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Addressing Regulatory Barriers to Trade in Services in Latin America and the Caribbean

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Abstract

Most barriers to trade in services stem from regulatory measures. This study assesses the degree of regulatory restrictiveness affecting trade in services across Latin America and the Caribbean and the degree of disparities in these measures. It then analyzes the impact of both the level of restrictions and the extent of regulatory divergence on service trade flows. Latin America emerges as a region with a mixed level of service trade restrictions and with a significant level of regulatory disparity across the individual countries. The econometric results indicate that higher regulatory barriers and greater regulatory disparities are both negatively associated with trade in services. The findings suggest that countries in the region could enhance service trade by reducing regulatory restrictions and harmonizing regulatory frameworks.

Keywords: Trade in services, regulatory barriers, regulatory cooperation

JEL Classification: F13, F14, F15

1 Introduction

Services play an important role in development, accounting for an important share of economic activity in most countries. Measured in value added terms, services typically account for around two thirds of a country's GDP, on average worldwide.

Unlike the cross-border exchange of goods, services are not subject to tariffs. Instead, barriers to trade in services are typically regulatory in nature. Restrictive trade policies on services curtail their supply by foreign providers. These restrictions, by limiting international competition, may reduce variety and consumer choice, thereby increasing prices and lowering quality. Beyond the potential negative effects on final consumers, these restrictions can also hamper production in other sectors that use services as inputs. Therefore, restrictions that impact the costs and quality of services can affect, through input-output linkages, the ability of many other firms in the economy to compete.

Beyond the level of restriction behind service trade policies, having dissimilar service regulations between countries can also limit trade flows. Policy measures set by countries independently of each other create heterogeneity and therefore can impose unintended trade costs on services suppliers who have to comply with different regulations across destination markets. Recent empirical evidence based mostly on OECD countries shows that regulatory heterogeneity in services is associated with lower trade flows (Nordås and Rouzet, 2017).

This study has two objectives. First, to examine the level of restrictiveness of regulatory measures on trade in services in Latin America and the Caribbean (LAC) as well as the level of disparities in these measures across the countries in the region. Second, to measure the extent to which the levels of regulatory restrictions and disparities in LAC affect trade flows in services.

Analyzing the trade-related impacts of regulation in services forms part of the broader discussion on regulations, non-tariff measures (NTMs), and their overall effects on trade. As in the case of goods, regulations in services pursue important and legitimate policy objectives. However, the emphasis differs. In the services context, regulatory frameworks are primarily directed at governing market entry and ensuring the professional qualifications and credentials of providers. These aspects reflect the inherently intangible and provider-dependent characteristics of services. In the case of trade in goods, regulatory measures are predominantly directed at the products themselves, primarily to address health and safety concerns associated with the production, trade, and consumption of food, plants, and animals, although they address other types of issues as well.

While regulations in both goods and services can pursue legitimate policy objectives, they are also shaped by political economy forces and may, at times, reflect protectionist motivations. Yet important differences also arise between goods and services. In goods trade, specific WTO disciplines constrain the scope for protectionist use of regulation. In particular, the Agreement on Technical Barriers to Trade (TBT) and the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) promote reliance on international standards and require that trade-restrictive measures be no more restrictive than necessary to achieve their stated regulatory objectives. By contrast, in the area of services trade, no equivalent WTO disciplines exist for

domestic regulatory standards. The absence of SPS- or TBT-like frameworks in services leaves greater scope for discretionary regulation, and thus for political economy considerations to influence market access conditions.

Another important difference concerns the application of the national treatment principle. In the case of goods, WTO members are required to treat imported products no less favorably than domestic products. By contrast, national treatment is not a general obligation in services trade; it applies only to the extent that a member has undertaken specific commitments under the General Agreement on Trade in Services (GATS). As a result, countries are not normally required to treat foreign service suppliers on equal terms with domestic providers.

In general, because WTO disciplines on services are weaker than those governing goods, it has been argued that the scope for protectionist capture is greater in services (Hoekman and Mavroidis, 2015). Consequently, trade in services may be subject to at least as much distortion from regulatory measures as trade in goods, and potentially even more, given the higher likelihood that such regulations reflect protectionist motivations. This underscores the importance of carefully analyzing the trade effects of services regulation.

A related aspect is whether countries that adopt more protectionist policies in goods trade also tend to be more protectionist in services trade. In principle, this need not be the case, as the actors influencing regulation in the two domains may differ in their characteristics, relative influence over policymakers, and policy preferences. Two widely used measures of regulatory trade protection are the ad valorem equivalents of non-tariff measures (NTMs) for goods estimated by Kee and Nicita (2022), and the WTO's Services Trade Restrictiveness Index (STRI). The simple correlation across countries between these two indicators is only 0.19, suggesting a weak relationship between protectionism in goods and in services. This finding is consistent with Hoekman and Shepherd (2017), who report a similarly weak correlation between the STRI and an overall trade restrictiveness index for goods.

Most studies examining the impact of regulatory restrictions on trade in services concentrate on OECD countries (Nordås and Kox, 2017; Benz, 2017; Nordås and Rouzet, 2017; Benz and Jaax, 2022; Bridger, 2022), while analyses focused on LAC remain scarce (Trachtenberg, 2021). This study aims to help fill that gap in the literature.

We employ the Service Trade Restrictions Index (STRI) from the WTO's Integrated Trade Intelligence Portal (I-TIP) Services Trade Policy Database and also construct a measure of regulatory disparities between countries.[1] These regulatory indicators are combined with data on trade in services from the International Trade and Production Database for Estimation (ITPD-E) developed by Borchert et al., (2022). An advantage of this dataset is that it includes not only

[1] The OECD Trade in Services database includes STRI measures, as well as measures of regulatory heterogeneity, but the information is limited to OECD countries. The WTO's I-TIP database, used in this study, includes many more countries than the OECD database, including many LAC countries. The I-TIP data include STRI measures but not measures of regulatory heterogeneity. For this reason, we construct regulatory heterogeneity measures from the I-TIP raw data.

international trade flows but also domestic ones, allowing for a robust identification of the trade effects of STRI measures.

The study finds that there is considerable heterogeneity in the level of restrictiveness across LAC countries. On average, the region's levels of restrictiveness are neither the highest nor the lowest globally. We also find that LAC exhibits some of the largest levels of intra-regional regulatory heterogeneity in most sectors. The econometric estimations show that both restrictive regulations as well as disparities in these regulations are negatively associated with trade in services. Counterfactual exercises based on the econometric results indicate that LAC countries can achieve substantial increases in service trade by reducing the current levels of service trade restrictions and by promoting regulatory convergence.

Our study makes several important contributions to the literature. The study consistently estimates the trade effects of both restrictive regulations and regulatory disparities using a robust econometric framework. Nordås and Rouzet (2017) also consider regulatory divergence alongside regulatory restrictions, but their treatment of divergence is largely supplementary, and their gravity specification omits key controls. By contrast, more recent studies such as Benz and Jaax (2022) and Bridger (2022) employ more robust gravity estimations, leveraging both international and domestic trade flow variation to identify the effects of the STRI index, but these analyses focus exclusively on the trade effects of regulatory restrictions, without accounting for the role of regulatory disparities.

Our study is also related to Trachtenberg (2021), who examines services trade restrictions in the context of LAC countries. Again, we improve this work by presenting a more robust empirical strategy that combines international and domestic trade flows and by analyzing not only the trade effects of regulatory restrictiveness but also those of regulatory disparities, an aspect previously unexplored in the context of the region.

In general, our study advances the analysis of services trade in Latin America and the Caribbean by providing an up-to-date regional comparison of services-trade regulations and by quantifying the potential increase in trade flows from changing these regulations. Beyond its regional focus, the paper contributes to the broader literature on services trade and regulation by demonstrating, using a robust empirical strategy, that services trade flows are shaped not only by the level of regulatory restrictiveness but also by cross-country regulatory disparities.

The rest of the paper is organized as follows. Section 2 presents the data sources and shows the construction of our measure of regulatory disparities. Section 3 examines the level of restrictiveness of regulatory measures on trade in services in LAC, and the level of disparities in these measures. Section 4 presents the econometric model and discusses the estimation results. Finally, section 5 provides concluding remarks.

2 Data sources and regulatory indices

The regulatory measures in services used in this study come from the WTO's Integrated Trade Intelligence Portal (I-TIP) Services Trade Policy Database, which provides information on services trade policies and regulations across 136 economies and 34 service subsectors. This database is built on information gathered through surveys conducted by the WTO and the World Bank, alongside data on services measures from the OECD STRI Regulatory Database. It provides detailed information on measures affecting the operation of services and trade in services, including the country implementing the measure, the sector involved, the mode of service delivery, and the type of regulation applied.[2] These raw measures are used to construct the Service Trade Restriction Indices (STRI) by assigning each measure a score from 0 to 1 based on its degree of restrictiveness, which are then aggregated. The database provides STRI values at both the subsector level and for nine broad sectors: communications services, computer and related services, professional services, financial services, transport services, distribution services, construction and related engineering services, health services, and tourism and travel related services.[3] In our analysis, we use the STRI values as our indicator of service trade restrictiveness. Note that all the STRI values are unilateral in the sense that they do not vary by trading partner. This reflects the fact that, for the most part, service trade policies apply to all countries.[4]

Additionally, we use the raw regulatory measures from the I-TIP database to construct an indicator of regulatory heterogeneity across countries. The methodology for constructing this indicator is detailed below.

Our data on trade in services come from the International Trade and Production Database for Estimation (ITPD-E) which have been released by Borchert et al., (2021). The authors follow a number of procedures to construct a consistent international and domestic trade dataset based on administrative/raw data that includes trade in goods and trade in services, covering more than 200 countries and 170 industries, including 17 service sectors.

To measure regulatory differences in services between countries we adopt the methodology for measuring differences in technical measures in goods applied by Cadot et al. (2015). Consider N_{omst} a dummy variable equal to 1 if country o applies technical measure m in service sector s in year t. Similarly, N_{dmst} is a dummy variable that equals 1 if country d applies technical measure m to service sector s in year t. The regulatory distance between countries o and d, for measure m in service sector k is given by the absolute value of the difference:

$$R_{odmst} = abs(N_{omst} - N_{dmst})$$

[2] The General Agreement on Trade in Services (GATS) identifies four modes of supply: cross-border trade (Mode 1), consumption abroad (Mode 2), commercial presence (Mode 3), and the temporary movement of natural persons (Mode 4).

[3] The methodology behind the dataset can be found in WB-WTO (2024)

[4] The STRI scores used in the regressions correspond to the average across all modes, a common practice in the literature (Nordås and Rouzet, 2017; Benz and Jaax, 2022; Bridger, 2022). These scores are taken directly from the I-TIP Service Trade Policy Database.

If both countries apply the same measure, the regulatory distance is 0; if not, the equation yields 1. To analyze regulatory patterns, the regulatory distance is aggregated across measures. Accordingly, the regulatory distance between countries *o* and *d* in service sector *s* in a given year is:

$$R_{odst} = \frac{\sum_m abs(N_{omst} - N_{dmst})}{M}$$

In other words, the regulatory distance between countries *o* and *d* in service *s* (R_{odst}), is the sum of all the regulatory distances over all the measures *m*, divided by the total amount of measures (*M*) imposed by both countries (without double counting) in the particular service sector. For each pair of countries, we calculate the regulatory distance at the subsector level and then aggregate them at the broad sector level (9 service sectors) using the same weights as in the I-TIP Services Trade Policy Database.[5]

3 Assessment of regulatory barriers to trade in services in Latin America and the Caribbean

The panels in figure 1 show the service trade restriction indices for each LAC country in the various sectors.[6] The panels also show the simple average for LAC as well as for other regions, including North America (Canada and the US), the European Union (EU) and Asia.[7] For most countries, the values correspond to 2022, the last year in the data.[8]

The figure reveals a mixed picture of the level of restrictiveness in LAC. On average, LAC does not exhibit the highest level of restrictiveness across most sectors, but it also does not rank as the least restrictive. In nearly every service sector, there is at least one region with lower levels of restrictions. Specifically, in 6 out of the 9 sectors -communications services, computer services, transport services, distribution services, financial services, and tourism services- there is always a region, either North America or the EU, with a lower level of restrictions. In the remaining 3 sectors, LAC either has the lowest regional average (construction and health services) or shares the lowest score with another region (professional services).

But beyond LAC averages, there is a significant level of heterogeneity across the countries of the region. In particular, for every service sector, there are countries with lower scores than all the

[5] In particular, the weights are constant and are directly drawn from the WB-WTO (2024) methodology. Note also that our measure if regulatory distance is not the OECD STRI heterogeneity index. This is because the latter has a limited country coverage. Nevertheless, both measures capture the same underlying concept, namely the share of regulatory measures that are different across country pairs within a given sector. We test the correlation between our measure of regulatory distance and the OECD heterogeneity index for overlapping country pairs in the computer and telecommunication services sector. The correlation is high (0.589) and statistically significant at the 1% level.

[6] We employ the combined score of all the modes.

[7] Asia refers to Pacific-Asia and encompasses the members of the RCEP agreement for which data are available: Australia, China, Indonesia, Japan, Malaysia, Myanmar, New Zealand, Philippines, South Korea, Singapore, Thailand and Vietnam.

[8] For a few countries the last year in the data is 2021, 2020 or 2019.

regional averages and countries with scores higher than all the regional averages. Moreover, the countries with high or low scores are not always the same across the sectors. Some countries exhibit levels of restrictions in some sectors that are higher than the regional average but lower in other sectors. Overall, LAC emerges as a region with a mixed level of service trade restrictions with almost always a region showing a lower level of restrictions than LAC and with a significant disparity across the individual countries.

Besides the level of restriction in service regulations, dissimilar measures across countries can also potentially limit trade flows. Service providers wishing to serve different markets, including their own, may have to meet different regulations in different countries, and complying with these additional regulations may increase the cost of the service delivered across borders.

It is thus important to examine how different the regulatory measures imposed by LAC countries are. To this end, we employ the index of the regulatory distance between country pairs, mentioned in section 2. The panels in figure 2 show the regulatory distances for the nine sectors analyzed. For comparison, the figure shows the results for LAC as well as for other regions. The value for each region represents the simple average of the regulatory distances between all the country pairs in that region.

It is remarkable to see that LAC exhibits the largest level of regulatory heterogeneity in all but one sector (tourism). For example, in communications services, the regulatory distance in LAC is 50%. In other words, on average, 50% of the regulations that countries in the region impose within their territories are different. The equivalent figures for Asia, North America and the EU are 49%, 34%, and 28%, respectively. LAC also exhibits the largest level of regulatory heterogeneity in computer services, transport services, distribution services, financial services, construction services, and health services. The only sector in which LAC does not exhibit the largest regulatory distance is tourism services, which exhibits the smallest. Among the different sectors, the largest levels of intra-regional regulatory distances in LAC are observed in transportation services (58%), professional services (56%), distribution services (55%), and computer services (54%). These are followed by financial and communications services (both 50%), construction services (49%), health services (46%) and tourism services (43%).

The regulatory distance in services can also be constructed between LAC and the comparators. This is presented in the three panels of Figure 3. In general, LAC exhibits the largest regulatory distances with respect to Asia, followed by the EU and then North America. In terms of sectors, transportation services, professional services and computer services, present the largest regulatory distances with respect to all the regions, while health services exhibit always the smallest ones. The regulatory distance between LAC and each region, and for each sector is almost always larger than the respective regulatory distance within LAC. In other words, the intra-regional level of disparities in service regulations in LAC are large, but the inter-regional levels of disparities between LAC and other regions are even larger.

4 The impact of regulatory measures on trade in services

This section analyzes the impact of regulatory measures on international trade in services using econometric estimations. As mentioned in section 2, the source of the regulatory measures in services is the WTO's Integrated Trade Intelligence Portal (I-TIP) Services Trade Policy Database, while the data on trade in services come from the International Trade and Production Database for Estimation (ITPD-E). The trade data corresponds to the most recent period from 2016 to 2019. To align with the panel structure of the trade data, we adjusted the data on regulatory measures. Specifically, most countries have two rounds of observations in the I-TIP database, usually one in 2016 and another one in 2019, 2020, 2021, or 2022. Accordingly, for each country, we use linear interpolation between the two rounds of observations to fill the values for the missing years.

Additionally, in the trade data, the sectors of communications and computer services are bundled together, therefore, we do the same for the STRI indices by taking the simple average of these two sectors. Note also that in the regulatory measures data, the first round of observations (in 2016) does not include construction, health and tourism services; accordingly, we exclude these three sectors from the estimation. With all these adjustments, the final set of sectors for the estimation are: i) communications and computer services, ii) professional services, iii) financial services, iv) transport services, and v) distribution services. After merging these two datasets, we keep the observations for the 2016-2019 period. This is the time period that we employ. The resulting dataset is an unbalanced panel covering 74 exporting countries, 74 importing countries, and four years (2016-2019). We use the full sample of countries to estimate the required elasticities. In the last part of the paper, we employ these estimated elasticities to perform back-of-the-envelope calculations of the potential trade effects stemming from changes in the current levels of regulatory restrictions and heterogeneity observed in Latin American countries.

Our initial model follows the specification in Nordås and Rouzet (2017), which is based on a simple version of workhorse empirical model in international trade, the gravity equation. In particular, the baseline specification takes the following functional form:

$$S_{odt} = exp[\beta_1 \cdot STRI_{ot} + \beta_2 \cdot STRI_{dt} + Z_{od} \cdot \gamma + \theta_t] * \varepsilon_{odt} \qquad (1)$$

where S_{odt} represents the exports of origin country *o* to destination country *d* of a particular service sector in year *t*; $STRI_{ot}$ and $STRI_{dt}$ are the service trade restriction indexes for the origin and destination countries, respectively in the particular sector; $\bar{Z}_{od}$ is a vector that includes the physical distance between the two countries as well as the usual dyadic trade cost components: common language, contiguity and colonial ties. This vector also includes a dummy variable (RTA) that is equal to 1 if both countries share a trade agreement in services, or if both countries share a trade agreement that includes provisions for both goods and services. Finally, θ_t is a year fixed effect, and ε_{odt} is the error term.[9] Summary statistics for the main variables are presented in Table 1.

[9] As it is customary in the literature, the standard errors are clustered at the origin-destination level.

Estimating the gravity equation using a Poisson pseudo-maximum likelihood (PPML) estimator is standard practice for accounting for zero trade flows. This is what we do in this analysis. For comparison, we also estimate the model using ordinary least squares (OLS). Tables 2 and 3 present the results for OLS and PPML, respectively, with the estimated coefficients being very similar across both approaches. Concentrating on the PPML results (Table 3), the analysis reveals that in all sectors, the service trade restriction indices for both origin and destination countries are negative and statistically significant. This finding is consistent with the results in Nordås and Rouzet (2017).[10] The authors note that while the negative correlation between STRI indices and service imports is intuitive, the adverse impact of trade restrictions on export performance is less apparent; they argue that regulatory restrictions, by limiting domestic competition and efficiency, protect local firms from competitive pressure, and this undermines their export competitiveness. Our findings corroborate this argument.

We now modify the gravity model in (1) to employ a more robust specification. The gravity equation in (1) is subject to the critique in Anderson and van Wincoop (2003) that failure to control for the (unobservable) multilateral resistance term (MRTs) may lead to biased estimates of the coefficients of the determinants of trade flows. The standard practice in the literature is to control for the MRTs by including exporter-year and importer-year fixed effects. The problem in our setting is that including these fixed effects in the equation will absorb our main variables of interests, the STRI indices. In order to analyze national policy variables while simultaneously including country fixed effects one can follow the technique from Beverelli et al (2024). The authors add domestic trade flows in the data and interact the national policy variables with a dummy variable that indicates whether the trade flow is domestic or international. We follow this procedure in this analysis.

It is worth mentioning that even with domestic trade flows, one cannot simultaneously obtain separate effects of the impact of national policy variables for the origin and destination countries. This is because the national policy variables interacted with the domestic trade dummy for both the origin and destination countries are perfectly collinear.[11] One can only identify the impact of one of them. In fact, as shown by Beverelli et al (2024), the corresponding estimates of each of these variables from separate estimations will be identical. As argued by the authors, the correct interpretation of the estimate from the interaction term is that the coefficient captures the effect of the national policy variable on international trade (exports and imports) relative to domestic trade.[12]

[10] We use the original STRI scores with values that range from 0 to 100, while Nordås and Rouzet (2017) rescale the indices to a range of 0 to 1. This distinction explains why our beta coefficients remain comparable, provided they are multiplied by 100.

[11] A proof that these two variables are perfectly collineal can be found in Beverelli et al., (2018).

[12] Another way to view this is to think about domestic trade as the reference group for the identification, while the treatment group is international trade, i.e., exports and imports.

The modified gravity equation that incorporates the domestic trade flows takes the following form:

$$S_{odt} = exp[\beta_1 \cdot STRI_{ot} \cdot Intl_{odt} + \beta_2 \cdot Intl_{odt} + Z_{od} \cdot \gamma + \theta_{ot} + \theta_{dt}] * \varepsilon_{odt} \quad (2)$$

where $Intl_{odt}$ is a dummy variable that takes the value of 1 if the origin and destination countries are different (e.g. international trade flows) and 0 if they are the same (e.g. domestic trade flows); θ_{ot} and θ_{dt} are origin-year and destination-year fixed effects. The specification in equation (2) represents an improvement over equation (1) by accounting for multilateral resistance terms (MRTs). This is the specification employed also by Benz and Jaax (2022) in their study analyzing the trade impact of STRI measures across OECD countries, as well as by Bridger (2022) for a similar set of countries.

The results of estimating equation (2) are shown in Table 4. The results align closely with those in Benz and Jaax (2022) and Bridger (2022). In particular, the coefficient of interest -the interaction term between the STRI index and the international border dummy- is negative and significant across all the sectors. [13] This indicates that the greater restrictions on service trade correspond to lower trade flows. As mentioned before, we cannot separately disentangle the effects on imports and exports, but the findings from Table 3 suggest that service restrictions affects both trade flows. It is also worth mentioning that one might want to explore how the STRI affect the different modes of supplying services. However, the available trade statistics do not allow for a systematic breakdown by mode, since the concept of trade in services by mode has not yet been fully integrated into statistical collection frameworks.[14]

Our next step is to incorporate in the estimation the regulatory distance variable presented in section 3. As mentioned in the above, regulations set by countries independently of each other can create heterogeneity and therefore can impose unintended trade costs on services suppliers who have to comply with different regulations across destination markets. Nordås and Rouzet (2017) incorporate an index of regulatory heterogeneity in their specification (similar to equation 1) and find that regulatory heterogeneity is in general negatively associated with trade flows. We add the regulatory distance variable to the specification in (2). Our new specification takes the following form:

$$S_{odt} = exp[\beta_1 \cdot STRI_{ot} \cdot Intl_{odt} + \beta_2 \cdot Intl_{odt} + \beta_3 \cdot \ln(1 + Regdist_{odt}) + Z_{od} \cdot \gamma + \theta_{ot} + \theta_{dt}] * \varepsilon_{odt} \quad (3)$$

We lose a non-negligible number of observations by including the regulatory distance, because its construction requires that the countries have information on regulatory measures in all

[13] Benz and Jaax (2022) rescale the STRI indices to a range of 0 to 1, while we keep the original STRI scores from 0 to 100. This distinction explains why our beta coefficients remain comparable, provided they are multiplied by 100.

[14] A related discussion is that Mode 3 normally carries greater weight in the STRI than other modes, which could potentially create biases if the underlying trade data does reflect these weights. This, however, is not necessarily a limitation provided there is complementary across the modes of supply. In particular, the regulatory information conveyed through Mode 3 should be highly informative of the overall level of regulatory restrictiveness in the sector, especially if there is a complementary relationship between the modes, for instance, between commercial presence and cross-border trade in services. In this regard, there is ample empirical evidence demonstrating complementarity between modes, in many different sectors, including financial services, insurance, professional services, communications and IT services (e.g. Buch and Lipponer, 2004; Fillat-Castejón et al., 2009; Lennon, 2009).

the sub-sectors that compose the broad sectors, which is not always the case. Nevertheless, the results, shown in Table 5, remain largely consistent. The coefficients for regulatory distance are negative and significant in all the regressions, while the coefficients for STRI remain negative and very similar to those in Table 4.

The estimated elasticities provide partial equilibrium effects, holding everything else constant. In particular, the interpretation of a change in the STRI should take the form: *bilateral trade decrease by* $100\times[\exp(\beta_1 \cdot \Delta STRI_{ot})-1]$ *percent, ceteris paribus.*[15] For example, given a 1-point increase in the STRI of professional services, the estimated elasticity in the first column (-0.0191) implies a partial decline of 1.89% in bilateral trade in professional services, holding all else constant. The impacts are economically significant. Table A.1 in the appendix, for example, reports the results expressed in standard deviation units of the STRI variable. The table shows that a one-standard-deviation reduction in the STRI for professional, communication and computer, financial, transport, and distribution services are associated with increases in international trade of these services by 23%, 115%, 133%, 108%, and 61%, respectively.

The trade impacts of dissimilar regulations are also large. According to the results from Table 5, a 10% increase in the regulatory distance between the origin and destination countries for professional, communication and computer, financial, transport, and distribution services is associated with declines in international trade of these services by 23.5%, 60.8%, 40.9%, 41.2%, and 36.2%, respectively.[16]

4.1. Robustness exercises

We now present a series of robustness exercises to check for the consistency of the results. In particular, we examine the results after excluding outliers. We addressed potential outliers in two variables. First, for the STRI variable, we excluded observations in both tails of the distribution by dropping values above the 95th percentile and below the 5th percentile within each sector. The results of this exercise are reported in Panel A of Table 6. The estimated coefficients remain very similar to those in Table 5. Second, for the regulatory distance variable, we excluded observations above the 95th percentile. Note that we do not exclude observations in the lower tail, as these include values of regulatory distance equal to zero corresponding to domestic trade flows, which are essential for the estimation of the gravity equation. The results are reported in Panel B of Table 6. Again, the estimated coefficients remain highly consistent with those in Table 5.

The gravity equation specified in (3) represents our preferred model, along with the corresponding results presented in Table 5. For completeness, however, we also present results from an estimation that includes country-pair fixed effects. These fixed effects are increasingly used in the estimation of gravity models to capture distance and any other time-invariant bilateral trade costs. They are particularly popular on gravity models with trade in goods where panel datasets with long time periods can be assembled. Table 7 shows the results. The inclusion of

[15] The expression is similar to the partial equilibrium effect of an indicator variable in the gravity equation that is typically calculated in percentage terms as follows: $100\times[\exp(\hat{\beta}_{Dummy})-1]$. See Yotov et al., (2016).

[16] Note that different from the STRI variable, the regulatory distance variable is not an index but is expressed as a percentage. Because this variable has an intuitive unit of interpretation, we keep in its original form and do not present standardized results in the appendix.

country-pair fixed effect in our context makes the relevant coefficients to be less precisely estimated. For instance, only 2 out of the 5 coefficients for the STRI variables remain statistically significant and with the expected signs. This is consistent with results in Benz and Jaax (2022) who report a loss of significance in 3 out of 5 specifications for their STRI variables after including country-pair fixed effects. A similar loss of significance in regressions with country-pair fixed effects is observed in Bridger (2022).

The primary limitation of including country-pair fixed effects in analyses of service trade restrictions stems from the relatively short time spans of the datasets. Adding country-pair fixed effects implies that all the coefficients are identified only from variation over time within country pairs. Given that this type of regulations does not experience radical changes year-to-year and that the time periods of the panel are short, applying this specification to gravity models with STRI variables becomes less than ideal. Such strategy requires data on service trade barriers and cross-border service flows spanning for many more years, which are currently unavailable. Consequently, equation (3), which explicitly controls for time-invariant bilateral trade costs using standard variables in the literature, remains our preferred specification for the analysis.

The results of the empirical analysis can be used for back-of-the-envelope calculations about the potential trade effects of reducing the current levels of service trade restrictions in LAC. As mentioned before, these trade effects can be computed using the following expression $100\times[\exp(\beta_1 \cdot \Delta STRI_{ot})-1]$, where $\Delta STRI_{ot}$ is the difference between a desired counterfactual STRI level and the average level currently observed in LAC. For instance, the average STRI score for LAC in the communication and computer sector is 41.5 while the level corresponding to the first tercile of the global distribution is 39.5. Therefore, a movement from the current level to the first tercile implies a change in STRI of -2 points. Inserting this in the expression described above and using the estimated elasticity presented in Table 5 for the communication and computer sector (-0.0935) gives that trade flows in this sector would increase by an average of 20.6%.

Likewise, if LAC were to lower its average STRI scores in the transport, distribution and financial services sectors to the corresponding first terciles of the global distribution, trade in these sectors would increase by 15.2%, 36.8% and 52.8%, respectively.[17] In the case of professional services, lowering the STRI score to the first decile of the global distribution would lead to a 14.3% increase in trade flows.[18]

Also, trade flows can increase by reducing regulatory heterogeneity. As noted in section 3, LAC exhibits some of the highest levels of intra-regional regulatory heterogeneity compared to other regions. According to the estimated coefficients of the regulatory distance in Table 5, a 10% reduction in the average intra-regional regulatory distance in LAC would lead to important

[17] We apply this expression to each sector: $100\times[\exp(\beta_1 \cdot \Delta STRI_{ot})-1]$. Transport sector: 100x[(exp(-0.0886*(41.9 – 43.5))-1] = 14.3%. Distribution sector: 100x[(exp(-0.0498*(35.4 - 41.7))-1] = 36.8%. Financial sector: 100x[(exp(-0.1087*(41.6 – 45.5))-1] = 52.8%.

[18] For professional services we simulate a reduction to the first decile of the global distribution because LAC's average STRI score in this sector is already below the first tercile. Professionals sector: 100x[(exp(-0.0191*(38.2 – 45.2))-1] = 14.3%.

increases in intra-regional trade: 23% in professional services, 36% in distribution, 40% in finance, 41% in transport, and 60% in communications and computer services.

5 Concluding remarks

Most barriers to trade in services are regulatory in nature. This study examines the level of restrictiveness of regulatory measures on trade in services in Latin America and the Caribbean and explores the level of disparities in these measures across the countries in the region. Then, it proceeds to measure how these levels of regulatory restrictions and disparities affect trade flows in services.

LAC emerges as a region with a mixed level of service trade restrictions with almost always a region showing a lower level of restrictions than LAC and with significant differences in restriction levels across the individual countries. Regarding disparities, LAC exhibits the largest level of regulatory heterogeneity in almost all the sectors when compared to other regions.

The econometric analysis shows that both regulatory restrictions and regulatory disparities are negatively associated with trade flows in services. The estimations suggest that countries in LAC can increase trade in services by reducing trade service restrictions and by decreasing regulatory disparities. But countries should be cautious about reducing regulatory heterogeneity if that entails aligning with more restrictive regulatory frameworks from other nations. It is important to recognize, however, that not all regulations governing trade in services are inherently restrictive. While many policy measures can limit trade, others may promote it by ensuring transparency, fostering competition, or protecting the rights of foreign providers. For example, a measure like "cross-border supply prohibited" clearly restricts international trade, but a policy such as "foreign drivers permitted to transport cargo in a host country" could enhance trade in the transportation services sector (Trachtenberg, 2021). Therefore, when countries seek to harmonize their regulatory measures, they should consider the nature of the policies they adopt. For instance, a country may need to adopt new policy measures at home to reduce regulatory disparities with other nations. By adopting the non-restrictive measures, it can effectively decrease regulatory heterogeneity with other countries without imposing additional trade barriers.

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Figure 1: Service Trade Restrictions

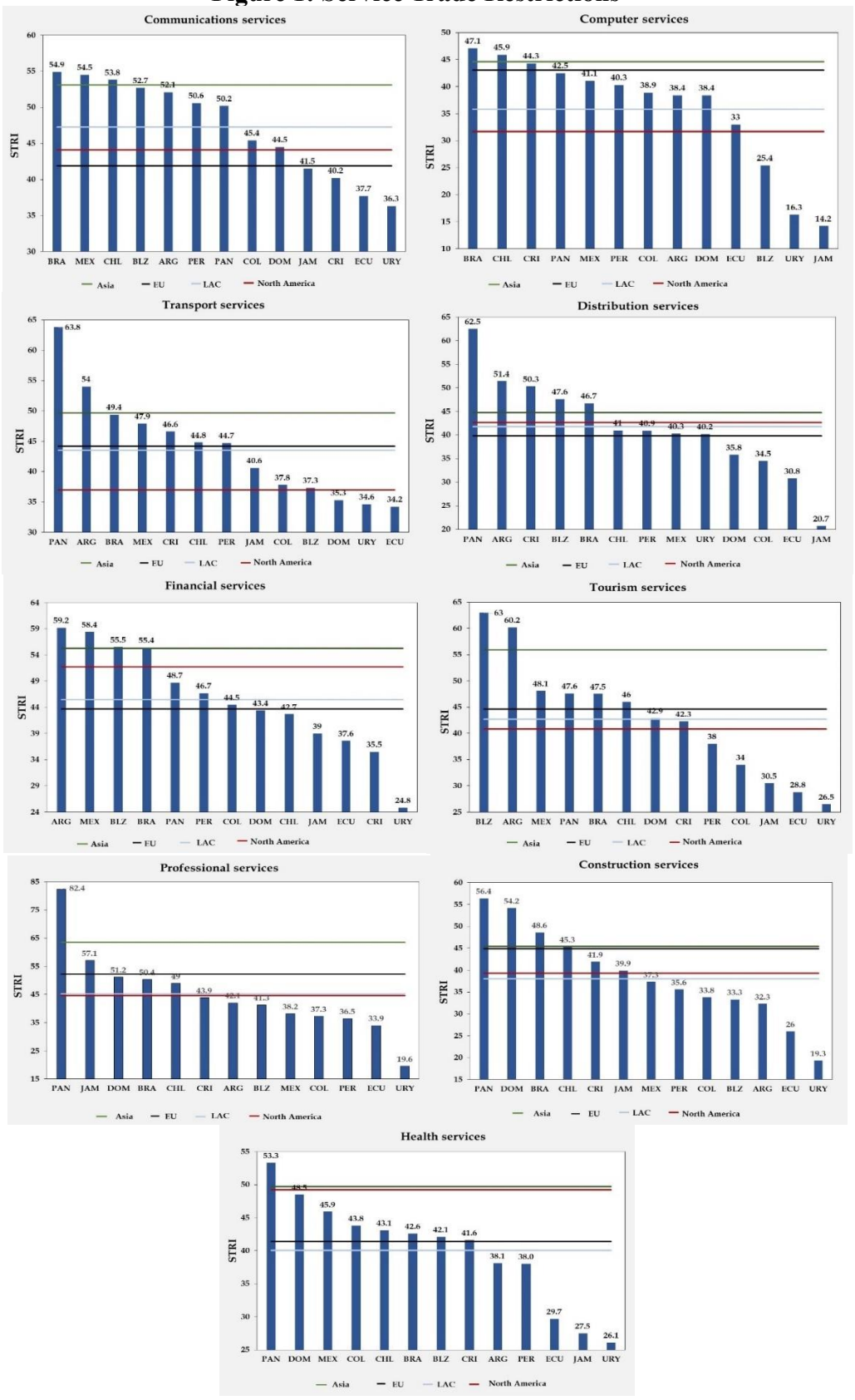

Figure 2: Intra-Regional Regulatory Distances

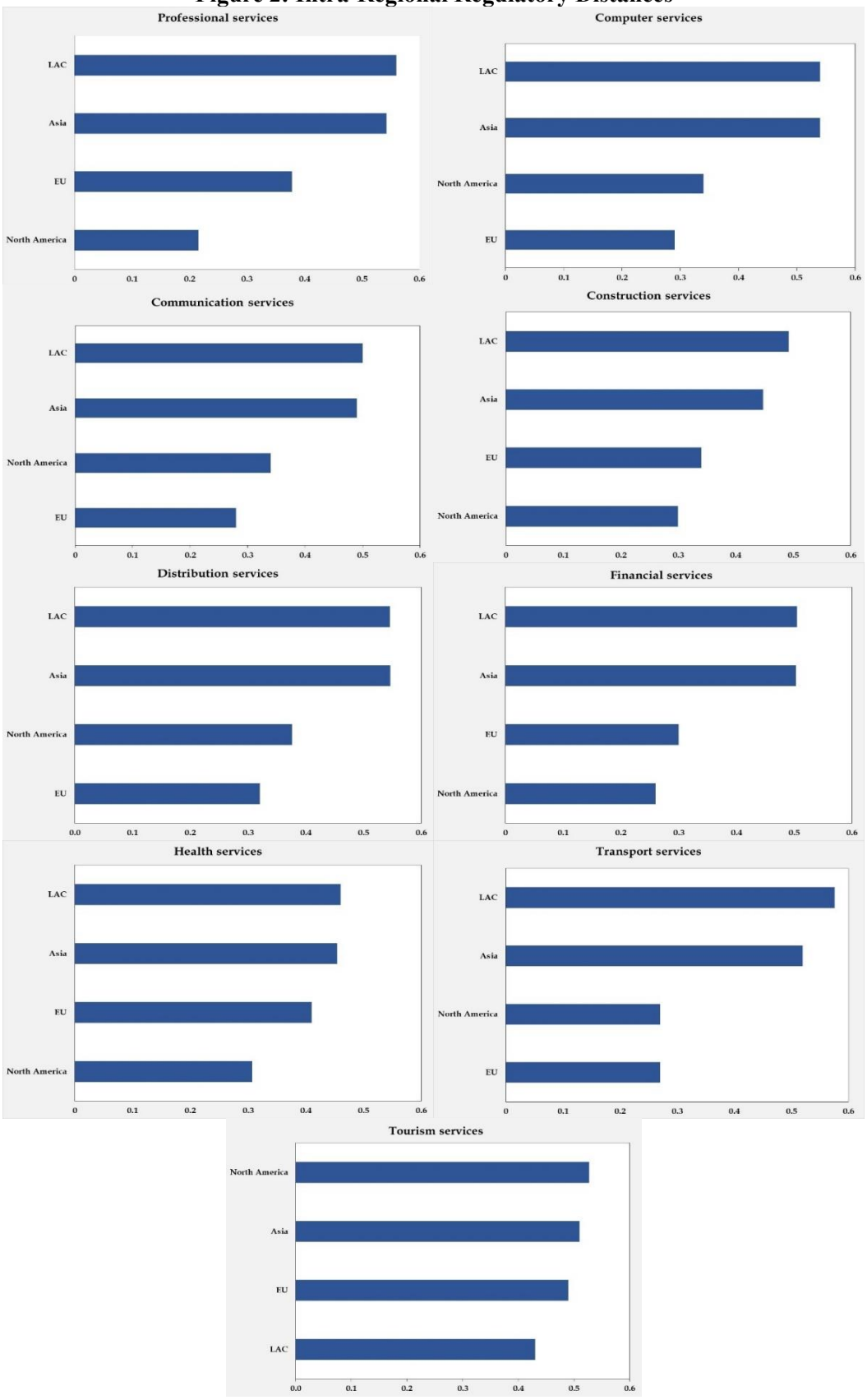

Figure 3: Regulatory Distances between LAC and Selected Region, by Sector

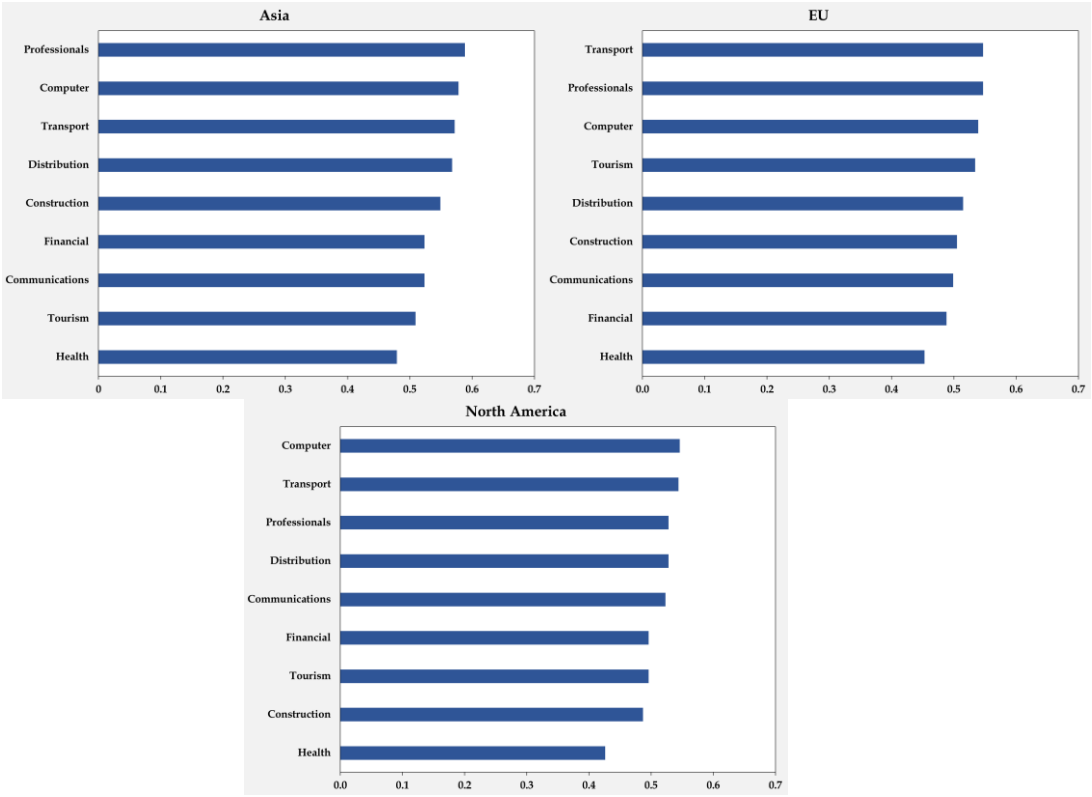

Table 1: Summary Statistics

	Mean	St. Dev	Min	Max
Bilateral services exports (million US$)	223.69	1,016.74	0	39,816
STRI	46.29	12.29	2.3	93.2
Regulatory distance	0.454	0.147	0.089	0.858
Distance (km)	6,196.57	4,727.58	55	19,590
Contiguity	0.051	0.219	0	1
Common language	0.085	0.278	0	1
Common legal origin	0.016	0.127	0	1
RTA	0.379	0.485	0	1
GDP (billion US$)	1,542.70	3,534.75	5.542	21,372

Table 2: OLS estimates using the Nordås and Rouzet (2017) specification

	Professionals	Communications & Computer	Finance	Transport	Distribution
	(1)	(2)	(3)	(4)	(5)
STRI exporter	-0.0081***	-0.0355***	-0.0539***	-0.0166***	-0.0173***
	(0.0023)	(0.0037)	(0.0023)	(0.0036)	(0.0052)
STRI importer	-0.0101***	-0.0173***	-0.0323***	-0.0219***	-0.0159***
	(0.0023)	(0.0044)	(0.0023)	(0.0037)	(0.0046)
Distance (in logs)	-1.0602***	-1.0330***	-0.7877***	-1.0067	-0.7975***
	(0.0340)	(0.0345)	(0.0340)	(0.0341)	(0.0439)
Contiguity	-0.2261*	-0.0551	0.0249	0.2801**	0.1853
	(0.1169)	(0.1166)	(0.1169)	(0.1247)	(0.1463)
Common language	1.2713***	1.0932***	2.1035***	0.7428***	1.3506***
	(0.1153)	(0.1089)	(0.1153)	(0.1114)	(0.1749)
Common legal origin	0.6819*	0.8258***	1.4788***	1.3525***	1.2736***
	(0.3827)	(0.2794)	(0.3827)	(0.2750)	(0.3881)
RTA	0.4798***	0.2663***	-0.1745*	0.2851***	0.3535***
	(0.0678)	(0.0703)	(0.0678)	(0.0698)	(0.0898)
GDP exporter (in logs)	0.9175***	0.7808***	0.9484***	0.7421***	0.7358***
	(0.0204)	(0.0194)	(0.0204)	(0.0209)	(0.0305)
GDP importer (in logs)	0.9418***	0.8491***	0.7859***	0.8534***	0.6588***
	(0.0208)	(0.0211)	(0.0208)	(0.0201)	(0.0269)
R2	0.647	0.612	0.522	0.631	0.503
Observations	7,885	7,054	6,391	6,807	4,459

Note: The dependent variable is bilateral exports. All regressions include year fixed effects. Standard errors clustered by country pair. ***, **, and * denote significant at the 1%, 5% and 10% level, respectively.

Table 3: PPML estimates using the Nordås and Rouzet (2017) specification

	Professionals	Communications & Computer	Finance	Transport	Distribution
	(1)	(2)	(3)	(4)	(5)
STRI exporter	-0.0107***	-0.0301***	-0.0481***	-0.0284***	-0.0317***
	(0.0035)	(0.0067)	(0.0053)	(0.0038)	(0.0099)
STRI importer	-0.0205***	-0.0335***	-0.0416***	-0.0216***	-0.0068
	(0.0034)	(0.0051)	(0.0056)	(0.0046)	(0.0076)
Distance (in logs)	-0.7511***	-0.7894***	-0.7466***	-0.6267***	-0.7967***
	(0.0448)	(0.0525)	(0.0779)	(0.0450)	(0.0864)
Contiguity	-0.5512**	-0.5842***	-0.9328***	-0.0416	-0.6099**
	(0.2193)	(0.1971)	(0.3419)	(0.1784)	(0.2938)
Common language	1.1562***	1.0606***	1.8559***	0.5065***	1.4209***
	(0.1899)	(0.1884)	(0.2308)	(0.1611)	(0.2219)
Common legal origin	0.1221	0.2115	-0.1337	0.4733*	0.7277
	(0.3024)	(0.3720)	(0.4712)	(0.2678)	(0.5497)
RTA	-0.1313	-0.0589	-0.3032*	0.2092**	-0.6117***
	(0.1213)	(0.0981)	(0.1545)	(0.2092)	(0.2121)
GDP exporter (in logs)	0.7316***	0.6926***	0.8053***	0.5425***	0.7141***
	(0.0495)	(0.0320)	(0.0769)	(0.0330)	(0.0717)
GDP importer (in logs)	0.7022***	0.7544***	0.7868***	0.6794***	0.5265***
	(0.7022)	(0.0373)	(0.0740)	(0.0377)	(0.0527)
Pseudo R2	0.721	0.739	0.612	0.667	0.481
Observations	9,301	8,612	8,835	8,660	7,092

Note: The dependent variable is bilateral exports. All regressions include year fixed effects. Standard errors clustered by country pair. ***, **, and * denote significant at the 1%, 5% and 10% level, respectively.

Table 4: Estimated effect of STRI under the preferred specification

	Professionals	Communications & Computer	Finance	Transport	Distribution
	(1)	(2)	(3)	(4)	(5)
STRI exporter x Intl	-0.0250***	-0.0606***	-0.1654***	-0.0943***	-0.0463***
	(0.0066)	(0.0086)	(0.0143)	(0.0076)	(0.0108)
Intl	-3.2087***	-2.0206***	1.8604***	-0.4590	-4.7815***
	(0.4163)	(0.4067)	(0.7043)	(0.4159)	(0.5077)
Distance (in logs)	-0.4122***	-0.6309***	-0.5394***	-0.5208***	-0.7963***
	(0.0515)	(0.0624)	(0.0686)	(0.0551)	(0.0886)
Contiguity	0.1224	0.0101	0.3434	0.3845***	0.0852
	(0.1594)	(0.1534)	(0.2228)	(0.1247)	(0.1980)
Common language	0.9668***	0.6843***	0.8661***	0.4485***	0.9256***
	(0.1623)	(0.1470)	(0.1764)	(0.1162)	(0.1913)
Common legal origin	-0.1882	-0.2458	-0.0835	-0.4505**	-0.5252
	(0.1882)	(0.2573)	(0.3235)	(0.2055)	(0.3437)
RTA	-0.1206	-0.0565	0.0058	0.0497	0.2723
	(0.0933)	(0.0817)	(0.1323)	(0.0777)	(0.1792)
Pseudo R2	0.990	0.994	0.965	0.986	0.998
Observations	9,461	8,772	8,971	8,810	7,223

Note: The dependent variable is bilateral exports. All regressions include exporter-year and importer-year fixed effects. Standard errors clustered by country pair. ***, **, and * denote significant at the 1%, 5% and 10% level, respectively.

Table 5: Estimated effects of STRI and regulatory heterogeneity under the preferred specification

	Professionals	Communications & Computer	Finance	Transport	Distribution
	(1)	(2)	(3)	(4)	(5)
STRI exporter x Intl	-0.0191**	-0.0935***	-0.1087***	-0.0886***	-0.0497***
	(0.0086)	(0.0137)	(0.0193)	(0.0160)	(0.0141)
Intl	-2.7717***	0.9024	-0.0943	0.3966	-3.4253***
	(0.5213)	(0.5507)	(0.7969)	(0.6569)	(0.6856)
Distance (in logs)	-0.4138***	-0.5640***	-0.4605***	-0.4441***	-0.8200***
	(0.0612)	(0.0651)	(0.0667)	(0.0604)	(0.1058)
Contiguity	0.0337	-0.2202	0.4839***	0.3849**	0.1335
	(0.1938)	(0.1814)	(0.1766)	(0.1627)	(0.2235)
Common language	0.9550***	0.8136***	0.8175***	0.2730	0.9535***
	(0.2191)	(0.1371)	(0.2071)	(0.1801)	(0.2535)
Common legal origin	-0.7836*	-0.8495*	-0.5054	0.2641	-0.4972
	(0.4740)	(0.4313)	(0.4836)	(0.3559)	(0.3220)
RTA	-0.2156	0.0516	0.0885	-0.0752	0.5930***
	(0.1901)	(0.0922)	(0.1650)	(0.1012)	(0.2185)
Regulatory distance	-2.3457**	-6.0791***	-4.0856***	-4.1173***	-3.6197***
	(1.0410)	(0.7948)	(0.9823)	(0.6154)	(1.2199)
Pseudo R2	0.992	0.996	0.980	0.990	0.999
Observations	6,013	5,578	5,715	5,422	4,462

Note: The dependent variable is bilateral exports. All regressions include exporter-year and importer-year fixed effects. Standard errors clustered by country pair. ***, **, and * denote significant at the 1%, 5% and 10% level, respectively.

Table 6: Robustness tests

		Professionals	Communications & Computer	Finance	Transport	Distribution
		(1)	(2)	(3)	(4)	(5)
Panel A:	**STRI exporter x Intl**	-0.0222**	-0.0932***	-0.1187***	-0.0887***	-0.0844***
		(0.0106)	(0.0138)	(0.0222)	(0.0170)	(0.0304)
	Regulatory distance	-1.6003*	-6.0288***	-3.9690***	-4.0632***	-3.3266***
		(0.8011)	(0.7730)	(1.0261)	(0.6856)	(1.1184)
	Observations	5,421	5,122	5,302	5,067	4,081
Panel B	**STRI exporter x Intl**	-0.0189**	-0.0930***	-0.1072***	-0.0864***	-0.0503***
		(0.0086)	(0.0133)	(0.0187)	(0.0161)	(0.0141)
	Regulatory distance	-2.0247*	-5.4989***	-3.7272***	-4.0174***	-3.4121***
		(1.1113)	(0.8081)	(1.0583)	(0.6445)	(1.2781)
	Observations	5,713	5,292	5,422	5,140	4,238

Note: Panel A reports regressions excluding outliers in the STRI variable, defined as observations above the 95th percentile and below the 5th percentile within each sector. Panel B reports regressions excluding outliers in the regulatory distance variable, defined as observations above the 95th percentile within each sector. All regressions include the same additional explanatory variables and fixed effects as those in Table 5, which are omitted from the table for brevity.

Table 7: Controlling for country pair fixed effects

	Professionals	Communications & Computer	Finance	Transport	Distribution
	(1)	(2)	(3)	(4)	(5)
STRI exporter x Intl	-0.0315**	-0.0061	0.0335	-0.0076	-0.0834**
	(0.0136)	(0.0225)	(0.0723)	(0.0188)	(0.0385)
RTA	0.4925***	0.0414	-0.1198	0.2941	-0.4143
	(0.1836)	(0.1502)	(0.1029)	(0.2043)	(0.5817)
Regulatory distance	0.2418	0.1195	-0.5653	0.1419	1.9377
	(0.3332)	(1.1405)	(0.4390)	(0.4768)	(1.4844)
Pseudo R2	0.999	0.999	0.997	0.998	0.999
Observations	5,510	5,041	4,551	4,414	3,654

Note: The dependent variable is bilateral exports. All regressions include exporter-year and importer-year fixed effects, as well as country pair fixed effects. Standard errors clustered by country pair. ***, **, and * denote significant at the 1%, 5% and 10% level, respectively.

Appendix

Table A.1: Main results using standardized units of the STRI variable

	Professionals	Communications & Computer	Finance	Transport	Distribution
	(1)	(2)	(3)	(4)	(5)
STRI exporter x Intl	-0.2344**	-1.1482***	-1.3342***	-1.0874***	-0.6107***
	(0.1061)	(0.1691)	(0.2377)	(0.1970)	(0.1732)

Note: The table reports the same regressions as in Table 5, but with the STRI variable expressed in standardized units. The estimated coefficients for all other variables remain identical to those reported in Table 5.

Table A.2: Robustness tests using standardized units of the STRI variable

		Professionals	Communications & Computer	Finance	Transport	Distribution
		(1)	(2)	(3)	(4)	(5)
Panel A	**STRI exporter x Intl**	-0.2727**	-1.1438***	-1.45747***	-1.0885***	-1.0355***
		(0.1309)	(0.1704)	(0.2730)	(0.2091)	(0.3732)
Panel B	**STRI exporter x Intl**	-0.2330**	-1.1414***	-1.3148***	-1.0610***	-0.6169***
		(0.1055)	(0.1639)	(0.2298)	(0.1969)	(0.1732)

Note: The table reports the same regressions as in Table 6, but with the STRI variable expressed in standardized units. The estimated coefficients for the regulatory distance variable remain identical to those reported in Table 6. Similar to Table 6, all regressions include the same additional explanatory variables and fixed effects as those in Table 5, which are omitted from the table for brevity.