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## Services trade costs

**TARIFF EQUIVALENTS OF SERVICES TRADE  
RESTRICTIONS USING GRAVITY ESTIMATION**

Sebastian Benz

JEL Classification: F13, F14, F15, F68

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## SERVICES TRADE COSTS: TARIFF EQUIVALENTS OF SERVICES TRADE RESTRICTIONS USING GRAVITY ESTIMATION

Sebastian Benz, OECD

Estimates for *ad valorem* tariff equivalents of services trade restrictions for cross-border trade in six services sectors are presented in this paper. These equivalents are found to be very big in several service sectors with estimates ranging as high as 2000% when trade flows are relatively inelastic, as opposed to between 20% and 300% in most other sectors. The results indicate that trade costs may even increase less than proportionally as the degree of services trade restrictiveness rises. In addition, the paper shows that services trade liberalisation has the largest effect on trade flows in smaller markets. The estimates presented in this Paper are based on a gravity framework using data on both bilateral trade flows and on the value of domestic production. Production values are used to construct measures for the domestic consumption of domestic services in each country, which enables country-specific trade restrictions to be identified, while controlling for multilateral resistance using fixed effects.

**Keywords:** Trade in services, trade liberalisation, trade costs, services trade restrictions

**JEL codes:** F13, F14, F15, F68

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## Executive Summary

Services trade restrictions can impose significant costs on importers and exporters of services. This report presents preliminary evidence on aggregate trade cost equivalents of the barriers captured in the OECD Services Trade Restrictiveness Index (STRI) in six sectors: computer services, construction, courier services, telecommunications, maritime transport and commercial banking. Moreover, the report highlights the unequal contribution of different types of restriction to aggregate trade costs and it shows that the trade effect of services trade liberalisation depends on observable country characteristics. The report goes beyond existing evidence with three key findings:

First, *ad valorem* tariff equivalents of the STRI are calculated. Estimates for these tariff equivalents depend strongly on the underlying import demand elasticity. Importantly, trade costs do not rise linearly with a country's STRI score in many sectors. For example, in the construction sector only restrictions up to a score of around 0.25 contribute to trade costs. Trade costs for computer services cannot be identified, probably because restrictions to online trade are not yet sufficiently well captured in the STRI.

Second, different types of regulatory policies contribute unequally to services trade costs for cross-border trade, even though these policies account for identical STRI scores:

- in three out of six sectors (computer services, construction and maritime transport) domestic regulation contributes more to services trade costs than barriers to market access and national treatment;
- barriers to Mode 3 (commercial presence), barriers to Mode 4 (presence of natural persons) and barriers behind the border affecting all modes of services trade all have a significantly positive contribution to the cost of cross-border services trade in at least two out of the six sectors;
- non-discriminatory barriers represent higher trade costs than discriminatory barriers in two of the six STRI sectors (construction and maritime transport);
- barriers which affect the establishment of services providers in an export market generally represent higher trade costs than barriers to operations of services providers in courier services, commercial banking, telecommunications and maritime transport, while only in construction services the opposite is true.

Third, the impact of regulatory reform on the volume of services trade can vary by market size, economic development and geographic size. While economies with a smaller GDP are more open to trade in general, they also experience faster growth of trade when liberalising regulation in the commercial banking and the courier services sector. Moreover, a liberalisation induces stronger trade growth: (i) in the computer services, construction, telecommunications and banking sector in economies with a higher GDP per capita; (ii) in maritime transport in economies with a lower GDP per capita; (iii) in the commercial banking sector in economies with a larger geographic size.

All results are derived from sector-level gravity regressions on cross-border trade in services which include different types of STRI variables, typical gravity control variables and multilateral resistance terms. This report is one of a suite of studies which are currently conducted at the OECD, exploring alternative ways to estimate the costs associated with services trade restrictions.

## Introduction

Services trade restrictions can impose significant costs on importers and exporters of services. This report presents detailed evidence on the importance of the OECD Services Trade Restrictiveness Index (STRI) for the cost of cross-border services trade.<sup>1</sup> The STRI represents the state of regulatory restrictions in 19 different services sectors and 42 countries<sup>2</sup> on a scale from 0 to 1. The study is part of the analysis on the trade cost equivalents of services trade restrictions, one of the priorities of the Trade Committee PWB 2015-16. It should enhance the understanding of trade costs associated with different types of services trade restrictions and the implications for services policy reforms.

This paper presents estimated *ad valorem* trade cost equivalents of services trade restrictions for cross-border trade in services as well as estimated trade effects, which indicate the resulting growth in trade volumes from the reduction of services trade restrictions. While these two concepts are closely linked, both have their particular advantages. Trade cost equivalents provide direct information on the size of services trade restrictions, but they rely on estimates of import demand elasticities taken from the literature. Since it is not possible to determine an exact value for the import demand elasticity, I report results for different values within a range of plausible values. Trade effects provide information on the welfare effect of trade liberalisation, because changes in welfare are larger if consumers are actually willing to substitute foreign products or services for domestic products or services after a reduction of trade costs.<sup>3</sup> These trade effects can be calculated directly from the coefficients of gravity regressions, without having to rely on any additional information. Both, the derivation of trade cost equivalents as well as the prediction of the trade effect of services trade liberalisation, are important components of ex ante policy evaluation. Nevertheless, two aspects of how services trade restrictions affect consumer welfare are not captured by these measures:

- GATS Mode 3 of services trade (commercial presence) is not included in trade in services statistics from the balance of payments. Therefore, it is not possible to account for this mode of services trade in the present report. In situations where the STRI has no significant effect on the cost of cross-border trade in services, it might actually represent substantial costs for the provision of services trade via Mode 3. The relationship of the STRI and services trade via Mode 3 is not part of this study but will be explored in the future, primarily by exploiting information on foreign affiliate sales from firm-level data.<sup>4</sup> Nonetheless, this paper provides an implicit identification of complementarities between different modes of services trade by analysing the impact of barriers to Mode 3 on cross-border services trade.
- Several measures in the STRI capture more than only restrictions to services *trade*. For example, restrictions in policy area 4, barriers to competition, do not only protect dominant domestic firms from foreign competitors, but also from domestic competitors. In such a situation, trade flows are not sufficient as proxy for consumer welfare. This shows the importance of analysing the relationship between the STRI and the level of competition in an economy (see Rouzet and Spinelli, 2016).

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1 The STRI database and indices are available at <http://oe.cd/stri>.

2. Country coverage includes all 35 OECD countries plus Brazil, the People's Republic of China, Colombia, India, Indonesia, Russian Federation and South Africa.

3. Accordingly, the value of trade flows relative to GDP is a proxy for the level of consumer welfare in a large group of economic models, see Arkolakis et al. (2012).

4. Services trade via Mode 3 is very important. For example, foreign affiliate sales of services accounted for 68% of cross-border exports of services and foreign affiliate sales in the United States in 2012 (Christen and Francois, 2015).

With these caveats in mind, this paper shows that the *ad valorem* trade cost equivalent of services trade restrictions can be very high in some sectors, but the estimates depend strongly on the assumed import demand elasticity. Subsequently, it reveals that different types of regulatory policies contribute unequally to services trade costs, even though these policies account for identical STRI scores. Moreover, it describes how the impact of services trade liberalisation on trade flows depends on observable country characteristics, such as GDP, GDP per capita and geographic size. The report is organised as follows: Section 2 summarises the existing literature on services trade costs; section 3 presents the data used for the estimations; section 4 provides an overview on the methodology; section 5 shows the estimated trade cost equivalents of the aggregate STRI and its decomposition into different groups; section 6 illustrates the impact of country characteristics on the trade effect of services trade liberalisation; section 7 concludes.

## Literature review

Several existing publications present estimates on trade costs for services. Most of these studies do not use information on restrictions to services trade. Instead, they estimate the size of aggregate services trade cost based on a comparison of a country's services trade volume relative to services trade in a benchmark country or relative to domestic consumption of services. The two strategies can provide evidence on the aggregate trade costs for services, but neither of them is able to identify whether services trade costs are due to political or natural trade barriers.

Fontagné et al. (2011) estimate trade costs for nine services sectors based on services trade data from the Global Trade Analysis Project (GTAP) data base. Estimates for average tariff equivalents range between 20% for transport services and 65% for construction services. Barriers in the most restrictive country represent trade costs between 49% and 160%. These estimates represent trade costs relative to a trade costs in a benchmark economy with the highest volume of trade in services, given its observable characteristics. Benchmark economies with low levels of restrictions are Hong Kong, China; Belgium; Austria; Singapore; Ireland; Mexico; and Greece; depending on the sector in question. The authors use an import demand elasticity of -4.6 which indicates that foreign and domestic services are relatively good substitutes.

In a subsequent paper, Fontagné et al. (2016) provide an update relying on the same estimation strategy but using more recent trade data from 2011 and a higher number of countries. *Ad valorem* equivalents in the most restrictive country are between 146% and 291% based on an import demand elasticity of -4.6. Using a very similar approach but considering zero trade flows explicitly in a Heckman selection model, Guillin (2013) estimates tariff equivalents between 28% and 71%.

A different approach is used by Miroudot et al. (2013) and Miroudot and Shepherd (2015). Tariff equivalents of total trade costs are not calculated relative to a benchmark country but instead they are based on a country's volume of trade in services relative to domestic consumption of services. Since this measure implies positive services trade costs even for the most liberal benchmark country, the resulting tariff equivalents are substantially larger for all countries in the sample and on average. The average tariff equivalent for services trade costs is calculated as 155% based on an import demand elasticity of -7. Due to the difference in the elasticity chose, results of the two studies are not directly comparable.<sup>5</sup> Since sectors can differ with respect to their services trade costs, some sectors must necessarily be characterised by lower trade costs, while trade costs in other sectors can be substantially higher.

Anderson et al. (2014) use information on services trade of Canadian regions with the United States. They find that all Canadian regions trade significantly less with the United States than they trade among each other. Using import demand elasticities between -5 and -9 they estimate that the difference of services trade across the border between the United States and Canada compared to intra-Canada services trade corresponds

5 A back of the envelope calculation suggests that the result by Miroudot et al. (2013) correspond to a 316% average tariff equivalent based on an import demand elasticity of -4.6. This is calculated as  $(1.55 + 1)^{7/4.6} - 1$ .



to a tariff equivalent between 52% and 111% for exporting services from Canada to the United States. This approach relies on the unique data set of regional services trade in Canada.

Berden et al. (2009) estimate trade cost equivalents of non-tariff measures (NTM) based on a business survey. Survey results are used to construct country-pair-specific NTMs. They use a two-step Heckman approach to control for selection into bilateral export relationships. This approach must be usually based on an exclusion restriction: An explanatory variable which has a significant coefficient in the selection equation but does not contribute to the explanation of bilateral trade volumes, once that selection is taken into account (Puhani, 2000). However, the authors do not provide a convincing explanation for the exclusion restriction used in their estimation, which raises questions on the validity of the results.

So far there exists little evidence on the estimation of services trade costs originating from regulatory barriers using constructed indices of services trade restrictiveness. Van der Marel and Shepherd (2013) identify a significantly negative effect of the World Bank STRI on services trade while Nordås and Rouzet (2015) find the same for the OECD STRI. However, these studies do not calculate tariff equivalents of services trade costs. Existing firm-level studies usually do not quantify *ad valorem* equivalents of services trade barriers but rather characterise the patterns of services trade. Examples thereof can be found in Crozet and Milet (2014), Breinlich and Criscuolo (2011), Ariu and Mion (2012), Walter and Dell'mour (2010) and Kelle and Kleinert (2010).

## Data

All results in this report are based on STRI scores calculated according to the new STRI methodology (2015 update) but using the regulatory framework of 2014. Since no trade data for 2015 is available yet, the regulatory framework of 2014 is most appropriate for the representation of restrictions to services trade in the regression analysis. In addition to the aggregate STRI scores, further specifications of the regression are based on a decomposition of the STRI into individual groups which represent a more narrowly defined and homogeneous set of services trade restrictions than the aggregate STRI.

Data on the value of services production come from the OECD national accounts data. The classification of production data is more aggregate than the classification of data on trade flows in some cases so that an exact sector correspondence is not always feasible. This reduces sector coverage for this type of analysis slightly compared to an estimation based only on trade data. Services trade flows come from three different data sources: The OECD Trade in Services by Partner Country (TISP) data; the WTO-UNCTAD-ITC trade in services database; and the United Nations Service Trade database, of which TISP is the preferred data source. When no information on the export volume is available, imports reported by the partner country are used to fill the gaps wherever possible.

Trade data is only scarcely available for the year 2014 so far. Hence, all regressions are based on trade flows from 2010 to 2013. Data from before 2010 is not used because the STRI captures the level of services trade restrictions in 2014. Restricting the sample to all available years since 2010 implies a sufficient number of observations while at the same time limiting the time mismatch between the state of regulatory environment and observed trade flows. Unfortunately, no balanced panel of export data is available for any sector. Exporter information is available only for 31 countries out of the 42 STRI countries, while all 42 economies are included as importers.

This study analyses six STRI sectors: computer services (CS), construction (CO), courier services (CR), telecommunications (TC), maritime transport (TRmar) and commercial banking (FSbnk). Countries in the sample report an aggregate export volume of 180 billion USD in these six sectors over the four years covered. The mean value of annual bilateral exports is highest in the banking sector, with around 136 million USD. In contrast, exports are relatively low in courier services, construction services, and telecommunication services. Bilateral exports on the sector level are characterised by a relatively high number of zeros. The share of zeros varies between 28% in computer services and 54% in courier services.

**Table 1. Services exports 2010-2013 by sector, in million USD**

	Observations	Mean	Std. Dev.	Maximum	Share of zeros
Construction (CO)	5 166	24	86	1 529	43.71%
Computer (CS)	4 715	103	396	7 686	27.66%
Courier (CR)	4 059	10	80	3 070	54.42%
Telecommunication (TC)	4 551	29	113	1 933	36.23%
Maritime transport (TRmar)	2 905	128	442	7 312	30.81%
Commercial banking (FSbnk)	4 715	136	678	13 976	29.63%

## Methodology

The gravity model is the workhorse model for the analysis of international trade flows, not only for trade in goods, but also for services. In this model, bilateral trade flows are explained by observable country characteristics and country-pair characteristics. These characteristics typically include domestic expenditure (usually measured by GDP), bilateral distance, common language, bilateral trade agreements and many more. While this base specification has not lost its relevance, several extensions have been developed which allow for more tightly focussed analysis.

For the application of gravity estimation to services trade restrictions, a major difficulty arises from the multilateral property of the STRI score. Each country's STRI represents an identical level of services trade restrictions with respect to all partner countries; a country-pair dimension does not exist. However, in the modern gravity regressions introduced by Anderson and van Wincoop (2003) coefficients on country-specific variables cannot be identified because country-level fixed effects are used to control for a country's unobservable multilateral resistance to trade.

While there are real country-specific variables such as GDP or population, the STRI does not constitute such a real country-specific variable. It is rendered a country-specific variable in a standard gravity equation by assuming that trade with all *other* countries is affected identically by a country's services trade restrictions. But what about domestic sales of domestic services suppliers? Due to the nature of the STRI it is not possible to assume that the supply of services from domestic producers to domestic consumers is unaffected by services trade restrictions. However, it is valid to assume that domestic producers are affected differently from foreign producers.

The availability of data on the value of services production in each country allows to construct measures of so-called 'within-country trade flows', defined as the value of domestically produced services which are consumed domestically. Technically, these are constructed by subtracting the aggregate value of exports in a sector from the value of production in this sector. This section provides a less-technical and more intuitive description of the estimation strategy based on these 'trade flows'. More technical information can be found in Box 1.

To include within-country trade flows in a gravity analysis, an otherwise standard gravity equation is augmented by a binary variable indicating international trade, the so-called border dummy, i.e. the variable is zero when the services-producing country is equal to the services-consuming country and one in all other cases.<sup>6</sup> If frictions to cross-border trade in services exist the coefficient on the border dummy should be

6 The importance of within-country trade flows follows directly from the theoretical gravity equation in Anderson and van Wincoop (2003), where the resulting gravity equation  $X_{ij} = \frac{E_j Y_i}{Y} \left( \frac{t_{ij}}{P_j \Pi_i} \right)$  also holds for  $i=j$  and the entire system of equations is homogeneous of degree zero in the vector of trade costs  $t_{ij}$ , so that only the effect of relative changes in trade costs (for example costs for international trade relative to domestic

significant and negative. The impact of services trade restrictions on trade flows is identified from the interaction of the STRI score with the border dummy. The coefficient on this interaction indicates whether services trade restrictions – as measured by the STRI – affect the volume of trade across borders relative to domestic consumption of domestic services. A negative coefficient implies that economies with a higher STRI score trade less with other countries than economies with a lower STRI score. In other words, more restrictive economies face a higher tariff equivalent for the imports of services.

### Box 1. Estimation strategy

All regressions are run separately for each sector and are estimated using the poisson pseudo maximum likelihood technique introduced by Santos Silva and Tenreiro (2006). The estimation equation for each of these sector-level regressions can be written as

$$exports_{ijt,k} = \exp(\beta_0 STRI_{j,k} border_{ij} + \beta_1 border_{ij} + \gamma Z_{ij} + \eta_{it} + \mu_{jt} + \varepsilon_{ijt}),$$

where  $i$  indicates the exporter,  $j$  indicates the importer,  $t$  indicates the year,  $k$  indicates the service sector and  $\exp(.)$  is an exponential function. The variable  $exports$  represents bilateral sector-level exports, including the volume of domestic services which is consumed domestically for country pairs where  $i=j$ ,  $border$  is a binary variable which takes the value of zero when  $i=j$  and the value of one otherwise.  $Z$  is a vector of bilateral gravity control variables,  $\eta$  is an exporter-year dummy,  $\mu$  is an importer-year dummy and  $\varepsilon$  is a normally distributed error term. Finally,  $STRI$  is a vector of variables indicating services trade restrictiveness, consisting of linear STRI scores and squared STRI scores. Of interest is  $\beta_0$ , a vector of regression coefficients.

To control for trade cost with respect to intra-EEA trade, the interaction of the STRI and a dummy which is equal to 1 if importer and exporter are members of the European Economic Area (EEA) is added as additional elements of this vector. This means that  $\beta_0 STRI_{j,k}$  can be written as

$$\beta_0 STRI_{j,k} = \beta_{0A} STRI_{j,k} + \beta_{0B} STRI_{j,k}^2 + \beta_{0F} STRI_{j,k} EEA_{ij} + \beta_{0G} STRI_{j,k}^2 EEA_{ij}.$$

When analysing separate components of the STRI, these components are included as distinct STRI variables. For example, for the decomposition into market access and national treatment vs. domestic regulation and other barriers, there exist two terms  $\beta_0 STRI_{j,k} = \beta_0^{MANT} STRI_{j,k}^{MANT} + \beta_0^{DRO} STRI_{j,k}^{DRO}$  and the decomposition from above must be applied to both terms separately. To account for the heterogeneity of the trade effect with respect to observable country characteristics, the STRI vector includes the interaction of the STRI with the natural logarithm of the importers' GDP, GDP per capita and internal distance. In this case  $\beta_0 STRI_{j,k}$  includes additional terms so that

$$\begin{aligned} &\beta_{0C} STRI_{j,k} \ln GDP_j + \beta_{0D} STRI_{j,k} \ln GDP_{pcj} + \beta_{0E} STRI_{j,k} \ln Dist_j + \beta_{0H} STRI_{j,k} EEA_{ij} \ln GDP_j + \beta_{0I} STRI_{j,k} EEA_{ij} \ln GDP_{pcj} \\ &+ \beta_{0J} STRI_{j,k} EEA_{ij} \ln Dist_j + \gamma_{0C} \ln GDP_j + \gamma_{0D} \ln GDP_{pcj} + \gamma_{0E} \ln Dist_j + \gamma_{0H} EEA_{ij} \ln GDP_j \\ &+ \gamma_{0I} EEA_{ij} \ln GDP_{pcj} + \gamma_{0J} EEA_{ij} \ln Dist_j. \end{aligned}$$

Trade effects of an STRI reduction by 0.01 are calculated as

$$\Delta = [\exp(-0.01(\beta_{0A} + \beta_{0B}(2 * STRI - 0.01) + \beta_{0C} * \ln GDP + \beta_{0D} * \ln GDP_{pc} + \beta_{0E} * \ln Dist)) - 1] * 100,$$

where  $\beta_{0A}$  is the coefficient on the linear STRI term,  $\beta_{0B}$  is the coefficient on the quadratic STRI term and  $\beta_{0C}$ ,  $\beta_{0D}$  and  $\beta_{0E}$  represent the coefficients on the interaction of the STRI with  $\ln GDP$ ,  $\ln GDP$  per capita, and  $\ln$  internal distance. The variable  $STRI$  is the initial level of services trade restrictions for which the trade effect is calculated. The tariff equivalent of the STRI is calculated as

$$\tau = [\exp((STRI_{min2} - STRI)(\beta_{0A} + \beta_{0B}(STRI + STRI_{min2}))/\varepsilon) - 1] * 100,$$

where  $STRI$  is the STRI score to which the tariff equivalent corresponds,  $STRI_{min2}$  is the second lowest STRI score in the sample of economies for which trade data is available and  $\varepsilon$  is the import demand elasticity. As above,  $\beta_{0A}$  is the coefficient on the linear STRI term,  $\beta_{0B}$  is the coefficient on the quadratic STRI term. Trade cost equivalents can either be calculated for the aggregate STRI or for different components of the STRI. For the decomposition mentioned above, one tariff equivalent is based on  $\beta_{0A}^{MANT}$  and  $\beta_{0B}^{MANT}$  while the other is based on  $\beta_{0A}^{DRO}$  and  $\beta_{0B}^{DRO}$ .

Standard errors are clustered on the importer-level, to account for a correlation of regression residuals along this dimension. Such a correlation might be due to the lack of country-pair variation in the STRI. Confidence intervals on the tariff equivalent and trade effect can be obtained by first considering the linear combinations of the linear and square term. In a second step, confidence intervals on these linear combinations are transformed by an exponential transformation similarly to the calculation of the tariff equivalents and the trade effect itself. Using the delta method to account for the nonlinear transformation and obtain standard errors yields relatively similar results.

trade) can be identified. See Chen (2004), Evans (2003) or Wei (1996) for early research based on this strategy.

Since the coefficient on the STRI is identified from data with an exporter-dimension, importer-dimension and year-dimension, exporter-year and importer-year fixed effects can be included in the regression to account for multilateral resistance. These fixed effects also absorb all other country specific variables.<sup>7</sup> This advantage comes at the cost of slightly smaller sector coverage, since data quality on the value of production is not sufficiently good for all sectors covered by the STRI.

As mentioned above, the STRI represents barriers on an MFN basis and does not capture more liberal regulation from preferential agreements so that the volume of services trade within the European Union may lead to biased results for the impact of the STRI on trade flows in these economies. In order to deal with this problem two additional variables are included. The first is a dummy variable which indicates trade flows within the European Economic Area (EEA) and the second is calculated as the interaction of the STRI-border interaction used in the respective specification with the EEA dummy. The coefficient on this variable captures trade flows between two EEA economies, while the regular STRI variable is only identified from the remaining variation of trade flows which include at least one non-EEA member.

All regressions control for the standard gravity variables, such as the natural logarithm of bilateral distance, contiguity, common language, colonial history, bilateral time differences, bilateral free trade agreements covering services, etc. Moreover, all regressions control for measures of regulatory heterogeneity of the STRI, as calculated in Nordås (2016).<sup>8</sup> Since these are all bilateral variables, they can be included as control variables without additional interactions. All these variables take values of zero for within-country trade flows, so that their coefficients only represent trade costs for international trade, while the difference between trade costs for international trade and within-country trade is captured by the border dummy.

Two additional control variables are inserted as proxies for language skills, using information on each country's number of student studying abroad and the number of students studying abroad in an English-speaking country relative to the size of the population.<sup>9</sup> Language skills can be an important determinant for the volume of cross-border trade in services which is not driven by the regulatory regime in a sector, but by the quality of a country's education system. Moreover, in four of the six sectors I control for the share of household with internet access. This variable captures the access to e-commerce which can be an important determinant of services trade flows, for example in courier services. This variable is not included for the regressions in the computer services and telecommunications sector, since the variable is potentially determined by the STRI in these sectors. This means that the effect of the STRI on trade flows could no longer be identified from the STRI variable itself, if the broadband access variable was included. Since these variables do only contain variation on the country-level they are interacted with the border dummy to be included in the regression.

Linear and quadratic terms of the STRI are included in most regressions to identify the potentially nonlinear effect of services trade restrictions on trade costs. This is a relatively simple and straightforward approach to account for the fact that the effect of additional trade barriers on trade costs may depend on the initial level of restrictiveness in a country. The coefficient on the quadratic term should be significantly different from zero in this case. Quadratic terms are not included, if they do not improve the fit of the estimation equation.

7 Due to these methodological improvements, results in this paper can be considered somewhat more reliable than those from previous evidence on the impact of services trade restrictiveness on trade flows by Nordås and Rouzet (2015).

8 The measure of regulatory heterogeneity provides information on the dissimilarity of regulation in two countries according to the STRI. The measure is equal to one for a country pair, if the two countries obtain different scores for each measure in the STRI, while it is equal to zero if two countries obtain identical scores for all measures.

9 For countries with English as official language this variable contains the value of Luxembourg, which is the country with the highest ratio of students studying abroad in an English speaking country relative to the size of its population in my sample of countries in which English is not official language.

Since all coefficients are identified from variation across countries, not from variation over time, the derived trade costs and trade effects must be understood as long run potential of trade liberalisation. This implies that trade costs will not fall immediately after a liberalisation of services trade. There exists some evidence that trade liberalisation takes quite some time before coming into economic effect entirely, even though most evidence is based on data of trade in goods. For example, Baier and Bergstrand (2007) find a ten-year “phase-in” period for the effect of free trade agreements on trade growth. Such a time horizon also seems plausible for the required time until a regulatory reform fully translates into lower trade costs and additional trade in services.

One reason for this long “phase-in” period is that services providers need to adjust to the new regulatory environment. For example, it is likely that services trade providers will invest more in services trade capacities, services trade infrastructure or specific knowledge about foreign markets when the regulation is more liberal towards trade in services. If such investment reduces the cost of cross-border trade, this effect is also captured in the estimated coefficients, since the effect of this investment on trade costs cannot be separated from the tariff equivalent of the STRI in a cross-country analysis. This means that part of the tariff equivalent of the STRI may represent the lack of investment which has not yet taken place due to a restrictive regulatory environment which does not promote services trade.

All results represent the outcomes of independent regressions on the sector-level. This approach allows for a heterogeneous impact of services trade restrictions on trade flows across sectors. The additional flexibility makes this approach superior to a joint regression based on trade data from all services sectors, but comes at the cost of fewer observations per regression, which may increase the standard errors of the estimation coefficients. Estimates are based on the poisson pseudo maximum likelihood estimator, as suggested by Santos Silva and Tenreiro (2006). With this strategy, zero trade flows can explicitly be accounted for in the regression.

## Trade cost equivalents of the STRI

The link between observed differences in trade flows and implicit trade cost equivalents is established via import demand elasticities. These import demand elasticities are not known and there exists a large literature trying to estimate their values. Most approaches focus on estimates of the elasticity of substitution  $\sigma$  so that the import demand elasticity is given by  $\varepsilon = 1 - \sigma$  and relatively more evidence exists for goods than services.

In particular for goods there exists some evidence that the elasticity of substitution has decreased over time. Broda and Weinstein (2006) report an average  $\sigma$  of 6.8 in the period between 1972 and 1988 based on 246 different categories of products. At the same level of product aggregation they find a mean elasticity of 4.0 between 1990 and 2001. Due to the existence of outliers with very large values, sample medians are much smaller than arithmetic averages. In the same study, Broda and Weinstein (2006) find a median of 2.5 between 1972 and 1988 and a median of 2.2 between 1990 and 2001. Using a more disaggregate product classification usually leads to higher estimates for the elasticity of substitution. Hence, estimates from the lower end this range might be more adequate for the estimation of trade costs based on restrictions that are measured on a broad sector classification.

More recently, Breinlich (2010) estimates the elasticity of substitution for 14 different services categories. His preferred specifications provide results in the range between 1.13 and 2.49, significantly smaller than for goods. He acknowledges the fact that some of the difference between the elasticity of substitution for goods and services might be due to an aggregation bias when services trade flows are reported at a more aggregate level than goods trade. However, he also argues that “services are by their very nature highly differentiated, tailored to individual customers and thus not easily substitutable” (Breinlich, 2010).

Given this evidence, values between -1.5 and -5 can be considered as reasonable estimates for the import demand elasticity. This is at the lower end of what has previously been used in the literature, which means that the calculated tariff equivalents can be higher than previously been reported. However, it adequately

reflects on most recent evidence and can thereby provide a more realistic picture of services trade costs.<sup>10</sup> Therefore, values of -1.5, -3 and -5 are used for the calculation of the aggregate tariff equivalents of the STRI. Tariff equivalents for different components of the STRI will be based on an import demand elasticity of -3. The focus in those parts of the report is on the relative contribution of different groups of measures to the tariff equivalent, rather than the size of the tariff equivalent, so that it is not necessary to report estimates for different values of import demand elasticities.

Trade cost equivalents of the STRI are reported relative to a benchmark country. This benchmark country is the country with the second lowest STRI score in each sector in the sample of STRI countries. Reason for this approach is that such trade costs can only be estimated with sufficient precision within the range of available observations. Hence, the vertical axis in all figures indicates trade costs that importers in countries with a high STRI score have to pay in addition to importers in the respective benchmark country.

With an analysis on the sector-level, estimated tariff equivalents in some sectors will naturally be larger than what could be expected from a regression on the aggregate trade flows and in some sectors they will be smaller. Since high tariff equivalents are more likely to materialise in sectors with low trade volumes, a simple average of the resulting tariff equivalents would still overstate the aggregate cost of services trade. Hence, high tariff equivalents in some sectors are not inconsistent with much smaller estimates for aggregate services trade cost.

The reported trade cost equivalents are based on the point estimates of the regression coefficients. While information on the standard errors and significance of the coefficients is reported in the annex, confidence intervals are not shown graphically. Nevertheless, it should be understood that substantial statistical uncertainty prevails with respect to these estimates and that the figures may suggest a level of precision which the underlying estimations are not able to meet. Hence, figures should be taken as indicative information on the true levels and patterns of services trade costs induced by the STRI.

Caution with respect to the precision of the estimate is also required due to some additional caveats. Most importantly, the measurement of services trade flows in the balance of payments results from the measurement of financial transactions, which can only provide a poor and often inconsistent representation of the international flow of services. In particular, mismeasurement may occur due to different contractual relationships between firms or due to netting out of mutual services provision.

More conceptually, *ad valorem* tariff equivalents represent a hypothetical mark-up on the unit price of a service in the importing country. This hypothetical mark-up is chosen so that observed trade flows represent optimal choices of consumers given the prices they face. The mark-up is hypothetical since it is only necessary to align trade flows with optimal choices of consumers. Consumers do not actually have to pay this mark-up. The interpretation of this concept is difficult for services since specific units of services can often not be observed and, hence, unit prices do not exist.

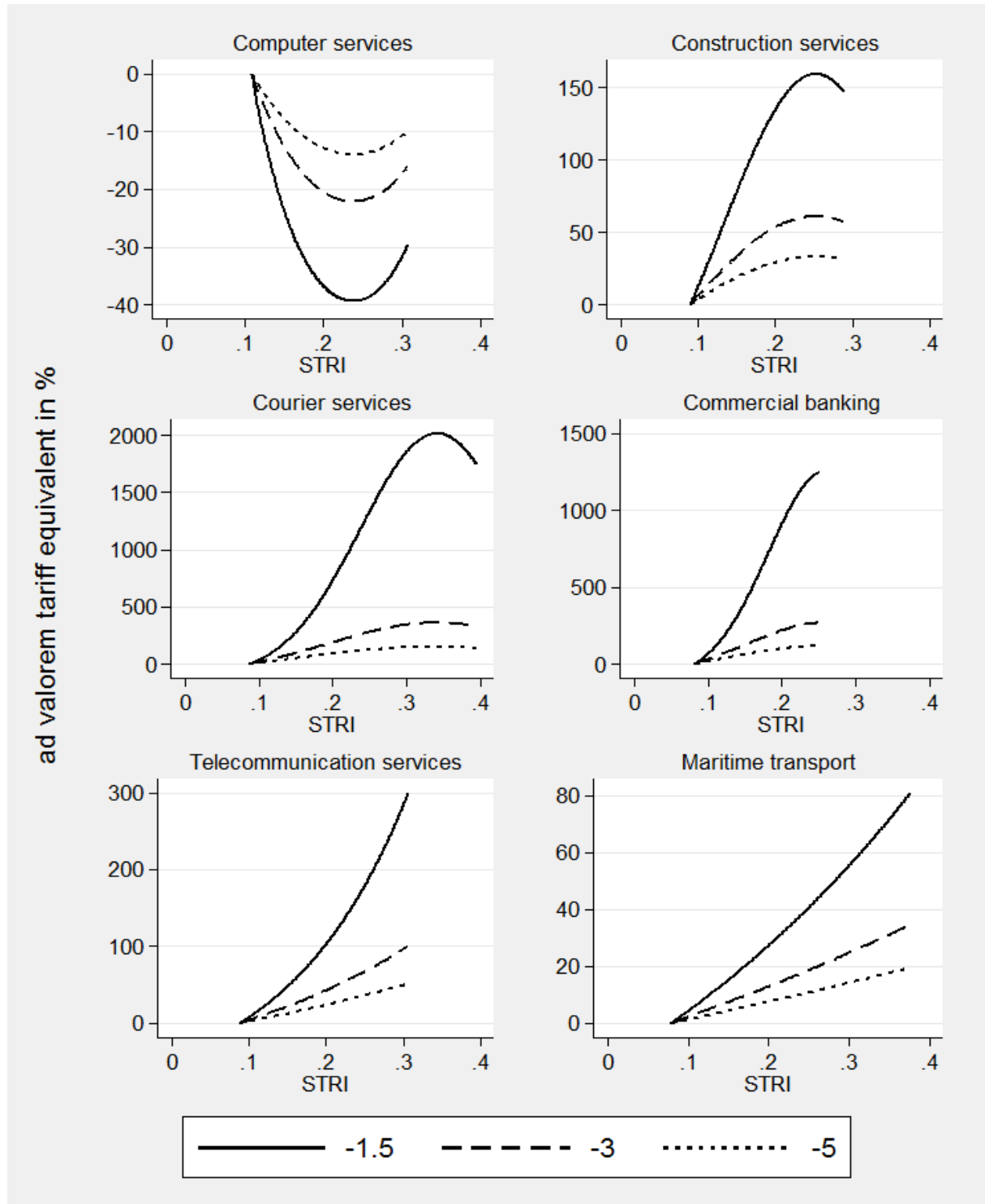
### ***Aggregate trade cost equivalents***

Estimated trade cost equivalents differ a lot across sectors. The STRI constitutes very high trade barriers in two sectors, courier services and commercial banking services. In the courier services sector, an STRI score of 0.34 relative to a benchmark score of 0.085 corresponds to an additional import tariff between 150% for an import demand elasticity of -5 and 2016% for an import demand elasticity of -1.5. Estimates in the commercial banking sector indicate additional trade barriers between 118% and 1246% in countries with an STRI score of 0.25 compared to countries with a score of 0.08.

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10 Results based on very high elasticities of substitution around 8 are typically justified by studies conducted in the 1990s on trade in goods and summarised in Anderson and van Wincoop (2004).

Figure 1. Trade cost equivalent of the STRI



Notes: The vertical axis shows the estimated *ad valorem* tariff equivalent of the STRI. It is normalised to zero for the second most liberal country in the sample. Import demand elasticities used for the calculation are -1.5, -3 and -5. Figures are based on the coefficients from column (1) of the regression tables reported in the annex.

Moreover, in both of these sectors initial restrictions represent a larger tariff equivalent than additional restrictions of identical size when a country's STRI score already is high. For example, an increase of the STRI score in the commercial banking sector from 0.1 to 0.11 leads to a larger increment of services trade costs than an equivalent increase of the STRI from 0.25 to 0.26. This can be seen from the fairly linear relationship between services trade restrictions and trade costs in Figure 1 which flattens towards the end on the right side.

The STRI represents trade costs of intermediate size in three other sectors. An STRI score of 0.25 in the construction sector corresponds to an additional import tariff between 33% and 159%, relative to an STRI score of 0.09. As above, the benchmark represents the STRI score of the second most liberal country in the sample. In this sector, only restrictions up to a score of 0.25 represent barriers to services trade. Starting from this threshold, trade costs do not rise any further with additional services trade restrictions.<sup>11</sup> This implies that the benefit from the reduction of services trade barriers in this sector is even more skewed towards situations in which countries already have liberal regulatory services trade environments in place than in the courier services sector and commercial banking services sector.

The tariff equivalent of an STRI score of 0.31 in the telecommunications sector is between 51% and 299%, compared to a score of 0.09.<sup>12</sup> Estimates in the maritime transport sector and in the computer services sector are not significantly different from zero. The tariff equivalent in the maritime transport sector still takes plausible values based on the insignificant point estimate, while in the computer services sector the resulting tariff equivalent of the STRI is slightly negative. It seems that the aggregate STRI is not able to explain the pattern of cross-border services trade in this sector. This might be due to the importance of Mode 3 and Mode 4 for the STRI score in this sector, while trade in computer services is often conducted via Mode 1 without any accompanying movement of people, for example via online transfer of data.<sup>13</sup> The subsequent parts of this report will present further analysis whether individual components of the total STRI may be able to explain the pattern of trade costs for computer services and in all other sectors.

### ***Market access and national treatment vs. domestic regulation***

All STRI measures are classified into different groups, according to the type of restriction they imply.<sup>14</sup> These classifications are used to construct an STRI which is exclusively based on a certain type of barrier. The first distinction is made between barriers with respect to market access and national treatment of foreign suppliers, as opposed to an STRI from domestic regulation and other barriers. An intuition for these two categories is outlined in the STRI sector papers:

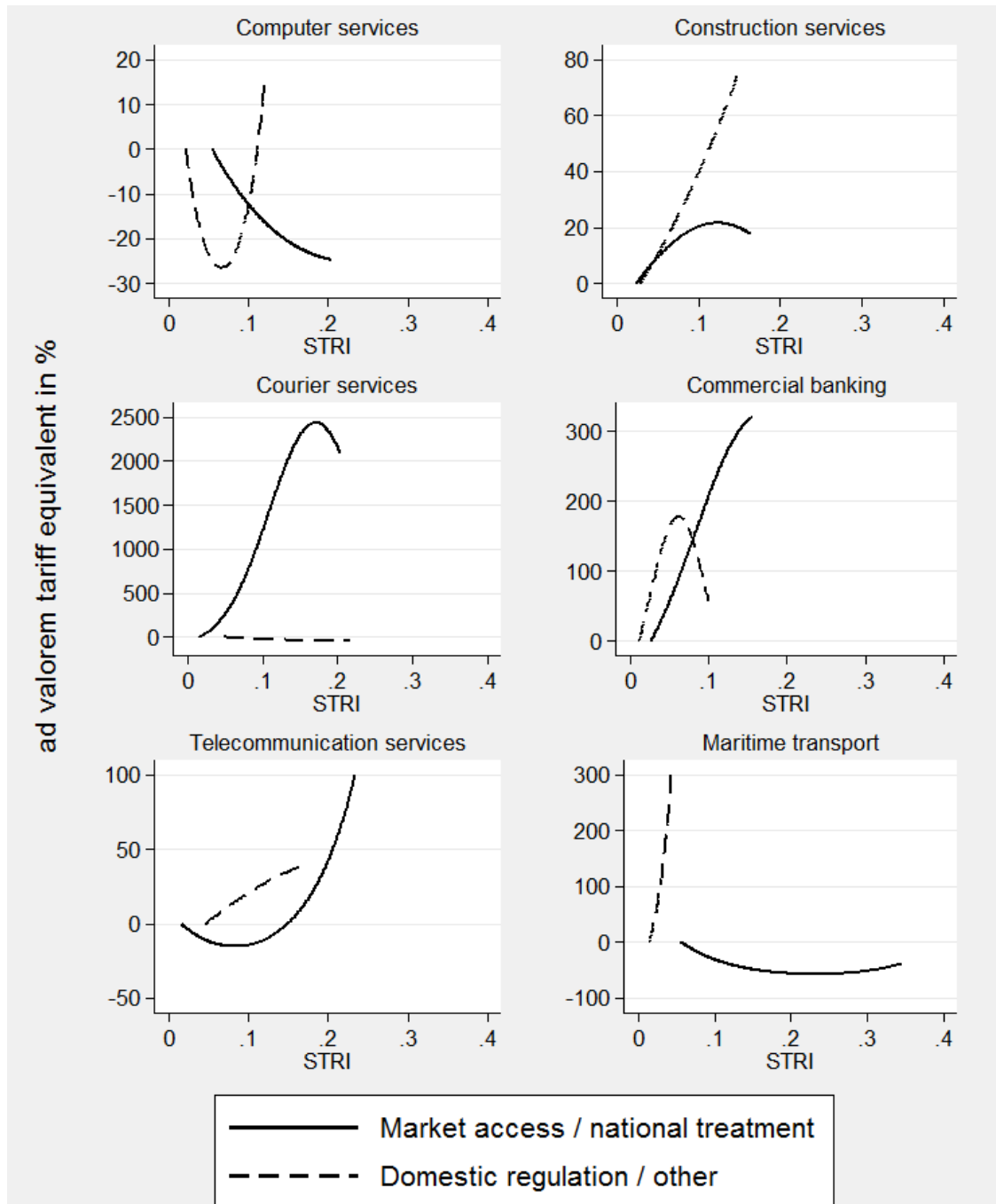
*“As with any classification, it is not always possible to clearly identify to which category certain restrictions belong and there are overlaps in the classification of some barriers. Therefore, market access and national treatment measures are classified together. This grouping also allows a distinction to be made between restrictions subject to scheduling under the GATS and domestic regulatory measures that usually do not need to be scheduled. Restrictions not captured by either market access or national treatment are classified under domestic regulation, and other barriers. The classification is without prejudice to WTO Members' commitments and obligations under the GATS.” (Nordås et al., 2014a)*

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- 11 While the point estimate suggests that the tariff equivalent falls for very high STRI scores, this effect is not statistically significant.
  - 12 Only a linear STRI term is used in the specification for this sector, based on the results from several econometric tests.
  - 13 The 2016 update of the STRI adds measures that capture restrictions to Mode 1. In particular, restrictions on data transfer are included which might constitute significant barriers to cross-border trade in computer services.
  - 14 A complete list of all measures and their classification with respect to these categories as well as the resulting STRI scores can be found in the STRI sector papers published as Geloso Grosso et al. (2014a, 2014b, 2014c), Nordås et al. (2014a, 2014b, 2014c), Rouzet et al. (2014) and Ueno et al. (2014).



The following figures are all based on an import demand elasticity of -3 and it should be born in mind that estimates of the tariff equivalent depend strongly on the import demand elasticity. Consequently, these estimates should not be interpreted according to their absolute values, but rather with respect to the relative importance of the different groups of restrictions in each sector.

**Figure 2. Market access and national treatment vs. domestic regulation**



*Notes:* The vertical axis shows the estimated *ad valorem* tariff equivalent of the STRI. It is normalised to zero for the second most liberal country in the sample. Import demand elasticity used for the calculation -3. Figures are based on the coefficients from column (2) of the regression tables reported in the annex.

The contribution of market access and national treatment barriers to services trade costs relative to the contribution of domestic regulation differs substantially across sectors. Market access and national treatment restrictions account for the major part of barriers to cross-border trade in the commercial banking sector, the courier services sector and the telecommunications sector; domestic regulation does not constitute a significant tariff equivalent in these sectors. Consequently, only a liberalisation which facilitates market access and national treatment can contribute to a reduction of trade barriers. Moreover, it can be seen that the relationship of the STRI and estimated trade costs flattens for high levels of restrictions in the courier services sector and the commercial banking sector. This pattern implies that the marginal impact of additional barriers on trade costs falls with a rising STRI score. Taking an opposite view, it means that a liberalisation of market access and national treatment barriers from 0.05 to 0.04 induces a stronger reduction of trade costs than a liberalisation from 0.15 to 0.14.

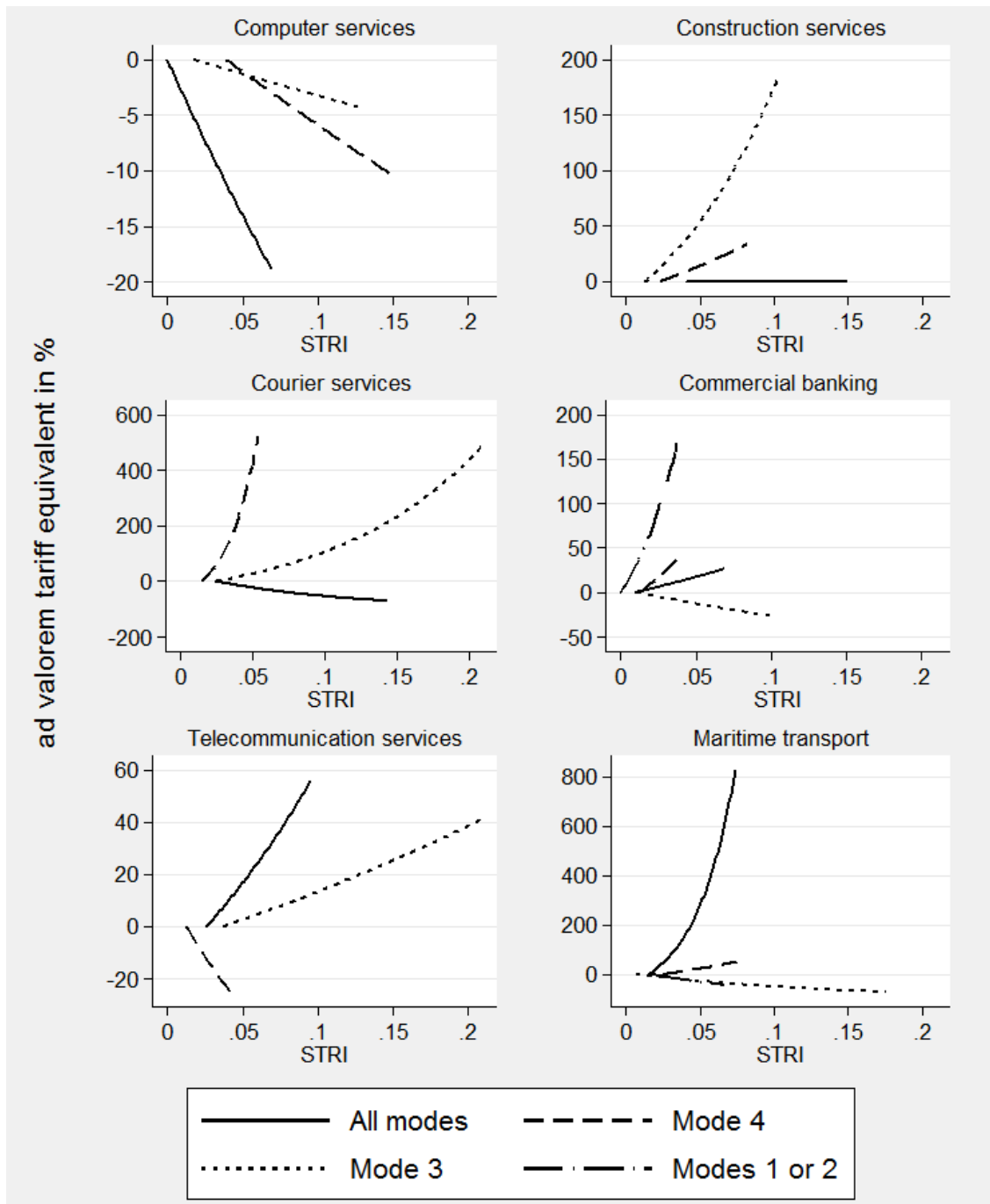
In contrast, domestic regulation is responsible for the major part of services trade costs in the remaining three sectors. These sectors are computer services, construction services and maritime transport. This result highlights the burden of costly adjustment to domestic regulation in a high number of countries to which firms export. There exist several distinct patterns with respect to the trade cost effect of domestic regulation.

For example, only very restrictive domestic regulation seems to constitute trade costs in the computer services sector, while this is not the case in the construction services sector. The possibility to export computer services via the internet might provoke this pattern, because foreign suppliers who provide their services online are not affected by many aspects of domestic regulation in the importing country.<sup>15</sup> In contrast, construction services suppliers are much more exposed to domestic regulation in the importing country, for example requirements to access public procurement contracts or differences in building standards and qualification requirements, so that significant trade costs may arise from just few of these restrictions. This explains why measures related to domestic regulation have a stronger impact on trade in construction services (and trade in maritime transport) than trade in computer services. The difference is especially pronounced for low levels of restrictiveness.

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15 Restrictions to data transfer might be an important determinant of cross-border trade in computer services. This aspect can be analysed after the completion of the 2016 STRI.

Figure 3. Restrictions with respect to different modes of services trade



Notes: The vertical axis shows the estimated *ad valorem* tariff equivalent of the STRI. It is normalised to zero for the second most liberal country in the sample. Import demand elasticity used for the calculation -3. Figures are based on the coefficients from column (5) of the regression tables reported in the annex.

### *Restrictions with respects to different modes of services trade*

The disaggregation of the STRI also allows for an analysis of restrictions to different modes of services trade. These modes are, Mode 1: Cross-border supply; Mode 2: Consumption abroad; Mode 3: Commercial presence; and Mode 4: Temporary movement of natural persons. In the STRI database measures are classified to either affect all modes of services trade, to affect only Mode 3, only Mode 4, or Modes 1 and 2. The last group, however, is only included in the STRI for commercial banking and maritime transport among the sectors analysed here. In the other four sectors, no policy measures could be identified which apply predominantly to Modes 1 and 2. Very often, different modes of trade in services are complementary to each other, for example when natural persons in a foreign economy provide services in collaboration with colleagues from their home country who export services via Mode 1. This means that all measures to the movement of people also affect trade in services via Mode 1. However, when measures can affect trade in services via different modes, they are classified according to the mode which they affect most. In the example above, restrictions to the movement of people are classified as barriers to Mode 4.

Data on cross-border trade in services from the balance of payments broadly cover Modes 1, 2 and 4, with the additional limitation that the services of self-employed suppliers staying in the host economy for a year or longer are not included, since these suppliers become residents of the host country. Nevertheless, also measures related to Mode 3 of services trade can affect cross-border trade. On the one hand, services provided via different modes may be substitutes, so that additional barriers to Mode 3 make cross-border trade relatively more attractive. Such a situation would be captured by a negative tariff equivalent of barriers to Mode 3. On the other hand, services are often supplied via a combination of different modes, so that restrictions to Mode 3 also constitute barriers for the supply of services across the border. In this case, the resulting tariff equivalent of barriers to Mode 3 should be positive.

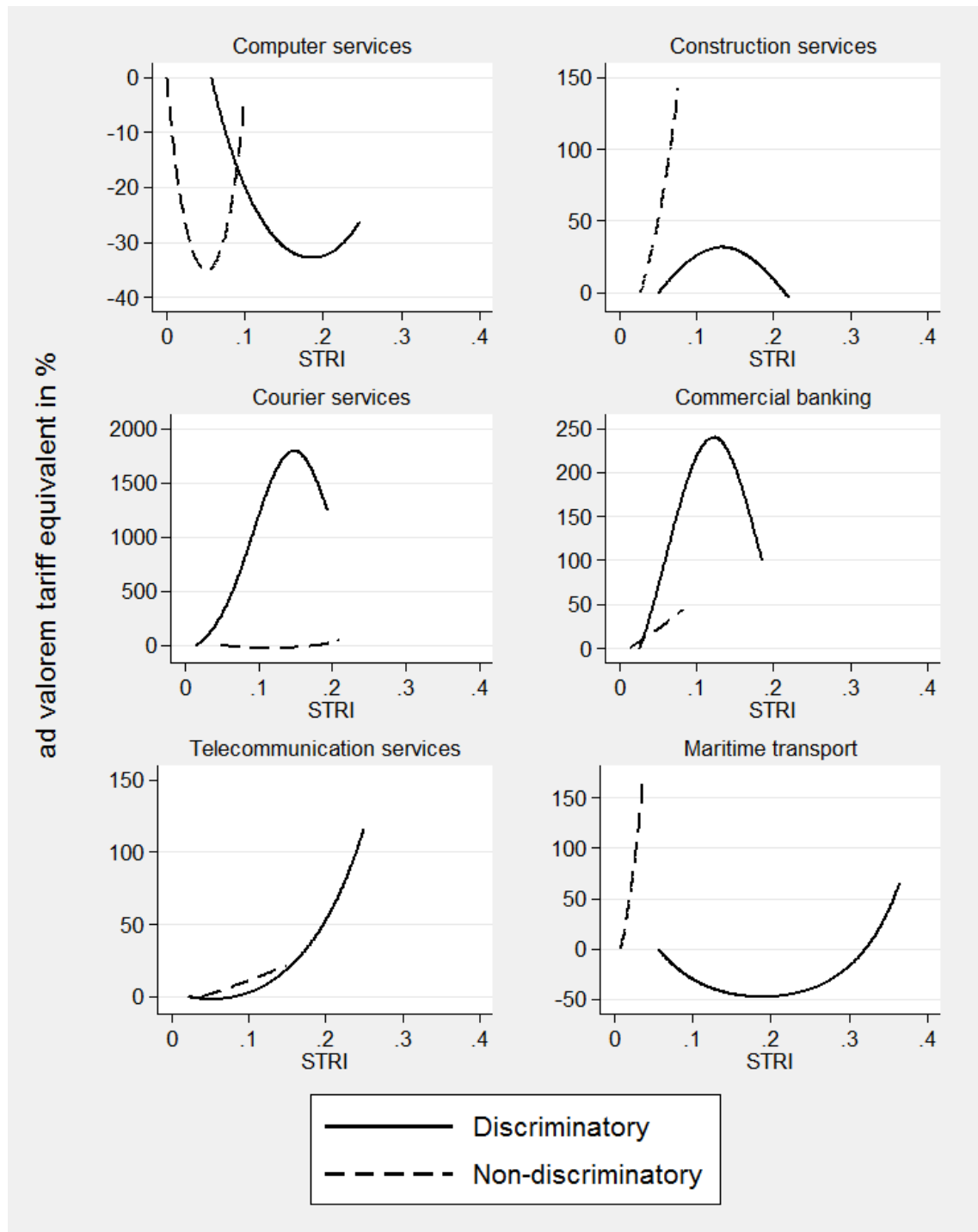
The econometric analysis provides support for the latter hypothesis.<sup>16</sup> Barriers to Mode 3 constitute positive trade costs in the construction and courier services sector, which means that Mode 3 is complementary to other modes of services trade in these sectors. This result seems particularly intuitive in the construction sector, where cross-border trade of construction materials is often recorded as trade in construction services which is complementary to the establishment of construction sites abroad via Mode 3.

Barriers to Mode 4 of services trade which are captured in the STRI constitute high trade costs in the construction sector, courier services and the commercial banking sector. For courier services and commercial banking, barriers to Mode 4 are among the most important restrictions to cross-border trade. This seems natural for a labour-intensive industry such as courier services where drivers and crew members are required to cross borders, while the importance of Mode 4 barriers for trade in commercial banking may result from the relevance of international intra-corporate transferees in this sector. In all other sectors, the regression coefficients are not statistically significant from zero. Behind-the-border barriers which affect all modes constitute trade costs in the maritime transport sector. These barriers seem to be very important and represent by far the largest share of total trade costs in this sector. Barriers to Modes 1 and 2 are only included in the STRI of two sectors out of the six sectors analysed.<sup>17</sup> They represent significant costs for cross-border trade only in the banking sector. In this sector, this type of barriers represents higher trade costs than barriers of any other type, while they have an insignificant effect in the maritime transport sector.

16 Quadratic terms cannot be included in this regression which implies that the lines in Figure 4 are exponential functions by construction.

17 Barriers to Modes 1 and 2 are included in all sectors in the 2016 updated of the STRI.

Figure 4. Discriminatory vs. non-discriminatory measures



Notes: The vertical axis shows the estimated *ad valorem* tariff equivalent of the STRI. It is normalised to zero for the second most liberal country in the sample. Import demand elasticity used for the calculation -3. Figures are based on the coefficients from column (3) of the regression tables reported in the annex.

### ***Discriminatory measures vs. non-discriminatory measures***

The measures in the STRI database can also be distinguished with respect to their effect on the competition between domestic services providers and foreign providers. Discriminatory measures affect the conditions of services provisions in favour of domestic suppliers so that demand is shifted towards them. In contrast, non-discriminatory measures affect domestic and foreign suppliers similarly, raising the cost for all services providers, resulting in higher prices and lower demand for services in general.

Discriminatory barriers only represent substantial trade barriers in two of the six sectors, the courier services and commercial banking sector. In these sectors such discriminatory barriers have a particularly large effect on trade costs when the level of restrictions is low. The marginal effect of additional barriers on trade costs vanishes with a growing amount of restrictions in place. While the point estimate displayed in Figure 5 suggests that trade costs fall for high levels of restrictions, this is not necessarily the case when taking into account statistical uncertainty. In all other sectors, the effect of discriminatory barriers on trade costs is not significantly different from zero.

Non-discriminatory barriers to services trade represent significant restrictions for construction services and in the maritime transport sector. In the other sectors, point estimates usually indicate positive trade costs but are not statistically significant. In contrast to discriminatory barriers, there does not seem to exist a saturation level at which additional restrictions do not contribute any further to trade costs. Instead, a restrictive framework of non-discriminatory regulation does constitute barriers to cross-border services trade in most sectors. This analysis indicates that a considerable share of the aggregate tariff equivalent of the STRI is due to non-discriminatory measures and the contribution of non-discriminatory measures is particularly high in countries with a high STRI score.

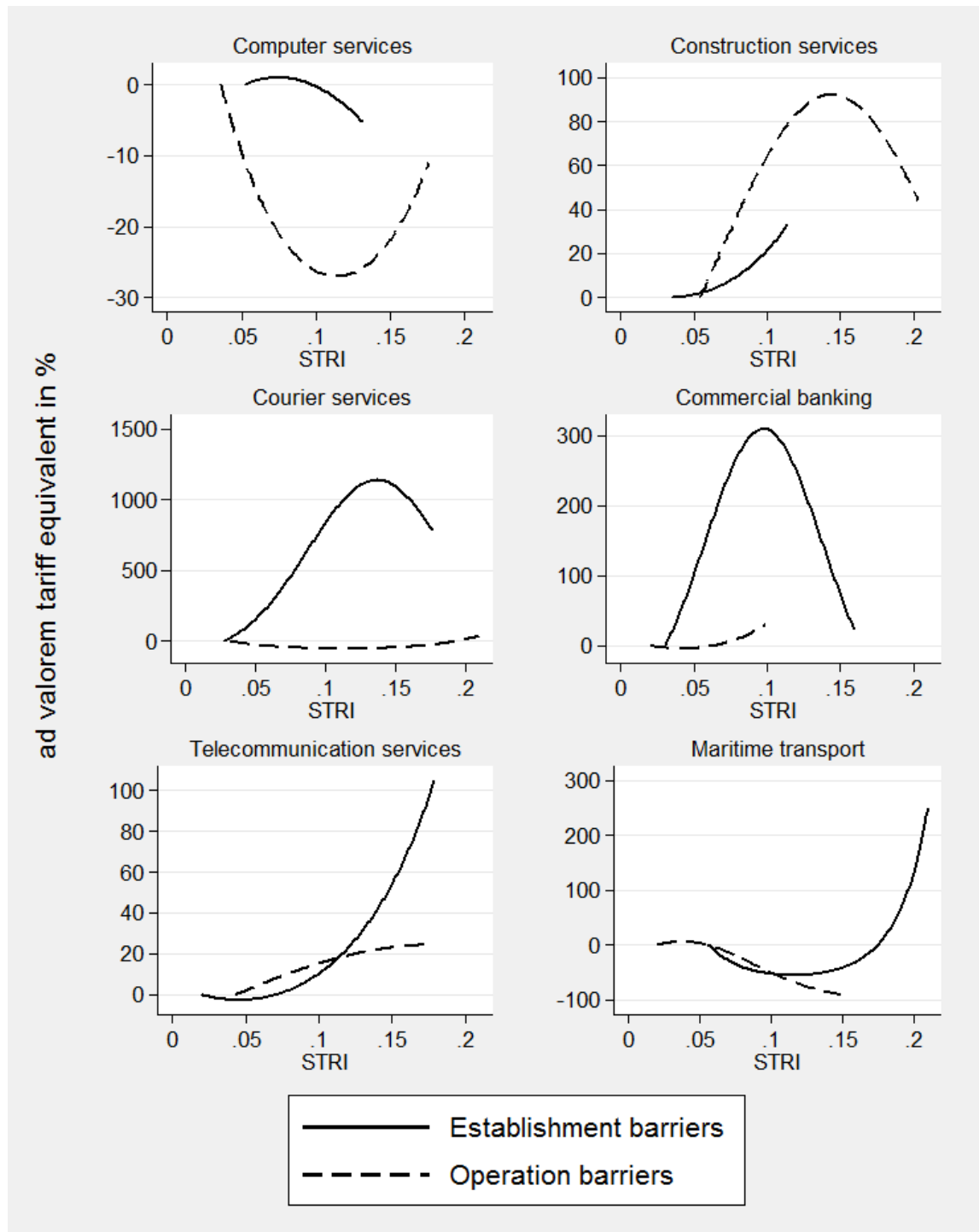
### ***Establishment barriers vs. barriers to operations***

Establishment barriers and barriers to operations affect services suppliers at different stages in the process of delivering services to a foreign country. “Establishment restrictions can generally be regarded as impediments to the movement of factors of production, while those applying to firms’ operations constrain service provision after establishment” (Nordås et al., 2014a). Consequently, measures are classified as establishment barriers, if they restrict or prevent the establishment of new trading relationships and these restrictions represent additional cost of entering into an export market for services exporters. Barriers to the operations of services suppliers restrict the ability of services suppliers to maintain their operations in an export market and represent additional costs in order to retain existing export relationships.<sup>18</sup>

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18 Establishment barriers might be associated with fixed export costs, which do not depend on the level of exports to a particular destination, while barriers to operations might constitute variable export costs which depend on the quantity of services exports. However, it is only possible to answer this question with trade data on the firm level. The importance of establishment barriers complicates the interpretation of trade costs as *ad valorem* tariff equivalent when the size of such barriers does not depend on the volume of services trade.

Figure 5. Establishment barriers vs. barriers to operations



Notes: The vertical axis shows the estimated *ad valorem* tariff equivalent of the STRI. It is normalised to zero for the second most liberal country in the sample. Import demand elasticity used for the calculation -3. Figures are based on the coefficients from column (4) of the regression tables reported in the annex.

Trade costs are mostly due to establishment barriers in four of the six sectors: courier services, commercial banking, telecommunications and maritime transport.<sup>19</sup> In the courier services and commercial banking sector low STRI scores already represent substantial tariff equivalents while the marginal costs to adding additional barriers falls as the level of trade restrictiveness increases. This implies that a substantial liberalisation is needed in order to reduce services trade costs in these sectors when a country starts out in a relatively restrictive environment. Only a small effect on trade costs can be expected from a less ambitious liberalisation.

The importance of establishment barriers in these sectors suggests that a reduction of services trade barriers may benefit small and medium enterprises in particular. The reason is that the cost to overcome such establishment barriers may be independent of the sales volume of services providers.<sup>20</sup> This implies that large firms find it easier to recover these costs when delivering large quantities across the border, while small firms with lower sales volumes might not be able to recover the costs of establishment in an export market and abstain from entering foreign markets in the first place. A reduction of services trade barriers would then allow for a higher share of exporting firms among all services providers.

Similarly, substantial differences across sectors arise with respect to trade costs from barriers to operations of services suppliers. In the construction sector barriers to operations represent a high tariff equivalent. However, additional barriers do only raise trade costs up to an STRI score of 0.13. An equivalent interpretation is that a removal of restrictions which does not bring the score down to at least 0.13 cannot contribute to a reduction of trade costs in the sector. In most other sectors, barrier to operations only have a negligible impact on services trade costs.

## What determines the size of the trade effect?

After having analysed which type of restrictions contribute most to services trade costs, the second focus of the analysis is to identify which countries benefit most from the liberalisation of their services sectors. As argued above, countries benefit most from trade liberalisation when it leads to a strong growth of exports and imports. The reason is that the growth of exports and imports indicates specialisation and, hence, gains from trade. It is possible to capture an important part of the heterogeneity across countries by controlling for a number of observable characteristics. In particular, the size of a country's internal market (GDP) is a crucial determinant for the impact of services trade liberalisation on trade flows. Other important factors are a country's level of development, measured by its GDP per capita, and its geographic size.

This section is based on an analysis for which these observable characteristics of the importing countries (GDP, GDP per capita and geographic size) are interacted with the STRI-border interaction. These interactions are included as additional explanatory variables in the regression for each sector. Thereby it is possible to calculate heterogeneous effects for countries which differ with respect to these characteristics. It is not necessary to include the observable country characteristics itself in the regressions, since this type of importer-specific variation is already captured by the importer-year fixed effects. However, it is essential to control for interactions of these variables with the border dummy to allow for different *levels* of international trade relative to domestic trade for economies which differ with respect to these characteristics. Coefficients for these additional control variables are reported in a separate Table 26 in the Annex.

Figures 6 to 8 present information on the increase of cross-border trade which is induced by a reduction of a country's STRI score by 0.01, starting from the level of restrictions indicated on the horizontal axis. It is important to note the difference between these figures and those in the previous sections. While these figures represent information on the importance of restrictions at a particular point of the STRI scale, all previous

19 However, only in the courier and commercial banking sector, these are based on regression coefficients that significant on a 10% level.

20 Such an interpretation of services trade costs stands in contrast with an *ad valorem* tariff equivalent as meaningful indicator of services trade costs.



figures display information on the cumulative impact of STRI barriers, starting from the second lowest STRI score and being accumulated over the entire range of observable STRI scores. Roughly speaking, this implies that high values in Figures 6 to 8 imply a steeply rising line in Figure 1 to 5; low values imply a less steeply rising line and negative values imply a falling line.

No tariff equivalents can be calculated for this part of the analysis because the observable country characteristics may also determine a country's import demand elasticity. Hence, it cannot be identified whether differences in the trade effect are due to differences in services trade cost or differences in the import demand elasticity. It is possible that differences in the trade effect are only driven by differences in the import demand elasticity so that the tariff equivalents of services trade restrictions calculated in the previous section hold for all countries.<sup>21</sup>

As above, squared STRI terms are only included in the estimation when they improve the fit of the regression. Due to the additional control variables, this is only the case in the courier services sector. For computer services, construction services and commercial banking the squared STRI term loses its significance when controlling for the interactions with GDP, GDP per capita and internal distance. The reason is that the STRI is correlated with these three observable characteristics, with a particularly strong negative correlation with GDP per capita and a positive correlation with internal distance. Importantly, the fact that squared STRI terms are no longer significant in this specification does not imply that there exists a linear relationship between the STRI and the natural logarithm of trade volumes. It simply means that existing data do not allow differentiating between a nonlinear effect and an effect which differs for countries with different characteristics.

### ***The role of market size (GDP) for trade growth***

Since the size of a country's internal market determines the availability of domestic services it is plausible that market size plays an important role for the impact of services trade liberalisation on trade flows. Indeed, the analysis shows that a reduction of the STRI leads to higher growth rates of services trade in economically small countries.<sup>22</sup> The effect can be seen in Figure 6 which shows the trade effect of services trade liberalisation for countries which differ in market size (GDP).<sup>23</sup> All graphs in this figure are drawn for the mean level of GDP per capita and the mean level of geographic size of all countries in the sample.

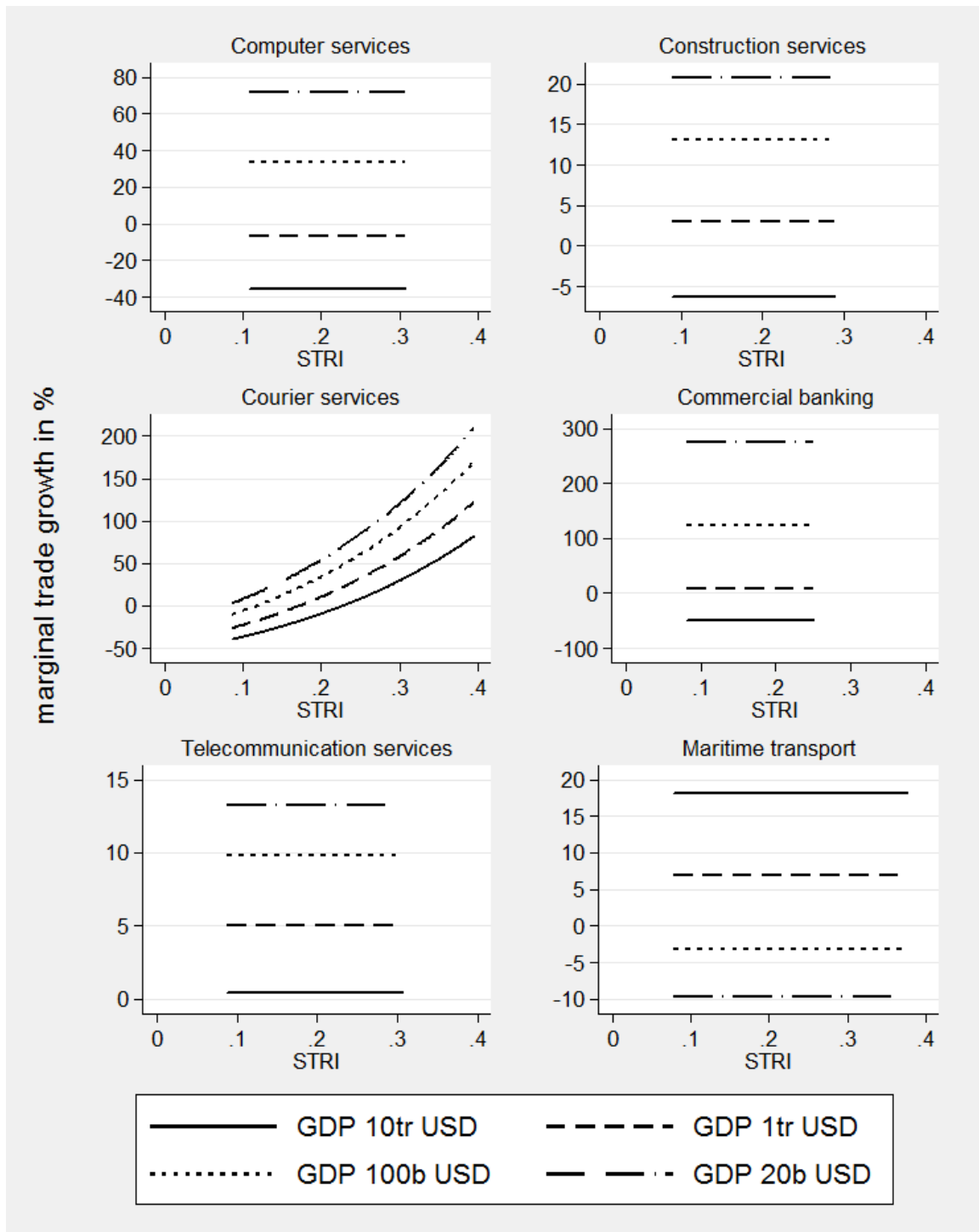
There are several explanations for this finding. For example, in economies with a small internal market domestic service providers are potentially more eager to start exporting in order to expand their business and benefit from economies of scale. At the same time, purely domestic firms do not benefit from such economies of scale and often cannot compete with highly productive foreign suppliers. This might lead to increasing specialisation so that both, imports and exports, increase faster in small economies than in large economies after a liberalisation of trade. The role of market size is most pronounced in the commercial banking sector and the computer services sector. These services often represent business models that are highly scalable and embody increasing returns to scale. Hence, there exists more pressure for companies established in smaller markets to expand internationally when this becomes possible, while at the same time consumers might turn to more competitive foreign providers, increasing both, exports and imports.

21 While such differences in the import demand elasticity across countries are an extremely interesting question with respect to the distribution of gains from trade liberalisation, such an analysis would go far beyond the scope of this report.

22 This is the case in all sectors except maritime transport, where the estimated coefficient is not statistically significant.

23 The figure only shows a quantitative impact based on the point estimate, while detailed information on the significance of coefficients is reported in regression tables in the annex.

Figure 6. The role of market size for trade growth



Notes: The vertical axis shows the average growth in cross-border trade when reducing the STRI score by 0.01, starting from the STRI score indicated on the horizontal axis. Figures are based on the coefficients from column (6) of the regression tables reported in the annex.

### ***The role of economic development (GDP per capita) for trade growth***

Similarly, there are reasons to believe that a country's level of economic development can be an important determinant for the trade effect of services trade restrictions. For example, economic development has an impact on a country's ability to compete on the world market in different kinds of services which all require particular skills. Moreover, it also affects demand for different types of services. A statistically significant relationship can indeed be identified in five of the six sectors analysed, computer services, construction, commercial banking, telecommunications and maritime transport. Only the estimated coefficient in the courier services sector is not significantly different from zero.

Results differ across the five sectors with significant regression coefficients. In computer services, construction, telecommunications and commercial banking, cross-border trade grows faster after trade liberalisation in economies with a higher GDP per capita. One explanation could be that demand for cross-border imports of technology-intensive services is particularly high in more developed economies where widespread access to broadband internet facilitates the use of imported services, while inadequate infrastructure in less developed economies prevents cross-border trade even when the sectors are liberalised.

In contrast, trade growth of maritime transport services is higher after a liberalisation in economies with a lower GDP per capita. The reason for this pattern is unclear. However, it has to be taken into account that trade in maritime transport services often is driven more by the patterns of international trade in goods than by services trade restrictions. Again, Figure 7 represents the trade effect at different levels of economic development but at the mean level of all countries in the sample for each country's GDP and geographic size.

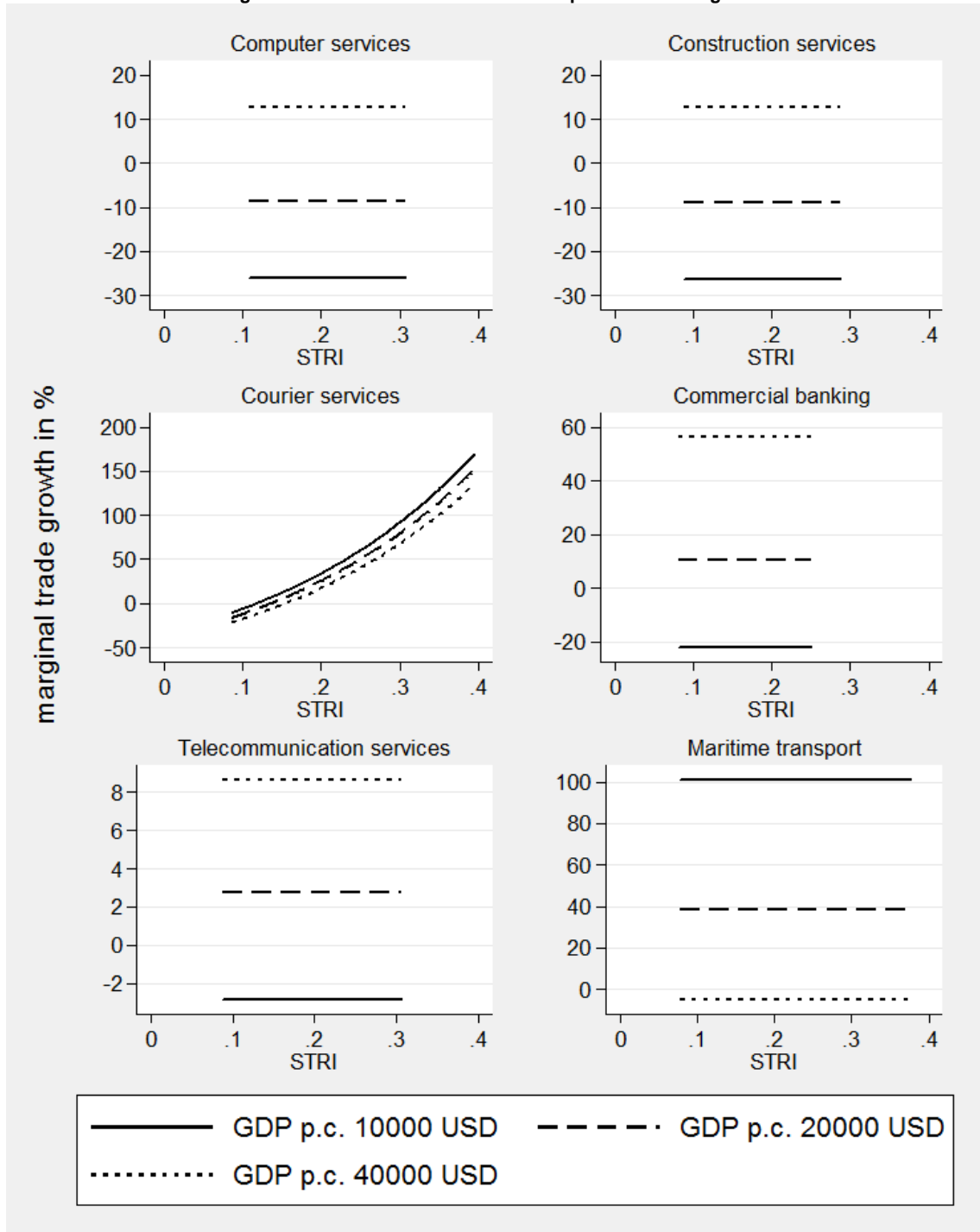
### ***The role of geographic size for trade growth***

A country's potential to benefit from trade liberalisation is also determined by its geographic size.<sup>24</sup> For example, in geographically small countries a high share of firms and consumers is located in direct proximity to a national border so that a liberalisation can easily facilitate trade across the border with neighbouring regions for domestic and foreign firms. If firms and consumers are located further away from a border they do not only have to trade across this border but also need to bridge the large distance between their location and the national border so that total trade costs are presumably higher and, hence, the relative impact of trade liberalisation on total trade costs is smaller. Even though this mechanism is likely to be more important for trade in goods, where physical transport is more relevant for trade flows, it is worthwhile to check for the existence of such a pattern also for services trade.

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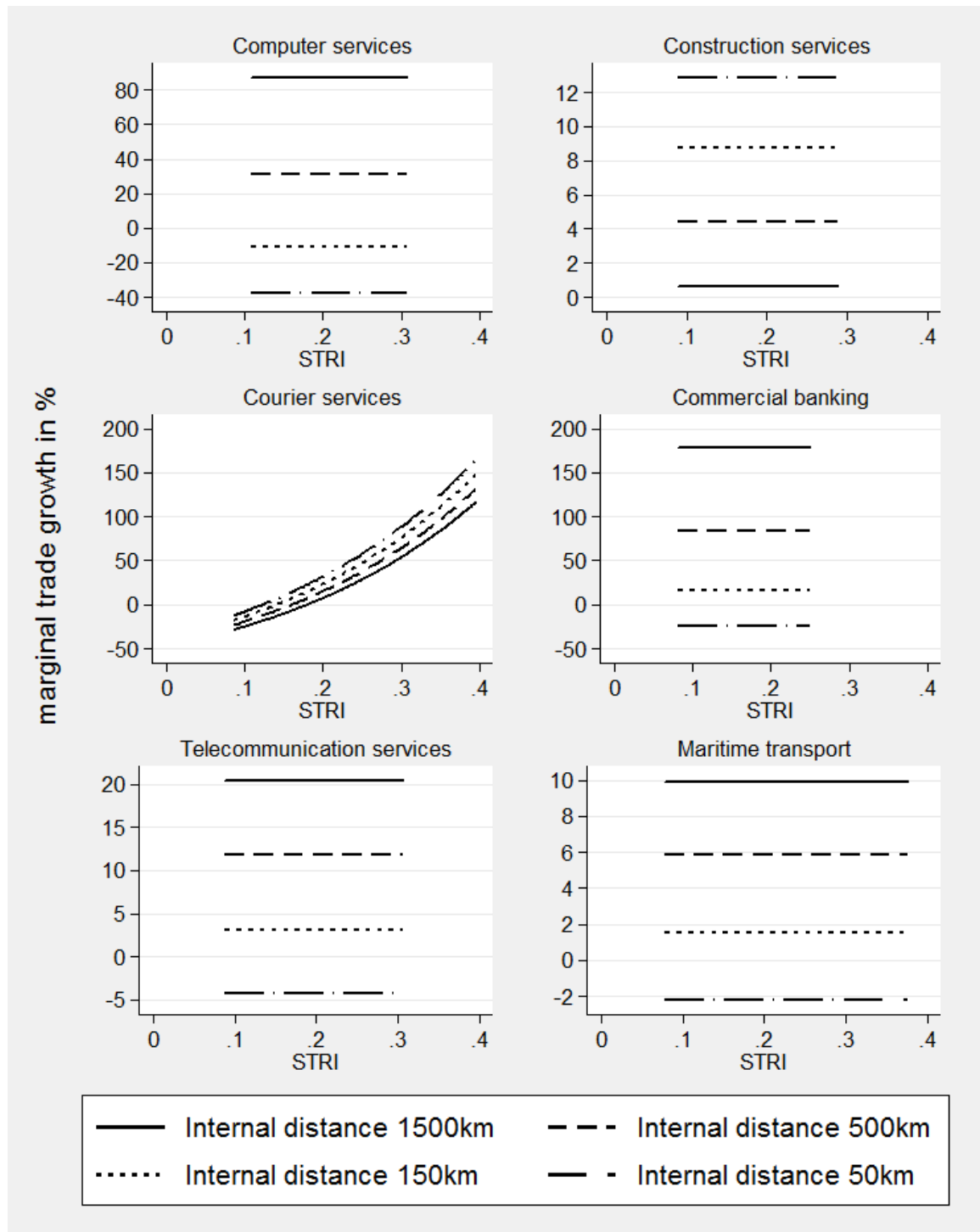
24 Geographic size is measured by a country's internal distance. This internal distance is the population weighted distance between major cities within a country, as constructed by CEPII; see Head et al. (2010) and Mayer and Zignago (2011).

Figure 7. The role of economic development for trade growth



Notes: The vertical axis shows the average growth in cross-border trade when reducing the STRI score by 0.01, starting from the STRI score indicated on the horizontal axis. Figures are based on the coefficients from column (6) of the regression tables reported in the annex.

Figure 8. The role of geographic size for trade growth



Notes: The vertical axis shows the average growth in cross-border trade when reducing the STRI score by 0.01, starting from the STRI score indicated on the horizontal axis. Figures are based on the coefficients from column (6) of the regression tables reported in the annex.

However, the analysis demonstrates that geographic size only plays a statistically significant role for the trade effect of the STRI in the commercial banking sector. Results do not support the intuition outlined above, since the volume of trade in commercial banking services grows significantly faster in geographically large countries following a reduction of services trade restrictions. In all other sectors, estimates are insignificant. This suggests that the effect of geographic distances within a country on services trade differs substantially from its effect on goods trade.

## Concluding remarks

This report presents preliminary evidence on the contribution of services trade restrictions to trade costs for cross-border trade in services. Estimated *ad valorem* tariff equivalents of the STRI depend strongly on the underlying import demand elasticities. Best estimates for their values lie between 150% and 2016% for courier services, between 118% and 1246% for commercial banking services, between 51% and 299% for telecommunication services and between 33% and 159% for construction services. Trade costs do not increase linearly with a country's STRI score in many sectors. For example, in the construction sector a pronounced drop in trade costs can be achieved by reducing barriers from 0.2 to 0.1, while a reduction from 0.3 to 0.2 does not contribute to a significant reduction of trade costs.

Moreover, the report shows that different types of regulatory policies contribute unequally to services trade costs even when they account for identical STRI scores. The patterns differ substantially across sectors. When comparing results from individual regressions on the sector-level, it is possible to identify similarities between the courier services sector and the commercial banking sector with respect to the composition of services trade costs. In both sectors, cross-border trade in services in the majority of are mostly due to market access and national treatment barriers, discriminatory measures and establishment barriers.

Likewise, the construction sector and the maritime transport sector seem to be relatively similar. In both sectors, a reduction of services trade costs should focus a liberalisation of domestic regulation and other barriers and a liberalisation of non-discriminatory measures. In the computer services sector, coefficients are often insignificant and substantially smaller. Last but not least, the impact of regulatory reform on the volume of services trade can vary by market size, economic development and geographic size: Countries with a smaller GDP will experience a significantly faster increase of trade volumes when liberalising regulation in the courier services sector and the commercial banking sector. Trade of more developed economies grows faster in the computer services, construction, telecommunication services and banking sector while trade of less developed economies grows faster in maritime transport services after a liberalisation in those sectors. And in commercial banking services, trade volumes grow faster after a reduction of trade barriers in countries with a larger geographic size.

The report does not cover Mode 3 of services trade, the commercial presence of services suppliers, which is a quantitatively very important component of total trade in services. This is due to the fact that these trade flows are not registered in a country's balance of payments. Instead, an estimation of trade costs for Mode 3 of services trade must rely on firm-level information on foreign affiliate sales. Acknowledging the importance of Mode 3 for a complete description of the costs of services trade, that type of analysis remains for future research.

Further progress from future research should be expected from the availability of additional data on services trade restrictions and services trade. It is a limitation that a country's STRI score from 2014 must be used to represent trade costs between 2010 and 2013. With the availability of trade data for the years from 2014 onwards this problem can be substantially mitigated. Even more importantly, with the availability of trade data from 2015 onwards, panel estimation techniques can be used to derive the effect of changes in the STRI over time on services trade flows. This can further improve the robustness of the estimated results. However, it must be noted that the feasibility of such an analysis hinges on the incidence of actual changes in services trade restrictions over time.

This paper constitutes one element of a suite of studies which are currently conducted at the OECD with the common objective to explore alternative ways to estimate the costs associated with services trade restrictions. Other studies determine the role of regulatory heterogeneity for trade costs, they analyse the impact of services trade restrictions on the level of domestic competition and they study to which degree these barriers restrict trade in services via Mode 3 using data on foreign affiliate sales. Hence, the results in this paper should not be considered as final evidence on the costs of services trade restrictions. Further evidence on different aspects of services trade costs will be made available in the future in order to complement these results. Moreover, newly available data on services trade and services trade restrictions over time might allow for more robust estimates in the future.

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## ANNEX

This annex contains regression tables on which graphical results in the main part of the report are based. For each sector, results from six different specifications are reported in three separate regression tables. The main regression tables contain the coefficients on the STRI variables which differ across specifications. All coefficients in the main regression tables refer to the interaction of an STRI variable with the border-dummy, which indicates that exporter and importer are not identical countries. A second regression table for each sector reports coefficients on the interaction of the STRI variables with the intra EEA dummy, while a third regression table for each sector reports coefficients on the gravity control variables which are identical in all six specifications.

Column (1) of each table reports results on the aggregate STRI, using a linear term and a quadratic term where the quadratic term is significant. Columns (2) to (5) report estimation results based on the decomposition of the aggregate STRI score into different groups. Column (6) reports the interaction of the STRI with observable country characteristics, GDP, GDP per capita and geographic size. Table 26 reports the additional control variables that are required for the specification in column (6) for all six sectors.

The estimated pseudo R-squared is not reported due to space constraints and low informative value. It is very high ( $>0.99$ ) in all specifications due to the high number of dummy variables.

**Table 2. Computer services: Regression results**

	(1)	(2)	(3)	(4)	(5)	(6)
b * STRI	21.51** (10.78)					288.41** (140.09)
b * STRI^2	-45.32* (27.05)					
b * DRO		60.04** (28.00)				
b * DRO^2		-455.47** (180.21)				
b * MANT		13.20 (12.13)				
b * MANT^2		-29.02 (49.07)				
b * DIS			27.15* (16.18)			
b * DIS^2			-73.35 (49.11)			
b * NDIS			51.01*** (13.85)			
b * NDIS^2			-500.87*** (111.37)			
b * EST				-8.84 (20.59)		
b * EST^2				59.28 (109.75)		
b * OPE				35.91** (16.97)		
b * OPE^2				-157.72* (91.23)		
b * All Modes					9.05 (10.37)	
b * Mode 3					1.20 (6.62)	
b * Mode 4					2.99 (4.30)	
b * STRI * lnGDP						15.70 (12.31)
b * STRI * lnGDPpc						-30.51** (14.47)
b * STRI * lnDist						-32.14 (21.60)
Gravity Controls	Yes	Yes	Yes	Yes	Yes	Yes
Intra-EU Controls	Yes	Yes	Yes	Yes	Yes	Yes
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	4597	4597	4597	4597	4597	4597

Notes: Dependent variable is the volume of exports. Standard errors clustered by importer. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. All independent variables are interactions with the border dummy. DRO: domestic regulation / other; MANT: market access / national treatment; DIS: discriminatory measures; NDIS: non-discriminatory measures; EST: establishment barriers; OPE: operations barriers.

**Table 3. Computer services: Intra-EU control variables**

	(1)	(2)	(3)	(4)	(5)	(6)
b * STRI	9.44 (14.11)					-388.88** (156.92)
b * STRI^2	-40.58 (41.52)					
b * DRO		-29.16 (26.31)				
b * DRO^2		181.16 (163.80)				
b * MANT		4.38 (11.87)				
b * MANT^2		-18.15 (51.42)				
b * DIS			-18.78 (14.83)			
b * DIS^2			38.61 (55.13)			
b * NDIS			-4.94 (9.21)			
b * NDIS^2			76.39 (73.63)			
b * EST				39.40 (47.56)		
b * EST^2				-223.45 (290.09)		
b * OPE				5.68 (14.64)		
b * OPE^2				-75.40 (83.30)		
b * All Modes					-31.11** (13.37)	
b * Mode 3					11.32** (5.65)	
b * Mode 4					-5.55 (5.59)	
b * STRI * lnGDP						-13.53 (11.60)
b * STRI * lnGDPpc						38.11*** (14.51)
b * STRI * lnDist						30.74 (22.21)
Gravity Controls	Yes	Yes	Yes	Yes	Yes	Yes
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	4597	4597	4597	4597	4597	4597

Notes: Dependent variable is the volume of exports. Standard errors clustered by importer. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. All independent variables are interactions with the intra EEA dummy and with the border dummy. DRO: domestic regulation / other; MANT: market access / national treatment; DIS: discriminatory measures; NDIS: non-discriminatory measures; EST: establishment barriers; OPE: operations barriers.

**Table 4. Computer services: Gravity control variables**

	(1)	(2)	(3)	(4)	(5)	(6)
border	0.22 (1.78)	1.10 (2.20)	-3.34 (2.13)	0.31 (2.28)	1.80 (1.84)	-71.84** (30.57)
STRI heterogeneity	-4.15*** (0.79)	-3.62*** (0.70)	-3.70*** (0.64)	-4.16*** (0.76)	-3.64*** (0.78)	-3.32*** (0.64)
lnDist	-0.79*** (0.12)	-0.76*** (0.12)	-0.48*** (0.17)	-0.82*** (0.14)	-0.89*** (0.12)	-0.82*** (0.19)
contiguity	0.38** (0.16)	0.31** (0.15)	0.55*** (0.13)	0.32** (0.16)	0.24 (0.15)	0.10 (0.13)
common language	0.08 (0.24)	0.21 (0.26)	0.02 (0.24)	0.06 (0.26)	0.18 (0.28)	-0.08 (0.23)
time difference	0.08** (0.03)	0.07** (0.03)	0.01 (0.04)	0.07* (0.04)	0.11*** (0.04)	0.10** (0.05)
former colony	-0.47*** (0.18)	-0.48** (0.22)	-0.50** (0.23)	-0.53** (0.23)	-0.50* (0.27)	-0.08 (0.17)
com legal system	-0.09 (0.16)	-0.05 (0.16)	0.04 (0.17)	-0.03 (0.18)	-0.01 (0.15)	0.01 (0.16)
RTA services	-0.07 (0.28)	-0.10 (0.27)	-0.12 (0.28)	-0.17 (0.31)	0.01 (0.30)	0.69** (0.33)
intra EU	-0.21 (1.16)	0.91 (1.20)	2.03** (0.90)	-1.29 (1.90)	0.73 (0.69)	76.73** (32.09)
b * language	-0.51*** (0.13)	-0.46*** (0.12)	-0.42*** (0.12)	-0.35** (0.16)	-0.48*** (0.12)	0.01 (0.31)
b * english	0.36*** (0.14)	0.07 (0.17)	0.34** (0.16)	0.37*** (0.14)	0.41*** (0.11)	0.04 (0.18)
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	4597	4597	4597	4597	4597	4597

Notes: Dependent variable is the volume of exports. Independent variables preceded by b \* refer to interactions with the border dummy. Standard errors clustered by importer in parentheses. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. Column numbers refer to the different specifications of the columns in the previous table.

**Table 5. Computer services: Descriptive statistics**

Variable	Obs.	Mean	Std. Dev.	Min	Max
STRI (aggregate)	42	0.200	0.077	0.094	0.415
All Modes	42	0.032	0.024	0	0.088
Mode 3	42	0.073	0.039	0	0.192
Mode 4	42	0.095	0.045	0	0.222
Market access / national treatment	42	0.124	0.061	0.015	0.302
Domestic regulation / other	42	0.076	0.039	0	0.148
Discriminatory measures	42	0.146	0.068	0.031	0.330
Non-discriminatory measures	42	0.054	0.034	0	0.122
Establishment barriers	42	0.092	0.044	0.018	0.216
Operations barriers	42	0.108	0.046	0.016	0.208

**Table 6. Construction services: Regression results**

	(1)	(2)	(3)	(4)	(5)	(6)
b * STRI	-27.16** (11.89)					241.41*** (81.42)
b * STRI^2	53.83* (30.42)					
b * DRO		-13.98* (7.33)				
b * MANT		-14.60 (17.16)				
b * MANT^2		59.56 (61.52)				
b * DIS			-32.27* (17.03)			
b * DIS^2			121.92** (54.59)			
b * NDIS			-54.15*** (16.54)			
b * EST				8.82 (19.94)		
b * EST^2				-131.79 (156.03)		
b * OPE				-70.20*** (18.70)		
b * OPE^2				243.91*** (71.50)		
b * All Modes					0.13 (5.48)	
b * Mode 3					-34.89*** (13.46)	
b * Mode 4					-14.74* (7.78)	
b * STRI * lnGDP						4.10 (2.98)
b * STRI * lnGDPpc						-30.68*** (7.64)
b * STRI * lnDist						3.37 (3.66)
Gravity Controls	Yes	Yes	Yes	Yes	Yes	Yes
Intra-EU Controls	Yes	Yes	Yes	Yes	Yes	Yes
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	5039	5039	5039	5039	5039	5039

Notes: Dependent variable is the volume of exports. Standard errors clustered by importer. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. All independent variables are interactions with the border dummy. DRO: domestic regulation / other; MANT: market access / national treatment; DIS: discriminatory measures; NDIS: non-discriminatory measures; EST: establishment barriers; OPE: operations barriers.

Table 7. Construction services: Intra-EU control variables

	(1)	(2)	(3)	(4)	(5)	(6)
b * STRI	18.16 (12.94)					-261.55*** (95.02)
b * STRI^2	-37.82 (26.40)					
b * DRO		0.08 (4.67)				
b * MANT		41.14** (19.60)				
b * MANT^2		-158.66** (73.62)				
b * DIS			47.34*** (17.48)			
b * DIS^2			-148.05*** (51.25)			
b * NDIS			16.09 (14.99)			
b * EST				18.19 (22.11)		
b * EST^2				-6.37 (170.12)		
b * OPE				36.65** (15.78)		
b * OPE^2				-126.98** (63.98)		
b * All Modes					-11.85** (5.68)	
b * Mode 3					35.91** (14.16)	
b * Mode 4					25.01*** (9.69)	
b * STRI * lnGDP						-5.20 (3.26)
b * STRI * lnGDPpc						33.10*** (8.31)
b * STRI * lnDist						-1.97 (3.47)
Gravity Controls	Yes	Yes	Yes	Yes	Yes	Yes
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	5039	5039	5039	5039	5039	5039

Notes: Dependent variable is the volume of exports. Standard errors clustered by importer. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. All independent variables are interactions with the intra EEA dummy and with the border dummy. DRO: domestic regulation / other; MANT: market access / national treatment; DIS: discriminatory measures; NDIS: non-discriminatory measures; EST: establishment barriers; OPE: operations barriers.



**Table 8. Construction services: Gravity control variables**

	(1)	(2)	(3)	(4)	(5)	(6)
border	-12.73*** (4.36)	-14.63*** (4.82)	-9.05** (4.28)	-7.02 (4.42)	-12.28*** (4.48)	-104.81*** (24.31)
STRI heterogeneity	1.16 (1.81)	1.86 (1.69)	0.51 (1.47)	1.14 (1.74)	2.02 (1.83)	0.26 (1.37)
lnDist	-0.79*** (0.17)	-0.92*** (0.15)	-0.82*** (0.15)	-0.80*** (0.16)	-0.91*** (0.15)	-1.16*** (0.20)
contiguity	0.55*** (0.17)	0.44*** (0.15)	0.32** (0.16)	0.46*** (0.14)	0.48*** (0.14)	0.02 (0.16)
common language	0.28* (0.16)	0.44** (0.20)	0.12 (0.18)	0.46** (0.22)	0.21 (0.17)	0.42* (0.23)
time difference	0.04 (0.04)	0.07 (0.04)	0.06 (0.04)	0.04 (0.04)	0.05 (0.04)	0.05 (0.05)
former colony	0.46** (0.18)	0.27 (0.20)	0.55*** (0.16)	0.45*** (0.17)	0.37* (0.20)	0.42** (0.20)
com legal system	0.10 (0.14)	0.19 (0.11)	0.34*** (0.13)	0.15 (0.12)	0.20* (0.12)	0.11 (0.13)
RTA services	0.47 (0.37)	0.56 (0.38)	0.60 (0.42)	0.40 (0.42)	0.61 (0.40)	0.81* (0.45)
intra EEA	-2.11 (1.46)	-2.61** (1.09)	-3.70*** (1.19)	-3.48** (1.46)	-2.08** (0.99)	86.29*** (22.54)
b * language	-0.34* (0.18)	-0.46*** (0.14)	-0.11 (0.15)	-0.45*** (0.17)	-0.26** (0.12)	0.65*** (0.24)
b * english	-0.23 (0.18)	-0.41* (0.24)	-0.64*** (0.23)	-0.34** (0.17)	-0.34* (0.19)	-0.48*** (0.16)
b * internet	3.72*** (0.78)	4.55*** (1.09)	3.43*** (0.89)	3.08*** (0.84)	3.60*** (0.92)	4.68*** (1.60)
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	5039	5039	5039	5039	5039	5039

Notes: Dependent variable is the volume of exports. Independent variables preceded by b \* refer to interactions with the border dummy. Standard errors clustered by importer in parentheses. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. Column numbers refer to the different specifications of the columns in the previous table.

**Table 9. Construction services: Descriptive statistics**

Variable	Obs.	Mean	Std. Dev.	Min	Max
STRI (aggregate)	42	0.200	0.082	0.071	0.403
All Modes	42	0.094	0.044	0.014	0.190
Mode 3	42	0.045	0.044	0	0.193
Mode 4	42	0.061	0.029	0	0.143
Market access / national treatment	42	0.106	0.054	0.015	0.275
Domestic regulation / other	42	0.094	0.042	0.027	0.202
Discriminatory measures	42	0.139	0.069	0.030	0.310
Non-discriminatory measures	42	0.060	0.024	0.026	0.126
Establishment barriers	42	0.075	0.043	0	0.207
Operations barriers	42	0.124	0.052	0.041	0.241

Table 10. Courier services: Regression results

	(1)	(2)	(3)	(4)	(5)	(6)
b * STRI	-47.95*					-193.29**
	(26.42)					(80.21)
b * STRI^2	70.29					-178.64***
	(55.76)					(38.27)
b * DRO		25.30				
		(43.33)				
b * DRO^2		-59.81				
		(190.18)				
b * MANT		-135.98***				
		(47.00)				
b * MANT^2		399.02**				
		(190.85)				
b * DIS			-146.41***			
			(45.29)			
b * DIS^2			494.65***			
			(190.58)			
b * NDIS			53.98			
			(39.59)			
b * NDIS^2			-233.72			
			(164.43)			
b * EST				-171.77***		
				(52.64)		
b * EST^2				629.87***		
				(230.94)		
b * OPE				77.25***		
				(26.40)		
b * OPE^2				-342.36***		
				(104.05)		
b * All Modes					30.70**	
					(11.93)	
b * Mode 3					-28.85***	
					(10.05)	
b * Mode 4					-140.65***	
					(52.75)	
b * STRI * lnGDP						8.52**
						(4.03)
b * STRI * lnGDPpc						9.84
						(8.39)
b * STRI * lnDist						5.87
						(5.70)
Gravity Controls	Yes	Yes	Yes	Yes	Yes	Yes
Intra-EU Controls	Yes	Yes	Yes	Yes	Yes	Yes
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	3887	3887	3887	3887	3887	3887

Notes: Dependent variable is the volume of exports. Standard errors clustered by importer. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. All independent variables are interactions with the border dummy. DRO: domestic regulation / other; MANT: market access / national treatment; DIS: discriminatory measures; NDIS: non-discriminatory measures; EST: establishment barriers; OPE: operations barriers.

**Table 11. Courier services: Intra-EU control variables**

	(1)	(2)	(3)	(4)	(5)	(6)
b * STRI	15.16 (27.32)					99.25 (336.18)
b * STRI^2	-2.44 (60.36)					101.42 (140.47)
b * DRO		-72.20 (44.81)				
b * DRO^2		342.72 (216.03)				
b * MANT		53.82* (32.12)				
b * MANT^2		-202.94 (177.44)				
b * DIS			55.11* (31.33)			
b * DIS^2			-180.77 (146.58)			
b * NDIS			-87.72** (41.41)			
b * NDIS^2			432.37** (190.55)			
b * EST				56.57 (44.60)		
b * EST^2				-189.48 (215.14)		
b * OPE				-67.67*** (26.14)		
b * OPE^2				369.19*** (106.65)		
b * All Modes					4.93 (17.76)	
b * Mode 3					12.03 (13.10)	
b * Mode 4					25.20 (52.68)	
b * STRI * lnGDP						-2.21 (16.02)
b * STRI * lnGDPpc						-21.21 (31.70)
b * STRI * lnDist						26.60 (20.68)
Gravity Controls	Yes	Yes	Yes	Yes	Yes	Yes
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	3887	3887	3887	3887	3887	3887

Notes: Dependent variable is the volume of exports. Standard errors clustered by importer. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. All independent variables are interactions with the intra EEA dummy and with the border dummy. DRO: domestic regulation / other; MANT: market access / national treatment; DIS: discriminatory measures; NDIS: non-discriminatory measures; EST: establishment barriers; OPE: operations barriers.

**Table 12. Courier services: Gravity control variables**

	(1)	(2)	(3)	(4)	(5)	(6)
border	-7.47 (5.06)	-7.85 (7.52)	0.05 (8.36)	8.65 (7.41)	-7.87 (8.10)	-3.13 (27.05)
STRI heterogeneity	-8.51** (4.29)	-6.54** (2.95)	-3.84 (2.88)	-5.19 (3.37)	-5.55* (3.16)	-4.19 (3.02)
lnDist	-0.16 (0.27)	-0.50** (0.24)	-0.66*** (0.23)	-0.53** (0.22)	-0.47 (0.30)	-0.47* (0.26)
contiguity	1.56*** (0.27)	1.12*** (0.31)	0.90*** (0.28)	0.97*** (0.26)	1.14*** (0.26)	0.81** (0.33)
common language	0.62 (0.46)	1.00* (0.54)	1.01* (0.54)	0.83* (0.47)	0.77* (0.43)	0.12 (0.54)
time difference	0.20** (0.08)	0.25*** (0.09)	0.28*** (0.08)	0.22*** (0.08)	0.10 (0.07)	0.14 (0.10)
former colony	-2.85** (1.17)	-2.36*** (0.91)	-1.99** (0.86)	-1.74* (0.90)	-2.52** (1.11)	-2.14** (0.98)
com legal system	0.07 (0.23)	0.13 (0.18)	0.18 (0.18)	0.10 (0.18)	0.21 (0.19)	0.29 (0.24)
RTA services	0.83 (0.61)	1.73** (0.67)	1.87*** (0.67)	1.55*** (0.51)	0.71 (0.61)	3.80*** (0.69)
intra EEA	-4.31* (2.31)	-2.32 (2.18)	-1.69 (2.06)	-3.15 (1.94)	-5.41** (2.21)	-37.98 (42.76)
b * language	-0.76** (0.31)	-0.57** (0.27)	-0.86** (0.34)	-0.94*** (0.28)	0.04 (0.38)	3.17*** (0.54)
b * english	0.23 (0.20)	1.23*** (0.45)	0.78* (0.44)	0.80* (0.43)	0.72** (0.30)	-0.46** (0.21)
b * internet	3.06*** (0.93)	1.60 (1.39)	0.80 (1.56)	-0.92 (1.61)	1.71 (1.14)	3.27*** (1.21)
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	3887	3887	3887	3887	3887	3887

Notes: Dependent variable is the volume of exports. Independent variables preceded by b \* refer to interactions with the border dummy. Standard errors clustered by importer in parentheses. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. Column numbers refer to the different specifications of the columns in the previous table.

**Table 13. Courier services: descriptive statistics**

Variable	Obs.	Mean	Std. Dev.	Min	Max
STRI (aggregate)	42	0.257	0.170	0.070	0.868
All Modes	42	0.087	0.054	0.012	0.239
Mode 3	42	0.131	0.108	0	0.544
Mode 4	42	0.039	0.019	0	0.086
Market access / national treatment	42	0.119	0.102	0	0.506
Domestic regulation / other	42	0.138	0.074	0.049	0.362
Discriminatory measures	42	0.115	0.094	0	0.448
Non-discriminatory measures	42	0.142	0.082	0.049	0.420
Establishment barriers	42	0.110	0.076	0.012	0.390
Operations barriers	42	0.147	0.099	0.031	0.479

**Table 14. Telecommunication services: Regression results**

	(1)	(2)	(3)	(4)	(5)	(6)
b * STRI	-9.48** (3.81)					90.71 (55.59)
b * DRO		-15.57 (30.91)				
b * DRO^2		35.43 (142.91)				
b * MANT		18.21 (12.31)				
b * MANT^2		-111.41*** (41.75)				
b * DIS			6.16 (12.06)			
b * DIS^2			-60.05 (38.88)			
b * NDIS			-5.13 (37.73)			
b * NDIS^2			-1.03 (192.32)			
b * EST				11.16 (18.42)		
b * EST^2				-124.27 (88.51)		
b * OPE				-12.44 (33.14)		
b * OPE^2				34.12 (149.86)		
b * All Modes					-19.21 (14.37)	
b * Mode 3					-6.00 (5.40)	
b * Mode 4					29.79 (19.01)	
b * STRI * lnGDP						1.93 (6.83)
b * STRI * lnGDPpc						-8.10** (3.65)
b * STRI * lnDist						-6.77 (6.27)
Gravity Controls	Yes	Yes	Yes	Yes	Yes	Yes
Intra-EU Controls	Yes	Yes	Yes	Yes	Yes	Yes
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	4439	4439	4439	4439	4439	4439

Notes: Dependent variable is the volume of exports. Standard errors clustered by importer. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. All independent variables are interactions with the border dummy. DRO: domestic regulation / other; MANT: market access / national treatment; DIS: discriminatory measures; NDIS: non-discriminatory measures; EST: establishment barriers; OPE: operations barriers.

**Table 15. Telecommunication services: Intra-EU control variables**

	(1)	(2)	(3)	(4)	(5)	(6)
b * STRI	6.68 (4.66)					183.88** (77.38)
b * DRO		93.14*** (31.78)				
b * DRO^2		-505.62*** (172.14)				
b * MANT		9.76 (17.15)				
b * MANT^2		-141.80 (150.57)				
b * DIS			33.18 (27.90)			
b * DIS^2			-319.85 (248.97)			
b * NDIS			96.75** (40.85)			
b * NDIS^2			-572.68** (241.90)			
b * EST				16.22 (26.87)		
b * EST^2				-246.12 (258.91)		
b * OPE				109.47*** (32.31)		
b * OPE^2				-547.67*** (156.93)		
b * All Modes					7.07 (12.51)	
b * Mode 3					5.02 (5.27)	
b * Mode 4					11.10 (14.57)	
b * STRI * lnGDP						20.80*** (7.99)
b * STRI * lnGDPpc						-18.16*** (6.38)
b * STRI * lnDist						-48.59*** (15.10)
Gravity Controls	Yes	Yes	Yes	Yes	Yes	Yes
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	4439	4439	4439	4439	4439	4439

Notes: Dependent variable is the volume of exports. Standard errors clustered by importer. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. All independent variables are interactions with the intra EEA dummy and with the border dummy. DRO: domestic regulation / other; MANT: market access / national treatment; DIS: discriminatory measures; NDIS: non-discriminatory measures; EST: establishment barriers; OPE: operations barriers.

**Table 16. Telecommunication services: gravity control variables**

	(1)	(2)	(3)	(4)	(5)	(6)
border	3.33* (1.81)	3.07 (2.49)	2.45 (2.44)	0.31 (2.58)	4.25** (1.99)	-28.07*** (10.05)
STRI heterogeneity	-4.38*** (1.24)	-3.81*** (1.13)	-4.30*** (1.07)	-4.54*** (1.09)	-3.67*** (1.40)	-2.68** (1.09)
lnDist	-0.76*** (0.18)	-0.83*** (0.18)	-0.72*** (0.15)	-0.56*** (0.17)	-1.00*** (0.19)	-0.98*** (0.20)
contiguity	0.21 (0.18)	0.13 (0.15)	0.20 (0.14)	0.28 (0.18)	-0.02 (0.19)	-0.25 (0.20)
common language	0.55*** (0.12)	0.47*** (0.12)	0.42*** (0.12)	0.39** (0.16)	0.53*** (0.12)	0.52*** (0.15)
time difference	-0.10** (0.04)	-0.09** (0.04)	-0.10*** (0.04)	-0.13*** (0.04)	-0.05 (0.05)	-0.08* (0.04)
former colony	-0.48*** (0.13)	-0.44*** (0.13)	-0.37*** (0.13)	-0.47*** (0.14)	-0.42*** (0.14)	-0.41*** (0.13)
com legal system	0.10 (0.12)	0.18 (0.12)	0.17 (0.12)	0.20 (0.14)	0.12 (0.12)	0.37*** (0.11)
RTA services	-0.46 (0.39)	-0.06 (0.34)	-0.03 (0.37)	-0.14 (0.33)	-0.10 (0.41)	-0.35 (0.31)
intra-EEA	-0.77 (0.95)	-4.09** (1.61)	-4.64*** (1.78)	-5.26*** (1.73)	-0.78 (1.00)	-30.02** (13.69)
b * language	-0.81*** (0.12)	-0.75*** (0.11)	-0.78*** (0.11)	-0.69*** (0.11)	-0.78*** (0.12)	-0.13 (0.20)
b * english	0.66*** (0.10)	0.54*** (0.08)	0.55*** (0.08)	0.66*** (0.09)	0.53*** (0.10)	0.32*** (0.11)
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	4439	4439	4439	4439	4439	4439

Notes: Dependent variable is the volume of exports. Independent variables preceded by b \* refer to interactions with the border dummy. Standard errors clustered by importer in parentheses. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. Column numbers refer to the different specifications of the columns in the previous table.

**Table 17. Telecommunication services: Descriptive statistics**

Variable	Obs.	Mean	Std. Dev.	Min	Max
STRI (aggregate)	42	0.228	0.136	0.080	0.569
All Modes	42	0.080	0.055	0.020	0.238
Mode 3	42	0.120	0.085	0.029	0.342
Mode 4	42	0.028	0.013	0	0.062
Market access / national treatment	42	0.093	0.069	0.010	0.253
Domestic regulation / other	42	0.136	0.083	0.036	0.354
Discriminatory	42	0.103	0.074	0.016	0.271
Non-discriminatory	42	0.125	0.077	0.030	0.330
Establishment	42	0.080	0.059	0.015	0.211
Operations	42	0.148	0.088	0.036	0.369

Table 18. Maritime transport: Regression results

	(1)	(2)	(3)	(4)	(5)	(6)
b * STRI	-2.97 (2.56)					-491.21** (243.14)
b * DRO		-142.80*** (44.72)				
b * MANT		38.59 (37.77)				
b * MANT^2		-83.60 (82.10)				
b * DIS			41.67 (35.15)			
b * DIS^2			-110.63 (73.22)			
b * NDIS			-102.00** (49.26)			
b * EST				157.69 (155.51)		
b * EST^2				-684.89 (650.27)		
b * OPE				-43.50 (81.79)		
b * OPE^2				577.74 (702.91)		
b * All Modes					-113.33*** (36.26)	
b * Mode 3					21.95 (15.39)	
b * Mode 4					-25.12 (24.02)	
b * Modes 1/2					34.87 (39.50)	
b * STRI * lnGDP						-4.31 (12.94)
b * STRI * lnGDPpc						54.07** (24.06)
b * STRI * lnDist						-3.43 (20.93)
Gravity Controls	Yes	Yes	Yes	Yes	Yes	Yes
Intra-EU Controls	Yes	Yes	Yes	Yes	Yes	Yes
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	2794	2794	2794	2794	2794	2794

Notes: Dependent variable is the volume of exports. Standard errors clustered by importer. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. All independent variables are interactions with the border dummy. DRO: domestic regulation / other; MANT: market access / national treatment; DIS: discriminatory measures; NDIS: non-discriminatory measures; EST: establishment barriers; OPE: operations barriers.



**Table 19. Maritime transport: intra EU control variables**

	(1)	(2)	(3)	(4)	(5)	(6)
b * STRI	-0.94 (4.78)					241.58 (314.37)
b * DRO		-13.50 (27.70)				
b * MANT		33.35 (28.00)				
b * MANT^2		-110.51 (83.69)				
b * DIS			20.31 (24.28)			
b * DIS^2			-53.97 (68.43)			
b * NDIS			-45.63* (25.39)			
b * EST				-2.88 (114.41)		
b * EST^2				81.37 (466.44)		
b * OPE				-76.14 (95.61)		
b * OPE^2				430.51 (780.31)		
b * All Modes					16.21 (18.50)	
b * Mode 3					-5.33 (6.38)	
b * Mode 4					18.56 (24.96)	
b * Modes 1/2					101.47* (54.20)	
b * STRI * lnGDP						-2.27 (9.35)
b * STRI * lnGDPpc						-10.36 (25.39)
b * STRI * lnDist						-19.11 (13.33)
Gravity Controls	Yes	Yes	Yes	Yes	Yes	Yes
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	2794	2794	2794	2794	2794	2794

Notes: Dependent variable is the volume of exports. Standard errors clustered by importer. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. All independent variables are interactions with the intra EEA dummy and with the border dummy. DRO: domestic regulation / other; MANT: market access / national treatment; DIS: discriminatory measures; NDIS: non-discriminatory measures; EST: establishment barriers; OPE: operations barriers.

**Table 20. Maritime transport: Gravity control variables**

	(1)	(2)	(3)	(4)	(5)	(6)
border	-12.65 (8.13)	5.69 (11.96)	8.03 (16.08)	-9.35 (10.95)	-7.93 (6.21)	78.62* (45.88)
STRI heterogeneity	0.59 (1.02)	1.92* (1.06)	1.38 (0.99)	0.74 (0.98)	0.84 (0.95)	1.25 (1.12)
lnDist	-0.44 (0.29)	-0.54** (0.27)	-0.65** (0.28)	-0.53* (0.28)	-0.76** (0.32)	-0.60** (0.29)
contiguity	0.60** (0.24)	0.23 (0.24)	0.33 (0.24)	0.23 (0.26)	0.20 (0.27)	0.16 (0.24)
common language	0.41 (0.29)	0.36 (0.26)	0.45* (0.26)	0.39** (0.19)	0.60** (0.27)	0.41** (0.21)
time difference	0.14** (0.06)	0.09 (0.06)	0.13** (0.06)	0.12* (0.07)	0.13** (0.06)	0.16 (0.10)
former colony	-0.15 (0.18)	-0.25 (0.18)	-0.25 (0.19)	-0.30 (0.18)	-0.28 (0.23)	-0.26 (0.16)
com legal system	-0.36* (0.20)	-0.13 (0.15)	-0.30* (0.18)	-0.10 (0.14)	-0.30 (0.19)	-0.08 (0.13)
RTA services	-0.28 (0.31)	-1.15*** (0.43)	-1.23*** (0.46)	-0.75 (0.57)	-1.20** (0.52)	1.30 (1.10)
intra EEA	0.96 (1.30)	-0.09 (2.39)	1.24 (2.09)	2.82 (5.01)	-2.48 (1.53)	-45.10 (53.26)
b * language	-0.79* (0.42)	-1.83*** (0.54)	-2.36*** (0.73)	-0.69 (0.45)	-0.84* (0.48)	-0.16 (0.82)
b * english	-0.52 (0.46)	-0.79* (0.43)	-1.02* (0.54)	-0.38 (0.45)	0.44 (0.38)	-0.72** (0.32)
b * internet	4.72 (2.97)	2.48 (3.30)	3.05 (4.10)	1.91 (2.23)	3.41** (1.67)	-0.67 (1.87)
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2794	2794	2794	2794	2794	2794

Notes: Dependent variable is the volume of exports. Independent variables preceded by b \* refer to interactions with the border dummy. Standard errors clustered by importer in parentheses. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. Column numbers refer to the different specifications of the columns in the previous table.

**Table 21. Maritime transport: Descriptive statistics**

Variable	Obs.	Mean	Std. Dev.	Min	Max
STRI (aggregate)	36	0.241	0.102	0.070	0.443
All Modes	36	0.054	0.028	0	0.110
Mode 3	36	0.091	0.069	0	0.238
Mode 4	36	0.056	0.027	0	0.140
Modes 1/2	36	0.040	0.019	0	0.077
Market access / national treatment	36	0.209	0.090	0.051	0.373
Domestic regulation / other	36	0.032	0.019	0.007	0.075
Discriminatory measures	36	0.213	0.093	0.051	0.380
Non-discriminatory measures	36	0.028	0.017	0	0.070
Establishment barriers	36	0.158	0.067	0.051	0.299
Operations barriers	36	0.083	0.045	0.014	0.201

Table 22. Commercial banking: Regression results

	(1)	(2)	(3)	(4)	(5)	(6)
b * STRI	-63.55*** (12.02)					287.40** (132.44)
b * STRI <sup>2</sup>	122.24*** (27.38)					
b * DRO		-146.39*** (37.72)				
b * DRO <sup>2</sup>		1189.93*** (319.55)				
b * MANT		-73.60*** (12.16)				
b * MANT <sup>2</sup>		221.95*** (45.91)				
b * DIS			-97.24*** (15.27)			
b * DIS <sup>2</sup>			398.49*** (79.60)			
b * NDIS			-18.33 (34.38)			
b * NDIS <sup>2</sup>			27.31 (286.39)			
b * EST				-183.43*** (28.88)		
b * EST <sup>2</sup>				939.42*** (172.06)		
b * OPE				24.03 (18.60)		
b * OPE <sup>2</sup>				-285.21** (114.83)		
b * All Modes					-12.04 (15.20)	
b * Mode 3					10.32 (9.33)	
b * Mode 4					-38.46*** (9.92)	
b * Modes 1/2					-78.92*** (12.34)	
b * STRI * lnGDP						31.97*** (6.50)
b * STRI * lnGDPpc						-50.12*** (8.58)
b * STRI * lnDist						-38.16*** (9.32)
Gravity Controls	Yes	Yes	Yes	Yes	Yes	Yes
Intra-EU Controls	Yes	Yes	Yes	Yes	Yes	Yes
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	4598	4598	4598	4598	4598	4598

Notes: Dependent variable is the volume of exports. Standard errors clustered by importer. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. All independent variables are interactions with the border dummy. DRO: domestic regulation / other; MANT: market access / national treatment; DIS: discriminatory measures; NDIS: non-discriminatory measures; EST: establishment barriers; OPE: operations barriers.

**Table 23. Commercial banking: intra EU control variables**

	(1)	(2)	(3)	(4)	(5)	(6)
b * STRI	10.10 (18.63)					83.48 (148.68)
b * STRI^2	-12.15 (61.27)					
b * DRO		31.73 (29.59)				
b * DRO^2		-78.71 (313.58)				
b * MANT		-2.66 (20.20)				
b * MANT^2		51.22 (127.63)				
b * DIS			1.47 (17.18)			
b * DIS^2			30.75 (102.61)			
b * NDIS			-11.82 (27.20)			
b * NDIS^2			436.41 (300.00)			
b * EST				0.95 (22.75)		
b * EST^2				-22.91 (147.27)		
b * OPE				1.20 (17.40)		
b * OPE^2				203.21 (200.27)		
b * All Modes					14.00 (10.59)	
b * Mode 3					9.43 (12.22)	
b * Mode 4					21.72 (15.03)	
b * Modes 1/2					1.62 (11.07)	
b * STRI * lnGDP						-15.41*** (5.38)
b * STRI * lnGDPpc						-0.71 (9.37)
b * STRI * lnDist						25.82*** (9.17)
Gravity Controls	Yes	Yes	Yes	Yes	Yes	Yes
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	4598	4598	4598	4598	4598	4598

Notes: Dependent variable is the volume of exports. Standard errors clustered by importer. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. All independent variables are interactions with the intra EEA dummy and with the border dummy. DRO: domestic regulation / other; MANT: market access / national treatment; DIS: discriminatory measures; NDIS: non-discriminatory measures; EST: establishment barriers; OPE: operations barriers.

**Table 24. Commercial banking: Gravity control variables**

	(1)	(2)	(3)	(4)	(5)	(6)
border	3.86 (4.83)	4.55 (4.33)	2.19 (4.77)	6.52 (4.65)	-8.32* (4.46)	-87.36*** (18.66)
STRI heterogeneity	2.39 (1.79)	1.33 (1.30)	-0.27 (1.46)	0.10 (1.18)	-0.99 (1.07)	-4.37*** (1.23)
lnDist	-1.25*** (0.18)	-1.37*** (0.13)	-1.59*** (0.18)	-1.53*** (0.16)	-1.61*** (0.17)	-0.85*** (0.12)
contiguity	-0.07 (0.28)	-0.04 (0.23)	-0.30 (0.23)	-0.21 (0.23)	-0.55*** (0.21)	-0.26 (0.22)
common language	1.04*** (0.30)	0.55** (0.28)	0.57** (0.25)	0.78*** (0.24)	0.64*** (0.21)	0.65*** (0.18)
time difference	0.15*** (0.05)	0.15*** (0.05)	0.17*** (0.05)	0.15*** (0.05)	0.21*** (0.05)	-0.00 (0.04)
former colony	-0.43** (0.19)	-0.58** (0.26)	-0.53** (0.24)	-0.32* (0.18)	-0.15 (0.27)	-0.18 (0.12)
com legal system	-0.07 (0.24)	0.26 (0.21)	0.24 (0.19)	-0.01 (0.15)	0.26* (0.16)	0.06 (0.13)
RTA services	-0.33 (0.31)	-0.33 (0.34)	-0.68** (0.33)	-0.86*** (0.30)	-0.64** (0.26)	-0.09 (0.23)
intra EEA	-1.33 (1.37)	-1.74 (1.35)	-1.04 (1.20)	-0.06 (1.24)	-0.01 (0.83)	15.35 (18.96)
b * language	-0.22 (0.27)	-0.07 (0.24)	-0.66** (0.28)	-1.09*** (0.25)	-0.78*** (0.17)	0.14 (0.18)
b * english	1.42*** (0.16)	1.62*** (0.19)	2.14*** (0.22)	2.21*** (0.20)	2.13*** (0.16)	1.39*** (0.13)
b * internet	-0.72 (0.97)	-0.81 (0.89)	-0.15 (1.02)	-0.20 (1.00)	1.74* (0.98)	-4.38*** (0.81)
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	4598	4598	4598	4598	4598	4598

Notes: Dependent variable is the volume of exports. Independent variables preceded by b \* refer to interactions with the border dummy. Standard errors clustered by importer in parentheses. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. Column numbers refer to the different specifications of the columns in the previous table.

**Table 25. Commercial banking: Descriptive statistics**

Variable	Obs.	Mean	Std. Dev.	Min	Max
STRI (aggregate)	42	0.189	0.122	0.064	0.551
All Modes	42	0.053	0.036	0	0.162
Mode 3	42	0.076	0.080	0.011	0.321
Mode 4	42	0.028	0.014	0	0.069
Modes 1/2	42	0.032	0.017	0	0.054
Market access / national treatment	42	0.113	0.076	0.019	0.323
Domestic regulation / other	42	0.076	0.053	0.010	0.228
Discriminatory measures	42	0.111	0.072	0.019	0.297
Non-discriminatory measures	42	0.077	0.059	0.011	0.254
Establishment barriers	42	0.112	0.074	0.029	0.329
Operations barriers	42	0.076	0.053	0.006	0.241

**Table 26. All sectors: Additional control variables to column (6)**

	CS	CO	CR	TC	TRmar	FSbnk
b * lnGDP	-2.05 (2.14)	1.10* (0.64)	0.25 (1.22)	1.47 (2.31)	2.65** (1.11)	-1.67** (0.75)
b * lnGDPpc	6.64** (2.63)	7.15*** (1.78)	1.65* (0.99)	-7.78* (4.08)	-4.56* (2.58)	9.79*** (1.46)
b * lnDist	5.32 (3.77)	-1.35* (0.77)	1.53 (1.62)	-1.34 (2.68)	-4.42*** (1.68)	3.13*** (1.17)
b * lnGDP * EU	2.21 (2.14)	-0.41 (0.62)	-3.31*** (1.24)	1.07 (1.49)	-0.53 (2.20)	1.09** (0.52)
b * lnGDPpc * EU	-7.32** (2.87)	-8.41*** (1.97)	3.52*** (1.32)	1.50 (3.93)	4.88 (4.28)	-1.65 (1.26)
b * lnDist * EU	-5.33 (4.04)	1.32** (0.65)	6.77*** (2.36)	2.36* (1.32)	-2.44 (3.00)	-2.36** (0.92)
Exp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Imp * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	4597	5039	3887	4439	2794	4598

Notes: Dependent variable is the volume of exports. Standard errors clustered by importer. \*\*\*, \*\* and \* mean statistical significance at 1%, 5% and 10% levels respectively. All independent variables are interactions with the border dummy.