Firms' Survival in Export Markets and Credit Constraints: Does Foreign Financing matter? Evidence form Micro Data on Argentine Firms[*]

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Abstract

We study to what extent foreign financing has an impact on firms' survival in export markets. We base our analysis on a panel of Argentine firms that became exporters between 2003 and 2008 which incorporates valuable information on firms access to foreign financing as well as on their performance in export markets. We conduct survival analysis to study the incidence of foreign financing on the permanence of firms in export markets. We find that access to foreign financing increases the probability of firms to survive in export markets. At the same time, diversifying exports in terms of destinations also increases the probability of remaining in export markets.

JEL Classification codes: F10, F13, G20, G28
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1 Introduction

The sharp contraction of trade that followed the dramatic tightening of credit conditions in international financial markets after the global financial crisis, made evident that international financing is undoubtedly important for trade.[1] At the same time, there is plenty of empirical evidence that the majority of export relationships are short lived –Besedes and Prusa (2006); Besedes and Blyde (2010) and Eaton et al. ((2011)- and more importantly, these relationships are even shorter in developing countries, so that raising survival rates in exports markets is central for boosting economic growth and development –Hausmann and Rodrik (2003) in these countries. Thus, assessing the importance of foreign financing for the firms survival in export markets can be informative for policy making.

We address this question at the micro level, making use of a unique database that provides us with detailed information on foreign debt of exporters in Argentina over the period 2003-2008.

The literature on firm survival initiated in the field of industrial organization. Although the importance of financial development for investment and economic growth has been documented by several empirical papers (see Levine 1003, Rajan and Singales, 1998), the inclusion of financial variables in equations modelling firms survival is quite recent. Fotopoulos and Louri (2000) was one of the first articles to employ financial information for 219 Greek manufacturing firms. A set of more recent papers look at global engagement as a way of shielding firms from financial constraints. Bridges and Guariglia (2008) claim that exporters have better access to internal and financial markets; they enjoy less bankruptcy risk; they are less dependent on the domestic demand and are expected to generate enough profits to pay the sunk costs associated with the exporting activity.

Like the industrial organization literature, international trade economists have recently emphasized the relevance of financial characteristics. These economists have traditionally recognized differences in factor endowments, market sizes and productivity levels across sectors and firms as the main sources of comparative advantage. A recent strand of literature has emphasized the importance of credit constraints for the performance of firms in export markets. Models developed by Chaney, 2005 and Manova, 2012 gave

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[1] See in this respect Amiti and Weinstein (2009), Eaton et al. (2011), Chor and Manova (2012) and Contessi and Nicola (2012), among others.

theoretical support to this intuition, while papers by Muûls, 2008; Manova et al., 2011; Minetti and Zhu, 2011, among others, provided empirical evidence in this regard at the firm level.

Our paper aims at contributing to the understanding the link between financial development and the duration of trade relationships. To the best of our knowledge, this is the first study that incorporates information on firms foreign debt in an equation modelling survival in the exports markets.

The paper is organized as follows: In section 2 we conduct descriptive analysis, in section 3 we present some econometric results on firms' survival in export markets while section 4 concludes.

2   A first glance to exporters performance and international financing

Our data set comprises 7,773 manufacturing firms that exported for at least one spell of two years between 2003 and 2008. That is, we exclude from the sample those firms that were just occasional exporters, not being able to export for at least two consecutive years. Firms are represented in the sample for their largest spell. For this sample of firms we have information on: (i) Export values by destination and product, (ii) Size, measured by the number of employees and (iii) Amount, origin and type of creditor.

Although our focus to study firms' survival is on starters, a first descriptive analysis for the complete sample is informative about the importance of foreign financing and its relationship with exporters survival, characteristics and performance A first glance to the data indicates that firms having access to foreign financing are able to stay longer in export markets (Table 1).

Table 1: Permanence in export markets

	Mean of Spell
Without foreign debt	4.0
With foreign debt	5.1

Given that our interest is on the permanence of firms in export markets and the fact we know that they are quite heterogeneous in this regard, we

split them into starters, sporadic and permanent exporters. We consider as starters those firms that began to export within the sample period, as sporadic exporters those firms that have exported at least for one spell of two years and as permanent exporters those that exported the six years of the sample. It can be seen from Table 2 that permanent exporters represent almost half of the firms in our sample, while 34% of the firms started to export within the sample period.

Table 2. Sample composition.

Condition	Number of firms	%
Starters	2,663	34.3
Sporadic exporters	1,315	16.9
Permanent exporters	3,795	48.8
	7,773	

How different are the three groups in terms of their access to foreign financing? We categorize a firm as having access to foreign financing if it received financing from abroad 40% of its exporting years. In Table 2 we see that permanent exporters are very different from the rest: almost 70% of them have access to foreign, while starters and sporadic exporters do not differ significantly: Only 40% of them get financing from abroad.

Table 3: Access to foreign financing

Condition	Without foreign debt	With foreign debt
Starters	62.7	37.3
Sporadic exporters	62.4	37.6
Permanent exporters	31.2	68.8

Our analysis could be subject to an endogeneiity issue, common in this literature, not easy to solve, because there is a strong presumption that those

that firms are able to remain quite permanently in export markets are the most productive, what probably allows them to diversify in markets and products thus helping them to survive to the occurrence of different kind of shocks to export markets, and eventually, to get access to financing. In this regard, firms' size can be used as a proxy, although imperfect, of productivity. The figures in Table 4, in which we split firms with the same criterion and show their mean size, confirms: Firstly, a positive relationship between access to financing and firms' size, measured by the number of employees and secondly, that permanent exporters are on average larger firms compared to starters and sporadic exporters.

Table 4: Mean of Employees

Condition	Without foreign debt	With foreign debt
Starters	21.8	45.1
Sporadic exporters	25.4	70.5
Permanent exporters	38.7	148.5

In Table 5 we look at the diversification of exports in terms of destination, using a Herfindahl-Hirschman index of exports destinations (HHI) and see that exporters with access to foreign financing are more diversified in terms of destinations and again, permanent exporters are much more diversified than firms that are either starters or sporadic exporters.

Table 5: Mean Herfindahl-Hirschman Index of exports destinations

Condition	Without foreign debt	With foreign debt
Starters	0.835	0.746
Sporadic exporters	0.858	0.732
Permanent exporters	0.663	0.507

We follow in more detail how diversification of destinations changes throughout the exporting years in Table 6. It can be seen from there that the HHI

does not change significantly for permanent and sporadic exporters, while on the contrary, it decreases notably for those starters that have access to foreign financing. This finding suggests that foreign financing could matter for firms' to widen their destinations, and eventually, for their survival.

Table 6: Herfindahl-Hirschman Index of exports destination by year of exporting

Year of exporting	Starters		Sporadic exporters		Permanent exporters	
	Without FD	With FD	Without FD	With FD	Without FD	With FD
1	0.889	0.827	0.854	0.729	0.713	0.546
2	0.838	0.758	0.863	0.719	0.686	0.521
3	0.798	0.694	0.857	0.715	0.650	0.501
4	0.769	0.665	0.858	0.751	0.643	0.491
5	0.768	0.658	0.864	0.799	0.641	0.487
6					0.643	0.495

To study in more detail the differences in performance across firms depending on their access to foreign financing and condition, we calculated weighted mean values for distance a gravity models' variable, which can be considered as a proxy of trade costs.[2] Thus, being able to export on average to distant markets is in our context a signal of good export performance. We calculated mean distances as weighted averages, with weights based on export values. From Table 7 we see that access to foreign financing positively relates with mean distances export destinations.

Table 7: Mean weighted distance of export destinations

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[2]Briefly speaking, the name "gravity" comes Newton's law of gravity: exports are directly proportional to the exporting and importing countries' economic "mass", measured by their GDP, and inversely proportional to the distance between them. Thus, these models predict that we expect larger country pairs to trade more, and countries that are further apart to trade less, mainly because transport costs between them are higher. See in this respect Leamer and Levinsohn (1995), Anderson and Van Wincoop (2003) and Shepard (2013).

Condition	Without foreign debt	With foreign debt
Starters	3,549.9	4,040.0
Sporadic exporters	4,183.1	4,323.7
Permanent exporters	3,605.4	3,951.7

Putting our focus on starters we see in Table 8 that the majority of them do not have initial financing and only a small percentage of these (24.2%) are able to get it within the sample period. The figures in Table 9 indicate that the majority of the firms that get access to financing do it in their earlier years of the exporting experience.

Table 8:Starters by initial foreign financing condition

Starters	Number of firms	%
With initial foreign financing	761	28.6
Without initial foreign financing	1,902	71.4
Of which: got financing onwards	461	24.2

Table 9:Year obtaining foreign financing

Year in which the firm got foreign financing	%
2	55.1
3	29.0
4	10.5
5	5.4

3 Survival in export markets and foreign financing

To study the survival of firms in export markets we concentrate on firms that started to export within the sample period, in order to avoid the left censoring problem. This leaves us with a set of 2,663 firms, represented in the sample by their longer spell.

We first characterize the patterns in duration depending on firms having or not access to foreign financing. In Figure 1 we present estimates of the Kaplan-Meier survival function for the two groups of starters in our sample. Firms' survival in export markets increases with their access to foreign finance (the survival function is higher for firms with access to financing). Note also the differences in dynamics: notably, the probability of survival of a firm without access to foreign finance decreases more rapidly than that of firms in the other group.

Figure 1. Kaplan-Meier survival estimates by access to foreign finance.
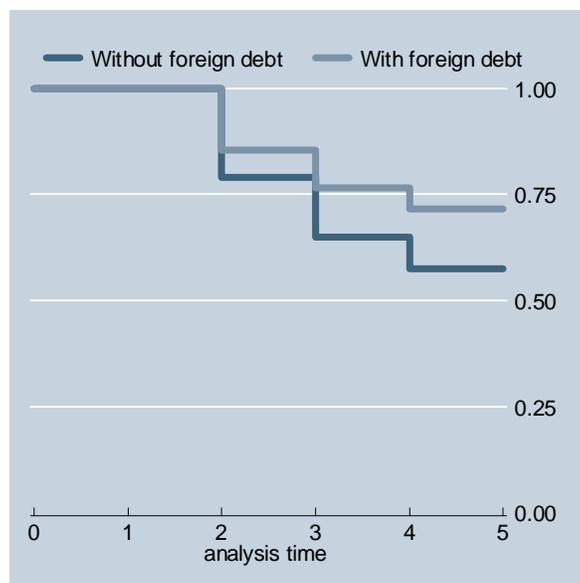
Second, we proceed with the multivariate analysis to provide some preliminary evidence on the incidence of access to foreign financing on firms' probability of survival in export markets, controlling for firms size as a proxy

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of firms' productivity, what helps us not to solve, but at least alleviate the endogeneiity problem we face. We also include indicators of exporters' performance that are supposed to be relevant for their permanence in international markets: as their ability to diversify their exports' destinations or to reach more quality demanding markets.

We estimate a Cox (1972) proportional hazard model in which the baseline hazard function is multiplicatively shifted by the covariates. According to it:

$$h(t/\mathbf{x}_j) = h_0(t)\exp(\mathbf{x}_j\boldsymbol{\beta}_x)$$

Were h_0 is the baseline hazard, $\mathbf{x}_j$, a vector of covariates and $\boldsymbol{\beta}_x$ a vector of coefficients to be estimated from the data. The model does no make any assumption on the shape of the hazard over time.

We include as covariates: A dummy variable that takes the value of 1 if the firm receives foreign financing and zero otherwise, firm's size, measured by their mean value of employees, the HHI index as a measure of concentration of exports destinations, a dummy variable that takes the value of 1 if the firm exports to developed countries and a dummy of contiguity that takes the value of 1 if the firm mostly exports to contiguous countries. All regressions also include industry dummies variables.

From Table 11 we see that access to foreign financing significantly decreases the hazard rate (at the 1% level in equations 2 to 4). Once we introduce the HHI index and the dummies controlling for developed and contiguous countries as main destination its significance is reduced. Consistently with what we found in our descriptive analysis in Section 2 and the evidence in the literature, being a large firm decreases the probability of exit from export markets. Quite surprisingly firm's size becomes insignificant once indicators of exporters' performance are considered. We also find that exporting to developed countries significantly decreases the probability of firms' survival. Although this results could appear as counter-intuitive, it can also be interpreted as an indication that the permanence in developed countries is a difficult task for firms, particularly if firms are starters. In the case of Argentina the geographical distance with respect to developed economies, makes it more difficult for exporters to reach these destinations. Finally, being less diversified in terms of export destinations significantly decreases the probability of remaining in export markets.

Although very preliminary, our results suggest that the access to international markets financing plays a role in explaining the permanence of firms

in export markets.

Table 11. Cox model estimation results: Hazard rates.

Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Employees (mean)	-0.00265***	-0.00193**	-0.00179**	-0.00184**	-0.00117	-0.00106	-0.00116
	[0.000868]	[0.000855]	[0.000849]	[0.000832]	[0.000820]	[0.000813]	[0.000803]
Dummy foreign financing		-0.348***	-0.358***	-0.351***	-0.144*	-0.153*	-0.157*
		[0.0804]	[0.0805]	[0.0805]	[0.0813]	[0.0813]	[0.0813]
Dummy export to developed country			0.313***			0.339***	
			[0.0933]			[0.0922]	
Dummy export to contiguous country				-0.498***			-0.420***
				[0.0784]			[0.0778]
HHI exports (mean)					3.502***	3.521***	3.435***
					[0.267]	[0.267]	[0.267]
Observations	2,505	2,505	2,505	2,505	2,505	2,505	2,505

*** Significant at 1%, ** at 5%, * at 10%.
Standard errors in brackets.

4 Conclusions

In this paper we study the importance of access to international markets financing for exporters' survival Focusing on a set of firms that started to export between 2003 and 2009 in Argentina, for which we have valuable information on export values and destinations as wel as size and access to foreign financing, we conduct survival analysis to asses the importance of foreign financing in explaining their survival as exporters. We find that access to financing contributes to the permanence of firms in export markets, as well as diversification in terms of export destination. We also find that exporting to markets that are quality demanding is a difficult task for starters in the exporting activity.

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References

[1] Amiti A. and D. Wenstein (2009), "Exports and Financial Shocks." NBER WP N° 15556.

[2] Bernard A., J. Eaton , J. Jensen and S. Kortum (2003), "Plants and productivity in international trade." American Economic Review, vol 93.

[3] Besedes, T. and J. Blyde (2010), "What drives export survival: An analysis of ex´port duration in Latina America.", mimeo.

[4] Besedes, T. and T. Prusa (2006), "Ins, Outs and the Duration of Trade.", Canadian Journal of Economics, Vol 30, N°1.

[5] Bridges, S and A. Guariglia (2008), "Financial Constraints, Global Engagement , and Firm Survival in the United Kingdom." Scottish Journal of Political Economy, Vol 55, N°4, September.

[6] Campa, J. and M. Shaver (2002), "Exporting and capital investment: On the strategic behavior of exporters." IESE Business School Discussion Paper N| 469, University of Navarra.

[7] Castagnino T., L D'Amato and M. Sangiácomo (2013) "How do firms in Argentina get financing to export?" Working Paper N° 58, BCRA.

[8] Chaney T. (2005). "Liquidity Constrained Exporters." Mimeo, University of Chicago.

[9] Chor D. and K. Manova (2012), "Off the Cliff and the Back? Credit Conditions and International Trade during the Global Financial Crisis." Journal of International Economics,

[10] Cleves M., R. Gutierrez, W. Gould and Yulia Marchenko (2010), "An Introduction to Survival Analysis Using Stata."

[11] Greenaway D., A. Guariglia and R. Kneller (2007), "Financial factors and exporting decisions." Journal of International Economics 73.

[12] Helpman, E., M. Meliz and S. Yeaple (2004), "Exports versus FDI." American Economic Review, vol. 64.

[13] Manova K., S. Wei and Z. Zhang (2011). "Firm Exports and Multinational Activity under Credit Constraints." NBER Working Paper 16905.

[14] Melitz M. (2003). "The Impact of Trade on Intra-industry reallocations and Aggregate Industry Productivity." Econometrica, vol. 71.

[15] Minneti R. and S. Chun Zhu (2011). "Credit Constraints and Firms Export: Microeconomic Evidence from Italy." Journal of International Economics, vol. 83 (2).

[16] Muûls M. (2008). "Exporters and Credit Constrains. A Firm-Level Approach." National Bank of Belgium.