Exports and Productivity: Does Destination Matter?*

Exportaciones y Productividad: ¿El destino importa?

Juan Barboni
Analista de Riesgo, Despegar

Nicolas Ferrari
Consultor Axiona Sociedad de Soluciones

Hanna Melgarejo
Consultor Agencia de Compras y Contrataciones Estatales (ACCE)

Adriana Peluffo
Instituto de Economía, Universidad de la República, Uruguay

Abstract

In this work, we analyze the effect of export destinations on Total Factor Productivity (TFP) of manufacturing Uruguayan firms for the period 1997-2006. We study two effects: self-selection and learning by exporting. There is evidence of self-selection with a stronger effect for firms exporting to developed countries. Nevertheless, applying transition groups methodology in order to mitigate endogeneity issues, there is no evidence that exporting to developed countries enhances productivity through learning by exporting. However, evidence of learning by exporting is found for those firms starting to export to less developed countries. These findings suggest an international strategy through which firms reach gains in productivity exporting to markets with lower entry cost, and once they have learned and improved their productivity, are in a better position to enter more developed countries.

Key words: Total factor productivity, exports, destination of exports, self-selection, learning by exporting.

JEL Code: D21, D24, F14, O54.

Resumen

En este trabajo se analiza el efecto del destino de las exportaciones sobre la productividad total de los factores de las empresas manufactureras uruguayas, para el periodo 1997-2006. Se estudian dos efectos: autoselección y aprendizaje a través de las exportaciones. Se encuentra evidencia de autoselección con un efecto mayor para las empresas que exportan a los países desarrollados. Sin embargo, aplicando la metodología de grupos de transición, a efectos de mitigar los problemas de endogeneidad, no hay evidencia de que las exportaciones a países desarrollados aumente la productividad a través del aprendizaje por exportar. Sin embargo, si hay evidencia de aprendizaje por exportar para aquellas empresas que empiezan a exportar a países de la región, menos desarrollados. Estos hallazgos sugieren una estrategia internacional en la cual las firmas logran ganancias de productividad exportando a mercados con menores costos de entrada, y una vez que han adquirido experiencia-aprendido- y aumentado su productividad, están en una mejor posición para entrar en los mercados de los países desarrollados.

Palabras clave: Productividad total de los factores, exportaciones, destino de las exportaciones, auto-selección, aprendizaje por exportar.

Código JEL: D21, D24, F14, O54.

I. Introduction

The objective of this work is to study the relationship between total factor productivity (TFP) of Uruguayan exporting firms and its destination. To this aim, we focus on analyzing the effect of exporting to developed countries on TFP of manufacturing firms.

A number of empirical works conducted in the last decades find that exporting firms are more productive than non exporting ones (Clerides et al. 1998; Bernard & Jensen 1999; Girma et al. 2004; Alvarez & López 2005; Isgut & Fernandes 2009; De Loecker 2007; Da Costa Ferré 2008). Thus, exporting firms could play an important role in the economic growth of countries, particularly for small developing economies like Uruguay.

A key aspect to analyze is whether the greater productivity of exporters is achieved before entering into foreign markets, or after breaking into exporting. In the literature, both hypotheses are known as "self-selection" and "learning by exporting" respectively. Both hypotheses are not mutually

exclusive, since firms can increase their productivity before breaking into foreign markets, and experience further improvements in productivity, after entering into foreign markets due to gains in economies of scale, greater competition with foreign firms, learning of better practices and the acquisition of new technologies.

Even though several works analyze self-selection and learning by exporting, less studied has been the impact of the destination of exports on productivity. Girma et al. (2004), Álvarez and López (2005), da Costa Ferré (2008), Pisu (2008) and Boermans (2010) are some examples of studies that analyze learning by exporting. Nevertheless, studies for developing countries that analyze learning by exporting and destinations are less. Among the latter, we find the works by Isgut and Fernandes (2009), Trofimenko (2008), De Loecker (2007), Granér and Isaksson (2009) and Boermans (2010).

For a developing country, it could be assumed that the cost of entering foreign markets are higher the greater the level of economic development due to a higher level of exigency of foreign costumers –i.e. a higher valuation for quality-, quality and standards requirements, and a more competitive environment. Moreover, for Uruguay, developed countries are located far away, implying so higher transport costs. One hypothesis is that those firms that export to more developed countries have to overcome higher entry costs than firms that export to less developed countries, so that self-selection should be higher for these firms. This would imply that firms that export to high income countries are far more productive even before starting to export to high income destinations (Trofimenko 2008; Pisu 2008). In this regard, Eaton et al. (2008) suggest that the relationship between firm performance and exporting depends on the destination of exports.

Regarding to learning by exporting, it can be argued that increases in productivity would be higher for those firms that export to developed countries. This would be so due to a greater competition and a higher exposure to more technological advanced firms, more stringent demand for quality, delivery time, and post-sales services, so the ensuing potential opportunities for learning and productivity enhancements would be higher (Fernandes and Isgut, 2009). Furthermore, foreign buyers might provide their suppliers with technical assistance and product design in order to improve the quality of imported goods, and access to first world-class technologies. Finally, less experienced exporters –but with lower technology gaps, i.e. high productivity- may learn more than more experienced ones.

In this work we analyse whether these hypotheses are met for the Uruguayan case, for the period 1997-2006. To this end we first analyse if there is an association between productivity and exporting by destination. Then, we examine these relations using probit models (to analyze self-selection), and the methodology of transition groups to study self-selection and learning by exporting, and the impact of the destination of exports on them.

This work contributes to the existing literature by being one of the first studies to use actual data on the destination of exports at the firm level for a small middle income country to analyse the relationship between export destination and firm's performance. Thus, the results of this work could provide new insights to the existent literature, which have focused mostly on developed economies. Furthermore, it could provide with new knowledge for the discussion and design of the international strategy of the country.

We find evidence of self-selection with this effect being stronger for firms that start exporting to developed countries. Nevertheless, applying transition group methodology (Alvarez and López 2005) in order to mitigate endogeneity issues, there is no evidence that exporting to developed countries enhances productivity through learning by exporting. However, evidence of learning by exporting is found for those firms starting to export to less developed countries, suggesting learning processes in markets with lower entry costs. We note that most entrants to developed countries were already exporting to less developed countries (76 %). This finding is consistent with the work by Fernandes and Isgut (2009) who find that entrants to the export market learn more than experienced exporters, or in other words, that there are decreasing returns to learning. In summary, our findings suggest an international strategy through which firms reach gains in productivity exporting to markets with lower entry cost, and once they have learned and improved their productivity, are in a better position to enter into more developed countries.

This work structures as follows: after this introduction, in Section 2 we present briefly some previous literature, in Section 3, we describe the empirical strategy; in the fourth, we present the results, and finally some concluding remarks.

II. Literature review

In the last years there was a burgeoning of studies showing the relationship between the level of productivity and the exporting status at the

firm level (see for instance Aw and Hwang (1995) for Taiwan; Bernard and Wagner (1997) for Germany; Bernard and Jensen (1999) for United States; Kraay (1999) for China; Delgado et al. (2002) for Spain; Girma et al. (2004) for the United Kingdom; Álvarez and López (2005) for Chile). Most of these works finds that exporting firms are more productive than those that serve the domestic market.[1] Further, the evidence shows that while most studies find support for the self-selection hypothesis, this is not so for learning by exporting (Clerides et al. 1998; Bernard and Jensen 1999; Álvarez and López 2004, Pisu 2008). Moreover, among the studies that do find learning by exporting, only few take into account the destination of exports.

The first, most well known study was the one by Bernard and Jensen (1999) for the United States, finding that exporting firms are larger, more productive and more capital intensive. These authors find evidence in favor of self-selection but not for learning by exporting. Álvarez and López (2005) find similar results for Chilean firms using transition group methodologies. Nevertheless, Girma et al. (2004) for UK, using matching techniques find evidence of learning by exporting.

Fernandes and Isgut (2009) take into account the destination of exports in their analysis of productivity differences between exporters and non-exporters for Colombian firms. These authors find higher productivity for firms exporting to developed countries compared to those that export to less developed countries, evidence of learning by exporting, and diminishing returns to export experience. Moreover, Trofimenko (2008) working also with a panel of Colombian firms, introduce four groups of countries of destination, obtaining similar results to the findings by Fernandes and Isgut (2009): exporting to countries with higher income enhances productivity gains. Nevertheless, there is also opposite evidence. Granér and Isaksson (2009), working for Kenyan firms find that exporters learn more from regional export participation and not by exporting to developed countries. The explanation they pose for this result is that the high technological distance from developed countries can act as an impediment to use external knowledge. Moreover they show that firms have to be more productive to enter developed markets, but this is not so for exporting inside the continent. Pisu (2008) analyzes the destination of Belgian exports, finding that self-selection explains the higher productivity of exporting firms, particularly for those firms that export to developed countries. This author confirms the hypothesis that sunk entry costs are country specific, but he finds no evidence of learning by exporting.

1. For a survey see Wagner (2007).

Boermans (2010) studies five African countries, and finds self-selection and learning by exporting using matching and difference-in-difference techniques. Taking into account export destination, this author finds that firms that export outside Africa are more capital and skilled labor intensive, which would explain their higher productivity, compared to firms exporting to the region.

Mukim (2011) using matching techniques for Indian firms, finds that learning by exporting takes place only in the first years after breaking into foreign markets. This author makes a distinction between the countries of origin of exporting firms. In this regards, he argues, that since exporters from developing countries are far away the world technological frontier, there is greater scope for productivity improvements after breaking into foreign markets –i.e. higher scope for "catching-up"-. In this regard there is an on-going debate in the literature. On one side, there is the idea that to be able to learn from foreign technologies, the technology gap should be small (e.g. Aghion et al. (2009), and on the other side, there is the idea that the greater the technological distance, the greater the probability to catch up (Griffith et al. 2004).

De Loecker (2007) using matching techniques for Slovenian manufacturing firms, finds that export entrants become more productive once they start exporting. Moreover, this author finds that productivity gains are higher for firms exporting towards high income regions.

For the Uruguayan case, there are some works. Bittencourt and Vaillant (2001)analyze the characteristics of exporting firms for the 1980s and 1990s. These authors find an association between average firm size and its permanence in export markets. They also analyze entry and exit in international markets and find that exiting firms have a short duration in export markets.

Da Costa Ferré (2008) using a panel of Uruguayan manufacturing firms for the period 1997-2001, analyze whether self-selection and learning by exporting hypothesis hold. This researcher, using transition group methodologies find evidence of self-selection and learning by exporting.

Finally, Peluffo (2008) analyzes several channels of international technology transfer to explain the productivity of Uruguayan manufacturing firms for the period 1997-2001. This author analyzes the effects of imported intermediate, exports and foreign ownership of capital in an augmented pro-

duction function and in a two-step approach. The main findings are that these variables have a positive and significant impact on productivity, and that the effect is higher for those firms that undertake R&D and training of workers, and have so higher absorptive capacity.

To sum up, the empirical evidence points out to a better performance of exporting firms, and robust evidence for the self-selection hypothesis. Nevertheless, results for learning by exporting are not clear cut. Regarding to the effect of the destination on self-selection and learning by exporting, most works support the hypothesis that sunk entry costs to foreign markets are country specific, and higher the greater the level of development of the country of destination. Therefore, self-selection would explain the greater productivity of firms exporting to more developed countries. Moreover, some works point out that for developing countries exporting to more developed countries could bring greater productivity gains (Fernandes and Isgut 2009; Trofimenko 2008, Boermans 2010). Nevertheless, there is also opposite evidence (Granér and Isaksson 2007), consistent with the debate on the role of technology gaps and domestic capabilities.

III. Empirical Strategy

III.1. Methodology

III.1.a. Exporting Premium

Firstly, we analyze associations, namely the exporting premium without controlling for destination (equation 1), and then we control for destination with a dummy variable that takes the value of one if the firm exports to developed countries (equation 2), outside the region (equation 3), and to the region (equation 4). Moreover, we also control for firm size, foreign ownership of capital, sector and time dummies. Our dependent variable is Total Factor Productivity (TFP) in natural logarithms, and we use Ordinary Least Squares estimation. Total Factor Productivity is estimated using the Levinsohn and Petrin(2003) methodology (LP), which allows correcting for endogeneity in inputs, while attrition is tackled using an unbalanced panel of firms.[2] We performed various estimations of TFP using Levinsohn and Petrin's methodology (LP) and Olley and Pakes(1996) methodology (OP). We report the results in Table 1. For the LP methodology, we use as proxy variable electrical energy, and as inputs total employment and capital (LP1), and employment discriminated into skilled and unskilled workers and capital (LP2). For the OP method-

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2. More details on productivity estimation are available upon request.

Table 1: Total Factor Productivity Estimation

	LP1	LP2	OP1	OP2	OP3	OP4
ln *PO*	0.683			0.602	0.555	
	(0.043)			(0.038)***	(0.047)***	
Ln *SL*		0.415	0.38			0.390
		(0.031)***	(0.032)***			(0.007)***
Ln *UL*		0.228	0.226			0.188
		(0.035)***	(0.040)***			(0.019)***
Ln *K*	0.166	0.255	0.206	0.199	0.205	0.214
	(0.047)	(0.047)***	(0.036)***	(0.038)***	(0.028)***	(0.004)***
L1.*EXP*					0.005	0.001
					(0.088)	(0.039)
Trend			0.024	0.021	0.025	0.030
			(0.006)***	(0.006)***	(0.002)***	(0.002)***

LP stands for Levinshon and Petrin methodology and OP for Olley and Pakes.LnPO: total employ-
 ment; Ln SL: skilled labor; Ln UL: unskilled labor; Ln K: capital; L1.EXP: lagged export status;
 Trend: time trend.LP1: total employment and capital, LP2 employment discriminated into skilled
 and unskilled workers and capital. For the OP1: skilled and unskilled labor and capital; OP2: total
 labor and capital;OP3: total labor, capital and lagged export status; OP4: labor discriminated into
 skilled and unskilled workers, capital and lagged export status.

Table 2: Correlation matrix between different TFP estimates

	LP1	LP2	OP1	OP2	OP3	OP4
LP1	1					
LP2	0.951	1				
OP1	0.9628	0.9905	1			
OP2	0.9968	0.953	0.9691	1		
OP3	0.9937	0.9508	0.9704	0.9993	1	
OP4	0.9555	0.9882	0.9993	0.9641	0.9664	1

LP stands for Levinshon and Petrin methodology and OP for Olley and Pakes.
LP1: total employment and capital, LP2 employment discriminated into skilled and unskilled workers
 and capital. For the OP1: skilled and unskilled labor and capital; OP2: total labor and capital;OP3:
 total labor, capital and lagged export status;OP4: labor discriminated into skilled and unskilled
 workers, capital and lagged export status.

ology we use as a proxy variable investments, and skilled and unskilled labor and capital (OP1), total labor and capital (OP2), total labor, capital and lagged export status (OP3), and labor discriminated into skilled and unskilled workers, capital and lagged export status (OP4). Results are robust to different proxy, labor definitions and state variables used. In Table 2 we present the correlation matrix of the estimates of TFP for the different specifications used.

Our baseline estimation equation is (1), which is extended in equation (2), (3) and (4) to include exports to developed countries, outside the region, and to the region respectively.

The estimating equations are the following:

$$\ln tfp_{it} = \alpha_0 + \alpha_1 \exp_{it} + \alpha_2 foreign_{it} + \alpha_3 medium_{it} \\ + \alpha_4 big_{it} + d_t + d_j + \varepsilon i_t \tag{1}$$

$$\ln tfp_{it} = \alpha_0 + \alpha_1 \exp_{it} + \alpha_2 \exp rich_{it} + \alpha_3 foreign_{it} \\ + \alpha_4 medium_{it} + \alpha_5 big_{it} + d_t + d_j + \varepsilon i_t \tag{2}$$

$$\ln tfp_{it} = \alpha_0 + \alpha_1 \exp_{it} + \alpha_2 \exp outreg_{it} + \alpha_3 foreign_{it} \\ + \alpha_4 medium_{it} + \alpha_5 big_{it} + d_t + d_j + \varepsilon i_t \tag{3}$$

$$\ln tfp_{it} = \alpha_0 + \alpha_1 \exp_{it} + \alpha_2 \exp reg_{it} + \alpha_3 foreign_{it} \\ + \alpha_4 medium_{it} + \alpha_5 big_{it} + d_t + d_j + \varepsilon i_t \tag{4}$$

Where tfp is total factor productivity, $\exp$ stands for a dummy variable that takes the value of one if the firms exports and zero otherwise; $foreign$: is a dummy that takes the value of one if the firms is foreign owned; $medium$: is a dummy variable that takes the value of one if the firms has between 49-99 workers and zero otherwise; big: is a dummy variable that takes the value of one if the firms has more than 100 workers and zero otherwise; d_j: are industry dummies; d_t: are time dummies, $\exp rich$: is a dummy that takes the value of one if the firms exports to developed countries and zero otherwise; $\exp outreg$: is a dummy variable that takes the value of one if the firm exports outside the region and zero otherwise. We define as region Mercosur countries and other Latin American and Caribbean countries. We note that most of exports to the region are to Mercosur partners.

Firms exporting to a larger number of destinations tend to be more productive (Eaton et al. 2008). In this work we do not consider explicitly the

number of destinations. We find that for the period 1997-2005 the median number of destinations is 2, and that the number of destinations presents a higher correlation with firm size (0.50) than with productivity (0.04). Thus, since we are controlling for size, the omission of the number of destination should not biased the results.

We further analyze the effect of the exporting more than 50 % of total exports to more developed countries ($\exp rich > 50$ %) and the effect of exporting more than 50 % of total exports outside the region ($\exp outreg > 50$ %). We estimate the following equations:

$$\ln tfp_{it} = \alpha_0 + \alpha_1 \exp_{it} + \alpha_2 \exp outreg_{it} > 50\%_{it} + \alpha_3 foreign_{it}$$
$$+ \alpha_4 medium_{it} + \alpha_5 big_{it} + d_t + d_j + \varepsilon_{it} \qquad (5)$$

$$\ln tfp_{it} = \alpha_0 + \alpha_1 \exp_{it} + \alpha_2 \exp rich_{it} > 50\%_{it} + \alpha_3 foreign_{it}$$
$$+ \alpha_4 medium_{it} + \alpha_5 big_{it} + d_t + d_j + \varepsilon_{it} \qquad (6)$$

A major econometric difficulty in estimating the effect of exports on productivity is reverse causality due to self-selection of the most productive firms into the export market. In this regard the transition group methodology could help to mitigate the issue of endogeneity, with higher s helping to break simultaneity. Furthermore, for self-selection we also estimate probit models.

III.1.b. Self-selection and Learning by Exporting

To test the of self-selection and learning by exporting hypotheses we apply transition groups methodology, used by Aw et al. (1998), Álvarez and López (2005), and more recently by Verardi and Wagner (2012). Additionally, to test self-selection, we also conduct a probit analysis, in line with the work by Alvarez and López (2005).

Firstly we test the hypotheses without taking into account the destination of exports, and then we distinguish by destination.

We define four groups of firms according to their export activities during different time intervals. We take two years, $t-s$ and t ($t-s$ stands for the initial year of exporting and t the final year of exporting, s is the time interval). The exporting status of the firm is defined by: a) Non-exporting: does not export in $t-s$, neither in t; b) Entrant (ent): does not export in $t-s$, but starts exporting in t; c) Quitter ($quit$): exports in $t-s$, and stops exporting in t; d) Permanent exporter ($perm$): exports in $t-s$ and in t.

The transition groups allow analyzing the differentials in productivity of exporting firms with respect to non-exporting firms. We evaluate whether the differentials in productivity of entrants at the beginning of the period $(t-s)$ are verified before breaking into export markets, by means of transition groups as we explain below. Furthermore, we conduct a probit analysis, and look at how the probability of beginning to export in the second year is affected by firm characteristics in the year before starting to export. We follow Alvarez and Lopez (2005) and estimate the following equation:

$$\Pr(X_{i,t} = 1 \mid X_{i,t-1} = 0) = F(\beta'\Omega_{i,t-1} + d_j + d_t + \varepsilon_{it}) \quad (7)$$

Where $X_{i,t}$ is a dummy variable equal to one if plant i exported at time t, $\Omega_{i,t-1}$ is a vector of firm characteristics at $t-1$, which previous works have found that affect the probability of exporting. These variables are TFP, plant size and foreign ownership. β is the vector of parameters that reflect the impact of changes in Ω on X.

Furthermore, we extend the model to examine the role of destination markets in self-selection effects. We consider firms that start exporting to similar or less developed countries than Uruguay, to the region, and to developed countries.

To analyze the hypothesis of learning by exporting we use both years $(t-s$ and $t)$, in order to compare productivity at the beginning and at the end of the period. In this way we can observe if firms that start exporting become more productive after breaking into export markets. In other words, we expect the parameter associated to entrants and permanent exporters to be positive. Furthermore, in the case that productivity gains are more prevalent for plants recently entering foreign markets, we should find a larger parameter for entrants (Alvarez & Lopez, 2005).

The transition groups consider intervals of 1 to 4 years, so the export status is defined according to the following time periods: a) Transition 1 year: all the possible combinations between the initial $(t-1)$ and the final year of exporting activity (t) for a time window (s) of one year;[3] b) Transition 2 years: all the possible combinations between $t-2$ and t;[4] c) Transition 3 years: all the possible combinations between $t-3$ and t;[5] d) Transition 4 years: all the possible combinations between $t-4$ and t.[6]

3. This is 97-98, 98-99, 99-00, 00-01, 01-02, 02-03, 03-04, 04-05.
4. This is 97-99, 98-00, 99-01, 00-02, 01-03, 02-04, 03-05.
5. This is 97-00, 98-01, 99-02, 00-03, 01-04, 02-05.
6. This is 97-01, 98-02, 99-03, 00-04, 01-05.

The econometric model for the initial year of exporting is:

$$\ln tfp_{i,t-s} = \varphi_0 + \varphi_1 ent^s_{i,t} + \varphi_2 quit^s_{i,t} + \varphi_3 perm^s_{i,t} + \varphi_4 foreign_{i,t} \\ + \varphi_5 medium_{i,t} + \varphi_6 big_{i,t} + d_t + d_j + \varepsilon_{i,t-s} \qquad (8)$$

Where s=1, 2, 3 and 4.

The model for the final year is:

$$\ln tfp_{i,t} = \gamma_0 + \gamma_1 ent^s_{i,t} + \gamma_2 quit^s_{i,t} + \gamma_3 perm^s_{i,t} + \gamma_4 foreign_{i,t} \\ + \gamma_5 medium_{i,t} + \gamma_6 big_{i,t} + d_t + d_j + \varepsilon_{i,t-s} \qquad (9)$$

where s=1, 2, 3 and 4.Furthermore, $\ln tfp, ent$; $quit$, $perm$, $foreign$, $medium$ and big are the variables defined previously.

The coefficients that measure the percentage difference in productivity with respect to non-exporting firms are the following: i) φ_1 and γ_1 is the percentage difference between entrants and non-exporting firms in $t-s$ and t respectively; ii) φ_2 and γ_2 is the percentage difference between quitters and non-exporting firms in $t-s$ and t respectively; iii) φ_3 and γ_3 is the percentage difference between permanent exporters and non-exporting firms in $t-s$ and t respectively.

If there is self-selection the following two relations should be met: i) $\varphi_1 > 0$, hence the productivity of entrants prior to start exporting should be higher than for non-exporting firms; ii) $\varphi_3 > \varphi_2 > 0$, hence the productivity of permanent exporters should be higher than for quitters, and productivity of permanent exporters and quitters should be higher than for non exporting firms.

If the there is learning by exporting in the period $(t-s, t)$ then we should find that: i) $\varphi_1 - \gamma_1 > 0$, implying that the difference in productivity between entrants and non-exporting firms increases; ii) $\varphi_3 - \gamma_3 > 0$, therefore the differential in productivity between permanent exporters and non-exporting firms increases; and iii) $\gamma_3 - \gamma_2 > \varphi_3 - \varphi_2$, the difference in productivity between firms that stay in the export market and quitters should increase.

III.2. Data sources and descriptive statistics

The empirical analysis is based on the Annual Industrial Survey carried out by the National Institute of Statistics of Uruguay (INE) for the years

1997 to 2006.[7] The surveys cover manufacturing plants with more than 5 workers at the firm level. Each firm has a unique identification number which allows following the firms over time. For each firm, the INE collects data on production, value added, sales, employment, wages, exports, investments, capital, depreciation, energy usage, foreign ownership of capital among other variables. Further, each firm is classified according to its main activity at the 4 digit ISIC level. Nevertheless, they do not register exports by destination, so we use data from the National Direction of Customs which records exports by the firm in value and country of destination, and we merge these data to the INE database. All variables were deflated by specific price indexes with base year 1997.[8]

The countries of destination of exports were classified according to the level of development and the geo-economic region according to the World Bank classification[9] for each year.

To test the hypothesis of self-selection and learning by exporting we construct two broad categories: countries with a higher level of development than Uruguay –i.e. high income countries- and countries with a similar or lower level of development than Uruguay –i.e. medium and low income countries-. Furthermore, we classify countries according to the geo-economic region in the following groups: Mercosur, NAFTA, Other Latin American and Caribbean countries, European Union and Rest of the World. Finally, we define as "region" Mercosur countries and other Latin American and Caribbean countries.

III.3. General Features of the data

We have an unbalanced panel for the period 1997-2006 with 8,260 total observations and 1,330 manufacturing firms,[10] of which 726 had export activity in the period according to data from the Customs Direction.[11]

From Table 3 it can be observed a high presence of exporting firms in the panel, with the highest presence in 2006 since only the compulsory stratum was surveyed that year.

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7. In 1997 a Census was carried out.
8. The specific Price indexes were estimated and provided by Susana Picardo, Department of Economics, University of the Republic, Uruguay.
9. Uruguay belongs to the medium-high income countries.
10. The number is lower in 2006 since only those firms with more than 50 workers and/or sales greater than 120 millions of pesos per year were surveyed (compulsory stratum).
11. There is a difference of 7.3 % lower if we take data from the INE.

Table 3: Number of firms per year

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Non-exporting firms	525	420	436	403	479	452	482	485	491	135
Exporting firms	428	440	406	388	381	353	399	402	438	317
Exporting firms (%)	45	51	48	49	44	44	45	45	47	70
Total number	953	860	842	791	860	805	881	887	929	452

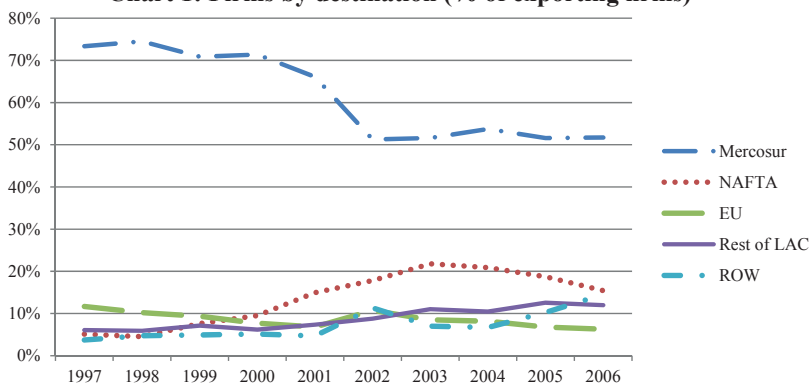Source: own elaboration based on data of the INE and DirecciónNacional de Aduanas.

Table 4: Firms according to main destination (to the region or outside the region)

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Non-exporting outside the region										
Number	229	234	211	191	181	128	151	157	171	100
(%)	54	53	52	49	48	36	38	39	39	31
Exports <50% outside the region										
Number	104	115	99	108	96	86	100	100	107	101
(%)	24	26	24	28	25	24	25	25	24	32
Exports>50 % outside the region										
Number	95	91	96	89	104	139	148	145	160	116
(%)	22	21	24	23	27	39	37	36	37	37
Total number of exporting firms	428	440	406	388	381	353	399	402	438	317

Source: Own elaboration based on data of the INE and DirecciónNacional de Aduanas

Regarding to the destination, it can be observed from Chart 1, a high participation of firms that have as main destination Mercosur´s partners (62 % of exporting firms). After 2002, there is a reduction in the share of firms that export mainly to Mercosur´s partners (52 %), and there is an increase in exports to the NAFTA and the Rest of the World.

Chart 1: Firms by destination (% of exporting firms)

Rest of LAC: rest of Latin American and Caribbean Countries; ROW: Rest of the world.
Source: Own elaboration based on data of the INE and Dirección Nacional de Aduanas.

The amounts in value by destination (Chart 2) to the Mercosur were in average 38 % of total exports per year, with a figure of 44 % for the period 1997-2001 and 30 % for the period 2003-2006. Thus since the beginning of the recession in 1999 there is a diversification in the destination of exports that is further deepened after the 2002 crisis that hit the Uruguayan economy.
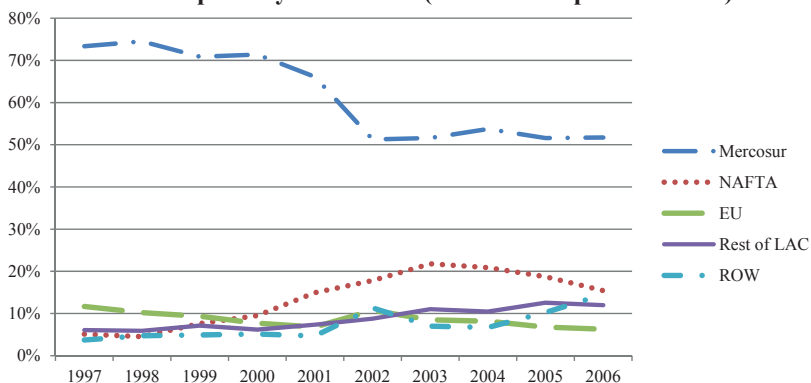
Chart 2: Exports by destination (% of total exports in value)

Rest of LAC: rest of Latin American and Caribbean Countries; ROW: Rest of the world.
Source: Own elaboration based on data of the INE and Dirección Nacional de Aduanas.

Table 5: Exporting firms according to the destination of exports (richer and less developed countries)

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Export only to non-rich countries	247	253	230	217	210	157	185	189	212	125
Export only to non-rich (% exporting firms)	58	58	57	56	55	44	46	47	48	39
Export to rich countries<50%	98	104	96	104	92	106	110	116	129	127
Export to rich countries<50% (% exporting firms)	23	24	24	27	24	30	28	29	29	40
Export to rich countries>50%	83	83	80	67	79	90	104	97	97	65
Export to rich countries>50% (% exporting firms)	19	19	20	17	21	25	26	24	22	21
Total exporting firms	428	440	406	388	381	353	399	402	438	317

Non-rich countries stands for less developed countries.Export to rich countries <50 %: exports to rich countries less than 50 % of total firm exports;
Export to rich>50%: export to rich countries more than 50% of firm total exports.
Source: Own elaboration based on data of the INE and DirecciónNacional de Aduanas.

Table 6: Number of observations according to destination

	Export < 50% to rich countries	Export>50% to rich countries	Total
Export < 50% outside the region	2760	10	2770
Export>50% outside the region	348	834	1182
Total	3108	844	3952

Export<50% outside the region: exports less than 50% of firm total exports outside the region;
Export>50%: exports more than 50% of firm total exports outside the region.
Source: Own elaboration based on data of the INE and DirecciónNacional de Aduanas

From Table 4, it can be observed that up to 1999 most exporting firms concentrate their exports to Mercosur's partners. After the 2002 crisis, there is a reduction in exports to Mercosur's countries, from 53 % for the period 1997-1999, to 36 % in 2002.

We find a similar behavior when we analyze the share of exporting firms according to destination by level of economic development.

As can be observed in Table 5, most exporting firms target their sales towards the region, with this feature being more pronounced for the period 1997-2001. As it was to be expected, most of the exports to richer countries are concentrated outside the region.

In Table 6, we report the association between exporting more of the 50 % of total exports to richer countries and outside the region. It can be observed that for the 98 % of the observations firms export to both richer countries and outside the region (834 observations).[12]

In Table 7 we present the main features according to whether the firm is a permanent exporter, switch into exporting, and the destination of exports.[13] We can observe that exporting firms are bigger in terms of employment, value added and foreign ownership of capital, corroborating the findings of the empirical works for other countries. Further, there are significant differences if exports are mainly targeted to non richer countries, or if they export to more developed (richer) countries. [14]

We observe that switchers (firms that change exporting status more than once) outperform non-exporting firms, and that permanent exporters present better performance in terms of capital, employment, sales, value added, capital intensity, labor and total productivity than switcher and non-exporting firms. Moreover, firms that exports mostly to developed countries (more than 50 % of their exports) are similar to permanent exporters, but present a higher export propensity, labor productivity and slightly higher total factor productivity.

Entrants to less developed countries and to the region present a similar performance, but lower than entrants to developed markets in all the characteristics analyzed.

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12. The coefficient of correlation is 0.91.
13. A similar analysis was conducted for export to the region or outside the region and throw out similar results. Results are available upon request.
14. We will refer to richer or developed countries as synonymous.

Table 7: Characteristics of firms according to the destination of exports

Type	Non-exporting	Perm_Exporters	Switchers (a)	Entrants to Developed	Ent to Less Developed	Entrants to Region	Exports more than half to richer	Total
Capital (millions of constant pesos)	3	63	13	35	28	28	53	26
Employment	31	160	66	98	85	82	176	83
Sales (millions of constant pesos)	13	179	41	94	79	76	179	75
Value Added (millions of constant pesos)	5	43	14	34	26	29	32	21
Foreign ownership of capital	0.052	0.433	0.158	0.367	0.272	0.272	0.335	0.218
Export propensity	0.000	0.484	0.071	0.241	0.148	0.098	0.568	0.181
Total factor productivity	41,461	88,57	54,772	82,429	69,427	69,721	91,661	62,016
Labor productivity	142,124	265,671	193,189	303,546	253,301	266,477	349,68	203,08
Capital intensity	75,186	341,966	195,154	294,425	249,291	236,605	285,665	200,761

(a) Firms that entry and exit into exporting more than once. Non-exporting: firms that do not export; Perm-Exporters: firms that export every year over the period; Switchers: firms that change status more than once over the sample period; Entrants to Developed: firms that start exporting to developed countries; Ent to Less Developed: firms that start exporting to less developed countries; Entrants to the region: firms that start exporting to regional countries; Exports more than half to richer: firms that export more than half of total exports to richer countries in average for the sample period.

Source: Own elaboration based on data of the INE and DirecciónNacional de Aduanas

To analyze entrants by destination, we define a dummy variable $entrich_t$ that takes the value of one if the firm did not export to rich countries in $t-1$ and export to richer countries in t. Further, we define the dummy variable $expnorich_{t-1}$ that takes the value of one if the firm exported only to less developed countries in $t-1$ and zero otherwise. The variable $entnorich_t$ is a dummy that takes the value of one if the firm did not export to less developed countries in $t-1$ and export only to less developed countries in t; and the variable $exprich_{t-1}$ that takes the value of one if the firm exported to developed countries in $t-1$ and zero otherwise. In Table 8, we present the number of entrants to developed countries and to less developed countries.

Table 8: Entrants to developed and less developed countries

Entrants to Developed Countries	Entrant to rich country in t	Non-entrant to rich country in t	Total No. Obs.
Export only to non-rich countries in $t-1$	241	1524	1765
Non-exporting in $t-1$	76	6419	6495
Total number of observations	317	7943	8260

Entrant to Less Developed Countries	Entrant to non rich country in t	Non-entrant to non rich it t	Total No. Obs.
Exporting to rich countries in $t-1$	211	1434	1645
Non-exporting in $t-1$	235	6380	6615
Total number of observations	446	7814	8260

Source: Own elaboration based on data of the INE and Dirección Nacional de Aduanas

We can observe that those firms that start exporting to developed countries in t, in 76 % of the cases exported in the previous period to less developed countries (241 observations), while only 24 % did not export in the previous year. Moreover, firms that begin to export to less developed countries, in 53 % of the cases did not export in the previous year (235 observations). We do not find firms beginning to export simultaneously to both developed and less developed countries.

These features could point out that the firms that were previously domestically oriented- first acquire experience in less developed and closer export markets (i.e. countries with lower entry costs), and after they gain ex-

perience, they orient their sales to developed destinations. Thus, past export experience could help to ease the entry to developed countries.[15]

IV. Results

IV.1. Premia

In Table 9 we present the estimation by Ordinary Least Squares with standard errors clustered at the firm level in order to account for serial correlation of outcomes over time. The exporting premium is of 25 %. Furthermore, bigger and foreign owned firms are more productive than smaller and domestically owned firms.

To analyze the effect of destination on TFP, we first observe whether the premium is higher for those firms that export to developed countries –i.e. countries richer than Uruguay-. To this end, we define the variable $exprich$, that is a dummy variable that takes the value of one if the firm exports to developed countries and zero otherwise. The premium of exporting is equal to $\alpha_1 + \alpha_2$, where α1 is the coefficient of exporting status and α_2 is the premium of exporting to developed countries which is the coefficient of $exprich$ (see equation 4). The contribution of advanced countries to this premium is given by α_2. The parameter α_1 is the return to exporting in general, irrespective of the development level of the destination market. Parameter α_2 is the additional increment to the returns to exporting associated with exporting to more developed countries.

We find that the coefficient of $exp(\alpha_1)$ is positive and significant while the coefficient of $exprich(\alpha_2)$ is not significant. This would indicate that there is no premium for exporting to developed countries.

We also try a dummy variable named $exprich>50\%$, that takes the value of 1 if 50 % or more of exports are targeted to countries richer than Uruguay and zero otherwise. In other words, we try to see if there is a premium for concentrating exports to developed countries. In this case we find that α_1 is positive and significant with a value of 0.23, while the coefficient for $exprich>50\%$ is not significant.

In order to analyze if productivity differentials between exporting firms are associated with geographical proximity of the country of destination, we

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15. Additionally we estimate a probit model to analyze the determinants of the probability of exporting to developed countries in period t, finding that the fact of exporting to less developed countries in t-1 has a positive and significant impact, and even higher than size and lagged productivity. Results are available upon request.

Table 9: Exporting premium, Pooled Ordinary Least Squares

LN TFP	(1)	(2)	(3)	(4)	(5)	(6)	(7)
EXPORTERS	0.2490 (0.0405)***	0.2426 (0.0425)***	0.2311 (0.0417)***	0.2519 (0.0482)***	0.2520 (0.0455)***	0.2427 (0.0466)***	0.2359 (0.0424)***
EXPRICH		0.0161 (0.0454)					
EXPRICH>50%			0.0950 (0.0645)				
EXPREGIONONLY					-0.0072 (0.0440)		
EXPREGION>50 %				-0.0053 (0.0468)			
EXPOUTREG						0.0110 (0.0439)	
EXPOUTREG>50 %							0.0538 (0.0587)
MEDIUM	0.2876 (0.0482)***	0.2878 (0.042)***	0.2890 (0.0482)***	0.2878 (0.0419)***	0.2875 (0.0420)***	0.2875 (0.0420)***	0.2885 (0.0420)***
BIG	0.3984 (0.0482)***	0.3962 (0.0482)***	0.3996 (0.0482)***	0.3984 (0.0483)***	0.3973 (0.0483)***	0.3967 (0.0483)***	0.3989 (0.0483)***
FOREIGN	0.3953 (0.0700)***	0.3951 (0.0701)***	0.3943 (0.0701)***	0.3957 (0.0701)***	0.3950 (0.0702)***	0.3949 (0.0703)***	0.3959 (0.0701)***
SECTORAL DUMMIES	YES	YES	YES	YES	YES	YES	YES
TIME DUMMIES	YES	YES	YES	YES	YES	YES	YES
OBSERVATIONS	6113	6113	6113	6113	6113	6113	6113
R SQUARED	0.309	0.309	0.309	0.309	0.309	0.309	0.309

*** p<0.01, ** p<0.05, * p<0.1.Exporters: exporting firms; Exprich: firms exporting to rich countries; Exprich>50%: firms exporting more than 50% of total exports to rich countries; Expregonly: firms that exports only to the region; Expregion>50%: firms that exports more than 50% of total exports to the region; Expoutreg: firms that export to countries outside the region; Expoutreg>50%: firms that exports more than 50% of their total exports outside the region; Medium: dummy equal one if the firm has between 49-99 workers and zero otherwise; Big: is a dummy variable that takes the value of one if the firms has more than 100 workers and zero otherwise; Foreign: is a dummy that takes the value of one if the firms is foreign owned; workers and zero otherwise.

estimate a regression including a dummy variable named *expoutreg*, that takes the value of one if the firm exports outside the region and zero otherwise. Results are presented in the sixth column of Table 9. We find that the coefficient for the export status is positive and significant while exporting outside the region is not significant. This result would point out that there is not a differential in productivity for exporting outside the region.

When we include fixed effects by firm to control for unobserved heterogeneity results change considerably. While the estimated productivity premia for exporters are still statistically significant the estimated coefficients are much lower (0.06). This result – considerably lower estimated exporter premia in empirical models including fixed effects- is standard in micro-econometric studies of firm performance and international activities.[16]

Thus, we find higher productivity for exporting firms and no evidence that targeting most of the exports outside the region translate into higher productivity. Thus, in what follows we will analyze the effect of destination of exports on self-selection and learning by exporting, according to the level of income of the countries of destination.

4.2. Self-selection and learning by exporting

We analyze the hypothesis of self-selection by means of probit models and transition groups, and learning by exporting using the methodology of transition groups. Transition groups were used by Aw et al (1998), Alvarez and Lopez (2004), da Costa Ferré (2008), and most recently by Verardi and Wagner (2012).

Firstly, we test the hypothesis without taking into account the destination of exports. Then, applying the same techniques we distinguish by destination of exports, according to the level of development of foreign markets.

We consider the period 1997-2005, since in 2006 only the compulsory stratum was surveyed by the INE.

4.2.1. Self-selection

To analyze self-selection we estimate probit models to observe how initial firm characteristics affect the probability of beginning to export as we explained above. In Table 11, we present the results –namely the marginal ef-

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16. See the International Study Group on Exports and Productivity (2008)for evidence from several countries.

Table 10: Exporting premium, Fixed Effect by Firm

Ln TFP	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Exporters	0.060	0.069	0.063	0.042	0.079	0.051	0.065
	(0.0350)*	(0.0358)*	(0.0358)*	(0.0358)	(0.0422)*	(0.0368)*	(0.0360)*
Exprich		-0.0419					
		(0.0375)					
Exprich > 50%			-0.0181				
			(0.0531)				
Expregiononly					-0.0282		
					(0.0353)		
Expregion > 50 %				0.0327			
				(0.0374)			
Expoutreg						0.0282	
						(0.0353)	
Expoutreg > 50 %							-0.0288
							(0.0483)
Medium	0.0437	0.0433	0.0438	0.0438	0.0437	0.0437	0.0437
	(0.0389)	(0.0388)	(0.0388)	(0.0388)	(0.0388)	(0.0388)	(0.0388)
Big	0.1274	0.1286	0.1274	0.1262	0.1261	0.1261	0.1266
	(0.0586)**	(0.0586)**	(0.0586)**	(0.0586)**	(0.0586)**	(0.0586)**	(0.0586)**
Foreign	0.0163	0.0170	0.0166	0.0171	0.0162	0.0162	0.0168
	(0.068)	(0.068)	(0.068)	(0.068)	(0.068)	(0.068)	(0.068)
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6113	6113	6113	6113	6113	6113	6113
R squared	0.09	0.09	0.09	0.09	0.09	0.09	0.09

*** $p<0.01$, ** $p<0.05$, * $p<0.1$.Exporters: exporting firms; Exprich: firms exporting to rich countries; Exprich>50%: firms exporting more than 50% of total exports to rich countries; Expregonly: firms that exports only to the region; Expregion>50%: firms that exports more than 50% of total exports to the region; Expoutreg: firms that export to countries outside the region; Expoutreg>50%: firms that exports more than 50% of their total exports outside the region; Medium: dummy equal one if the firm has between 49-99 workers and zero otherwise; Big: is a dummy variable that takes the value of one if the firms has more than 100 workers and zero otherwise; Foreign: is a dummy that takes the value of one if the firms is foreign owned; workers and zero otherwise.

fects- of estimating equation (7). In the first column the dependent variable is a dummy that takes the value of one for firms that start exporting in t and zero otherwise, irrespective of the destination of exports. In the second column, the dependent variable takes the value of one for those firms that begin to export to similar or less developed countries than Uruguay. In the third column, the dependent variable takes the value of one for firms that start exporting to the region and finally in the fourth column the dependent variable takes the value of one for firms that start exporting to developed countries.

For all the dependent variables, we find that those firms that initially are more productive and larger are more likely to enter the export markets, with some differences in the magnitude of the marginal effects.

Table 11: Probability of beginning to export (marginal effects)

	Entrants	**Start Less Developed**	**Start region**	**Start Developed**
Ln (TFP)$t-1$	0.0213***	0.0084*	0.0455***	0.1370***
	(0.0068)	(0.0048)	(0.0118)	(0.0411)
Medium $t-1$	0.0575***	0.0237***	0.1218***	0.03523***
	(0.0134)	(0.0089)	(0.0233)	(0.0082)
Large $t-1$	0.0763***	0.0318***	0.1031***	0.0450***
	(0.0145)	(0.0093)	(0.0268)	(0.0081)
Foreign capital $t-1$	0.0098	0.0099	0.0828**	0.0070
	(0.0159)	(0.1046)	(0.00339)	(0.0871)
No. of observations	5037	5019	4872	4987
Pseudo R-squared	0.05	0.04	0.12	0.07

Numbers are marginal effect of probit estimation. Standard errors clustered by firm between brackets, *** p<0.01, ** p<0.05, *p<0.1. Sector and year dummies were included but not reported.

A 1 % increase in productivity increases the probability of beginning to export to 2 percent for all firms that start exporting –irrespective of its destination-, 0.8 % for firms that start exporting to less developed economies, 4.5 % for firms that start exporting to the region and 13.7 % that start exporting to developed countries. Thus, we find evidence of self-selection -more productive firms become exporters-, and this effect is higher for exports to developed countries.

Medium and large firms are also more likely to begin to export than small firms. The coefficients for those firms that start exporting to less developed countries are lower than for all the new exporters, and for firms that

veloped countries are lower than for all the new exporters, and for firms that begin to export to the region and to developed countries.

Finally, the coefficient of foreign ownership is only significant for firms exporting to the region: being part of a multinational increases the probability of entering the regional market to 8.28 %.[17] One possible explanation for this result is that foreign firms enter into the domestic market in order to reduce trade costs –i.e. lower transport costs and tariff jumping to Mercosur countries-.

Summing up, these results imply that before breaking into export markets firms must be more productive and larger, and that higher productivity is far more important for firms entering into developed countries, confirming the self-selection hypothesis.

Analyzing self-selection by means of transition groups, for the final year (t) we observe that all the estimated coefficient for the entrants (ent) and permanent (perm) firms are positive and significant. Thus, firms that enter exporting markets and permanent exporters are more productive than those firms oriented towards the domestic market. Quitters (quit) are the firms that show lower levels of productivity. This suggests that exiting foreign markets is associated with a lower productivity of these firms. We report the results in Table 12.1.

In Table 12.2 we control for initial TFP finding an important role of this variable.

In Table 12.3.we analyze the initial year (t-s).We observe that the estimated coefficients for entrants are positive and significant, so the productivity of entrants is higher than for non-exporting firms even before breaking into foreign markets. Moreover, productivity of permanent firms is higher than for quitters and both have higher productivity than non-exporting firms. These results reported in Table 12.3 are consistent with the hypothesis of self-selection.

Summing up, results from the probit and the transition groups confirm self-selection, with this effect being stronger for exports to developed countries.

4.2.2. Learning by exporting

To analyze the hypothesis of learning by exporting we consider the final (t) and the initial year. Results for the final year are presented in Table

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17. We observe that 27 % of entrants to the region are foreign owned firms, while this figure is 43 % for permanents exporters, and 34 % for firms exporting more than 50 % to developed countries.

Table 12: Productivity differentials according to the permanence in the exporting market

Table 12.1: Productivity differentials for the final year

Type of transition Variables	1 year lnTFP	2 years lnTFP	3 years lnTFP	4 years lnTFP
Entrants	0.344***	0.377***	0.365***	0.402***
	(0.0611)	(0.0730)	(0.0825)	(0.0898)
Quitters	0.182***	0.208***	0.122	0.131
	(0.0669)	(0.0705)	(0.0789)	(0.0922)
Permanents	0.300***	0.293***	0.291***	0.280***
	(0.0572)	(0.0626)	(0.0698)	(0.0795)
Medium	0.262***	0.250***	0.242***	0.228***
	(0.0539)	(0.0593)	(0.0656)	(0.0732)
Big	0.283***	0.304***	0.309***	0.289***
	(0.0667)	(0.0720)	(0.0789)	(0.088)
Foreign	0.653***	0.683***	0.678***	0.679***
	(0.0859)	(0.0893)	(0.0963)	(0.105)
Constant	10.19***	10.17***	10.16***	10.13***
	(0.0375)	(0.0397)	(0.0439)	(0.0493)
Observations	4,905	4,15	3,415	2,733
R-squared	0.117	0.114	0.105	0.092

Table 12.2: Productivity differentials for the final year controlling for initial productivity

Type of transition Variables	1 year lnTFP	2 years lnTFP	3 years lnTFP	4 years lnTFP
Initial TFP	0.725***	0.631***	0.635***	0.659***
	(0.0240)	(0.0330)	(0.0401)	(0.0514)
Entrants	0.148***	0.236***	0.258***	0.0835
	(0.0378)	(0.0498)	(0.0698)	(0.0649)
Quitters	0.0204	0.0339	0.0125	-0.0357
	(0.0401)	(0.0523)	(0.0614)	(0.0664)
Permanents	0.0505*	0.0734*	0.111*	0.132**
	(0.0262)	(0.0410)	(0.0569)	(0.0660)
Medium	0.0775***	0.0630	0.0341	-0.0140
	(0.0254)	(0.0409)	(0.0561)	(0.0687)
Big	0.0973***	0.151***	0.103*	0.0217
	(0.0285)	(0.0472)	(0.0589)	(0.0731)
Foreign	0.232***	0.330***	0.284***	0.303***
	(0.0364)	(0.0572)	(0.0661)	(0.0824)
Constant	2.789***	3.716***	3.598***	3.280***
	(0.246)	(0.341)	(0.417)	(0.538)
Observations	4,297	3,444	2,738	2,195
R-squared	0.546	0.395	0.326	0.286

*** p<0.01, ** p<0.05, * p<0.1.Entrants: firms that start exporting; Quitters: firms that stop exporting; Permanents: firms that continue exporting; Medium: dummy equal one if the firm has between 49-99 workers and zero otherwise; Big: is a dummy variable that takes the value of one if the firms has more than 100 workers and zero otherwise; Foreign: dummy variable that takes the value of one if the firms is foreign owned; workers and zero otherwise. Standard errors clustered by firm between brackets.Sector and year dummies were included but not reported.

12.1 and 12.2 and for the initial year in Table 12.3. The results show that the productivity differential of entrants with respect to non-exporting firms increases in t with respect to t-s. There is no evidence of increases of productivity in permanent exporters and quitters. These results would indicate the existence of a learning process at the beginning of exporting, but not a learning process long after breaking into foreign markets. This result is consistent with some works that find learning by exporting (Isgut and Fernandes, 2009; Girma et al.2004).

In Table 12.2 we include as control the initial value of TFP, since it is argued that not controlling for initial differences in TFP could generate misleading results. We expect a positive and significant parameter associated to entrants and permanent exporters. Furthermore, if productivity gains are stronger for firms recently entering into export markets, we should find a larger parameter for entrants. We find a reduction in the coefficients for entrants and permanent exporters once we control for initial TFP, and that entrants lose significance in transition 4, which could indicate decreasing returns to learning. For transitions one to three we find larger productivity for

Table 12.3: Productivity differentials for the initial year

Type of transition variables	1 year lnTFP	2 years lnTFP	3 years lnTFP	4 years lnTFP
Entrants	0.267***	0.297***	0.282***	0.371***
	(0.0618)	(0.0664)	(0.0669)	(0.0560)
Quitters	0.232***	0.210***	0.174***	0.173***
	(0.0616)	(0.0669)	(0.0660)	(0.0654)
Permanents	0.356***	0.361***	0.364***	0.347***
	(0.0551)	(0.0548)	(0.0559)	(0.0547)
Medium	0.227***	0.237***	0.174***	0.206***
	(0.0515)	(0.0494)	(0.0506)	(0.0506)
Big	0.267***	0.265***	0.234***	0.258***
	(0.0625)	(0.0631)	(0.0636)	(0.0638)
Foreign	0.589***	0.591***	0.591***	0.556***
	(0.0835)	(0.0805)	(0.0780)	(0.0795)
Constant	10.22***	10.25***	10.34***	10.39***
	(0.0376)	(0.0386)	(0.0390)	(0.0383)
Observations	4,743	4,032	3,369	2,833
R squared	0.125	0.135	0.145	0.166

*** p<0.01, ** p<0.05, * p<0.1.Entrants: firms that start exporting; Quitters: firms that stop exporting; Permanents: firms that continue exporting; Medium: dummy equal one if the firm has between 49-99 workers and zero otherwise; Big: is a dummy variable that takes the value of one if the firms has more than 100 workers and zero otherwise; Foreign: dummy variable that takes the value of one if the firms is foreign owned; workers and zero otherwise. Standard errors clustered by firm between brackets. Sector and year dummies were included but not reported.

Table 13.1: Differentials in productivity by destination

Type of transition Variables	1 year lnTFP	2 year lnTFP	3 year lnTFP	4 year lnTFP
Entrant rich	0.347***	0.269***	0.354***	0.308***
	(0.0800)	(0.0990)	(0.101)	(0.104)
Quitrich	0.224***	0.239***	0.195**	0.0888
	(0.0712)	(0.0815)	(0.0876)	(0.124)
Permanent rich	0.196**	0.193**	0.152	0.144
	(0.0868)	(0.0949)	(0.110)	(0.126)
Entrant non rich	0.272***	0.264***	0.298***	0.326***
	(0.0577)	(0.0718)	(0.0779)	(0.0984)
Quitnorich	0.0994	0.0744	0.0536	0.0574
	(0.0649)	(0.0670)	(0.0775)	(0.0827)
Permnorich	0.326***	0.328***	0.332***	0.346***
	(0.0576)	(0.0649)	(0.0730)	(0.0842)
Medium	0.261***	0.251***	0.239***	0.227***
	(0.0538)	(0.0594)	(0.0656)	(0.0732)
Big	0.300***	0.318***	0.333***	0.310***
	(0.0680)	(0.0732)	(0.0801)	(0.0892)
Foreign	0.647***	0.671***	0.664***	0.670***
	(0.0846)	(0.0881)	(0.0941)	(0.102)
Constant	10.19***	10.18***	10.16***	10.14***
	(0.0373)	(0.0395)	(0.0433)	(0.0486)
Observations	4,905	4,15	3,415	2,733
R squared	0.120	0.116	0.109	0.094

*** $p<0.01$, ** $p<0.05$, * $p<0.1$. Entrant rich: start exporting to richer markets; Quit rich: quit exporting to richer markets; Permanent rich: keeps exporting to richer countries; Quit no rich: quit exporting to less developed countries; Permanent no rich: keeps exporting to less developed countries; Medium: dummy equal one if the firm has between 49-99 workers and zero otherwise; Big: is a dummy variable that takes the value of one if the firms has more than 100 workers and zero otherwise; Foreign: dummy variable that takes the value of one if the firms is foreign owned; workers and zero otherwise. Standard errors clustered by firm between brackets.Sector and year dummies were included but not reported

entrants than for permanent exporters, consistent with the learning hypothesis. Nevertheless, permanent exporters exhibit a higher productivity than non-exporting firms in the four types of transitions.

We define the same four groups of firms as previously in non-exporting, entrants, quitters and permanent firms, but now we classify these groups according to the main destination of exports into two groups: richer countries and countries that are similar or less richer than Uruguay.

The results for the initial year (Table 13.1) show that the coefficient for entrants is positive and significant in all the cases, regardless of the desti-

nation of exports. The coefficient for entrants to richer countries is positively significant and higher than for entrants to non richer countries for all the transitions groups. These results would indicate a process of self-selection, which is greater for entrants to richer countries, corroborating the hypothesis that to break into a more developed country higher levels of productivity are required in order to overcome the entry costs in these markets.

On one hand, from the descriptive analysis we observe that exporters to richer countries are in average bigger (in terms of employment) than other exporting firms. This could suggest that to break into developed countries, aside reaching higher productivity, a higher scale of production is required (being these variables determined simultaneously).

Regarding to the learning by exporting hypothesis, we find that entrants and permanent exporters to richer countries do not seem to show increases in their productivity levels. Thus, there is no evidence that firms after breaking into high income countries achieve significant increases in productivity. This result could be explained by decreasing returns to learning.

On the other hand, analyzing the evolution of the differentials in productivity of those firms that export exclusively to non richer countries, we find a similar behavior to permanent exporters and firms that exported to richer countries (Table 13.1 and 14). Nevertheless, when we analyze entrants to non richer countries we find larger increases in productivity between the initial and the final year, for the intervals from one up to three years. This result is similar to the one found when we do not distinguish exports by destination. Summing up, higher gains in productivity in the first three years of starting to export are associated with exports to non richer countries.

In Table 13.2 we control for initial TFP. We find higher productivity for entrants and permanent exporters to both destinations, richer and less developed countries, except for transition 2 that shows not significant effects of entering into richer markets. In the first year (transition 1), entry to richer countries is associated with higher productivity than entry to non richer countries, with a decreasing effect afterwards. Entry to less developed countries is always positive and significant, with a higher coefficient for the third transition. Permanent exporters to richer countries do not show higher productivity while permanent exporters to less developed countries show larger productivity, except for transition 1.

Table 13.2: Differentials in productivity by destination

Type of transition Variables	1 year lnTFP	2 years lnTFP	3 years lnTFP	4 years lnTFP
Initial TFP	0.701***	0.605***	0.599***	0.661***
	(0.0323)	(0.0401)	(0.0492)	(0.0516)
Entrantrich	0.136***	0.109	0.199**	0.176*
	(0.0505)	(0.0778)	(0.0942)	(0.0962)
Quitrich	0.0459	0.0638	0.0769	0.0322
	(0.0528)	(0.0625)	(0.0818)	(0.132)
Permanentrich	0.0335	0.0629	0.0551	0.0667
	(0.0390)	(0.0582)	(0.0794)	(0.0964)
Entrantnorich	0.122***	0.150***	0.254***	0.159*
	(0.0378)	(0.0511)	(0.0741)	(0.0958)
Quitnorich	-0.0172	-0.0811	-0.0542	-0.0561
	(0.0409)	(0.0506)	(0.0638)	(0.0727)
Permanentnorich	0.0459	0.0781*	0.137**	0.151*
	(0.0283)	(0.0454)	(0.0624)	(0.0769)
Medium	0.0805***	0.0683	0.0351	-0.00749
	(0.0262)	(0.0419)	(0.0570)	(0.0686)
Big	0.102***	0.152***	0.116*	0.0372
	(0.0308)	(0.0490)	(0.0614)	(0.0745)
Foreign	0.243***	0.337***	0.291***	0.303***
	(0.0393)	(0.0589)	(0.0686)	(0.0817)
Constant	3.045***	3.999***	3.981***	3.278***
	(0.334)	(0.416)	(0.512)	(0.541)
Observations	4,297	3,444	2,738	2,195
R-squared	0.533	0.385	0.319	0.286

*** $p<0.01$, ** $p<0.05$, * $p<0.1$. Entrant rich: start exporting to richer markets; Quit rich: quit exporting to richer markets; Permanent rich: keeps exporting to richer countries; Quit no rich: quit exporting to less developed countries; Permanent no rich: keeps exporting to less developed countries; Medium: dummy equal one if the firm has between 49-99 workers and zero otherwise; Big: is a dummy variable that takes the value of one if the firms has more than 100 workers and zero otherwise; Foreign: dummy variable that takes the value of one if the firms is foreign owned; workers and zero otherwise. Standard errors clustered by firm between brackets. Sector and year dummies were included but not reported.

The explanation for these results could be associated with the strategy of internationalization of the firms. In this regard, firms could consider regional markets as the first market to break in due to geographic and cultural proximity, lower entry costs and trade agreements that make easier to enter and compete in these markets compared to other destinations (Vaillant and Cassoni, 1992). Thus, firms have a strategy of "learning to export" targeting their sales to closer markets with lower trade costs first.

**Table 14: Differentials in productivity according to destination
and permanence in export markets**

Type of transition Variables	1 year lnTFP	2 years lnTFP	3 years lnTFP	4 years lnTFP
Entrant rich	0.306***	0.312***	0.344***	0.302***
	(0.0705)	(0.0685)	(0.0746)	(0.0695)
Quitrich	0.215***	0.171*	0.208**	0.0324
	(0.0797)	(0.0887)	(0.0928)	(0.103)
Permrich	0.268***	0.267***	0.239***	0.259***
	(0.0805)	(0.0811)	(0.0813)	(0.0781)
Entnorich	0.226***	0.243***	0.173**	0.345***
	(0.0611)	(0.0705)	(0.0847)	(0.0607)
Quitnorich	0.212***	0.181***	0.155**	0.161***
	(0.0586)	(0.0577)	(0.0629)	(0.0590)
Permnorich	0.389***	0.402***	0.413***	0.378***
	(0.0560)	(0.0568)	(0.0566)	(0.0566)
Medium	0.229***	0.241***	0.179***	0.206***
	(0.0515)	(0.0496)	(0.0510)	(0.0507)
Big	0.289***	0.291***	0.273***	0.278***
	(0.0638)	(0.0648)	(0.0659)	(0.0650)
Foreign	0.584***	0.583***	0.587***	0.552***
	(0.0826)	(0.0802)	(0.0770)	(0.0795)
Constant	10.21***	10.25***	10.34***	10.40***
	(0.0378)	(0.0389)	(0.0386)	(0.0377)
Observations	4,743	4,032	3,369	2,833
R squared	0.127	0.136	0.145	0.169

*** p<0.01, ** p<0.05, * p<0.1. . Entrant rich: start exporting to richer markets; Quit rich: quit exporting to richer markets; Permanent rich: keeps exporting to richer countries; Quit no rich: quit exporting to less developed countries; Permanent no rich: keeps exporting to less developed countries; Medium: dummy equal one if the firm has between 49-99 workers and zero otherwise; Big: is a dummy variable that takes the value of one if the firms has more than 100 workers and zero otherwise; Foreign: dummy variable that takes the value of one if the firms is foreign owned; workers and zero otherwise. Standard errors clustered by firm between brackets. Sector and year dummies were included but not reported.

Thus, firms gain experience and increase their productivity levels in regional markets. Once firms have acquired experience and become more productive in regional markets they can start a strategy of market diversification and enter more exigent developed markets.

V. Concluding remarks

The main findings are that exporting firms exhibit higher productivity levels than non exporting ones, consistently with the national and international evidence. Moreover, there is evidence that the differentials in pro-

ductivity are higher for those firms that have as main destination developed countries. These firms are characterized by higher export propensity and size with respect to those firms exporting to markets of similar or lower level of development than Uruguay.

From the probit and transition group analyses we find self-selection, and that this effect is stronger to enter developed markets. To break into developed countries higher productivity seems to be a prerequisite. This, would indicate that entry barriers into foreign countries are higher, the higher the level of development of the country of destination.

On the other hand, there is no evidence of permanent gains in productivity through learning by exporting, but there are gains in productivity in the first years after entering into foreign markets. This result is also consistent with the empirical literature.[18]

Furthermore, there is no strong evidence that exporting to developed countries enhances firms' productivity. On the contrary, the evidence shows that learning by exporting is achieved by exporting to similar or less developed countries.

Finally, there is also some evidence that size is an important factor to overcome sunk entry costs into foreign markets, in particular to developed countries. In this regard, industrial policies aimed at facilitating entry to foreign markets, and in particular for small and medium enterprises, would be important in helping firms to face the challenges of entering export markets.

These finding also raise other related questions that are in our agenda, such as which type of goods do we sell by destination, and how do exports impacts on employment and skills. In this regard, there is evidence that firms that enter into developed countries employ not only more workers, but also more skilled labor force. On the other hand, there are some studies that show that exporting firms offer better job conditions. To dig deeper into these issues, is important both from academic and policy-maker perspective.

VI. References

Aghion, P., R. Blundell, R. Griffith, P. Howitt, y S. Prantl., (2009). "The effects of entry on incumbent innovation and productivity", *The Review of Economics and Statistics*. 91 (1), pp. 20-32.

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18. For instance, Girma et al. (2004) find gains up to three years after breaking into foreign markets.

Alvarez, R., y R. A López., (2005). "Exporting and performance: evidence from Chilean plants". *Canadian Journal of Economics/Revue canadienne d'économique.* 38 (4), pp. 1384-1400.

Aw, B.Y. y Hwang, A.R., (1995). "Productivity and the export market: A firm-level analysis". *Journal of Development Economics*, 47(2), pp.313–332.

Bernard, A. B, y J. Bradford Jensen, (1999). "Exceptional exporter performance: cause, effect, or both?". *Journal of International Economics.* 47 (1) pp. 1-25.

Bernard, A.B. y Wagner, J., (1997). "Exports and success in German manufacturing". *Review of World Economics*, 133(1), pp.134–157.

Bittencourt, G., y M. Vaillant., (2001). "Oferta Exportable en el Uruguay. Empresas: ¿Quiénes venden?". Documento de trabajo, mimeo. Departamento de Economía, FCS, UDELAR, Montevideo.

Boermans, M. A., (2010). "Learning-by-Exporting and Destination Effects: Evidence from African SMEs", *Applied Econometrics and International Development*, 13 (2), pp. 149-168

Clerides, Sofronis K., Saul Lach, y James R. Tybout., (1998). "Is Learning by Exporting Important? Micro-Dynamic Evidence from Colombia, Mexico, and Morocco". *Quarterly Journal of Economics* 113 (3) pp. 903-47.

Da Costa Ferré, L., (2008). "Diferenciales de productividad según orientación exportadora de las empresas: ¿se cumple la autoselección y el aprendizaje?" Documento de Trabajo No. 07/08, Departamento de Economía, FCE, UdelaR.

De Loecker, J., (2007). "Do exports generate higher productivity? Evidence from Slovenia". J*ournal of International Economics* 73 (1) pp. 69-98.

Delgado, M.A., Farinas, JC, Ruano, S. (2002). "Firm productivity and export markets: a non-parametric approach". *Journal of International Economics*, 57(2), pp. 397-422.

Eaton, J., S. Kortum, y F. Kramarz. (2008). "An anatomy of international trade: Evidence from French firms". National Bureau of Economic Research. NBER Working Paper No. 14610.

Fernandes, A.M., y A.E. Isgut., (2007). "Learning-by-Exporting Effects: Are They for Real?". MPRA Paper 3121, University Library of Munich, Germany.

Girma, S., D. Greenaway, y R. Kneller., (2004). "Entry to export markets and productivity: A microeconometric analysis of matched firms". *Review of International Economics.* 12 (5) pp. 855-66.

Granér, M., y A. Isaksson., (2009). "Firm Efficiency and the Destination of Exports:

Evidence from Kenyan Plant-level Data".*The Developing Economies.* 47 (3) pp. 279-306.

Griffith, R., S. Redding, y J. Reenen., (2004). "Mapping the two faces of R&D: Productivity growth in a panel of OECD industries". *Review of Economics and Statistics.* 86 (4) pp. 883-95.

ISGEP, International Study Group on Exports and Productivity., (2008). "Understanding Cross-Country Differences in Exporter Premia: Comparable Evidence for 14 Countries". *Review of World Economics.* 144 (4) pp. 596-635.

Kraay, A., (1999). "Exports and economic performance: evidence from a panel of Chinese enterprises". *Revue d'Economie du Developpement*, 1(2), pp.183–207.

Levinsohn, J., y A. Petrin, (2003). "Estimating Production Functions Using Inputs to Control for Unobservables". *Journal of Development Economics* 70 pp. 317-41.

Mukim, M., (2011). "Does exporting increase productivity? Evidence from India". LSE working papers. Disponible en: http://personal.lse.ac.uk/mukim/mukim_jmp.pdf.

Olley, S., y A. Pakes., (1996). "The dynamics of productivity in the telecommunications equipment industry". *Econometrica.* 64 (6) pp. 1263-97.

Peluffo A. (2008). "Trade and Technology Progress: An Analysis For Uruguay". *Revista de Economía y Estadística*, vol. XLVI, no. 2, pp. 103 - 139.

Pisu, M., (2008). "Export destinations and learning-by-exporting: Evidence from Belgium", Working Paper Research 140, National Bank of Belgium.

Trofimenko, Natalia., (2008). "Learning by Exporting: Does It Matter Where One Learns? Evidence from Colombian Manufacturing Firms". *Economic Development and Cultural Change.* 56 (4) pp. 871-94.

Verardi, Vincenzo, y Joachim Wagner., (2012). "Productivity Premia for German Manufacturing Firms Exporting to the Euro-Area and Beyond: First Evidence from Robust Fixed Effects Estimations". *The World Economy.* 35 pp. 694–712.

Wagner, J., (2007). "Exports and productivity: a survey of the evidence from firm-level data". *The World Economy* 30 (1) pp. 60-82.