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Export Costs and Geographic Diversification: Does Experience Matter?*

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Abstract

What drives firms' geographic diversification in international markets? I build a model to show that if some export costs are sunk and shared between alike destinations, the decision of a firm to enter a market is a function of its experience in a similar one. Using a rich firm-level dataset for Argentina I test this prediction and I provide evidence on the role and nature of shared export costs. Product adaptation costs, associated to market similarities in geography and culture, and quality upgrading costs, associated to market similarities in income level, are found to be significant. Finally, I show that the failure to consider firms' idiosyncratic experience in international markets leads to an underestimation of the difficulty to enter export markets.

JEL codes: F10, F12, F13, F14
Keywords: firm-level, export costs, quality, experience, geographic diversification

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1 Introduction

New theoretical developments have placed a primary role to the interaction between firm heterogeneity (firm effect, i.e. productivity) and export costs (market effect) to explain patterns of entry into foreign markets (Melitz, 2003; Chaney, 2008; Eaton *et al.*, 2008a; Helpman *et al.*, 2008). The basic prediction of these models is the so-called "hierarchy of export destinations", according to which a firm will cover as many markets as its level of productivity allows it to (i.e., a firm that export to the j^{th} most difficult market will export to all less difficult than j markets as well). However, some recent empirical findings regarding the creation of trade relations by firms hardly fit this prediction. Among these stands out the fact that entry to foreign markets is mostly explained by the specific ability of a firm to sell to specific markets (firm-country effects)[1] and that firms enter additional markets gradually rather than in large clumps (Eaton *et al.*, 2008b; Buono *et al.*, 2008).

In this paper I build a model to show that certain aspects in these dynamics are compatible with a setting where some export costs are sunk and (at least partially) shared between alike destinations. Should this be the case, the decision by a firm to enter a market will also be a function of its experience exporting to a similar one. A reverse implication would be that patterns in the paths of geographic diversification followed by firms would be indicative, not only of the presence, but also of the nature of the costs involved in exporting activity.

The persistence of export behavior induced by sunk costs of exporting is well documented in the literature (Roberts and Tybout, 1997; Bernard and Jensen, 2004)[2]. What is less documented is the implication that export sunk costs have for trade dynamics in a multicountry framework. I intend to fill this gap by exploiting a rich panel dataset of Argentine exporters between 2003 and 2006 that comprises: (i) customs data regarding value exported, products sold, destination markets served and an indirect measure of quality such as unit export prices; (ii) a direct measure of quality such as firm $ISO-9000$ certification; and (iii) employment as a measure of firm size.

I test for the presence and sources of export sunk costs and the hysteresis they can generate by asking whether the exporting spatial history of a firm (i.e., where the firm exported in the previous period) helps to explain current export market entry. Results show that having exported to a specific destination in $t-1$ increases the probability of exporting to a similar country in t. In particular, "product adaptation" export costs, asociated to market similarities in terms of geography and culture (distance, border and language in common between pairs of destinations countries), result particularly relevant to explain geographic diversification by firms. "Quality upgrading" export costs, related to market similarities in terms of development, and hence similarities in the demand for quality (Hallak, 2006 and 2008), also result siginificant. Importantly, taking into account the specific experience each firm has in international markets appears to be important to properly account for its likelihood of entry to some markets.

These results are consistent with evidence coming from marketing literature that suggests that a usual strategy of exporters is to geographically spread their exports in a way that they can leverage their accumulated knowledge from one market to another (see Kogut and Zander, 1993; and Johanson and Vahlne, 1977). The more similar export markets are, the more possibilities to benefit from sunk investments a firm has. In fact, trade export costs, commonly associated to marketing and the adaptation of the product to the taste of the new consumers (i.e. repackaging), are possibly shared among culturally similar or geographically proximate countries. Also, the fact that higher income countries consume higher quality goods (Hallak 2006, 2008) could imply additional restrictions, specially for a firm established in a developing country, but once sorted they would allow selling to other high income destinations.[3]

[1] Rather than to firm ability (firm effects) and/or export costs (country effects) by separate as is predicted by theory.

[2] Roberts and Tybout (1997) and Bernard and Jensen (2004) explore the presence and magnitude of sunk costs in the decision to export or not by testing the importance of past export status to explain current export status. After controling for heterogeneity and other sources of endogeneity, persistence in exporting activity is evidence in favour of the existence of sunk costs.

[3] The fact that consumers in foreign markets tend to percieve products from developing countries negatively, a

The importance the results presented here for a developing country are fairly evident. From a policy point of view, it is crucial to understand the patterns of entry to external markets, especially in the case of developing countries for which the contribution of the extensive margin, i.e. existing exports to new markets, explains the greater part of trade growth (Benton and Newfarmer, 2007; Amurgo Pacheco and Pierola, 2008; Besedeš and Prusa, 2007). In addition, a large number of governments have encouraged the entry of firms to international markets by means of export promotion agencies[4] and trade agreements with the idea that exports might fuel economic growth. But the effect of these policies may depend on the specific characteristics of firms and target countries. If, for example, entry to high income countries is the result of the ability to overcome quality constraints, then polices focusing exclusively on facilitating entry may not generate increases in export participation if they are not accompanied by improvements in firms' ability to compete internationally. Thus, understanding these issues is relevant to assess the efficacy and a proper design of export promotion programs. At the same time, they provide concrete elements to the ever-lasting discussion on the convenience of North-South vs. South-South trade agreements.

This paper is related to a growing literature on the description of firms' exporting strategies that emphasize on learning mechanisms and uncertainty to explain export dynamic patterns. Albornoz et al. (2009) and Eaton et al. (2009) appeal to arguments such as the existence of a probation period to test waters and clear out uncertainty to explain firm export entry patterns and growth. Arkolakis (2008) introduces dynamics into a static model of international trade by assuming a stochastic process for the growth of firms' productivities. All this ongoing research seeks to explain the fact that the certain export relations are more short-lived than what would be predicted by any export sunk cost model. Although this is not the focus of this paper, the geographic spread of trade patterns described here may well be compatible with some aspects of the learning mechanisms they propose.

The plan of the paper is as follows. In the next section I sketch a theoretical model and motivate the analysis performed in the empirical section. Section 3 describes the data. Section 4 tests implications derived in Section 2. In Section 5 I discuss the importance of the results from a policy point of view. Finally, in Section 6 some conclusions are derived.

2 Theoretical Motivation: Shared Export Costs in a Heterogeneous Firm Model

This section presents the theoretical basis of the econometric analysis developed in Section 4. The model incorporates the key features of Melitz (2003), Chaney (2008) and Eaton et al. (2008a) -that is, firm heterogeneity and fixed and variable costs of exporting- and extend them, probably in the most simple way it can be done, to a multiperiod framework.

2.1 Set up

I consider the export behavior of a set of N firms, indexed by i, that each period t face the decision to export to a set of J countries, indexed by j. I assume that each firm produces only one product from the set goods Ω available in the world economy. Therefore, i also indexes products and no additional index is needed. Time is discrete and starts at $t = 0$. Optimization is static and on a market by market basis which means that a firm decides to enter a market when profits derived from activity in that market are positive *ex-ante* within period (i.e. firms take into account the effect that exporting in t to j has on profits derived from exporting to a j' market only in $t + 1$).

As is standard in international trade literature, I assume a single factor of production, constant marginal costs, mill-pricing, the Dixit-Stiglitz mark-up, and iceberg transport costs. Firms differ

phenomenon known in marketing literature as "country of origin effect" (see for example Bilkey and Nes, 1982) can reinforce the argument (Chiang and Masson, 1988; Hudson and Jones, 2003).

[4] According to Lederman et al. (2007) the number of national export promotion agencies has multiplied by three over the past two decades.

in productivity, φ, which reduces variable production costs, $c\tau_j$. c is the price of the single factor of production and τ_j are the variable costs of exporting to j which have the iceberg specification[5]. These can be interpreted as transport costs but also as tariffs and other costs that increase with the quantity produced (marketing, distribution, etc.). Formally:

$$c_j(\varphi_i) = \frac{c\tau_j}{\varphi_i} \tag{1}$$

Fixed variable costs of exporting to market j are a composite function of a market specific cost ($f_{ij,t}$), a cost shared by members of a group of markets k where j and some other $j\prime$ countries belong to ($f_{ik,t}$), and a random disturbance $\eta^f_{ij,t}$ that idiosyncratically affects firm i's costs of exporting to market j. Formally:

$$f_{ij,t} = f_{ij,t} f_{ik,t} \eta^f_{ij,t} \qquad 1 \leq f_{ij,t} \leq \overline{f}_j \; ; \; 1 \leq f_{ik,t} \leq \overline{f}_k \tag{2}$$

where $log(\eta^f_{ij,t})$ is a supply shock that is zero mean, iid, uncorrelated to any producer's efficiency, φ_i, and independent across j.

The reason for modeling fixed export costs in this way is fairly intuitive. In the first place, export costs, commonly associated to marketing and the adaptation of the product to the taste of the new consumers (i.e. repackaging), are market specific but possibly shared among culturally similar or geographically proximate countries. In the empirical application I will refer to these first sources of shared export costs as "product adaptation" costs.

In the second place, exporting to higher income countries implies additional restrictions in terms of quality requirements, specially for a firm established in a developing country. First, due to national reputation effects, buyers perceive products from developing countries as of poor quality[6]. Second, this restriction can be made explicit in the requirement for quality standards, i.e. $ISO-9000$ series. WTO (2005) recognizes the negative impact that quality standards can have on exports of developing countries[7,8]. Policy-oriented research also back-ups this concept (Chen et al., 2006[9], Maskus et al., 2005). Finally, quality constraints are more stringent the more developed is the market as high income countries tend to consume goods of higher quality (Hallak, 2006 and 2008)[10]. Whatever the explanation could be, the important thing to note is that a costly quality upgrading investment is required to sell to a high income country[11], but once made it would allow the firm to further expand its sales among those destinations. In the empirical application I will refer to this second source of export costs as "quality upgrading" export costs.

Export costs are assumed to be sunk. This implies that they are a decreasing function of firms' participation in j and in other $j' \in k$ markets served by the firm . Formally, $f_{ij,t} = f_{ij}(s_{ij,t-1})$ and $f_{ik,t} = f_{ik}(s_{ij'\in k,\, t-1})$, with $f'_{\bullet,t} < 0$, where s_{ijt-1} and $s_{ij'\in k,t-1}$ are indicator functions that take the value of 1 if firm i exported in $t-1$ to country j or $j' \in k$, respectively, and 0 else.

For example, if firm i has no experience in export markets, or has experience but exporting to a very different country, then $f_{ij,t} = \overline{f}_j$ and $f_{ik,t} = \overline{f}_k$ and the firm will have to pay the full export cost $F_{ij,t} = \overline{F}_j$ to enter the new market j. If firm i has not exported to market j but has exported to a

[5] τ_j units have to be shipped to market j for 1 unit to arrive.

[6] The concept is known in international marketing literature as "country of origin effect" (Chiang and Masson, 1988; Hudson and Jones, 2003)

[7] What is more, in Doha Declaration, the lower capacity of less developed countries to comply with international standards is acknowledged. Member countries are encoureged to give technical support and financial assistance to those countries.

[8] Evidence for high income countries shows the opposite sign (Swann et al.,1996; Moenius, 1999; Piermartini, 2005) or are not a relevant impediment for firms to export (OECD, 1999).

[9] This work reports that the likelihood of exporting to more than three countries is reduced by 7% when standards are present.

[10] The fact that the ranking of countries that report standards is by far dominated by the most developed countries also supports this idea (WTO, 2005)

[11] Maskus et al. (2005) provide evidence in this respect. They find that fixed costs of compliance with quality standards reach to aproximately U$S 425,000 per firm (4.7% of value added on average).

market j' that fully shares the export cost (i.e. a very similar market), then $f_{j,t} = \overline{f}_j$ but $f_{k,t} = 1$ and the firm will not need to pay the shared export cost again. Intermediate values for $f_{ik,t}$ will depend on the degree of similarity between destination countries.[12]

Finally, firm i faces in t a demand curve for its product in market j given by:

$$q_{ij,t} = \eta^q_{ij,t} p^{-\sigma}_{i,t} \frac{E_{j,t}}{P^{1-\sigma}_{j,t}} \qquad \sigma > 1 \tag{3}$$

where $log(\eta^q_{ij,t})$ is a zero mean and iid random demand shock that is also independent of any producers productivity, φ_i, and across j; p_i is the price charged by the firm; E_j is the level of expenditure of country j; and $P_{j,t} = \left(\int_{i\in\Omega} p^{1-\sigma}_{i,t} di\right)^{\frac{1}{1-\sigma}}$ is the ideal price index of imports of country j.[13] In what follows I dispense with the price aggregator P_j to simplify notation.

2.2 Market entry in the first period

In the first period ($t = 0$) no firm has experience in export markets. So $f_{ij,t} = \overline{f}_j$ and $f_{ik,t} = \overline{f}_k$, which means that $F_{ij,t} = \overline{F}_j$. Firm i will only export to market j when its profits are positive. This would only be possible if:

$$\varphi_i > \left(\zeta^{-1} \frac{\overline{F}_j}{E_j} \psi_{ij}\right)^{\frac{1}{\sigma-1}} c\tau_j \tag{4}$$

where $\zeta = \left(\frac{1}{\sigma-1}\right)\left(\frac{\sigma-1}{\sigma}\right)^{\sigma}$ and $\psi_{ij} = \eta^f_{ij}/\eta^q_{ij}$ is a positive shock to entry to market j. For any $\psi_{ij} = \psi$, condition (9) for entry determines a cut-off productivity level:

$$\underline{\varphi}_j = \left(\zeta^{-1} \frac{\overline{F}_j}{E_j} \psi\right)^{\frac{1}{\sigma-1}} c\tau_j \tag{5}$$

The productivity cut-off depends negatively on accessibility to the market given by the combination of trade costs and expenditure. If it were not for ψ_{ij} the model would predict a hierarchy of export destinations, as distinct levels of accessibility determine distinct productivity cut-off levels to enter markets and only suppliers with productivity levels such that $\varphi_i > \underline{\varphi}_j$ would export to j and any j' market whose $\underline{\varphi}_{j'} < \underline{\varphi}_j$. In other words, the hierarchy of export destinations would be strict if it were not for the occurrence of idiosyncratic supply and/or demand shocks η^f_{ij} and η^q_{ij}.

2.3 Market Entry in Subsequent Periods: Shared Export Costs and the Geographic Diversification of Exports

From $t+1$ onwards, because export costs are shared between destination markets, additional sources for market entry may arise. Suppose two countries, j and j', that belong to a group of countries k. Suppose also that in period t firm i exported to j but not to j'(because firm i has a $\varphi_i < \underline{\varphi}_{j'}$). Benefits from selling in market j' in $t+1$ of firm i will be:

$$\Pi_{ij',t+1} = \zeta \eta^q_{ij',t+1} \left(\frac{\varphi_i}{\tau_{j'} c}\right)^{\sigma-1} E_{j',t+1} - \overline{f}_{j',t+1} f_{ik,t+1} \eta^f_{ij',t+1} \tag{6}$$

[12] A straightforward and intuitive argument that supports this way of modelling sunk costs of exporting is, for example, the fact that in the presence of harmonization in quality standards, paying the cost to comply with them enlarges the possibilities that a firm has to sell to other markets that share the same quality restriction, without any additional investments in quality.

[13] The demand system (4) can be derived formally from Dixit-Stiglitz preferences assuming that representative consumer in every country j consumes all goods in Ω.

As $f_{ik,t+1}$ is negatively related to past export experience, then $\frac{\partial \Pi_{ij' \in k,t+1}}{\partial s_{ij \in k,t}} \geq 0$. So, having paid the fixed cost to export to market j in t, can potentially turn benefits in market j' (that were negative in t) positive in $t+1$. The extent of the impact of having exported to j in t on exporting to j' in $t+1$ will depend on the degree of similarity of those two countries.

Hence, the productivity cut-off that firm i faces in market j',

$$\underline{\varphi}_{ij',t+1} = \left(\zeta^{-1} \frac{\overline{f}_{j',t+1} f_{ik,t+1}}{E_{j',t+1}} \psi_{t+1} \right)^{\frac{1}{\sigma-1}} \tau_{j'} c \tag{7}$$

will depend on its own history in international markets. Clearly, as $f_{ik,t} = f_{ik}(s_{ij' \in k,\, t-1})$ is decreasing in export experience in other similar markets $j \in k$, then $\frac{\partial \underline{\varphi}_{ij' \in k,t+1}}{\partial s_{ij \in k,t}} \leq 0$. The productivity cut-off to enter market $j' \in k$ in $t+1$ provided that the firm exported to other $j \in k$ in t is $\underline{\varphi}_{ij' \in k,t+1}\big|_{s_{ij \in k,t}=1} \leq \underline{\varphi}_{ij' \in k,t+1}\big|_{s_{ij \in k,t}=0} = \underline{\varphi}_{j}$.

This is a direct result of the asumption that optimization is static and firms optimize *ex-ante* within period. In a forward looking decision problem, firms would discount the effect of exporting to j on benefits of exporting to j', and may also decide to sell in t to countries that *ex-ante* generate negative benefits within period but positive *ex-post*, after discounting the benefit derived from exporting to other markets.

2.4 A General Assessment of Departures from Hierarchy of Destinations

Firms' experience in export markets provides an additional source of explanations for departures from hierarchy of export destinations. Taking logs of equation (11), the decision of a firm to enter market j in a period t, having not exported to that market in $t-1$, can be described as:

$$s_{ij,t}\big|_{s_{ij,t-1}=0} = \begin{cases} 1 \text{ if } \log\left(\frac{\varphi_i}{c}\right) + \frac{1}{\sigma-1}\log(\zeta) + \frac{1}{\sigma-1}\log(E_{j,t}) - \log(\tau_j) - \\ \qquad - \frac{1}{\sigma-1}\log f_{ij}(s_{ij,t-1}) - \frac{1}{\sigma-1}\log f_{ik}(s_{ij' \in k,t-1}) + \\ \qquad + \frac{1}{\sigma-1}\left[\log(\eta^{q}_{ij',t}) - \log(\eta^{f}_{ij',t})\right] > 0 \\ \\ 0 \text{ else} \end{cases} \tag{8}$$

To simplify exposition, let the shared export costs of markets belonging to a k group be $\overline{f}_k$ in the first country belonging to k the firm exports to and zero for all other countries belonging to k.[14] In this case, equation (12) can be more compactly written as:

$$s_{ij,t}\big|_{s_{ij,t-1}=0} = \begin{cases} 1 \text{ if } \alpha + \beta_i + \gamma_j + \delta_{ij,t-1} + \varepsilon_{ij,t} > 0 \\ \\ 0 \text{ else} \end{cases} \tag{10}$$

where where:

$\alpha = \frac{1}{\sigma-1}\log(\zeta)$

$\beta_i = \log\left(\frac{\varphi_i}{c}\right)$

$\gamma_j = \frac{1}{\sigma-1}\left[\log E_j - \log \overline{F}_j\right] - \log \tau_j$

[14] That is:

$$\log f_{ik,t} = \begin{cases} \log(\overline{f}_k) \text{ if } s_{ij' \in k,t-1} = 0 \text{ and } s_{ij \in k,t-1} = 0 \;\forall\; j, j' \in k \\ \\ 0 \text{ else} \end{cases} \tag{9}$$

$\delta_{ij,t-1} = s_{ij' \in k,t-1} \frac{1}{\sigma-1} \log f_k$.

$\varepsilon_{ij,t} = \frac{1}{\sigma-1} \left[\log(\eta^q_{ij,t}) - \log(\eta^f_{ij,t}) \right]$

Even in the presence of idiosyncratic supply or demand shocks (firm-market effects $\varepsilon_{ij,t}$), productivity (firm effect β_i) or accessibility (market effect γ_j) do not fully explain entry to markets. Time dependent firm-market effects $\delta_{ij,t-1}$, given by experience in similar markets, explain departures from hierarchy of destinations. Note also that because $\delta_{ij,t-1}$ is correlated with γ_j (both include the shared export cost f_k in their definition), its omission when estimating an equation like (14) would result in an underestimation of the costs of entry. In section 4 I test the validity and importance of the time dependent firm-market effect $\delta_{ij,t-1}$ and explore the nature of export costs underlying it.

3 The Data

The dataset consists of three databases. The first one provides highly disaggregated customs export data at the firm level over the period 2002-2006. Data are reported annually at the firm-product-market level, i.e., one can know how much a given Argentine firm has exported of a certain product to a certain market in a particular year. Specifically, each record includes the firm's tax ID, the product code (6-digit HS), the country of destination, and the export value in US dollars. The second one provides data on ISO certificates, which was obtained from the National Institute of Industrial Technology (INTI) website.[15] Data includes both the beginning and expiration dates, over the same period. The third one provides data on firms' employment for the same lapse from Argentinas' tax agency (AFIP). In each of the cases firms were identified by their tax ID, so that databases could be merged.[16]

I restrict the sample to firms that export differentiated products as defined in Rauch (1999) liberal classification because theory refers to these kind of products (in fact, it builds on a differentiated product demand structure). I will take the unit of observation i as representing only the firm, dispensing with the product dimension (i.e. if firm i exported products a and b to market j, the firm is observed only once in market j). Only when inspecting price setting behavior I will take as the unit of analysis the firm-product observation (i.e. if firm i sells products a and b to j, the firm is observed twice in market j).

Another restriction I make affects the geographic dimension of the database. Data on GDP, per capita GDP, tariffs and other variables are not available for all destinations. Thus, 100 countries (98% of total exports of Argentina) are kept in the final database. Many times I will refer to the country group or region were countries belong to. The groups were defined with a policy criteria as they correspond to the major regional blocks with whom Argentina has a trade agreement in force or has once initiated trade negotiations. These groups are MKS+ (Mercosur countries plus Chile), NAFTA (Nafta countries except Mexico), R.ALADI (the rest of the Latinamerican Integration Asociation countries), EU-15 (the fifteen original members of the European union) and OTHERS (the rest of the countries).

4 Econometric Testing

In this section I test econometrically some of the derivations of the theoretical model of Section 2 regarding the effects of experience in market entry. I also explore in more depth the existence of quality upgrading export costs looking at their implications for quality production and price setting behavior.

[15] http://www.inti.gov.ar

[16] More details on data can be found in Appendix A.

4.1 Market Entry

The main goal of this subsection is to empirically identify the existence and the role shared export costs have in determining the geographic expansion of a firm in international markets. To do so I estimate equation (14) and I pose special attention on the effect of $\delta_{ij,t-1}$. This effect will also be informative about the nature of export costs incurred by firms when exercising in international markets. Regularities in the way firms add markets, i.e. similarities between destination markets previously served and a new market served, constitute evidence on the characteristics of past investments incurred to export. To do so, I propose four measures of similarity or "proximity" between markets to proxy for $\delta_{ij,t-1}$.[17] I will call these P-variables. The measures are as follows:

$PBORD$ and $PLANG$ are $0-1$ variables that indicate whether the new market shares, respectively, a common border and common commercial language with at least one of the markets to which the firm exported in the preceding period.

$PDIST$, reflects geographic distance of j market to the most proximate market to which the firm exported in $t-1$. Specifically,

$$PDIST_{ijj',t} = \min_{j'}\{\ln(DIST_{jj'})|_{s_{ij',t-1}=1}\} \tag{11}$$

where, $DIST_{jj'}$ is the geographic distance between actual market j and the most proximate country j' to which the firm exported in $t-1$. Figure 3 depicts a kernel estimation of the distribution of this variable for destinations to which firms started exporting (Starts: $s_{ij,t}|_{s_{ij,t-1}=0} = 1$) and destinations to which firms did not start exporting (No Starts: $s_{ij,t}|_{s_{ij,t-1}=0} = 0$). Clearly, the former concentrates more mass around smaller values of the variable, showing that new entries tend to occur to markets close to those previously exported. In the econometric estimations this variable will enter with a negative sign so that closeness to a previously exported country is interpreted to rise probability of entry.

$PBORD$, $PLANG$ and $PDIST$, each in a different manner, point to similarities in terms of geography an culture, so I will interpret them as being the reflection of the existence of "product adaptation" costs. But, as I mentioned, export costs are also associated to quality requirements in international markets. To define a measure of "quality upgrading" export cost, let's first assume, as it is done in previous studies (see Hallak 2005 and 2006), that quality restrictions in international markets are linked to the level of development of the country. The reason is that the more developed is the market, the higher are the quality requirements and the costs associated to comply with them. Given this, $PDEV$ tries to capture the extent to which the new export market and export markets served in $t-1$ are related in terms of development and hence in terms of demand for quality[18]. Formally:

$$PDEV^{1\max}_{ijj',t} = \{abs\left[\ln(y_{jt}) - \ln(y_{j'^{\max}t-1})\right]|_{s_{ij',t-1}=1}\} \tag{12}$$

$PDEV^{1\max}$ measures the development gap between actual market and the most developed market to which the firm exported in $t-1$, $y_{j'^{\max}t-1}$, an indicator of the maximum level of quality reached in the previous period. Again, Figure 3 depicts a kernel estimation of the distribution of this variable for destinations to which firms started exporting (Starts: $s_{ij,t}|_{s_{ij,t-1}=0} = 1$) and destinations to which firms did not start exporting (No Starts: $s_{ij,t}|_{s_{ij,t-1}=0} = 0$). The former concentrates more mass around smaller values of the variable, showing that new entries tend to occur to markets of similar income to that of the most developed market to which the firm exported in the previous period. In the econometric estimations that will be presented in what follows this variable enters the equation with a negative sign so that similarity in terms of income to a previously exported country is interpreted to rise probability of entry.

To proxy for market effect γ_j usual gravity variables are included in the regression. $DIST_j$, the geographic distance between Argentina and the destination country, proxies for transport costs.

[17] Evenett and Venables (2002) employ a similar approach to explain the disappearance of numerous zeros in bilateral trade matrices since the 70s.

[18] The measure is similar to those used to test the validity of Linder hipothesis (see Hallak, 2008).

$BORD_j$ is a dummy variable that reflects the fact that the destination country shares a border with Argentina, $LANG_j$ is the dummy for common language and DEV_j is the per capita income of destination country, a variable that tries to capture its development level and hence the extent of the quality restriction. Finally, $PREF_j$ is the preferential tariff that firm i pays in market j and GDP_j is the logarithm of the gross domestic product of market j.[19] Global supply or demand changes are simply captured as a function of time by temporal dummy variables.

The estimable analogue of equation (14) is then:

$$\begin{aligned} s_{ij,t} &= \beta_i + \gamma_1 GDP_j + \gamma_2 PREF_{ij} + \gamma_3 BORD_j + \gamma_4 LANG_j + \\ &\quad \gamma_5 DIST_j + \gamma_6 DEV_j + \gamma_7 PBORD_{ijj',t} + \gamma_8 PLANG_{ijj',t} + \\ &\quad \gamma_9 PDIST_{ijj',t} + \gamma_{10} PDEV_{ijj',t} + \varepsilon_{ij,t} \end{aligned} \tag{13}$$

4.1.1 Econometric Issues

The main drawback to estimate equation (17) is that β_i is unobservable. Neglecting firm heterogeneity would overstate the effect of past participation in international markets, because the entry to certain foreign markets will be correlated to the firms' ability to export.

To account for the endogeneity coming from non random selection of firms into certain export markets (in e.g. more productive firms exporting to more difficult countries) I opt for a fixed effect specification as a random effects assumption is quite likely to be violated. I choose to work with a linear probability framework because it allows to model the unobserved firm effect as fixed and for its computational simplicity and straightforward interpretation of results.[20]

It could be argued that there might be time varying heterogeneity biasing the results (i.e productivity indexed by t, $\varphi_{i,t}$), because, for instance, the mere exporting activity may lead, through learning, to productivity gains. In this case, not modeled persistence in the error structure will be picked up by the proximity measures and hence erroneously interpreted as the existence of shared export sunk costs. A specification with fixed effects by year and firm will help to alleviate this problem.

It is also true that in the setting presented above, productivity gains would result not only in an increase in the probability to enter any market (fact that would be effectively controlled by the firm-year fixed effects), but also would increase the probability to enter specific markets, resulting in a determinate pattern of geographic diversification too. If, as it is quite plausible, the distribution of productivity thresholds (the $\underline{\varphi}_j$s) followed any geographic, cultural and/or development pattern, significant coefficients for the P-variables could not be attributable to the existence of shared export costs as they would also be compatible with "productivity gain" type of explanations. However, if this were the case, the pattern of diversification would be one in which the firm moves up but along the hierarchy of export destinations in opposition to the one proposed by the shared export costs hypothesis that results in patterns of diversification according to which the firm moves away from the hierarchy.

To discriminate between these two stories I include in the estimations the variable $PHIERARCHY$. To compute this variable first I sort export destinations according to the number of Argentinean firms that export there. I call this variable $HIERARCHY$ (see appendix B). Less popular (more difficult) destinations have a lower value of this variable. Secondly, I compute the difference between the $HIERARCHY$ of the less popular (more difficult) market the firm exported in the previous period and the $HIERARCHY$ of the new export market . Formally:

$$PHIERARCHY_{ijj',t} = \{[\ln(HIERARCHY_{j'^{\max},t-1}) - \ln(HIERARCHY_{jt})]\,|_{s_{ij',t-1}=1}\} \tag{14}$$

[19] For additional details on sources and construction of variables see Appendix A.

[20] An alternative is to estimate equation (17) with a conditional logit specification to avoid the problem of negative and/or larger than 1 probabilities. Although a specification like that could effectively solve that problem, a conditional logit estimation does not provide marginal effects as only odds ratios could be estimated (appart from being computatinaly way more costly). Anyway, regressions with a conditional logit specification were also performed without any substancial change in the results.

If the coefficient associated to this variable is positive, then entry could be explained by increases in productivity, because new export markets would be typically less popular (more difficult) than the markets to whom the firm already exports to. Conversely, if the coefficient associated to this variable is negative then entries could not be explained by increases in productivity, because new entries would occur to be to "easier" countries. I also include the absolute value of this variable to learn about the magnitude of the movements along the hierarchy. If the coefficient of the absolute value is positive, then entry to markets would be associated to large movements or "jumps" along the hierarchy. This is not what one would expect is going to happen under a learning setting where improvements should be quite "smooth". A first inspection of this variable based on a kernel estimation its distribution depicted in Figure 3 shows that a productivity gain story can hardly explain new market entries, as starts ($s_{ij,t}|_{s_{ij,t-1}=0} = 1$) are associated to negative and quite large values of the variable.

Two alternative samples are used for the estimation of (17). Sample A includes (i) firms that were not exporters in $t-1$ but that become exporters in t (ii) firms that were exporters in $t-1$. In the case of (i) proximity variables were calculated on the basis of their experience in the domestic market, Argentina. Sample B includes only observations in (ii). Because of this, the bias associated with the selection of more skilled firms into exporting, and the possible changes in size, employment composition and wages due to changing status from non exporters to exporters reported in previous works (Bernard and Jensen, 1995, 1999) will probably not be present. Neither of the two samples includes firm-market observations that present positive exports two years in a row.[21]

Finally, I also present a random effects specification as a benchmark to observe the effect of certain variables that may proxy for the firm effect β_i. $QMKT_i$ measures the market coverage of the firm in $t-1$. The reason why this variable may proxy ability to export is simple: If adding a new destination country requires incurring in a specific cost of entry, then trading with a larger number of countries will reflect higher ability (Bernard et al., 2006; Bradford and Jensen, 2004; Roberts and Tybout, 1997). Size of firm is proxied alternatively by variables $LABOR_i$, that measures the firms' total number of employees, and $EXPO_i$, that measures total exports of the firm, both variables also positively correlated to the ability to export (Bernard and Jensen, 2001; Clerides et al., 1998; Roberts and Tybout, 1997, among others). $ISO-9000_i$ variable reflects the fact that the firm has a quality standard certificate (in e.g. $ISO-9000$) in t. As shown in Castagnino et al.(2008) the fact that a firm has a quality certificate is associated to greater market diversification and hence better performance in international markets. $EXPER_i$ measures lagged continuous experience of a firm in international markets (Roberts and Tybout, 1997; and Bernard and Jensen, 2004). All these variables are lagged one year to avoid simultaneity problems. Finally, $MULTI_i$ is a dummy variable that takes the value of 1 if the firms belongs to a multinational group and 0 otherwise. This characteristic may or may not be associated to a higher ability to enter new markets. On the one hand, belonging to a multinational group may make easier for a firm to enter any export market (because informational barriers would be lower, for instance). On the other hand, many multinational companies are inserted in an international chain production process and directed intra-firm trade exclusively governs their international trade operations. In this case trade with new partners is more unlikely.

[21] Although not reported here, regressions were performed also for a third sample that included observations of makets that were served in the previous period and not only restricted to new markets. In this third case the effect of the lagged dependent variable was estimated. However, as it is widely known the estimation of the lagged dependent variable *per se* violates the condition of independence of regressors and the error term at any point in time (see Baltagi, 2008), and hence estimation of coefficients of all explanatory variables would result biased. Dropping the observations corresponding to markets that where served the last period and keeping, as in the estimations I report, the observations for new entrances only, provides consistent estimates for the proximity variables, at the obvious cost of sacrificing the estimation of the coefficient for the lagged dependent variable. A surely more correct way of dealing with the endogeneity of the lagged dependent variable in a binary choice framework with unobserved heterogeneity would be to employ the initial conditions identification procedure proposed by Wooldridge (2005). Results comming from this estimation, although very preliminary, do not depart from those presented here.

4.1.2 Baseline Results

Table 3 shows estimation results for both samples for a variety of specifications. Column (1) of each sample shows the result for the random effects specification with firm characteristics and time dummies as controls. In column (2) of each sample a firm fixed effect is included (and firm characteristics come out). Columns (3) includes firm-year fixed effects (and time dummies come out). Of all these specifications the one in column (3) of Sample B is the preferred specification as takes care of all econometric issues pointed out in the previous subsection. I divided the table in four blocks each of them comprising different sets of variables. The first block includes firm characteristics (the β_is). The second block includes usual gravity variables (the γ_js). The third block includes P-variables (the $\delta_{ij,t-1}$s). The fourth block includes $PHIERARCHY$ and its absolute value.

The coefficient estimates for firm characteristics show mixed results. Size and the ISO-9000 dummy have the correct sign, feature that does not change between specifications. Perhaps less obvious are the results for $EXPER$, $QMKT$ and $MULTI$, whose sign changes between specifications, in the case of the first two variables, or shows no significant impact, in the case of the latter one. I have no concluding interpretation about the results for $EXPER$ and $QMKT$. Maybe responds to the fact that firms are more prone to add markets during their first years as exporters, when they export to a few countries, and they reduce their speed of diversification when they get to export to a substantial amount of markets or they gain experience (may be because there are no more export costs to leverage between export markets). The insignificancy of $MULTI$ is in line with the already pointed out *a-priori* uncertain effect of this characteristic.

Most of the coefficient estimates for gravity variables have the correct sign and are statistically significant at the 1%. Exceptions are the language dummy and the tariff barrier measure. The negative sign for the first one in some of the specifications might be due to Brazil, a Portuguese speaking country with whom Argentina, a Spanish speaking country, has very close trade relations. In turn, $PREF$ turns out to have the correct sign across all specifications but looses its significance for some specifications. In particular, it seems more significant for Sample A, fact that might be indicating that tariff barriers could be heavier for the firms that export for the first time. Other variables do not suffer much changes between specifications. Importantly, DEV shows a negative sign which indicates that quality demand factors are restrictive for Argentinean firms.

In turn, the P-variables, the variables of interest, all have a positive effect on the probability to enter a market, providing evidence on the existence of shared sunk costs. Specially high are those associated to adaptation costs, $PBORD$. The correct sign and significance of the coefficient for $PDEV$ indicates that sunk costs in quality may have a role in explaining market entries. This is so even after controlling for the other proximity variables. As there is a strong correlation between geography and the level of development of countries, $PBORD$ or $PDIST$ may be capturing some of the variation corresponding to the effect of path-dependence due to quality upgrading export costs. In fact, the coefficient for $PDEV$ significantly rises from 0.0024 to 0.0043 when the other P-variables are taken out of the regression, as it is shown in the first column of Table 4. Additionally, the positive effect of $PDEV$ is robust to other definitions of the variable as shown in columns (2) and (3) of the same table.[22] Finally, the effect is still significant if the estimation sample is restricted to firms that did not have an export experience until $t-1$, as shown in column (4) of the same table.

Finally, $PHIERARCHY$ and its absolute value have a negative and positive sign, respectively, result that is robust across specifications. Patterns of entry that these findings imply are not compatible with "productivity gain" type of explanations, as geographic diversification is on average more related to "easier" countries more than "difficult" ones, and to "jumps" rather than to "smooth" movements along the hierarchy of export destinations.

[22] The alternative definitions of $PDEV$ are as follows. $PDEV^{2\max}_{ij(-J),t} = \{[\ln(y_{jt}) - \ln(y_{(-j^{\max})t-1})]^2 \;\; | s^i_{-j,t-1} = 1\}$, which takes the square of the difference instead of the absolute value of the difference, as does $PDEV^{1\max}_{ij(-J),t}$. In turn, $PDEV^{1\max ppp}_{ij(-J),t}$, is defined exactly $PDEV^{1\max}_{ij(-J),t}$ but gdp per capita ppp instead of gdp per capita was used for its calculation.

4.1.3 Robustness (I): Low vs. High Income Markets

The effects of quality upgrading export costs in geographic diversification should be higher the higher the quality demand of the destination country. If, as argued, quality demand is positively related to income, the effect would be stronger for entries to high income destinations. In this subsection, I explore this possibility. Table 5 shows the results.

In column (1), I augment the preferred specification with an interaction term between $PDEV$ and DEV whose sign is positive and significant. The interpretation is straightforward: having already exported to a rich market in $t-1$, and hence having already paid the quality upgrading cost to do so, reduces the negative effect of quality requirements in new entries to richer countries.

The rest of the columns show results of estimations done for current entries to different blocks of countries. So, for instance, in the column (3) "to high income countries" I perform the estimation keeping observations for firms that in t entered high income countries no matter if they also export to low income countries or not. In turn, in the column (2) "not to high income countries" I perform the estimation keeping observations for firms that in t entered low or middle income markets but that did not enter high income markets. The idea is to compare determinants of entry for firms that have presumably attained different levels of quality compliance.

Results show that, the marginal effect of demand for quality similarity of $PDEV$ variable is higher for entries to high income markets, as shown by the higher effect of the variable in the columns (3) and (8). Again, as expected, the sunk costs in quality effect is stronger for high income countries. The exception is the effect for firms that entered to NAFTA (column (7)), result that could be explained either by the fluid trade relation Argentinean firms have with the US (it is the fourth most popular market; see Table 1.C in appendix C), or because of the US proximity to Mexico, or because the block is composed by only two countries.

4.1.4 Robustness (II): Firms' Size

Preferred specification was also estimated for subgroups of firms according to the number of employees. Results are shown in Tables X. Estimations show that marginal effects of P-variables are also, with the exception of $PDEV$, quite stable across decils[23], showing that those effects are independent from size. The effect of $PDEV$, in turn, seems to be decreasing in size. In the extreme, for firms in the $10th$ decil its effect is not significant, perhaps showing that either the ability to enter high income countries could be only partially related to size (or, in general, that export diversification is partially related to size). Alternatively, it can mean that bigger firms are able to diversify more freely their exports between very dissimilar countries in terms of demand for quality. To distinguish between these two explanations is beyond the scope of this paper, but would probably be a fertile ground for future research.

5 Discussion: Where You Export Matters

So far, I have showed evidence on the importance experience has for firms to break into new markets and on the importance of incurring in quality upgrading costs to sell to higher income destinations. In this section I briefly discuss the key implications of former findings.

As suggested in Section 2, the fact that experience is important can be seen as an omitted variable problem when learning about the probability a firm has to enter a market. In Table 11 I show two estimations. One (a) is analogous to the preferred specification in Table 3, the other (b) is the same as previous one but dispensing with proximity variables. Compared to (a), according to (b) is much easier to export to a country that shares the language with Argentina and is not such a big deal to

[23] Number of observations across decils should not be the same (i) because deciles were defined acording to the population of Argentinean firms (exporters and not exporters) and because, as said, (ii) observations for markets that were served twice in a row were dropped.

enter higher income countries. In at least these two cases, it seems that neglecting the importance of experience in external markets leads to an underestimation of the difficulty to enter foreign markets.

Hausman specification test in Table 4 corroborates this idea as it rejects the null at the 1% significance level. Hence, omitting proximity variables leads to an underestimation of the hurdles to enter a market. This is because the costs for an individual firm do not, and would likely not, match those of the average. Experience has a role.

Why are these results important to trade and industrial policy? In the first place, policies that solely reduce costs of exporting may not have the desired consequences as their effects may depend on the specific characteristics of firms and target countries. If a substantial amount of firms have experience selling abroad, but this experience is limited to less competitive markets, then, for example, signing a trade agreement with developed countries may not yield the pursued increases in the extensive margin of trade (in e.g. more firms selling to richer countries). In fact, this could be behind the fact that new exporters play a marginal role in the total export growth after a trade liberalization[24].

In the second place, it is the common practice of governments to ask for information regarding export experience of firms to make policy decisions (in the allocation of quotas, to give export credits and export marketing subsidies, etc.). The results here claim that export experience means more than just selling abroad and that where firms export is valuable information to learn about firms' probability of success in the face of a policy stimulus.

6 Conclusions

In this paper I provided evidence on the role experience has in entering export markets. Patterns in geographic diversification of firms were showed to be consistent with the hypothesis of the existence of export costs that are sunk and shared between destination countries. Specifically, I showed that entering a particular destination in the past increases the probability of entering a similar market in the future. Product adaptation export costs, associated to geography and culture, resulted particularly relevant to explain the geographic spread of firms' exports in international markets. Importantly, the incidence of quality upgrading export costs, associated to the level of development of destination countries, also resulted significant.

As shown by Hausman specification test results, it is necessary to take proper care of this issues to account for the "true" probability to enter certain markets, especially when there is a varying number of heterogeneous firms with different histories in export markets. Since exports to high income destinations are dominated by large exporters of long standing trade experience, neglecting the fact that they enter those markets in part because they have the knowledge to do so leads to a subestimation of the hurdles to export.

If fostering exports to high income destinations is a policy objective (because it increases profits of firms and the demand of skilled labor, make wages to go up or leads to improvements in technology) then the most convenient way of achieving it seems not to be exclusively the implementation of policies focused on facilitating entry across the board. In the first place, because in the face of the existence of high entry costs associated to quality upgrading, the results of those policy actions might be lower than expected. In the second place, and in addition to that, because this can happen even in the case of firms that already export.

As results showed, it is not easy to leverage experience in international markets, specially when trade diversification decisions involve very different destinations. This is specially important for a country like Argentina, which has a great proportion of firms selling only to Mercosur or other Latinamerican countries. The empirical evidence suggests that the experience in those markets may not be to a large extent useful to sell to high income destinations.

[24] See Iacovone and Javorcik (2010) for a firm-level examination of mexican export boom after this country joined NAFTA.

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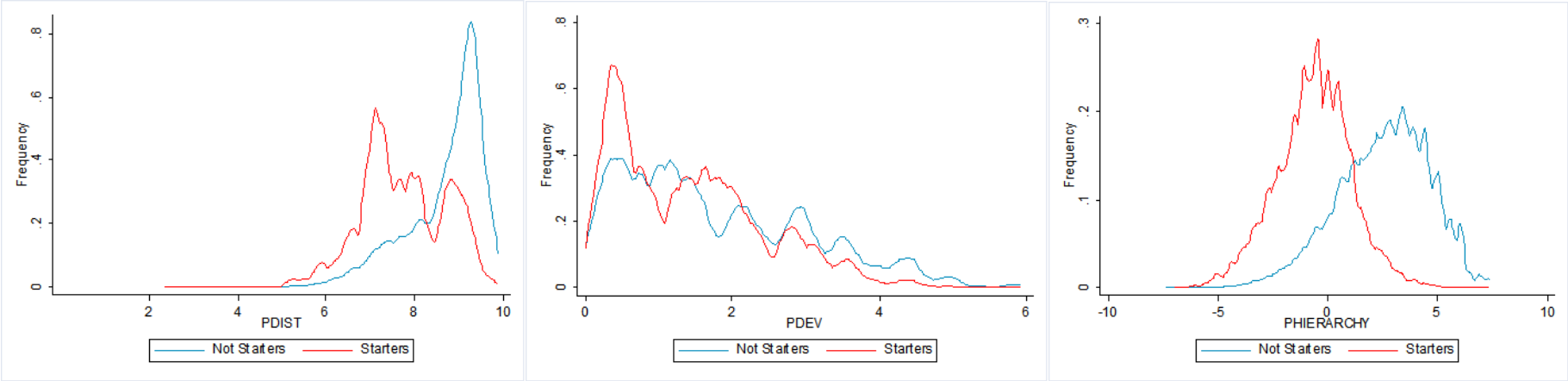
Table 3
Market Entry: Baseline Results

	Sample A Includes not exporters in t-1			**Sample B** Does not include not exporters in t-1		
	(1)	(2)	(3)	(1)	(2)	(3)
LABOR	0.0004 **	0.0026 **		0.0007 **	0.0030 **	
	0.0000	0.0003		0.0001	0.0004	
ISO-9000	0.0014 **	0.0043 **		0.0019 **	0.0049 **	
	0.0003	0.0010		0.0004	0.0011	
EXPER	0.0001 **	-0.0004 **		0.0004 **	0.0001	
	0.0000	0.0001		0.0000	0.0003	
QMKT	0.0014 **	-0.0045 **		0.0009 **	-0.0048 **	
	0.0000	0.0001		0.0000	0.0001	
MULTI	-0.0003			-0.0005		
	0.0007			0.0010		
BORDER	0.0298 **	0.0300 **	0.0302 **	0.0307 **	0.0308 **	0.0302 **
	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007
LANG	0.0011 **	0.0008 *	-0.0023 **	0.0044 **	0.0041 **	-0.0003
	0.0003	0.0003	0.0003	0.0003	0.0004	0.0004
DIST	-0.0245 **	-0.0239 **	-0.0214 **	-0.0179 **	-0.0173 **	-0.0140 **
	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003
DEV	-0.0018 **	-0.0017 **	-0.0017 **	-0.0027 **	-0.0026 **	-0.0027 **
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
GDP	0.0078 **	0.0077 **	0.0067 **	0.0065 **	0.0064 **	0.0049 **
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
PREF	-0.0010 **	-0.0007 *	-0.0006	-0.0006	-0.0003	-0.0002
	0.0003	0.0003	0.0003	0.0004	0.0004	0.0004
PBORDER	0.0307 **	0.0301 **	0.0291 **	0.0275 **	0.0271 **	0.0259 **
	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004
PLANG	0.0059 **	0.0060 **	0.0062 **	0.0062 **	0.0064 **	0.0064 **
	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
PDIST	0.0043 **	0.0047 **	0.0057 **	0.0040 **	0.0043 **	0.0051 **
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
$PDEV^{1max}$	0.0018 **	0.0017 **	0.0013 **	0.0027 **	0.0026 **	0.0024 **
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
PHIERARCHY	-0.0061 **	-0.0066 **	-0.0088 **	-0.0077 **	-0.0083 **	-0.0114 **
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002
ABS(PHIERARCHY)	0.0086 **	0.0089 **	0.0097 **	0.0100 **	0.0104 **	0.0114 **
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
firm re	yes	no	no	yes	no	no
firm fe	no	yes	no	no	yes	no
firm-year fe	no	no	yes	no	no	yes
year dummies	yes	yes	no	yes	yes	no
No obs.	3,119,970	3,119,970	3,119,970	2,248,770	2,248,770	2,248,770

** significant at the 1% level; * significant at the 5% level

Note: standard errors behind estimates

Figure 3
Distribution of *PDIST*, *PDEV* **and** *PHIERARCHY*



Note: Starters $s_{ij,t}|_{s_{ij,t-1}=0}= 1$; Starters $s_{ij,t}|_{s_{ij,t-1}=0}= 1$

Table 4

Market Entry: Robustness checks for quality sunk costs

	(1)	(2)	(3)	(4)
BORDER	0.0289 **	0.0304 **	0.0304 **	0.0257 **
	0.0007	0.0007	0.0007	0.0013
LANG	0.0045 **	-0.0002	-0.0001	-0.0022 **
	0.0004	0.0004	0.0004	0.0008
DIST	-0.0195 **	-0.0141 **	-0.0141 **	-0.0181 **
	0.0003	0.0003	0.0003	0.0006
DEV	-0.0039 **	-0.0019 **	-0.0012 **	-0.0022 **
	0.0001	0.0001	0.0001	0.0002
GDP	0.0050 **	0.0049 **	0.0049 **	0.0055 **
	0.0001	0.0001	0.0001	0.0002
PREF	-0.0003	-0.0002	-0.0001	-0.0006
	0.0004	0.0004	0.0004	0.0007
PBORDER		0.0261 **	0.0260 **	0.0135 **
		0.0004	0.0004	0.0009
PLANG		0.0067 **	0.0066 **	0.0079 **
		0.0002	0.0002	0.0005
PDIST		0.0052 **	0.0052 **	0.0039 **
		0.0001	0.0001	0.0003
$PDEV^{1max}$	0.0043 **			0.0029 **
	0.0001			0.0003
$PDEV^{2max}$		0.0003 **		
		0.0000		
$PDEV^{1maxppp}$			0.0016 **	
			0.0001	
PHIERARCHY	-0.0119 **	-0.0113 **	-0.0113 **	-0.0074 **
	0.0002	0.0002	0.0002	0.0003
ABS(PHIERARCHY)	0.0109 **	0.0114 **	0.0116 **	0.0091 **
	0.0001	0.0001	0.0001	0.0002
firm-year fe	yes	yes	yes	yes
No. obs.	2,248,770	2,248,770	2,248,770	403,277

** significant at the 1% level; * significant at the 5% level

Note: Regressions performed with sample B. Standard errors behind estimates.

Estimates in column (4) for a subsample of first time exporters in *t-1*.

Table 5

Market Entry: Estimations According to Maximum Level of Quality Attained

	(1) Interaction term	(2) Not to high income countries	(3) To high income countries	(4) Only to MKS+	(5) Only to R.ALADI	(6) Only to REST	(7) to NAFTA	(8) to EU-15
BORDER	0.0305 **	0.0377 **	0.0176 **	0.0354 **	-0.0164 **	0.0131 **	0.0227 **	0.0089 **
	0.0007	0.0008	0.0012	0.0008	0.0038	0.0042	0.0016	0.0016
LANG	0.0000	-0.0040 **	0.0003	-0.0019 **	0.0190 **	-0.0104 **	0.0021 *	-0.0047 **
	0.0004	0.0006	0.0007	0.0007	0.0020	0.0025	0.0009	0.0009
DIST	-0.0137 **	-0.0179 **	-0.0112 **	-0.0277 **	-0.0191 **	-0.0140 **	-0.0088 **	-0.0119 **
	0.0003	0.0004	0.0006	0.0006	0.0018	0.0020	0.0007	0.0007
DEV	-0.0023 **	-0.0014 **	-0.0063 **	-0.0009 **	-0.0009	-0.0023 **	0.0131 **	-0.0088 **
	0.0001	0.0001	0.0007	0.0001	0.0005	0.0008	0.0039	0.0007
GDP	0.0048 **	0.0048 **	0.0052 **	0.0034 **	0.0028 **	0.0040 **	0.0052 **	0.0054 **
	0.0001	0.0001	0.0002	0.0001	0.0005	0.0007	0.0002	0.0002
PREF	0.0000	0.0007	-0.0012 *	0.0005	0.0011	-0.0011	-0.0018 *	-0.0019 *
	0.0004	0.0005	0.0006	0.0005	0.0021	0.0024	0.0009	0.0008
PBORDER	0.0259 **	0.0276 **	0.0244 **	0.0102 **	0.0451 **	0.0002	0.0272 **	0.0218 **
	0.0004	0.0005	0.0006	0.0007	0.0024	0.0036	0.0008	0.0007
PLANG	0.0061 **	0.0110 **	0.0051 **	0.0077 **	*n.v.*	0.0143 **	0.0052 **	0.0066 **
	0.0002	0.0005	0.0003	0.0006	-	0.0016	0.0004	0.0005
PDIST	0.0052 **	0.0039 **	0.0047 **	-0.0123 **	-0.0089 **	0.0058 **	0.0057 **	0.0044 **
	0.0001	0.0002	0.0002	0.0006	0.0011	0.0008	0.0003	0.0002
$PDEV^{1max}$	0.0001	0.0017 **	0.0050 **	0.0010 **	0.0021 **	0.0020 *	-0.0143 **	0.0073 **
	0.0004	0.0002	0.0007	0.0002	0.0007	0.0009	0.0039	0.0008
$DEVxPDEV^{1max}$	0.0003 **							
	0.0001							
PHIERARCHY	-0.0115 **	-0.0091 **	-0.0137 **	-0.0405 **	-0.0347 **	-0.0070 **	-0.0141 **	-0.0148 **
	0.0002	0.0002	0.0003	0.0008	0.0017	0.0009	0.0003	0.0003
ABS(PHIERARCHY)	0.0114 **	0.0105 **	0.0119 **	0.0407 **	0.0351 **	0.0059 **	0.0126 **	0.0120 **
	0.0001	0.0001	0.0001	0.0008	0.0015	0.0006	0.0002	0.0002
firm-year fe	yes	yes	yes	yes	yes	yes	yes	yes
Continuers in market j	no	no	no	no	no	no	no	no
Not exporters in t-1	no	no	no	no	no	no	no	no
No. obs.	2,248,770	1,290,726	958,044	805,323	72,074	48,412	596,348	624,748

** significant at the 1% level; * significant at the 5% level

n.v. : no variation

Note: standard errors behind estimates

Table 7
Market Entry: Estimations According to Size

	1st decil	2nd decil	3rd decil	4th decil	5th decil	6th decil	7th decil	8th decil	9th decil	10th decil
BORDER	0.0091 **	0.0232 **	0.0224 **	0.0263 **	0.0349 **	0.0395 **	0.0421 **	0.0437 **	0.0405 **	0.0209 **
	0.0020	0.0020	0.0020	0.0019	0.0019	0.0019	0.0021	0.0021	0.0023	0.0027
LANG	-0.0012	0.0031 **	0.0068 **	0.0020	0.0014	0.0013	0.0026 *	-0.0013	-0.0013	-0.0114 **
	0.0012	0.0012	0.0012	0.0011	0.0012	0.0011	0.0012	0.0012	0.0012	0.0014
DIST	-0.0132 **	-0.0136 **	-0.0177 **	-0.0142 **	-0.0166 **	-0.0157 **	-0.0195 **	-0.0124 **	-0.0126 **	-0.0131 **
	0.0010	0.0009	0.0010	0.0009	0.0009	0.0009	0.0010	0.0010	0.0011	0.0013
DEV	-0.0036 **	-0.0026 **	-0.0025 **	-0.0019 **	-0.0025 **	-0.0017 **	-0.0025 **	-0.0028 **	-0.0027 **	-0.0026 **
	0.0004	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0004	0.0006
GDP	0.0053 **	0.0050 **	0.0050 **	0.0046 **	0.0048 **	0.0044 **	0.0056 **	0.0046 **	0.0049 **	0.0062 **
	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004
PREF	-0.0015	0.0002	-0.0002	0.0011	0.0004	0.0005	0.0005	0.0006	-0.0001	-0.0034 *
	0.0010	0.0011	0.0013	0.0011	0.0010	0.0012	0.0011	0.0012	0.0011	0.0015
PBORDER	0.0153 **	0.0199 **	0.0204 **	0.0267 **	0.0243 **	0.0232 **	0.0237 **	0.0299 **	0.0311 **	0.0251 **
	0.0013	0.0013	0.0013	0.0012	0.0012	0.0012	0.0012	0.0011	0.0011	0.0012
PLANG	0.0074 **	0.0061 **	0.0036 **	0.0072 **	0.0063 **	0.0062 **	0.0062 **	0.0071 **	0.0055 **	0.0060 **
	0.0008	0.0008	0.0008	0.0008	0.0008	0.0007	0.0008	0.0007	0.0007	0.0008
PDIST	0.0049 **	0.0049 **	0.0033 **	0.0044 **	0.0035 **	0.0042 **	0.0046 **	0.0055 **	0.0054 **	0.0065 **
	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0005
PDEV^{1max}	0.0042 **	0.0032 **	0.0029 **	0.0021 **	0.0026 **	0.0018 **	0.0022 **	0.0021 **	0.0011 *	0.0006
	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0005	0.0006
PHIERARCHY	-0.0077 **	-0.0082 **	-0.0084 **	-0.0099 **	-0.0107 **	-0.0104 **	-0.0091 **	-0.0108 **	-0.0126 **	-0.0164 **
	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
ABS(PHIERARCHY)	0.0082 **	0.0096 **	0.0096 **	0.0114 **	0.0117 **	0.0112 **	0.0102 **	0.0102 **	0.0106 **	0.0127 **
	0.0003	0.0003	0.0004	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
firm·year fe	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Continuers in market j	no	no	no	no	no	no	no	no	no	no
Not exporters in t-1	no	no	no	no	no	no	no	no	no	no
No. obs.	170,115	184,803	198,762	212,621	227,425	237,756	239,578	256,557	262,401	258,752

** significant at the 1% level; * significant at the 5% level
Note: standard errors behind estimates

Table 11
Omitted Variable Bias - Hausman Specification Test

	Estimated Coefficient (a) consistent	Estimated Coefficient (b) efficient	Difference
BORDER	0.0262 ***	0.0253 ***	0.0010 ***
	0.0006	0.0006	0.0001
LANG	-0.0003	0.0054 ***	-0.0057 ***
	0.0003	0.0003	0.0001
DIST	-0.0120 ***	-0.0167 ***	0.0048 ***
	0.0003	0.0003	0.0001
DEV	-0.0026 ***	-0.0006 ***	-0.0020 ***
	0.0001	0.0001	0.0001
GDP	0.0046 ***	0.0043 ***	0.0003 ***
	0.0001	0.0001	0.0000
PREF	-0.0003	0.0001	-0.0005 ***
	0.0003	0.0003	0.0000
No obs.	2,750,068	2,750,068	
Hausman Test	$Chi^2(6)=15,952.14$	$prob>Chi^2=0.0000$	

(a) Estimation performed on Sample B. Includes *P*-variables: *PBORDER*, *PLANG*, *PDIST* and *PDEV^{1max}*. Specification consistent under H_0.

(b) Estimation performed on Sample B. No *P*-variables included. Specification consistent and efficient under H_0. Inconsistent under H_a.

Note: *p-values* behind the estimates.

Appendix A: Data description

Database was complemented by destination country specific data. CEPII gravity variables database was used to obtain variable for distance ($DIST$ and $PDIST$), common border ($BORD$ and $PBORD$) and common commercial language ($LANG$ and $PLANG$) between pairs of destination markets. Also, World Banks' World Development Indicators were used to construct the measure of development level (DEV) and development gap ($PDEV$) between destination countries as well as other country specific variables. WTO information at its web site was used to construct the dummy for regional trade agreement.

Applied Tariffs are from MAcMap database for the year 2004, reported at HS-2digit level. MAcMap tariffs include *ad-valorem* and *ad-valorem* equivalent specific tariffs. I computed the tariff that a particular firm faces in a particular market by imputing the tariff of the HS chapter through which the firm exported, in the case that the firm exported through a single chapter, and the exports weighted average, in the case that a firm exported through more than one chapter

Appendix B: Hierarchy of Destinations and Number of Exporters

To obtain closed form solutions, I follow recent literature in assuming a Pareto distribution for φ_i. I assume that the CDF, $G(\varphi)$, and the PDF, $g(\varphi)$ take the forms

$$G(\varphi) = 1 - (\varphi/\widehat{\varphi})^{-\kappa}, \text{ and } g(\varphi) = \kappa\widehat{\varphi}^{\kappa}\varphi^{-\kappa-1} \tag{1.B}$$

where $\widehat{\varphi}$ is the lower support of the distribution for φ_i.

The total pool of firms that might export to market j is given by N_j and the total pool of firms that export is given by N_x, this latter being considered an exogenous variable here. The share of firms exporting to market j is:

$$N_j/N_x = \Pr(\varphi/\underline{\varphi}_j) = 1 - G(\underline{\varphi}_j) = (\underline{\varphi}_j/\widehat{\varphi})^{-\kappa} \tag{2.B}$$

Plugging (9) into equation $(2.B)$ for $\underline{\varphi}_j$ the potential number of exporters to a market j can be expressed as a function of the attributes of the market:

$$N_j = N_x \left[\zeta^{-1}\frac{F_j}{E_j}\psi\right]^{\frac{-\kappa}{\sigma-1}} (c\tau_j)^{-\kappa}\,\widehat{\varphi}^{\kappa} \tag{3.B}$$

Clearly the hierarchy of export destinations manifests in the popularity of the markets. An alternative approach is to express the cut-off value in market j as a function of the number of potential entrants:

$$\underline{\varphi}_{jt} = G^{-1}(1 - N_j/N_x) = (N_j/N_x)^{-1/\kappa}\widehat{\varphi}$$

In the econometric section, I define $HIERARCHY = N_j/N_x$, which can be thought as a single index of the difficulty of entering market j. This measure has the advantage of compactness and will be used to see if market diversification could be explained by productivity gains.