Do sunk exporting costs differ among markets? Evidence from Spanish manufacturing firms ☆

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ABSTRACT

We test whether sunk exporting costs differ among markets. Our results confirm that during 1990–2002, sunk exporting costs were relevant for Spanish firms, and differed depending on the destination market. Besides, the costs to enter/re-enter were higher in developed markets.

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1. Introduction

Firms that enter an international market have to adapt their products to foreign demand, technical and administrative standards and find distribution networks. Imperfect information and informal or formal barriers that separate domestic and foreign markets are supposed to explain the existence of sunk exporting costs. Literature on border effect and gravity equation gives an idea of the importance of these hidden barriers, often seen as the best candidates to explain the "mystery of the missing trade"[1] (Trefler, 1995).

Our contribution is twofold: first, we test whether sunk costs differ from one market to another. Secondly, we test whether the experience in one market has the same influence as the experience in other markets on the probability to export. We use a panel data probit model to study the export behaviour of a sample of Spanish manufacturing firms continuously operating from 1990 to 2002.

The existence of sunk costs may explain the fact that exporters are generally more productive than non-exporters. Melitz (2003) provides a theoretical justification for this self-selection effect. Roberts and Tybout (1997) derive an empirical model, using data from Colombia, and find evidence in favour of the *hypothesis of sunk exporting costs*: a firm incurs in a cost for entering (re-entering) a market, then it exports only if the expected gross profit is positive and its current export status depends on its past experience. Bernard and Jensen (2004) obtain similar conclusions with a panel of manufacturing companies from the United States for the period 1984–1992. Campa (2004) uses a sample of Spanish manufacturing firms and finds sunk costs hysteresis to be an important determinant of export market participation.

Máñez et al. (2008) find that sunk costs, labour productivity, size of the firms, R&D intensity, unobserved characteristics of products and correlations in exogenous shocks influence the firms' participation in export markets. Esteve et al. (2004) find that survival rate at exporting is positively correlated with the export intensity. Furthermore, firms exporting to closest markets export during a longer period. Barrios et al. (2003) show that R&D activities exert a determinant effect on the exporting decision and on the intensity, for national and foreign firms, moreover when exporting to EU and OECD. Finally, Fariñas and Martin-Marcos (2007) show that exporters exhibit a greater economic performance and that they self-select. In particular, firms selling a higher share of their exports in OECD markets have a higher

[1] This expression describes the fact that trade is larger than predicted by demand-supply analysis. Then it is partly explained by common language, presence of bilateral agreements and cultural proximity.

Table 1
Firms characteristics by export market in 2002 (continuous sample)

	Firms (number)	Firms (%)	Exports (%)	Average R&D (% in sales)	Average advertisement (% in sales)	Average labor productivity	Average foreign capital (% in capital)	Average exports (% in sales)
No exporter	244	32.3	0.0	0.3	0.9	4.050	2.0	0.0
Exporter to:								
EU, OECD & ROW	227	30.1	62.9	1.4	2.0	7.368	33.8	45.7
EU	109	14.4	11.0	0.4	1.2	6.800	19.4	17.7
EU & ROW	93	12.3	10.9	0.6	2.0	8.198	30.8	21.2
EU & OECD	56	7.4	14.6	0.6	2.0	8.231	35.3	35.5
ROW	18	2.4	0.1	0.6	1.4	5.157	3.9	10.3
OECD	6	0.8	0.5	0.9	2.3	4.618	33.3	28.2
ROW & OECD	2	0.3	0.0	0.0	1.3	2.468	0.0	3.9
	755	100	100					

productivity than firms mainly exporting to the Rest of the World (ROW). None of these micro-level studies have tested the hypothesis of sunk costs by destination market, as we propose in this paper.

This paper is organised as follows. In Section 2, we present the empirical model. In Section 3, we describe the data set. Our findings are explained in Section 4. Section 5 concludes.

2. Empirical model

We closely follow Roberts and Tybout's (1997) approach to model a multi-period export decision for the entry and exit with sunk costs. They consider that in each period, a firm decides to export if the increment to the expected gross profits associated with exporting is positive. Following related literature, a reduced form of the dynamic model is estimated. We assume that the expected gross profits depend on exogenous firm's characteristics (X_{it}), macro conditions (μ_t) and past exports. Let us define I_{it}^k an indicator function that takes value 1 if firm i exported to k in year t. As the fixed cost is not observed, we include the lagged export status in the explanatory variables.[2] Therefore the equation for the decision to export is:

$$I_{it}^k = \begin{cases} 1 & \text{if } 0 \le \mu_t + \beta X_{it} + \sum_k \sum_{h=1}^H \gamma^h I_{it-h}^k + \varepsilon_{it}^k \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

where ε_{it}^k is an error term and k = (ALL, EU, OECD, ROW). We control for observable firm's characteristics by including: the age of the firm in logarithm; the size of the firm in logarithm terms; a dummy that takes value 1 if more than 25% of its capital is owned by foreigners; a variable to measure the firm's labour productivity in logarithm terms; a variable to measure the R&D intensity in logarithm terms; a dummy that takes value 1 if the firm receives any subvention for R&D and a set of dummies for year and sector. We use the panel probit with random effects maximum likelihood estimator to control for the other unobservable characteristics that may explain the persistence in the exporting status.

The inclusion of time-specific effects seeks to capture macro-level changes in export conditions like temporal variations in export profitability, start-up costs that are common among firms, the influence of business cycles, credit-market conditions, aggregate exchange rate movements, trade-policy conditions, overall changes in demand for Spanish exports and other time-varying factors. The industry dummies control for unobservable characteristics of industries like market concentration, technologies, entry costs, etc.

The parameter γ reflects the role of sunk costs in the decision to export. If significant, this coefficient should be interpreted as the rate of depreciation of export market experience and accumulated knowledge in foreign markets. We expect the lagged export status to affect the export decision positively.

3. Data

The Encuesta sobre Estrategias Empresariales (ESEE) is an annual representative survey of Spanish manufacturing firms classified by industrial sector[3] and size categories.[4] The ESEE includes variables relative to the structural characteristics of the company, information on the volume of exports and imports. Firms indicate the distribution of their exports among three regions: OECD countries, EU and ROW[5] each four years (1990, 1994, 1998 and 2002). Therefore, we use the four-lagged value of export status and current data of the firms for 1994, 1998 and 2002.

We select firms continuously operating during the whole period. We end up with a balanced panel of 756 firms. Note that the period is larger than in most studies on sunk costs, especially for Spain. Sample representativeness is very close to the complete sample from the ESEE. This is true especially for relevant variables like the probability of being an exporter/non-exporter and the share of exporting firms in total sales.

Table 1 presents some firms' relevant characteristics by export market. The main destination of Spanish exports is the EU (15). This pattern is more striking for the export value than for the number of exporting firms. The share of exports, advertisement, R&D on sales and the presence of foreign capital are larger for those firms that export to the EU non exclusively and to the OECD. Firms that export to the EU have a larger labour productivity than other exporters and than non-exporters.

4. Econometric results

We estimate the model considering the export to four sets of countries: ALL, EU, ROW, and OECD. We study the impact of the past experience in each of these markets on the current status.[6] Results are reported in Table 2. Dummies for years and industries are included in the estimations, but coefficients are not displayed due to space limitation. They are generally significant.

Considering the firms' characteristics, we find that the largest firms display higher probability of exporting. This result is consistent with the hypothesis of increasing returns and with other empirical studies. The firms' age does not appear significant. Technological framework and innovation process are also important features for exports in general and exports to ROW, since the intensity in R&D expenditure

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[2] We follow Roberts and Tybout (1997) and Bernard and Jensen (2004).

[3] NACE-93 classification.

[4] Participation rate to the survey is about 70% for firms with more than 200 employees. Firms that employed between 10 to 200 persons were randomly sampled by industry and size strata holding around a 5% of the population.

[5] Since 2000, the disaggregation includes Latin America and Asia. We cannot take it into account here because the period is very short.

[6] Due to the availability of data, we are able to study how (and not how long) the experience in each market affects the current export status since we cannot include more recent lagged values.

Table 2
Probability of exporting

	Exporting to ALL		Exporting to EU		Exporting to OECD		Exporting to ROW	
1 if exported to EU	1.316***	[0.135]	1.454***	[0.125]	0.875***	[0.140]	−0.000	[0.148]
1 if exported to OECD	0.671***	[0.175]	0.678***	[0.145]	1.291***	[0.085]	0.362***	[0.091]
1 if exported to ROW	0.630***	[0.149]	0.354***	[0.126]	0.484***	[0.088]	1.122***	[0.089]
Log of age	0.060	[0.079]	0.033	[0.074]	0.003	[0.060]	−0.018	[0.064]
Log of size	0.220***	[0.058]	0.252***	[0.053]	0.129***	[0.040]	0.038	[0.043]
1 if foreign capital > 25%	0.355*	[0.195]	0.252	[0.163]	0.040	[0.099]	−0.191*	[0.102]
Log of labor productivity	0.212*	[0.110]	0.220**	[0.101]	0.002	[0.084]	0.068	[0.088]
Log of R&D intensity	0.040**	[0.016]	0.006	[0.014]	0.009	[0.010]	0.026**	[0.010]
1 if any subvention for R&D	−0.429*	[0.229]	−0.097	[0.199]	0.128	[0.126]	0.040	[0.133]
Constant	−2.635***	[0.964]	−3.196***	[0.878]	−2.040***	[0.738]	−1.040	[0.755]
# Observations	1620		1620		1619		1288	
# Firms	738		738		738		508	

Standard deviation in brackets * significant at 10%, ** at 5% and *** at 1%.

does have a significant and positive effect in these cases while R&D subvention does not.

More striking results are found concerning productivity and ownership. The productivity has a positive and significant effect in general and for the EU. These results are the expected from the Melitz model and confirm a presence of self-selection effect, especially in the EU market. Foreign participation has a negative effect on export to ROW, which can be due to the fact that foreign firms invest in Spain in order to export to developed markets.[7]

Regardless of the destination, we find that there is a significant difference between the re-entry cost of a firm that has exported previously and a firm that never exported, since the experience in each of the three markets has a positive effect. Besides, a previous experience in the EU market has a greater impact on the current export status.

Focusing on the probability to export to the EU, ROW or OECD, sunk costs clearly differ among markets, since the experience as an exporter to the ROW is less relevant for the current exports to developed markets. In the same way, firms that previously exported to the EU do not have a higher probability of exporting to the ROW. Finally, the recent experience in the same market has, as expected, a larger effect on the current export status.

5. Conclusions

Summarising, this paper shows that the costs to enter (and "to re-enter") are higher in developed markets than in those of the ROW.

Moreover, we find that a previous experience in the EU market (respectively the ROW) increases both the probability of exporting to the OECD and to the same market but is less relevant for the ROW (respectively for the EU). OECD countries (non-EU) appear as an intermediate case. European norms may be very specific and homogeneous among members, whereas specificities of other OECD countries imply different types of organisation that are more easily used to perform in other markets.

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[7] Foreign participation in capital increases significantly the probability of exporting in general. For the EU, it is positive and significant at the 15% level for the EU.