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Are trade costs higher for services than for manufactures? Evidence from firm-level data

Minondo, Asier

Deusto Business School, University of Deusto

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Asier Minondo

Deusto Business School, University of Deusto

Camino de Mundaiz 50, 20012 San Sebastian, Spain. Tel:+34 943326600;

E-mail: aminondo@deusto.es

Abstract

Using a unique database, we estimate the costs of trading with European Union countries, relative to the costs of trading with the domestic market, for services and manufacturing firms located in the Basque Country region of Spain. We find that, despite the dramatic improvement in information and communication technologies, international trade costs for services are still much larger than for manufactures. Based on standard elasticities of substitution used in the literature, our results suggest that the tariff equivalent of international trade costs is between 50% and 60% larger for services than for manufactures.

1. Introduction

Services constitute the most important economic activity in the world. According to the Word Bank data, services accounted for 71 per cent of overall GDP in 2010. However, the share of services in world exports, around 25%, is much lower than its share in world GDP.[1] In contrast to manufacturing, where goods move, in a large range of services the supplier or the customer has to move. This proximity burden explains why services are less traded than manufactures (Francois and Hoekman, 2010).

However, during the last decades, the reduction in communication costs, and in particular the spread of the Internet, have increased the opportunities to exchange services across countries with almost no costs. In addition to that, trade liberalization and reductions in the cost of travelling have lowered the costs of supplying services overseas. As Jensen (2011) explains, these processes have led to a perception that services are becoming as internationally tradable as merchandises. The goal of this paper is to analyze the validity of this perception, comparing the costs that services and manufacturing firms face when trading with foreign markets, relative to domestic markets.

Due to the inaccuracy and incompleteness of many direct costs measures for manufactures and, particularly, for services, we use a quantitative analysis to estimate relative trade costs in these sectors (Anderson and van Wincoop, 2004). To do so, we derive an econometric equation from a theoretical model with heterogeneous firms, where exports are function of firms' productivity and trade costs. I estimate this equation using a unique database of services and manufacturing

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[1] www.wto.org/statistics.

firms operating in the Basque Country, a region located in the North of Spain. The use of firm-level data is particularly convenient for this analysis, because aggregated data might bias trade costs estimates (Helpman et al., 2008). To my knowledge, this is the first time that services and manufacturing firms' data are combined to estimate, and compare, international trade costs relative to domestic trade costs in these sectors.

Our estimates show that, despite the spread of information and communication technologies, the cost of trading in international markets, relative to the domestic market, is still much larger in services than in manufactures. According to our results, and based on standard elasticities of substitution used by the literature, the tariff equivalent of international trade costs is between 50% and 60% larger in services than in manufactures.

The rest of the paper is organized as follows. The next section presents the characteristics of the firm-level database. Section 3 explains how the econometric equation is derived. Section 4 comments the results of the econometric analyses, and section 5 concludes.

2. Database

Our database covers firms operating in services and manufactures in the Basque Country, a region located in the North of Spain. The firm-level database is built from different surveys carried out by the Basque Statistical Institute (Eustat). In services, Eustat surveys firms operating in accommodation and restaurants, business services and personal services. The database does not include firms operating in transport and

storage, financial activities, education, health, and public administration activities.[2] In contrast to services, except for oil refineries, the Eustat database covers all manufacturing activities. Surveys on firms operating in services are carried out every five years, and our database has information for services and manufacturing firms for the years 2004 and 2009. The database includes 4574 firms in services and 4435 firms in manufactures. These firms cover 40% of services employees and 35% of exports, and 64% of manufacturing employees and 80% of exports.

The database provides different firm-level variables, such as employment, wages, and investment. Along with these variables, the survey asks firms to report the amount of sales for two different destinations: sales to the rest of Spain (not including the Basque Country) and sales to the European Union. We use this information to identify exporters and non-exporters.

3. The empirical model

The econometric equation is derived from a theoretical model with heterogeneous firms and fixed trade costs (Melitz, 2003). The main characteristics of this model are that firms differ in terms of productivity, and have to incur in additional variable and fixed costs if they want to export. Due to these additional trade costs, only those firms with a sufficiently high productivity will obtain profits in foreign markets.

In this model, once firms become exporters, the amount of sales abroad does not depend on the fixed costs of exporting. Analytically, the firm-level intensive margin of exports is determined by (Lawless, 2010):

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[2] Affiliates of Basque companies based in foreign countries are not included either.

$$x_{ijt} = \left(\frac{\in - 1}{\in} \frac{P_{jt} a_{it}}{\phi_j c_t} \right)^{\epsilon - 1} Y_{jt} \qquad (1)$$

where x_{ijt} are exports of firm i to country j at time t, $\in$ is the elasticity of substitution across products and services, which is assumed to be the same in all countries, P_{jt} is a price index in country j, a_{it} is firm i's productivity index, c is the cost of labor in the country where firm i is located, and Y_j is demand in country j. ϕ_j denotes the variable costs of trading between the country in which firm i is located and country j. This variable captures different costs that a firm faces every time it supplies a service or sells a product abroad, such as transport and communication costs, tariffs and non-tariff barriers, financial and legal costs.

To derive the econometric equation, we take logs of equation (1),

$$ln x_{ijt} = \alpha + \beta_t + \beta_{jt} + \beta_{it} ln(a_{it}) + (1 - \epsilon)\phi_j + e_{ijt} \quad (2)$$

where $\alpha = (\epsilon - 1)ln\left(\frac{\epsilon-1}{\epsilon}\right)$, $\beta_t = (\epsilon - 1)ln(c_t)$, $\beta_{jt} = (\epsilon - 1)ln(P_{jt}) + ln(Y_{jt})$, and e_{ijt} is the error term. The first right-hand side variable of equation (2) is captured by the constant term of the regression equation, and the second right-hand side variable by a time dummy. As we do not have data on the price index in country j at time t, we capture this variable with a time-specific destination fixed effect. This fixed effect precludes the introduction of other variables that are destination and time specific, such as the level of demand Y_{jt}. Hence, the fixed effect captures all the effects that destination j has on firm i sales at time t.

International trade costs are estimated with a dummy variable, EU, that takes the value of one when a Basque Country firm exports to the European Union, and zero when it sells to the rest of Spain. The coefficient of the dummy variable captures the

additional trade costs (transport, communication, financial and others) that Basque firms face when selling their products or services to European Union countries, relative to the rest of Spain. Our database does not distinguish which European Union country Basque Country's firms export to. This limitation precludes the independent estimation of observable trade costs components' effect, such as distance, on the amount of firms' sales.

4. Results from the econometric analyses

To estimate correctly the additional variable trade costs that selling abroad imposes on firms, equation (2) should be estimated with a sample of firms that sell both in the rest of Spain and in the European Union. If we mixed exporting and non-exporting firms, the trade cost coefficient would capture the effect of trade barriers both on the intensive and the extensive margins of trade. The removal of non-exporters reduces the amount of firms in the sample from 4574 to 372 in services, and from 4435 to 2115 in manufactures.

Table 1 presents the results of estimating equation (2). First, we estimate the equation for firms operating in services (Column 1), and then for firms operating in manufactures (Column 2). Firms' total factor productivity is estimated following the Levinsohn and Petrin (2003) procedure.[3] As expected, the productivity coefficient is positive and statistically significant both for services and manufacturing firms. For services, we can see that the additional costs that firms face when offering their services in the European Union have a severe negative impact on exports. In

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[3] We also estimated the model with a total factor productivity measure computed with an OLS technique, and with labor productivity. Results do not change.

particular, a Basque Country's exporter of services sells six times more in the domestic market than in the European Union (exp 1.71). For manufacturing (Column 2), we also find that firms face additional costs when selling to the European Union. However, those costs have a lower impact on exports: the ratio of domestic sales to European Union sales drops to three. These results are in line with previous studies that use aggregated data to compare the ratio of international to domestic sales in services and manufactures (Anderson et al., 2011).

Table 1. Results of the econometric analyses

	1	2	3	4
Industry	Services	Manufactures	Services	Manufactures
Productivity	0.68 (0.12)*	1.08 (0.08)*		
EU	-1.71 (0.16)*	-1.16 (0.08)*	-1.71 (0.19)*	-1.16 (0.10)*
Adj. R-square	0.27	0.18	0.40	0.28
Observations	744	4230	744	4230
Firm+time fixed effects	No	No	Yes	Yes

Note: All regressions include time+destination and time dummies. Robust standard errors in parentheses. * statistically significant at 1%.

If we assume an elasticity of substitution between 6 and 10, as standard in the literature (Anderson et al., 2011), the tariff equivalent of variable international trade costs, relative to domestic trade costs, would lie between 41% and 21% for services; in the case of manufactures, the tariff equivalent would lie between 26% and 14%. That is, the tariff equivalent of international trade costs is between 50% and 60% higher for services than for manufactures.

To control for other variables that might influence the amount of firm' sales both in the domestic and the European Union market, in Columns 3 and 4, we estimate the equation with time specific firm fixed effects. The introduction of these fixed effects precludes the estimation of other variables, such as productivity, that are firm and time specific. As shown in the table, results are not altered.

5. Conclusions

This paper estimates whether the costs of trading internationally are larger for service exporters than for manufacturing exporters. To do so, we derive an econometric equation from a theoretical model with heterogeneous firms, where exports are function of firms' productivity-level and trade costs. We estimate this equation using a unique firm level data on services and manufacturing firms operating in the Spanish region of Basque Country. We find that the home-bias of Basque Country firms is much larger for services than for manufactures. Based on standard elasticities of substitution used by the literature, we conclude that the tariff equivalent of international trade costs is between 50% and 60% higher for services than for manufactures. This result points out that despite the dramatic improvements

in information and communication technologies, and the spread of the Internet, it is still more costly to trade in services than in manufactures.

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