Export Failure and Its Consequences: Evidence from Colombian Exporters*

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Abstract

Exporters pay high fixed costs to enter foreign markets, yet the majority will not export beyond one year. What happens to these exporters after they fail abroad? For these firms, exporting likely resulted in heavy profit losses. Despite this, trade literature often views exporting as a harmless exercise based on a simple cost-benefit analysis of foreign profits. This rationale ignores the differential effect export failure may have on financially-constrained firms. I develop a heterogeneous-firm model with financial constraints and marketing costs to show how export failure can: 1) make the liquidity constraint more likely to bind, 2) force financially-constrained firms to limit marketing expenditure and, hence, decrease domestic sales, and 3) induce some firms to default. Using Colombian firm-level data and three identification techniques (DD, PSM, and IV), I provide empirical support for these propositions. I find evidence that export failure has a differential impact on financially-constrained firms. These firms have a higher probability of going out of business, lower domestic revenue, and lower domestic revenue growth after exporting; the findings are robust to comparisons with similar successful exporters and even non-exporters.

JEL Classification: F10, F14, F36, G20, G33.
Keywords: Export failure, market linkages, financial constraints, heterogeneous firms.

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I Introduction

Exporting allows firms to reach more consumers, potentially earn higher profits, and diversify against risk in the home market. Yet few firms export (Bernard and Jensen, 2004; Brooks, 2006). While several factors affect the costs and benefits of exporting, fixed export costs are particularly important in limiting international trade. These costs are estimated to be around half a million US dollars for a single firm in Latin America (Das, Roberts, and Tybout, 2007; Morales, Sheu, and Zahler, 2011), and often exceed export revenue in the first years of exporting.[1] In Colombia, for example, foreign revenue in the 1996–2010 period for first-time exporters is about US $200,000 on average and US $13,000 for the median firm. Since the majority of firms are unable to export beyond one year (Eaton, Eslava, Kugler, and Tybout, 2007), it is likely the exporting resulted in profit losses for unsuccessful exporters.

What happens to those firms that try to export but fail? The trade literature often views exporting as a harmless exercise based on a simple cost-benefit analysis of foreign profits, where the most productive firms export and there is no uncertainty in export success. And, from this perspective, there is no additional cost or benefit to export failure. However, export failure can have an effect on domestic production: it can be positive if firms learn from exporting, or negative if export failure has a negative feedback effect. There are economic reasons to believe that for some firms the negative effect dominates. For example, firms tend to rely more on external financing for export sales than for domestic sales (Amiti and Weinstein, 2011), so an unsuccessful exporter cannot simply refocus its resources towards domestic production and ignore foreign losses. Moreover, a firm's financial constraint might tighten due to the addition of export debt but little or no incoming foreign revenue. The tightened financial constraint may mean fewer financing options for domestic operations, limiting hiring, marketing, capital investments, and even operating cash flow. This differential effect on financially-constrained firms means that the negative consequences of export failure, not just the probability of export failure, lower expected returns from exporting.

In this paper, I examine the consequences of export failure. I develop a partial-equilibrium model that explains how a failed export attempt when accompanied with financial frictions can have a negative feedback on existing domestic operations. The model with heterogeneous firms shows that there exists a set of exporters for which export failure can have lasting negative consequences, including firm death. In addition, I find empirical support for this model. Using Colombian firm-level data and three identification techniques (difference-in-difference, propensity score matching, and instrumental variable methods), I show that export failure is associated with reduced economic performance in the domestic market. I find that financially-constrained unsuccessful exporters have a higher probability of default after attempting to export, and those that are able to survive have lower revenue and lower revenue growth. The effect, just as expected from the theoretical model, is robust to comparisons with similar successful exporters and even non-exporters. No paper to my knowledge focuses on failed exporters, provides stylized facts about these firms, nor links export

[1] Export revenue tends to be small for first time exporters (Rauch and Watson, 2003; Esteve-Pérez, Mánez-Castillejo, Rochina-Barrachina, and Sanchis-Llopis, 2007).

failure with poor domestic market performance. My work fills this gap.

The theoretical model builds the intuition for the empirical analysis. Since I am interested in the ex post effects of entering a foreign market, I model the firm's profit-maximization problem *after* export failure has been determined.[2] The model focuses on failed exporters, but also compares these firms with successful exporters and non-exporting firms; successful exporters and non-exporting firms provide counterfactuals for the failed exporters. Exporting has a differential impact on domestic operations because of financing needs and the existence of financial frictions. I assume firms borrow twice to pay for upfront costs: the first loan is to pay the export fixed cost and the second is to pay for domestic operations (marketing and upfront labor costs). Firms use their production-entry expenditure as collateral for the loans; this collateral is an asset necessary for production. I follow Manova (2013) in modeling financial frictions and Arkolakis (2010) in modeling marketing costs. To these I add an element of uncertainty in export success. Uncertainty is resolved after paying a search fee (the export fixed costs); the search fee gives a firm a chance to randomly match with a foreign distributor. Since a foreign distributor is necessary to sell any quantity abroad, export failure results when a firm is unable to find a suitable match. The probability of export failure is known and exogenous to the model, therefore similar-productivity firms may differ in export success. Furthermore, since export failure results in new debt but no additional revenue, it tightens the liquidity constraint and diminishes the maximum amount firms can borrow to pay for domestic operations. In the model, I demonstrate how small and medium-sized firms can become financially constrained, decrease domestic sales, or even default because of a failed export attempt.

In the empirics I test the propositions of the model while also considering alternative explanations for the stylized facts. I provide robust evidence that a failed exporting attempt has a negative impact on a firm's domestic market performance. A firm may even pay the ultimate price and go out of business because of its failed export attempt. Specifically, export failure results in lower domestic revenue, lower domestic revenue growth, and a higher probability of going out of business. In the medium run—and in some cases the short run—the association is strong even when comparing unsuccessful exporters with matched non-exporters and successful exporters.[3] Since the differences are statistically insignificant in the long run, a firm that manages to keep its doors open can over come the negative shock. Note, however, that since export failure may lead to firms exiting the domestic market, the long-run estimates may suffer from attrition.[4] Finally, to address endogeneity concerns, I follow Hummels, Jørgensen, Munch, and Xiang (2014) and instrument for export success based on plausibly exogenous market changes at the product level in foreign markets. The instrument contains rich variation across products and destinations, so its impact on a firm

[2]In the ex-ante export-entry decision, both the cost of export failure the probability of export failure lower expected profit from exporting and lead to fewer firms exporting.

[3]I define the short run as the year firms first export, $t = 0$; medium run as the following five years, $t = 1$ *to* 5; and long run as the remaining "after" periods, $t > 5$. I explain why I make a distinction between these three periods in Section IV.

[4]The levels and Poisson estimates include zero values for firms that exit the domestic market and show that attrition works against finding any negative long-run effects.

varies considerably. Since the instrument is the plausibly exogenous change in the foreign market, firm shocks that affect both the domestic market and the probability of export failure should not influence the estimates. The medium-run differences using the IV approach continue to be strong and statistically significant for the three outcome variables.

The work in this paper complements various strands of the literature. It contributes to the firm heterogeneity literature by providing a better understanding of exporting costs, and thus of the firm export-entry decision.[5] This paper also contributes to the literature quantifying export costs. Das et al. (2007) and Morales et al. (2011) calculate a fixed dollar amount to export fixed costs, and Smeets, Creusen, Lejour, and Kox (2010) quantify how a home-country's institutions can effect export fixed costs. These studies differ from my work in that I focus on the prolonged costs—measured by the loss of domestic revenue and increased probability of going out of business—associated with export failure. Integrating the costs found in this paper into estimates of fixed costs may explain why the estimated fixed export costs are so high.

This paper also contributes to the literature on export survival.[6] The export survival literature includes studies using bilateral trade-flow data (Nicita, Shirotori, and Klok, 2013; Besedeš and Prusa, 2011, 2006a,b) and firm-level data (Stirbat, Record, and Nghardsaysone, 2013; Cadot, Iacovone, Pierola, and Rauch, 2013; Esteve-Pérez et al., 2007; Tovar and Martínez, 2011; Albornoz, Calvo Pardo, Corcos, and Ornelas, 2012). The focus of the existing literature is on understanding export survival, rather than understanding the consequences of export failure. Albornoz et al. (2012) develop a model that explains why firms have low export survival; in their model a firm can only infer its profitability abroad after exporting. In their model, however, there are no consequences to export failure. Besedeš and Prusa (2011) show that differences in export survival at the country level explain differences in long-run export performance. I construct a model and implement an empirical strategy using firm-level data that directly links export failure and firm performance in the domestic market. Thus, my work identifies a channel through which firm export survival can have welfare effects at the national level.

More generally, this paper contributes to the literature on financial frictions and international trade. This literature explains how financial frictions affect a firm's decision to enter a foreign market. Manova (2013), Feenstra, Li, and Yu (2013), and Chaney (2013) identify a mechanism by which financial frictions can affect trade. Manova (2013) shows how financial frictions can affect both which firms export and how much they export. Feenstra et al. (2013) find that banks impose more stringent credit constraints on exporting firms, when compared with non-exporting firms. Antunes, Opromolla, and Russ (2014) examine the riskiness involved in financing exporting firms. They find that exporters, compared with non-exporters, are less likely to go out of business and, conditional on going out of business, more likely to default. The export failure results found in this

[5]For a sample of the heterogeneous literature see Melitz (2003); Verhoogen (2008); Melitz and Ottaviano (2008); Bernard and Jensen (2004); Bernard, Jensen, Redding, and Schott (2007); Bernard, Redding, and Schott (2011); Helpman, Melitz, and Yeaple (2004).

[6]A related field is work on firm's and entrepreneur's overall success. See Ucbasaran, Shepherd, Lockett, and Lyon (2013) for a summary of the literature.

paper may explain another reason exporters are more likely to default.

Finally, this paper adds to the literature on the linkages between the domestic and export markets. Ahn and McQuoid (2013) find that export and domestic revenue are substitutes. They find that capacity-constrained firms lower domestic sales when experiencing a positive export shock. McQuoid and Rubini (2014) differentiate between successful and unsuccessful exporters and find that "transitory" exporters have a larger drop in sales than "perennial" exporters in the domestic market when exporting. They focus on the immediate, short-run opportunity costs of exporting. I add to this literature by showing that this linkage does not end when a firm stops exporting; I show that the effect is prolonged and larger when an unsuccessful exporter is financially constrained. Rho and Rodrigue (2010) find that exporters have slower domestic revenue growth than non-exporting firms. They argue that previous models overestimate the sized of fixed export costs. My work differs in that I focus on the prolong effects on financially-constrained unsuccessful exporters, while they study the linkages for continuous exporters. Lastly, other papers identify trade-offs between the home and foreign market due to a firm's investment decision (Spearot, 2013), entry and exit decision (Blum, Claro, and Horstmann, 2013), and pricing decision (Soderbery, 2014).

The rest of the paper is organized as follows. Section II describes the data and provides stylized facts about new exporters. Section III introduces a partial-equilibrium model, demonstrating how export failure can have repercussions in the home market. Section IV implements the identification strategy and provides some robustness checks. Section V concludes.

II Stylized Facts for New Exporters and Data Description

In this section, I describe the data, provide summary statistics, and offer empirical motivation for my findings. I use an event study analysis to compare the domestic market performance—before and after entering a foreign market—of firms exporting at the same time, but differing in export success. The analysis identifies stylized facts about the two types of new exporters (successful and unsuccessful) and presents a more complete picture of the association between domestic market performance and exporting. See Table 1 for a summary of the stylized facts.

Table 1: Summary of Three Stylized Facts

Fact 1:	Unsuccessful exporters are more likely to exit the domestic market after exporting than their successful counterparts, and financially constrained unsuccessful exporters have the highest exit rates.
Fact 2:	Unsuccessful exporters decrease domestic revenue after exporting, and financially constrained unsuccessful exporters decrease revenue the most.
Fact 3:	All financially constrained exporters, irrespective of their success abroad, have lower domestic revenue growth after exporting.

II.1 Data sources and sample

I use Colombian firm level data to analyze the link between export failure and domestic market performance. Using Colombian data for this analysis is ideal for several reasons. First, I am able to merge domestic financial data with trade data. The trade data help determine whether or not firms are successful at exporting, the products firms export, and the destination of these products. The financial data provide information on domestic revenue, and also on various other financial variables (eg. assets, liabilities, etc.). While the two data sets have been used before, to my knowledge I am the first to use both together. Second, since firms in developing countries have a higher probability of export failure than those in developed ones (see Besedeš and Prusa 2011), the consequence associated with such failure may be more acute in developing countries; thus it makes sense to use data from a developing country, such as Colombia, in the analysis. Finally, these data provide a fairly long panel (16 years) and, for many firms, we can observe firm behavior several years before and after first exporting.

I use Colombian customs data as reported by the Colombian National Directorate of Taxes and Customs (DIAN) to get firm-level exports for the 1994–2011 period. Each transaction includes a firm tax identifier (which is time-invariant), a product code, trading partner, and the free-on-board (FOB) export value in US dollars and Colombian pesos.[7] Although the data are at the transaction level, I aggregate to the annual level. I do this for two reasons. First, exporting is intrinsically discrete; thus, it makes more sense to aggregate. Aggregating eliminates seasonal fluctuation and accounts for the fact that some firms import infrequently to take advantage of economies of scale and to account for delivery lags (Alessandria, Kaboski, and Midrigan, 2010). Second, I aggregate the trade data to match the level of aggregation for the financial data.

I use Colombian financial data as reported by the Superintendency of Corporations ("Superintendencia de Sociedades") to get balance sheet information for firms producing in the 1995–2011 period. These data include only firms that fall under the jurisdiction of the agency, which is part of the Colombian Ministry of Commerce, Industry and Tourism; they are publicly available in the "Sistema de Informacion y Reporte Empresarial" (SIREM) database. The financial data are self-reported and must be provided annually by law. These data do not include the universe of firms and do not come from a survey, but do include most of the value added in the real economy. According to SIREM, the data account for 95% of the GDP in the real economy and cover on average of 25,000 firms per year (see SIREM User Guide). They include firms in the following categories: private limited companies, public limited companies, joint ventures, simple limited partnerships, limited joint-stock partnerships, foreign companies, and self-employed businesses.[8] The financial data include the firm name, sector, tax identifier, year, and various balance sheet information (liabilities, assets, revenue, etc.) in Colombian pesos. There is a possibility that a firm did not report data because it did not have to (firms that are in the process of shutting down do not have to report their financial information) or because the firm chose to break the law. In either case, if a firm does

[7] I ignore firms whose tax identifiers do not conform to the standard nine-digit number. The trade data are the same used in Eaton et al. (2007) and add up to within one percent of UN COMTRADE exports.

[8] See Table A.1 for a complete list of included and excluded firm types.

not report its financial data, I interpret this as representing a bad outcome and simply treat the firm as exiting the domestic market.

I merge the two data sets using the year and tax identifier and make additional restrictions to get the data sample used in this paper. I classify firms as unsuccessful exporters based on the trade data; if a firm is unable to export for more than one year, I consider such a firm as a failed exporter. However, I allow successful exporters to exit and enter the export market. I exclude a firm if it has missing financial data in any period between its first and last year of production; I do this because there are very few such firms and keeping them would result in missing data for reasons other than the firm exiting the domestic market. I make the additional requirement that all firms have financial data for at least three consecutive years: two years before exporting and the year of exporting. Thus, in my sample, at a minimum, all firms have one domestic revenue growth observation before exporting and one observation after. Finally, since new exporters are the focus of this paper, I exclude continuous exporters and non-exporters for most of the estimates. I define continuous exporters as firms that have trade data in 1994, the first year available with trade data, and non-exporters as firms with no export data in the periods analyzed. The 2010 export cohort is excluded since, for these firms, there is not enough information in the after period to calculate the medium-rum effect for the *firm exit* variable; keeping this group in the sample does not alter the results. I end up with 15,381 firm-year observations, 838 successful exporters, and 574 unsuccessful exporters.[9]

Variable definitions

There are three main outcome variables: *Domestic Revenue*, *Domestic Revenue Growth*, and *Exit* from the domestic market. Since the financial data only include total revenue by firm, I subtract total exports from total revenue to calculate domestic revenue.[10] *Domestic Revenue* equals either the level domestic revenue in Colombian Pesos or the natural log of domestic revenue for firm i at time t. *Domestic Revenue Growth* for firm i at time t equals the difference in log domestic revenue between time t and time $t-1$. *Exits* from the domestic market equals one if the firm exits the domestic market, and zero otherwise. Note that this last variable does not vary by time since firms in the sample enter and exit only once; so estimates for the probability of exiting from the domestic market do not come from panel regressions and do not include firm fixed effects.

The main covariates of interest are the following: successful exporter (S_{it}), unsuccessful exporter (U_{it}), and a measurement of financial constraint (NFV). U_{it} equals one for new exporters that fail to export beyond a 12-month period, and zero otherwise. Thus, a firm that exports in two calendar years can still be classified as unsuccessful. S_{it} equals one for all other new exporters, and zero otherwise. Since I am interested in comparing financially constrained firms, I separate financially- and non-financially-constrained firms. A firm is financially vulnerable ($NFV = 0$) if the ratio of

[9] I include as many non-exporters as unsuccessful exporters in the Propensity Score Matching estimates.

[10] This might introduce measurement error in the *Domestic Revenue* variable if firm financial data do not match the timing of the trade data.

cash flow from operations to total assets is less than the median at the time of first exporting ($t = 0$), and a firm is financially vulnerable ($NFV = 1$) if the same ratio for a firm is above or equal to the median. This ratio measures how well a company is able to generate cash from its assets. A smaller ratio implies that the firm will have less cash available for future expenditures, and thus will be more in need of external financing. This measurement is widely use in the literature (Ahn and McQuoid, 2013; Whited and Wu, 2006; Kaplan and Zingales, 1997). As a robustness check, I use the median total asset as a measurement for the financial constraint.

II.2 Summary statistics

The trade data show why focusing on unsuccessful exporters is important.[11] The importance of these firms, however, may be overlooked in the overall sample. For instance, I find that on average about nine thousand Colombian firms export in any given year. Of these, 2,458 are continuous exporters, 4,242 are successful exporters, and 1,817 are unsuccessful exporters (see Appendix Table A.2). On average, continuous exporters account for most of the export value (almost three fourths of all exports), successful exporters account for a bit over one fourth, and unsuccessful exporters account for the rest (less than one percent). Yet unsuccessful exporters make up the vast majority of *new* exporting firms; on average, unsuccessful exporters account for almost two thirds of new exporters, and successful exporters account for the rest. While unsuccessful exporters tend to export less than their share of firms, they still represent about a third of the export value coming from new exporters.

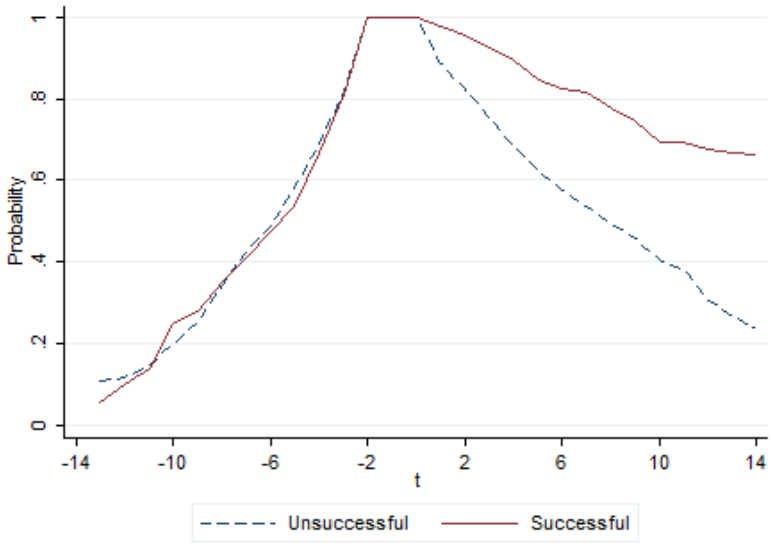
The financial data put the importance of exporters in context. On average, the financial data cover over fifteen thousand firms per year; 12 percent are continuous exporters, 70 percent are non-exporters, 12 percent are successful exporters, and 5 percent are unsuccessful exporters. While I find that 30 percent of firms export at least once, the number is inflated by the fact that the data do not come from a random sample, and the firms in the sample tend to be fairly large. In fact, non-exporters on average have total sales equal to about 5 billion Colombian pesos (about US $2.5 million), continuous exporters average about 50 billion, successful exporters average about 27 billion, and unsuccessful average about 15 billion. Of this value, continuous exporters receive 23 percent from exporting, successful exporters receive 14 percent, and unsuccessful exporters receive less than 1 percent. These data confirm findings in other papers: few firms export, only the most productive firms export, those that do export start small.

[11] See Eaton et al. (2007) for a through discussion on the export dynamics of Colombian firms. Note, however, that I do not use the same definitions used in that paper, and so the numbers in this paper will not match those of Eaton et al. (2007). For example, I define unsuccessful exporters, what they call "single year" exporters, as firms that are unable to export for more than 12 months and they define them as firms that exported in year t but not in $t-1$ or $t+1$.

II.3 Empirical motivation

I find that domestic market performance is correlated with exporting, and the association depends on both the export success and financial vulnerability of a firm; that is, the effect depends on whether or not the firm was successful at exporting and on whether or not the firm was financially vulnerable when it first exported. Looking at three outcome variable (firm exits from domestic production, domestic revenue, and domestic revenue growth), I identify three stylized facts regarding export failure and domestic market performance.

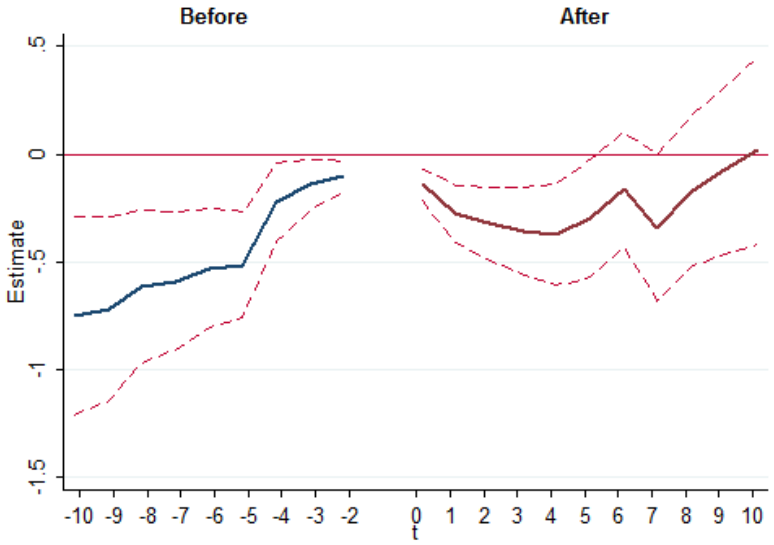
Figure 1: Firm Entry and Exit



Note: The probability of being in the data set is calculated by dividing, by firm type, the total number of firms in a given period by the total number of firms at $t = 0$. By design, the number of firms in the data do not change at $t = -2, -1, 0$.

The first stylized fact is that going out of business is more likely for unsuccessful than successful exporters. Figure 1 shows the share of firms in the sample by export success and exporting period; it is an average of all export cohorts. In the figure, by design, all firms are in the sample two periods before exporting ($t = -1, -2$) and the year the firm first exports ($t = 0$). In the pre-exporting period ($T < 0$), the figure shows the time from start of domestic production to start of exporting. In these periods there is no significant difference between successful and unsuccessful exporters. However the two types of firms are very different in the after-exporting period ($t \geq 0$); in those periods, the figure shows the time from start of exporting to end of domestic production. There we see that unsuccessful exporters are more likely to exit the domestic market than successful ones; for example, 80 percent of successful exporters are still producing five years after first exporting, but only 60 percent of unsuccessful exporters are still producing in the same period. The difference in

Figure 2: Ln(Domestic Revenue): Unsuccessful Exporters
(Financially-Constrained Firms)



Note: The estimates control for firm fixed effects and year fixed effects. The omitted group is financially-constrained, unsuccessful exporters at time $t = -1$.

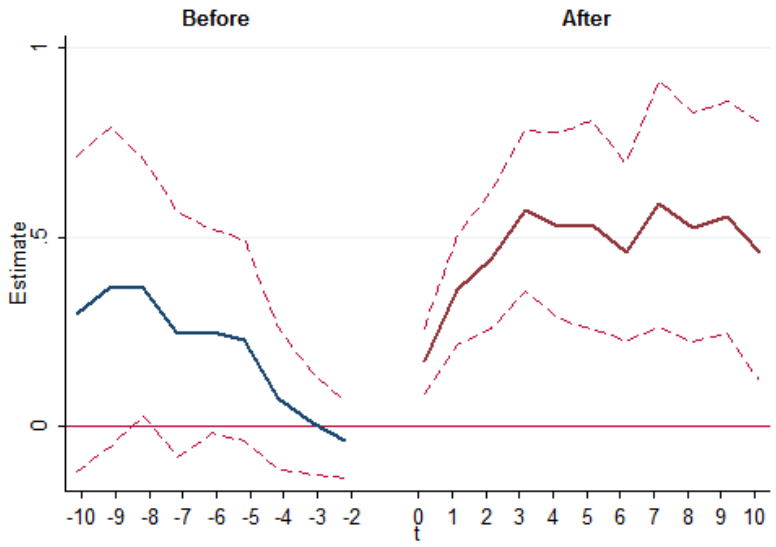
survival rates is increasing over time. However, this difference disappear in the long run if I compare the probability of exiting the domestic market conditional on producing at time t (the hazard rate). I get similar results if I separate financially vulnerable firm from the two types of exporters; the difference is that financially vulnerable firms are more likely to exit the domestic market than their their non-financially vulnerable counterparts.

The second stylized fact is that after export failure domestic revenue decreases for unsuccessful exporters and the drop is more pronounced for financially vulnerable ones. In event-study Figure 2, we can see how such financially vulnerable unsuccessful exporters acted in all periods before and after exporting relative to $t = -1$ (the year before exporting).[12] The figure comes from a regression with firm and year fixed effects that includes my whole data sample. In the before-exporting period, domestic revenue grows as firms gets closer to exporting, but the trend changes significantly afterward. In the before-exporting periods these firms were in an upward trajectory; so, for these firms, exporting was not a last resort effort to stay in business. Domestic revenue decreases for these unsuccessful exporter in the after-exporting period and eventually stalls at pre-exporting levels. The drop is quite significant in the short term; relative to $t = -1$, domestic revenue decreases about 10 percent the year the firm exports ($t = 0$) and this decreases to about 25 percent the next five years. For the median firm in $t = -1$, whose total revenue is about 4 billion pesos (roughly US$ 2 million), this would account for a drop of 400 million pesos the year the firm first exports

[12]For similar figures using matched data see Figures A.1, A.2, and A.3 in the Appendix.

and 1 billion pesos each of the following five years.

Figure 3: Ln(Domestic Revenue): Unsuccessful vs. Successful Exporters
(Financially-Constrained Firms)



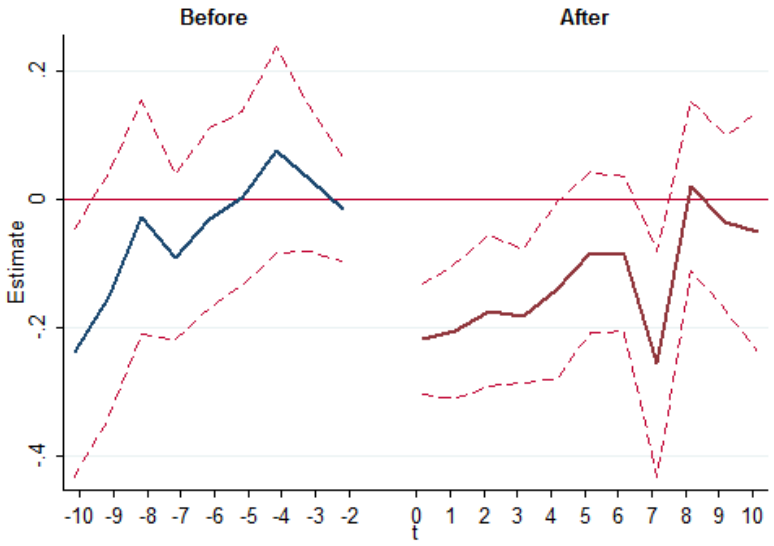
Note: Regression includes firm fixed effects and year fixed effects.

There may be numerous explanations why financially vulnerable unsuccessful exporters see a drop in domestic revenue after exporting. One possible explanation is that the figure may be capturing firm trends, so a difference-in-difference framework is more appropriate than a pre- and post-exporting analysis. A difference-in-difference framework may be necessary if, for example, firms tend to export at peak production, and a decrease in domestic revenue after the peak may be expected. In event study Figure 3 I estimate the difference between financially vulnerable successful exporters and unsuccessful ones; the figure comes from the same regression as Figure 2. There are two benefits to using an event study analysis for this comparison. First, we can see if the "control" group (successful exporters) has a similar trend to the "treatment" group (unsuccessful exporters) in the before-exporting periods. We see in the figure that there are no statistically significant differences in the pre-exporting periods; so both financially vulnerable successful and unsuccessful exporters have similar trends in domestic revenue before exporting. The second benefit of the event study analysis is that we can see how both firm types react in the domestic market after exporting relative to $t = -1$. The differences in these periods are stark. Financially vulnerable, successful exporters are much better off compare to those that are unsuccessful; these differences are statistically significant. The difference is such that domestic revenue for financially vulnerable successful exporters does not decrease at $t = 0$ or any other post-exporting periods, relative to $t = -1$.

To check if firm-specific trends are driving my results, I replicate the figures above using domestic

revenue growth as the outcome variable.[13] These results identify a third stylized fact: domestic revenue decreases after exporting for both financially vulnerable unsuccessful and successful exporters in the short and medium run. In event study Figure 4, we again see how financially vulnerable unsuccessful exporters acted before and after exporting relative to $t = -1$ (the year before exporting).[14] While domestic revenue growth picks up before a firm exports, this growth is, for the most part, not statistically different than that of the $t = -1$ period. In the after-exporting period, however, there is a large and statistically significant drop in the growth rate. Domestic growth decreases by about 20 percent the year the firm first exports, and while growth improves after that, it is still lower than the $t = -1$ growth for several years. Growth eventually returns to its trend about five years after exporting.

Figure 4: ΔLn(Dom. Revenue) for Unsuccessful Exporters
(Financially-Constrained Firms)



Note: Regression includes firm fixed effects and year fixed effects. The omitted group is constrained, unsuccessful exporters at time $t = -1$.

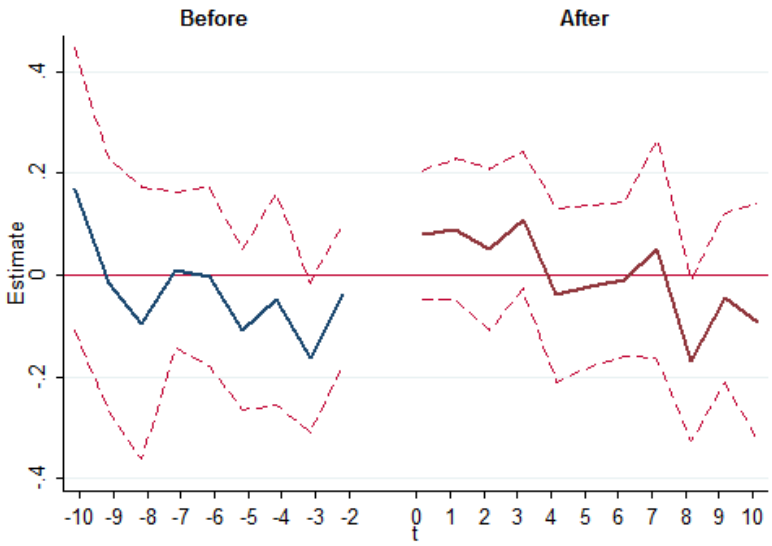
I compare the difference in domestic revenue growth between financially vulnerable successful and unsuccessful exporters to see how their trends differ. While these successful exporters are doing relatively worse in the before-exporting period, these differences are not statistically significant. When comparing these firms in the after-exporting period, we see a relative increase for successful exporters, but the difference is again not statistically significant (see event study Figure 5). Part of the reason I may not find a statistically significant difference may be that liquidity constraints

[13]Since the regression includes firm fixed effects, using this outcome variable removes time-invariant, firm-specific growth trends.

[14]For similar figures using matched data see Figures A.4, A.5, and A.6 in the Appendix.

may hinder revenue growth in the domestic market for successful exporters.[15] That is, successful exporter may require more financing to supply two markets. If firms are financially constrained and require external financing to generate domestic revenue, firms may have to lower such spending in the domestic market in order to supply another market. Nevertheless, a drop in domestic revenue growth for successful exporters is less worrisome as these firms make up for a loss in domestic revenue with foreign revenue. A drop in domestic revenue growth should be more worrisome for unsuccessful exporters as for these firms a loss in domestic revenue is not associated with foreign revenue. Even though liquidity constraints make it difficult to find a difference between successful and unsuccessful exporters, when I move away from the event study analysis and do a more traditional difference-in-difference study—with a pre- and a post-period comparison—in the empirics section, I find statistically significant difference between these two groups of firms.

Figure 5: ΔLn(Dom. Revenue): Unsuccessful vs. Successful Exporters
(Financially-Constrained Firms)



Note: Regression includes firm fixed effects and year fixed effects.

II.4 Discussion

While the association above is clear, it may be that successful and unsuccessful exporters are systematically different from each other in the before-exporting period and thus successful exporters are not a good counterfactual for unsuccessful exporters. For example, firms may have invested dif-

[15] Alternatively, we would see a similar outcome if capacity constraints were an issue. That is, because successful exporters are supplying the two markets, capacity constraints may prevent these firms from supplying the domestic market to the same extent that they were in the pre-exporting period.

ferently or had different debt levels; observable variables that may be different include short-term debt, long-term debt, short-term labor expenditure, long-term labor expenditure, short-term investment, long-term investment, inventory, property, intangibles (patents, etc.). As seen in Appendix Table A.3, however, most of the differences are not statistically significant. The only exception is long-term investment, successful exporters have over 70 percent more long-term investment than do unsuccessful ones. This applies to both the whole before-exporting period and also just the year before exporting. Successful exporters may have invested and upgraded to become competitive abroad. These pre-export, observable differences–even if there are few—make it clear that I must be careful when making the comparison between successful and unsuccessful exporters. The comparison is complicated by the fact that there might be unobserved, time-varying differences between the two groups. It may also be that it takes time to reorient the firm to serve only the domestic market; that firms experience different negative, long-lasting productivity shocks that correlate with exporting; or that the two groups export for different reasons and have different trends in the after exporting period. In the sections below, I attempt to rule out as many of these alternative explanations as possible and establish export failure as at least partially responsible for the negative performance seen after export failure.

III A Model with Export Failure, Marketing Costs, and Financial Frictions

In the previous section, I identified four stylized facts about unsuccessful exporters (see Table 1 for a summary). In this section, I develop a simple two-country, Melitz-type model with domestic outcomes as a function of export success that can replicate the stylized facts. I follow Manova (2013) in structuring financial frictions and Arkolakis (2010) in implementing marketing costs. In the model, firms fail abroad if they are unable to find a suitable match; thus, similar-productivity firms can differ in export success. Unlike most firm heterogeneity models, which focus on the firm export-entry decision, I focus on the firm's decision after export success has been determined. I contrast the ex post profit-maximizing decisions between non-exporters, unsuccessful exporters, and successful exporters. I identify three testable predictions from the model: exporting for unsuccessful exporters, compared to successful exporters and non-exporters, results in a tighten financial constraint, lower domestic revenue, and a higher probability of default.

III.1 Consumers

Consumers have constant elasticity of substitution (CES) preferences across varieties in each country (h and f). Utility for consumers is specified according to the following form:

$$U = \left(\int_{i \epsilon \Omega} c_i^{\rho} di \right)^{\frac{1}{\rho}}$$

Here, Ω is the mass of available goods and c_i is the consumption of variety i in each country.[16] Goods are substitutes, which implies that $0 < \rho < 1$ and that the elasticity of substitution between two goods is given by $\sigma = \frac{1}{1-\rho} > 1$. Aggregate prices are given by $P = \left(\int_{i\epsilon\Omega} p_i^{(1-\sigma)} di\right)^{\frac{1}{1-\sigma}}$ and aggregate consumption/aggregate utility per individual is given by $U = C = \left(\int_{i\epsilon\Omega} c_i^{\rho} di\right)^{\frac{1}{\rho}}$. Total revenue and expenditure per individual is given by $P \cdot C = Y$. Individuals maximize utility subject to a revenue constraint: $\int_{i\epsilon\Omega} p_i c_i di = Y$. Optimal consumption in each country, per individual who buys variety i, is given by $c_i = \frac{p_i^{-\sigma}}{P^{1-\sigma}} Y$. Finally, total consumption of variety i in each country is given by $q_i = L_i c_i = L_i \frac{p_i^{-\sigma}}{P^{1-\sigma}} Y$, where L_i is the number of individuals in a given country who buy variety i. L_i is endogenously determined by a firm's marketing expenditure.

III.2 Firms

Setup of the model

Firms enter under uncertainty. Firm pay a fixed entry fee, f_e, to enter the home market. This fee is in terms of labor and is a tangible asset that can be used as collateral. After paying f_e, the firm then draws a unit labor requirement coefficient, ϕ_i, from a known distribution $G(\phi_i)$. All firms must also pay an additional overhead labor cost, f_d, in order to produce in the home market (similar to Melitz, 2003); this cost is also in terms of labor and wages are normalized to one. Upon receiving its productivity draw, the firm decides whether or not to produce; low productivity firms never remain in the market.

After entry, firms must decide whether or not to enter the export market. If the firm decides to enter the export market, it must pay an export entry fee, f_x, which is in terms of labor. Firms enter the export market under uncertainty and pay this fee to find if they match with a foreign distributor/partner; a foreign distributor is necessary to sell any quantity abroad. The probability that a firm is successfully matched with a foreign distributor is γ and the probability that it is unable to find a suitable match abroad is $(1-\gamma)$. I assume firms are risk-neutral and that γ is determined outside of the model.[17] For convenience, I assume that unsuccessful exporters do not get any revenue from exporting; I do this as unsuccessful exporters receive a negligible amount of revenue from abroad (see Section II.2). For the conclusions to hold, unsuccessful exporters must lose profits from exporting; that is, the revenue from exporting does not cover the export entry fee, marketing expenditure, and variable cost spent to supply the foreign market. As mentioned in the introduction, this is likely to be the case for most new exporters.

Firms borrow twice before profits are realized. The first time is to pay exporting fixed costs, f_x.

[16] Since each firm produces only one product, i indexes for both the product and the firm. For convenience, I leave out country subscripts where the distinction is clear.

[17] Studies have found that firms upgrade before exporting, increasing export survival (see Bustos, 2011). But upgrading tends to takes place on the upper end of the distribution and not by financially-constrained firms.

The second is to pay for marketing, $F(L_i)$, and overhead labor costs in the domestic market, f_d. As in Manova (2013), I assume that firms cannot use profits from a previous period or other savings to pay for these costs. I also assume that all firms must borrow the full amount of these costs.[18] If a firm cannot borrow to pay the marketing expenses and overhead labor costs, it loses its collateral and is unable to produce.[19] These firms must replace their collateral if they wish to produce in the future.

Marketing costs, $F(L_i)$, are endogenous and determine the number of individuals a firm reaches. I assume marketing has increasing marginal costs and that firms only use domestic labor in marketing for any market. These costs determine how much a firm needs to borrow for marketing.

After borrowing, firms produce and earn profits. Firms use these profits to pay off their debt. See Table 2 for a summary of the sequence.

Table 2: Summary of Sequence of Events

1.	Pay entry fee, f_e, get productivity draw, and decide whether or not to stay in the domestic market.
2.	Borrow, if exporting is desirable, to pay the export entry fee, f_x; this is a matching fee that allows firms to match with a foreign partner/distributor.
3.	Borrow for marketing costs, $F(L_i)$, and overhead labor costs, f_d.
4.	Profits are realized and debt is paid off.

Firm maximization problem before export success has been determined

After the initial productivity draw, there is still uncertainty in the loan repayment for all firms that borrow and uncertainty in a firm's matching success for those firms that decide to export. The probability that a firm is successfully matched with a foreign distributor is γ and the probability of default is λ. Firms only pay the export entry fee if they are, conditional on surviving abroad, better off. All firms with expected foreign profits greater than or equal to zero enter the export market. If the probability of export survival were certain and if there were no financial frictions, the model would solve to something similar to that in Melitz (2003). The key difference between this model and the existing literature is that firms pay f_x to find an export match, and as mentioned

[18] I do this for convenience; for the conclusions of the model to hold, firms need to pay a percentage of the fixed costs and upfront marketing costs with outside capital. Thus, the conclusions here are more applicable to firms that are more dependent on outside capital.

[19] Risk-neutral creditors lend the export entry fee to some firms that, conditional on the firm discovering that it is an unsuccessful exporter, will be unable to borrow the second installment. Creditors charge higher repayment fees when repayment is not certain to ensure they do not lose money.

above the match success is uncertain.[20] By making the export matching probability exogenous, I abstract from the export-entry decision and instead focus on the decision after export success has been determined. Since matching success is determined outside of the model, and all firms attempt to enter the export market if expected foreign profits are greater than or equal to zero, similar firms can enter the export market and differ in export success.[21]

Firm maximization problem after export success has been determined

After export success is determined, there are three types of firms in the market: non-exporters, unsuccessful exporters, and successful exporters. Non-exporters only supply the home market and borrow to pay for the overhead costs, f_d, and marketing expenditure, $F(L_i)$. Unsuccessful exporters also only supply the home market, but have additional debt burden because of the export loan. Successful exporters also pay back the export loan, but, unlike unsuccessful exporters, have revenue from two or more markets to pay off this debt.[22] In this section, I focus on the unsuccessful exporter decisions and also provide the solutions for the non-exporter and successful exporter decisions.

For unsuccessful exporter i, the ex post maximization problem is as follows:

$$E\pi(\phi_i) = \max_{p_i, q_i, L_i} \left\{ p_i q_i - \frac{q_i}{\phi_i} - \lambda B_i - (1-\lambda) f_e \right\} \tag{1}$$

Subject to

$$q_i = L_i \frac{p_i^{-\sigma}}{P^{1-\sigma}} Y \tag{2}$$

$$F(L_i) = L_i^{\beta} \tag{3}$$

$$p_i q_i - \frac{q_i}{\phi_i} \geq B_i \tag{4}$$

$$\lambda B_i + (1-\lambda) f_e \geq f_x + f_d + F(L_i) \tag{5}$$

Equation (1) is the profit function. Equation (2) is the total demand for the variety produce by firm i. With CES utility, this is the demand function for individual varieties (see the consumer decision problem for details). Equation (3) is the marketing expenditure for the variety produced by firm i.

[20] This idea is similar to that of Albornoz et al. (2012), but the focus of the model is on the ex post profit maximization problem, not the ex ante maximization problem.

[21] The probability of default, as in Manova (2013), is exogenous to the model. Endogenous default would reinforce the findings of this model. The reason is that firms with a higher probability of default are either not able to borrow or have higher repayment costs. If costs are higher, then the firms that find that exporting is not viable are likely to become even more constrained and have a higher probability of becoming insolvent than in the exogenous default case. Thus, borrowing becomes even more difficult.

[22] Expected profits equal the sum of net revenue from the home and, if relevant, foreign markets minus expected loan repayment. The expected loan repayment is the loan, B_i, times the probability of paying back the loan, λ, plus the collateral, f_e, times the probability of losing the collateral, $1-\lambda$.

$F(L_i)$ is the amount of labor required to reach L_i consumers, and firms must borrow this amount. I assume $\beta > 1$ to allow for increasing marginal costs to reaching consumers.

Equation (4) is the firm's liquidity constraint. Net revenues, excluding the loan, must be larger than or equal to the loan repayment, B_i. When repaying the loan, firms can at most offer their net revenues to the creditor. This constraint is only binding for low productivity firms. Equation (5) is the risk-neutral, creditors' constraint. Creditors only fund a firm if net returns from the loan are greater than their outside options; this option is normalized to zero. This constraint ensures creditors do not lose money and thus are always be willing to lend when expected repayment is non-negative. Assuming perfect competition in the credit markets, this constraint holds with equality. f_x is the export entry fee and the size of the exporting loan; notice that the firm pays f_x, but has no new revenue. f_d is the overhead labor fixed costs in the home market and the size of the domestic-production loan. $F(L_i)$ is the marketing expenditure and the size of the marketing loan. These last three costs are financed using outside capital; although I assume that firms borrow the whole amount, the conclusions hold as long as firms have to borrow a share of those costs. B_i is the repayment creditors receive when firms repay all of their debt and f_e, the entry fee, is the collateral creditors receive when firms default on their debt.

In the following analysis, I make two key assumptions:

Assumption 1: $max\left\{\frac{f_e - f_d}{f_e}, \frac{1}{\beta}\right\} < \lambda$

Assumption 2: $f_x > f_d$

Assumption (1) ensures that $f_d > (1-\lambda)f_e$ and $\beta\lambda > 1$. The expected cost of defaulting, $(1-\lambda)f_e$, cannot be larger than the expected cost of repaying the overhead costs. Otherwise, the expected cost of borrowing would be higher than the actual cost. It would also mean borrowing costs would be prohibitively high and few firms, if any, would want or be able to borrow. Assumption (2) implies that that the fixed costs are higher in the foreign market than in the domestic market; this ensures that only the most productive firms export. The necessity of the two assumptions becomes obvious in the following subsections.

III.3 Credit-constrained firm threshold

Maximization problem for unconstrained firms

For financially unconstrained firms, Equation (4) will not bind and these firms will be able to borrow as much as they desire. Substituting Equations (2), (3), and (5) into the maximization problem gives the problem for unconstrained, unsuccessful exporters:

$$\max_{p_i, L_i} \; E\pi_i(\phi_i) = L_i \frac{p_i^{1-\sigma}}{P^{1-\sigma}} Y - \frac{L_i \frac{p_i^{-\sigma}}{P^{1-\sigma}} Y}{\phi_i} - f_x - f_d - L_i^{\beta}$$

Firms set their price by maximizing profits with respect to p_i. The profit-maximizing price is the following:

$$p_i^* = \frac{\sigma}{\sigma - 1}\frac{1}{\phi_i} = \frac{\mu}{\phi_i} \tag{6}$$

Where $\mu = \frac{\sigma}{\sigma-1}$ is the firm's constant markup above marginal cost. The number of consumers a firm reaches, L_i, increases net revenue, $p_i q_i - \frac{q_i}{\phi_i}$, but also increases marginal marketing costs, $\beta L_i^{\beta-1}$. By maximizing profits with respect to L_i and substituting in the profit-maximizing price, Equation (6), we get the profit-maximizing marketing expenditure:

$$L_i^* = \left(\frac{Y}{\sigma\beta}\right)^{\frac{1}{\beta-1}} \left(\frac{\mu}{P\phi_i}\right)^{\frac{1-\sigma}{\beta-1}} \tag{7}$$

These firms set the marginal cost of marketing equal to the marginal revenue of marketing. Since neither the fixed-exporting costs nor foreign revenues affect this decision, all unconstrained firms in the domestic market, regardless of their classification (non-exporter, unsuccessful exporter, and successful exporter), choose L_i^*. Firms set different L_i^* because of differences in productivity, ϕ_i. Furthermore, L_i^* is increasing in productivity, $\frac{\partial L_i^*}{\phi_i} > 0$.

Unconstrained firm threshold

For a financially-constrained firm, Equation (4) binds when setting the price and marketing levels equal to the profit-maximizing p_i^* and L_i^*. Intuitively, all firms need to borrow to pay the same export entry fee, f_x, and have the same collateral, f_e, but less productive firms, firms below ϕ_C, earn lower revenues and thus have lower repayment capabilities. For the firm at the constrained-unconstrained threshold, Equation (4) binds and yet the firm still chooses the loan amount it desires. To find this firm, substitute all of the constraints, the profit-maximizing p_i^* and L_i^*, and solve for ϕ_i. For unsuccessful exporters, this threshold firm, ϕ_C^{fail}, is the following:

$$\phi_C^{fail} = \frac{\mu}{P}\left(\frac{Y}{\sigma\beta}\right)^{\frac{1}{(1-\sigma)}} \left(\frac{f_x + f_d - (1-\lambda)f_e}{\lambda\beta - 1}\right)^{\frac{1-\beta}{\beta(1-\sigma)}} \tag{8}$$

Had these firms not paid the export entry fee, they would not have the export loan, and would be in better financial health. To find the unconstrained threshold firm had these firms not exported, we set $f_x = 0$. We get the following threshold firm, ϕ_C^{dom}, as the before-exporting period threshold for all firms before entering the export market or for all non-exporting firms:

$$\phi_C^{dom} = \frac{\mu}{P}\left(\frac{Y}{\sigma\beta}\right)^{\frac{1}{(1-\sigma)}} \left(\frac{f_d - (1-\lambda)f_e}{\lambda\beta - 1}\right)^{\frac{1-\beta}{\beta(1-\sigma)}} \tag{9}$$

Successful exporters have to pay the fixed export costs, just like the unsuccessful exporters, but have two revenue sources. While all successful exporters sell abroad, only those with productivity

above ϕ_C export at p_i^* and L_i^*. The unconstrained threshold firm depends on the size of the foreign market, foreign prices, and the other trade costs. If the successful exporter enters a foreign market similar to that of the home market, $Y_h = Y_f = Y$, with a price level equal to that of the domestic times the iceberg trade costs, $P_f = P_h \cdot \tau_{if}$, then the threshold firm for successful exporters, ϕ_C^{succ}, becomes:

$$\phi_C^{succ} = \frac{\mu}{P}\left(\frac{y}{\sigma\beta}\right)^{\frac{1}{(1-\sigma)}}\left(\frac{f_x + f_d - (1-\lambda)f_e}{2(\lambda\beta - 1)}\right)^{\frac{1-\beta}{\beta(1-\sigma)}} \tag{10}$$

For a general case, see Appendix A.1.a.[23]

Proposition 1: Some successful and unsuccessful exporters become liquidity constrained as a result of exporting. Controlling for firm productivity, unsuccessful exporters are more likely to become liquidity constrained than successful exporters ($\phi_C^{succ} < \phi_C^{fail}$).

Proof: The constrained-unconstrained threshold firm for non-exporters is the before exporting threshold, irrespective of export success. To prove the first part of the proposition, I compare, individually, successful and unsuccessful exporters with non-exporters. To prove the second part I compare the threshold firm for successful and unsuccessful exporters. See proof in Appendix A.2.

III.4 Credit-constrained firm marketing decision

For liquidity-constrained firms, firms with productivity below ϕ_C, choosing the profit-maximizing p_i and L_i results in Equation (4) binding. These firms are unable to get their desired financing and reduce their need for financing by lowering the number of consumers they reach. This happens because reaching more consumers, higher L_i, requires more financing, $\frac{\partial F(L_I)}{\partial L_i} = \beta L_i^{\beta-1}$, which increases the repayment necessary to meet creditors' demands, $\frac{\partial B_i}{\partial L_i} = \frac{\beta L_i^{\beta-1}}{\lambda}$. These two equations only equal when creditors are guaranteed repayment ($\lambda = 1$). An unconstrained, risk-neutral firm discounts the repayment by λ. A financially-constrained firm is unable to do discount because of the liquidity constraint and sets L_i below that of Equation (7). Since this deviation from optimum L_i lowers profits, the firm deviates as little as possible to ensure that the creditors break even. The second-best L_i for unsuccessful exporters is determined by setting Equation (4) to equality and substituting in Equations (2), (3), (5) and (6):

$$\frac{L_i Y}{\sigma}\left(\frac{\mu}{P\phi_i}\right)^{1-\sigma} - \frac{L_i^{\beta}}{\lambda} = \frac{f_x + f_d - (1-\lambda)f_e}{\lambda} \tag{11}$$

[23] An alternative way of thinking about this is by focusing on foreign profits, inclusive of loan repayment costs. Whether or not the threshold loosens or tightens depends on whether foreign profits, inclusive of loan repayment, are positive. Risk-neutral firms enter the export market as long as foreign profits, excluding the loan markup, are positive. Thus, it is possible that net foreign profits, inclusive of loan repayment costs, are negative.

For the before-exporting decision, set $f_x = 0$. This is also the L_i chosen by non-exporters. Thus, non-exporters choose L_i based on the following equation:

$$\frac{L_i Y}{\sigma}\left(\frac{\mu}{P\phi_i}\right)^{1-\sigma} - \frac{L_i^{\beta}}{\lambda} = \frac{f_d - (1-\lambda)f_e}{\lambda} \tag{12}$$

For financially-constrained successful exporters, the firm's choice of L_i depends on the foreign market and the trade costs. So, a previously financially-constrained firm can become more constrained, less constrained or, even, unconstrained. It depends on the net revenue from the foreign market. If the firm enters a similar size market ($Y_h = Y_f = Y$) with a foreign price level equal to that of the domestic price times the iceberg trade costs ($P_f = P_h \cdot \tau_{if}$), then the successful exporter chooses the following L_i in the domestic market:

$$\frac{L_i Y}{\sigma}\left(\frac{\mu}{P\phi_i}\right)^{1-\sigma} - \frac{L_i^{\beta}}{\lambda} = \frac{f_x + f_d - (1-\lambda)f_e}{2\lambda} \tag{13}$$

See Appendix A.1.b for a general case.

In all cases above, L_i is increasing in productivity, $\frac{\partial L_i}{\phi_i} > 0$ (see Appendix A.3).

Lower threshold for L_i

L_i is between the profit-maximizing L_i (see Equation 7) and the L_i that maximizes the left-hand side of Equations (11) to (13). Notice that maximizing the left-hand side of the equations with respect to L_i is just like maximizing expected profits with respect to L_i, except that the marketing costs are divided by λ. $\frac{L_i^{\beta}}{\lambda}$ is the repayment for the marketing costs, while L_i^{β} is the marketing expenditure.[24] Since $0 < \lambda < 1$, more weight is given to the marketing costs here than in the maximization problem for financially-unconstrained firms. There is no incentive to lower L_i beyond the value that maximizes the left-hand side of the above equation because beyond that point the marginal repayment cost of marketing, $\beta L_i^{\beta-1}$ is lower than the marginal revenue of marketing, $p_i q_i - \frac{q_i}{\phi_i}$; the firm would be better off increasing L_i. The L_i maximizing the left-hand side of equations (11) to (13) is given by the following equations:

$$L_i^C = \lambda^{\frac{1}{\beta-1}}\left(\frac{Y}{\sigma\beta}\right)^{\frac{1}{\beta-1}}\left(\frac{\mu}{P\phi_i}\right)^{\frac{1-\sigma}{\beta-1}} \tag{14}$$

From Equations (7) and (14), we can see that $L_i^C = \lambda^{\frac{1}{\beta-1}} L_i^*$. Since $\lambda < 1$ and $\beta > 1$, then $\lambda^{\frac{1}{\beta-1}} < 1$ and $L_i^C < L_i^*$. Thus, financially-constrained firms always choose an L_i that lies between these two values.

[24] L_i^{β} is also the expected repayment for the marketing expenditure.

Revenues before and after exporting

Domestic revenue (v_i) with profit-maximizing price for all firms is $p_i q_i = L_i Y \left(\frac{\mu}{P\phi_i}\right)^{1-\sigma}$. L_i depends on a firm's productivity draw and on whether or not the firm is financially constrained. For unconstrained firms, substitute in the profit-maximizing L_i (Equation 7) into the domestic revenue Equation to get the profit-maximizing domestic revenue:

$$v_i^* = Y^{\frac{\beta}{\beta-1}} \left(\frac{1}{\sigma\beta}\right)^{\frac{1}{\beta-1}} \left(\frac{\mu}{P\phi_i}\right)^{\frac{\beta(1-\sigma)}{\beta-1}} \tag{15}$$

For financially-constrained firms, L_i is determined by Equations (11), (12), and (13), depending on whether the firm is an unsuccessful exporter, a non-exporter, or a successful exporter, respectively. This L_i for financially-constrained firms in all cases, as mentioned above, is between the profit maximizing L_i^* (Equation 7) and L_i^C (Equation 14). Thus, total domestic revenues is between the total domestic revenues for financially-unconstrained firms (Equation 15) and the lower-bound domestic revenue for all firms. The lower-bound domestic revenues is given by the following:

$$v_i^C = \lambda^{\frac{1}{\beta-1}} Y^{\frac{\beta}{\beta-1}} \left(\frac{1}{\sigma\beta}\right)^{\frac{1}{\beta-1}} \left(\frac{\mu}{P\phi_i}\right)^{\frac{\beta(1-\sigma)}{\beta-1}} \tag{16}$$

Notice that $v_i^C = \lambda^{\frac{1}{\beta-1}} v_i$, so $v_i^C < v_i$.

Proposition 2: Some financially-constrained firms, regardless of their success abroad, have lower domestic revenues as a results of exporting. Controlling for firm productivity, the decrease in domestic revenue is greater for financially-constrained unsuccessful exporters than for successful ones; that is, $v_C^{dom} > v_C^{succ}, v_C^{fail}$.

Proof: From the domestic revenue Equation we see that anything that lowers L_i also lowers revenue.[25] In Appendix A.4, I show that some liquidity constrained firms, regardless of their success abroad, have lower L_i as a results of exporting. After controlling for firm productivity, the decrease in L_i is greater for financially-constrained unsuccessful exporters than for financially-constrained successful ones.

III.5 Firm production threshold

Some potentially profitable firms do not produce at home. Firms with productivity below ϕ_i^0 do not produce because, even if they give all profits to the creditor, the creditor still does not break

[25]The lower bound in Equation (14) does not depend on the classification of the firm (non-exporter, unsuccessful exporter, or successful exporter). It does, however, depend on the productivity draw. Since the threshold for constrained firms (Proposition 1) and the threshold for exiting the domestic market (Proposition 3) both increase for unsuccessful exporters, the L_i chosen by the firms on the two thresholds also increases.

even. The cutoff is defined by the constrained firm, ϕ_i^0, whose L_i choice equals L_i^C. That is, the firm producing at the lower bound L_i. As mentioned above, there is no incentive to set L_i below this level.

To get the firm producing at the threshold, substitute Equation (14) into Equation (11). Solving for ϕ_0 gives us the firm producing at the production threshold for unsuccessful exporters:

$$\phi_0^{fail} = \frac{\mu}{P}\left(\frac{Y\lambda}{\sigma}\right)^{\frac{1}{(1-\sigma)}}\left(\frac{f_x + f_d - (1-\lambda)f_e}{\beta - 1}\right)^{\frac{1-\beta}{\beta(1-\sigma)}} \tag{17}$$

The threshold for non-exporters is also the threshold for all firms before they enter the export market. Set $f_x = 0$ to get the non-exporting firm producing at the production threshold:

$$\phi_0^{dom} = \frac{\mu}{P}\left(\frac{Y\lambda}{\sigma\beta}\right)^{\frac{1}{(1-\sigma)}}\left(\frac{f_d - (1-\lambda)f_e}{\beta - 1}\right)^{\frac{1-\beta}{\beta(1-\sigma)}} \tag{18}$$

Firms know the potential consequences of entering the export market. No firm exports if, conditional on being a successful exporter, they would be forced to default.

Proposition 3: Some unsuccessful exporters are not able to borrow and stop production because of exporting; that is $\phi_0^{fail} > \phi_0^{dom}$. Controlling for the firm, unsuccessful exporters are more likely to fail in the domestic market than successful exporters; that is $\phi_0^{fail} > \phi_0^{succ}$.

Proof: See proof in Appendix A.5.

III.6 Discussion

The model shows that there are two types of new exporters: successful and unsuccessful. Underlying productivity differences result in lower-productivity exporters being financially constrained. Since there is also an idiosyncratic probability of export success, similar firms enter the export market but differ in outcome. In the model exporting has a differential impact on domestic market performance depending on whether or not the firm is successful abroad and whether or not the firm is financially constrained. Lower productivity exporters essentially gamble with their domestic sales when exporting. Higher productivity exporters, given their distance from their financial constraint, can attempt to enter the foreign markets without substantial negative consequences to export failure. The gamble for all exporters is that with probability $(1-\gamma)$ they pay the export fixed cost using profits from the home market, and with probability γ they pay the export fixed cost with profits from two markets. Furthermore, for lower productivity exporters the gamble results in lower domestic market performance. In the model, export failure leads low-productivity, unsuccessful exporters to 1) become financially constrained, 2) have lower domestic revenue, and 3) exit the domestic market.[26]

[26]Exporting is appealing even to financially-constrained firms because even though some successful exporters lose some of the domestic market, they are still better off overall. Indeed, this is the reason why many firms attempt to export—paying high export fixed costs—even when the majority are unsuccessful abroad.

Figure 6: Unsuccessful exporters: before and after export failure

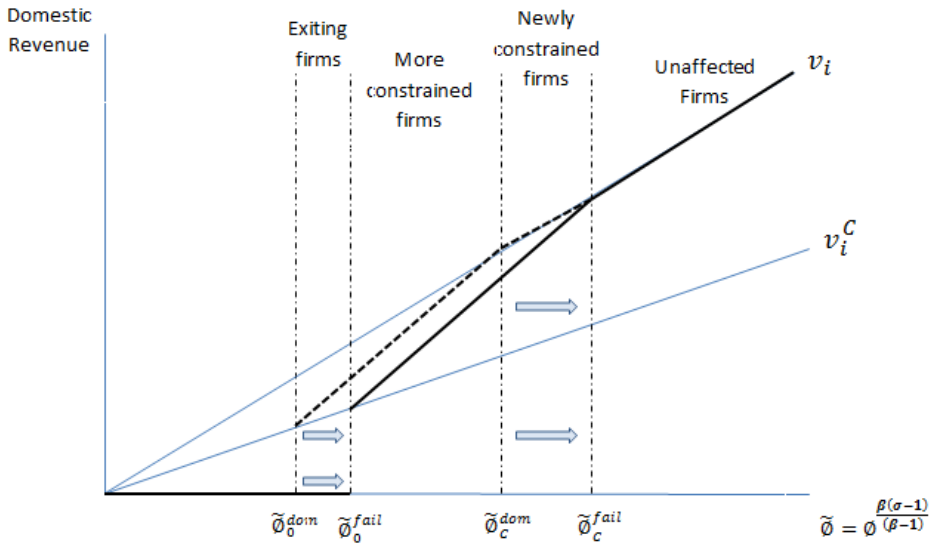


Figure 6 illustrates the consequences of export failure, in terms of domestic revenue, by firm productivity.[27] The top line, v_i, represents the optimal domestic revenue as a function of firm productivity and the bottom line, v_i^C, represents the lower bound on domestic revenue as a function of firm productivity; that is, Equations (15) and (16), respectively.[28] The figure shows domestic revenue (v_i) as a function of productivity, the constrained cutoff ($\tilde{\phi}_C$), and the production cutoff ($\tilde{\phi}_0$) for unsuccessful exporters, $fail$, and non-exporters, dom. For unsuccessful exporters, we can think of the dom outcomes as the before-exporting productivity and domestic revenue pairs, and the $fail$ outcomes as the after-exporting productivity and domestic revenue pairs. After attempting to export, unsuccessful exporters with productivity above $\tilde{\phi}_C^{fail}$ are not affected, those between $\tilde{\phi}_C^{fail}$ and $\tilde{\phi}_0^{fail}$ decrease domestic revenue, and those between $\tilde{\phi}_0^{dom}$ and $\tilde{\phi}_0^{fail}$ default and exit the domestic market. In the figure, I divide the firms into four categories: 1) unaffected firms, 2) newly constrained firms, 3) more constrained firms, and 4) exiting firms.

IV Empirical Evidence: Export Failure and Its Consequences

The stylized facts identified in Section II show that exporting is associated with poor domestic market performance for financially vulnerable unsuccessful exporters and the findings are robust to comparisons with successful ones. Domestic revenue, domestic revenue growth, and the probability of staying in business all decrease after exporting for these unsuccessful exporters. The after-

[27] A similar graph could be drawn for successful exporters selling to a symmetrical country, but the effect on domestic revenue would be lower. More importantly, however, the firm would be better off since the firm has revenue from two markets.

[28] It is not firm productivity, ϕ_i, exactly, but rather a transformation of firm productivity, $\phi_i^{\frac{\beta(\sigma-1)}{\beta-1}}$.

exporting outcomes are stark when compared with those of successful exporters. The theoretical model in Section III shows that export failure can result in poor domestic market performance for financially-constrained firms. Specifically, export failure causes less productive firms to: 1) become more financially constrained, 2) lower domestic revenue, and 3) have an increased probability of exiting the domestic market. However, the stylized facts and the model are not enough to identify export failure as the cause of poor domestic market performance, poor domestic market performance as the cause of export failure, or a third factor as the cause of both outcomes. In this section, I derive a baseline empirical equation based on the theoretical model, and also eliminate as many alternative explanations as possible for the identified association.

IV.1 Baseline empirical specification

While it is clear that unsuccessful exporters do worse after exporting, there may be alternative explanations for some of these coincidences. First, the association may be due to some firm characteristic: productivity of a firm, production sector, experience with the foreign markets (e.g. an importer), or access to cheaper credit (e.g. a foreign invested enterprise). Such characteristics make firms more likely to succeed abroad and to also do better in the domestic market. Second, the association may be due to the timing in the sample, which includes a boom in the export markets as well as a deep world recession. Other similar concerns might include price changes, demand changes, or overall economic environment affecting all Colombian firms in a given year. Third, the association may merely be showing that firms export at peak domestic performance. If that is the case, it is only a coincidence that firms are growing fast before exporting and then growth slows or decreases after exporting. Likewise, maybe firms export after receiving a productivity shock. So firms may seem healthier before exporting because of a positive shock and simply revert to their average after exporting. This is potentially problematic if successful and unsuccessful exporters have different trends or time-varying characteristics. Finally, a firm may also experience a negative productivity shock that coincides with exporting. For example, if the year the firm exports foreign competitors experience a positive productivity shock that makes them more competitive in a third country—resulting in export failure for the domestic exporter—and also in the home country—resulting in poor domestic market performance for all domestic firms.

I take several steps to eliminate the alternative explanations mentioned above. First, all regressions include firm fixed effects, and so all coefficients are estimated using only within-firm variation. Firm fixed effects control for any time-invariant firm characteristics, such as productivity, firm sector, foreign invested enterprises, and others. Note that the regressions for domestic revenue growth also include firm fixed effects, which additionally controls for firm-specific growth trends. The firm fixed effects represent the initial productivity draw from the theoretical model. Second, all regressions include calendar year dummies to deal with the economic environment—such as inflation, demand, etc.—affecting all firms in a particular year. Finally, I focus on the difference-in-difference estimator to control for overall firm trends. This estimator would, for example, help to control for firms growing faster early in their production life and exporting coinciding with the peak of a firm's

economic performance. Since the propositions that come out of the model assume everything else is constant, these steps help match the empirical estimates to the model. While these steps are not enough to establish causality, they do eliminate several alternative explanation and provide a better understanding of the association between domestic market performance and exporting. I deal with other alternative explanations (such as time-varying, firm-specific shocks) in subsections below.

To address the concerns mentioned above and to represent the theoretical model, I derive the following baseline empirical equation:

$$Y_{it} = \alpha_i + \delta_t + \beta_1 After_{it} + \beta_2 After_{it} \cdot Successful_i + u_{it} \tag{19}$$

In Equation (19), i indexes for the firm and t for the calendar year. Y_{it}, the outcome variable, is a measurement of economic performance in the domestic market; these outcome variables come from the predictions of the theoretical model. I include the following dependent variables: $log(Revenue_{it})$, the log of nominal domestic sales in Colombian Pesos by firm i in calendar year t; $\Delta log(Revenue_{it})$, the change in log domestic revenue for firm i between year t and $t-1$; and $Exit_i$, equals one if the firm exits before 2011, and zero otherwise. α_i is the firm fixed effects that control for time-invariant, firm-specific effects. δ_t are calendar year fixed effects that control for year specific changes that affect all firms equally. $After_{it} = 1$ for all calendar years after a firm first exports, and zero otherwise. This variable captures common trends between successful and unsuccessful exporters in the ex-post period. $Successful_i$ equals one for firms that export for more than one year, and zero otherwise. This variable captures characteristics specific to successful exports, the primary "control" group. Since the $log(Revenue_{it})$ and $\Delta log(Revenue_{it})$ estimates rely only on within-firm variation, the $Successful_i$ dummy is not included in the regression. It is, however, included in the $Exit_i$ regressions; as mentioned earlier, these estimates do not make use of the panel data and do not have firm fixed effects. $After_{it} \cdot Successful_i$ captures the difference between successful and unsuccessful exporters in the after-exporting periods. Thus, β_2 is the difference-in-difference estimator and the estimate of interest. Lastly, u_{it} is the error run.

The predictions of the theoretic model are most clearly tested using $log(Revenue_{it})$ as the outcome variable.[29] The model predicts that both successful and unsuccessful exporters that are financially constrained decrease domestic sales after exporting, $\beta_1 < 0$, but the decrease should be less for successful exporters, $\beta_2 > 0$. Although not shown in the model, in a dynamic setting, the effects of export failure should decrease with time; for example, over time, firms that manage to stay in business pay off export debt and can borrow at normal levels for domestic expenditures. To capture this, I separate out the long-run term effects. Note that in the empirical results, I cannot distinguish between firms recovering from export failure or the average estimates being biased towards zero due to attrition.[30] The estimates might be biased downward if firms hurt most by export failure exit the market, and the estimates are identified only by the surviving firms. I also

[29]The $\Delta log(Revenue_{it})$ estimates might be more convincing as firm fixed effects in this case also control for firm specific growth trends.

[30]I do, however, try alternative methods in an attempt to address these concerns, such as calculating the estimates from a Poisson regression and OLS estimates using level data. With these methods I can include zero revenue for firms that exit the domestic market.

separate the immediate effects of exporting since there might be a trade-off between domestic and export sales; decreases in domestic revenue the first year of exporting—when all firms export—might be fundamentally different than decreases after firms stop exporting. Because of these concerns, I do not estimate Equation (19) in the estimates, but instead split the $After_{it}$ dummy into three periods:

$$\beta_1 After_{it} \rightarrow \beta_{11} After(t=0)_{it} + \beta_{12} After(t=1 \; to \; 5)_{it} + \beta_{13} After(rest)_{it}$$

Here $After(t=0)_{it}$ equals one the first year firms export, and zero otherwise; I refer to this period as the short run. $After(t=1 \; to \; 5)_{it}$ equals one for the next five years, and zero otherwise; I refer to this period as the medium run. $After(rest)_{it}$ equals one for the remaining periods, and zero otherwise; I refer to this period as the long run. Based on the model, I expect all of these estimates to be negative. β_{11} corresponds to the findings in Ahn and McQuoid since both successful and unsuccessful exporters export that year; I refer to this as the short-run effect. However, I am more interested in the estimates for β_{12} and β_{13}, the periods during which unsuccessful exporters only supply their domestic market. I refer to the β_{12} estimate as the medium-run effect of export failure and the β_{13} estimate as the long-run effect.

For similar reasons as those mentioned above, I also change the interaction term ($\beta_2 After_{it} \cdot Succ_i$); this term becomes:

$$\beta_{21} After(t=0)_{it} \cdot Succ_i + \beta_{22} After(t=1 \; to \; 5)_{it} \cdot Succ_i + \beta_{23} After(rest)_{it} \cdot Succ_i$$

These measure the short-run, medium-run, and long-run differences-in-difference between successful and unsuccessful exporters. The empirics focus on these difference-in-difference estimates. Based on the theoretical model, I expect all of these to be positive. β_{21} might be positive due to capacity constraints; as shown in McQuoid and Rubini (2014), continuous exporters experience less of a trade-off between the domestic market and the foreign market than do transitory exporters. However, if β_{22} and β_{23} are positive, this implies that unsuccessful exporters are worse off in the domestic market after exporting when compared with successful exporters. If capacity constraints were playing a dominant role, we might expect β_{22} and β_{23} to be negative, not positive as in my stylized facts and model.

Baseline estimates

To test the predictions of the model, I estimate modified Equation (19) with domestic revenue as the outcome variable. The results are shown in Column (1) of Table 3. I find that exporting for unsuccessful exporters is associated with a significant drop in domestic revenue; unsuccessful exporter decrease domestic revenue by 7 percent the first export year (the short run), 32 percent the following five years (the medium run), and 56 percent for the rest of the periods (the long run). More importantly the difference-in-difference estimator is large and significant; relative to successful exporters, unsuccessful exporter have domestic revenue that is 17 percent lower in the short run, 35 percent in the medium run, and 45 percent in the long run. These estimates, however, do not

differentiate between firms that are financially vulnerable and those that are not; as the theoretical model showed the effect of exporting should differ not only between successful and unsuccessful exporters but also between financially vulnerable ones.

Table 3: Baseline Estimates: All Data

Dependent →	Ln(Dom. Rev.)			ΔLn(Dom. Rev.)		
	(1)	(2)		(3)	(4)	
	Base		Base*NFV	Base		Base*NFV
Year of exp	-0.07**	-0.17***	0.21***	-0.16***	-0.24***	0.18***
	(0.03)	(0.04)	(0.06)	(0.03)	(0.04)	(0.05)
After (t=1 to 5)	-0.32***	-0.52***	0.43***	-0.19***	-0.22***	0.06
	(0.05)	(0.07)	(0.09)	(0.03)	(0.03)	(0.05)
After (rest)	-0.56***	-0.72***	0.38**	-0.15***	-0.20***	0.13**
	(0.09)	(0.11)	(0.16)	(0.04)	(0.05)	(0.06)
Successful*(Year of exp)	0.17***	0.12*	0.08	0.05	0.12**	-0.15**
	(0.04)	(0.06)	(0.08)	(0.03)	(0.05)	(0.07)
Successful*After(t=1 to 5)	0.35***	0.39***	-0.12	0.04	0.09**	-0.11**
	(0.06)	(0.09)	(0.11)	(0.03)	(0.04)	(0.06)
Successful*After(rest)	0.45***	0.44***	-0.03	-0.05	0.01	-0.13**
	(0.09)	(0.13)	(0.19)	(0.03)	(0.05)	(0.07)
Firm and year fixed effects	Yes	Yes		Yes	Yes	
Number of observations	16,161	16,161		15,381	15,381	
Number of clusters/groups	1,412	1,412		1,412	1,412	
Adjusted R^2	0.252	0.262		0.042	0.043	

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, clustered at the firm level, shown in parenthesis; and *Not Financially Constrained(NFV)* equals 1 if the firm has a cash flow to total assets ratio greater than .07 (the median ratio for all firms).

The second specification in Table 3 better matches the theoretical model. In Column (2) I interact all of variables in the modified Equation (19) with a variable measuring financial vulnerability. As described in Section II.1, not financially vulnerable (NFV) equals one if the firm is not financially vulnerable at the time of exporting, and zero otherwise. These estimates show that the association between export failure and poor domestic market performance is stronger for financially vulnerable firms; for these firms domestic revenue decreases by 17 percent in the short run, by 52 percent in the medium run, and by 72 percent in the long run. Not all financially vulnerable firms react in the same way; successful exporters that are financially vulnerable are 12 percent better off than those that fail in the short run, 39 percent in the medium run, and 44 percent in the long run. Furthermore, the negative association between export failure and domestic market performance is much weaker for unsuccessful exporters that are not financially vulnerable.

The triple difference estimator is not significant in this regression. Note, however, that the estimates might suffer from attrition. If I include zero domestic revenue for firms that exit that domestic market, the long run differences increase further in the levels regression and Poisson regression and the triple differences are negative and significant in the Poisson regression.[31] Since the

[31]See Table A.5 for these baseline estimates and Table A.6 for estimates excluding the largest firms.

triple differences are negative, the differences between the four firm types *increases* after exporting.[32] This is consistent with the model since unsuccessful exporters that are not financially constrained should not be negatively affected by the export failure.

As an alternative measurement of domestic market performance I use domestic revenue growth as an outcome variable. The results are shown in Columns (3) and (4) of Table 3. Exporting is associated with a significant drop in domestic revenue growth for both successful and unsuccessful exporters; As seen in Column (3) unsuccessful exporters decrease domestic revenue growth by 16 percent in the short run, 19 percent in the medium run, and 15 percent in the long run. The differences between successful and unsuccessful exporters, however, are small and not statistically significant. These estimates change when interacting all of variables with a variable measuring financial vulnerability in Column (4). There we see that the association between export failure and poor domestic market performance is stronger for financially vulnerable firms; they decrease by 24 percent in the short run, 22 percent in the medium run, and 20 percent in the long run. The negative association between export failure and domestic market performance is much weaker for unsuccessful exporters that are not financially vulnerable. As mentioned earlier, not all financially vulnerable firms react the same; successful exporters that are financially vulnerable are 12 percent better off in the short run, 9 percent in the medium run, and no statistically significant differences in the long run. The lack of significance in the long run may be because unsuccessful exporters recover in the long run or that the estimates are masked over due to capacity constraints of successful exporters or to attrition in the data; all of these cases work against finding a significant difference.[33] The triple difference estimator is large and significant in these estimates.

Another—and perhaps more important—measurement of domestic market performance is the probability of staying/exiting the domestic market. The results measuring the probability of exiting the domestic market underscore how the negative effects of exporting might be so large that they can lead to firms going out of business (see Table 4).[34] The regressions control for export value and various pre-exporting characteristics: firm industry, export cohort, revenue, revenue growth, short- and long-term debt, short- and long-term labor, sort- and long-term investment, inventory, property, and intangibles. In the table, I only show the estimates of interest and the estimates for control variables that are statistically significant; for example, higher initial export value and higher long-term investment decreases the probability of a firm exiting the domestic market, but higher short- and long-term debt increases the probability of firm exit. The estimates shows that even after controlling for these firm characteristics, financially vulnerable unsuccessful exporters are 10 percentage points more likely to exit the domestic market than their financially healthy counterparts. Likewise, these financially vulnerable unsuccessful exporters are 32 percent more

[32]The four firm types are financially-constrained unsuccessful exporter, financially-unconstrained unsuccessful exporter, financially-constrained successful exporter, and financially-unconstrained successful exporter.

[33]This was shown already shown to be true for domestic revenue in Tables A.5 and A.6. For an alternative way to see how much attrition may be affecting my results, see Lee's treatment effect bounds (Lee, 2009) in Appendix Table A.7.

[34]The estimates here are for a linear probability model. However, the estimates are robust to using a logarithmic transformation on the outcome variable.

Table 4: Exporting Increases the Probability of Going Out of Business

Dependent= *Exit*	All	Survived SR	Surv. SR & MR
Successful	-0.32***	-0.26***	-0.02
	(0.03)	(0.04)	(0.02)
SuccessfulxNFV	0.09**	0.09*	-0.03
	(0.05)	(0.05)	(0.03)
Not Fin. Vulnerable (NFV)	-0.10***	-0.09**	0.02
	(0.04)	(0.04)	(0.02)
First Export Value$_{t=0}$	-0.00***	-0.00***	-0.00
	(0.00)	(0.00)	(0.00)
Avg. Short-Term Debt$_{t<0}$	0.02**	0.02*	0.01
	(0.01)	(0.01)	(0.01)
Avg. Long-Term Debt$_{t<0}$	0.02**	0.03**	0.01
	(0.01)	(0.01)	(0.01)
Avg. Long-Term Investment$_{t<0}$	-0.02*	-0.02**	-0.00
	(0.02)	(0.02)	(0.01)
Number of observations	1,240	1,192	1,013
Adjusted R^2	0.179	0.142	0.070

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parenthesis. The regressions also control for industry, export cohort, short-term labor, long-term labor, inventory, property, short-term debt, domestic revenue, and intangible.

likely to exit than their successful counterparts. If I restrict the sample to firms that produce in the medium run, the effect remains almost unchanged. However, the effect disappears if I restrict the sample to firms that produce in the long run. This may imply that if the firm survives the short and medium run, it can recover from any long-run effects.

IV.2 Propensity score matching

I match successful exporters and non-exporters to unsuccessful exporters to eliminate the possibility that the baseline estimates are biased because they fail to control for pre-exporting observables or that successful exporters are fundamentally different and thus not a good control group. In order to match unsuccessful exporters with non-exporters and successful exporters, I use nearest neighbor, propensity score matching (PSM). I match non-exporters so that I can get an alternative control group and also to assign non-exporters an "after-exporting" period. I assign this period based on the match; that is, each non-exporter is assigned a pseudo exporting cohort based on the cohort of the unsuccessful exporter to which it was matched. With this match, I can then track non-exporters before and after the hypothetical exporting year and compare them with unsuccessful exporters. I follow a similar procedure to match successful exporters with unsuccessful ones. The difference is that, for successful exporters, I do not create an artificial after-exporting period; these firms already have an exporting cohort. Creating a matched successful exporting group does not fundamentally alter the results but it does control for pre-exporting observables.

Matching is based on a single index that captures all of the observable characteristics of the firm before it exported. The variables used to calculate the propensity score are *revenue, revenue growth, cash flow/total assets, short- and long-term debt, short- and long-term labor, short- and long-term investment, inventory, property,* and *intangibles* (intellectual property, patents, etc). Each of these is at the firm-year level.[35] I match non-exporters and unsuccessful exporters based on the propensity score and force the match to be within the same start-up year and sector.[36] For successful exporters, I match based on observable characteristics, but do not force the match to be within the same start-up year and sector. With the matched sample, the only observable difference is either their decision to export, in the case of non-exporters, or in their export success, in the case of successful exporters.

Table 5: Matched Estimates: All Data

Dependent →	Ln(Dom. Rev.)			ΔLn(Dom. Rev.)		
	(1) Base	(2)	Base*NFV	(3) Base	(4)	Base*NFV
Year of Exp.	-0.09***	-0.20***	0.24***	-0.14***	-0.23***	0.20***
	(0.03)	(0.04)	(0.06)	(0.03)	(0.04)	(0.05)
After (*t=1 to 5*)	-0.36***	-0.58***	0.47***	-0.18***	-0.21***	0.06
	(0.05)	(0.08)	(0.10)	(0.03)	(0.04)	(0.05)
After (*t=rest*)	-0.57***	-0.75***	0.42**	-0.14***	-0.19***	0.10*
	(0.10)	(0.11)	(0.18)	(0.04)	(0.05)	(0.06)
Successful* *Year of Exp.*	0.23***	-0.00	0.09	-0.00	0.07	-0.05
	(0.05)	(0.07)	(0.10)	(0.04)	(0.07)	(0.09)
Successful*After(*t=1 to 5*)	0.47***	0.31***	-0.22	0.04	0.12***	-0.11
	(0.07)	(0.11)	(0.14)	(0.03)	(0.05)	(0.07)
Successful*After(*t=rest*)	0.55***	0.36**	-0.29	-0.07*	0.11**	-0.19**
	(0.11)	(0.14)	(0.24)	(0.04)	(0.06)	(0.08)
Domestic* *Year of Exp.*	0.02	0.21***	-0.01	0.04	0.09	-0.19**
	(0.05)	(0.07)	(0.09)	(0.05)	(0.06)	(0.08)
Domestic*After(*t=1 to 5*)	0.19***	0.57***	-0.25*	0.07**	0.10**	-0.12*
	(0.07)	(0.11)	(0.13)	(0.03)	(0.05)	(0.06)
Domestic*After(*t=rest*)	0.22*	0.61***	-0.18	0.03	-0.01	-0.13*
	(0.11)	(0.15)	(0.22)	(0.04)	(0.06)	(0.07)
Firm and year fixed effects	Yes	Yes		Yes	Yes	
Number of observations	16,830	16,830		15,332	15,332	
Number of clusters/groups	1,473	1,473		1,473	1,473	
Adjusted R^2	0.252	0.260		0.033	0.034	

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, clustered at the firm level, shown in parenthesis; and *Not Financially Constrained(NFV)* equals 1 if the firm has a cash flow to total assets ratio greater than .07 (the median ratio).

[35]PSM matching is used to reduce the dimensionality problem; matching along different dimensions without PSM would be extremely difficult. See Rosenbaum and Rubin (1983) for details. The propensity score matching strategy is to construct a counterfactual for unsuccessful exporters using non-exporters and successful exporters. Non-exporters, since they did not invest in exporting, might have invested in other business ventures and thus would be a better measurement of the opportunity costs of exporting.

[36]The start-up year is based on when the firm first appeared in the SIREM dataset. The start-up sector is at the ISIC chapter level. Note that since the ordering of the data might affect a firm's match, I randomize the data before matching.

Propensity score matching estimates

In the PSM first stage, I estimate the probability of being an unsuccessful exporter, conditional on pre-exporting firm characteristics. To calculate the probability of being an unsuccessful exporter, I use the observable variables mentioned above from balance sheet information. To get this propensity score for each firm, I regress the variables on the probability of being an unsuccessful exporters: $P(FAIL_i = 1)$. $FAIL_i$ equals one for unsuccessful exporters, and zero otherwise; it does not vary within a firm. Based on this propensity score, I perform 1-to-1 matching without replacement and impose a common support to find the match. This procedure matches firms in terms of observable, pre-exporting differences. Since the before-exporting period length differs greatly by firms, I create an algorithm to match firms using as much of the data as possible. Thus, unsuccessful exporters with a lot of data in the pre-exporting period were matched with firms having at least as much data. For example, an unsuccessful exporter with five years of pre-exporting data was matched with a non-exporting firm with at least 6 years of data. Unsuccessful exporters with only two periods in the before-exporting period were matched last. The matching method ensures that at a minimum, all matches have data for at least two years before exporting and at least one year after exporting.

Having constructed the "control" groups using PSM, I then repeat the estimation procedure for the baseline estimates. The only difference is that I have a matched-on-observable sample that includes non-exporters. Overall, successful exporters and non-exporters are better off than unsuccessful exporters, with successful exporters faring better (see Table 5).[37] In Column (1) we see the matched estimates with log domestic revenue as the outcome variable; unsuccessful exporters are worse off after exporting, and both successful and non-exporting firms fare better. Once I separate the financially vulnerable firms in Column (2), we see that firms financially vulnerable failed exporters decrease domestic revenue by 20 percent in the short run, 58 percent in the medium run, and 75 percent in the long run.[38] Unsuccessful exporters that are not financially constrained also decrease, but by a lesser amount. Comparing financially constrained firms, non-exporters have domestic revenue that is 21 percent higher in the short run, 57 percent higher in the medium run, and 61 percent higher in the long run. Successful exporters have domestic revenue that is no different in the short run, but 31 percent higher in the medium run and 36 percent higher in the long run. The triple differences are not statistically significant.

The results hold even when using domestic revenue growth as the outcome variable (see Table 5). While the differences-in-differences, for the most part, are not statistically significant (see Column 3), they become significant when separating out the financially vulnerable firms (see Column 4). The short-run difference-in-difference between the two control groups and unsuccessful exporters are positive, but not statically significant; this is consistent with the model as unsuccessful exporters have not yet failed. The medium-run difference-in-difference is about 10 percent for both successful and non-exporting firms. There are no statistically significant differences in the long run. Similarly

[37]This ranking is not consistent with the theoretical model because I assume symmetrical countries. The ranking would be consistent if firms export to countries larger than Colombia; this is likely as the US is one of the primary export destinations.

[38]For the Poisson and levels regression estimates see Table A.8.

Table 6: Matched Estimates: Probability of Going Out of Business

Dependent= *Exit*	All	Survived SR	Surv. SR & MR
Successful	-0.31***	-0.26***	-0.03
	(0.04)	(0.04)	(0.02)
SuccessfulxNFV	0.08	0.07	-0.02
	(0.05)	(0.05)	(0.03)
Domestic	-0.06*	-0.07*	-0.00
	(0.04)	(0.04)	(0.03)
DomesticxNFV	0.00	0.02	-0.02
	(0.05)	(0.05)	(0.03)
Not Fin. Vulnerable (NFV)	-0.10***	-0.09**	0.01
	(0.04)	(0.04)	(0.02)
Avg. Domestic Revenue$_{t<0}$	-0.03***	-0.02**	-0.01
	(0.01)	(0.01)	(0.01)
Avg. Short-Term Debt$_{t<0}$	0.02*	0.02	0.01
	(0.01)	(0.01)	(0.01)
Avg. Short-Term Investment$_{t<0}$	0.11***	0.12***	0.03
	(0.03)	(0.03)	(0.03)
Number of observations	1,468	1,391	1,165
Adjusted R^2	0.197	0.175	0.105

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parenthesis. The regressions also control for industry, export cohort match, short-term labor, long-term labor, inventory, property, Long-Term Investment, Long-Term Debt, and intangible.

to the other results, the drop for unsuccessful exporters that are not financially vulnerable are smaller. Finally, the triple differences are negative and significant.

The matched $Exit_i$ results also underscore how the negative effects of exporting might be large and may lead to firm exiting domestic production (see Table 6).[39] The Table shows that even after controlling for the same numerous pre-exporting variables as in Table 4, financially vulnerable unsuccessful exporters are 31 percentage points more likely to exit the domestic market than successful ones and 6 percentage points more than non-exporting firms. Likewise, these financially vulnerable firms are 10 percentage points more likely to stop producing than their non-financially vulnerable exporting counterparts. If I restrict the sample to firms that produce in the medium run, the effects remain almost unchanged. The effect disappears if I restrict the sample to firms that produce in the long run. For the matched data, increases in short-term debt and short-term investment increase the probability of the firm exiting, and increases in domestic revenue decrease the probability of exiting the domestic market.

[39]The estimates here are for a linear probability model, but the estimates are robust to using a logarithmic transformation on the outcome variable.

IV.3 Instrumenting for export success

Are successful exporters systematically different than unsuccessful exporters even after controlling for firm fixed effects and observable, pre-exporting characteristics? Does the same concern apply for financially vulnerable firms? It may be, for example, that financially vulnerable unsuccessful exporters experience a negative productivity shock that coincides with exporting. This shock would also explain the association found in the data. If so, even matched successful exporters are not a good counterfactual for unsuccessful exporters and the results found above may have an omitted variable bias. To correct for possible biases created by time-varying omitted variables that are correlated with with export failure, I must instrument for the two endogenous variables: export success and financial vulnerability. In this paper, I only have one instrument but two endogenous variables. To get around this problem, I leave out the difference between financially-constrained firms in this section and only instrument for export success. However, as shown in the previous results, not separating financially vulnerable firms hides the association between export failure and poor domestic market outcomes; so finding differences between successful and unsuccessful exporters without separating financially vulnerable firms is encouraging.

A valid instrument must explain at least part of the variation in export success between firms, but also have no effect on firm-level outcomes other than through export success or failure. The instrument used for export success is the change in a firm's "world import market" between the year it first exports and the following year.[40] The world import market for a given firm exporting variety i to Country f is Country f's total imports of variety i (at the HS-1996, six-digit product level) from the world minus imports from Colombia at time t.[41] Changes in the world import market should affect whether a firm continues to supply the foreign market beyond one year, but should not be correlated with domestic market performance. The instrument has product, destination, and year variation; it does not vary within a firm. This instrument is similar to that used in Hummels et al. (2014). As explained in that paper, an increase in world imports could result from a demand shock (either though consumer preference or firm input use) or from a supply shock (for example, a loss of comparative advantage by Country f in variety i).

Instrumental Variable estimates

For the world import market to be a valid instrument, it must satisfy both the inclusion and exclusion restrictions. Testing whether or not the IV satisfies the inclusion restriction is fairly straightforward; we can see in the first-stage regression results that the inclusion restriction is satisfied (see Table 7). Note that I do not instrument for successful exporter directly, as it is absorbed by the firm fixed effects. Rather, I instrument for the interaction between successful

[40] I use growth, not log growth, to calculate market changes because of the low values for F-tests of excluded instruments using log growth.

[41] I only have data to create the instrument for the 2000–2011 period, so the data sample is much smaller for the IV estimates than for the other estimates. I plan to expand this to include the 1996–1999 period in future versions of the paper.

Table 7: First-Stage Regressions for **Market Changes** as a Instrument

Dep. →	**A(0)*Suc**	**A(1-5)*Suc**	**A(>5)*Suc**	**A(0)*Suc**	**A(1-5)*Suc**	**A(>5)*Suc**
A$(t=0)$	0.58***	-0.01***	-0.00	0.58***	-0.01***	-0.00*
	(0.02)	(0.00)	(0.00)	(0.02)	(0.00)	(0.00)
A$(t=1-5)$	0.01**	0.62***	-0.00	0.01**	0.61***	-0.00
	(0.00)	(0.02)	(0.00)	(0.00)	(0.02)	(0.00)
A$(rest)$	0.01	-0.02	0.76***	0.00	-0.04**	0.76***
	(0.00)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
A$(t=0)$***IV**	-0.002***	0.0002**	-0.00002	-0.002***	0.0002	-0.00002
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
A$(t=1-5)$***IV**	0.0002	-0.00***	-0.00002	0.0001	-0.002***	-0.00003
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
A$(rest)$***IV**	-0.002	-0.01	0.015	-0.002	-0.01	0.02
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)
Observations	10,207	10,207	10,207	9,581	9,581	9,581
Adjusted R2	0.542	0.613	0.735	0.542	0.613	0.734
Second-stage	ln(Domestic Revenue)			Domestic Revenue Growth		

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; All regression include firm fixed effects and year fixed effects. Robust standard errors, clustered at the firm level, in parenthesis. **Angrist-Pischke multivariate F test** of excluded instruments for Log(dom. Rev.)/ Δlog(dom. Rev.): Successful*(Year of exp) = 48.44/45.27, Successful*After(t=1 to 5) = 12.54/12.04, Successful*After(rest) = 1.1/1.34.

exporter and the three after periods; that is, I instrument for the short-run, medium-run and long-run difference-in-difference variables. I instrument for these difference-in-difference variables using the interactions between the three periods and the instrument for successful exporters; see Wooldridge (2008) for details on the estimation procedure. The first stage regressions have high F-tests and show that export success is indeed correlated with market changes. The Angrist-Pischke multivariate F-tests for $After(t=0)*Succ.$, $After(t=1\ to\ 5)*Succ.$, and $After(rest)*Succ.$, are about 45, 12, and 1, respectively.[42] The first-stage estimates also show that the instrument is overall significantly correlated with export success and that the correlation decreases both in terms of size and significance for the long-run difference-in-difference estimates.

To satisfy the exclusion restriction, the error term must not be correlated with the changes in foreign markets. It is unlikely that a new exporter can affect market changes in its world import market. While the shocks are exogenous to the firm, the exclusion restriction might nonetheless be violated if there is something about successful exporters that enables them to identify growth opportunities and also enables them to do better in the domestic market. Likewise, there are issues with the instrument if the world import market is correlated with the domestic market. Since I control for year fixed effect, this is only an issue if the shocks and correlation are industry specific.[43]

[42]The F-test differ slightly depending on whether the outcome variables is domestic revenue or domestic revenue growth. The reason for this difference is that the number of observations is different depending on the outcome variable.

[43]Although not done in this version of the paper, in future versions of this paper, I plan to run separate regressions

Table 8: IV Estimates

Dependent →	Ln(Dom. Rev.)	ΔLn(Dom. Rev.)
Year of exp	-0.13*	-0.31***
	(0.08)	(0.11)
After($t = 1$ ***to* 5**)	-0.66***	-0.60***
	(0.25)	(0.17)
After(*rest*)	0.23	-0.03
	(1.88)	(0.72)
Successful*Year of exp	0.26*	0.32
	(0.14)	(0.20)
Successful*After($t = 1$ ***to* 5**)	0.90**	0.74***
	(0.40)	(0.28)
Successful*After(*rest*)	-0.60	-0.16
	(2.48)	(0.96)
Firm and year fixed effects	Yes	Yes
Number of observations	10,207	9,581
Number of clusters/groups	904	904

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; All regression include firm fixed effects and year fixed effects. Robust standard errors, clustered at the firm level, in parenthesis.

For example, a positive shock to industry producers in the rest of the world may make domestic firms less likely to continue exporting in a foreign country and also to experience a negative shock in the home market. Another problem not addressed by this instrument is that exporting might be associated with learning-by-doing; if learning-by-exporting exists—something that is disputed—export success would cause better domestic market performance and focusing on the difference-in-difference estimate to test the effects of export failure is not appropriate.

After instrumenting for successful exporters, as can be see in Table 8, much of the difference between successful and unsuccessful exporters in the first year of exporting disappears. This might be expected since in that period both types of firms export; the difference should be seen after export success is determined, in the medium and long run.[44] I find that indeed in the medium run, there is a significant difference between successful and unsuccessful exporters. In those years, unsuccessful exporters, relative to successful ones, have much lower domestic revenue and domestic revenue growth. There are no statistically significant differences in the long run.

Finally, the significance of the results using *Exit* as a dependent variable also do not change if I use an instrumental variable approach. Unsuccessful exporters are more likely to exit the domestic market than successful ones, but this difference disappears if the firm manages to survive beyond the medium run (see Table 9).

within industries to see if my result are sensitive to firm industries.

[44] Alternatively we might expect there to be a difference in the short run; while no firm has "failed" at exporting in this period, some firms might be in the process of failing.

Table 9: IV Estimates: Probability of Going Out of Business

	All	Survived SR	Survived SR and MR
First Stage (Dependent = $Successful$)			
Market Change	-0.0016***	-0.0017***	0.0005
	(0.0005)	(0.0005)	(0.0088)
Second Stage (Dependent = $Exit$)			
Successful	-1.80***	-1.78***	4.96
	(0.52)	(0.50)	(89.64)
Number of observations	904	870	720

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parenthesis. The regressions control for export value and various pre-exporting characteristics: firm industry, export cohort, revenue, revenue growth, short- and long-term debt, short- and long-term labor, sort- and long-term investment, inventory, property, and intangibles.

V Conclusion

Policymakers in developing countries often emphasize the importance of domestic firms entering foreign markets. They spend precious government resources trying to gain foreign access and implement numerous export-promoting programs. However, the reality is that most firms fail in the export market, and do so rapidly. Yet little is known about what happens to these firms after they fail to export. Exporting in the hopes of "making it big" in a foreign country likely resulted in heavy profit losses. Despite this, trade literature often views exporting as a harmless exercise based on a simple cost-benefit analysis of foreign profits. This rationale ignores any effects export failure may have on domestic operations; for example, combining export failure with financial frictions may result in lower financing, decreasing domestic sales, lowering product quality, and even causing the sudden death of a firm.

The focus of this paper is on unsuccessful exporters and the costs of export failure. I develop a heterogeneous-firm model with liquidity constraints and marketing costs to show how export failure can: 1) make the liquidity constraint more likely to bind, 2) force constrained firms to limit their marketing expenditure and, hence, decrease domestic sales, and 3) make some firms more likely to default. Using Colombian firm-level data I test the propositions of the model. The empirical results show that after exporting, unsuccessful exporters that are financially constrained have a higher probability of exiting the domestic market, and those that survive have lower domestic revenue growth and lower domestic revenue; these results are robust to various identification strategies, including comparisons with similar successful exporters and non-exporter. No paper, to my knowledge, focuses on unsuccessful exporters after they exit the foreign market nor attempts to quantify the costs associated with export failure.

The main implication of this paper is that export failure costs, not just the probability of export failure, lower expected returns and limit the number of firms that export. The policy implication of this finding is that to increase exports policymakers should focus beyond market

entry and lowering foreign trade barriers. Specifically, firms in developing countries would benefit from lowering the cost of export failure by, for example, lowering fixed export costs and decreasing export financing costs. Alternatively, these countries would benefit from lowering the probability of export failure by lowering the cost of finding a good foreign match. These two policy implications are already implemented in some developed countries. In the U.S., for example, the International Trade Administration helps American firms find foreign partners by providing market advice, organizing meetings with potential partners, and even arranging meeting space and translators. Additionally the Export-Import Bank in the U.S. provides favorable financing options to exporters.

There are several ways to expand this work. The first is to exploit the product information in the data; it may be that the negative effects found in this paper are lower for firms producing homogeneous goods or in established exporting sectors. The second is to exploit the destination variation; the fixed costs of exporting should vary by initial export destination, and so should the costs of export failure. Fixed export costs may be lower for firms exporting to a neighboring country than for a firm exporting to a far away or developed country. The third is to focus on continuous exporters rather than new exporters; I can analyze the consequences of trying to enter an additional foreign market and failing. Finally, as the long-run equilibrium implications of my findings are not clear, I plan to increase the scope of the research in the future by analyzing the long-run equilibrium effects of export failure. I will do this by analyzing export failure in a general equilibrium framework where I model how export failure affects the number of exporter and aggregate exports. I want to test the hypothesis that at the country level export failure costs hamper gains from trade liberalization.

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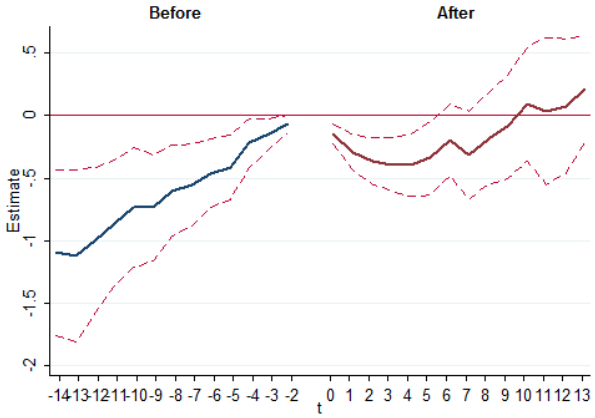
Appendix A

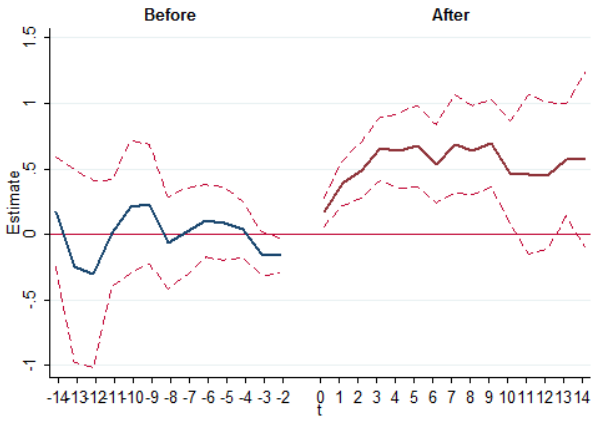
Figures

Figure A.1: Ln(Domestic Revenue): Unsuccessful Exporters
(Financially-Constrained Firms)



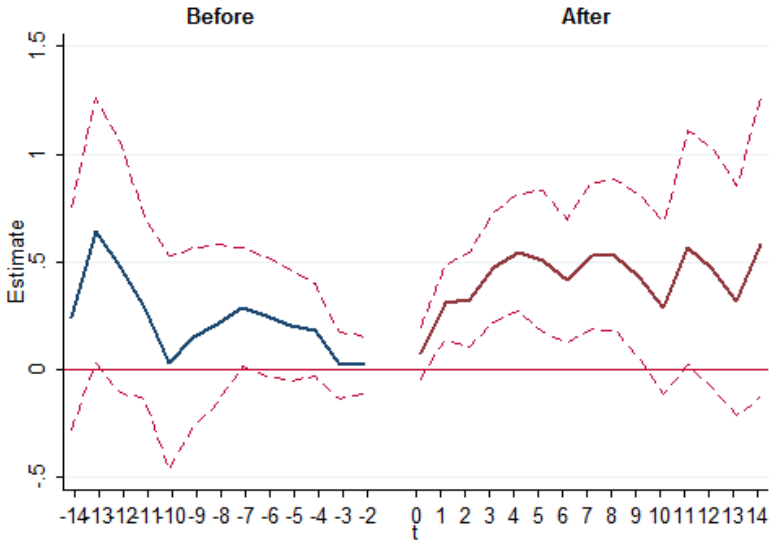
Note: Regression includes firm fixed effects and year fixed effects. The periods are interacted with not financially constrained, non-exporters, and successful exporters. The omitted group is constrained, unsuccessful exporters at time $t = -1$.

Figure A.2: Ln(Domestic Revenue): Unsuccessful vs. Successful Exporters
(Financially-Constrained Firms)



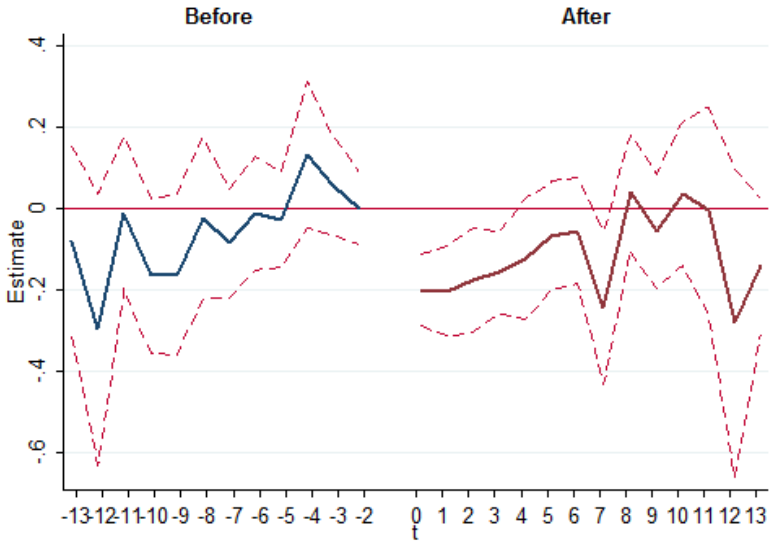
Note: Regression includes firm fixed effects and year fixed effects. The periods are interacted with not financially constrained, non-exporters, and successful exporters. The omitted group is constrained, unsuccessful exporters at time $t = -1$.

Figure A.3: Ln(Domestic Revenue): Unsuccessful Exporters vs. Non-Exporters
(Financially-Constrained Firms)



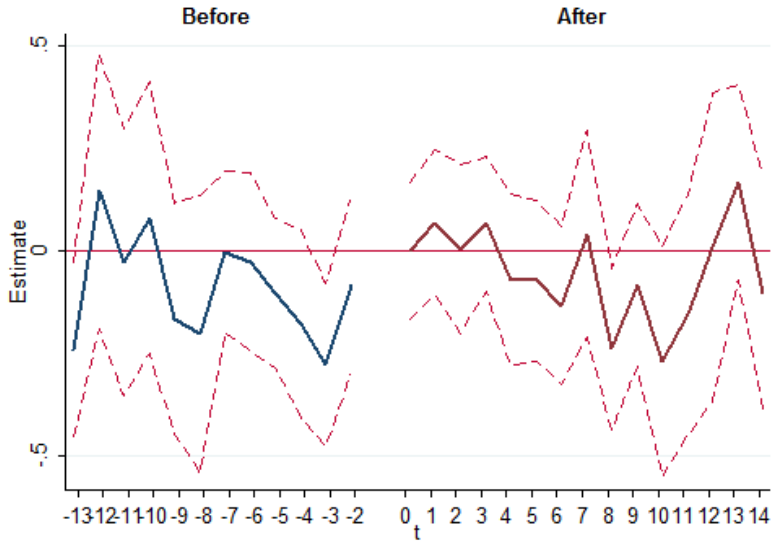
Note: Regression includes firm fixed effects and year fixed effects. The periods are interacted with not financially constrained, non-exporters, and successful exporters. The omitted group is constrained, unsuccessful exporters at time $t = -1$.

Figure A.4: ΔLn(Dom. Revenue) for Unsuccessful Exporters
(Financially-Constrained Firms)



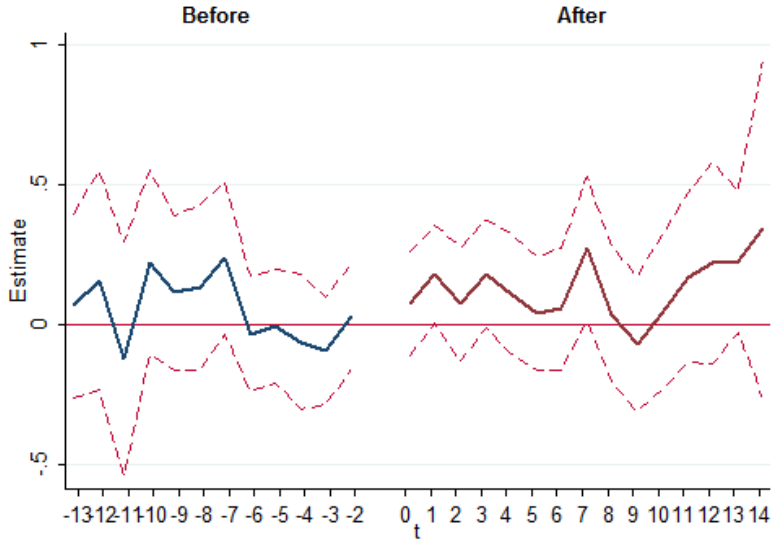
Note: Regression includes firm fixed effects and year fixed effects. The periods are interacted with not financially constrained, non-exporters, and successful exporters. The omitted group is constrained, unsuccessful exporters at time $t = -1$.

Figure A.5: ΔLn(Dom. Revenue): Unsuccessful vs. Successful Exporters
(Financially-Constrained Firms)



Note: Regression includes firm fixed effects and year fixed effects. The periods are interacted with not financially constrained, non-exporters, and successful exporters. The omitted group is constrained, unsuccessful exporters at time $t = -1$.

Figure A.6: ΔLn(Dom. Revenue): Unsuccessful Exporters vs. Non-Exporters
(Financially-Constrained Firms)



Note: Regression includes firm fixed effects and year fixed effects. The periods are interacted with not financially constrained, non-exporters, and successful exporters. The omitted group is constrained, unsuccessful exporters at time $t = -1$.

Tables

Table A.1: Business Classifications and availability

Tipo	Descripcion Sociedad	Classification	In Data
1	Personas Naturales	Natural Persons	
2	Establecimientos de Comercio	Establishments of Commerce	
3	Soc. Limitada	Private Limited Company	x
4	Soc. S. A.	Public Limited Company	x
5	Soc. Colectivas	Joint Ventures	x
6	Soc. Comandita Simple	Simple Limited Partnership	x
7	Soc. Comandita por Acciones	Limited joint-stock partnership	x
8	Soc. Extranjeras	Foreign Companies	x
9	Soc. de Hecho	Business Association	
10	Soc. Civiles	Civil Society Organisations.	
11	Reseña Ppal, Suc, Agencia	Head office	
12	Sucursal	Branch	
13	Agencia	Agency	
14	Emp. Asociativas de Trabajo E.A.T	Associative Work Organizations	
15	Entidades Sin Animo de Lucro E.S.A.L.	Non-Profit Entities	
16	Empresas Unipersonales E.U.	Self-Employed Businesses	x

Source: Superintendencia de Sociedades

Table A.2: Summary Statistics

	Continuous	Successful	Unsuccessful	Non-exporters
Trade data				
Avg. Number of Exporters per Year	2,458	4,242	1,817	-
Share of Exporters	0.30	0.52	0.22	-
Share Export value	0.74	0.27	0.01	-
Share of New Exporters	-	0.36	0.64	-
Share New Export value	-	0.68	0.32	-
Financial Data				
Avg. Number of Firms per Year	1,887	1,964	706	10,803
Share of Firms	0.12	0.13	0.05	0.70
Revenue (1 billion COL Pesos)	49.3	26.6	14.9	6.0
Exports(1 billion COL Pesos)	11.3	3.8	0.1	-
Exports/Revenue	0.23	0.14	0.00	-

Note: Calculations based on data from the Colombian National Directorate of Taxes and Customs (DIAN) and Superintendencia de Sociedades.

Table A.3: PPML Estimates: Check Balance on Variables

Explanatory Variable = Successful Exporter	All Periods Before Exporting	One Period Before Exporting
Short-Term Debt	0.17	0.17
	(0.39)	(0.29)
Long-Term Debt	0.17	-0.35
	(0.29)	(0.23)
Short-Term Labor	0.20	0.02
	(0.16)	(0.14)
Long-Term Labor	-0.25	0.11
	(0.68)	(0.41)
Sort-Term Investment	0.13	0.07
	(0.34)	(0.31)
Long-Term Investment	0.77**	0.72**
	(0.36)	(0.33)
Inventory	0.33	0.11
	(0.23)	(0.19)
Property	-0.10	-0.27
	(0.43)	(0.35)
Intangibles	0.54	0.10
	(0.48)	(0.46)
Total Observations	6,018	1,239

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; standard errors, clustered at the firm level, shown in parenthesis. Outcome variables are listed on the left, so the table displays the estimates on the "successful (future) exporter" variable. All regressions are performed by PPML2 (Poisson pseudo-maximum likelihood).

Table A.4: Probability of Exit: Linear Probability Model

	After Exporting: Dependent = Enter		**Before Exporting: Dependent = Exit**	
Successful	0.00	0.01	-0.04***	-0.08***
	(0.01)	(0.02)	(0.01)	(0.01)
After($\|t = 1\ to\ 5\|$)		-0.00		-0.01
		(0.02)		(0.01)
After (rest)		-0.00		-0.04***
		(0.02)		(0.01)
Successful*After($\|t = 1\ to\ 5\|$)		-0.01		0.04***
		(0.02)		(0.01)
Successful*After(rest)		-0.02		0.08***
		(0.03)		(0.02)
Year FE	Yes	Yes	Yes	Yes
Firm FE	No	No	No	No
Number of observations	5,187	5,187	10,194	10,194
Adjusted R^2	0.141	0.141	0.016	0.019

note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, cluster at the firm level, shown in parenthesis; t=0 is either the first year of exporting or the year right before exporting.

Table A.5: Baseline Estimates: All Data

Dependent=Domestic Revenue	Poisson			Levels (2 billion Pesos)		
	(1)	(2)		(3)	(4)	
		Base	Base*NFV		Base	Base*NFV
Year of exp	0.21**	0.25*	-0.12	1.23	2.57	-2.88
	(0.10)	(0.15)	(0.16)	(1.73)	(3.54)	(3.94)
After (t=1 to 5)	0.14	0.05	0.22	0.23	0.97	-1.63
	(0.21)	(0.32)	(0.41)	(3.26)	(6.18)	(7.42)
After (rest)	-0.31	-0.49	0.48	-7.66***	-7.71	0.44
	(0.26)	(0.45)	(0.51)	(2.66)	(4.95)	(6.64)
Successful*(Year of exp)	0.03	-0.08	0.23	0.94	-1.15	4.23
	(0.11)	(0.17)	(0.19)	(2.00)	(3.80)	(4.11)
Successful*After(t=1 to 5)	0.19	0.21	-0.10	3.96	1.07	5.67
	(0.23)	(0.38)	(0.45)	(4.38)	(7.08)	(8.31)
Successful*After(rest)	0.57*	0.58	-0.20	11.10**	7.25	7.32
	(0.31)	(0.50)	(0.56)	(4.57)	(6.59)	(8.53)
Number of observations	18,741	18,741		18,741	18,741	
Groups	1,412	1,412		1,412	1,412	
Cluster by Group	No	No		Yes	Yes	
Adjusted R^2				0.019	0.019	

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, clustered at the firm level, shown in parenthesis; and *Not Financially Constrained(NFV)* equals 1 if the firm has a cash flow to total assets ratio greater than .07 (the median ratio for all firms).

Table A.6: Baseline Estimates: Dropping Firms with Revenues above 1 trillion or More Pesos

Dependent=Domestic Revenue	Poisson			Levels (2 billion Pesos)		
	(1)	(2)		(3)	(4)	
	Base		Base*NFV	Base		Base*NFV
		Base	Base*NFV		Base	Base*NFV
Year of exp	0.07	0.01	0.11	-0.69	-1.28*	1.08
	(0.05)	(0.07)	(0.08)	(0.62)	(0.66)	(0.84)
After (t=1 to 5)	-0.07	-0.50***	0.80***	-2.87*	-5.51***	5.53*
	(0.19)	(0.18)	(0.29)	(1.62)	(1.25)	(2.96)
After (rest)	-0.57***	-1.12***	1.17***	-9.84***	-12.80***	6.91***
	(0.22)	(0.27)	(0.33)	(1.98)	(2.07)	(2.54)
Successful*(Year of exp)	0.15**	0.15	-0.03	2.56***	2.36*	0.31
	(0.06)	(0.10)	(0.12)	(0.86)	(1.24)	(1.65)
Successful*After(t=1 to 5)	0.36*	0.75***	-0.76**	5.51***	7.20***	-3.88
	(0.20)	(0.25)	(0.34)	(2.06)	(2.79)	(4.04)
Successful*After(rest)	0.78***	1.23***	-1.02***	12.16***	12.97***	-2.74
	(0.23)	(0.31)	(0.38)	(2.28)	(2.83)	(4.50)
Number of observations	18,718	18,718		18,718	18,718	
Groups	1,410	1,410		1,410	1,410	
Cluster by Group	No	No		Yes	Yes	
Adjusted R^2				0.040	0.042	

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, clustered at the firm level, shown in parenthesis; and *Not Financially Constrained(NFV)* equals 1 if the firm has a cash flow to total assets ratio greater than .07 (the median ratio for all firms).

Table A.7: Domestic Revenue Growth: Lee's bounds for Attrition

Dependent =	**FD OLS**	**Lee's bounds (LB)**		**Observations**	
Δln(Revenue)	**Successful*After**	**lower**	**upper**	**OLS**	**LB**
After 2 year	0.25***	0.11***	0.40***	1,334	1,412
	(0.05)	(0.04)	(0.04)		
After 3 year	0.25***	0.02	0.52***	1,281	1,412
	(0.06)	(0.05)	(0.05)		
After 5 year	0.29***	-0.50***	1.04***	952	1,412
	(0.08)	(0.10)	(0.09)		
After 10 year	0.50***	-1.62***	2.27***	431	1,412
	(0.15)	(0.29)	(0.25)		

note: $***p < 0.01, **p < 0.05, *p < 0.1$ Robust standard errors for OLS estimates and bootstrapped standard error for leebounds estimates; data demeaned by year. Dependent=ln(Domestic Revenue X years after exporting) - ln(domestic revenue on year before exporting). Attrition may affects the results and the assumption made about the missing data determines the sign of the effect.

Table A.8: Matched Estimates: All Data

Dependent=Domestic Revenue	Poisson			Levels (2 billion Pesos)		
		Base	Base*NFV		Base	Base*NFV
Year of Exp.	0.05	0.01	0.07	-0.18	-0.31	0.20
	(0.05)	(0.07)	(0.08)	(0.60)	(0.72)	(0.80)
After (t=1 to 5)	-0.30**	-0.55***	0.50**	-3.15***	-4.32***	2.43*
	(0.12)	(0.18)	(0.20)	(0.95)	(1.25)	(1.46)
After (t=rest)	-0.74***	-1.19***	0.97***	-8.52***	-10.60***	5.13**
	(0.19)	(0.27)	(0.31)	(1.61)	(1.83)	(2.21)
Successful*Year of Exp.	0.18***	0.22**	-0.08	2.76***	3.53**	-1.42
	(0.07)	(0.10)	(0.13)	(1.03)	(1.69)	(2.05)
Successful*After(t=1 to 5)	0.71***	0.99***	-0.58*	10.61***	11.89***	-2.71
	(0.16)	(0.27)	(0.31)	(3.39)	(4.44)	(6.23)
Successful*After(t=rest)	1.13***	1.48***	-0.81**	19.53***	20.92***	-3.83
	(0.23)	(0.32)	(0.41)	(4.53)	(4.78)	(8.93)
Domestic*Year of Exp.	0.00	-0.13	0.24*	-0.42	-1.58**	2.87**
	(0.07)	(0.09)	(0.12)	(0.61)	(0.64)	(1.33)
Domestic*After(t=1 to 5)	0.36**	0.48*	-0.28	1.62	1.54	0.56
	(0.17)	(0.29)	(0.34)	(1.30)	(1.67)	(2.64)
Domestic*After(t=rest)	0.59**	0.93**	-0.78*	3.11*	4.03*	-2.16
	(0.25)	(0.36)	(0.42)	(1.71)	(2.19)	(3.39)
Number of observations	19,259	19,259		19,259	19,259	
Groups	1,473	1,473		1,473	1,473	
Cluster by Group	No	No		Yes	Yes	
Adjusted R^2				0.023	0.023	

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, clustered at the firm level, shown in parenthesis; and *Not Financially Constrained(NFV)* equals 1 if the firm has a cash flow to total assets ratio greater than .07 (the median ratio for all firms).

Proofs and Extensions for Theoretical Section

A.1 General Case: Successful Exporters

A.1.a Unconstrained threshold for successful exporters

For successful exporters, the liquidity constraint changes to

$$p_{ih}q_{ih} - \frac{q_{ih}}{\phi_i} + p_{if}q_{if} - \frac{\tau_{if}q_{if}}{\phi_i} \geq B_i$$

For a constrained firm, this Equation binds when setting the price and marketing levels equal to the profit-maximizing p^*_{ih}, p^*_{if}, L^*_{ih} and L^*_{if}. So to get the threshold for constrained/unconstrained firms, we bind the equation above and substitute in the firm's profit-maximizing prices and marketing level. Substituting demand, the marketing function, profit-maximizing prices and the modified creditors' constraint (which needs to include the new loans for marketing in all countries) into the liquidity constraint for successful exporters we get the following threshold:

$$\frac{L^*_{ih}Y_h}{\sigma}\left(\frac{\mu}{P_h\phi}\right)^{1-\sigma} - \frac{L^{*\beta}_{ih}}{\lambda} + \frac{L^*_{if}Y_f}{\sigma}\left(\frac{\mu\tau_{if}}{P_f\phi}\right)^{1-\sigma} - \frac{L^{*\beta}_{if}}{\lambda} = \frac{f_x + f_d - (1-\lambda)f_e}{\lambda}$$

Substituting in L^*_{ih} from Equation (7) and the profit-maximizing L^*_{if}, we get the following condition:

$$\left(\frac{Y_h}{\beta\sigma}\right)^{\frac{\beta}{\beta-1}}\left(\frac{\mu}{P_h\phi}\right)^{\frac{\beta(1-\sigma)}{\beta-1}} + \left(\frac{Y_f}{\beta\sigma}\right)^{\frac{\beta}{\beta-1}}\left(\frac{\mu\tau_{if}}{P_f\phi}\right)^{\frac{\beta(1-\sigma)}{\beta-1}} = \frac{f_x + f_d - (1-\lambda)f_e}{\beta\lambda - 1}$$

Simplifying:

$$\phi^{succ}_C = \mu\left(\frac{1}{\sigma\beta}\right)^{\frac{1}{(1-\sigma)}}\left(\frac{f_x + f_d - (1-\lambda)f_e}{\lambda\beta - 1}\right)^{\frac{1-\beta}{\beta(1-\sigma)}}\left(y_h^{\frac{\beta}{\beta-1}}\left(\frac{1}{P_h}\right)^{\frac{\beta(1-\sigma)}{\beta-1}} + y_f^{\frac{\beta}{\beta-1}}\left(\frac{\tau_{if}}{P_f}\right)^{\frac{\beta(1-\sigma)}{\beta-1}}\right)^{-\frac{1-\beta}{\beta(1-\sigma)}}$$

Note that here I assume that either the firm uses domestic labor for foreign marketing or that the foreign market wages are the same as those of the domestic market. I also assume that there are no additional trade costs in marketing.

If the firm enters a similar size market ($Y_h = Y_f = Y$) with a price level equal to that of the domestic times the iceberg trade costs ($P_f = P_h \cdot \tau_{if}$), then the above equation simplifies to:

$$\phi^{succ}_C = \frac{\mu}{P}\left(\frac{y}{\sigma\beta}\right)^{\frac{1}{(1-\sigma)}}\left(\frac{f_x + f_d - (1-\lambda)f_e}{2(\lambda\beta - 1)}\right)^{\frac{1-\beta}{\beta(1-\sigma)}}$$

A.1.b Credit-constrained marketing decision for successful exporters

A successful exporter must decide how much to charge for its product and how much to spend on marketing at home and abroad. The prices are not affected by the liquidity constraint, so the firm always charges the profit maximizing prices in each market. Substituting this price into the expected profit equation and the modified credit budget constraint into the maximization problem, we get the following:

$$Max\ E\pi_i(p_i, L_i; \phi_i) = \frac{L_{ih}Y_h}{\sigma}\left(\frac{\mu}{P_h\phi}\right)^{1-\sigma} - L_{ih}^{\beta} + \frac{L_{if}Y_f}{\sigma}\left(\frac{\mu\tau_{if}}{P_f\phi}\right)^{1-\sigma} - L_{if}^{\beta} - f_x - f_d$$

Subject to the binding financing constraint:

$$\frac{L_{ih}Y_h}{\sigma}\left(\frac{\mu}{P_h\phi}\right)^{1-\sigma} - \frac{L_{ih}^{\beta}}{\lambda} + \frac{L_{if}Y_f}{\sigma}\left(\frac{\mu\tau_{if}}{P_f\phi}\right)^{1-\sigma} - \frac{L_{if}^{\beta}}{\lambda} \geq \left(\frac{f_x + f_d - (1-\lambda)f_e}{\lambda}\right)$$

Using ε as the multiplier, we get:

$$\frac{\partial\pi_i}{\partial\varepsilon}: \quad \frac{\sigma\beta L_{ih}^{\beta-1}}{Y_h\left(\frac{\mu}{P_h\phi_i}\right)^{1-\sigma}} = \frac{1+\varepsilon}{1+\frac{\varepsilon}{\lambda}}$$

$$\frac{\partial\pi_i}{\partial\varepsilon}: \quad \frac{\sigma\beta L_{if}^{\beta-1}}{Y_f\left(\frac{\mu\tau_{if}}{P_f\phi_i}\right)^{1-\sigma}} = \frac{1+\varepsilon}{1+\frac{\varepsilon}{\lambda}}$$

$$\frac{\partial\pi_i}{\partial\varepsilon}: \quad \frac{L_{ih}Y_h}{\sigma}\left(\frac{\mu}{P_h\phi}\right)^{1-\sigma} - \frac{L_{ih}^{\beta}}{\lambda} + \frac{L_{if}Y_f}{\sigma}\left(\frac{\mu\tau_{if}}{P_f\phi}\right)^{1-\sigma} - \frac{L_{if}^{\beta}}{\lambda} = \frac{f_x + f_d - (1-\lambda)f_e}{\lambda}$$

This means that $Ł_{if} = \left(\frac{Y_f}{Y_h}\right)^{\frac{1}{\beta-1}}\left(\frac{P_h\tau_{if}}{P_f}\right)^{\frac{1-\sigma}{\beta-1}} L_{ih}$. Substituting $Ł_{if}$ out of the financial constraint:

$$\left(\frac{L_{ih}Y_h}{\sigma}\left(\frac{\mu}{P_h\phi}\right)^{1-\sigma} - \frac{L_{ih}^{\beta}}{\lambda}\right)\left(1 + \left(\frac{Y_f}{Y_h}\right)^{\frac{\beta}{\beta-1}}\left(\frac{P_h\tau_{if}}{P_f}\right)^{\frac{\beta(1-\sigma)}{\beta-1}}\right) = \frac{f_x + f_d - (1-\lambda)f_e}{\lambda}$$

Thus, the firm chooses the L_{ih} that solves the following equation:

$$\frac{L_{ih}Y_h}{\sigma}\left(\frac{\mu}{P_h\phi}\right)^{1-\sigma} - \frac{L_{ih}^{\beta}}{\lambda} = \left(1 + \left(\frac{Y_f}{Y_h}\right)^{\frac{\beta}{\beta-1}}\left(\frac{P_h\tau_{if}}{P_f}\right)^{\frac{\beta(1-\sigma)}{\beta-1}}\right)^{-1} \frac{f_x + f_d - (1-\lambda)f_e}{\lambda}$$

If the firm enters a similar size market ($Y_h = Y_f = Y$) with a price level equal to that of the

domestic times the iceberg trade costs ($P_f = P_h \cdot \tau_{if}$), then the above equation simplifies to:

$$\frac{L_{ih}Y_h}{\sigma}\left(\frac{\mu}{P_h\phi}\right)^{1-\sigma} - \frac{L_{ih}^{\beta}}{\lambda} = \frac{f_x + f_d - (1-\lambda)f_e}{2\lambda}$$

A.1.c Firm production threshold for successful exporters

The firm production threshold for successful exporters does not change. All firms want to supply both markets and no firm would enter the export market if it knew that, conditional on surviving in the export market, it would have to exit the domestic market.

A.2 Proof of Proposition 1

Proof for the first statement:

We can think of the cutoff for non-exporters as the cutoff before a firm attempts to exports, irrespective of export success. Thus, to prove the first part of the proposition, I compare, individually, successful and unsuccessful exporters with non-exporters.

To prove that the threshold for unsuccessful exporters is higher after the export attempt ($\phi_C^{dom} < \phi_C^{fail}$), Equation (8) must be bigger than Equation (9). This holds as long as $f_x > 0$. Notice also that the threshold is higher the higher the f_x ($\frac{\partial \phi_C}{\partial f_x} > 0$). The sign of the derivative is positive because $\frac{1-\beta}{\beta(1-\sigma)} > 0$, since $\beta > 1$ is required for an interior marketing solution and $\sigma > 1$ is required for an interior pricing solution; and, by Assumption 1, we have that $f_x + f_d > (1-\lambda)f_e$ and $\lambda\beta > 1$.

To prove that the threshold for successful exporters is higher after exporting ($\phi_C^{dom} < \phi_C^{succ}$), we need Equation (10) to be larger than Equation (9). This holds as long as $f_d - f_x < (1-\lambda)f_e$. This must hold since $(1-\lambda)f_e > 0$ and, by Assumption 2, we have that $f_x > f_d$. So some successful exporters that were not previously constrained might become constrained.

Proof for the second statement:

For the second statement, I compare the thresholds between successful exporters (Equation 10) and unsuccessful exporters (Equation 8). Comparing the two thresholds, we see that $\phi_C^{succ} < \phi_C^{fail}$ if

$$\frac{1}{2}\left(f_x + f_d - (1-\lambda)f_e\right) < \left(f_x + f_d - (1-\lambda)f_e\right)$$

This holds because, by Assumption 1, $(1-\lambda)f_e < f_x + f_d$. The difference is decreasing with τ_{if}, holding everything else equal. Thus, the constrained threshold difference between successful and unsuccessful exporters is greatest with smaller iceberg trade costs. The difference between successful and unsuccessful newly-constrained exporters is that while both are worse off in terms of domestic revenue, successful exporters are better off overall.

A.3 Proof of that Constrained L_i is Increasing in ϕ_i

The equations for the constrained L_i choice for all firms are identical on the left hand side: $\frac{L_i Y}{\sigma}\left(\frac{\mu}{P\phi}\right)^{1-\sigma} - \frac{L_i^{\beta}}{\lambda}$ (see Equation 11 for the unsuccessful exporter choice, Equation 12 for the domestic producer choice, and Equation 13 for the successful exporter choice). The right hand side differs, but it does not vary by productivity or marketing choice; changes in productivity only change the marketing choice after export success has been determined. Thus, to prove that the constrained L_i choice is increasing in ϕ_i I take the total derivative of each of the equations and set them equal to zero:

$$\frac{dL_i}{d\phi} = \frac{(\sigma-1)\phi^{\sigma-2}\frac{L_i Y}{\sigma}\left(\frac{\mu}{P}\right)^{1-\sigma}}{\frac{\beta L_i^{\beta-1}}{\lambda} - \frac{Y}{\sigma}\left(\frac{\mu}{P\phi}\right)^{1-\sigma}} > 0$$

This is positive since $\sigma - 1 > 0$, $\sigma > 1$, and $\frac{\beta L_i^{\beta-1}}{\lambda} > \frac{Y}{\sigma}\left(\frac{\mu}{P\phi}\right)^{1-\sigma}$. Notice that $\frac{Y}{\sigma}\left(\frac{\mu}{P\phi}\right)^{1-\sigma}$ is the marginal revenue of marketing and $\frac{\beta L_i^{\beta-1}}{\lambda}$ is the marginal cost of borrowing for marketing costs. All firms are risk neutral, and all unconstrained firms choose the L_i that sets the marginal cost $\left(\beta L_i^{\beta-1}\right)$ equal to the marginal revenue of marketing $\left(\frac{Y}{\sigma}\left(\frac{\mu}{P\phi}\right)^{1-\sigma}\right)$. Marginal cost is below the marginal cost of borrowing for marketing $\left(\frac{\beta L_i^{\beta-1}}{\lambda}\right)$. With no financial frictions, $\lambda = 1$, the two marginal costs equal. For unconstrained firms, marginal revenue from marketing is less than the marginal cost from marketing. Constrained firms would like to do this as well, but doing so makes their liquidity constraint bind. As they decrease L_i, their marginal cost of borrowing for marketing decreases, but it is still above their marginal revenue. Deviating also means lower expected profits, so the firms deviate as little as possible. There is no point in lowering L_i below L_i^C, and hence no point in lowering marginal costs below that which equates marginal revenue to marginal cost of borrowing for marketing. So the last firm to produce is the one that in order to borrow has to set marginal cost of borrowing for marketing equal to marginal revenue of marketing. All firms set marginal cost of borrowing for marketing greater than or equal to the marginal revenue $\left(\frac{\beta L_i^{\beta-1}}{\lambda} \geq \frac{Y}{\sigma}\left(\frac{\mu}{P\phi}\right)^{1-\sigma}\right)$ and only unconstrained firms set marginal cost of marketing equal to marginal revenue of marketing $\left(\beta L_i^{\beta-1} = \frac{Y}{\sigma}\left(\frac{\mu}{P\phi}\right)^{1-\sigma}\right)$.

A.4 Proof of Proposition 2

Proof for the first statement:

We can think of the L_i for non-exporters as the L_i for successful and unsuccessful exporters before they attempted to export. Thus, to prove the first part of the proposition, I compare, individually, successful and unsuccessful exporters with non-exporters.

Since L_i is decreasing between the profit-maximizing L_i^* and L_i^C, then $\frac{\partial LHS_i}{\partial L_i} < 0$ in Equation (11). Since $\frac{\partial LHS_i}{\partial L_i} < 0$, to prove that the L_i for constrained unsuccessful exporters is lower after exporting ($L^{dom} > L^{fail}$), I have to show that $f_d - (1-\lambda)f_e < f_x + f_d - (1-\lambda)f_e$. Since $0 < f_x$, then $L^{dom} > L^{fail}$. Alternatively, we can also note that $\frac{\partial L_i}{\partial f_x} < 0$. Thus, if $\frac{\partial RHS_i}{\partial f_x} > 0$ in the same equation, then $\frac{\partial L_i}{\partial f_x} < 0$. Taking the derivative of the right hand side with respect to f_x, we get $\frac{\partial RHS_i}{\partial f_x} = \frac{1}{\lambda} > 0$, so $\frac{\partial L_i}{\partial f_x} < 0$.

Whether or not L_i for constrained successful exporters is lower after exporting ($L^{dom} > L^{succ}$) depends on whether or not the new market loosens or tightens the constrained. If the markets are similar, then it is likely that entering the new market tightens the constraint. We can see if the new market constrains the successful firm by comparing Equations (12) and (13). For Equation (13), I assumed the firm enters a similar sized market ($Y_h = Y_f = Y$) with a price level equal to that of the domestic times the iceberg trade costs ($P_f = P_h \cdot \tau_{if}$). Then $L^{dom} > L^{succ}$ when

$$f_d - (1-\lambda)f_e < \frac{1}{2}\left(f_x + f_d - (1-\lambda)f_e\right)$$

That is, when $f_d - f_x < (1-\lambda)f_e$. This is likely to be the case, since, by Assumption 2, $f_d < f_x$.

Proof for the second statement:

We can prove that the constrained L_i is less for unsuccessful than successful exporters ($L^{fail} < L^{succ}$) from Equation (11) and Equation (13). In those equations we see that successful exporters are better off as long as $\frac{1}{2}\left(f_x + f_d - (1-\lambda)f_e\right) < \left(f_x + f_d - (1-\lambda)f_e\right)$. Which, as we saw in Appendix A.2, is likely to hold.

A.5 Proof of Proposition 3

Proof for the first statement:

We can think of the production cutoff for non-exporters as the production cutoff for successful and unsuccessful exporters before the firms attempt to exports. To prove the first statement, I

individually compare successful and unsuccessful exporters with non-exporters.

To prove that the production threshold for unsuccessful exporters is higher after exporting ($\phi_0^{dom} < \phi_0^{fail}$), I have to show that $f_d - (1-\lambda)f_e < (f_x + f_d - (1-\lambda)f_e)$. This holds as long as $f_x > 0$. Alternatively, I can prove that $\frac{\partial \phi_0}{\partial f_x} > 0$ or that the following is greater than zero:

$$\frac{\partial \phi_0^{fail}}{\partial f_x} = \frac{\mu}{P}\left(\frac{Y}{\sigma\beta}\right)^{\frac{1}{(1-\sigma)}} \frac{1-\beta}{\beta(1-\sigma)} \lambda^{\frac{\beta}{1-\beta}} \frac{1}{\beta-1}\left(\lambda^{\frac{\beta}{1-\beta}} \frac{1}{\beta-1}\left(f_x + f_d - (1-\lambda)f_e\right)\right)^{\frac{1-\beta}{\beta(1-\sigma)}-1} > 0$$

This sign is positive because 1) $\frac{1-\beta}{\beta(1-\sigma)} > 0$ since $\beta, \sigma > 1$; 2) $f_x + f_d > (1-\lambda)f_e$ since we assume $f_x > f_d > f_e$; and 3) $\frac{1}{\beta-1} > 0$ since $\beta > 1$.

Proof for the second statement:

Since firms only export if they expect to be better off, no firms exports if, conditional of surviving abroad, they would be worse off. Since the production threshold for unsuccessful exporters is higher after exporting than before, it means the production threshold is also higher for unsuccessful than successful exporters ($\phi_0^{succ} < \phi_0^{fail}$).