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New exports from emerging markets: Do followers benefit from pioneers?☆

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ABSTRACT

We study the micro dynamics of new exports from a country. The modern international trade workhorse models (e.g. Melitz, 2003) assume heterogeneous productivity and, implicitly, predict that the ex-post largest exporters in a new product would be the pioneers, since they can pay back exploration costs. However, using detailed data on the early dynamics of new exports in Chile (1990–2007) we show that, on average, pioneers export *less* than comparable followers in the same new product. Moreover, followers are 40% more likely to enter a product if a pioneer survives more than one year exporting. These facts are consistent with pioneer-to-follower spillovers, or at least with stories in which the cost of entering early is disproportionally higher for larger exporters. Otherwise they would enter first. Firms better at "exploration" could be worse at "exploitation" (scale-up) in a new export product. This phenomenon is scarce, though, since in most new products pioneers are not followed, even if they survive.

1. Introduction

Pioneer firms are the first to export a new product from a country. A fraction of these new exported products also have follower firms, which start exporting after the pioneers in those same products. We try to understand if pioneers are different from followers. Are pioneer firms the first at entering into a new export product because they will export more, so they can more easily pay back any exploration costs? Or is it that pioneers enter earlier because they have lower exploration costs in the product, so it is cheaper for them to try new products? These micro-level questions can have important implications for the way countries diversify their aggregate export baskets and explore their dynamic comparative advantages (e.g. Grossman and Rossi-Hansberg, 2010; Hausmann and Rodrik, 2003).

The dominant paradigm today in international economics is modeling firms with heterogeneous productivity. Applying its standard logic to one particular new product, would predict that firms that end up exporting the most of a particular new product should be the pioneers (e.g. Melitz (2003) and extensions, such as Arkolakis (2010); Eckel and Neary (2010) for multiproduct firms). By having larger expected profits these firms should be willing to pay the sunk cost of exporting before other firms with lower expected revenue in the product. In this empirical paper we find, however, that in the early stages of new exports the largest exporters in a product do not coincide with the pioneers, at least when they have followers.

Using a detailed novel dataset for a developing economy, and a more precise definition of what a new exported product is than the previous literature, we find three stylized facts. First, around 70% of pioneered products do not have followers. Even in the majority of cases when the pioneer survives there are no followers. This could suggest that, in case there is such a thing as pioneer-to-follower informational spillovers, as suggested by Hausmann and Rodrik (2003), this might not be ubiquitous to all products. Some of these cases of "lonely pioneers" could be consistent with the Krugman (1980) model with increasing

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Table 1
Taxonomy of different events of a firm exporting a product.

		Has any firm exported this product from the country before 1995?	
		Yes "*old* product"	No "*new* product"
Is it the first firm exporting the product from the country?	Yes	N/A $N = 0$	$Pioneer_{new\ product}$ $N = 110$
	No	$Follower_{old\ product}$ $N = 8964$	$Follower_{new\ product}$ $N = 288$

Each observation in this table is a unique firm-product combination for all the firms that begin exporting a new product for them; which in most cases is not a new product for the country as a whole. They are organized in a two by two matrix. The columns relate to products (the left column showing old products and the right column showing new products); the rows relate to firms (pioneer or follower). The first row groups pioneers and the second row the followers, depending on whether the firm is among the exporters during the first year of exports for that particular product.

returns to scale, in which there is no room for follower firms in the same product and country. Second, we find that followers are 40% more likely to enter a product if the pioneer survives exporting more than one year. The third stylized fact focuses only on products that do have followers. Despite pioneers and followers coming from a similar distribution of overall export size, we find that pioneers tend to be systematically smaller than followers in the specific new product they pioneered, even if we control for how experienced firms are in the new product as well as for product-year shocks.

This latter finding seems at odds with current standard international trade models of firms with heterogeneous productivity but a homogeneous menu of entry costs. Our facts could be consistent with the possibility that relatively larger exporters in a product may also have higher exploration costs in that new export. This could plausibly be consistent with followers learning about export profitability from a pioneer that enters because of an "exploration advantage".

These pioneer-to-follower informational spillovers in non-excludable innovations have been highlighted at least since Arrow (1962). These theories argue that pioneers of new products are "data producers" (Schumpeter, 1934) generating information about technology and markets from which subsequent followers free-ride. The consequence is that pioneers do not fully internalize the social benefit of the information they create, and as a result there is less than optimal experimentation in new products. This can force countries into an income trap due to their inability to exploit dynamic comparative advantages (e.g. Bardhan, 1971; Hausmann and Rodrik, 2003; Hoff, 1997). For clarity, our results do not prove that there is a market failure in this discovery, since empirically it is almost impossible to discard every other possible alternative story. Having said that, though, there is a relevant related literature claiming that externalities between pioneers and followers would not prevent a country from finding its long run comparative advantage. This could be the case if pioneers can scale-up very large post entry, and therefore they can internalize a large fraction of the "discovery externality", *if* there is one (Grossman and Rossi-Hansberg, 2010). Our evidence, though, shows that pioneers are not the best at scaling up exports of the new product, challenging an important assumption of the Grossman and Rossi-Hansberg (2010) model. Although we cannot rule out that pioneers internalize all the benefit from the export discovery for the products in which there is no room for a second player.

Part of the novelty of our paper relies in the way a new product is defined and the dataset used, which differs from previous empirical literature that analyzed new export products and pioneer-to-follower spillovers (Freund and Pierola, 2009; Iacovone and Javorcik, forthcoming). These papers analyze successful ex-post cases or industries, or use definitions of new products which might be contaminated by "old" products that are intermittently exported. On the contrary, we build a data set of all "new" export products from Chile using transactions data (1990–2006), which allows us to: (i) observe information at firm-product level over time, to distinguish firm behavior from industry behavior; (ii) focus specifically on the subset of new export products, where there is arguably something new to learn[1] and where we can identify the order of entry of firms, so we know who is the pioneer; and (iii) analyze the universe of disaggregated product categories exported in the period, to avoid hindsight biases towards ex post successful cases. With this data, we define a new product as one that has not been exported in the last 5 years, together with several filters which had the goal of being very conservative in the identification of truly new products which reflect the effort of productive firms of selling innovation abroad. These contrasts with the definitions used in the previously mentioned empirical literature, which defines a new product as any code that has not been exported for only 1 year. This short pre-sample period might be problematic, since it can confuse the emergence of truly new products – which have never been exported before – with the re-entry of intermittent exports (products that are exported for a year or more, and then are not exported for 1 or 2 years, returning a few years later). This intermittent entry and exit are not the phenomenon of truly new exports that we would like to pick. Taking a pre-sample of 5 years without exports to classify a product as *new*, reduces the proportion intermittent exporting that may be misclassified as "new". As one can expect, using this criterion alters results significantly when compared to the simpler criteria described in the literature.[2]

Even though new exports are rarely relevant in terms of the overall export value of a country, the study of these early stages is important. All successful products were at some point new, so analyzing their early dynamics and its implications is important for the potential impact they have on future relevant export products or sectors. If one understands new products as options of moving in the ladder of dynamic comparative advantage, then it matters whether the exploration mechanism offered by the market is working reasonably well or whether it suffers from significant market failures. In our sample we do not find a significant number of products that could be classified as "big successes". So we are unable to quantitatively study what differentiates standard pioneers from the pioneers of superstar products. Since big export successes are a very low probability event, studying them would probably require pooling together samples from many countries, which is certainly a challenge for future research.

We focus our analysis in a developing economy for data and conceptual reasons. On the one hand, we had access to detailed and diverse data for Chile. Also, given the way we define newly exported products for a country, it is unlikely that we will identify new products in advanced economies because these countries export many more existing codes in a long time span as the one we use. Second, in a developed economy we would be mixing pioneers exporting with pioneers creating a new product, which is likely to have a more complex R&D process than exporters in our sample, which are inside the global technological frontier. Also, the international Customs classification of products are relevant for our problem only if the entity that updates the global list of goods adds them to the classification before the first export of such a product for a country, which is unlikely to happen in developed economies like

[1] Foster and Rosenzweig (2010), in a review of recent empirical literature on externalities, remark that in order to statistically find learning "*there ought to be something new to learn*". Under this logic, for example Duflo et al. (2009) do not find learning across firms in fertilization of *old* crops in Kenya. In contrast, for the *new* and unknown pineapple crop in Ghana, Conley and Udry (2010) distinguish learning *across* firms. The spirit of our empirical strategy is precisely to focus only on new products, to see whether we can find evidence of learning flowing from the pioneer to the follower.

[2] Iacovone and Javorcik (forthcoming) find many "pioneers" exporting "new" products from Mexico to the US immediately after NAFTA in 1994. Moreover, they find that the largest exporters entered first which is the opposite of our findings. In Section 4 we actually make the presample period shorter to compare results with similar definitions of new products. Shortening the presample period changes our results and end up being similar to that of Iacovone and Javorcik (forthcoming), revealing the importance of a careful definition of new products.