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## **Microeconomic adjustments during an export boom: Argentina, 2003-2011**

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### **Abstract**

This paper examines Argentine exports at the firm level between 2003 and 2011, a period of exceptional and sustained export growth. While at the

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product level the pattern of specialization barely changed, exporters exhibit new dynamics in international markets: firms not only expanded sales abroad by increasing their exports in existing markets, but also by entering into new destinations and adding new products. That is, new export strategies allowed exporters achieve greater resistance to the variations in the macroeconomic environment. We find that the importance of the different export margins changes overtime: while the currency is depreciated, the intensive margin explains most of export growth, whereas the sub-extensive and extensive margins become the main source of export growth once the currency appreciates. We also uncover a strong complementarity between import and export growth.

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## I. Introduction

Between 2003 and 2011, Argentine exports increased 179%. This is one of the longest periods of sustained export growth for this country (Albornoz, 2013) and is characterized by big changes in the macroeconomic environment, with years of low and high real exchange

rates and variations in terms of trade. Explanations of this export boom included -on the one hand- external factors, such as improvements in the terms of trade, increasing regional demand, and a (temporarily) competitive exchange rate, and -on the other hand- structural changes in the pattern of trade specialization.<sup>4</sup> In this paper, we study export dynamics at the firm level during these years. By doing this, we contribute to not only the study of this particular export growth episode, but also, and perhaps more importantly, to the understanding of how export dynamics, and its determinants, vary across different exchange rate regimes.

As has been established in the literature, firm heterogeneity explains different responses to trade policy (e.g. Melitz 2003, Melitz and Ottaviano, 2008; Bernard, Jensen, Redding and Schott, 2007; Melitz and Redding, 2012; Aghion, Burgess, Redding and Zilibotti, 2008). However, changes on other aspects of the economic activity also matter and may generate heterogeneous responses at the firm level. For example, depreciation of the exchange rate can give a competitive price to firms that, despite their limited capacities or low productivity, become exporters. Some of these firms will stop exporting once currency appreciates again. Other firms, in turn, will be able to establish lasting links that resist, at least in part, the challenges of currency appreciation.

To take into account variation in price-competitiveness associated with changes in the exchange rate, we have divided our study into two phases. Phase I (2003-2008) is characterized by a competitive exchange rate that amplified the commercial opportunities for pre-existing exporters and generated an opportunity for less efficient firms to reach foreign markets for the first time. Some of the new exporters were not ready to operate in global markets and they rapidly failed (e.g. Eaton, Eslava, Kugler and Tybout, 2007; Albornoz, Calvo Pardo, Corcos and Ornelas, 2012; Albornoz, Fanelli and Hallak, 2014). Surviving exporters, by contrast, expanded into new markets (Albornoz, Calvo Pardo, Corcos and Ornelas, 2012) and introduced new products. To the extent that expansion required sunk costs or/and generated learning opportunities (e.g. De Loecker, 2007), exporters reduced part of their sensitivity to the exchange rate and became more resilient. Phase II (2008-2011) is associated with a strong currency appreciation that was thought to cause strong declines in exports; in particular, for manufacturing firms.<sup>5</sup> This was not the case, and export

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<sup>4</sup> On the determinants of export performance of Argentina at the product level during the period see Albornoz, Calvo, Coremberg, Heymann and Vicondoa, 2012; Berrettoni and Polonsky, 2011; Herrera and Tavosnanska, 2011; Bianco, Porta and Vismara, 2008; Bugna and Porta, 2007; Castagnino, 2006 and Bianco, 2006.

<sup>5</sup> It is curious that since, at least 2007, economic policy discussion has centered on maintaining the real exchange rate, which was difficult to determine amid elusive price indexes. It largely ignored analysis of the independent growth of Argentine exports despite the temporary “gift of competitiveness.” Frenkel and Rapetti (2007) and Frenkel and Rapetti (2008), for example, discuss the positive effects of a competitive exchange rate for Argentina’s growth during 2002-2007, and they

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growth continued to be positive during this Phase. Our analysis shows that greater sophistication (serving more market with more products) in international markets explains why exports continued to grow despite currency appreciation.

Furthermore, we find that heterogeneous export responses also changed over the years. Firms expanded in international markets by introducing new products as well as serving new destination markets. In particular, we describe the contribution of the different margins of export growth. That is, whether firms increased exports along the intensive margin (more exports of the same product to the same country) or along the extensive margin (new destination markets and/or new products). Importantly, the importance of the different margins and sub-margins varied between the two phases of the period. First, we show that 89% of export growth in the aftermath of the 2003 depreciation (Phase I, 2003-2008) is explained by the intensive margin of exports. However, sub-extensive margins became more predominant after 2008, during the Phase II. In this phase, export growth was associated with the expansion of firms to new destinations. This is consistent with highly dynamic export growth even in the presence of exchange appreciation. This result suggests that during the period 2003-2011, firms did not only increase sales of the same products in known markets, but they also expanded to new markets and that their export performance became more resistant to changes in exchange rates and disruptions in the economic cycle. This is important as it points at microeconomic adjustments that reflect a greater capacity to operate in diverse markets and with multiple goods, which allow exporters to react successfully to changes in the macroeconomic environment.

Another contribution of our analysis is to identify complementarities between exports and imports. In particular, we provide empirical evidence of a strong complementarity between export success and the use of import varieties during production.<sup>6</sup> On this ground, we find that exporting heavily depends on the possibility of importing. This bears important implications and highlight that taking into account the relationship between these two activities is important to understand the dynamic of the firms in international markets. For

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suggest the necessity for an economic policy in which the central bank aims to maintain a real exchange rate that is competitive in the medium and long term. It is true that the efforts to maintain a high exchange rate revolved around a key element of implicit development strategy that took form after 2007. In fact, the economic policy made an effort, and later failed to fix the nominal exchange rate. Later, when the real currency appreciation became inevitable, the need for foreign currency resuscitated a much older policy: import substitution. While we do not aim to engage in a deep discussion of the determinants of productive strategies and development in Argentina, it is nonetheless interesting to underline how the macroeconomic ups and downs, reflected in the real exchange rate, undermined policies for production and greater international insertion.

<sup>6</sup> This result is consistent with recent literature that examines how importing and exporting are inter-related activities. Bas (2012) shows that importing raises the firm's productivity as well as the probability of exporting the next year. Albornoz and García Lembergman (2015) show that exporting to a region raises the probability of importing from that region the next year, given that, by exporting, the firm acquires relevant knowledge about the market (i.e. potential suppliers), reducing the costs of entering as an importer.

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example, if a large depreciation causes a boost in exports, we should also expect an increase on the amount of imports by these firms. Hence, in contrast to standard models that consider exporting and importing as independent activities, once we take into account export-import complementarities, it is possible to observe an increase in imports after a large real depreciation. Blaum (2017) explores the plausibility of this channel for the case of Mexico and provides evidence that in fact aggregate import shares increase after a large depreciation. Taken together, these results imply that restricting imports may harm the possibility of firms to be able to export and reach more destinations. On this ground, this paper contributes to a recent literature that observes that importing intermediate goods increases productivity and, thus, it increases the probability of export entry to any destination in the future (e.g. Bas and Strauss-Kahn (2011) and Bas (2012), Bache and Laugesen (2013) and Kasahara and Lapham (2013)).<sup>7</sup>

The contribution of this paper goes beyond the interest for this particular episode of Argentinean exports. Our results on the evolving preponderance of different export margins add to a broader literature that have studied the evolution of export growth in different countries. Eaton, Eslava, Kugler and Tybout (2007) analyze Colombian firms from 1996 to 2005 and find that that the intensive margin of exports account for 50% of export growth. This is consistent with our results in Phase I, in which the currency was relatively depreciated. As in our study, Eaton, Eslava, Kugler & Tybout (2007) also show that Colombian firms reach more destinations as their exports grow. For example, a Colombian firm that successfully penetrated the Latin American has a higher probability of penetrating the OECD markets. In contrast to these results, Bernard, Jensen, Redding & Schott (2009) study US firms from 1993 to 2003 and find that the extensive margin is attributable to most of the trade growth. Arguably, intensive margin ends up being a more important margin of adjustment in developing countries, such as Argentina or Colombia where entering and surviving is harder. This is consistent with Besedes and Prusa (2008), who find important differences between advanced and developing countries. For developing countries most of trade growth is attributable to the intensive margin and export entry exhibits too low survival rates and subsequent expansion to influence trade growth in the long-term. Our results show that this is not always the case, and that the relevance of different margins of export growth changes over time according to different macroeconomic conditions.

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<sup>7</sup> The link between import activity and export activity is a fundamental factor relatively overlooked by the literature on export dynamics with important policy implications. In identifying a virtuous association between importing and exporting, our work connects to the debate over import substitution as an industrial development strategy. If importing is a key factor in the export success of a firm, policies that restrict imports with the aim of stopping trade imbalances could work against firms' exporting strategies, aggravating the very same problems of commercial declines that the policies had sought to improve.

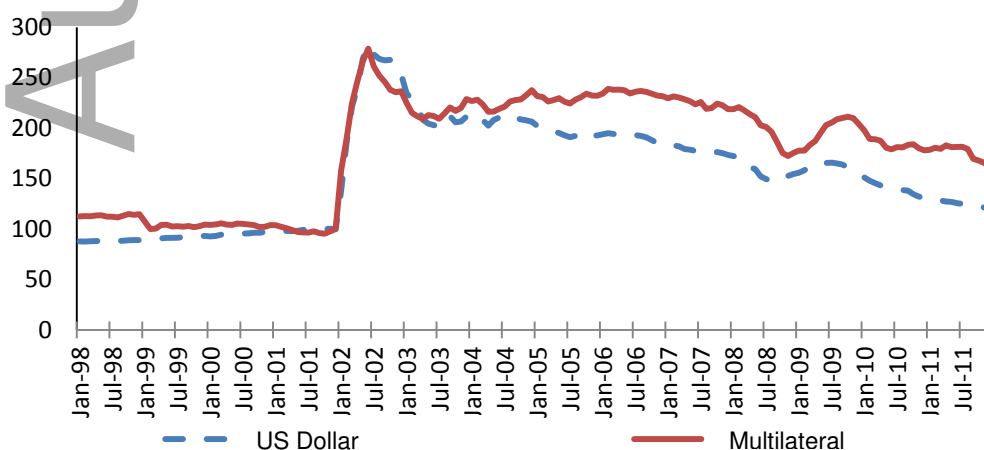
Furthermore, we find that the relevance of the different export margins vary across periods characterized by different evolution of the exchange rate. Berman, Martin and Mayer (2012) show that the reactions to real exchange variations are heterogeneous in the case of French exporters. Our results show that different exchange rate regimes imply different responses of the same firms. Thus, exchange rate changes not only affect firms in a heterogeneous way but also firms' responses vary over time.

This paper is organized as follows: Section II briefly discusses the evolution of Argentinian exports. Section III studies various aspects of the evolution of Argentine export firms, including their characteristics (section III.1), their internalization trajectories (section III.2), the margins of export growth (section III.3) and the complementarity between exports and imports (section III.4). Section IV concludes.

## II. Evolution of Argentine Exports, 2003-2012

Before studying its microeconomic aspects, it is necessary to trace the trajectory of Argentine exports during the boom. This period ran from 2003-2012. While export growth began in 2002, this take off was fundamentally related to an abrupt and profound currency devaluation. As suggested by Figure 1, the effects of the competitive exchange rate lasted for much of the period studied here, although it languished for several years. Thus, it is important to divide the exposure period into two distinct phases. The first phase (Phase I) begins in 2003 and ends in 2008. During this phase, exports enjoyed from a relatively high competitive real exchange rate. However, high inflation rates gradually appreciated the real exchange rate over that period. As there is no consensus as to when a definitive break in the real exchange rate occurred, we identify 2008 as the end of Phase I. Since then to, at least, 2011 (Phase II) firms faced an export environment characterized by a less favorable real exchange rate.

**Figure 1. Evolution of the real exchange rate (December 2001=100).**

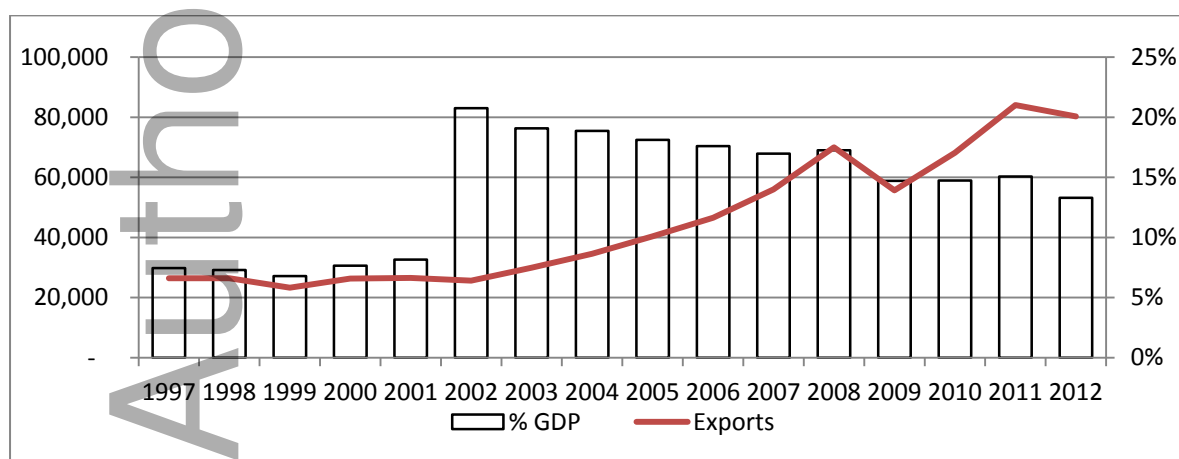


Source: Illustration by authors using data from BCRA, INDEC and IPC Santa Fe.

As is illustrated in Figure 2, Argentine exports clearly experienced significant growth since 2003, increasing 180% between 2003 and 2011 and rising from 30 billion to 84 billion dollars in 2011. Going back in the past, the trajectory of Argentine exports can be broken down into three periods and one episode. First, the value (in dollars) of Argentine exports remained relatively stagnant between 1997 and 2001. Then, in response to the large devaluation in 2002 (which rose 260% in the first six months of the year), Argentine exports began their most dynamic period, reaching 133% growth between 2003 and 2008 (at an annual rate of 18.5%). The period between 2008 and 2011 began with a sharp drop in 2009, a setback of 20.5%, which coincided with the rupture created by the global financial crisis at the end of 2008. Finally, Argentine exports rose back to 2008 levels, and in 2010, they continued their expansionary course with about 23% growth.

Figure 2 also displays changes in the export coefficient (ratio of exports to GDP). This indicator experienced an abrupt jump in 2002 due to a decline in GDP, but it steadied in 2003 due to the high growth rate relative to exports. Since then, we observe a slight but gradual decline that set the weight of exports over GDP at a value close to 15%, considerably higher than its values at the end of the 1990s. This suggests that the international insertion of Argentine products was strengthened by the devaluation (Phase I) and maintained relatively high levels despite the appreciation of the real exchange rate during Phase II.<sup>8</sup>

**Figure 2. Evolution of total exports. Period 1997-2012 (in millions of dollars, current)**



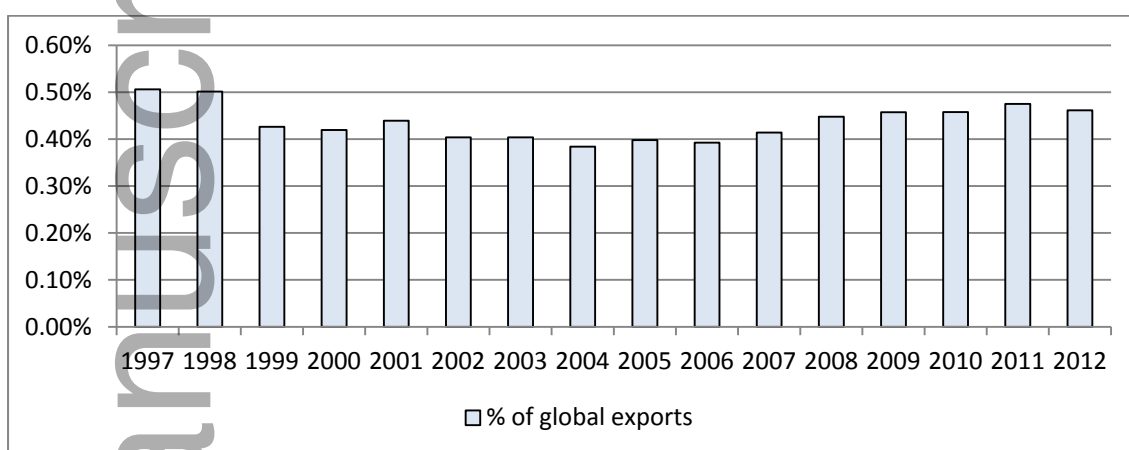
Source: Author's illustration based on INDEC data.

Beyond the remarkable growth in exports and its greater weight in the GDP, it is important to note that this rise coincided with equally strong growth in international trade. As shown by

<sup>8</sup> On this point see: Alborno, Calvo, Coremberg, Heymann and Vicondoa, 2012.

Figure 3, the contribution of Argentine exports to international trade fell from 1995 to 2003 and partially recovered in 2007, staying within a band with a minimum of .4 percentage points (between 2002 and 2007) and maximum of around .5 percentage points.<sup>9</sup> That is to say, the export boom, beyond its local impact and its importance in terms of the productive activity, has not altered the marginal role Argentina plays in international markets.<sup>10</sup>

**Figure 3. Participation of Argentine exports in global exports**



Source: Author's illustration based on, COMTRADE, UN.

A main question is whether the described surge in exports modified the patterns of trade and resulted in a more sophisticated export basket. Different papers have documented that the export basket has not changed significantly at the aggregate level. More specifically, Argentine exports maintained a profile with a preponderance of primary commodities, agricultural manufacturing, industrial commodities, and a group of high value added products (chemicals and metalworking) primarily imported by countries in the region. In Albornoz, García-Lembergman, Juárez (2017), we show that this process has not increased the share of products with high technological content, or induced relative improvements in export complexity (see also Albornoz, Calvo, Coremberg, Heymann and Vicondoa, 2012; Berrettoni and Polonsky, 2011; Herrera and Tavosnanska, 2011; Bianco, Porta and Vismara, 2008; Bugna and Porta, 2007; Castagnino, 2006; Bianco, 2006).

<sup>9</sup> Bianco, Porta and Vismara (2008) underline this fact for the years between 2002 and 2006.

<sup>10</sup> In fact, they maintained levels that were close to those at the end of the 1990s. Bouzas and Pagnotta (2003) show that the highest jump in the share of Argentine exports in the world was between 1992 and 1998, when it rose from 0,25% to 0,50%.



However, in a context where exports increases for most of products and markets, the process of scaling up exports may involve relevant productive transformations at the firm level. Exploring this possibility requires us to study the exports at a firm level. We turn to this question in the following section.

### III. Export dynamics at the firm level

We use Argentine customs data comprising the universe of the country's exports and imports transactions. Our database covers the 1994-2011 period for exporters and the 2003-2008 period for importers. It includes annually reported information about the value (in US dollars) of foreign sales and imports for each firm, distinguished by destination and product.

In this section, we explore the dynamics of exporters more closely. First, we briefly describe their main features and their export trajectories (sections III.1 and III.2). Second, we study the different margins of exports and their change over different phases (section III.3). Lastly, we establish the complementarity between exports and imports at the firm level (section III.4).

#### III.1. Characterization of exporters.

Table 1 displays the number of exporters per year. We can see that, while the value of exports increased over the period, the total number of exporters per year actually decreased from 13,711 in 2003 to 12,838 in 2011. This may suggest that exports were concentrated in less firms. Nevertheless, if we focus on "established firms," which is to say, those that exported for at least two consecutive years, we can clearly see that these firms increased in number over the years. While in 2003 there were only 8,896 "established" exporters, in 2011 there were over 10,000. Focusing on the dynamics of established exporters will enable us to set aside firms that exported sporadically or that failed quickly in their intent.<sup>11</sup> The evidence suggests that in the Phase I of the export boom, many firms tried to enter export markets and, upon experiencing little success, quickly exited. A possible explanation of this is that the sudden advantage provided by a high exchange rate raised the marginal expected income of exports and, as a result, firms with less export capability ventured into international markets.

**Table 1. Descriptive statistics on exports for the period 2003-2011**

Year	Number	Number of	Exports	Number of
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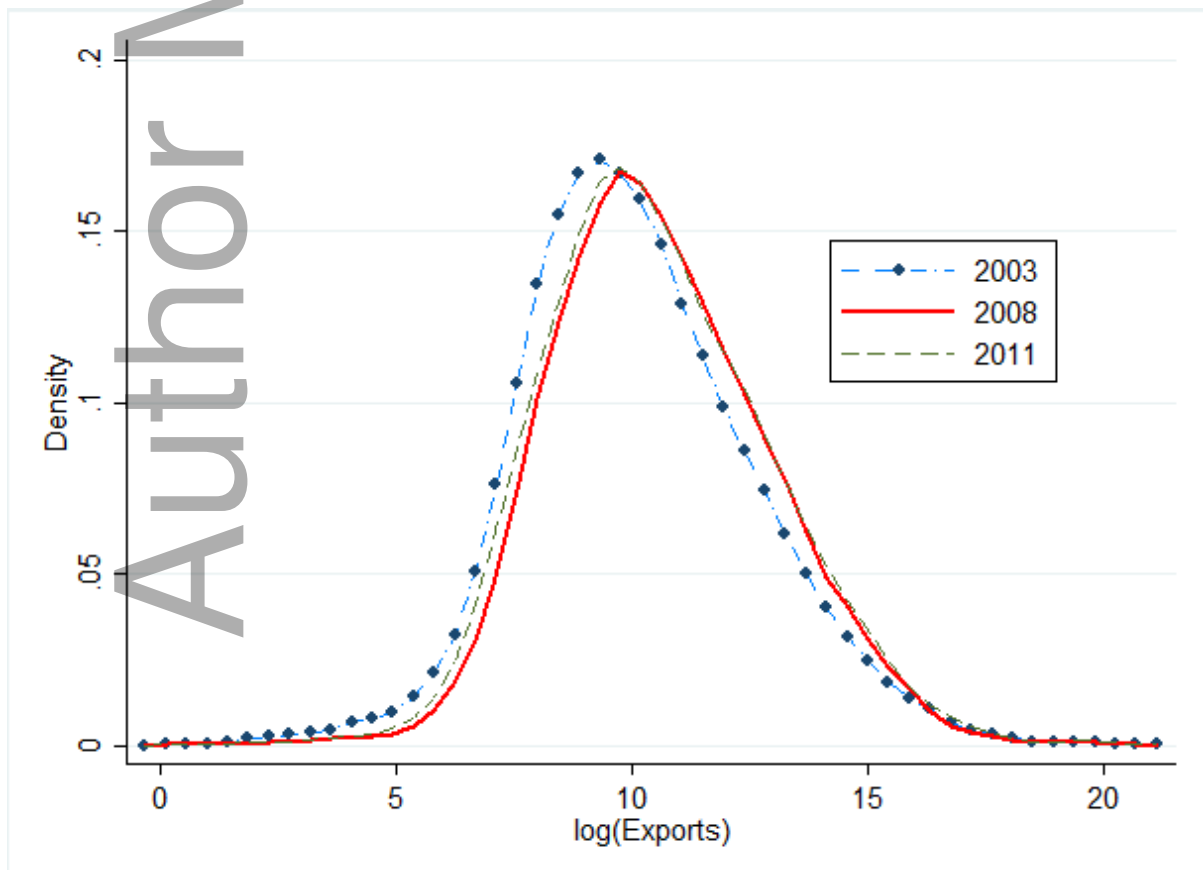
<sup>11</sup> Eaton, Eslava, Kugler and Tybout, 2007 show that a large segment of new exporters stopped exporting the following year. Albornoz, Fanelli and Hallak, 2014 provide the evidence of export survival of Argentinean firms.

	of firms	established firms	(US\$)	Destinations
2003	13711	8896	26561	1
2004	14093	9608	33532	2
2005	14764	10431	38979	2
2006	15075	11037	46480	2
2007	14444	11137	61407	2
2008	14170	11118	74459	2
2009	13268	10550	72158	2
2010	13145	10374	84300	2
2011	12838	10268	100176	2

Source: table by author using custom's data.

Second, we plot the distribution of firms according to their export value for the years 2003, 2008 and 2011 in Figure 4. Indicative of the boom in exports during the first period of our analysis, the distribution of firms in 2008 is to the right of the distribution in 2003. We do not observe significant differences between the distribution in 2008 and 2011.

Figure 4. Firm distribution of exports, 2003, 2008, 2011.



Beyond monitoring how many export firms were active at any given time, we are also interested in firms' characteristics. The literature suggests that export firms are distinct from other kinds of firms in a number of ways: they are more productive, use skilled labor and capital in a more intensive manner, pay higher salaries, have a tendency to generate more innovation and to produce with greater quality standards (Redding, 2011; Bernard et al., 2011; Melitz and Redding, 2012). To identify different attributes that distinguish exporters, we exploit available data on employment, exports, and imports at the firm level. Specifically, we analyze the year 2008, the last year of Phase I, which allows us to increase the dimensions that we take into account, given the available data. In particular, we are interested in distinguishing firms according to the following dimensions: employment, exports, and imports.

We define export intensity in three different ways: a) amount exported in US\$, b) number of destination countries reached by the firm and c) number of products exported. Panel A of Table 2 suggests following: First, most Argentine firms do not export (74%); second, the median export firm (typical, from now on) exported nearly 75 thousand dollars and employed twice the number of formal employees than the typical non-export firm; third, we find that in 2008, export firms were more dynamic, raising their number of employees by 43% during the 2003-2008 period, while the typical non-exporter only did so by 33%.

These differences between exporters and non-exporters are amplified by export intensity. In panels B, C, and D, we propose different forms of capturing export intensity. When we examine the largest firms in terms of export value (Panel B), firms that ship to the greatest number of destinations (Panel C), or firms that export more products (Panel D), we find that both employment and employment growth are positively associated with export intensity. As we have already mentioned, the size effect of exporting firms is not only found in Argentina, and has been documented in many other countries (Bernard and Jensen, 2007, among others). Nevertheless, the finding that exports have been more dynamic in terms of employment is interesting, as it suggests that firms that have increased their presence in international markets have demanded more work than those that have less participation in foreign markets.

The final column in panel A of Table 2 illustrates firms' import behavior in relation to their export behavior. We can observe that exporters also stand out in their use of imports of capital and intermediate goods. Unlike the typical non-export firm, which does not import, the typical exporter imports by values up to 7,100 dollars and typically require two varieties

of inputs.<sup>12</sup> As firm have higher export intensity (Panels B, C, and D), they spend more in imported inputs and import from more sources. These observations suggest that there are complementarities between exporting and importing. In section III.4, we will examine the underlying dynamics of this finding to understand the relationship between imports and exports.

**Table 2. Characterization of export firms (year 2008)**

	# firms	<u>Expo</u> us\$ <i>median</i>	<u>Workers</u>		<u>Imports</u>	
			N <i>median</i>	Growth (%) <i>median</i>	us\$ <i>median</i>	Variety <i>Median</i>
<b><u>Panel A:</u></b>						
<b><u>Exporter Status</u></b>						
Does not export	40556	0	12	33	0	0
Does export	14170	74459	24	43	7102	2
<b><u>Panel B:</u></b>						
<b><u>Amount exported</u></b>						
Small	4723	8874	13	43	1220	1
Medium	4724	74459	19	44	1555	2
Large	4723	1104161	58	41	4799	4
<b><u>Panel C:</u></b>						
<b><u>Destination Intensity</u></b>						
Low	6171	18604	15	39	0	0
Medium	3902	74758	21	42	8215	1
High	4097	818538	53	43	82012	6
<b><u>Panel D:</u></b>						
<b><u>Product Intensity</u></b>						
One product	4706	26452	15	40	0	1
Multiple products	9464	125190	29	44	26885	3

Source: table by author using data from Customs.

<sup>12</sup> We define variations as a combination of product and country of origin, with the product classified according to HS6 (see for example, Broda and Weinstein, 2006).

## III.2. Internationalization of export firms

We will now examine the extent to which Argentine firms grew by exporting new or old products destined to new or known (III.2.a) markets, the effect on the concentration of exports (III.2.b), and the initial characteristics of firms associated with greater intensity in export growth (III.2.c). This analysis permits us to verify (at least partially) the existence of microeconomic adjustment that are difficult to observe at greater aggregation.

### III.2.a. Strategies of internationalization

First, we analyze the number of firms that increased their product range and destination dimension. Table 3 shows the number of firms in each period, categorized by whether they had just begun entering the export market (entering), those that had experience exporting and continued their export activity (continuing) and those that exported at the beginning of the period but stopped exporting by 2011 (outgoing). Observe that the percentage of firms that began to export during Phase I is considerably greater than those that began during Phase II. This concurs with the finding in the previous section in which we argued that expectations of potential export growth generated incentives for firms to enter the international market. Consistent with this interpretation, we can also observe that the number of outgoing firms is greater during the first phase. As for firms that continued their export activity, there is evidence that there was a greater percentage of firms experiencing growth during the first period as compared to the second period. That is, of the firms that exported during each phase, those that were active in the first phase experienced more growth than those that were active in the second phase.

**Table 3. Evolution of the number of firms per period**

Phase	Continuing		Outgoing	Entering
	Declining	Growing		
2003-2008	1636	5345	6729	7278
	23%	77%	32%	35%
2008-2011	4095	4875	5289	3867
	46%	54%	29%	21%

Source: table by author using data from Customs.

Another interesting exercise to understand firms' evolution during the period consists in identifying the percentage of total firms that increased the number of destinations, or the

percentage of firms that introduced new products. Table 4 presents this data. The first two columns represent the firms that exported in both 2003 and 2008. Data corresponding to new firms are reported in the third column. During Phase I, 36% of firms reached a new market and around 34% of firms were able to introduce a new product to their export basket. For Phase II, these values are 40% and 44%, respectively. This suggests that, during the export boom, more firms were able to diversify both by reaching new destinations and by diversifying the products that they offered, and, thus, they became more resistant to changes in the macroeconomic cycle. During Phase I of the boom, a greater number of firms experienced growth, which is consistent with the notion that export growth during that period involved greater quantities of old products in old destinations, while the export growth that occurred in this phase was characterized by a process of microeconomic adjustment associated with a greater variety of destinations and products. These qualitative differences between both phases highlight an important impulse towards internationalization among Argentine firms.

**Table 4. Number of firms that expanded to new destinations or new products.**

Period	Continuing		New	Total
	New Destinations	New Products		
2003-2008	4893	5118	7278	14260
	34%	36%		
2008-2011	5121	5598	3867	12838
	40%	44%		

Source: Table by author using data from Customs.

### *III.2.b. Effects on the concentration of exports.*

It is clear that during the period studied firms followed different dynamics when it came to their export development. For this reason, it is necessary to verify if changes at the microeconomic level can be seen in the concentration levels of exports at the aggregate level. To capture this we use the Herfindahl (HHI) index and examine the share of the 10 firms with the greatest share of total exports (Share).<sup>13</sup> Table 5 illustrates these alternatives, both at the general level and by sector for years 2003, 2008, and 2011. It can be observed that, according to the HHI, the concentration of total exports decreased, although this tendency was specific to several sectors. While the concentration of exports decreased in Foods, Beverages, and Tobacco, and Fuel, Chemicals, Rubber, and Plastics, the

<sup>13</sup> The HHI measures the economic concentration of a market. The higher the index, the more concentrated and less competitive the market. This index takes values between 0 and 1, with 1 being the level of a monopoly.

concentration of exports grew in the Textile, Clothing and Leather and the Metalworking and Electrical Appliances sectors. The changes are mediated by our decision to examine the contribution of only the top ten exporting firms. According to this indicator, there were no significant changes at the aggregate level. The top ten firms still account for 50% of total exports. This suggests that, beyond the entry of firms into the export market, which is reflected in the lower HHI, the upper bound remains practically unchanged as the total exports continue to be dominated by the ten firms. There also were no notable changes at the sector level beyond an increased share of the 10 principal exporters in the Metalworking and Electrical Appliances sector.

**Table 5. Concentration index, by sector**

Sector	HHI 2003	HHI 2008	HHI 2011	Share 2003	Share 2008	Share 2011
Total	0.033	0.032	0.029	49%	48%	49%
Food, Drink and Tobacco	0.086	0.086	0.066	78%	75%	71%
Textiles, Clothing and Leather	0.043	0.038	0.049	56%	49%	56%
Fuel	0.255	0.163	0.125	90%	93%	87%
Chemicals, Leather and Plastics	0.022	0.016	0.018	37%	33%	36%
Metalworking and Electrical Appliances (autos/equipment)	0.014	0.025	0.040	27%	36%	40%

Source: table by author using data from Customs.

### III.2.c. Determinants of export growth at the firm level

As we have seen, responses to the boom have been heterogeneous and firms' strategies of expansion have permitted them to reach new destinations and launch new products. It is also important to identify characteristics at the firm level that are associated with export performance. In particular, we want to distinguish between the effect of firm size, as captured by formal employment, and the experience of the firm in international markets, as captured by the initial level of exports and the number of varieties exported. To do this, we estimate the export growth of the firm according to the following linear regression model:

$$varexp_{ipt} = \beta_1 employment_{ip,t-1} + \beta_2 exports_{ip,t-1} + \beta_3 varieties_{ip,t-1} + \gamma_p + \varepsilon_{ip,t} \quad (1)$$

$varexp_{ipt}$  represents the variation in the log of exports of the firm  $i$  in sector  $p$  between the years  $t$  and  $t-1$ . Specifically,  $t$  and  $t-1$  correspond to the years of the sub-periods analyzed

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(2003-2011, 2003-2008, 2008-2011).  $employment_{i,t-1}$  is the log of the number of workers in  $t-1$ . Thus,  $\beta_1$  accounts for the effect of the size of the firm on export growth. The export experience is estimated by  $exports_{ip,t-1}$  (the logarithm of the value of exports at the beginning of the period,  $t-1$ ) and  $varieties_{ip,t-1}$  (indicator of the number of varieties exported by the firm in  $t-1$ ). As is common in the literature (e.g. Broda and Weinstein, 2004), a variety is defined as a combination of product and destination. In this way, the model estimate can determine if the export sophistication is associated with greater sales growth in international markets, or not. Finally,  $\varepsilon_{ip,t}$  represents the error term.

Table 6 shows the results of the different estimations of equation (1). Two regressions are reported (with and without the inclusion of firm employment in  $t-1$ ) for each sub-period: 2003-2011, 2003-2008, and 2008-2011. In all cases, the effects of initial characteristics at the firm level are clear: export growth increases with the size of the firm and is greater the higher the initial level of exports and the quantity of export varieties. The connection between employment and export growth is stronger during the high export growth phase (2003-2008). In contrast, initial exports are more strongly associated with export growth during the low phase of the boom. In other words, the larger firms took better advantage of a favorable exchange rate. In the Phase in which “price” competitiveness was less relevant, previous experience was of greater importance. On the other hand, the effect of the initial level of varieties appears independent of the cycle.

**Table 6. Variation in exports and specific characteristics of the firms**

Variables	Export growth					
	2003-2011		2003-2008		2008-2011	
Employment in $t-1$	0.982***		0.899***		0.487***	
	0.071		0.068		0.057	
Exports in $t-1$	0.317***	0.153***	0.357***	0.206***	0.493***	0.406***
	0.035	0.037	0.033	0.035	0.029	0.031
Varieties in $t-1$	0.026***	0.015***	0.022***	0.012***	0.017***	0.012***
	0.004	0.004	0.003	0.004	0.003	0.003
Constant	-9.603***	-11.205***	-8.651***	-10.094***	-10.541***	-11.071***
	0.45	0.47	0.43	0.447	0.407	0.413
Fixed effects by sector	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,275	7,024	7,275	7,024	8,682	8,605
R-squared	0.055	0.078	0.05	0.072	0.07	0.077



Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

\*\*\*

This section reveals that the process of internationalization of Argentine companies during the boom of 2003-2011 involved multiple strategies and paths of expansion. Beyond export entry, the intensive margin of exports is determined by the initial characteristics of previously existing exporters. Among those characteristics, we underline the importance of firm size and previous exporting experience. This is to say, larger firms with a deeper external insertion at the beginning of the period had the greatest increase in sales in external markets. For this reason, the emergence of new exporters did not imply important changes in the distribution of exports among firms and concentration levels were not significantly altered over the period.

### **III.3. The margins of export growth**

To characterize the margins of growth over the period, we now examine contributions along different margins of Argentine export expansion. First, we distinguish between the extensive and intensive margin. The extensive margin includes those firms that entered the international market at some moment during the years considered. The intensive margin includes the export growth of firms that were already exporting when the period began.<sup>14</sup>

Distinguishing again between phases I and II, and the whole period, Table 7 reports the contribution of each margin to export growth. For the entire period, 86% is explained by firms that were already exported in 2003. New firms explain the remaining 14%. This suggests that the boom carried through for firms that were already exporters before the period began. This could support the argument that export growth resulted in few changes at the microeconomic level. Nevertheless, concluding our analysis here would be a mistake, as it would discard the potential changes at the firm level that explain this occurrence, which we will demonstrate in the following sections.

For Phase I, total growth was 131%, 89% of which is explained by the intensive margin and 11% by the extensive margin. For Phase II, the intensive (extensive) margin lost (gained) relative shares as it when from explaining 79% (21%) of total growth in exports that was, nonetheless, less than in Phase I (19%). It is possible that the decline in the relative weight of the intensive margin reflects the difficulties imposed by a lower exchange rate. A

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<sup>14</sup> The intensive margin takes into account diverse cases at once: firms that were already exporting and that increased the quantity of goods and/or destinations, and those that simply exported more than what they exported before, to an old destination or a new one.

decelerated intensive margin made export growth depend in large part on the emergence of new export companies and their performance. Given that the quantity of new exporters fell during Phase II, the relative growth of the extensive margin reveals greater average growth among new exporters.

If the value of exports is given an even closer look, the intensive margin can be broken down again into two sub-margins: the pure intensive margin and the sub-extensive margin. The pure extensive margin is composed of growth in exports of products that were already exported to known destinations. This is to say, it was growth in exporting “more of the same.” The sub-extensive margin refers to several novelties, among them, new destinations for a product that was already exported, or new products destined to new markets, or new combinations of destinations and products at each firm. Notably, the pure intensive margin explains only 39% of export growth (45% of the 86%) between 2003 and 2011. That is to say, 55% of export growth involved new markets, products, or firms. Moreover, continuing firms that reached new markets explain 24% of the boom. The contribution of new export products by these firms is as high as 22%. Finally, new combinations of products and destinations for continuing firms represented 21% of total growth between 2003 and 2011. It is possible to conclude that firms have in fact changed the way they serve international markets. This can also explain why export growth has persisted during times in which the currency appreciated: exports became more sophisticated and were associated with diversified risks and opportunities.

We can observe that one of the differences in terms of the composition of growth can be found in pure intensive margin. In Phase I, these exports represented 58% of the total intensive margin, while, during Phase II, they only made up 9%. On the one hand, it is possible that the effect of currency appreciation generated greater challenges for firms that increased sales with already established commercial relations, resulting in less sales by the possible loss of competitive price imposed by appreciation. On the other hand, the greater part of firm growth during Phase II involved new combinations of products and markets (71%).

In either case, the introduction of new destinations and new products was of heightened importance during Phase II. New destinations for ongoing exporters explains 24% (2003-2011), 23% (2003-2008) and 52% (2008-2011) of total growth. At the same time, new products introduced by ongoing exporters explain 22% (2003-2011), 12% (2003-2008) and 29% (2008-2011) of the same. In particular, we can see evidence of a strong effect in firms that brought old products to new markets (50% of the growth of the ongoing exporters in Phase II, while their relative importance in Phase I was only 20%). This means that,

geographic expansion dominated as a strategy to expand the export basket, which may reflect a limited capacity in the multi-product dimension.

**Table 7. Export Margins**

Period	2003-2008	2008-2011	2003-2011
<b>General Growth</b>	<b>131%</b>	<b>19%</b>	<b>175%</b>
<b>Continuing</b>	<b>89%</b>	<b>79%</b>	<b>86%</b>
a. Intensive Margin	58%	9%	45%
b. New products, old markets	8%	21%	17%
c. Old products, new markets	20%	50%	18%
d. New products, new markets	6%	16%	9%
e. New combination of product-market	19%	71%	21%
f. Stop exporting products or destination	-11%	-67%	-10%
<b>Entering</b>	<b>11%</b>	<b>21%</b>	<b>14%</b>

Source: table by author using data from Customs.

#### **III.4. Complementarity between imports and export performance.**

In this section, we provide evidence the relationship between export success and the introduction of new import varieties. First, we examine the complementarity between export intensity and import intensity and then we examine the association between import intensity and the persistence of firms in export markets.

##### *III.4.a. Evolution of exports in relation to the evolution of firms' import behavior*

We now examine the link between exporting and importing in more detail. To do this we must assess the dynamics of exporting firms and how their performance is related to new varieties of imports.

Since exporting firms tend to be larger, it is of little surprise that (in Section III.1) we found that the firms that export the most are also spending more on imported products. However, there are other more revealing issues underpinning this correlation between export intensity and imports. If the size of the firm was the only explanation, it would not be clear why the firms that export to more locations are importing more and are also using more varieties of import inputs in their production. One possible explanation is that when a firm seeks to intensify their exports and reach new markets they must improve the quality of their product or lower marginal costs of production. If the necessary inputs to achieve these objects are

not locally available, it is reasonable that they would seek out imported options. For example, Bas (2011) finds a positive effect of new imports of intermediate goods on the capacity of firms to enter new export markets. On the other hand, in Albornoz and García Lembergman (2015) we have argued that exporting allows a firm to acquire relevant information about potential suppliers of inputs abroad. By consequence, exporting to a region can generate new imported inputs from that region in the future.

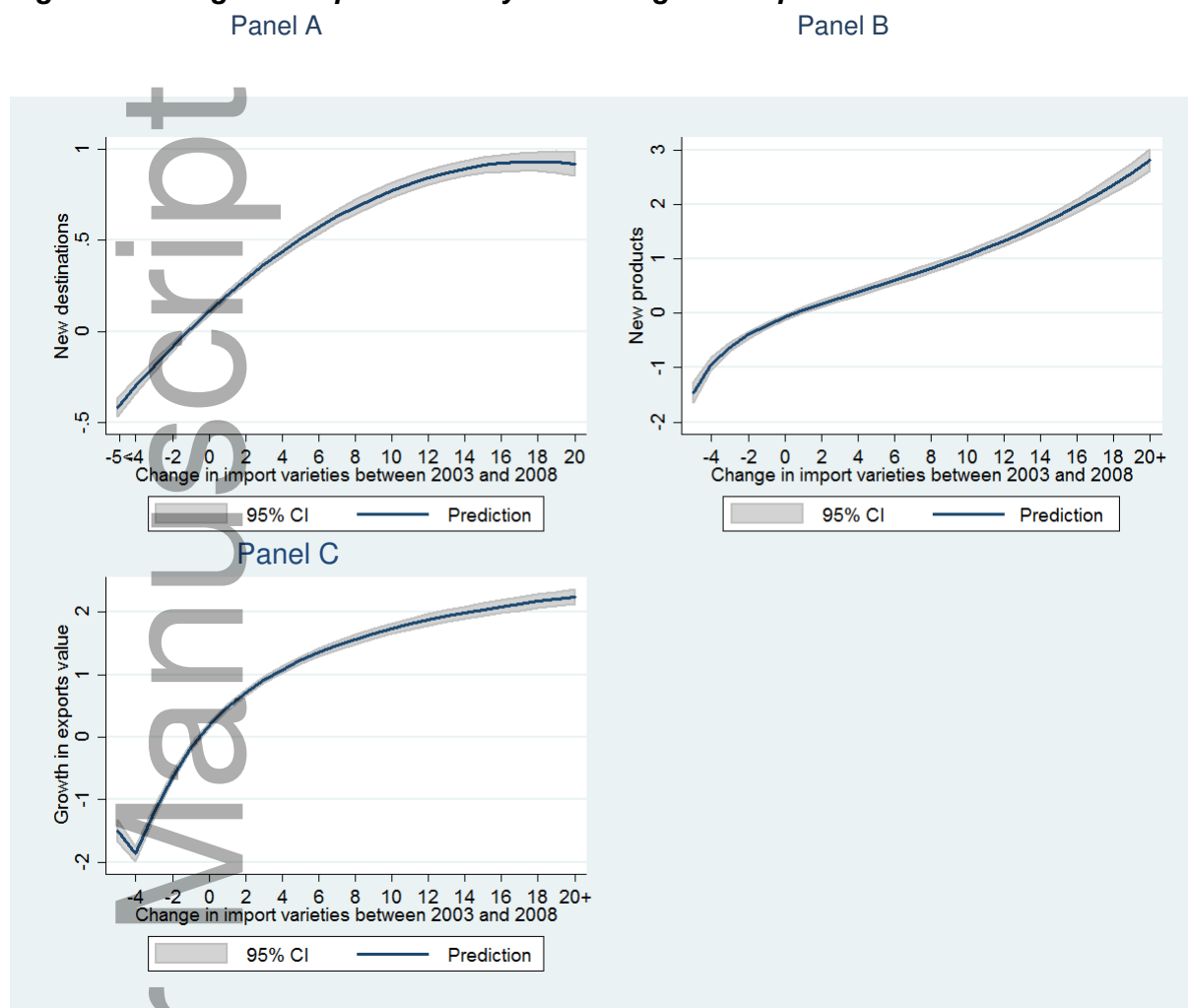
To investigate the existence of complementarity we rely on difference in difference regressions, in which we can compare how the same firm which raised its export intensity during the period behaved in terms of import intensity. This allows us to compare changes in the same firm over two periods of time, purging any explanation related to the firm's features that do not change over time, including initial productivity, initial size, firm's age, among others. More formally, we estimate the following regression:

$$ExpIntensitiy_{it} = \sum_{j=1}^6 \beta_j ImportVarieties_{it} + \ln(L)_{it} + \gamma_i + \gamma_t + \varepsilon_{it},$$

where  $i, t$  denotes firm  $i$  in period  $t$  and  $t$  can be 2003 or 2008.  $ExpIntensitiy_{it}$  denotes the three measures of export intensity that we previously defined. In order to capture non-linearity in the effect, we define 6 categories for import varieties: 1 variety, from 2 to 4, from 5 to 9, from 10 to 14, from 15 to 19, and 20 or more varieties. We control for firm's employment in period  $t$  and include firm and year fixed effects to control for shocks specific to the year and time-invariant characteristics of the firm. As we have two periods, we can interpret the coefficients as the effect of a change in import intensity between 2003 and 2008 on the change in export intensity.

As a first glance, we summarize in Figure 5 the results. All panels reflect the relationship between the rise in import varieties between 2003 and 2008 and the rise in the intensity of exports during those same years. We can observe that for all measures of export intensity, those firms that most increased their import varieties are those that achieved greater growth in export markets. Panel A shows that the firms that did not incorporate new varieties did not reach (on average) new destination markets. By contrast, we can see that there is a positive relationship between new varieties and new destinations. The same pattern can be observed for those firms that increased the products that they exported (Panel B) and for those firms that increased the amount (Panel C). No matter the measure of export intensity, there is no doubt that the firms that developed a more complex production function increased their import varieties.

**Figure 5. Changes in export intensity and changes in imported varieties**



Source: table by author using data from Customs.

While the three previous panels controlled for any characteristic that did not vary over time, it is evident that a great part of the growth, both in import variety and in exports, can be attributed to the growth in the size of the firm between 2003 and 2008. To see the relationship between these two variables in a more precise way and to control for fixed effects by firm and by year, we added a natural logarithm of firm size as a proxy variable to capture changes in firm employment and productivity.<sup>15</sup> Table 8 reports the results. While the effect is attenuated when controlling for employment, the firms that increased their import varieties are, on average, those that most increased their export intensity both in terms of the value of exports and in terms of exporting to more markets or introducing more products into the export market. For example, the firms that raised only one variety during the period had a 13.7% higher probability of reaching a new destination as compared to

<sup>15</sup> When there are two periods, the regression with fixed effects by firm and year is the same as the regression of variables taking initial differences.

those that did not increase their import varieties. The firms that increased their import variety by more than 20% are those with greater probability of reaching new destinations, introducing new products, and/or are those that most increased their exports.

**Table 8. Export growth dependent on import varieties growth between 2003 and 2008.**

	(1) Destinations	(2) Exported products	(3) ln(exports)
<i>Import Varieties</i>			
1	0,137** (0,062)	0,273* (0,150)	0,642*** (0,127)
2-4	0,196*** (0,057)	0,488*** (0,146)	0,850*** (0,118)
5-9	0,316*** (0,088)	0,593** (0,244)	1,030*** (0,167)
10-14	0,378*** (0,122)	0,810*** (0,303)	1,305*** (0,208)
15-19	0,537*** (0,127)	1,313*** (0,406)	1,463*** (0,218)
20+	0,762*** (0,122)	2,483*** (0,515)	1,976*** (0,216)
ln(employment)	0,476*** (0,046)	0,754*** (0,123)	1,121*** (0,089)
<i>Firm FE</i>	Yes	Yes	Yes
<i>Year FE</i>	Yes	Yes	Yes
Observations	60380	60380	60380
R-squared	0,920	0,864	0,852

Robust standard errors clustered at the firm level. \*\*\*, \*\*, \* denotes significance to the 1.5 and 10%, respectively.

#### *III.4.b Exporter persistence according to export or import intensity*

For the strong export growth period, 2003-2008, we have shown that firms not only grew in their extensive margin and sub-extensive margin of exports but that their growth was accompanied by a strong rise in imports, both in terms of value and in terms of the number. This article is protected by copyright. All rights reserved

of varieties imported. Thus, since 2008, a significant portion of export firms exhibited a strong integration in international markets. In this section, we examine the characteristics of firms exporting in 2008 that were able to persist in international markets by 2009, when the earnings from a favorable exchange rate were diminishing.

Tables 9 and 10 show how export intensity—in terms of destinations reached—and import intensity—in terms of import varieties—influenced firms’ persistence in export markets after 2008. While the first table focuses on all firms that actively exported in 2008, the second table only considers those firms that did not export in 2003 and did export in 2008. That is, the second table allows us to analyze the evolution of those firms that entered the international market as exporters when the exchange rate presented advantages. We will call these exporters “new exporters.”

**Table 9. Exporter persistence between 2009 and 2011 of exporters in 2008**

Exporter persistence (%)	Export intensity						Exporters total	
	Low			High				
Import intensity	0	Low	High	0	Low	High	Imports=0	Imports>0
2009	52,5	54,4	56,3	82,9	90,4	93,8	66,2	79,8
2010	44,6	49,3	53,5	74,7	84,9	91,2	58,2	76,4
2011	37,4	43,1	49,3	67,4	80,6	87,2	50,9	72,1
Firms in 2008	3317	962	1892	2718	1399	3882	6035	8135

Source: table by author using data from Customs.

**Table 10. Exporter persistence between 2009 and 2011: Firms that did not export in 2003 and did export in 2008.**

Exporter persistence (%)	Exporter intensity						Exporters total	
	Low			High				
Importer Intensity	0	Low	High	0	Low	High	Imports=0	Imports>0
2009	49,6	52,0	54,0	79,0	85,7	87,0	60,5	69,0
2010	41,7	45,2	48,0	68,3	79,0	83,2	51,5	63,4
2011	35,0	40,2	43,5	62,9	73,6	77,1	44,6	58,2
Firms in 2008	2452	776	1072	1433	629	860	3885	3337

Source: table by author using data from Customs.

The first stylized fact that emerges from tables 9 and 10 is that the firms that were globally integrated (importers and exporters) in 2008 had a greater rate of survival during Phase II. This is true for all firms that exported in 2008 and for new firms that emerged from 2003 and 2008.

Second, there is a marked difference between the export persistence of those firms that exported to more than one destination (high intensity) in 2008 and those firms that only exported to one destination (low intensity). For example, looking at Table 9, only 37% of the total non-importing firms that exported to only one destination in 2008 survived to 2011 (column 1), while 67.4% of those firms that exported in 2008 to more than one destination (column 4) survived to the same year. Similarly, Table 10 shows that, of the newly active exporters in 2008, only 35% of those that did not import in 2008 and only reached one destination survived to 2011, while the percentage rises to 62.9% for those non-importers that exported to more than one destination.

Third, a firm's import intensity in 2008 also increased its chances of survival in subsequent years, although the effect was less powerful.

Fourth, those firms with high global integration (firms with high export and import intensity) achieved greater stability after 2008. It is interesting that most of the new exporters (Table 9) that integrated as both exporters and importers by 2008 survived the real currency appreciation. Specifically, 77% of the 860 firms that exhibited high export and import intensity in 2008 were still exporting in 2011.

Finally, it is important to underline that the new exporters had a lower survival rate in almost every category. This reflects that the permanence export values in Table 14 are, in general and for all categories, lower than those in Table 13, which considers all of the firms and not only those that emerged during the boom.

## **V. Conclusion**

In this paper, we examined export growth in Argentina between 2003 and 2011 and focused on firm export dynamics. Despite the absence of substantial changes in the export basket, we find that exporters increased their sales abroad by intensifying their previous exports in preexisting markets, but they expanded by reaching new destination markets and incorporating new products into their export baskets. While in the first phase of the boom (2003-2008), the intensification of exports was substantial, during the second phase we find



evidence of Argentine exporters expanding their horizons, reaching new destinations and offering new products. This expansion suggests that firms did not only take advantage of a temporary competitive exchange rate to intensify their sales in known markets, but that they were also able to diversify destinations and scope.

We find that the importance of the different export margins changes overtime. While the currency depreciated, the intensive margin explains most of export growth. However, the sub-extensive and extensive margins become relatively more important when the currency appreciates. At the same time, this work has emphasized the positive impact of imports in exporter success. We document a strong complementarity between imported variety and firm development. We show how firms increasing exports, whether it be by selling more of the same or by expanding to new markets, are those that have increased the quantity of imported varieties used in their productive process.

Our results have implications for the design of development policy. For example, the discussion surrounding economic policy in Argentina that arose after 2007 centered on maintaining artificial high exchange rates. By not correctly identifying changes at the firm level (documented in this work), the “competitive” exchange rate has been considered the key element to development strategy (Frenkel and Rapetti, 2007; 2008) and, as a result, economic policies tried, and later failed, to set a nominal exchange rate. We see this experience as an example of how macroeconomic needs subordinate a sound strategy of industrial development. Later, around 2011, when the appreciation of the real exchange rate became inevitable, currency needs revived an old development strategy: import substitution. Without understanding those microeconomic transformations emphasized in this paper, the macroeconomic changes expressed in the real exchange rate imposed restrictive policies that ended up affecting firm opportunities, including their access to imported inputs that were necessary for their success on the international stage (both to expand exports and to continue operating as exporters). Therefore, the restriction of imports, thought to solve growing trade imbalances, can in fact sabotage its own aims by adversely affecting exports, the source of sustainable trade balances.

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