is a strong negative association between the services trade restrictions and performance in the sectors directly affected by the restrictions.[9]

6 | CONCLUSION

Compared to the vast empirical literature on the determinants and impact of merchandise trade, little is known about the movers and impact of trade in services. Lack of comparable information on trade and policy-determined barriers to trade in services largely explains the relatively sparse literature in this field. This paper has presented a rich database on regulations affecting trade in services. It captures barriers to cross-border trade, movement of people, foreign establishment, competition policy issues and regulatory transparency in most services sectors in addition to regulatory heterogeneity between country pairs. The STRIs are available annually from 2014 onwards.

The database and indicators document large differences across countries and sectors as far as trade restrictions are concerned. It also shows that although some countries are more open than others across the board, few countries are in the top or bottom five in all sectors. It is also notable that during

[9]Also, bank credit to the private sector is negatively correlated to the STRI in commercial banking with a coefficient of −0.30, significant at a 1% level, but this is not robust to controlling for GDP and GDP per capita.

TABLE 11 Correlation between the STRI and sector performance

Dep. var	Logistics performance	Credit	Interest spread	ATM density	Broadband density	Secure server density	Legal rights	Time insolvency
STRI ind.	Cargo handl.	Commercial banking			Telecommunications		Legal	
Ln GDPcap	0.248***	0.303***	−0.014	0.148*	0.625***	1.441***	−0.274	−0.536***
	(0.038)	(0.036)	(0.104)	(0.057)	(0.051)	(0.074)	(0.237)	(0.096)
Ln GDP	0.097***	0.062*	−0.218***	0.117***	−0.013	−0.129***	−0.116	−0.094*
	(0.013)	(0.024)	(0.055)	(0.02)	(0.021)	(0.035)	(0.144)	(0.042)
STRI	−1.138***	0.054	5.013**	−1.467**	−1.783***	−2.335**	−3.878***	0.897**
	(0.089)	(0.384)	(1.646)	(0.533)	(0.487)	(0.731)	(1.005)	(0.322)
R^2	.709	.373	.387	.259	.753	.837	.103	.331
N	88	129	57	125	132	132	132	132

Note: The dependent variables are the World Bank Logistics performance indices, credit to private sector share of GDP, the densities as indicated, legal rights (indicator) and time to resolve insolvency. All indicators are from the WDI. The densities and credit are in logs, that is the log of the number of, for example, broadband subscribers per 100 people. The data cover 3 years, 2014–2016. Robust standard errors are in parentheses. ***, ** and * signify statistical significance at a 1%, 5% and 10% level respectively.

the past few years with rising popular concerns about globalisation and migration, we have observed significant tightening of services trade restrictions, and the tightening is concentrated in restrictions on movement of people, more stringent investment screening and new restrictions on cross-border data flows. The paper finally shows a robust negative relationship between the score on the STRI and trade in services. It is beyond the scope of this paper to establish causality between services trade policy and services trade and services sector performance in general. This is left to future research as longer and wider panels of data become available.

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