
Rodrigo A. Wagner¹

PhD Dissertation - Harvard University; defended May 2011;

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Abstract

This dissertation explores innovation in the context of the new export products of emerging and developing economies. The first essay shows that economies with a more flexible export structure tend to recover faster from macroeconomic crises. The second essay opens the black box of how these new products are “discovered” for export; documenting facts consistent with the view that pioneers create knowledge that benefit subsequent followers. The last essay explores how firms coordinate to solve market failures in their industries. It shows that participation in associations is disproportionately important for exporters.

Category: Economics: International Economics: Global innovation and knowledge diffusion

Keywords: Export Entrepreneurs, Macroeconomic recovery, Innovation, Business Associations

¹ Assistant Professor at Tufts University since Sep 2011

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Executive Summary

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This dissertation contains three essays on international economics, with emphasis on how less developed economies innovate in different export activities.

The first essay, "Growth Collapses", explores why some countries tend to recover much slower from macroeconomic crises than others. In some way, this first chapter puts into context why should we ever care about new export products.

At the beginning of the chapter we identify 535 events of output contractions around the world – where GDP is below its historical maximum - between 1960 and 2005. The distribution of these episodes is highly skewed: while the median duration is 2 years, more than a quarter of them last more than 7 years and roughly 14% last more at least 15 years. Developing countries are much more likely to experience prolonged contractions than industrial countries.

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We have studied the factors that coincide with the onset of these crises. In terms of statistical significance, we find that the drop in real aggregate exports is the variable most strongly associated with the probability of suffering a crisis -- at least in developing countries. A one standard deviation decrease in the growth rate of merchandise exports implies a 5.47 percentage point increase in the probability of a crisis. In terms of economic significance, a one-standard deviation increase in inflation appears to be slightly more damaging, though the coefficient is somewhat less precisely estimated. Wars, sudden stops and political transitions also tend to coincide with the onset of crises.

The duration of a collapse is somewhat more difficult to predict. Surprisingly, *the variables that we find to be significantly associated with the probability of a crisis occurring do not appear to be related to crisis duration*. Inflation, aggregate exports or natural disasters do not tell you how long the crisis will last.

Nonetheless, the main contribution of this chapter is to show that the *flexibility* of a country's export basket is systematically associated with shorter GDP collapses. Importantly, this stylized fact remains robust even after controlling by income, population and other usual suspects driving cross country differences in either income or volatility.

This is consistent with the view that once an economy collapses, those with a flexible export structure are more resilient. By flexible export structure we mean the existence of nearby products that are currently not being exported, but that are intensive in some of the factors and capabilities that the country currently has, so if a current export products collapses, resources can be re-deployed to other uses and the economy can take off³

This finding leaves an open question on whether the flexible export structure is a cause or simply a signal of some underlying factors and institutions in the country. We lack a perfect experiment to

³ Export flexibility is measured using the "openforest" computations of Hausmann and Klinger (2007).

disentangle the previous causality question, but these results certainly increase the demand to better understand how export diversification takes place at a micro-level; which is precisely the goal of the next chapter

Chapter two of my dissertation corresponds to my job market paper "*Do Followers Benefit from Pioneers in New Export Products?*". It explores how new export products are "discovered" by countries, looking at the dynamics of early entry into very specific products.

The first part of the paper builds a database of new export products, using firm-level Customs data from Chile between 1991 and 2006. This is, at the best of my knowledge, the first comprehensive dataset of all new export products from a country.

The first finding comes straight from tabulating the number of pioneers (entrants the first year) and followers (subsequent entrants) in each product.

For the period 1995-2005, Table 1 indicates that less than 30% of products have followers; and only one third of the products with followers have two or more followers . This quantitatively suggests that only few potential entrants into exporting can benefit from learning, which contrasts with the largely publicized cases of new product adoption in agriculture, where by the structure of industry there are many potential entrants⁴.

⁴ Like the traditional case of Griliches (1957), and more recently Conley and Udry, 2010; Foster and Rosenzweig, 2010

Table 1. Number of Products in the sample tabulated according to the number of pioneers and followers. Only product cohorts that started pre Dec 31, 2000.

N of Pioneers			Total %
	1	2	
N followers			
0	110	5	66%
1	27	4	18%
2	17	0	10%
3	5	1	3%
4 to 6	6	0	3%
Total %	94%	6%	N=175 100%

Second, in 96% of the new products there is a single pioneer. This was the first indication that there might be something different across firms that make them start exporting before others do. If firms were very similar and the only thing going on was a demand shock or an exchange rate movement, then we would expect that many firms jump into exporting the product at the same time, as found by Iacovone and Javorcic in their study of Mexican firms after NAFTA in 1994.

The second piece of evidence we provide is that the entry of followers is more likely in products in which the pioneer survived. Table 2 shows that if the pioneer survives the first export season, it is almost twice as likely that some followers enter the product (16.3/39.7 vs. 15.9/60.3). Part of this effect could be because survival is tougher in some years. That is why in the paper we run further regressions, correcting by year effects, finding that it is still 12 percentage points more likely to observe followers if

the pioneer succeeded. This is, again, consistent with the view that other firms can infer from the success of the pioneer whether the new export product is more likely to be profitable. Followers enter disproportionately in cases where the product has proved to be more sustainable for the pioneer

Table 2. Products tabulated depending on pioneer survival and whether some follower(s) enter the product or not.

	Product has follower(s)		Total
	No	Yes	
Pioneer does not survive	44.4	15.9	60.30%
Pioneer survives a season	23.4	16.3	39.70%
Total	67.8	32.2	100.00%

Pr (Pearson's $\chi^2 > 5.67$)=0.018

The third piece of evidence, and probably the most compelling for modern international economics research, focuses on the export volume differences between pioneers and followers.

Modern workhorse models of exports with heterogeneous firms, like Melitz (2003), are based on the idea that firms differ chiefly in their productivity and size. That simplification has proved very useful to understand how reallocation takes place after large changes to the steady state, like the massive trade liberalization of the 1980s and 1990s. Extending this idea into new export products, one would expect that the (ex post) largest exporter of a product would have been more likely to be pioneer. Following this view, if there is any additional cost of being pioneer of a new good, then the “best seller” can more easily pay the toll of this exploration, since it is expected to recover that cost faster than any other firm due to its larger export revenues in the future. Our results in Chapter 2, however, are counterfactual to this interpretation.

Table 3 shows that our pioneer exporters tend to be *smaller* than the followers firms that enter the same product. The coefficients in specifications (1) and (3) show that pioneers export, on average, between 25 and 50 percentage points less volume than follower entrants. When correcting by the additional years of experience and various other controls, the results remain consistent.

Table 3. Linear regressions of the Volume exported by firm in a product and year, depending on whether they are pioneers or followers and correcting for year and product effects.

log of the volume Exported by firm i at time t in product p				
	entrants within 5 years		all entrants	
1 if firm is Pioneer	-0.23**	-0.37**	-0.49***	-0.37**
	-0.0946	-0.174	-0.18	-0.177
Year of entry to product		-0.056	FE	-0.0559
		-0.0552		-0.0559
Product FE	yes	yes	yes	yes
Observations	177	177	177	177
R-squared	0.323	0.331	0.431	0.334

This is suggestive that pioneer exporters may have a lower cost of innovation/experimentation, rather than higher productivity or size. For example, innovative pioneer exporters can be smaller and less productive, but at the same time can be more aware of the product characteristics or the destination market, which is very valuable information in the early stages of exporting.

In this way, this chapter shows that new export products are closer to innovation models in economics, in which a smaller firm innovates, and then subsequent entrants – maybe with comparative advantage in production rather than innovation - benefit from the first mover. Under some circumstances, one can interpret this exploration as an industry-specific public good, from which the whole industry can benefit. The provision of some of these goods for exporters is the theme of the last chapter.

The third chapter of the dissertation, "Coordination of global entrepreneurs", explores how exporters and importer firms associate more, as a way to provide industry-specific public goods. Using a cross national firm survey in more than 71 countries, the paper shows that exporters and importers are more likely to participate in Business Associations. The easiest way to look at this is by means of Figure 1, which plots the participation in Business Associations for exporters and non-exporters. The 45 degree line in the graph indicates a theoretical equality between these two groups. But the fact that almost all countries are located above the 45 degree line implies that, not only in the global average, but in almost every country exporters tend to associate more than non exporters.

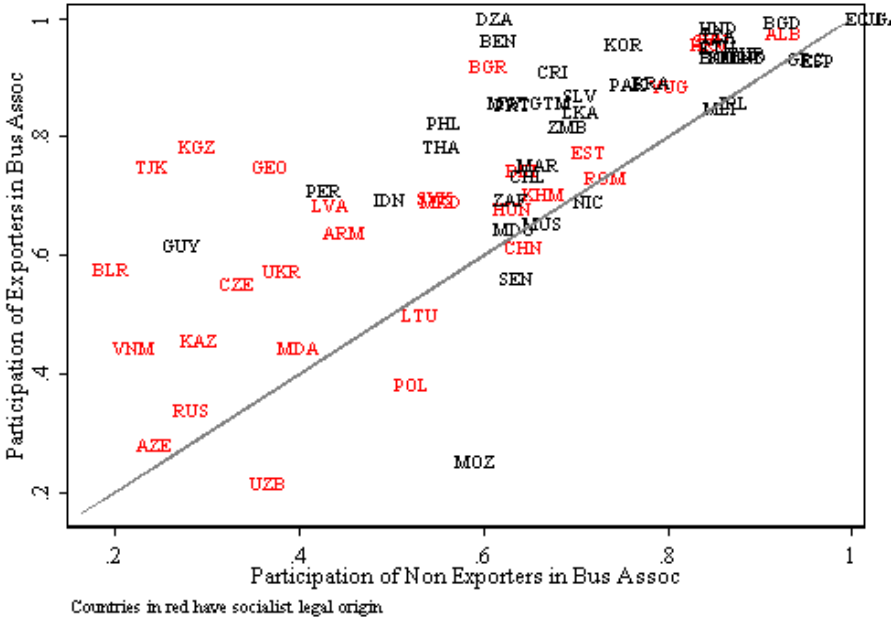


Figure 1. Participation of exporters and non exporters in Business Associations. The 45 degree line signals equality between exporters and non-exporters. Labels correspond to ISO codes for each country.

Of course we know that exporters have very different characteristics than non-exporters; but this stylized fact is robust even controlling for the productivity, size and sector of the economy; suggesting that firms dealing with international trade are more intensive in this type of collective action.

When political economists look at these patterns of association, it seems natural to argue that the associations are simply mechanisms for lobbying to get subsidies or transfers. We show additional stylized facts that are less supportive of this view and, by iterative elimination, more supportive of the hypothesis that associations can be a source of industry specific innovation and information.

If the additional propensity to associate of exporters were due to lobby for a subsidy, then usually the largest firms would be the ones participating in the associations. In fact, Bombardini (2008) shows empirically that for each industry, only the largest firms contribute to US lobby. In contrast, Table 4 indicates that the additional association of exporters is disproportionately more important for smaller firms, as indicated by the negative coefficient in the interaction between being exporter and having employment. Quantitatively, the coefficient implies that an exporter that with 50 workers is nine percentage points more likely to participate in associations than an exporter with 2000 workers. This supports the view that smaller exporters may benefit relatively more, like when they receive information about foreign markets or technical assistance as in a public service.

Table 4. Linear probability regression of participation in associations on firm’s exporting status, as well as interactions of the export status of the firm with other characteristics of the firm and of the country. Standard errors are clustered at the industry*country level.

	1 if firm participates in Association	
	(1)	(2)
1 if firm is exporter	0.228*** (0.03)	0.201*** (0.03)
1 if Exporter * log Employment	-0.0297*** (0.01)	-0.0264*** (0.01)
Other controls	YES	YES
N	20056	16808
R2 (after FE)	0.056	0.072
N industry * country (FE)	976	909

Finally, we not only analyze the revealed preference of firms in terms of participation, but also the stated preferences of firms when they are asked what they value from Associations. In their answers, exporters tend to mention more the services related to productivity and information than those related to lobby and negotiation. Again, although not all lobbying activity is necessarily rent-seeking, the above trend indicates that firms connected to the global economy are more likely to cooperate for constructive purposes. At the best of our knowledge, this is the first empirical validation of a conjecture made by Alfred Marshall almost a century ago. *“The tasks required in the export trade are often too heavy to be borne by individual producers; while merchants may lack the technical knowledge and special interest needed for making the most of goods that lie outside of the ordinary course of trade. Cooperative organizations can afford to advertise, to study foreign demands and customs, to make demonstrations,—to collect credit information, and to extend credit.”*⁵

⁵ Alfred Marshall (1920) Industry and trade. Book III. Chapter 12

This last chapter concludes the PhD Dissertation that explored the role of new export products. Taking stock, the first chapter showed how having a more flexible export structure is systematically associated with faster recoveries from recessions. The second chapter digs deeper into how new export products are discovered, finding evidence supportive of the view that there is some information flow between pioneer and followers. Finally, the third paper shows that exporters are more likely to coordinate in associations, which is useful to overcome the challenges of doing international business.

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