The Discriminatory Effect of Domestic Regulations on International Services Trade: Evidence from Firm-Level Data*

Matthieu Crozet† Emmanuel Milet‡ Daniel Mirza§

November 30, 2011

Abstract

In order to develop trade in services, the GATS aims to eliminate progressively *discriminatory* regulations, which apply to foreign suppliers. This paper looks instead at the trade effect of *domestic* regulations, which apply to all firms indifferently and do not intend to exclude imports. We propose a theory-based empirical test to determine whether or not these domestic regulations affect more foreign suppliers than local ones, through the sign of their effect on the trade margins. We then apply it on French firm-level exports to OECD countries in professional services. Our econometric results show that domestic regulations in the importing markets do matter significantly for trade in services. They reduce both the decision to export and individual exports. This result tends to prove that domestic regulations are discriminatory *de facto* even if they are not *de jure*.

Keywords: Trade in services, Domestic Regulations, Firm Heterogeneity.

JEL codes: F1, L8.

*This paper is produced as part of the project European Firms in a Global Economy: Internal policies for external competitiveness (EFIGE), a collaborative project funded by the European Commissions Seventh Research Framework Programme, Contract # 225551. The views expressed in this publication are the sole responsibility of the authors and do not necessarily reflect the views of the European Commission. We thank Andrew Bernard, Joseph Francois, David Hummels, Florian Mayneris, Mathieu Parenti and participants at the ETSG and GIST conferences, and seminars at CEPII, PSE, WTO and the French Ministry of Finance for fruitful discussions and comments.

†Paris School of Economics (Paris I) and CEPII

‡Paris School of Economics (Paris I)

§University François Rabelais and GERCIE, CEPII/CIREM (Paris) and the Banque de France. This paper represents the views of the authors and should not be interpreted as reflecting those of the Banque de France.

1 Introduction

Services account for about two thirds of the GDP in the advanced economies and nearly half of their employment. The share of services activities in GDP is also rising in middle and low income countries and almost reached 50% in the poorest countries in 2007 (Francois and Hoekman, 2010). Nevertheless, international trade in services sill accounts for only one fifth of world trade (WTO, 2008). Of course, many services require proximity between buyers and sellers which prevent most of them from being internationally traded. However, if one focuses solely on services that do not require proximity (i.e. arm's length services trade)[1], the international trade of services remains limited: simple calculations from EBOPS-OECD and STAN-OECD databases on the US economy in 2008 show, for instance, that the share of exports of services in the total production of arm's length services is around four times smaller than the share of exported goods in total manufacturing. Why then is there so little trade in arm's length services?

The recent literature points to a significant role being played by regulations (see Francois and Hoekman, 2010 for a survey). In the OECD countries at least, regulations in services are found to be relatively high compared to those in the manufacturing sector. Whether or not a high degree of regulation is justified in the services sectors is beyond the scope of this paper.[2] We are interested in looking at whether regulations play a particular role in explaining the lack of cross-border trade in services. Deardorff and Stern (2008) propose a taxonomy of different regulations that could apply to most if not all of services. Some regulations can impact entry (i.e. licenses, administrative handling) while others are more related to ongoing operations (environmental norms, prudential measures, price controls, etc). The first usually designate fixed costs, while the second are more related to variable costs. A large part of these regulations applies to all sellers alike (i.e they are non-discriminatory). We shall call them *domestic* regulations in the rest of the paper. Others, however, are discriminatory against foreign suppliers. Regulations in this case, become instruments of protection, and act as non-tariff barriers (NTBs) to services. The General Agreement on Trade in Services (GATS) is mainly concerned about services NTBs.[3] Its purpose is to ensure equal treatment between national and foreign suppliers of services, but not necessarily to reduce or harmonize *domestic* regulations among WTO Members.[4] Nevertheless, domestic regulations might also matter for trade. We ask here whether they can explain (part of) the lack of services trade. And if so, how?

One of the first empirical studies using bilateral services trade data from the OECD at

[1] An expression that has been made popular by Bhagwati *et al.* (2004).

[2] There is a debate in the literature over the efficiency of regulations: high regulations in services might be justified by the frequent presence of natural monopolies or asymmetric information in the market (Hoekman and Mattoo, 2011). They are set to promote efficiency or equity. Another strand of the literature shows however that by introducing additional costs and/or distortions to competition, some regulatory policies might not be efficient for firm level performance and/or macro level growth (e.g. Blanchard and Giavazzi, 2003; Nicoletti and Scarpetta, 2005; Griffith *et al.*, 2007 and Arnold *et al.*, 2008).

[3] see WTO website devoted to GATS at `http://www.wto.org/english/tratop_e/serv_e/gats_factfiction_e.htm`

[4] The role of regulatory reforms and services trade liberalization negotiated within the GATS or in Preferential Trade Agreements is currently under study by Borchert, Gootiiz and Mattoo (2010), using a new dataset on international regulations.

the aggregate level is Nicoletti *et al.* (2003), complemented recently by Lennon *et al.* (2009). They find that regulations in the origin and destination countries have a strong negative impact on aggregate services exports.[5] Kox and Lejour (2005) show that cross-country differences in the structure of regulations (what they call the heterogeneity of regulations across countries) matter as much as cross-country differences in the overall level of regulations. By taking advantage of sectoral data of better quality from Eurostat and two years for regulation data from the OECD, Schwellnus (2007) could control for unobserved country heterogeneity. By doing so, he shows that the negative impact of product market regulations (PMR) is reduced by half, with an elasticity of bilateral trade to regulations significantly smaller than that found in previous studies. Kox and Nordas (2007) is the closest paper to our work. It treats PMR as fixed costs of entry before estimating a negative impact on services trade using industry level data. All these studies show, at the industry or country level, a negative correlation between the level of market regulations in a country and the amount exported to this country. However, it is important to note, that these empirical evidences do not prove that services market regulations can be assimilated to trade barriers which discriminate foreign producers. Indeed, because a non-discriminating market regulation is likely to increase entry or marginal costs for all services firms, it is likely to reduce sales of both local and foreign producers. As a result, highly regulated markets should import less, even if they do not protect their domestic producers from foreign competitors. In contrast, we propose in this paper an empirical analysis that explicitly shows that domestic regulations of services markets - which are not discriminating *de jure* - act as discriminatory barriers *de facto*.

To achieve this, we rely on firm-level trade data that allows to investigate the impact of regulations on both the extensive and the intensive margins of trade in services. Actually, our contribution to the existing literature is threefold. First, our firm-level regressions illustrate how regulations affect both firms' decision to export services and the amount they export. Second, we look at the nature of domestic regulations by examining whether they act as a variable or a fixed cost. Third, and more importantly, we perform a theory-based empirical test in order to determine explicitly whether domestic regulations of services markets discriminate against foreign sellers, and acts as a trade barrier.

Our empirical analysis uses French firm-level data on trade in services, provided by the Banque of France. This kind of data has only recently become available in a few countries. Breinlich and Criscuolo (2011) were the first to use British firms' data on trade in services, followed by Kelle and Kleinert (2010) for German firms, and recently Conti *et al.* (2010) for Italian firms. These studies describe the characteristics of the firms engaged in international trade in services although without linking them to regulations in services. Our Banque of France dataset provides exhaustive information on the services traded by each French firm. The firms level export flows are provided by destination country and type of service. We focus our analysis on "other business services" which include most professional services, covering essentially architecture,engineering, accounting, consultancy and legal services. Two important reasons lie behind our choice of looking at professional services only. First, their market functioning is quite similar to that of goods, in the sense that they are traded at

[5]Earlier studies focused on specific sectors: Mattoo and Mishra (1998) look at both discriminatory and non-discriminatory regulations in the case of Indian engineers, lawyers and architects in the United States. Warren and Findlay (1999) compile several sectoral studies carried by the Australian Productivity Commission (Banking sector, Telecommunication, maritime, professional).

arm's length and independently from trade in goods. This is not the case for most of other services such as tourism or transport services. Second, we need services data that could directly correspond to available data on domestic regulation. Two institutions provide these data: the OECD and the Australian Productivity Commission. Both indicators are specifically designed to describe the importance of regulations on markets for professional services. The OECD provides data on regulation in OECD countries only. These are aggregated into the Non-Manufacturing Regulation indicator (NMR_{OBS}, hereafter). NMR_{OBS} is available for 1999, 2003 and 2008. The Australian Productivity Commission provides information specific to professional services through the Trade Restriction Index (TRI, hereafter). The TRI is provided for 1998 only, however, but it has the advantage of giving information independently on domestic regulations on the one hand, and 'foreign-discriminatory' NTB regulations on the other. This allows us, when looking at the impact of domestic regulations, to control explicitly for discriminatory regulations in our specifications and focus our analysis on non-discriminatory ones.

We find that domestic regulations have a negative and statistically significant impact on the extensive but also intensive margins of trade in services. This result is consistent with only one particular case raised by the theory: the case where domestic regulations raise the variable costs of foreign suppliers more than they do for domestic sellers. This is to say that the domestic regulations, that are non-discriminatory *de jure* are discriminatory *de facto*. Furthermore, we show that tightening domestic regulations in a given country increases the relative marginal cost of foreign producers but does not impact significantly the fixed entry cost of exporting to this country.

In the next section, we present the set-up on which we base our tests. Section 3 describes the dataset and show some stylized facts on French exporters of services. Section 4 presents the econometric results and we conclude in the last section.

2 Theory

Complying with market regulations is certainly not costless, both for domestic and foreign firms. However, because it is hard to know precisely what kind of cost they involve, it is not trivial to assess the exact impact of domestic regulations on bilateral trade flows. Indeed, regulations can take the form of an additional fixed entry cost, a marginal cost, or both. Moreover, they might be equally burdensome for foreign and domestic companies or be discriminatory, affecting foreign firms relatively more. This section outlines a simple model of trade in order to present the mechanisms at work and list our empirical predictions. We do not aim to present a structural model to be tested but simply to determine the kind of consequences regulations might have on firm-level trade flows.

We consider the market for a given tradable service in country d. Consumers have CES preferences over a continuum of imperfectly substitutable varieties produced by monopolistically competitive firms. Firms aiming to serve the market incur a fixed entry cost, F_d. We assume no pricing-to-market. Firms' sales on market d are a combination of destination country characteristics, some bilateral elements linking the origin and the destination countries (such as transaction costs), and firm-level ability, a.[6] More precisely, the demand for

[6]In the following, we implicitly consider that a represents the productivity of the firms and determines

services addressed by country d to a firm located in country o, characterized by the ability a, should be of the form:

$$x_{do}(a) = p_{do}(a)^{1-\sigma}(E_d/\Phi_d)\Lambda_{do}(a), \tag{1}$$

where $\Lambda_{do}(a)$ takes a value of one if the firm has decided to enter the market d and zero otherwise. $p_{do}(a)$ is the price charged to the final consumer for one unit of firm's output; and σ is the price elasticity. E_d is the market size in country d. Φ_d is inversely related to the price index in country d, and captures the strength of the competition. It is positively influenced by the number of competitors in this market and negatively by their respective delivered price. A firm from country o, with ability a, will enter market d if its current profits cover the fixed cost. With constant mark-up, the probability that a firm enters is:

$$P\left[\Lambda_{do}(a) = 1\right] = P\left[x_{do}(a) > \sigma F_d\right]. \tag{2}$$

Services market regulation of country d, noted B_d, might be either associated with a fixed entry cost or a marginal cost. We consider both cases, setting $F_d = B_d^{\eta}$ (with $\eta \geq 0$) and assuming that B_d enters positively in international and intra-national transaction cost functions. Moreover, although it might not be discriminatory *de jure*, we consider that market regulation might be discriminatory *de facto* in a sense that foreigners might be more sensitive to similar market regulations faced by domestic producers. The delivered price of imported and local services are respectively:[7]

$$p_{od}(a) = p_o(a)t_{od}B_d^{\gamma}, \quad \text{and} \quad p_{dd}(a) = p_d(a)t_{dd}B_d^{\kappa}, \quad 0 \leq \kappa \leq \gamma, \tag{3}$$

$p_o(a)$ denotes the production price of a variety of services imported from country o, and t_{od} is the transaction cost (cost to deliver country d). Similarly, $p_d(a)$ is the production price of services delivered domestically and t_{dd} is the intra-national delivering cost. Market regulation in country d will be discriminatory if $\kappa < \gamma$. Finally, the toughness of competition in the market Φ_d is:

$$\Phi_d = \left[\int_{a\in\Omega_{dd}} [p_d(a)t_{dd}B_d^{\kappa}]^{1-\sigma} + \sum_{o\neq d}\int_{a\in\Omega_{od}} [p_o(a)t_{od}B_d^{\gamma}]^{1-\sigma}\right]^{\frac{1}{1-\sigma}}, \tag{4}$$

where ω_{od} is the set of varieties produced in country o and available in country d. We obtain the elasticity of firm-level exports with respect to market regulations in the destination country from Equation (1):

$$\varepsilon_B^x = \frac{\partial x_{do}(a)}{\partial B_d}\frac{B_d}{x_{do}(a)} = \left[(1-\sigma)\gamma - \frac{\partial \Phi_d}{\partial B_d}\frac{B_d}{\Phi_d}\right]. \tag{5}$$

Equation (5) indicates that the impact of destination market regulations on firm-level export values is twofold. A direct effect is captured by the first term in the brackets. It is

the delivered price of its variety. Without loss of generality, we could have assumed that a captures the ability of the firm to attain a higher level of quality. Then, the price variable, apparent in the following equations, would stand for the inverse of the quality-adjusted price.

[7] Because it makes no difference at this stage whether foreign and domestic firms face the same fixed cost or not, we consider that F_d applies to all producers.

unambiguously negative if γ is positive. The second term shows an indirect effect channeled by changes in the price index. Indeed, market regulations should reduce the number of competitors in the destination country and raise the delivered price of each service variety. This will impact positively the demand addressed to all incumbent firms in this market. The overall elasticity of firms' exports with respect to market regulations is undetermined *a priori*. It could be either zero, positive or negative.

Similarly, the impact of domestic regulations on the export decision of a firm in country o is largely undetermined. But equation (2) provides some clue about the sign of the elasticity of the probability of exporting with respect to the level of regulations, ε_B^P. It must be positive if $\varepsilon_B^x > \sigma\eta$ and negative if $\varepsilon_B^x < \sigma\eta$.

Let us consider different hypotheses on the nature of market regulations. They can be considered as a fixed entry cost ($\eta > 0$), a marginal cost ($\gamma > 0$ and $\kappa > 0$) or both. Moreover, they can be discriminatory *de facto* ($\gamma > \kappa$) or not ($\gamma = \kappa$) . The theoretical predictions are summarized in Table (1).

Table 1: Signs of the elasticities of firm-level exports and export decisions with respect to destination market regulations

		No entry cost $\eta = 0$	Entry cost $\eta > 0$
No marginal cost	Export value (ε_B^x)	0	+
$\gamma = \kappa = 0$	Export decision (ε_B^P)	0	-
Non-discriminatory marginal cost	Export value (ε_B^x)	0	+
$\gamma = \kappa > 0$	Export decision (ε_B^P)	0	-
Discriminatory marginal cost	Export value (ε_B^x)	-	?
$\gamma > \kappa > 0$	Export decision (ε_B^P)	-	-

Let us begin with the case where regulations do not influence the marginal cost: $\gamma = \kappa = 0$. The signs of ε_B^x and ε_B^P are shown in the two first rows of Table (1). Obviously, these elasticities are simply zero if regulations have no influence on the fixed cost. But if complying with regulations involves an additional entry cost ($\eta > 0$), they should impact negatively on the export decision ($\varepsilon_B^P < 0$). As the number of firms active in the market diminishes, Φ_d falls and the second term in equation (5) shifts to being, while the first one is zero. Then, each firm remaining active in this market has larger sales: $\varepsilon_B^x > 0$.

The theoretical predictions would be exactly the same if regulations have a non-discriminatory impact on the marginal cost of delivering a service ($\gamma = \kappa > 0$). If they have no impact on the fixed entry cost, then it is straightforward to show that the second term in Equation (5) exactly cancels out the first one. Indeed, with CES preferences, if all firms face the same shock on their marginal cost, the direct negative impact it has on their sales is exactly offset by the lessening of competitive pressures. In the case where $\eta > 0$, we expect a positive relationship between regulations and firms' sales due to a decrease in the number of entries.

Finally, domestic regulations will impact negatively on foreign firms' exports only if they hurt more foreigners than the local producers, i.e. $\gamma > \kappa > 0$. In that case, for foreign firms, the indirect positive effect in Equation (5) will not offset the direct negative effect, and their export value should decrease. Because $x_{od}(a)$ decreases, the probability of exporting is also

affected negatively. If one further assumes that regulations increase the fixed entry cost, the negative impact on export probability would be even larger. But if $\sigma\eta$ is very large, the reduction of the number of exporters could be sufficiently big to compensate the direct effect of regulations on firms' exports. The sign of ε_B^x is undetermined in this case.

3 The Data

Our empirical analysis uses two different sources of data. The exhaustive record of exports of services by French firms and the index of services market regulations. This section details and describes the main features of our data.

3.1 The Banque de France database for services trade

We use micro-level data from the Banque *de* France on French exporters of services. The services covered in the dataset fall into the Mode I classification by the GATS.[8] The Banque *de* France data come either directly from the company itself,[9] or from commercial banks declarations. The dataset records for each firm the annual amount of its transactions, the nature of the service traded and the partner country. The product classification used by the Banque *de* France dataset is slightly more aggregated than the *Extended Balance of Payments Services Classification (EBOPS)*. It identifies 21 types of services. Among them, there are five types of professional services: "Operational leasing services", "Research and development, architectural engineering and other technical services", "Legal, accounting, auditing, book-keeping and tax consulting services" and "Other business services". Each firm is uniquely identified by its SIREN code (*Système d'Identification du Répertoire des Entreprises*) which allows to match this information on trade with most French firm level databases. Destinations are split across 250 countries. Although the data is available from 1999 to 2007, we only use figures for 1999 and 2003, the two years for which we have data on regulation. The original database reports Mode I export flows for about 13,800 French firms in 2003, with a total value close to 25 billion euros. However, given the aim of this paper, we need to focus on a restricted subset of firms.

First, we drop all firms that do not declare having their main activity in the services sector. It is very likely that exports of services by manufacturing firms are side-products of their trade in goods or intra-firm trade. This kind of trade relationships might not be affected by the services market conditions in the destination country. The French statistical institute (INSEE) provides additional information on the identity of each French firm, along with the main economic activity. By matching these with our services trade data we can easily identify the main activity of each firm. It appears that a very large share of the exporters of services are registered in the manufacturing sector. We could identify only

[8] Mode I covers all services exchanged between residents and non-residents across the borders. They cover mainly all professional and other business services (communication, computer services) along with transport services.

[9] This usually concerns the biggest ones, called *Déclarants Directs Généraux*.

around 7,000 firms in 2003 belonging to the services sector and exporting services.[10] This information is however only available to us until 2003.

Second, because we need to match the trade data to the regulation indicators, we restrict our sample to OECD countries and trade in professional business services. This restriction limits the database to 19 destination countries at most (out of 250) and five types of services (out of 21). This restriction is less harsh than it might appear. Among the 7,000 services firms we have in our original database, almost 90% sell around 80% of their Mode I services to OECD countries. In 2003, within Mode I, professional services represented nearly half of the sales to the OECD, undertaken by nearly half of the exporters. In the end, we are left with a database which contains information for two years (1999 and 2003), 3018 firms and 19 countries at most. Of course, all firms do not export all types of services to all countries and the data contains many zero trade flows. For 1999, there were 1373 exporters and 18 importing countries in our database. We have 78.3% of zero trade flows, which leaves us with 26,861 positive export flows, for a total value of 3.2 billions euros. For 2003, the data covers 2071 firms and 19 countries;[11] there are 43,415 strictly positive export flows for this year, representing 4.8 billion euros.

3.2 Domestic Regulation Measures

We use two different indicators of domestic regulations. The first was developed by the OECD and the second by the Australian Productivity Commission (APC). The OECD provides Non-Manufacturing regulation indicators (NMR) that are specific to professional services. They rely on questionnaires completed by the competent authorities in OECD member states[12]. Questions are either qualitative (for instance: Do national, state or provincial government control at least one firm in the Insurance sector?) or quantitative (for instance, "For how many services does the profession have an exclusive or shared exclusive right to provide?"). Questions fall into two categories: entry regulation and regulations affecting the conduct of operation. Entry regulations (Entry_{NMR} hereafter) focus on rules concerning licensing or minimum educational requirements while ongoing activities' regulations (Conduct_{NMR} hereafter) are associated with price-setting policies, or framing advertisements. The composite indexes rank from zero (low regulations) to six (high regulations). We apply a minor change to the NMR indicator. Recall that we want to use data on regulations that are non-discriminatory. Therefore, we exclude one question from the questionnaire which explicitly targets foreign professionals[13]. The indicator we obtain appears to be highly correlated with the original one, however, and using the latter in all our regression does not alter the conclusions. To avoid any confusion, we will refer to NMR_{OBS} as our modified index. We use it for 1999 and 2003.

The second indicator we use is provided by the Australian Productivity Commission.

[10] Only 10,000 firms in 2003 could be retrieved in both Banque de France and INSEE databases. Among them, about 3,000 are registered as manufacturing firms. We do not retain those firms in our sample.

[11] Data on local production of professional services are missing in 1999 for Belgium.

[12] Questionnaires and answers are freely available at `http://www.oecd.org/document/24/0,3746,en_2649_34323_35858776_1_1_1_1,00.html`

[13] The question that has been excluded is: "Is the number of foreign profesionnals/firms permitted to practice restricted by quoats or economic needs tests?"

The APC produces an indicator of domestic regulations they call the Trade Restrictiveness Index (TRI, hereafter). The indicator is fully described in Warren and Findlay (2000). It follows the same construction method as the NMR_{OBS}. Two types of information are found in this index. The first set of information focuses on domestic regulations in the spirit of the NMR_{OBS} index: it summarizes the regulation on entry and ongoing operations for each country. The second type of information concentrates instead on a set of regulations which only affect foreign suppliers. Although the TRI is only provided for 1998, it remains of particular interest for our study as it allows the impact of 'foreign-discriminatory' NTB restrictions to be explicitly controlled for in the regressions. The TRI is available for several services sectors, but because we are mainly interested in professional services we focus only on the TRI related to these services.[14]

The other data used for the econometric analysis are described in Section 5 below.

4 Stylized facts

We first present some stylized facts on French services exporters, then introduce some figures regarding the regulation data before linking both types of measures.

4.1 French exporters of services

As for trade in goods, only few firms are able to export services. But for professional services, the gate to the export market seems to be particularly narrow. When matched with the INSEE data, the firms exporting professional services account for around 2% of the total number of services firms having their main activity in professional services. This share is around nine times smaller than the share of firms exporting goods in Manufacturing. Indeed, Eaton, Kortum and Kramarz (2004) report that about 17% of French manufacturing firms exported some good to at least one destination in 1986, while Bernard and Jensen (2003) report a very similar figure (18%) for the US in 1987.

Moreover, among exporting firms, export concentration is very high suggesting that only a few 'superstars' are able to sell several services to several countries. Tables (2) and (3) give an idea of the extent of heterogeneity among exporters with respect to the number of countries they serve and the number of services they export. In particular, in 2003, while 68% of the firms sell only one service in a single country, their share in exports is less than 21% of total exports of professional services. At the other extreme, a much smaller proportion of firms (4.44+0.87=5.31%) exports two services or more to at least three destinations, and they represent more than 40% (29.61+10.46) of total exports.

4.2 Domestic regulations

Figure 1 displays the OECD NMR_{OBS} indicator related to each destination country faced by French exporters in 1999 and 2003.

[14]Research papers and data can be found at `http://www.pc.gov.au/research/researchmemorandum/servicesrestriction`.

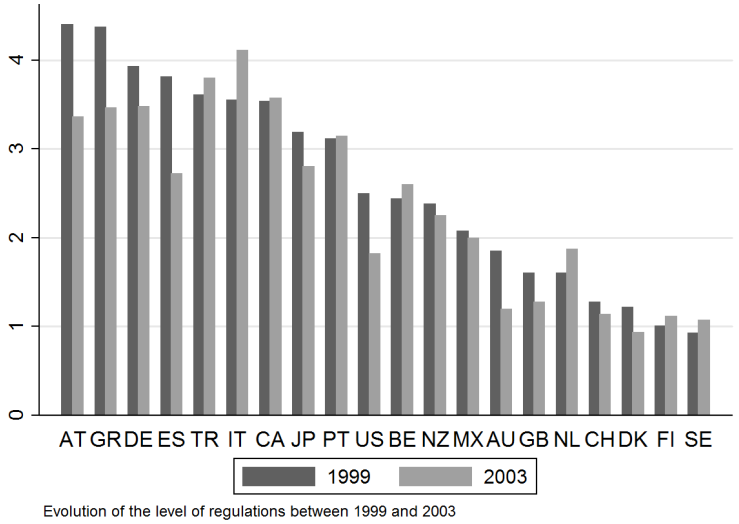
Table 2: Share of exporters in 2003 (2,072 exporters)

		Number of countries		
		1	2	3 or more
Number of Services	1	67.86	10.47	11.53
	2	2.32	2.27	4.44
	3 to 5	0.10	0.14	0.87

Table 3: Share of export values in 2003 (4.8 billion euros)

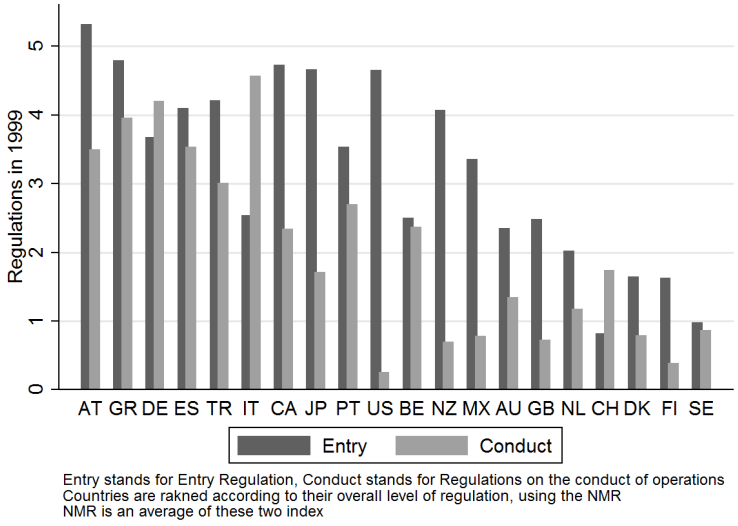
		Number of countries		
		1	2	3 and more
Number of Services	1	20.41	3.45	34.03
	2	0.67	1.26	29.61
	3 to 5	0.02	0.09	10.46

Figure 1: Levels of Regulation in 1999 and 2003



Regulations in professional services seem to be linked to geography, at least at both extremes of the distribution. In particular, while Germany and Austria followed by Mediterranean countries (Greece, Turkey, Spain, Italy) have the highest regulations in professional services, Nordic countries (Denmark, Finland and Sweden) have the lowest ones. More interestingly, and for econometric purposes, this figure allows us to understand better the sources of variation in the data. Two facts emerge from this figure. First, not all countries decreased their level of regulation between 1999 and 2003. Eight countries actually experienced an increase in their NMR_{OBS} index over the period. Second, there is a lot of heterogeneity in the changes of the index. Some countries experienced minor changes in their level of regulation: New-Zealand (-5.6%), Portugal (+0.8%), Belgium (+6.6%); while others saw major changes: Australia (-35%), Spain (-28%), the Netherlands (+16.8%). Although we find variation over time in the regulation index, we prefer to use the cross-section dimension of our data, because we do not have enough data to perform robust within estimates. We only have two years at our disposal, and the change in export values over time could only be computed for firms exporting both in 1999 and 2003. This would leave us with a very small number of firms (266) and too few variability in export values.

Figure 2: Entry regulations and Conduct of Operation in 1999

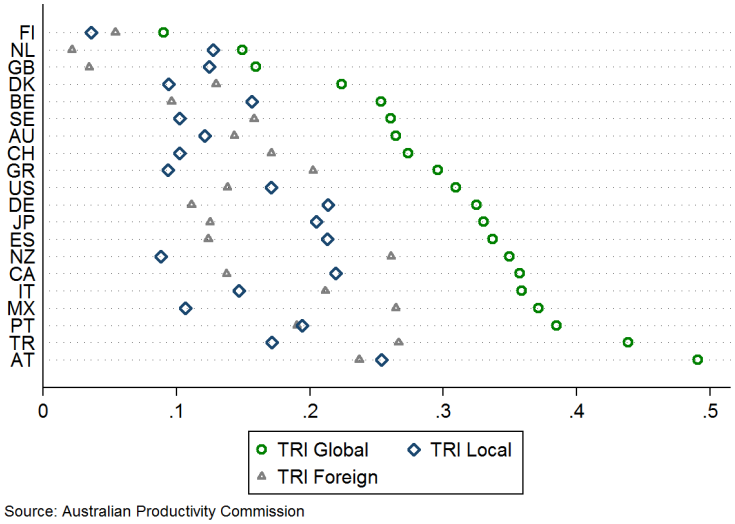


We go further by disaggregating the NMR_{OBS} into its two components: Entry_{NMR}, and the Conduct_{NMR}. The NMR_{OBS} is a simple average of both components, and large heterogeneity between countries exists when looking at this disaggregated level. Figure (2) plots together the two components of the NMR_{OBS} in 1999. Large differences can be observed between and within countries.[15] Both components rank from 0 to 6, so there is no scale effect here. Figure (2) has several interesting features. First, we note that if the ranking were to be made according to the level of Entry_{NMR} regulation, it would look quite different to what it looks like in figure (1): countries like the United States would appear among the most regulated, while Italy for instance would move on the right side of the graph with the less

[15]Data for 2003 show the same trend: there was a lot of variation within countries and between countries.

regulated countries. The same thought exercise applies to the Conduct_{NMR} component: the United States would be the most liberalized country, while Switzerland would end-up in the middle of the ranking. Second, almost all the countries appear to have tougher regulations concerning the entry than the conduct of operations[16]. To summarize, we argue that the NMR_{OBS} index offers enough variance to estimate properly the impact of regulations in the destination countries on trade. Indeed, the index varies substantially across countries, over the period 1999-2003. These differences between countries are also present when we decompose the indicator into the Entry_{NMR} component and the Conduct_{NMR} component and the variations in the NMR_{OBS} are not driven by only one of its component. Morover, there is no obvious correlation between the regulations on entry and regulations on the conduct of operation, which allows us to assess the impact of each component on international trade.

Figure 3: The decomposition of the Trade Restrictiveness Index, 1998



Source: Australian Productivity Commission

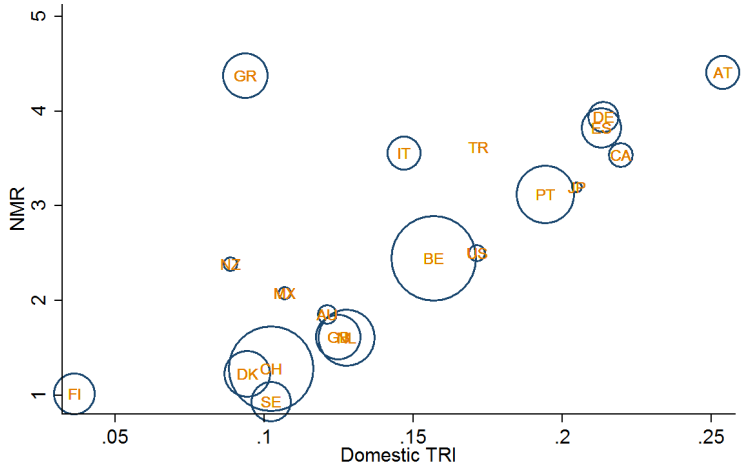
Figure (3) illustrates the decomposition of the APC-TRI regulation data in professional services. TRI_{Global} is decomposed into its two components: TRI_{Local} and $\text{TRI}_{Foreign}$. We do not observe a specific pattern in the distribution of domestic and foreign-oriented regulations across countries. While some countries have both high local and foreign-oriented regulations, others may be more protectionists on the one hand, while being more lenient with regards to their domestic firms on the other hand. In contrast, a small number of countries (Germany, Japan and Spain) appears to be relatively open to foreign firms, although still imposing high domestic regulations on all firms serving in their market. This observation suggests that the information brought by TRI_{Local} is different from that offered by the foreign-oriented indicator ($\text{TRI}_{Foreign}$). Put differently, changes in domestic regulations should not be picking changes in foreign-oriented regulations, which should strengthen our econometric results regarding the impact of domestic regulations.

[16]Data for 2003 tell us that all countries had higher scores on entry than on conduct of operations in this year

4.3 Non-manufacturing regulations and French exporters

Figure (4) crosses 3 variables of our database, across destinations: the NMR_{OBS}, the Australian TRI_{Local} and the number of French exporters in each market (weighted by the GDP of the destination market). First, the Figure shows that the NMR_{OBS} and the TRI_{Local} indexes are strongly correlated. Second, there is no monotonic linear relationship between the extent of regulation (defined by either NMR_{OBS} or TRI_{Local}) and the number of exporters. It should be noticed, however, that countries whose regulations are the most stringent (say Austria, Germany and Spain), appear to be associated with a low number of French exporters despite their proximity to France.

Figure 4: TRI_{Local} (1998), NMR_{OBS} (1999) and the number of firms exporting professional services (1999)



Source: OECD, APC, author's calculations
Circles are proportionnal to the number of firms exporting to the market divided by the size of the market (GDP)

Figures (5) and (6) present the distributions of the log of French export values across countries, ranked by level of regulation. They show the median, the 25th and 75th percentiles, the lower and upper adjacent values and possible outside values. Figure (5) looks at within country distributions of professional services exports, and sorts destination countries with respect to their increasing level of aggregate NMR_{OBS}. No clear pattern emerges from this figure. In particular, if only fixed costs were to play a role in regulating markets, theory states that regulations should smooth the competitive pressure on the market, allowing firms in place to sell more. Then, the whole distributions of individual export values should be raised up with respect to increases in the NMR_{OBS} index. In contrast, if variable costs due to regulations were playing a role, then all things being equal, one should observe a downward shift of exports with respect to an NMR_{OBS} increase. These predictions do not show up in these simple figures. However, explicitly controlling for other determinants of trade (such as trade costs, the total demand or firm specific factors), the econometric analysis below will reveal a significant negative influence of regulations on trade. The same type of observation can be made if we use the TRI_{Local} instead of the NMR_{OBS} (Figure 6).

Figure 5: NMR in Professional Services and Export Distributions, by Country, 1999

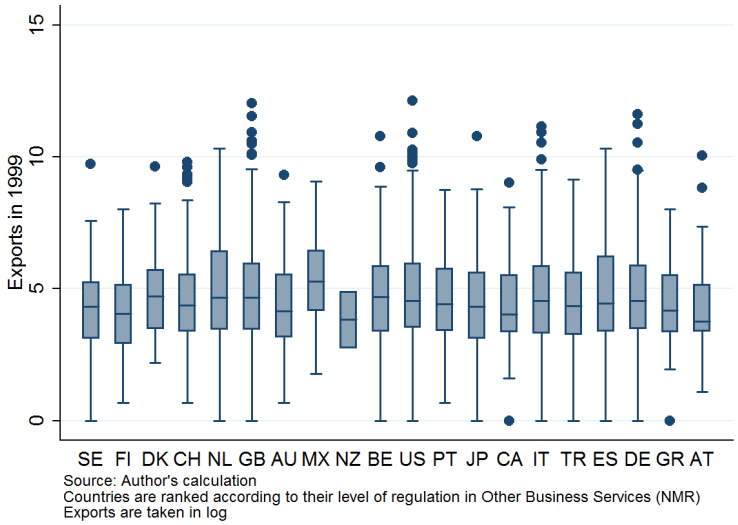
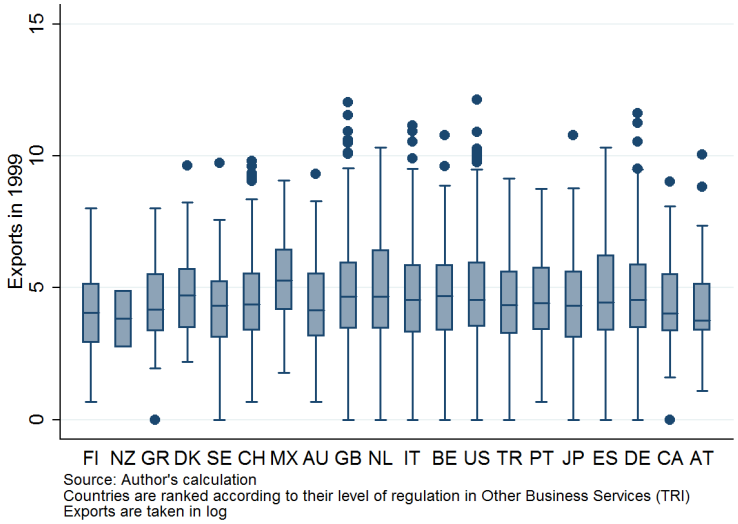


Figure 6: TRI in Professional Services and Export Distributions, by Country, 1999



5 Econometric results

Theory guides our tests. By replacing the CIF price given by Equation (3) into equations (2) and (1), we obtain two estimable equations. The first is related to a firm's decision to export, while the second gives the firm-level export value, conditional on being an exporter. This section presents the details of our econometric specifications and discusses the empirical results.

5.1 Econometric specification

For both our equations, we have three sets of right-hand side variables: country-specific variables (E_d, Φ_d and our regulation variable B_d), bilateral variables capturing the trade costs (t_{od}), and the firm-level ability (a).

Market size (E_d) is measured by the local demand for professional services. We compute this variable by subtracting net exports from national production of professional services. For production, we use OECD-STAN data, retaining the production of "Real estate, renting and business activities" (code C70T74). This includes information on real estate, computer related services, research & development and other business activities. Data on the exports and imports of "other business services" are from the OECD as well. As a robustness check, we replace this variable by GDP per capita and the total population of the destination country provided by the World Development Indicators. It is important to recall here that our empirical strategy to identify the impact of market regulations on international trade (summarized in Table 1) is based on the interpretation of the sign of the elasticities of export decisions and export values with respect to market regulation, i.e. Equation (5). To ensure that the regression coefficients on the variable B_d capture both the direct and indirect effect of the regulations, the proxy for the price index (Φ_d) we have to introduce into the estimated equation should not be directly affected by the regulations. Nevertheless, we have to control for exogenous determinants of competition, such as the geographic location of the destination market. Therefore, we introduce into the estimated equation the macroeconomic Real Market Potential index (RMP), computed using the method developed by Head and Mayer (2004). Because it takes into account both the production of manufacturing and services, it is very unlikely to be significantly affected by market regulations in services. We take this index from the CEPII's Market Potentials database.[17]

Transport costs (t_{od}) are proxied by bilateral distances between countries, and dummies indicating whether destination countries share a common border or a common official language with France. All of these data are taken from the CEPII's Distance database.[18]

The individual ability of the exporter, which is hardly observable, is accounted for through Year × Service type × Firm fixed effects.

Finally, we complete our analysis introducing a variable aiming at capturing the quality of institutions in the destination market. We want to make sure that our regulation variables are not just proxies of the overall political of economic environment in the destination country. We introduce a political risk index, the ICRG, developed by the Political Risk Services

[17]The database is available at `http://www.cepii.fr/anglaisgraph/bdd/marketpotentials.htm`, and the methodology is described in detail in Mayer (2008).

[18]Data are available at: `http://www.cepii.fr/francgraph/bdd/distances.htm`

Group.[19] We are well aware of the weakness of this kind of indicator (Glaeser *et al.*, 2004), but we only use it as a control variable, and do not infer anything from the sign or magnitude of the estimated coefficient. Besides, our sample contains mainly OECD countries, so the issues raised by Glaeser *et al.* (2004) are very unlikely to arise here.

The estimation of the export decision is carried by using a firm-level fixed effect conditional logit regression. It is important to note at this stage that the parameter values relative to the conditional logit regressions cannot be interpreted as elasticities or semi-elasticities of the probability to export, as in the linear probability models. Only their sign can be directly interpreted. In fact, it can be shown that a parameter, say β on some explanatory variable x, reveals the impact of a unit change in x on the log-odds ratio of the probability to export relative to that of not exporting ($\ln(P/1-P)$). A bit more algebra shows however, that a one unit change in x affects the change in the odds ratio $(P/1-P)$ by $\exp(\beta)$, or its proportional change by $(\exp(\beta)-1)$. This transformation makes the parameters more easily interpretable. In the case of a continuous variable expressed in logs, however, the β can be interpreted as the elasticity of the odds to changes in such a variable. We shall interpret the parameters obtained each time we think it is important, in particular to estimate the magnitude of the impact of regulations on the ratio of the odds.

The estimation of the individual exports equation could have been estimated by a simple OLS if we had observed positive trade flows for all firms to each destinations. However, most firms report positive trade flows to only a very small number of countries, so that almost 80% of possible trade relationships are zero. Theory predicts that the decision to supply the destination market d depends on whether or not the excepted sales can compensate for an exogenous cutoff value, σF_d. With such a cutoff, the export data are truncated and the OLS estimates are affected by a selection bias. A Tobit method should remove this bias, but the exact cutoff value is unobservable. Fortunately, Eaton and Kortum (2001) show that an appropriate estimate of this censoring point can be the minimum export value observed in each destination. Of course, this value varies across destination countries, so we perform Generalized Tobit estimates to account for changes in the latter[20].

5.2 Baseline econometric results

The first set of results is shown in Table (4) and focuses on the NMR_{OBS} index of domestic regulations. It consists in two sets of specifications. For each specification, we estimate two equations: the export probability equation ($P_r > 0$) and the individual export values one (x_{do}).

First, the gravity variables are estimated with the expected sign and are significant at the 1% level in all four equations. Our individual data thus confirm previous evidence obtained with aggregate data, that gravity equations perform well for international trade in services (see Kimura and Lee, 2006; Walsh, 2006; Head, Ries and Mayer, 2009). Note that the coefficient on ICRG_{Pol} is positive although non-significant. Turning to the variable of interest – the NMR_{OBS} – we see that the coefficient is statistically significant (at the 1% level) and negative in both Columns (1) and (2). Domestic regulations in services reduce

[19] See `http://www.prsgroup.com/Default.aspx` for more information on the PRS Group.

[20] Crozet *et al.* (2011) use a similar method and perform Monte Carlo simulations indicating that it successfully corrects the selection bias.

Table 4: The impact of market regulations (NMR_{OBS}) on export probability and export values.

	$P_r > 0$	x_{do}	$P_r > 0$	x_{do}
	(1)	(2)	(3)	(4)
Local Demand	0.989^a	2.331^a	0.953^a	2.173^a
	(0.019)	(0.058)	(0.019)	(0.049)
Distance	-0.882^a	-1.925^a	-0.892^a	-1.885^a
	(0.022)	(0.062)	(0.023)	(0.054)
Border	1.402^a	2.586^a	1.016^a	2.456^a
	(0.105)	(0.365)	(0.105)	(0.303)
Common Language	0.785^a	1.835^a	0.697^a	1.598^a
	(0.044)	(0.120)	(0.045)	(0.107)
$ICRG_{Pol}$	0.329	0.592	0.171	0.267
	(0.300)	(0.772)	(0.306)	(0.751)
Real Market Potential	-0.072^a	-0.254^a	-1.063^a	-0.225^a
	(0.023)	(0.059)	(0.023)	(0.051)
NMR_{OBS}	-0.290^a	-0.761^a	-0.293^a	-0.756^a
	(0.035)	(0.097)	(0.036)	(0.091)
Export of Goods			2.050^a	4.980^a
			(0.171)	(0.382)
NMR_{OBS}×Export of goods			0.394^b	0.526
			(0.181)	(0.375)
Observations	70,276	70,276	70,276	70,276
Pseudo R^2	0.26	0.19	0.28	0.20

Significance levels: ^{c} $p < 0.1$, ^{b} $p < 0.05$, ^{a} $p < 0.01$. Columns (1) and (3) report export probability estimates, using a Conditional Logit. Columns (2) and (4) report individual export estimates, using a Generalized Tobit. Year×firm×service fixed effects are included in each regression. Standard errors are clustered at the fixed effect level. $ICRG_{Pol}$ measures the political risk in the destination country. Real Market Potential is taken from Mayer (2008). NMR_{OBS} measures the level of regulation in Other Business Services in the destination country. All variables are in logs. Estimates are conducted for 3,018 firms, for both 1999 and 2003.

French exports, both through the number of firms, and through individual export sales. In particular, in Column (2) one can see that a 10 percent increase in regulations reduces services export values by more than 7%. Besides, the same percent change in regulations in Column (1) reduces the odds ratio by around 2.8% (i.e. exp(-0.29*10%)-1). That is, the probability of exporting with respect to that of not exporting is reduced by 2.8%, if regulation in the destination country is 10% higher than in another country.

In Columns (3) and (4), we further control for each observed firm being an exporter of goods or not in the same destination market. We introduce a dummy indicating whether the firm exports goods to a given market and an interaction term between this variable and our measure of regulations. The idea behind this exercise is to see if firms exporting goods and services to the same market are less sensitive to regulations. Exporters of goods might be more familiar with regulations in host countries in general, which might provide a relative advantage for exporting services too. If this dimension is not accounted for, then the negative impact of regulations could be underestimated. This is not what the results show however. Exporters of goods are, indeed, more inclined to be exporters of services and would export higher values. But this is not driving down the coefficient on regulations (in absolute value). The interaction terms are unambiguously non-significant.[21]

Table (5) shows alternative results for the TRI indicator. Recall that the TRI has a practical feature: it provides a measure of domestic regulations (TRI_{Local}) and regulations targeting foreign firms ($TRI_{Foreign}$). We introduce both measures in the first specification (Columns 1 and 2). TRI_{Local} is our variable of interest, and we control for discriminatory regulations by introducing $\text{TRI}_{Foreign}$. As in Table (4), domestic regulations reduce both the export probability and the individual export sales. Because we only have one year of observation, the sample used here is smaller than in the previous table, and so coefficients should not be directly compared. Here, a one percent change in TRI_{Local} translates into a 4.6% decrease in the odd ratios. An interesting feature of this table is the control for discriminatory regulations. As a matter of fact, the $\text{TRI}_{Foreign}$ index is only significant in Column (3), for the export decision. The weakness of this influence suggests, surprisingly, that discriminatory regulations (which only apply to foreign firms and are the type of regulations tackled by the GATS) seem to have a much less detrimental effect on international trade than do non-discriminatory regulations.

To summarize, if the two measures of regulation we use - TRI_{Local} and NMR_{OBS} - are not directly comparable, they yield similar results. Domestic market regulations reduce both the extensive and the intensive margins of trade in professional services. This result is striking as the only theoretical situation consistent with these empirical results occurs when regulations affect the variable cost, and affect foreign suppliers more than domestic suppliers (cf. the last line in Table 1). In other words, our econometric results confirm that non-discriminatory domestic regulations are *de facto* discriminatory.

[21] A close look at the data reveals that only about 2% of services firms actually export goods into the same market where they also export services.

Table 5: The Impact of Market Regulations (TRI) on Export Probability and Export Values

	$P_r > 0$	x_{do}	$P_r > 0$	x_{do}
	(1)	(2)	(3)	(4)
Local Demand	1.046^a	2.431^a	1.004^a	2.270^a
	(0.032)	(0.084)	(0.032)	(0.082)
Distance	-0.856^a	-1.197^a	-0.862^a	-1.883^a
	(0.037)	(0.091)	(0.038)	(0.092)
Border	0.893^a	2.186^a	0.878^a	2.088^a
	(0.196)	(0.574)	(0.195)	(0.562)
Common Language	0.857^a	1.817^a	0.763^a	1.573^a
	(0.083)	(0.201)	(0.087)	(0.201)
ICRG_{Pol}	1.112^b	5.437^a	0.837^c	4.548^a
	(0.441)	(1.133)	(0.445)	(1.100)
Real Market Potential	-0.161^a	-0.423^a	-1.159^a	-0.429^a
	(0.145)	(0.108)	(0.046)	(0.106)
TRI_{Local}	-0.453^a	-1.358^a	-0.428^a	-1.284^a
	(0.084)	(0.201)	(0.085)	(0.201)
$\text{TRI}_{Foreign}$	-0.078	-0.152	-0.103^a	-0.058
	(0.051)	(0.134)	(0.052)	(0.133)
Export of Goods			2.834^a	6.177^a
			(0.665)	(1.364)
$\text{TRI}_{Local}\times$ Export of goods			-0.237	-0.474
			(0.347)	(0.709)
$\text{TRI}_{Foreign}\times$ Export of goods			-0.140	0.237
			(0.145)	(0.345)
Observations	26,861	26,861	26,861	26,861
Pseudo R^2	0.26	0.19	0.28	0.120

Significance levels: ^{c} $p < 0.1$, ^{b} $p < 0.05$, ^{a} $p < 0.01$. Columns (1) and (3) report export probability estimates, using a Conditionnal Logit. Columns (2) and (4) report individual export estimates, using a Generalized Tobit. Firm×service fixed effects are included in each regression. Standard errors are clustered at the fixed effect level. ICRG_{Pol} measures the political risk in the destination country. Real Market Potential is taken from Mayer (2008). TRI_{Local} measures the level of regulation which applies to all firms in Other Business Services activities in the destination country. $\text{TRI}_{Foreign}$ measures the level of regulation which only applies to foreign firms in Other Business Services activities in the destination country. All variables are in logs. Estimates are conducted over 1,373 firms, for 1999.

6 Robustness Checks

We run some robustness checks to verify the validity of our results. In a recent paper, Fillat-Castejon *et al.* (2008) investigate the link between trade in services and Foreign Direct Investment in the services sector. They find a positive correlation between FDI outflows and cross-border exports, both in the short-term and in the long-run. They also find that business services show "the largest potential for cross-border trade when market regulations are reduced and when commercial presence increases". Because restrictions on FDI in the destination country may also reduce cross-border trade and may be correlated to market regulations, our econometric results might be affected by an omitted variable bias. In table (6), we control for the restriction in FDI prevailing in the destination country by introducing the $\text{FDI}_{Restriction}$ index in the regressions (Columns 1 and 2). This index comes from the same OECD database as NMR_{OBS}, and ranges from 0 (no restriction) to 6 (high restrictions). Our results confirm those found by Fillat-Castejon *et al.* (2008). Larger restrictions on inward FDI in a given destination market reduce both the probability that French firms export professional services to this destination and export sales. But, more importantly, the introduction of this additional control variable does not affect significantly the coefficient on services market regulations.

In addition, to make sure that our results are not driven to some extent by our measure of local demand, we replace it by proxies of demand more conventionally used in gravity equations: the log of GDP per capita and the log of population in the destination market (Columns 3 and 4 in table 6). Results are qualitatively unchanged. However, the coefficient on NMR_{OBS} becomes much larger in absolute terms, suggesting that the inclusion of GDP per capita and population overestimates the impact of regulation on cross-border trade in services. This is not surprising. Tougher regulation in services in a given destination country increases the cost of delivering services and/or makes it more difficult to enter the market. This would leads to higher prices, and thus lower demand. By using GDP per capita and population (or only GDP), we overestimate the market size for professional services in highly regulated markets, and the effect of regulation on cross-border trade appears much stronger than it really is.

Table (7) decomposes the NMR_{OBS} indicator into its entry and its conduct of operations components. As already mentioned, the former is related to regulations affecting the entry of firms into the market, while the latter captures regulations that affect the day-to-day conduct of operations. We re-estimate our first table using these two components instead of the aggregate NMR_{OBS}. Interesting results appear in Columns (1) and (2). The Entry_{NMR} regulations are not statistically correlated with lower probability of entering the market, while the Conduct_{NMR} is. The overall effect found when using the NMR_{OBS} comes from this later variable. On the other hand, export values are positively associated with the Entry_{NMR} variable and negatively with the Conduct_{NMR} regulations. This tends to point in the direction of entry regulations acting as a fixed cost (by leading to a self-selection by firms and increasing individual exports, although the variable is not significant on the export probability equation), and day-to-day regulations act more as an additional variable cost. The results remain unchanged if we control for firms exporting goods to the very same market. Furthermore, the interaction term is positive and significant, except in the case of the entry regulations.

Table 6: Robustness Checks I: $FDI_{Restriction}$ Index, GDP per Capita and Population

	$P_r > 0$	x_{do}	$P_r > 0$	x_{do}
	(1)	(2)	(3)	(4)
Local demand	0.936^a	2.101^a		
	(0.020)	(0.052)		
GDP per Capita			0.531^a	0.777^a
			(0.063)	(0.145)
Population			1.210^a	2.819^a
			(0.025)	(0.066)
Distance	-0.886^a	-1.851^a	-0.988^a	-2.080^a
	(0.023)	(0.054)	(0.024)	(0.057)
Border	1.047^a	2.596^a	1.030^a	2.576^a
	(0.106)	(0.302)	(0.105)	(0.303)
Common Language	0.719^a	1.677^a	0.931^a	2.239^a
	(0.046)	(0.108)	(0.051)	(0.118)
$ICRG_{Pol}$	0.126	-1.055	2.724^b	7.165^a
	(0.326)	(0.784)	(0.368)	(0.872)
Real Market Potential	-0.076^a	-0.271^a	-0.025	-0.008
	(0.023)	(0.052)	(0.022)	(0.051)
NMR_{OBS}	-0.271^a	-0.674^a	-0.613^a	-1.664^a
	(0.045)	(0.092)	(0.037)	(0.097)
Export of Goods	2.065^a	5.023^a	2.080^a	5.051^a
	(0.172)	(0.382)	(0.172)	(0.384)
NMR_{OBS}×Export of Goods	0.380^b	0.492	0.337^c	0.427
	(0.181)	(0.375)	(0.181)	(0.374)
$FDI_{Restriction}$ Index	-0.068^a	-0.316^a		
	(0.025)	(0.060)		
Observations	70,276	70,276	70,276	70,276
Pseudo R^2	0.28	0.20	0.28	0.20

Significance levels: ^{c} $p < 0.1$, ^{b} $p < 0.05$, ^{a} $p < 0.01$. Columns (1) and (3) report export probability estimates, using a Conditional Logit. Columns (2) and (4) report individual export estimates, using a Generalized Tobit. Year×firm×service fixed effects are included in each regression. Standard errors are clustered at the fixed effect level. $ICRG_{Pol}$ measures the political risk in the destination country. Real Market Potential is taken from Mayer (2008). NMR_{OBS} measures the level of regulation in Other Business Services in the destination country. The $FDI_{Restriction}$ index is taken from the OECD regulation database, and measures the level of restriction on Foreign Direct Investment in the destination country. All variables are in logs. Estimates are conducted on 3,018 firms.

Table 7: Robustness Checks II: Decomposing the NMR_{OBS} Index.

	$P_r > 0$	x_{do}	$P_r > 0$	x_{do}
	(1)	(2)	(3)	(4)
Local demand	0.937^a	2.147^a	0.906^a	2.009^a
	(0.019)	(0.049)	(0.019)	(0.049)
Distance	-0.937^a	-2.212^a	-0.951^a	-2.066^a
	(0.025)	(0.059)	(0.025)	(0.060)
Border	1.085^a	2.735^a	1.061^a	2.608^a
	(0.104)	(0.303)	(0.105)	(0.300)
Common Language	0.918^a	2.298^a	0.833^a	2.038^a
	(0.049)	(0.117)	(0.051)	(0.116)
ICRG_{Pol}	-0.517^c	-2.188^a	0.610^b	-2.267^a
	(0.290)	(0.706)	(0.295)	(0.696)
Real Market Potential	-0.062^a	-0.215^a	-0.055^a	-0.196^a
	(0.023)	(0.053)	(0.023)	(0.052)
Entry_{NMR}	0.069	0.408^a	-0.064	0.375^a
	(0.045)	(0.109)	(0.046)	(0.110)
Conduct_{NMR}	-0.247^a	-0.850^a	-0.246^a	-0.817^a
	(0.022)	(0.059)	(0.023)	(0.060)
Export of Goods			1.993^a	4.829^a
			(0.187)	(0.422)
$\text{Entry}_{NMR}\times$Export of Goods			0.340^b	0.451
			(0.148)	(0.309)
$\text{Conduct}_{NMR}\times$Export of Goods			0.162^c	0.392^b
			(0.087)	(0.183)
Observations	70,276	70,276	70,276	70,276
Pseudo R^2	0.26	0.19	0.28	0.20

Significance levels: ^{c} $p < 0.1$, ^{b} $p < 0.05$, ^{a} $p < 0.01$. Columns (1) and (3) report export probability estimates, using a Conditional Logit. Columns (2) and (4) report individual export estimates, using a Generalized Tobit. Year×firm×service fixed effects are included in each regression. Standard errors are clustered at the fixed effect level. ICRG_{Pol} measures the political risk in the destination country. Real Market Potential is taken from Mayer (2008). Entry_{NMR} measures regulations affecting the entry into the destination market. Conduct_{NMR} measures regulations affecting the conduct of operations in the destination market. All Variables are in logs. Estimates are conducted on 3,018 firms.

7 Regulations as Fixed Costs?

The previous section has shown that domestic market regulations in business services are discriminating *de facto* against foreign producers and impede the international trade in services. But the regressions presented until now do not allow us to fully identify the nature of the costs induced by regulations. The aim of this last section is to investigate further the idea that regulations measured by the OECD (NMR_{OBS}) and the APC (TRI) act essentially on the variable costs of delivering a service rather than on the fixed entry cost.

Figures (5) and (6) give a first insight into this question. If regulations significantly influence the entry cost, the minimum export sales needed for a firm to penetrate a market should be large, for highly regulated countries. This is, however, not what Figures (5) and (6) show. A more formal econometric analysis, estimating directly the relationship between regulations and the entry fixed cost on each market, will confirm this absence of relationship between market regulations and the export entry costs .

As previously emphasized, the minimum export value observed in each country in our data should be a good proxy for the entry cost faced by a French firm in a specific market. In Table (8), we regress the log of the proxy for the entry cost on the log of our measures of regulations. The regressions displayed in the bottom panel of Table (8) also control for the log of local demand and distance.[22] Note that in this exercise, regressions are no longer at the firm level, since we consider only one export value per country and year. We are left with 37 observations when using the NMR_{OBS} indicator, and only 18 when using the TRI_{Local}. To assess the robustness of our results, we use three alternative proxies for the entry threshold. Each line corresponds to a different definition for the proxy of the entry cost.

The first line (Min 1) takes the minimum export value observed for each destination in the whole sample of export flows. The second and third lines (Min 2 and Min 3) take the average of the two smallest export flows as dependent variable. Taking the average of the two smallest observations alleviates the impact of possible misreporting trade flows or exceptionally low values of exports by some firms. In the second Line (Min 2), we restrict our sample for firms exporting only services. We saw in the previous section that firms exporting goods can be less sensitive to regulations than firms that do not. Therefore, a small export value can be driven by the fact that the firm is also exporting goods to the same market. In the third line (Min 3), we try to further limit a possible bias due to the presence of multinational firms or firms that export to so many countries that they enjoy the benefits of economies of scope in complying with market regulations. To do so, we focus on small firms only, restricting the sample to firms exporting on aggregate less than the median firm. In other words, we retain here the average of the two smallest export flows, observed in the sample of exports by relatively small firms that do not export goods.

The NMR_{OBS}, Entry_{NMR} and Conduct_{NMR} indicators , along with the TRI_{Local} do not affect the minimum export value. The relationship between $\text{TRI}_{Foreign}$ and the entry cost appears to be significant however, in the last two specifications. An increase in the regulations targeting only foreign firms seems to increase the minimum amount exported by a firm, while local regulations do not affect it (whether we use the NMR_{OBS} or the TRI_{Local}). Overall,

[22] The coefficients on these variables are not reported in Table (8), but they are available upon request. In all regressions, market size reduces the minimum export value, while distance increases it, as expected.

the weakness of estimated relationship between our measure of fixed cost and the different indexes of domestic regulations, suggests that these regulations act much more as a variable cost than a fixed entry cost.

Table 8: The Impact of Regulation on the Minimum Export Value

	NMR_{OBS}	$Entry_{NMR}/Conduct_{NMR}$	$TRI_{Local}/TRI_{Foreign}$
	(1)	(2)	(3)
		Panel 1: No Controls	
Min 1	0.106	0.660^b / -0.411^b	-0.855^b / 0.739^b
	(0.298)	(0.303) / (0.185)	(0.362) / (0.252)
Min 2	0.145	0.316 / -0.105	-0.944^b / 1.124^a
	(0.310)	(0.350) / (0.215)	(0.406) / (0.287)
Min 3	0.141	0.008 / 0.106	-0.741 / 0.913^b
	(0.235)	(0.262) / (0.166)	(0.417) / (0.306)
Year f.e.	yes	yes	no
Controls	none	none	none
		Panel 2: Controlled for local demand and distance	
Min 1	0.119	0.824^b / -0.505^b	-0.445 / 0.463
	(0.303)	(0.364) / (0.225)	(0.457) / (0.310)
Min 2	0.230	0.063 / 0.095	-0.405 / 0.787^b
	(0.250)	(0.333) / (0.206)	(0.460) / (0.313)
Min 3	0.224	-0.008 / 0.144	-0.246 / 0.648^b
	(0.226)	(0.292) / (0.176)	(0.441) / (0.306)
Year f.e.	yes	yes	no

Significance levels: ^{c} $p < 0.1$, ^{b} $p < 0.05$, ^{a} $p < 0.01$. Min 1 is the minimum of the whole sample. Min 2 and Min 3 are the average of the two lowest values. For Min 2, we restricted the sample to firms exporting services only. For Min 3, we further restricted the sample to firms exporting less than the median firm.

8 Conclusion

Trade in services is growing but remains a small fraction of World Trade. We investigate the role played by domestic regulations in explaining the lack of services trade. We study the relationship between domestic regulations and cross-border trade in professional services, using a unique data set of French, firm-level data. We find that regulations affect both the export probability and the individual exports of a firm. Moreover, we find that domestic measures of regulation, which do not aim *a priori* at limiting international trade, are *de facto* discriminatory against foreign suppliers and have an impact which is comparable to the one of a tariff.

This findings provide an original view of the multilateral trade negotiations taking place at the moment, within the World Trade Organization. While access to foreign markets surely needs to be improved, our results suggest that another important determinant of the pattern of trade in services lies in domestic regulation. These regulations apply to every supplier, regardless of nationality, but we have shown that they affect more foreign firms than domestic ones. Thus, they might, just like an explicit trade barrier, distorts the incentives of both producers and consumers and reduce the national welfare. Actually, our empirical results based on the Australian Trade Restriction Index suggest that domestic regulations impede even more international trade than existing discriminatory measures. Our study supports the view of paying more attention to Article VI of GATS, related to domestic regulations, as far as the promotion of world trade in services is concerned.

9 References

Arnold J., G. Nicoletti and S. Scarpetta (2008), "Regulation, allocative efficiency and productivity in OECD countries: industry and firm-level evidence", *OECD working paper* N. 616.

Bhagwati J., A. Panagariya and T.N. Srinivasan (2004): "The Muddles over Outsourcing", *Journal of Economic Perpectives*, vol. 18(4), pages 93-114.

Blanchard O. and F. Giavazzi (2003), "Macroeconomic Effects of Regulation and Deregulation in Goods and Labor Market" *The Quarterly Journal of Economics*, vol. 118(3), pages 879-907.

Borchert, I., B. Gootiiz and A. Mattoo (2010), "Restrictions on Services Trade and FDI in Developing Countries", *World Bank, mimeo.*

Breinlich H. and C. Criscuolo (2011), "International Trade in Services: A Portrait of Importers and Exporters", *Journal of International Economics*, 84(2), pages 188-206 .

Conti G., A. Lo Turco and D. Maggioni (2010), "'Exporters in Services: new Evidence from Italian Firms"', *Applied Economics Quarterly*, vol. 56(1), pages 73-98.

Conway P. and G. Nicoletti (2006), "Product market regulation in the non-manufacturing sectors of OECD countries: measurement and highlights", *OECD Working Paper* N. 530.

Crozet M., K. Head and T. Mayer (2011), "Quality Sorting and Trade: Firm-level Evidence for French Wine", *Review of Economic Studies*,Forthcoming.

Deardorf A. V. and R. M. Stern (2008), "Empirical Analysis of Barriers to International Services Transactions and the Consequences of Liberalization"', *University of Michigan Working Papers* N. 505.

Disdier A.-C. and K. Head (2008), "The Puzzling Persistence of the Distance Effect on Bilateral Trade", *The Review of Economics and Statistics*, vol. 90(1), pages 37-48.

Eaton J., S. Kortum and F. Kramarz (2004), "'Dissecting Trade: Firms, Industries, and Export Destinations"', *American Economic Review Papers and Proceeding*, vol. 94(2), pages 150-154.

Fillat-Castejon C., J. Francois and J. Woerz (2008), "Trade trough FDI: Investing in Services", *IIDE Discussion Papers N. 2008-0502*

Findlay C. and F. Warren (2000), *Impediments to Trade in Services: Measurement and Policy Implications*, Routledge: London.

Francois J. and B. Hoekman (2010), "Services Trade and Policy, *Journal of Economic literature*, vol. 48(3), pages 642-92.

Glaeser E.L., R. La Porta and F. Lopez-de-Silanes (2004), "Do Institutions Cause Growth?", *Journal of Economic Growth*, vol 9(3), pages 271-303.

Hoekman B. and A. Mattoo (2011), "Services trade liberalization and regulatory reform: re-invigorating international cooperation", *The World Bank Policy Research Working Paper Series* N. 5517.

Head K. and T. Mayer (2004), "Market Potential and the Location of Japanese Investment in the European Union", *Review of Economics and Statistics* 86(4), pages 959-972.

Head K., T. Mayer and J. Ries (2009), "How Remote is the Offshoring Threat?", *European Economic Review*, vol. 53(4), pages 429-444.

Jean S. and G. Nicoletti (2004), "Regulation and Wage Premia", *CEPII Working Paper* N 2004-12.

Kelle M. and J. Kleinert (2010), "German Firms in Service Trade", *Applied Economics Quarterly*, vol. 56(1), pages 51-72.

Kimura F. and H-H. Lee (2006), "The Gravity Equation in International Trade in Services", *Review of World Economics*, vol. 142(1), pages 92-112.

Kox H. and A. Lejour (2005), "Regulatory Heterogeneity as Obstacle for International Services Trade", *CPB Discussion Paper* N. 49.

Kox H. and H. K. Nordas (2007), "Services Trade and Domestic Regulation", *OECD Trade Policy Working Papers* N. 49.

Lennon C., D. Mirza and G. Nicoletti (2009), "Complementarity of Inputs in Services Trade", *Annales d'Economie et de Statistiques*, N. 93-94.

Levchenko, A.A. (2007), "Institutional Quality and International Trade", *The Review of Economics and Statistics*, vol. 74(3), pages 791-819.

Mayer T. (2009), "Market Potential and Development", *CEPII Working Paper* N. 2009-24.

Mayer T. and G. Ottaviano (2008), "The Happy Few: The Internationalisation of European Firms", *Review of European Economic Policy*, vol. 43(3), pages 135-148.

McGuire G. (1998), "Australia's Restrictions on Trade in Financial Services", *Productivity Commission Staff Research Paper*, November.

Nguyen-Hong D. (2000), "Restrictions on Trade in Professional Services", *Productivity Commission Staff Research Paper*, August.

Nicoletti G. and S. Scarpetta (2003), "Regulation, Productivity and Growth: OECD Evidence", *Economic Policy*, vol. 18(36), pages 9-72.

Schwellnus C. (2007), "The Effect of Domestic Regulation on Service Trade Revisited", C*EPII Working Paper* N. 2007-08.

Walsh K. (2006), "Trade in Services: Does Gravity Hold? A Gravity Model Approach to Estimating Barriers to Trade in Services", *The Institute for International Integration Studies Discussion Paper Series* N. 183.

Warren F. (1999), "A Quantity-Impact measure to impediments to trade in telecommunications services", paper presented to the Impediments to Trade in Services: Telecommunication seminar, Canberra, March.

Wolfl A., I. Wanner, T. Kozluk and G. Nicoletti (2009), "Ten Years of Product Market Reform in OECD Countries: Insights from a Revised PMR Indicator", *OECD Economics Department Working Papers* N. 695.

10 Appendix

We are interesting in how regulations affect small and big firms. To do so, we look at the distribution of firm-level exports and affect each firm to its decile of the distribution. On the first decile we find the 10% of firms that export the less, and on the top decile, the 10% biggest firms in terms of export sales.

We then interact these deciles with our measures of regulation (NMR_{OBS}, $TRI_{domestic}$[23]) and replace them in the export equation (columns 2 and 4 in tables 4 and 5). Specifically, we replace NMR_{OBS} (resp. $TRI_{domestic}$) by $NMR_{OBS} * d_i$ (resp. $TRI_{domestic} * d_i$), i $\in [1, 10]$. These interaction terms take the value NMR_{OBS} (resp. $TRI_{domestic}$) if the firm is in the i^{th} decile, and 0 otherwise.

This way, we are able to capture any non-linearity in the coefficient of regulations. We can isolate the effect regulations have on small, medium and large firms. This exercice will help us disentangle the heterogeneous effect of regulations. To complete the exercice, we test if the estimated coefficients (the $NMR_{OBS} * d_i$ and $TRI_{domestic} * d_i$) are statistically different one from the other, i.e. we test if firms are affected the same by regulation depending on their relative position in the distribution.

Figures 7 and 8 show graphically the estimated coefficients[24]. For each figure, we plot a 95% confidence interval around the estimated coefficient. The first decile of the distribution (the smallest firms in terms of total exports) is taken as reference.

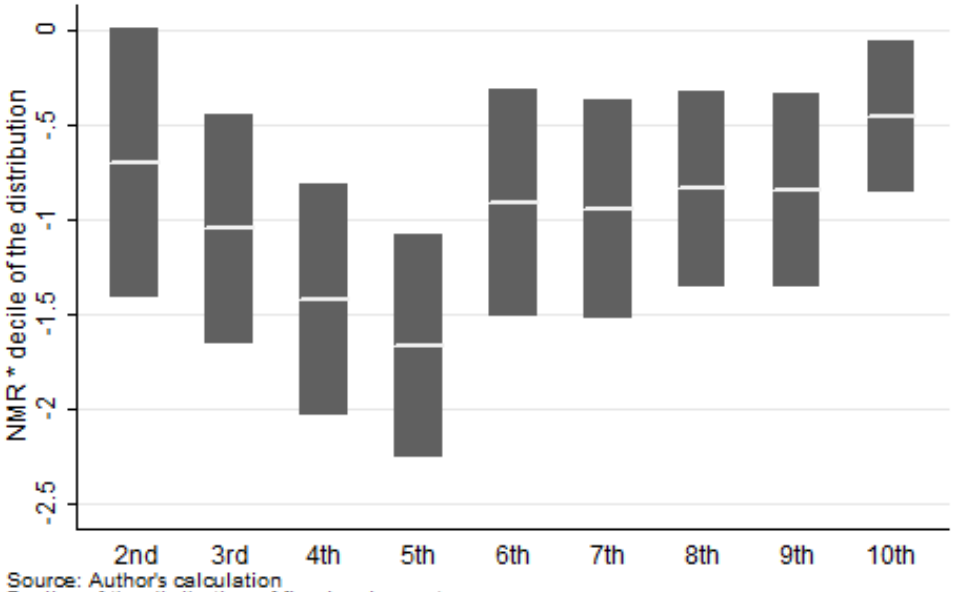
Figure 7 tell us that firms in the first half of the distribution seem to be the most affected by regulations. Firms that export more than the median firm (after the 5^{th} decile) seem to be affected in exactly the same fashion. To make sure these are sound results, we test if the estimated coefficients are statistically different. Our null hypothesis here is that they are not, so that the difference is not statistically different from zero. Table 9 displays the P_{value} associated with the test. In almost all cases we strongly accept the null hypothesis: coefficients are not statistically different from each other. In economic terms, this means that firms are affected the same by regulations, no matter their position in the distribution.

Figure 8 and table 10 tell a similar story. Firms in the upper-half of the distribution seem to be less affected than smaller firms. Again, a close look at table 10 reveals that these differences are not statistically significant.

[23] We also interacted with the TRI-foreign variable, and none of the estimated coefficient was statistically different from zero. These results, not shown here, are available upon request

[24] We do not report the other coefficients such as absorption, distance etc... as they are precisely estimated and do not present any direct interest for this exercice. They are available upon request.

Figure 7: NMR_{OBS}: The heterogeneous impact of regulation on small versus large firms



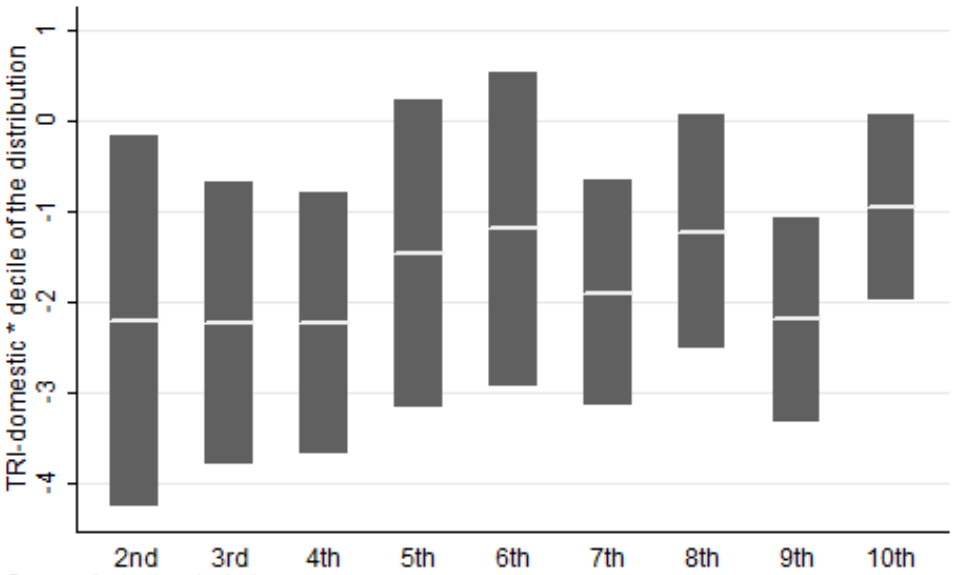
Source: Author's calculation
Deciles of the disribution of firm-level exports.
Sample restricted to firms exporting services only
Firms in the 2nd decile have low level of exports.
Firms in the 10th decile are the biggest firms in terms of total exports.

Table 9: H0: $NMR_{OBS} * d_i = NMR_{OBS} * d_j$, P-value displayed

	NMR_{d20}	NMR_{d30}	NMR_{d40}	NMR_{d50}	NMR_{d60}	NMR_{d70}	NMR_{d80}	NMR_{d90}	NMR_{d100}
NMR_{d20}	1.000								
NMR_{d30}	0.460	1.000							
NMR_{d40}	0.123	0.384	1.000						
NMR_{d50}	**0.036**	0.138	0.552	1.000					
NMR_{d60}	0.657	0.745	0.231	**0.069**	1.000				
NMR_{d70}	0.595	0.801	0.254	**0.075**	0.931	1.000			
NMR_{d80}	0.761	0.591	0.140	**0.031**	0.852	0.775	1.000		
NMR_{d90}	0.749	0.604	0.007	**0.033**	0.867	0.789	0.984	1.000	
NMR_{d100}	0.537	0.097	0.036	**0.000**	0.201	0.153	0.232	0.222	1.000

Note that $NMR_{di} = NMR_{OBS} * d_i$. P_{values} for the test: $NMR_{OBS} * d_i = NMR_{OBS} * d_j$. Deciles come from the distribution of firm-level exports. A firm in the first decile is among the 10% firms exporting the least in a given year. We restricted the sample to firms exporting only services. Estimation is carried using a censored regression over 3010 firms.

Figure 8: $TRI_{domestic}$: The heterogeneous impact of regulation on small versus large firms



Source: Author's calculation
Deciles of the disribution of firm-level exports.
Sample restricted to firms exporting services only
Firms in the 2nd decile have low level of exports.
Firms in the 10th decile are the biggest firms in terms of total exports.

Table 10: H0: $TRI_{dom} * d_i = TRI_{dom} * d_j$, P-value displayed

	TRI_{d20}	TRI_{d30}	TRI_{d40}	TRI_{d50}	TRI_{d60}	TRI_{d70}	TRI_{d80}	TRI_{d90}	TRI_{d100}
TRI_{d20}	1.000								
TRI_{d30}	0.980	1.000							
TRI_{d40}	0.978	0.999	1.000						
TRI_{d50}	0.577	0.497	0.482	1.000					
TRI_{d60}	0.454	0.368	0.352	0.826	1.000				
TRI_{d70}	0.800	0.733	0.720	0.673	0.506	1.000			
TRI_{d80}	0.419	0.310	0.288	0.823	0.978	0.443	1.000		
TRI_{d90}	0.996	0.968	0.965	0.467	0.331	0.719	0.246	1.000	
TRI_{d100}	0.273	0.161	0.138	0.604	0.809	0.224	0.733	0.996	1.000

Note that $TRI_{di} = TRI_{domestic} * d_i$. P_{values} for the test: $TRI_{domestic} * d_i = TRI_{domestic} * d_j$. Deciles come from the distribution of firm-level exports. A firm in the first decile is among the 10% firms exporting the least in 1999. We restricted the sample to firms exporting only services. Estimation is carried using a censored regression over 1365 firms.