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, the trade literature largely ignores export failure and views exporting as a simple cost-benefit analysis based on foreign profits and trade costs. 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 have the following effects: 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. I build a Colombian dataset that merges firm-level trade and financial data to test the propositions of the model. I find evidence that export failure has a differential impact on financially-constrained firms. After exporting, financially constrained unsuccessful exporters have a worse cash flow to total assets ratio, lower domestic revenue, slower domestic revenue growth, and a higher probability of going out of business. The findings are robust to comparisons with similar successful exporters and even non-exporters, and an instrumental variable approach.

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Keywords: Exporter dynamics, market linkages, financial constraints, export failure.

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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 for first-time exporters is about US $200,000 on average and US $13,000 for the median firm in the 1996–2010 period. Since the majority of firms do not export beyond one year (Eaton, Eslava, Kugler, and Tybout, 2007), it is likely exporting resulted in profit losses for unsuccessful exporters.

What happens to those firms that try to export but stop after one year? The trade literature often views exporting as a simple exercise based on a 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 a failed export attempt. However, this attempt can have an effect on domestic production: it can be positive if firms learn from exporting, or negative if the attempt has a negative feedback effect. There are economic reasons to believe that for some firms the negative effect dominates. 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 debt but little or no foreign revenue. A 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 export attempts and their consequences. 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 two identification techniques (difference-in-difference and instrumental variable methods), I show that exporting only once and then exiting is indeed associated with reduced economic performance in the domestic market. I find that financially-constrained unsuccessful exporters have a higher probability of default after exporting, and those that 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. The estimates are also robust to various definitions of export success and financially constraint classifications, as well as various other

[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).

robustness tests. To my knowledge, I am the first to focus on firms with failed export attempts, provide stylized facts about these firms, and link failed export attempts with poor domestic market performance.

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-exporters; 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 because of the existence of financial frictions. I assume firms borrow twice to pay upfront costs: the first loan pays for the export fixed cost and the second pays 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 (an export fixed costs); the search fee gives the firm a chance to randomly match with a foreign distributor. Since a foreign distributor is necessary to sell any quantity in a foreign country, export failure takes place 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 default because of a failed export attempt.

I test the model empirically and provide robust evidence that a failed exporting attempt has a negative impact on a firm's domestic market performance. A firm may pay the ultimate price and go out of business because of its failed export attempt. Specifically, export failure results in worse cash flow to total assets, lower domestic revenue, and a higher probability of going out of business. The association is strong even when comparing unsuccessful exporters with matched non-exporters and successful exporters. To address additional endogeneity concerns, I follow Hummels, Jørgensen, Munch, and Xiang (2014) and Aghion, Bergeaud, Lequien, and Melitz (2018) to 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 varies considerably.

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.[3] This paper also contributes to the literature quantifying export

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

[3]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).

costs. Das et al. (2007) and Morales et al. (2011) calculate a dollar amount to export fixed costs, and Smeets, Creusen, Lejour, and Kox (2010) quantify how a home-country's institutions can effect these costs. These studies differ from this 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.[4] 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 and 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 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 my paper explain another reason why exporters are more likely to default.

Finally, this paper adds to the literature on linkages between 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.

[4] 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.

They argue that previous models overestimate the size of fixed export costs. My work differs in that I focus on the prolonged effects on financially-constrained unsuccessful exporters, while Rho and Rodrigue (2010) 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 introduces a partial-equilibrium model, demonstrating how export failure can have repercussions in the home market. Section III describes the data and provides stylized facts about new exporters. Section IV implements the identification strategy and provides robustness checks. Section V concludes.

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

I develop a simple two-country, heterogeneous-firm model to demonstrate how adding an element of uncertainty in export success links the export success outcome to the domestic market performance. With this key addition to a Melitz-like model, I identify three testable predictions for unsuccessful exporters: export failure results in [1] a tighter financial constraint, [2] lower domestic revenue, and [3] higher probability of default.

II.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 varieties and c_i is the consumption of variety i. Since each firm produces only one product, i indexes for both the product and the firm. Goods are substitutes, which implies that $0 < \rho < 1$ and that the elasticity of substitution between two goods is given by $\sigma = \frac{1}{1-\rho} > 1$. Individuals maximize utility subject to a revenue constraint: $\int_{i \epsilon \Omega} p_i c_i di = Y$. Optimal consumption for an individual who buys variety i is given by $c_i = A p_i^{-\sigma}$, where $A = Y P^{\sigma - 1}$ is the market demand index that depends on income (Y) and aggregate prices (P). Total consumption of variety i in each country is given by $q_i = L_i c_i = L_i A p_i^{-\sigma}$, 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.

II.2 Firms

Setup of the model

Firms pay a fixed entry fee, f_e, to enter the home market. The fee is a tangible asset a firm buys that can also be used as collateral. After paying f_e, the firm then draws a unit labor requirement coefficient, $1/\phi_i$, from a known distribution $G(\phi_i)$. Upon receiving its productivity draw, the firm decides whether or not to produce; if producing, firms must additionally pay an overhead labor cost, f_d. All firms must also market their products to consumers; marketing costs, $F(L_i)$, determine the number of individuals a firm reaches. I assume marketing has increasing marginal costs, firms only use domestic labor in marketing, domestic wages are normalized to one, and all fees/costs are in terms of labor.

After entering the domestic market, firms must decide whether or not to export. In order to export, a firm must pay an export entry fee, f_x, and identify a foreign distributor/partner. My key theoretical contribution is to add an element of uncertainty since identifying a foreign distributor is not guaranteed. γ share of firms identify a foreign distributor and the rest $(1-\gamma)$ are unable to do so; foreign distributors are necessary to sell abroad. For convenience, unsuccessful exporters gain no revenue from exporting.[5] To abstract from the export-entry decision and instead focus on the decision after export success has been determined, γ is determined outside of the model. While studies have found that more productive firms have higher export survival rates and some firms upgrade before exporting (see Bustos, 2011), this assumption is not a concern here for several reasons: 1) for the conclusions to hold, similar productivity firms need to differ in export success, 2) upgrading to improve export success tends to takes place on the upper end of the distribution, not at the productivity levels that are most adversely impacted by export failure, and 3) I treat export failure as endogenous in the empirics.

Firms borrow to pay exporting fixed costs, f_x, overhead labor costs, f_d, and marketing costs, $F(L_i)$. As in Manova (2013), firms cannot use profits from a previous period or other savings to pay for these costs. For convenience, firms borrow the full amount of these costs; for the conclusions of the model to hold, firms simply need to pay a percentage of the fixed costs and upfront marketing costs with outside capital. Firms borrow in two installments: to pay for the fixed costs, f_x and f_d, and to pay for the marketing expenditure, $F(L_i)$. Note that spending on marketing is necessary to sell any quantity. Thus, firms able to borrow the first loan but not the second, will not produce. Additionally, firms unable to repay their first loan will lose their collateral, which must be replaced to produce in the future.

Financial frictions exist because creditors cannot collect all debts. In the model, creditors collect debt from a share (λ) of firms. As in Manova (2013), λ is the probability of default and is exogenous to the model. Endogenous default would reinforce the findings of this model as borrowing becomes more difficult and more costly for the firms on the export/don't-export threshold.

[5]The conclusions will hold as long as unsuccessful exporters lose profits from exporting. As mentioned in the introduction, this is likely to be the case for most new exporters.

Firm maximization problem after export success has been determined

In my model there will be three firm types in the market: successful exporters, unsuccessful exporters, and non-exporters. *Successful exporters* supply two markets (home and domestic); *unsuccessful exporters* supply only the domestic market and have additional debt from their export attempt; and *non-exporters* supply only the domestic market but have no export debt. For my key predictions, I focus on the unsuccessful exporter's outcome and I compare it with that of similar productivity non-exporters and successful exporters.

For unsuccessful exporter i, the maximization problem *after* the export attempt 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

$$q_i = L_i A p_i^{-\sigma} \tag{2}$$

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

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

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

Equation (1) is the profit maximization problem for firm i. Equation (2) is total demand for the variety produced by firm i. Equation (3) is the marketing expenditure, the amount of labor required to reach L_i consumers. As in Arkolakis (2010), I assume $\beta > 1$ to allow for increasing marginal costs to reaching consumers. Equation (4) is the firm's liquidity constraint; net revenues must be larger than or equal to the loan repayment, B_i. The constraint binds for low productivity firms because less productive firms earn lower revenues and thus have lower repayment capabilities. Equation (5) is the risk-neutral, creditor's constraint; creditors fund a firm if expected net returns from the loan are greater than their outside option. This constraint holds with equality when credit markets have perfect competition and an outside option normalized to zero.

II.3 Three propositions from the Model

Credit-constrained firm threshold

All firms set a constant mark-up ($\mu = \frac{\sigma}{\sigma-1}$) above marginal cost ($\frac{1}{\phi_i}$) and set prices as follows: $p_i^* = \frac{\mu}{\phi_i}$. Note that this pricing decision is not affected by the number of consumers reached by a firm (L_i). The profit maximizing L_i, in turn, is given by the following: $L_i^* = \left(\frac{A}{\sigma\beta}\right)^{\frac{1}{\beta-1}} \left(\frac{\mu}{\phi_i}\right)^{\frac{1-\sigma}{\beta-1}}$. L_i^* increases with productivity, ϕ_i, since $\frac{\partial L_i^*}{\partial \phi_i} > 0$. See Appendix A.1 for details.

For a financially constrained firm, Equation (4) binds when setting price and marketing levels equal to the profit-maximizing p_i and L_i. For the firm at the constrained/unconstrained threshold, Equation (4) binds, and yet the firm still chooses p_i^* and L_i^*. With this, I can solve for the unconstrained firm threshold for non-exporters (ϕ_C^{dom}), unsuccessful exporters (ϕ_C^{fail}), and successful exporters (ϕ_C^{succ}).

Proposition 1: Some successful and unsuccessful exporters become liquidity constrained as a result of exporting. For similar productivity firms, unsuccessful exporters are more likely to become liquidity constrained than successful exporters.

To prove this proposition, I compare the unconstrained firm threshold for both successful and unsuccessful exporters with non-exporters (ϕ_C^{dom} vs ϕ_C^{fail}, and ϕ_C^{dom} vs ϕ_C^{succ}). For successful exporters, this outcome depends on the size of the foreign market; the conclusions hold as long as exporters enter a market similar to that of the home market. Appendix A.2 proves that $\phi_C^{dom} < \phi_C^{fail}$, and $\phi_C^{dom} < \phi_C^{succ}$; that is, the unconstrained firm threshold is higher for both successful and unsuccessful exporters than for non-exporters. To prove the second part of the proposition, I compare the threshold firm for similar productivity successful and unsuccessful exporters. In the appendix, I prove that the threshold will be even higher for unsuccessful exporters than successful exporters, $\phi_C^{succ} < \phi_C^{fail}$; that is, compared with successful exporters, more unsuccessful exporters will be classified as financially constrained.

Marketing decision and revenue for credit-constrained firm

Financially constrained firms are unable to get their desired financing and reduce their need for financing by lowering the number of consumers reached. Reaching more consumers 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, $\frac{\partial B_i}{\partial L_i} = \frac{\beta L_i^{\beta-1}}{\lambda}$.[6] An unconstrained risk-neutral firm discounts the repayment by λ. A financially constrained firm, on the other hand, is unable to do so because of the liquidity constraint, and thus sets L_i below L_i^*. Since deviation from optimum L_i lowers profits, the firm deviates as little as possible to ensure that the creditors break even. Appendix A.3 solves for the credit-constrained firm's marketing decision for non-exporters, unsuccessful exporters, and successful exporters. In all cases, L_i is increasing in productivity, $\frac{\partial L_i}{\partial \phi_i} > 0$. While I cannot solve for the L_i chosen by financially constrained firms, I can solve for the lower threshold for L_i: $L_i^C = \lambda^{\frac{1}{\beta-1}} \left(\frac{A}{\sigma\beta}\right)^{\frac{1}{\beta-1}} \left(\frac{\mu}{\phi_i}\right)^{\frac{1-\sigma}{\beta-1}}$ and $L_i^C = \lambda^{\frac{1}{\beta-1}} L_i^*$. Since $L_i^C < L_i^*$, financially constrained firms choose an L_i that lies on or between these two values. Additionally, since domestic revenue (v_i) for all firms is $p_i q_i = L_i A \left(\frac{\mu}{\phi_i}\right)^{1-\sigma}$, I can also calculate the revenue for financially unconstrained firms (v_i^*) and the lower-bound domestic revenue (v_i^C) for all firms (See Appendix A.3). The lower bound does not depend on export success, but it does depend on the productivity draw.

[6] These two equations only equal when there are no financial frictions ($\lambda = 1$).

Proposition 2: Some financially constrained firms, regardless of their success abroad, have lower domestic revenues as a result of exporting. For similar productivity firms, the decrease in domestic revenue is greater for financially constrained unsuccessful exporters than for successful ones.

To prove this proposition, first note that anything that lowers L_i also lowers revenue. Appendix A.4 shows that liquidity constrained firms, regardless of their success abroad, reach fewer consumers in the domestic market ($L^{dom} > L^{succ}, L^{fail}$), and hence also have lower domestic revenue as a result of exporting. Additionally, as shown in the Appendix, after controlling for firm productivity, the decreases in L_i and v_i are greater for financially constrained unsuccessful exporters than for financially constrained successful ones ($L^{succ} > L^{fail}$).

Production threshold for firms

Some potentially profitable firms stop producing. Firms with productivity below ϕ_i^0 do not produce because they cannot get a loan; if these firms were to give all profits to the creditor, the creditor would still not break even. The cutoff is defined by the constrained firm, ϕ_i^0, whose L_i choice equals L_i^C. I calculate the production threshold for non-exporters (ϕ_0^{dom}), unsuccessful exporters (ϕ_0^{fail}), and successful exporters (ϕ_0^{succ}) in Appendix A.5.

Proposition 3: Some unsuccessful exporters are unable to borrow and stop production because of exporting. Unsuccessful exporters are also more likely to fail in the domestic market than successful exporters.

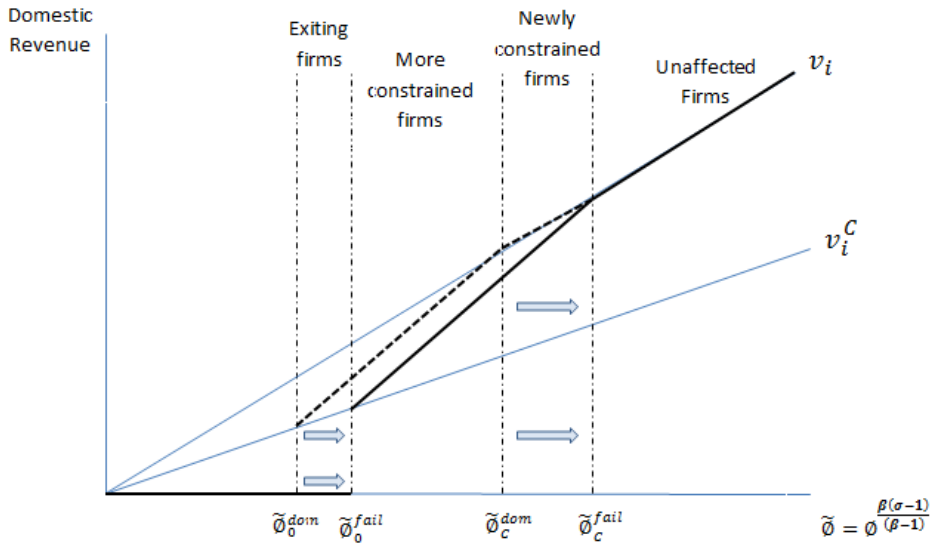
Appendix A.6 shows that the production cutoff is higher for unsuccessful exporters than for non-exporters ($\phi_0^{fail} > \phi_0^{dom}$) and that this cutoff is also higher than that of unsuccessful exporters ($\phi_0^{fail} > \phi_0^{succ}$).

II.4 Discussion

The model shows that 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 success. Specifically, $(1-\gamma)$ share of these firms fail and must repay the export fixed cost using only domestic profits, and γ succeed and pay the cost with domestic and foreign profits. Exporting failure, thus, deteriorates a firm's financial health and this can impact the domestic market performance of financially constrained firms. In the model, export failure leads low-productivity, unsuccessful exporters to become financially constrained, have lower domestic revenue, and exit the domestic market. Higher productivity exporters, given the distance from their financial constraint, can attempt to export without substantial negative consequences to failure. Figure 1 illustrates the consequences of export failure in terms of domestic revenue. In the figure, unsuccessful exporters are grouped into four categories: [1] unaffected firms, [2] newly

constrained firms, [3] more constrained firms, and [4] exiting firms. These theoretical outcomes are the basis for my empirical work.

Figure 1: Unsuccessful exporters: before and after export failure



Note: 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 a transformation of firm productivity. The figure shows the constrained cutoff ($\tilde{\phi}_C$) and the production cutoff ($\tilde{\phi}_0$) for unsuccessful exporters, $fail$, and non-exporters, dom.

Motivation for entering a foreign market. In the model, firm entry into exporting is a profit-seeking activity. The firms are assumed to be risk neutral and, thus, firms export because they expect profits to be greater than zero. Theoretically, it makes sense to assume firms are risk neutral as this is typical of most Melitz-like models. But could there be other motivations for exporting? For example, a firm may simply be exporting as a last resort because their domestic market share is decreasing, so they try their luck at exporting. Thus, once the firm fails abroad, it would be expected to continue to do worse in the domestic market. This poor performance is clearly not linked with the failure in the export market. Additionally, a firm might be willing to take on the risk associated with exporting (maybe a risk-seeking firm), and once they export, they take on other risky behavior that results in the firm doing poorly both domestically and abroad. In this case too, firm export failure is not the cause of the poor domestic market performance that takes place after the failed export attempt. While these arguments are legitimate and may biased my estimates. My argument is that even if these were the motivations, export failure can result in even greater losses and result in even worse performance in the domestic market because of the high costs associated with exporting. It is only through the empirics that I can identify the consequences of export failure, and can attempt to control for situations such as the ones described here.

III Data Description and Descriptive Evidence

In this section, I provide descriptive evidence of the link between export failure and domestic market performance. To analyze this link, I build a dataset using Colombian firm-level data. Using Colombian data to identify this connection is ideal for several reasons: [1] I can merge firm-level trade data with domestic firm-level financial data, [2] I can create a fairly long panel (16 years) and can observe a firm's behavior several years before and after exporting, and [3] firms in developing countries have a higher probability of failed export attempts (see Besedeš and Prusa 2011), and the consequence associated with these attempts may be felt more acutely in countries like Colombia.

III.1 Data sources and sample

I use two data sources in creating my dataset: Colombian National Directorate of Taxes and Customs (DIAN) and Sistema de Informacion y Reporte Empresarial (SIREM). DIAN reports firm-level customs data for the 1994–2011 period. This is the same source used in Eaton et al. (2007) and adds up to within one percent of UN COMTRADE exports. Each transaction includes a 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. I aggregate the transaction level data to the annual level to match the level of aggregation of the financial data. Trade data should be aggregated to the annual level for two additional reasons: [1] seasonal fluctuations, and [2] there is evidence that firms trade infrequently to take advantage of economies of scale and to account for delivery lags (Alessandria, Kaboski, and Midrigan, 2010).

The other data source, SIREM, reports financial data for the 1995–2011 period. This database is managed by Superintendencia de Sociedade, which is part of the Colombian Ministry of Commerce, Industry and Tourism. The database does not include the universe of firms, only those under the ministry's jurisdiction. However, these firms account for 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). The data 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.[7] For each firm, the database provides the tax identifier, firm name, sector, year, and various balance sheet variables (liabilities, assets, revenue, etc.) in Colombian pesos. The financial data are self-reported and must be provided annually by law. There is a possibility that a firm did not report their data because it did not have to (firms that are in the process of shutting down do not have to report financial information) or because the firm is breaking the law. Both of these represent negative outcomes.[8]

To build the data sample, I merge the SIREM and DIAN datasets using the year and tax

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

[8] Note that in this dataset, I cannot differentiate between a firm that goes out of business and one that merges with another firm.

identifiers and make some additional restrictions. From the DIAN data, I drop firms whose tax identifiers do not conform to the standard nine-digit number. Since new exporters are the focus of this paper, I also exclude firms that exported in 1994, the first year available for the trade data. From the SIREM data, I exclude firms that have missing financial data in any period between their first and last year of operation and firms with negative domestic revenue. From the merge dataset, I make an additional requirement that all firms have financial data for at least two consecutive years: a year before exporting and the year of exporting. I do this to estimate the change between the pre- and post-exporting periods in several domestic variables. The dataset ends up with 19,073 firm-year observations, with 1,696 individual firms: 920 successful exporters, and 776 unsuccessful exporters.

Variable definitions. Four variables of interest come out of the model in Section II: [1] export success classification, [2] financially-constrained firms classification, [3] domestic survival classification, and [4] domestic revenue levels.

A firm is an *unsuccessful exporter* if the firm exports, but fails to export beyond a 12-month period.[9] To ensure that these exporters are not simply trying to export as a last resort, I will define success several ways as robustness checks; I measure "failure" as firms that only export either two years, three years, or 2-3 years. A firm is *financially constrained* if its ratio of cash flow from operations to total assets is less than the median for all new exporters at the time of first exporting. 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 used in the literature (Ahn and McQuoid, 2013; Whited and Wu, 2006; Kaplan and Zingales, 1997). As a robustness check, I use various definitions of this constraint, including using a tighter definition of a financially vulnerable firm. A firm "*survives*" in the domestic market if it operates on the last year of available data. While I cannot know with certainty that a firm exits the domestic market (it could have been acquired by another firm), these firms do not affect the estimates as they are excluded when revenue equals 0. Lastly, *Domestic Revenue* is the log of total revenue in Colombian pesos minus total exports.

III.2 Summary statistics

Table 1 provides summary statistics. On average, about nine thousand Colombian firms export: 2,450 are continuous exporters, 4,090 are successful exporters, and 1,760 are unsuccessful exporters. Continuous exporters, firms that exported in 1994 and their year of export entry is unknown, account for most of the export value (over two thirds of all exports), successful exporters account for almost a third, and unsuccessful exporters account for the rest (less than one percent). This table also demonstrates why ignoring unsuccessful exporters is unwise. The vast majority of *new*

[9] A firm that exports in two calendar years but fewer than 12 months can still be classified as an unsuccessful exporter. I get similar results if I use the calendar year to define export failure. See Appendix Tables C.11 and C.11

Table 1: Summary Statistics

	Continuous	Successful	Unsuccessful	Non-exporters
Trade Data				
Avg. Number of Exporters per Year	2,450.6	4,089.8	1,760.2	-
Share of Exporters	29.5	49.3	21.2	-
Share Export value	69.0	30.3	0.7	-
Share of New Exporters	-	34.2	65.8	-
Share New Export value	-	71.6	28.4	-
Financial Data				
Avg. Number of Firms per Year	1,872.6	1,844.8	663.0	10,978.1
Share of Firms	12.2	12.0	4.3	71.5
Revenue (1 billion COL Pesos)	49.3	26.5	14.7	6.3
Exports (1 billion COL Pesos)	11.4	3.9	0.1	-
Exports/Revenue	23.1	14.6	0.3	-

Note: Calculations based on data from the Colombian DIAN and SIREM databases. *Unsuccessful* exporters are firms that attempt to export during the years observed, but do not continue beyond a 12-month period. *Successful* exporters are firms that export beyond one year. *Continuous* exporters are firms that exported in 1994 (there is no data on firm entry into the export market). *Non-exporters* are firms than do not attempt to export.

exporting firms are one time exporters; unsuccessful exporters account for almost two thirds of new exporters. While unsuccessful exporters tend to export less than their share of firms, they nonetheless represent almost 30% of the export value from *new* exporters.

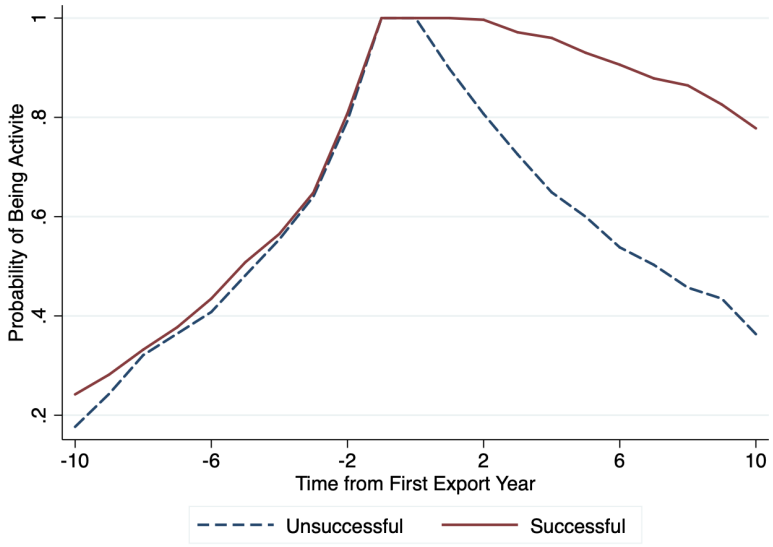
The financial data in Table 1 puts the importance of these exporters in context. The financial data covers, on average, over fifteen thousand firms per year: 70 percent are non-exporters, 12 percent are continuous exporters, 12 percent are successful exporters, and 4 percent are unsuccessful exporters. While 30 percent of firms export at least once, the number is likely inflated by the fact that this data is not a random sample of all Colombian firms, and the sample tends to include firms that are relatively large. Indeed, non-exporters on average have total sales equal to about 6 billion Colombian pesos (about US $2.5 million), continuous exporters average about 50 billion pesos, successful exporters average about 27 billion pesos, and unsuccessful average about 15 billion. Of this value, continuous exporters receive 23 percent of their revenue from exporting, successful exporters receive 14 percent, and unsuccessful exporters receive less than 1 percent. The findings here confirm previously identified exporter characteristics: few firms export, only the most productive firms export, and those that do export rely mostly on domestic revenue.[10]

To get a better understanding of the data see Appendix Table C.2. The table contains financial data for a sample year (2005), and includes the following variables: *firm count, domestic revenue, intangibles, inventory, long-term debt, long-term investment, long-term labor, profits, property, short-term debt, short-term investment, short-term labor, total assets, total cash flow, total equity, and Total liabilities*. All variables, except *firm count*, are firm averages within groups, in thousands of Colombian Pesos. I use these variables in two ways: as controls in the exit estimates, and as variables used in the matching process (see details in Section IV). The table shows that the four firm types (continuous, successful, unsuccessful, and non-exporters) are significantly different from each other. In terms of many of the variables, continuous exporters tend to be the largest firms, and non-exporters the smallest firms. Successful exporters fare better than unsuccessful ones, but the data includes both pre- and post-exporting data. The objective is to find the best control group for onetime exporters, and to test the model propositions that failed export attempts affect domestic market performance.

Export Failure and Domestic Production. Is it possible that domestic revenue drops enough for some firms that they go out of business as stipulated in the model (Proposition 3)? Figure 2 shows the share of financially-constrained firms by export success and exporting period averaged over the various cohorts. 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; so there appears to be little difference in firm age at time of exporting for both firm types. However, the trend significantly differs for the two firm types in the after-exporting period ($t \geq 0$). Unsuccessful exporters are more likely to cease operating than successful ones, and the difference in survival rates increases over time. For example, about 90 percent of successful exporters are operating five years after first exporting, but only about 60

[10]See Díez, Mora, and Spearot (2018) or Bernard et al. (2007) for a summary of the data.

Figure 2: Firm Entry and Exit
(Financially Constrained Firms Only)



Note: The probability of being in the dataset 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 $t = -2, -1, 0$.

percent of unsuccessful exporters are still operating in the same period.

While the exit numbers above may seem excessively large, firms in the dataset do not remain active for long. Appendix Table C.3 compares the survival rates for all firm types, and ignores the financial vulnerability classification and the year of export; it also provides the number of firms active in a production year, this number decreases with time as firms drop out. As in Figure 2, successful exporters continue to have high survival rates after five years of operation, while only 65% of domestic firms continue to operate in the same time period, 83% of continuous firms, and 89% of unsuccessful exporters; by year ten, these numbers drop to 40%, 71%, and 65%, respectively. Separating the firms by their financial constraint classification would show financially vulnerable firms have even lower survival rates than those mentioned here.

IV Consequences of Failed Export Attempts: Empirics

In this section, I derive a baseline empirical equation based on the theoretical model, provide several comparison groups to control for firm trends, and also provide results using an instrumental variable approach to control for firm-specific shocks that correlate with failed export attempts.

IV.1 Baseline empirical specification

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

$$Y_{it} = \alpha_i + \delta_t + \beta_1 After_{it} + \beta_2 After_{it} \cdot Successful_i + u_{it} \tag{6}$$

In Equation (6), 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 outcome variables: the ratio of *Cash Flow to Total Assets*$_{it}$, as a measure of the financial constraint; $log(Revenue_{it})$, the log of nominal domestic sales in Colombian Pesos by firm i in calendar year t; and $Survive_i$ equals one if the firm does not cease operating during the period observed and zero otherwise. α_i are the firm fixed effects and δ_t are calendar year fixed effects. $After_{it}$ equals one for all calendar years after a firm first exports, and zero otherwise. $Successful_i$ equals one for firms that export for more than one year, and zero otherwise. This variable drops out of the baseline equation when I include firm fixed effects. Since $After_{it} \cdot Successful_i$ captures the difference between successful and unsuccessful exporters in the after-exporting periods, β_2 tells us the difference between successful and unsuccessful exporters and, thus, the estimate of interest when concerned about firm trends. Lastly, u_{it} is the error term. In the results, I will separate the estimates based on whether or not the firms are financially vulnerable. As the estimated differences between these two groups could be endogenous, the triple differences provide the strongest evidence in identifying a causal effect of export failure. While there may be reasons to expect differences between each of the comparison groups, it is harder to explain why these differences should change with exporting in the absence of firm-specific shocks that coincide with export attempts; I address firm-specific shocks using an instrumental variable approach.

The model predicts that after exporting, both successful and unsuccessful exporters that are financially constrained will have worse domestic market performance, $\beta_1 < 0$, but the decrease should be less for successful exporters, $\beta_2 > 0$. To test if the effects are long lasting, I modify Equation (6) by splitting the $After_{it}$ dummy into three post exporting periods:

$$\beta_1 After_{it} \rightarrow \beta_{11} Short\ Run(t=0)_{it} + \beta_{12} Medium\ Run(t = 1\ to\ 4)_{it} + \beta_{13} Long\ Run(\geq 5)_{it}$$

Here, $Short\ Run(t=0)_{it}$ equals one the first year firms export, and zero otherwise. I separate the short run effect since there might be an immediate trade-off between domestic and foreign sales due to capacity constraints, and this decrease is fundamentally different than decreases in future periods.[11] $Medium\ Run(t = 1\ to\ 4)_{it}$ equals one for the next four years, and zero otherwise. The medium run is the period of interest as the consequences of export failure should be most acutely felt during this period and capacity constraints should have no impact on domestic sales during this period. $Long\ Run(t \geq 5)_{it}$ equals one for the remaining periods, and zero otherwise. Based on the

[11] 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.

model, I expect all of these estimates to be negative. However, as mentioned earlier, any negative association between export failure and domestic market performance should be smaller in the long run.

Baseline estimates

The results for the baseline estimates will be divided into two sets depending on the outcome variables: financial constraints and domestic sales are grouped together, and the probability of staying in business is separate, as this variable is fundamentally different than the other outcomes since its classification (firm survival) doesn't change with time.

Baseline estimates (Table 2) show that the findings are remarkably consistent regardless of the outcome variable: failed export attempts leads to a worse domestic market performance. Exporting, for unsuccessful exporters, results in worse cash flow to total assets (column 1), and less domestic sales (column 3). In all cases, successful exporters experience a much smaller decrease, if at all, when compared with unsuccessful exporters. Furthermore, as predicted by the model, these outcomes are worse for financially vulnerable firms ($FV = 1$ for firms that are financially vulnerable). For the cash flow to total assets ratio, there are almost no negative effects for financially unconstrained firms whether or not they are successful; this means that most of the negative outcomes of exporting are experienced by financially vulnerable firms. The ratio of cash flow to total assets (columns 2) decreases by 12% in the short run for financially vulnerable firms before stabilizing at a decrease of 3%, all when compared with financially unconstrained firms.

Domestic revenue as an outcome variable (columns 4) likewise shows that the drop is mostly for financially constrained, onetime exporters. One important difference between financially unconstrained successful and unsuccessful exporters does appear: successful exporters are likely to experience higher domestic revenues in all periods after exporting (17% higher in the short run, 23% in the medium run, and 38% in the long run). When looking at financially vulnerable firms, onetime exporters decrease 24% in the short run when compared with their unconstrained counterparts. While this may be evidence of capacity constraints, these constraints cannot explain why domestic revenue is 45% lower in the medium run and 43% in the long run. [12]

If $Successful$ and FV capture characteristics specific to these variables and exporting is not a cause of poor domestic market performance, I would not expect the triple differences to be statistically significant. However, these differences in every case are large and statistically significant in the medium run. The difference grows for all categories: cash flow to total assets ratio is 5% higher and domestic sales are 22% higher. A positive estimated difference implies both that the difference, after exporting, between financially-vulnerable successful and unsuccessful exporters grows more than the difference for those firms that are *not* financially vulnerable; and the difference between

[12] While not shown in the table these financially vulnerable onetime exporters decrease domestic revenue by 15% in the short run after exporting, 44% in the medium run, and 64% in the long run. These decreases are statistically significant at the 1% significance level.

the two types of unsuccessful exporters grows more than the difference for those firms that are successful exporters.[13] These findings are consistent with the model since financially unconstrained firms should not be affected by unsuccessful export attempts, and the model predicts worse domestic outcomes for financially vulnerable unsuccessful firms when compared with all other firm types.

The probability of staying in business is another, and perhaps more important, measurement of domestic market performance. The results measuring this probability underscore how the negative effects of exporting might be so large that they can lead to firms going out of business (see Table 3).[14] For these estimates, I modify the baseline equation since *the probability of staying in business* does not vary with time, and use the following empirical equation:

$$Survive_i = \beta_1 Successful_i + \beta_2 Successful_i \cdot FV + \beta_3 FV + \Theta_i + u_i \tag{7}$$

FV, as before, equals one if the firm is financially vulnerable, and zero otherwise. Θ_i are variables controlling for individual characteristics. These variables include export value and various pre-exporting characteristics: *short-term labor, investment, and debt; long-term labor, investment, and debt; and inventory, property, domestic revenue, intangibles, total assets, profits, and cash flow.* I exclude most of these estimates from the results table as most of these estimates are not statistically significant. Nonetheless, the estimates in Table 3 show that after controlling for these firm characteristics (column 2 and 4), financially unconstrained successful exporters are still 6 percentage points more likely to stay in business than financially unconstrained unsuccessful exporters in the short run, 15% in the medium run, and 7% in the long run. Financially constrained unsuccessful exporters are less likely to stay in business than their constrained counterparts, but these differences are not statistically significant when controlling for firm characteristics. This outcome may not be surprising as I control for variables that explain this classification (eg. Total assets and cash flow). The triple difference, as before, are statistically significant in the short run (4%) and in the medium run (5%).[15] Which is in line with the previous estimates and with the predictions of the model.

IV.2 Alternatives to Baseline Estimates

Propensity score matching. One alternative to the baseline estimates is to find better control groups. Thus, I match unsuccessful exporters to both successful exporters and non-exporters (domestic-only firms) to control for pre-exporting observables, and also to create alternative control groups. In order to match these firms, I use nearest neighbor, propensity score matching (PSM); I perform 1-to-1 matching without replacement and impose a common support to find the match. See Appendix Section B for details on the matching process.

[13] The estimates might be stronger if not for attrition. If I correct for attrition by including zero domestic revenue for firms that exit the domestic market, the long run differences increase further.

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

[15] See Appendix Table C.4 for estimates with a probit model. The triple differences disappear when using this model.

Table 2: Baseline Estimates: All Data

Dependent Var. ⇒	Cashflow/Tot. Assets		Ln(Dom. Rev.)	
	(1)	(2)	(3)	(4)
Short Run ($t = 0$)	-0.01	0.06***	-0.03	0.09**
	(0.01)	(0.01)	(0.03)	(0.04)
Medium Run ($t = 1$ *to* 4)	-0.02***	-0.01	-0.22***	0.01
	(0.01)	(0.01)	(0.05)	(0.05)
Long Run ($t \geq 5$)	-0.03**	-0.03*	-0.44***	-0.21*
	(0.01)	(0.02)	(0.08)	(0.12)
Successful*Short Run	0.02**	-0.01	0.17***	0.17***
	(0.01)	(0.02)	(0.04)	(0.05)
Successful*Medium Run	0.03***	0.01	0.36***	0.23***
	(0.01)	(0.01)	(0.06)	(0.06)
Successful*Long Run	0.03***	0.00	0.50***	0.38***
	(0.01)	(0.02)	(0.09)	(0.13)
Short Run*FV		-0.12***		-0.24***
		(0.02)		(0.06)
Medium Run*FV		-0.03**		-0.45***
		(0.01)		(0.08)
Long Run*FV		0.00		-0.43***
		(0.02)		(0.15)
Successful*Short Run*FV		0.05**		-0.05
		(0.02)		(0.08)
Successful*Medium Run*FV		0.05**		0.22**
		(0.02)		(0.11)
Successful*Long Run*FV		0.06**		0.19
		(0.02)		(0.17)
Firm and year fixed effects	Yes	Yes	Yes	Yes
Number of observations	19,073	19,073	18,711	18,711
Number of clusters/groups	1,696	1,696	1,696	1,696
Adjusted R^2	0.006	0.019	0.264	0.271

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, clustered at the firm level, shown in parenthesis. *Financially Vulnerable* (FV) equals one if the firm is financially constrained and zero otherwise. *Successful* equals one if the firm exports for more than one year. *Short run* is the immediate effect, the year the firm exports. *Medium run* is the effect between year 1 and year 4 after first exporting. *Long run* is the effect 5 or more years after exporting. I use the inverse hyperbolic sine transformation of Cash Flow/Total Assets to handle extreme values; winsorizing the data gives similar results. Onetime exporters are the excluded group.

Table 3: Exporting Failure Decreases Probability of Staying in Business

Dependent Var. ⇒	Survived SR		Survived MR		Survived LR	
	(1)	(2)	(3)	(4)	(5)	(6)
Successful	0.06***	0.06***	0.17***	0.15***	0.07***	0.07***
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Successful*FV	0.04**	0.04*	0.06*	0.05*	-0.02	-0.02
	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)
Fin. Vulnerable (FV)	-0.03*	-0.02	-0.05*	-0.03	-0.01	-0.00
		(0.02)	(0.03)	(0.03)	(0.02)	(0.02)
First Export Value$_{t=0}$		0.01**		0.04***		-0.00
		(0.01)		(0.01)		(0.01)
Avg. Long-Term Labor$_{t<0}$		0.00		0.01**		0.00
		(0.00)		(0.00)		(0.00)
Avg. Revenue$_{t<0}$		0.00		-0.01***		0.00
		(0.00)		(0.00)		(0.00)
Avg. Profits$_{t<0}$		-0.00		0.00		-0.00
		(0.00)		(0.00)		(0.00)
Firm-Level Controls	No	Yes	No	Yes	No	Yes
Exp. Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,696	1,687	1,640	1,631	1,437	1,430
Adjusted R^2	0.066	0.070	0.133	0.151	0.123	0.127

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parenthesis. *Financially Vulnerable* (FV) equals one is the firm is financially vulnerable. *Successful* equals one if the firm exports for more than one year. SR is one for firms that survive past the short run, MR is one for firms that survive past the medium run (excluding firms that exit in SR), and LR is one if the firm does not exit during the period of observation (excluding firms that exit in SR and MR). Firm-level controls include *short-term labor, investment, and debt; long-term labor, investment, and debt; and inventory, property, domestic revenue, intangibles, total assets, profits, and cash flow.* All of these variables are transformed using an inverse hyperbolic sine transformation. Onetime exporters are the excluded group.

Table C.5 shows that both successful exporters and domestic firms are, overall, better off than unsuccessful exporters, with successful exporters seeming to fare better.[16] The findings using the matched successful exporter group are fairly consistent with the baseline estimates as are the post-exporting estimates for unsuccessful exporters. Thus, in this section, I focus on the difference between domestic-only firms and unsuccessful exporters. The estimated post-exporting difference between these firms, before identifying financially vulnerable firms, varies depending on the outcome variable: for cash flow to total assets (column 1), there are no statistically significant differences; and for domestic sales (column 3), there is a short run difference, but the medium and long run effects are not statistically significant. While there may not be many differences here, once I separate the outcomes by their financial constraint classification (columns 2 and 4), I find interesting results. financially-constrained unsuccessful exporters do worse than their matched domestic-only firms: Cash flow to total assets for unsuccessful exporters drops in the short-run and medium run relative to their financially unconstrained counterpart, and, more importantly, the difference between these firms and domestic-only firms grows in the short run; and domestic revenue for these exporters likewise drops, and the difference between these firms and their non-exporting counterparts grows in all periods. To summarize, these estimates find some evidence that financially constrained, unsuccessful exporters are worse off in the domestic market when compared with firms that have similar pre-exporting trajectories. The matched survival results (see Table C.6) for the successful exporter comparison group are consistent with the previous findings: successful exporters are more likely to survive and the triple difference is positive and statistically significant.[17] The findings for the domestic-only comparison group, while similar in sign, are not statistically significant. These findings imply that the decreases in domestic market performance, while still there and long lasting, may be smaller than those estimated in the baseline results.

Domestic revenue growth as the dependent variable. One drawback to the baseline estimates is that they do not control for firm productivity changes. Adding domestic revenue growth as the dependent variable, given the same specifications, allows me to control for firm-level productivity changes, as long as these trends are constant. The estimates in Appendix Table C.8 show that the results don't vary much when domestic revenue growth is used as the dependent variable (column 1): revenue growth decreases for unsuccessful exporters, but less so for successful exporters. When separating firms by their financial constraint classification (Column 2), clear differences show up: financially unconstrained, unsuccessful exporters experience a decrease in growth after exporting, but these changes are not statistically significantly different compared with their successful counterparts. Financially vulnerable firms, on the other hand, experience a larger drop compared with firms without financial constraints; the differences are statistically significant in the short and medium run. Lastly, the triple difference estimates show that the effect is different for successful exporters that are financially vulnerable. As with the other results, the differences between the two

[16]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 the case as the U.S. is one of the primary export destinations for Colombian firms.

[17]See Appendix Table C.7 for estimates with a probit model. The triple difference estimates are not significant when using this model.

groups grows after exporting. Using domestic revenue growth as the dependent variable provides further support for the propositions in the theoretical model.[18]

Sectoral differences. Since the theoretical key driver is fixed costs, it logically follows that the effect of export failure may vary by sector. Sectors with high fixed costs would have a greater impact for onetime exporters, than sectors with low fixed costs. To test this, I separate the estimated results by SITC sector for the key variables: cash flow to total assets (Appendix Table C.9) and domestic revenue (Appendix Table C.10). In terms of the financial constraint, the triple differences are the strongest for machinery and transport equipment (Sector 7), and miscellaneous manufactured articles (Sector 8); it should be noted that these two sectors are the largest export sectors for Colombian firms in the dataset. In almost all sectors, the financial constraint gets tighter in the short run for unsuccessful financially-constrained firms relative to their financially unconstrained counterparts; the triple differences, however, are not statistically significant. As for domestic revenue, while the estimated effects are more consistent across sectors than those of the cash flow to total assets ratio, the effects are still strongest for the manufacturing sectors: Sector 5 (Chemicals and related products, n.e.s), Sector 6 (Manufactured goods), Sector 7 (Machinery and transport equipment), and Sector 8 (Miscellaneous manufactured articles). The triple differences are statistically significant for Sectors 5, 7, and 8. For the exit variable (not shown), these sectors have the right sign, but only Sector 8 is statistically significant.

If I make the assumption that manufacturing sectors have greater fixed costs than agriculture and less differentiated goods, then this provides more empirical evidence for the theoretical model.

The Great Recession. To alleviate any concerns that the results might be affected by the Great Recession, I calculate the estimates excluding those years and any year after. Removing these years makes little impact to the estimates, whether looking at the cash flow to total assets ratio (Appendix Table C.11, column 2 and 3) or domestic revenue (Appendix Table C.12, column 2 and 3).[19] The exit results (not shown) have the same sign and size for short-run and medium-run exits as the baseline estimates, but these estimates are not statistically significant.

Redefining success. Another potential concern is that these unsuccessful exporters might have exported as a last resort. For example, the business is failing and the owners might try their luck at exporting. Once these firms fail at exporting, it might even be expected that revenue will decrease and that the firm may go out of business. To alleviate this concern, I redefine successful exporters in several ways: [1] define successful exporters as firms that export more than two years, and drop onetime exporters; [2] define successful exporters as firms that export more than three years, and

[18] We can make the same argument if the revenue growth variable were used in the matching exercise (Appendix Table C.8), above, or the instrumental variable approach (Appendix Table C.16), below.

[19] Column 2 drops all years after 2007, and column 3 drops all years after 2007. The Great Recession technically started at the end of 2007, but had its greatest impact in the years that followed.

drop one- and two-year exporters; and [3] define successful exporters as those that export more than three years, and drop one year exporters (that is, combine unsuccessful exporters in [1] and [2]). Changing the way I define success has little impact on the estimates, but it does lower the significance level of the triple difference for the cash flow to total assets ratio (Appendix Table C.11) and for domestic revenue (Appendix Table C.12).[20] This might be because the number of unsuccessful firms decreases greatly when I define successful exporters in these ways: 776 in the baseline estimates to 127 firms in [1], 98 in [2] and 225 in [3].

For the exit estimates (not shown) the effects are similar to those in the baseline results. One major difference is that there is no firm that exits after the short-run with the new definitions and, thus, these estimates cannot be calculated.

Redefining Financial Vulnerable classification. Lastly, to test if the results are sensitive to the financial constraint classification, I redefine firms as being financially vulnerable only if they have a cash flow to total assets ratio that is very low. To be precise, a firm is deemed financially vulnerable if its ratio is in the lowest 25% of firms. See Appendix Table C.14 for the financial constraint and domestic revenue, and Table C.15 for exit data.[21] The results, especially those for domestic revenue, become stronger when redefining the financial vulnerable classification in this manner. The triple differences increase from 22% to 38% in the medium run, and 19% to 51% in the long run; these estimates are statistically significant now both statistically significant.

IV.3 Export demand shock as an instrument for export success

Are unsuccessful exporters systematically different than the control groups even after controlling for both firm fixed effects and observable, pre-exporting characteristics? If so, using alternative control groups is insufficient in identifying the link between export failure and domestic market performance. To address this, I will use an instrumental variable approach to deal with an endogenous outcome: a failed export attempt. Instrumenting for export success will allow me to robustly estimate how this variable affects the domestic market for all firms, for financially unconstrained firms, and for financially constrained firms. One drawback of this approach is that I am unable to test whether or not the differences between the two groups are statistically significant. Nonetheless, this strategy allows me to show that export failure has negative effects on a firm's domestic market performance; which has important policy implications.

Market trend changes abroad between the year a firm first exports and the following year is the instrument for export success. To calculate this change, I first define the market for any firm i in country h as a weighted average of total demand abroad (excluding demand from h country) in

[20] The differences between successful and unsuccessful exporters continued when extending the definition beyond year 3, but the difference between firms that are financially vulnerable and those that are not tends to largely disappear.

[21] I also used the mean as the cutoff (not shown) and those results are essentially the same as using the me dian.

exported products. Specifically, I define weighted demand (WD) as follows:

$$WD_t^{ih} = \sum_{f,p} S_{pf,t=0}^{ih}(imp_{pt}^{f} - imp_{pht}^{f})$$

$S_{pf,t=0}^{ih}$ is the share of firm i's total exports in product p (HS-1996, six-digit product level) to country f when first exporting ($t = 0$); for all firms $\sum_{f,p} S_{pf,t=0}^{ih} = 1$. These weights are firm specific and do not vary. More importantly, defining the shares this way ensures that firm-specific WD varies only when foreign countries change their demand for non-Colombian imports. The second term, $imp_{pt}^{f} - imp_{pht}^{f}$, defines non-Colombian imports: total imports of product p from all firms into country f (imp_{pt}^{f}) minus imports from Colombian firms (imp_{pht}^{f}). Thus, changes in WD from the year a firm first exports to the following year should affect whether a firm continues to supply the foreign market, but should not be correlated with domestic market performance. To address the fact that firms may project changes based on past outcomes, the instrument is the change in past trends. This instrument has product, destination, and year variation.[22] Finally, 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 exporter and the three after-exporting periods; that is, I instrument for the short-run, medium-run and long-run difference-in-difference variables. I instrument for these variables using the interactions between the three periods and the instrument for successful exporters.

To satisfy the exclusion restriction, the WD trend shock must be exogenous to the firm and its initial exporting decisions; this is likely to be the case for first-time exporters. The exclusion restriction might nonetheless be violated if successful exporters are better able to identify growth opportunities and to perform 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 are industry specific. Finally, another issue not addressed by this instrument is that exporting might be associated with learning-by-doing, something that is disputed.

The first-stage regression results (Table 4) demonstrate that the inclusion restriction is satisfied. The first stage regressions have high F-tests and show that export success is correlated with world demand trend changes. The F test of excluded instruments for $Short\ Run(t = 0) * Succ.$, $Medium\ Run(t = 1\ to\ 4) * Succ.$, and $Long\ Run(t \geq 5) * Succ.$, are all well over 30 in every case. In the first-stage estimates, the instrumental variables are positively correlated with export success and the correlation decreases both in terms of size and significance for the long-run estimates.

[22]This instrument is similar to that used in Hummels et al. (2014) to explain a firm's offshoring decision and Aghion et al. (2018) to explain a firm's innovation decision. The key difference is that I focus on the percentage change and only at the time of entering the export market.

Instrumental variable estimates

Table 5 shows the consequences of export failure using the instrumental variable approach described above. I start by calculating the estimates for both financially constrained and financially unconstrained firms as I did in the baseline estimates in Table 2, and then focus on the medium and long run effects, ignoring short-run effects that, as mentioned earlier, may be biased by capacity constraints. In the medium run, relative to the baseline estimates, export failure is associated with an even greater deterioration in domestic revenue. More importantly, I find that successful exporters are relatively better off (the difference-in-difference estimates are positive and statistically significant). The ratio of cash flow to total assets estimates lose significance relative to the baseline estimates; the reason may be that the effect of export failure on this variable depends on whether or not the unsuccessful exporters are financially constrained. To test this, I re-run the estimates for all of these variables, but separate firms by their constrained classification. These estimates show that there are consequences to export failure and that the estimates may differ by classification.

The IV estimates for domestic revenue demonstrate that revenue decreases in the medium and short run for unsuccessful firms, whether or not they are financially constrained.[23] However, as expected, the negative after-exporting outcomes are larger for financially constrained unsuccessful exporters, and the relative improvements are also larger for financially constrained successful exporters. While I cannot test whether or not these differences are statistically significant, they do match the earlier findings. Lastly, the estimates on the ratio of cash flow to total assets do not seem to have much of an impact for financially constrained unsuccessful exporters, but there is some positive association, at least in the short run, for financially unconstrained firms. Again, this may simply reinforce the point that even if there are some negative effects of export failure for all firms, financially-constrained firms are impacted more.

[23]The effects are similar when looking at domestic revenue growth, see Table C.16

Table 4: First-Stage Regressions for Market Changes as a Instrument

Dependent Var. ⇒	SR(0)*Suc	MR(1 − 4)*Suc	LR(≥ 5)*Suc	SR(0)*Suc	MR(1-4)*Suc	LR(≥ 5)*Suc
Short Run ($t = 0$)	0.560***	-0.00236	-0.0145***	0.560***	-0.00446	-0.0159***
	(43.71)	(-0.87)	(-4.36)	(43.68)	(-1.56)	(-4.82)
Medium Run ($t = 1$ *to* 4)	-0.00699***	0.610***	-0.0198***	-0.00872***	0.613***	-0.0217***
	(-5.08)	(48.13)	(-4.24)	(-5.87)	(48.15)	(-4.68)
Long Run ($t \geq 5$)	-0.0208***	-0.0800***	0.741***	-0.0230***	-0.0831***	0.746***
	(-7.64)	(-8.65)	(46.00)	(-8.09)	(-8.68)	(45.95)
Short Run*IV	0.00403**	0.0000154	0.000204	0.00403**	0.0000276	0.000219
	(2.70)	(0.03)	(1.14)	(2.69)	(0.06)	(1.22)
Medium Run*IV	0.000218*	0.00335***	0.0000732	0.000245*	0.00332***	0.0000662
	(2.16)	(3.37)	(0.39)	(2.38)	(3.33)	(0.35)
Long Run*IV	0.000357***	0.000671*	0.00263***	0.000387***	0.000717**	0.00255***
	(3.69)	(2.47)	(8.81)	(4.03)	(2.64)	(8.55)
Number of Observations	16,834	16,834	16,834	16,497	16,497	16,497
F Test	38.73	35.78	56.92	40.53	35.48	54.19
Second Stage →	Cash Flow to Total Assets			Domestic Revenue		

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, clustered at the firm level, in parenthesis. The F test is for excluded instruments. IV is the instrumental variable: weighted demand (WD) for a particular product abroad. *Short run* is the immediate effect, the year the firm exports. *Medium run* is the effect between year 1 and year 4 after first exporting. *Long run* is the effect 5 or more years after exporting. Successful (Sus) equals one if the firm exports more than one year. All regressions include firm fixed effects and year fixed effects. I use the inverse hyperbolic sine transformation of Cash Flow/Total Assets to handle extreme values; winsorizing the data gives similar results. Lastly, *Domestic Revenue* is the log of domestic revenue.

Table 5: IV Estimates

	All Firms		Financially Constrained		Financially Unconstrained	
Dep. Var. ⇒	CF/TA	Dom. Rev.	CF/TA	Dom. Rev.	CF/TA	Dom. Rev.
Short Run ($t = 0$)	-0.02	-0.27	0.01	-0.18	0.12***	0.05
	(0.07)	(0.18)	(0.02)	(0.12)	(0.03)	(0.12)
Medium Run ($t = 1$ *to* 4)	0.07*	-0.82***	-0.02	-0.61***	0.07**	-0.44***
	(0.04)	(0.14)	(0.04)	(0.13)	(0.03)	(0.13)
Long Run ($t \geq 5$)	0.03	-2.14***	-0.01	-3.02***	-0.08**	-2.09***
	(0.02)	(0.28)	(0.04)	(0.18)	(0.03)	(0.30)
Successful*Short Run	0.04	0.66**	-0.10***	0.38	-0.11**	0.22
	(0.13)	(0.31)	(0.04)	(0.24)	(0.05)	(0.19)
Successful*Medium Run	-0.12**	1.40***	0.04	1.00***	-0.11***	0.86***
	(0.06)	(0.19)	(0.07)	(0.25)	(0.04)	(0.18)
Successful*Long Run	-0.06**	2.86***	0.03	4.09***	0.04	2.64***
	(0.03)	(0.33)	(0.05)	(0.31)	(0.04)	(0.33)
Firm and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	16,834	16,497	8,410	8,221	8,424	8,276
Number of clusters/groups	1,492	1,491	741	741	751	750

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, clustered at the firm level, in parenthesis. *IV* is the instrumental variable: weighted demand (WD) for a particular product abroad. *Successful* equals one if the firm exports more than one year. *Short run* is the immediate effect, the year the firm exports. *Medium run* is the effect between year 1 and year 4 after first exporting. *Long run* is the effect 5 or more years after exporting. *CF/TA* is the ratio of Cash Flow to Total Assets; I use the inverse hyperbolic sine transformation of Cash Flow/Total Assets to handle extreme values; winsorizing the data gives similar results. Lastly, *Dom. Rev.* is the log of domestic revenue. Onetime exporters are the excluded group.

Finally, I leave out the survival results as the IV identification strategy fails when including firm-level control variables. While the identification strategy finds some consequences of export failure, it does not find evidence that export failure leads to more firms going out of business. The reason for this may be that firms that are near the production threshold do not attempt to export, and few or no firms will fall in the "exit firms" category identified in the theoretical model.

V Conclusion

Policymakers in developing countries and many economists emphasize the importance of increasing exports as a means to improve economic development. Yet, in these countries, few firms export and most exporters will cease exporting after just one year. Could there be a link between these two facts that explains the lack of export growth in some developing countries? If so, what is the link? Answering this question is critical to ensure that precious government resources are spent is the most efficient way possible. Other papers examine the link between export failure and low export growth. In this paper, I identify another source, in addition to the probability of export failure, that explains why many firms in developing countries may hesitate to enter the export market: export failure may result in poor domestic market performance. I show theoretically and empirically that exporting and domestic market performance are linked through financial constraints. These export failure costs, in addition to traditional trade costs (transportation, tariffs, fixed trade costs, etc.), may explain the lack of export growth in some developing countries.

Understanding why some firms fail to enter the export market can help policymakers develop strategies to increase exports. This knowledge is particularly helpful for developing countries where export failure is more prevalent. 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 as a result of additional borrowing, but little or no additional revenue; 2) force financially constrained firms to decrease domestic sales as unsuccessful exporters may be unable to borrow at previous levels as a result of the additional debt from an export attempt; and 3) result in some firms being unable to borrow enough to continue operating in the domestic market. I provide empirical support for the model using a Colombian database; I build the database using firm-level trade and financial data. I show that after exporting, unsuccessful exporters that are financially constrained 1) become even more financially constrained, 2) have lower domestic revenue, and 3) are also more likely to go out of business. My main concern with these findings, as explained in detail earlier, is that these findings may be associated with firm trends or firm specific shocks that result in export failure and poor domestic market performance. To deal with concerns about firm trends, I have several control groups and focus on the triple differences. For the most part, the results are robust to these comparisons and nicely match the implications in the model. To deal with concerns about firm-specific shocks, I use an instrumental variable approach where the trend changes in import demand in a foreign market (excluding Colombian imports), *after* a firm enters the market, explain export success but not domestic market performance. These estimates, especially when analysing domestic revenue, are robust to this instrumental variable approach. No paper, to my knowledge,

focuses on unsuccessful exporters after they exit the foreign market nor attempts to quantify the costs to domestic market performance associated with a failed export attempt.

The main implication of this paper is that the costs of a failed export attempt, not just the probability of export failure, lower expected returns and limit the number of firms that export. To increase exports, policymakers should look beyond increasing market access to increase exports, and also focus on lowering both failed attempts and the costs of these attempts. For example, helping firms make an informed decision in entering foreign markets would lower export failure rates and lower the expected costs of an export attempt, resulting in an increase in export growth. Developed countries already have policies in place that help firms make better decisions and that result in less export failure. In the U.S., for example, the International Trade Administration (USITA) helps American firms find foreign partners by providing market advice, organizing meetings with potential partners, and even arranging meeting spaces and translators. In addition to leading to better matches abroad, these actions also lower the fixed cost of finding a suitable partner. Finally, the cost of financing itself results in more firms deciding not to expand abroad. Developed countries also have policies in place that help lower trade financing costs. In the US, for example, the Export-Import Bank provides favorable financing options to exporters. This paper provides strong support for similar policies in developing countries and these policies may have just as much of an impact on export growth as increases in market access.

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Appendix A Proofs and Extensions

A.1 Credit-constrained firm threshold

Maximization problem for unconstrained firms

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

$$\max_{p_i, L_i} \; E\pi_i(\phi_i) = L_i A p_i^{1-\sigma} - \frac{L_i A \; p_i^{-\sigma}}{\phi_i} - f_x - f_d - L_i^{\beta} \tag{8}$$

Firms set prices by maximizing Equation (8) with respect to p_i. The profit-maximizing price is the following:

$$p_i^* = \frac{\sigma}{\sigma - 1} \frac{1}{\phi_i} = \frac{\mu}{\phi_i} \tag{9}$$

Where $\mu = \frac{\sigma}{\sigma - 1}$ is the firm's constant markup above marginal cost. Notice that L_i levels do not affect this decision.

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, $\beta L_i^{\beta - 1}$, at an increasing rate. Profit-maximizing firms set the marginal cost of marketing equal to the marginal revenue of marketing. That is, by maximizing Equation (8) with respect to L_i and substituting in the profit-maximizing price (Equation 9), I get the profit-maximizing marketing expenditure:

$$L_i^* = \left(\frac{A}{\sigma \beta} \right)^{\frac{1}{\beta - 1}} \left(\frac{\mu}{\phi_i} \right)^{\frac{1 - \sigma}{\beta - 1}} \tag{10}$$

Since neither the fixed-exporting costs nor foreign revenue affects this decision, all financially unconstrained firms in the domestic market, regardless of their classification (non-exporter, unsuccessful exporter, and successful exporter), choose L_i^*. L_i^* is increasing in productivity, $\frac{\partial L_i^*}{\partial \phi_i} > 0$.

Constrained firm threshold

For all financially constrained firms, Equation (4) binds when setting price and marketing levels equal to the profit-maximizing p_i and L_i. For the firm at the constrained/unconstrained threshold, Equation (4) binds and yet the firm still chooses p_i^* and L_i^*. To find this firm, I substitute all of the

constraints from the maximization problem and the profit-maximizing p_i^* and L_i^* into Equation (4), and solve for ϕ_i. For unsuccessful exporters, the constrained threshold firm, ϕ_C^{fail}, is the following:

$$\phi_C^{fail} = \mu \left(\frac{A}{\sigma\beta}\right)^{\frac{1}{(1-\sigma)}} \left(\frac{f_x + f_d - (1-\lambda)f_e}{\lambda\beta - 1}\right)^{\frac{1-\beta}{\beta(1-\sigma)}} \tag{11}$$

Had this firm not tried to export, it would not have the export loan, and would be in better financial health. This can be seen by comparing this firm to a similar non-exporting firm. The constrained threshold firm for the non-exporters is the same, except $f_x = 0$. Thus, I can also think of the threshold firm ϕ_C^{dom} as the threshold firm for all exporters before trying to enter the foreign market:

$$\phi_C^{dom} = \mu \left(\frac{A}{\sigma\beta}\right)^{\frac{1}{(1-\sigma)}} \left(\frac{f_d - (1-\lambda)f_e}{\lambda\beta - 1}\right)^{\frac{1-\beta}{\beta(1-\sigma)}} \tag{12}$$

Successful exporters have to pay the fixed export costs, just like the unsuccessful exporters, but now have two revenue sources. While all successful exporters sell abroad, not all will export at the profit maximizing p_i^* and L_i^*. The constrained threshold firm for successful exporters 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 level times the iceberg trade costs, $P_f = P_h \cdot \tau_{if} = P$, then $A_f = A_h \cdot \tau_{if}^{\sigma-1}$ and the threshold firm for successful exporters, ϕ_C^{succ}, becomes:

$$\phi_C^{succ} = \mu \left(\frac{A}{\sigma\beta}\right)^{\frac{1}{(1-\sigma)}} \left(\frac{f_x + f_d - (1-\lambda)f_e}{2(\lambda\beta - 1)}\right)^{\frac{1-\beta}{\beta(1-\sigma)}} \tag{13}$$

For the general case where the firm does not export to a market similar to that of the home market, see Appendix A.6.a.[24]

A.2 Proof of Proposition 1

Proof for the first statement: Essentially, the cutoff for non-exporters is the cutoff before a firm attempts to export, irrespective of export success. Thus, to prove the first part of the proposition, I compare the constrained threshold for successful and unsuccessful exporters, individually, with that of the non-exporter threshold.

To prove that the threshold for unsuccessful exporters is higher after the export attempt ($\phi_C^{dom} < \phi_C^{fail}$), Equation (11) must be bigger than Equation (12). This holds as long as $f_x > 0$. Notice also that the threshold increases with exporting fixed costs ($\frac{\partial \phi_C}{\partial f_x} > 0$). The sign of the derivative

[24] An alternative way of thinking about this is to focus on foreign profits, inclusive of loan repayment costs. Whether or not the threshold decreases or increases 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.

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 I assume fixed costs are greater than the collateral times the financial friction ($f_d > (1-\lambda)f_e$) and $\lambda\beta > 1$.

To prove that the threshold for successful exporters is higher after exporting ($\phi_C^{dom} < \phi_C^{succ}$), Equation (13) must be larger than Equation (12). This holds as long as $f_d - f_x < (1-\lambda)f_e$. This must hold since $(1-\lambda)f_e > 0$ and $f_x > f_d$. Thus, some successful exporters that were not previously financially constrained might become constrained.

Proof for the second statement: For the second statement, I compare the thresholds between successful exporters (Equation 13) and unsuccessful exporters (Equation 11). Comparing the two thresholds, $\phi_C^{succ} < \phi_C^{fail}$ 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 $(1-\lambda)f_e < f_x + f_d$. While both types of firms are worse off in terms of domestic revenue, the difference between successful and unsuccessful financially constrained exporters is that the successful ones are not solely dependent on the domestic market for their revenue.

A.3 Credit-constrained firm marketing decision

For financially constrained firms, 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 their marketing costs, which results in fewer consumers. The marginal revenue from reaching more consumers is constant while the marginal costs will be increasing. Furthermore, 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 there are no financial frictions ($\lambda = 1$). An unconstrained risk-neutral firm discounts the repayment by λ. A financially constrained firm is unable to discount because of the liquidity constraint, and sets L_i below L_i^*. Since 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 (9). I get the following equation:

$$\frac{L_i A}{\sigma}\left(\frac{\mu}{\phi_i}\right)^{1-\sigma} - \frac{L_i^{\beta}}{\lambda} = \frac{f_x + f_d - (1-\lambda)f_e}{\lambda} \tag{14}$$

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:

$$\frac{L_i A}{\sigma}\left(\frac{\mu}{\phi_i}\right)^{1-\sigma} - \frac{L_i^{\beta}}{\lambda} = \frac{f_d - (1-\lambda)f_e}{\lambda} \tag{15}$$

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. The outcome depends on the net revenue from the foreign market. As before, if a firm enters a similar sized market ($Y_h = Y_f = Y$) with a foreign price level equal to that of the domestic price times the iceberg trade costs ($P_f = P_h \cdot \tau_{if} = P$), then $A_h = A_f = A$ and the successful exporter chooses the following L_i in both markets:

$$\frac{L_i A}{\sigma}\left(\frac{\mu}{\phi_i}\right)^{1-\sigma} - \frac{L_i^{\beta}}{\lambda} = \frac{f_x + f_d - (1-\lambda)f_e}{2\lambda} \tag{16}$$

Below I show that there is a lower-bound for L_i, prove that L_i is increasing with productivity ($\frac{\partial L_i}{\partial \phi_i} > 0$), and link L_i to domestic revenue.

Lower threshold for L_i

While I cannot solve for L_i, I know L_i is between the profit-maximizing L_i (Equation 10) and the L_i that maximizes the left-hand side of Equations (14) to (16). Notice that maximizing the left-hand side of Equations (14) to (16) with respect to L_i is just like maximizing expected profits with respect to L_i in the unconstrained case, except that the marketing costs are divided by λ.[25] 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 *discounted* marginal repayment cost of marketing, $\beta L_i^{\beta-1}$, is lower than the marginal revenue of marketing, $p_i q_i - \frac{q_i}{\phi_i}$; and the firm would be better off increasing L_i.

The L_i maximizing the left-hand side of equations (14) to (16) is given by the following equations:

$$L_i^C = \lambda^{\frac{1}{\beta-1}}\left(\frac{A}{\sigma\beta}\right)^{\frac{1}{\beta-1}}\left(\frac{\mu}{\phi_i}\right)^{\frac{1-\sigma}{\beta-1}} \tag{17}$$

From Equations (10) and (17), I 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, as in Manova (2013), financially constrained firms choose either an L_i that lies between these two values or one of these two values.

[25] $\frac{L_i^{\beta}}{\lambda}$ is the repayment for the marketing costs, while L_i^{β} is the marketing expenditure. L_i^{β} is also the expected repayment for the marketing expenditure. Since $0 < \lambda < 1$, more weight is given to the marketing costs here than in the maximization problem for financially unconstrained firms.

Proof 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: $\frac{L_i A}{\sigma}\left(\frac{\mu}{\phi}\right)^{1-\sigma} - \frac{L_i^{\beta}}{\lambda}$ (see Equation 14 for the unsuccessful exporter choice, Equation 15 for the domestic producer choice, and Equation 16 for the successful exporter choice). The right hand side differs, but it does not vary by productivity or marketing choice. 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. In all cases I get the following:

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

This is positive since $\sigma > 1$, and $\frac{\beta L_i^{\beta-1}}{\lambda} > \frac{A}{\sigma}\left(\frac{\mu}{\phi}\right)^{1-\sigma}$, that is, for financially unconstrained firms, marginal revenue from marketing is less than the marginal cost from marketing. Notice that $\frac{A}{\sigma}\left(\frac{\mu}{\phi}\right)^{1-\sigma}$ 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 *discounted* marginal cost, $\beta L_i^{\beta-1}$, equal to the marginal revenue of marketing, $\frac{A}{\sigma}\left(\frac{\mu}{\phi}\right)^{1-\sigma}$. The *discounted* marginal cost is below the marginal cost of borrowing for marketing, $\frac{\beta L_i^{\beta-1}}{\lambda}$. Financially constrained firms would like to do the same, 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 from the profit maximizing L_i also means lower expected profits, so the firms deviate as little as possible.

As mentioned above, 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 least productive firm to produce 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 $\left(\frac{\beta L_i^{\beta-1}}{\lambda} \geq \frac{A}{\sigma}\left(\frac{\mu}{\phi}\right)^{1-\sigma}\right)$ and only unconstrained firms set the *discounted* marginal cost of marketing equal to marginal revenue of marketing $\left(\beta L_i^{\beta-1} = \frac{A}{\sigma}\left(\frac{\mu}{\phi}\right)^{1-\sigma}\right)$.

Domestic revenues before and after exporting

Domestic revenue (v_i) for all firms is $p_i q_i = L_i A\left(\frac{\mu}{\phi_i}\right)^{1-\sigma}$. This is because L_i does not affect the pricing decision and all firms, whether financially constrained or not, set p_i equal to p_i^*. L_i, as shown above, does depend on a firm's productivity draw and on whether or not the firm is

financially constrained. To get the domestic revenue for financially unconstrained firms, substitute in the profit-maximizing L_i (L_i^* from Equation 10) into the domestic revenue equation to get the profit-maximizing domestic revenue:

$$v_i^* = A^{\frac{\beta}{\beta-1}} \left(\frac{1}{\sigma\beta}\right)^{\frac{1}{\beta-1}} \left(\frac{\mu}{\phi_i}\right)^{\frac{\beta(1-\sigma)}{\beta-1}} \tag{18}$$

For financially constrained firms, L_i is determined by Equations (14), (15), and (16), 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 10) and L_i^C (Equation 17). Thus, total domestic revenues is between the total domestic revenues for financially unconstrained firms (Equation 18) and the lower-bound domestic revenue for all firms. To get the lower-bound domestic revenues , substitute in the lower-bound L_i (L_i^C from Equation 17) into the domestic revenue equation to get the lower-bound domestic revenue:

$$v_i^C = \lambda^{\frac{1}{\beta-1}} A^{\frac{\beta}{\beta-1}} \left(\frac{1}{\sigma\beta}\right)^{\frac{1}{\beta-1}} \left(\frac{\mu}{\phi_i}\right)^{\frac{\beta(1-\sigma)}{\beta-1}} \tag{19}$$

The lower bound in Equation (19) does not depend on the classification of the firm (non-exporter, unsuccessful exporter, or successful exporter). It does, however, depend on the productivity draw. Notice that $v_i^C = \lambda^{\frac{1}{\beta-1}} v_i$, so $v_i^C < v_i$.

A.4 Proof of Proposition 2

Proof for the first statement: Essentially, L_i for non-exporters is the L_i for successful and unsuccessful exporters before these firms attempted to export. Thus, to prove the first part of the proposition, I simply compare the L_i choice for successful and unsuccessful exporters, individually, with that of non-exporters. As mentioned earlier, L_i is decreasing between the profit-maximizing L_i^* and L_i^C, so $\frac{\partial LHS_i}{\partial L_i} < 0$ in Equation (14) – (16). 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 the right-hand side of Equation (14) is higher than that of Equation (15), that is $f_d - (1-\lambda)f_e < f_x + f_d - (1-\lambda)f_e$. Since $0 < f_x$, then $L^{dom} > L^{fail}$. Alternatively, I can also note that $\frac{\partial L_i}{\partial f_x} < 0$. I can show that $\frac{\partial RHS_i}{\partial f_x} > 0$, and thus $\frac{\partial L_i}{\partial f_x} < 0$. Taking the derivative of the right hand side with respect to f_x, I get $\frac{\partial RHS_i}{\partial f_x} = \frac{1}{\lambda} > 0$, and $\frac{\partial L_i}{\partial f_x} < 0$.

For a constrained successful exporter, whether the firm reaches more or less domestic consumers, ($L^{dom} > L^{succ}$) depends on whether or not the new market loosens or tightens the financial constraint. If the export market is similar to the home market, then it is likely that entering the new market tightens the constraint and the firm reaches fewer domestic consumers. To prove this I

compare Equations (15) and (16). $L^{dom} > L^{succ}$ 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 must be the case since $f_d < f_x$ and $0 < (1-\lambda)f_e$.

Proof for the second statement: I can prove that the constrained L_i is less for unsuccessful than for successful exporters ($L^{fail} < L^{succ}$) from Equation (14) and Equation (16). In those equations, successful exporters are better off as long as $\frac{1}{2}\left(f_x + f_d - (1-\lambda)f_e\right) < \left(f_x + f_d - (1-\lambda)f_e\right)$. This is the case, as already shown in Appendix A.2.

A.5 Firm production threshold

Some potentially profitable firms will stop producing as a result of export failure. 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 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 identify the firm producing at the threshold, substitute Equation (17) into Equation (14). Solving for ϕ_0 gives the firm producing at the production threshold for unsuccessful exporters:

$$\phi_0^{fail} = \mu\left(\frac{A\lambda}{\sigma}\right)^{\frac{1}{(1-\sigma)}}\left(\frac{f_x + f_d - (1-\lambda)f_e}{\beta - 1}\right)^{\frac{1-\beta}{\beta(1-\sigma)}} \tag{20}$$

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:

$$\phi_0^{dom} = \mu\left(\frac{A\lambda}{\sigma\beta}\right)^{\frac{1}{(1-\sigma)}}\left(\frac{f_d - (1-\lambda)f_e}{\beta - 1}\right)^{\frac{1-\beta}{\beta(1-\sigma)}} \tag{21}$$

Firms know the potential consequences of entering the export market. No firm exports if export success would force it to default.

A.6 Proof of Proposition 3

Proof for the first statement: Essentially, the production cutoff for non-exporters is the production cutoff for successful and unsuccessful exporters before the firms attempt to export. To prove the first statement, I compare successful and unsuccessful exporters, individually, 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:

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

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 $f_x > f_d > f_e$, and 3) $\frac{1}{\beta-1} > 0$ since $\beta > 1$.

Proof for the second statement: Since firms export only if they expect to be better off, no firms export if they would be worse off conditional of surviving abroad. 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 ($\phi_0^{succ} < \phi_0^{fail}$).

A.6.a General Case: Successful Exporters

Unconstrained threshold for successful exporters: For the firms that export to foreign market f (successful exporters), I get the following financial constraint:

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

For a financially 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}^*. To get the threshold for constrained/unconstrained firms, I bind the equation above and substitute in the firm's profit-maximizing prices and marketing level. Substituting in the demand equation, 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, gives the following threshold:

$$\frac{L_{ih}^* A_h}{\sigma} \left(\frac{\mu}{\phi}\right)^{1-\sigma} - \frac{L_{ih}^{*\beta}}{\lambda} + \frac{L_{if}^* A_f}{\sigma} \left(\frac{\mu\tau_{if}}{\phi}\right)^{1-\sigma} - \frac{L_{if}^{*\beta}}{\lambda} = \frac{f_x + f_d - (1-\lambda)f_e}{\lambda}$$

Substituting in L_{ih}^* from Equation (10) and the profit-maximizing L_{if}^*, gives the following condition:

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

Simplifying:

$$\phi_C^{succ} = \mu \left(\frac{1}{\sigma\beta}\right)^{\frac{1}{(1-\sigma)}} \left(\frac{f_x + f_d - (1-\lambda)f_e}{\lambda\beta - 1}\right)^{\frac{1-\beta}{\beta(1-\sigma)}} \left(A_h^{\frac{\beta}{\beta-1}} + A_f^{\frac{\beta}{\beta-1}} (\tau_{if})^{\frac{\beta(1-\sigma)}{\beta-1}}\right)^{-\frac{1-\beta}{\beta(1-\sigma)}}$$

Note that 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 level times the iceberg trade costs ($P_f = P_h \cdot \tau_{if}$), then $A_f = A_h \cdot \tau_{if}^{\sigma-1}$ and the above equation simplifies to:

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

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 product prices are not affected by the liquidity constraint, and the firm always charges the profit maximizing prices in each market. Substituting these prices into the expected profit equation and the modified credit budget constraint into the maximization problem, gives the following:

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

Subject to the binding financing constraint:

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

Using ε as the multiplier, I get:

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

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

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

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

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

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

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

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

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

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.

Appendix B The Propensity Score Matching Process

I match unsuccessful exporters to both successful exporters and non-exporters to control for pre-exporting observables, and also to create alternative control groups. In order to match these firms, I use nearest neighbor, propensity score matching (PSM); I perform 1-to-1 matching without replacement and impose a common support to find the match.[26]

Since the ordering of the data might affect a firm's match, I randomize the data before matching. To match the firms, I used the following variables: short-term labor, investment, and debt; long-term labor, investment, and debt; and inventory, property, domestic revenue, intangibles (intellectual property, patents, etc.), total assets, profits, and cash flow. Each of the variables is at the firm-year level and is transformed using an inverse hyperbolic sine transformation. I then regress these variables to predict the probability of firms being onetime exporters (ie. unsuccessful exporters), which gives me a propensity score value for all firms. I then modify these values to ensure that the match is within the same sector. I use these values to onetime exporters with successful exporters and non-exporters. With the matched sample, the only observable difference with unsuccessful exporters is either the firm's exporting decision, in the case of non-exporters, or in the firm's export success, in the case of successful exporters. Once I have a match, I can then replicate the baseline estimation procedure with two additional control groups.

There is some variation in matching onetime exporters with successful exporters and non-exporters. For non-exporters, I match them to an unsuccessful exporter based on the latter's pre-exporting variables. Once matched, non-exporters are assign their "after-exporting" period based on the match; I force the match to be within the same start-up year and sector. 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. Each non-exporter is assigned a pseudo exporting cohort and can be compared with unsuccessful exporters in the pre- and post-"exporting" periods. Since the before-exporting period length differs greatly by firm, I create an algorithm that uses as much of the data as possible to match firms. 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 would match with a non-exporting firm with at least 6 years of data. This process ensures that non-exporters do not exit the domestic market before the pseudo exporting year. I follow a similar procedure to match successful exporters with unsuccessful ones. However, I do not create an artificial after-exporting period for successful exporters as these firms already have an exporting cohort and I do not force the match to be within the same start up year.

[26] See Rosenbaum and Rubin (1983) for details.

Appendix C Tables

Table C.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 C.2: Financial Data: Average of Firms operating in 2005

Variable	Continuous	Successful	Unsuccessful	Non-exporters
Count	979	784	498	12,928
Domestic revenue	46,106	30,210	15,331	4,456
Intangibles	949	972	305	230
Inventory	7,347	4,207	1,912	698
Long-term debt	2,087	1,333	549	349
Long-term investment	3,661	1,195	563	2,494
Long-term labor	35	18	6	2
Profits	2,005	1,336	557	304
Property	8,359	5,587	4,434	865
Short-term debt	4,151	2,947	1,830	413
Short-term investment	1,994	973	425	247
Short-term labor	440	204	114	40
Total assets	45,022	26,220	14,256	8,472
Total cash flow	4,437	3,092	1,042	429
Total equity	26,265	13,907	7,261	6,130
Total liabilities	18,757	12,313	6,994	2,341

Note: Calculations based on data from the Colombian DIAN and SIREM databases. Variables are in thousand of Colombian pesos. *Unsuccessful* exporters are firms that attempt to export during the years observed, but do not continue beyond a 12-month period. *Successful* exporters are firms that export beyond one year. *Continuous* exporters are firms that exported in 1994 (there is no data on firm entry into the export market). *Non-exporters* are firms than do not attempt to export.

Table C.3: Exit Summary Statistics: All Firm Types

Year	Share of Active Firms by Year				Number of Firms Active by Year			
	Continuous	Successful	Unsuccess.	Non-exp.	Continuous	Successful	Unsuccess.	Non-exp.
1	1.00	1.00	1.00	1.00	1,404	920	776	32,559
2	0.94	1.00	1.00	0.86	1,314	920	776	24,767
3	0.89	1.00	0.98	0.78	1,253	920	757	21,653
4	0.87	1.00	0.94	0.72	1,215	910	704	17,438
5	0.83	0.99	0.89	0.65	1,154	896	652	15,103
6	0.80	0.98	0.83	0.61	1,118	881	600	13,820
7	0.77	0.96	0.78	0.56	1,059	810	504	10,693
8	0.75	0.94	0.74	0.47	1,004	717	362	5,561
9	0.73	0.93	0.68	0.43	974	682	310	4,559
10	0.71	0.91	0.65	0.40	954	656	285	4,160
11	0.70	0.90	0.63	0.38	935	646	274	3,919
12	0.69	0.90	0.61	0.36	915	615	256	3,594
13	0.68	0.88	0.59	0.33	899	560	229	2,818
14	0.66	0.87	0.56	0.33	865	514	203	2,561
15	0.64	0.85	0.54	0.31	844	471	184	2,317
16	0.63	0.84	0.51	0.30	823	414	151	1,922
17	0.63	0.82	0.50	0.30	810	378	141	1,688

Note: Calculations based on data from the Colombian DIAN and SIREM databases. *Unsuccessful* exporters are firms that attempt to export during the years observed, but do not continue beyond a 12-month period. *Successful* exporters are firms that export beyond one year. *Continuous* exporters are firms that exported in 1994 (there is no data on firm entry into the export market). *Non-exporters* are firms than do not attempt to export. *Year* is the year of operation for a firm.

Table C.4: Probability of Staying in Business: Probit Estimates

	Coefficients				Marginal Effect			
Dependent Var. $\Rightarrow$	Survived MR		Survived LR		Survived MR		Survived LR	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Successful	1.03***	0.93***	0.67***	0.72***	0.18***	0.16***	0.14***	0.14***
	(0.14)	(0.15)	(0.20)	(0.21)	(0.02)	(0.02)	(0.04)	(0.04)
Successful*FV	0.11	0.10	-0.29	-0.29	0.02	0.02	-0.06	-0.06
	(0.18)	(0.19)	(0.25)	(0.25)	(0.03)	(0.03)	(0.05)	(0.05)
Fin. Vulnerable (FV)	-0.18	-0.04	-0.01	0.01	-0.03	-0.01	-0.00	0.00
	(0.12)	(0.13)	(0.21)	(0.21)	(0.02)	(0.02)	(0.04)	(0.04)
First Export Value$_{t=0}$		0.26***		-0.03		0.04***		-0.01
		(0.05)		(0.07)		(0.01)		(0.01)
Avg. Long-Term Labor$_{t<0}$		0.04**		0.01		0.01**		0.00
		(0.02)		(0.02)		(0.00)		(0.00)
Avg. Revenue$_{t<0}$		-0.06**		0.02		-0.01**		0.00
		(0.03)		(0.03)		(0.00)		(0.01)
Avg. Profits$_{t<0}$		0.01		-0.01		0.00		-0.00
		(0.01)		(0.01)		(0.00)		(0.00)
Firm-Level Controls	No	Yes	No	Yes	No	Yes	No	Yes
Exp. Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,488	1,479	837	833	1,488	1,479	837	833
Adjusted R^2	0.187	0.226	0.122	0.147				

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parenthesis. *Financially Vulnerable* (FV) equals one is the firm is financially vulnerable. *Successful* equals one if the firm exports for more than one year. SR is one for firms that survive past the short run, MR is one for firms that survive past the medium run (excluding firms that exit in SR), and LR is one if the firm does not exit during the period of observation (excluding firms that exit in SR and MR). Firm-level controls include *short-term labor, investment, and debt; long-term labor, investment, and debt; and inventory, property, domestic revenue, intangibles, total assets, profits, and cash flow.* All of these variables are transformed using an inverse hyperbolic sine transformation. Onetime exporters are the excluded group.

Table C.5: Matched Estimates: All Data

Dependent Var. ⇒	Cashflow/Tot. Assets		Ln(Dom. Rev.)	
	(1)	(2)	(3)	(4)
Short Run ($t = 0$)	-0.01	0.06***	0.00	0.13***
	(0.01)	(0.01)	(0.03)	(0.04)
Medium Run ($t = 1$ *to* 4)	-0.02***	-0.01	-0.17***	0.05
	(0.01)	(0.01)	(0.05)	(0.05)
Long Run ($t \geq 5$)	-0.03**	-0.03*	-0.34***	-0.13
	(0.01)	(0.02)	(0.08)	(0.12)
Successful*Short Run	0.03**	-0.00	0.18***	0.17***
	(0.01)	(0.02)	(0.04)	(0.05)
Successful*Medium Run	0.03***	0.01	0.37***	0.25***
	(0.01)	(0.01)	(0.06)	(0.06)
Successful*Long Run	0.04***	0.01	0.50***	0.42***
	(0.01)	(0.02)	(0.09)	(0.13)
Domestic*Short Run	-0.01	-0.07***	-0.10**	-0.25***
	(0.01)	(0.02)	(0.04)	(0.06)
Domestic*Medium Run	-0.00	-0.01	0.01	-0.22***
	(0.01)	(0.01)	(0.06)	(0.07)
Domestic*Long Run	0.01	0.02	0.10	-0.12
	(0.01)	(0.02)	(0.09)	(0.14)
Short Run*FV		-0.12***		-0.25***
		(0.02)		(0.06)
Medium Run*FV		-0.03**		-0.42***
		(0.01)		(0.08)
Long Run*FV		0.00		-0.38***
		(0.02)		(0.15)
Successful*Short Run*FV		0.05**		-0.03
		(0.02)		(0.09)
Successful*Medium Run*FV		0.05**		0.19*
		(0.02)		(0.11)
Successful*Long Run*FV		0.06**		0.11
		(0.02)		(0.18)
Domestic*Short Run*FV		0.12***		0.28***
		(0.02)		(0.08)
Domestic*Medium Run*FV		0.02		0.45***
		(0.02)		(0.11)
Domestic*Long Run*FV		-0.01		0.41**
		(0.02)		(0.19)
Firm and year fixed effects	Yes	Yes	Yes	Yes
Number of observations	24,164	24,164	23,562	23,562
Number of clusters/groups	2,295	2,295	2,280	2,280
Adjusted R^2	0.007	0.016	0.228	0.233

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, clustered at the firm level, shown in parenthesis. *Financially Vulnerable* (FV) equals one if the firm is financially constrained and zero otherwise. *Successful* equals one if the firm exports for more than one year. *Domestic* equals one if the firm does not export. Both Successful and domestic firms are match with onetime exporters (the excluded group). *Short run* is the immediate effect, the year the firm exports. *Medium run* is the effect between year 1 and year 4 after first exporting. *Long run* is the effect 5 or more years after exporting. I use the inverse hyperbolic sine transformation of Cash Flow/Total Assets to handle extreme values; winsorizing the data gives similar results.

Table C.6: Matched Estimates: Export Failure and the Probability of Staying in Business

Dependent Var. ⇒	Survived SR		Survived MR		Survived LR	
	(1)	(2)	(3)	(4)	(5)	(6)
Successful	0.07***	0.06***	0.17***	0.16***	0.07***	0.07***
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Successful*FV	0.04**	0.04**	0.06*	0.07**	-0.02	-0.02
	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)
Domestic	-0.02	-0.02	0.01	0.01	0.04**	0.04**
	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)
Domestic*FV	0.02	0.02	-0.00	-0.01	0.01	0.01
	(0.03)	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)
Fin. Vulnerable (FV)	-0.03	-0.02	-0.05*	-0.04	-0.01	-0.01
	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)
Firm-Level Controls	No	Yes	No	Yes	No	Yes
Exp. Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	2,280	2,278	2,163	2,162	1,836	1,835
Adjusted R^2	0.047	0.057	0.149	0.164	0.135	0.141

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parenthesis. *Financially Vulnerable* (FV) equals one is the firm is financially vulnerable. *SR* is one for firms that survive past the short run, *MR* is one for firms that survive past the medium run (excluding firms that exit in SR), and *LR* is one if the firm does not exit during the period of observation (excluding firms that exit in SR and MR). The regressions also control for *short-term labor, investment, and debt; long-term labor, investment, and debt; and inventory, property, domestic revenue, intangibles, total assets, profits, and cash flow.* All of these variables use inverse hyperbolic sine transformation. *Successful* equals one if the firm exports for more than one year. *Domestic* equals one if the firm does not export. Both Successful and domestic firms are match with onetime exporters, the excluded group.

Table C.7: Probability of Staying in Business: Matched Probit Estimates

Dependent Var. ⇒	Coefficients				Marginal Effect			
	Survived MR		Survived LR		Survived MR		Survived LR	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Successful	1.01***	0.97***	0.66***	0.71***	0.21***	0.20***	0.13***	0.14***
	(0.15)	(0.15)	(0.20)	(0.21)	(0.03)	(0.03)	(0.04)	(0.04)
Successful*FV	0.12	0.19	-0.24	-0.24	0.03	0.04	-0.05	-0.05
	(0.20)	(0.20)	(0.26)	(0.26)	(0.04)	(0.04)	(0.05)	(0.05)
Domestic	0.02	0.04	0.51**	0.55**	0.00	0.01	0.10**	0.11**
	(0.13)	(0.13)	(0.25)	(0.26)	(0.03)	(0.03)	(0.05)	(0.05)
Domestic*FV	-0.01	-0.01	-0.10	-0.18	-0.00	-0.00	-0.02	-0.03
	(0.17)	(0.17)	(0.32)	(0.33)	(0.04)	(0.03)	(0.06)	(0.06)
Fin. Vulnerable (FV)	-0.20*	-0.17	-0.08	-0.01	-0.04*	-0.03	-0.02	-0.00
	(0.12)	(0.13)	(0.20)	(0.21)	(0.03)	(0.03)	(0.04)	(0.04)
Firm-Level Controls	No	Yes	No	Yes	No	Yes	No	Yes
Exp. Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,929	1,928	916	915	1,929	1,928	916	915
Adjusted R^2	0.180	0.205	0.118	0.144				

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parenthesis. *Financially Vulnerable* (FV) equals one is the firm is financially vulnerable. *SR* is one for firms that survive past the short run, *MR* is one for firms that survive past the medium run (excluding firms that exit in SR), and *LR* is one if the firm does not exit during the period of observation (excluding firms that exit in SR and MR). The regressions also control for *short-term labor, investment, and debt; long-term labor, investment, and debt; and inventory, property, domestic revenue, intangibles, total assets, profits, and cash flow.* All of these variables use inverse hyperbolic sine transformation. *Successful* equals one if the firm exports for more than one year. *Domestic* equals one if the firm does not export. Both Successful and domestic firms are match with onetime exporters, the excluded group.

Table C.8: Revenue Growth Regressions: Baseline and Matched Data

Dependent Var. ⇒	Domestic Revenue Growth			
	Baseline		Matched Data	
Short Run ($t = 0$)	-0.10***	-0.03	-0.09***	-0.02
	(0.03)	(0.04)	(0.03)	(0.04)
Medium Run ($t = 1$ *to* 4)	-0.19***	-0.15***	-0.18***	-0.14***
	(0.03)	(0.03)	(0.03)	(0.03)
Long Run ($t \geq 5$)	-0.17***	-0.16***	-0.15***	-0.13***
	(0.04)	(0.05)	(0.03)	(0.05)
Successful*Short Run	0.07*	-0.02	0.06	-0.02
	(0.04)	(0.04)	(0.04)	(0.05)
Successful*Medium Run	0.05*	-0.02	0.06*	-0.01
	(0.03)	(0.04)	(0.03)	(0.04)
Successful*Long Run	-0.03	-0.03	-0.02	-0.04
	(0.03)	(0.05)	(0.03)	(0.05)
Domestic*Short Run			0.07*	-0.05
			(0.04)	(0.05)
Domestic*Medium Run			0.11***	0.05
			(0.03)	(0.04)
Domestic*Long Run			0.10***	0.09*
			(0.04)	(0.06)
Short Run*FV		-0.14**		-0.14***
		(0.05)		(0.05)
Medium Run*FV		-0.09**		-0.08*
		(0.05)		(0.05)
Long Run*FV		-0.03		-0.04
		(0.06)		(0.06)
Successful*Short Run*FV		0.17**		0.16**
		(0.07)		(0.08)
Successful*Medium Run*FV		0.15**		0.13**
		(0.06)		(0.06)
Successful*Long Run*FV		0.02		0.05
		(0.07)		(0.07)
Domestic*Short Run*FV				0.22***
				(0.08)
Domestic*Medium Run*FV				0.12*
				(0.06)
Domestic*Long Run*FV				0.03
				(0.07)
Firm and year fixed effects	Yes	Yes	Yes	Yes
Number of observations	16,989	16,989	21,237	21,237
Number of clusters/groups	1,695	1,695	2,276	2,276
Adjusted R^2	0.034	0.035	0.029	0.029

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, clustered at the firm level, shown in parenthesis. Domestic revenue growth is the log difference between two years. *Financially Vulnerable*(FV) equals one if the firm is financially constrained and zero otherwise. *Successful* equals one if the firm exports for more than one year. *Domestic* equals one if the firm does not export. Both Successful and domestic firms are match with onetime exporters (the excluded group). *Short run* is the immediate effect, the year the firm exports. *Medium run* is the effect between year 1 and year 4 after first exporting. *Long run* is the effect 5 or more years after exporting. I use the inverse hyperbolic sine transformation of Cash Flow/Total Assets to handle extreme values; winsorizing the data gives similar results.

Table C.9: Sector Regressions: Cash Flow to Total Assets

Dep ⇒ CF/TA	Base	Sect 0	Sect 1	Sect 2	Sect 3	Sect 4	Sect 5	Sect 6	Sect 7	Sect 8
Short Run ($t = 0$)	0.06***	0.10***	0.05	0.13***	0.04	-0.01	0.02	0.02	0.08**	0.04***
	(0.01)	(0.02)	(0.07)	(0.03)	(0.06)	(0.04)	(0.02)	(0.02)	(0.04)	(0.01)
Medium Run ($t = 1$ *to* 4)	-0.01	0.05	0.04	-0.03	-0.07	-0.03	-0.04	-0.03	-0.01	0.01
	(0.01)	(0.04)	(0.06)	(0.03)	(0.05)	(0.05)	(0.02)	(0.04)	(0.01)	(0.01)
Long Run ($t \geq 5$)	-0.03*	-0.04	0.20**	-0.05	-0.10*	0.07	-0.05	-0.05	-0.05*	0.01
	(0.02)	(0.05)	(0.08)	(0.05)	(0.05)	(0.07)	(0.03)	(0.06)	(0.03)	(0.02)
Successful*Short Run	-0.01	-0.04		-0.09*	0.07	0.03	0.02	0.03	-0.03	0.01
	(0.02)	(0.03)		(0.05)	(0.14)	(0.04)	(0.02)	(0.03)	(0.04)	(0.02)
Successful*Medium Run	0.01	0.01		-0.00	0.07	0.04	0.03	0.03	0.00	-0.01
	(0.01)	(0.05)		(0.05)	(0.07)	(0.04)	(0.03)	(0.04)	(0.02)	(0.02)
Successful*Long Run	0.00	0.06	-0.18***	0.03	0.23***	-0.09***	0.01	-0.01	0.03	-0.03
	(0.02)	(0.06)	(0.05)	(0.06)	(0.08)	(0.02)	(0.03)	(0.06)	(0.03)	(0.03)
Short Run*FV	-0.12***	-0.09***	-0.06	-0.15***	-0.19**	0.04	-0.08***	-0.07*	-0.16***	-0.13***
	(0.02)	(0.03)	(0.11)	(0.03)	(0.07)	(0.07)	(0.03)	(0.04)	(0.04)	(0.02)
Medium Run*FV	-0.03**	-0.01	-0.07	-0.04	-0.21*	0.09	0.01	0.01	-0.01	-0.07***
	(0.01)	(0.05)	(0.07)	(0.06)	(0.11)	(0.05)	(0.03)	(0.04)	(0.02)	(0.02)
Long Run*FV	0.00	0.09*	-0.28***	0.01			-0.02	0.02	0.05*	-0.06**
	(0.02)	(0.05)	(0.06)	(0.06)			(0.06)	(0.06)	(0.03)	(0.03)
Successful*Short Run*FV	0.05**	-0.01	-0.02	0.07	-0.05	-0.05	0.11	0.00	0.08*	0.06**
	(0.02)	(0.04)	(0.06)	(0.05)	(0.12)	(0.05)	(0.11)	(0.05)	(0.04)	(0.03)
Successful*Medium Run*FV	0.05**	-0.06	-0.14**	0.07	0.11	0.00	0.10	-0.01	0.04*	0.11**
	(0.02)	(0.05)	(0.05)	(0.07)	(0.15)	(0.04)	(0.09)	(0.05)	(0.03)	(0.04)
Successful*Long Run*FV	0.06**	-0.10		0.02	-0.03	0.14	0.17*	0.06	0.01	0.13***
	(0.02)	(0.06)		(0.07)	(0.10)	(0.09)	(0.09)	(0.07)	(0.04)	(0.05)
Firm and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	19,073	1,538	117	869	200	156	2,168	3,825	5,454	4,746
Number of clusters/groups	1,696	126	8	75	19	11	193	334	503	427
Adjusted R^2	0.019	0.027	0.232	0.026	-0.002	0.056	0.027	0.012	0.036	0.024

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, clustered at the firm level, shown in parenthesis. *Financially Vulnerable* (FV) equals one if the firm is financially constrained and zero otherwise. *Successful* equals one if the firm exports for more than one year. *Short run* is the immediate effect, the year the firm exports. *Medium run* is the effect between year 1 and year 4 after first exporting. *Long run* is the effect 5 or more years after exporting. I use the inverse hyperbolic sine transformation of Cash Flow/Total Assets to handle extreme values; winsorizing the data gives similar results. Onetime exporters are the excluded group. *Base* is the base regression in column (2) of Table 2. Sector names are found in Table C.13.

Table C.10: Sector Regressions: Log Domestic Revenue

Dep ⇒ ln(Dom. Rev.)	Base	Sect 0	Sect 1	Sect 2	Sect 3	Sect 4	Sect 5	Sect 6	Sect 7	Sect 8
Short Run ($t = 0$)	0.09**	0.38*	0.15	0.21	-0.35*	0.37	0.02	0.19**	0.03	0.01
	(0.04)	(0.21)	(0.25)	(0.20)	(0.17)	(0.22)	(0.09)	(0.09)	(0.08)	(0.07)
Medium Run ($t = 1$ *to* 4)	0.01	0.35*	0.81	-0.03	-0.65**	0.43	-0.19	0.09	-0.10	0.03
	(0.05)	(0.19)	(0.84)	(0.36)	(0.28)	(0.30)	(0.16)	(0.14)	(0.10)	(0.09)
Long Run ($t \geq 5$)	-0.21*	0.35*	-0.29	-0.20	-0.72	0.37	-0.38	0.15	-0.59**	-0.11
	(0.12)	(0.19)	(0.96)	(0.42)	(0.59)	(0.40)	(0.36)	(0.17)	(0.25)	(0.23)
Successful*Short Run	0.17***	-0.12		0.48*	0.28	-0.27	0.24**	0.12	0.24**	0.17*
	(0.05)	(0.24)		(0.28)	(0.22)	(0.21)	(0.11)	(0.11)	(0.10)	(0.09)
Successful*Medium Run	0.23***	0.13	-0.60	0.63	0.32	-0.15	0.49***	0.27*	0.23**	0.10
	(0.06)	(0.23)	(0.67)	(0.39)	(0.19)	(0.26)	(0.18)	(0.15)	(0.11)	(0.11)
Successful*Long Run	0.38***	0.39**	0.23	1.11***	0.48**	0.10	0.69*	0.05	0.55**	0.12
	(0.13)	(0.19)	(0.75)	(0.37)	(0.22)	(0.25)	(0.38)	(0.20)	(0.26)	(0.24)
Short Run*FV	-0.24***	-0.16	0.23	-0.16	-0.15	-0.44*	-0.25	-0.32***	-0.31***	-0.17*
	(0.06)	(0.29)	(0.52)	(0.22)	(0.24)	(0.22)	(0.17)	(0.11)	(0.12)	(0.10)
Medium Run*FV	-0.45***	-0.09	-0.43	-0.42	0.11	-0.58*	-0.70**	-0.57***	-0.31**	-0.49***
	(0.08)	(0.29)	(0.35)	(0.38)	(0.35)	(0.28)	(0.33)	(0.18)	(0.15)	(0.15)
Long Run*FV	-0.43***	-0.24	-0.71**	-0.21			-0.74	-0.86***	-0.06	-0.47
	(0.15)	(0.27)	(0.21)	(0.47)			(0.49)	(0.22)	(0.28)	(0.31)
Successful*Short Run*FV	-0.05	-0.55	0.18	-0.10	-0.08	0.20	-0.01	0.04	0.11	0.09
	(0.08)	(0.36)	(0.39)	(0.39)	(0.65)	(0.25)	(0.22)	(0.15)	(0.15)	(0.15)
Successful*Medium Run*FV	0.22**	-0.98**		0.61	-0.60	0.48	0.64*	0.23	0.41**	0.44**
	(0.11)	(0.39)		(0.49)	(1.19)	(0.33)	(0.38)	(0.21)	(0.19)	(0.20)
Successful*Long Run*FV	0.19	-0.89**		-0.09	1.11	-0.20	0.94*	0.45	0.15	0.39
	(0.17)	(0.44)		(0.62)	(1.04)	(0.65)	(0.54)	(0.29)	(0.32)	(0.35)
Firm and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	18,711	1,518	116	850	189	155	2,131	3,751	5,318	4,683
Number of clusters/groups	1,696	126	8	75	19	11	193	334	503	427
Adjusted R^2	0.271	0.189	0.288	0.227	0.463	0.633	0.337	0.315	0.294	0.298

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, clustered at the firm level, shown in parenthesis. *Financially Vulnerable* (FV) equals one if the firm is financially constrained and zero otherwise. *Successful* equals one if the firm exports for more than one year. *Short run* is the immediate effect, the year the firm exports. *Medium run* is the effect between year 1 and year 4 after first exporting. *Long run* is the effect 5 or more years after exporting. Onetime exporters are the excluded group. *Base* is the base regression in column (4) of Table 2. Sector names are found in Table C.13.

Table C.11: Other Robustness Checks: Cash Flow to Total Assets

Dep ⇒ CF/TA	Base	$y \leq 2007$	$y \leq 2006$	$Unsuc: 1y$	$Unsuc: 2y$	$Unsuc: 3y$	$Unsuc: 2/3y$
Short Run ($t = 0$)	0.06***	0.08***	0.08***	0.06***	0.01	-0.05*	-0.06***
	(0.01)	(0.02)	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)
Medium Run ($t = 1$ *to* 4)	-0.01	-0.01	-0.01	-0.01	-0.06**	-0.07***	-0.08***
	(0.01)	(0.01)	(0.02)	(0.01)	(0.03)	(0.02)	(0.02)
Long Run ($t \geq 5$)	-0.03*	-0.05*	-0.05*	-0.03	-0.12***	-0.13***	-0.12***
	(0.02)	(0.03)	(0.03)	(0.02)	(0.04)	(0.04)	(0.04)
Successful*Short Run	-0.01	-0.03	-0.03	-0.01	-0.00	0.05*	0.04**
	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)
Successful*Medium Run	0.01	0.00	0.00	0.01	0.04	0.03	0.04*
	(0.01)	(0.01)	(0.02)	(0.01)	(0.03)	(0.02)	(0.02)
Successful*Long Run	0.00	0.03	0.03	0.00	0.07*	0.07*	0.06*
	(0.02)	(0.03)	(0.03)	(0.02)	(0.04)	(0.04)	(0.03)
Short Run*FV	-0.12***	-0.15***	-0.17***	-0.14***	-0.02	-0.05	0.08***
	(0.02)	(0.03)	(0.03)	(0.02)	(0.04)	(0.07)	(0.02)
Medium Run*FV	-0.03**	-0.03*	-0.03	-0.03**	0.06	0.07**	0.08***
	(0.01)	(0.02)	(0.02)	(0.01)	(0.05)	(0.03)	(0.02)
Long Run*FV	0.00	0.01	0.03	-0.00	0.09*	0.14***	0.15***
	(0.02)	(0.03)	(0.03)	(0.02)	(0.05)	(0.05)	(0.04)
Successful*Short Run*FV	0.05**	0.07***	0.09**	0.07***	0.04	0.08	-0.04
	(0.02)	(0.03)	(0.03)	(0.02)	(0.04)	(0.08)	(0.03)
Successful*Medium Run*FV	0.05**	0.06**	0.05**	0.04**	-0.01	-0.00	-0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.05)	(0.03)	(0.02)
Successful*Long Run*FV	0.06**	0.05	0.03	0.06***	-0.01	-0.07	-0.08*
	(0.02)	(0.04)	(0.04)	(0.02)	(0.05)	(0.05)	(0.04)
Firm and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	19,073	13,621	12,225	19,073	12,623	11,420	12,623
Number of clusters/groups	1,696	1,640	1,624	1,696	1,000	873	1,000
Number of successful firms	920	920	920	1,000	873	775	775
Adjusted R^2	0.019	0.023	0.027	0.020	0.014	0.017	0.015

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, clustered at the firm level, shown in parenthesis. *Financially Vulnerable* (FV) equals one if the firm is financially constrained and zero otherwise. *Short run* is the immediate effect as it is the year the firm exports. *Medium run* is the effect between year 1 and year 4 after first exporting. *Long run* is the effect 5 or more years after exporting. I use the inverse hyperbolic sine transformation of Cash Flow/Total Assets to handle extreme values; winsorizing the data gives similar results. *Successful* equals one if the firm exports for more than one year. Onetime exporters are the excluded group. Base is from column (2) of Table 2, "$Y \leq 2007$" excludes the years after 2007; "$Y \leq 2006$" excludes the years after 2006; "$Unsuc: 1y$" defines unsuccessful as firms that export only in one calendar year,: "$Unsuc: 2y$" defines unsuccessful as firms that export only in two calendar years ($Unsuc: 1y$ are dropped); "$Unsuc: 3y$" defines unsuccessful as firms that export only in three calendar years ($Unsuc: 1y$ and $Unsuc: 2y$ are dropped); and "$Unsuc: 2/3$" defines unsuccessful as firms that export two or three calendar years ($Unsuc: 1y$ are dropped).

Table C.12: Other Robustness Checks: log Domestic Revenue

Dep ⇒ Ln(Dom. Rev)	Base	$y \leq 2007$	$y \leq 2006$	$Unsuc: 1y$	$Unsuc: 2y$	$Unsuc: 3y$	$Unsuc: 2/3y$
Short Run ($t = 0$)	0.09**	-0.02	-0.04	0.08*	0.07	-0.04	-0.22***
	(0.04)	(0.05)	(0.07)	(0.04)	(0.07)	(0.08)	(0.08)
Medium Run ($t = 1$ *to* 4)	0.01	-0.13	-0.16*	-0.00	-0.09	-0.20*	-0.25***
	(0.05)	(0.08)	(0.10)	(0.06)	(0.10)	(0.10)	(0.08)
Long Run ($t \geq 5$)	-0.21*	-0.52***	-0.57***	-0.20	-0.69***	-0.72***	-0.90***
	(0.12)	(0.20)	(0.21)	(0.13)	(0.21)	(0.21)	(0.19)
Successful*Short Run	0.17***	0.25***	0.28***	0.19***	0.11	0.16*	0.28***
	(0.05)	(0.06)	(0.07)	(0.05)	(0.07)	(0.08)	(0.09)
Successful*Medium Run	0.23***	0.30***	0.33***	0.23***	0.21**	0.23**	0.24***
	(0.06)	(0.09)	(0.10)	(0.06)	(0.10)	(0.10)	(0.08)
Successful*Long Run	0.38***	0.55***	0.59***	0.35**	0.72***	0.69***	0.80***
	(0.13)	(0.20)	(0.21)	(0.14)	(0.21)	(0.21)	(0.19)
Short Run*FV	-0.24***	-0.14**	-0.14	-0.26***	-0.29*	-0.31**	-0.21
	(0.06)	(0.07)	(0.09)	(0.06)	(0.15)	(0.15)	(0.15)
Medium Run*FV	-0.45***	-0.52***	-0.50***	-0.47***	-0.24	-0.72***	-0.39*
	(0.08)	(0.12)	(0.13)	(0.09)	(0.20)	(0.27)	(0.21)
Long Run*FV	-0.43***	-0.33	-0.33	-0.48***	-0.09	-0.14	0.00
	(0.15)	(0.22)	(0.24)	(0.16)	(0.44)	(0.33)	(0.33)
Successful*Short Run*FV	-0.05	-0.13	-0.12	-0.02	0.14	0.24	0.20
	(0.08)	(0.09)	(0.10)	(0.08)	(0.16)	(0.16)	(0.16)
Successful*Medium Run*FV	0.22**	0.35**	0.35**	0.25**	0.09	0.67**	0.35
	(0.11)	(0.14)	(0.15)	(0.11)	(0.21)	(0.28)	(0.22)
Successful*Long Run*FV	0.19	0.18	0.20	0.25	-0.06	0.04	-0.10
	(0.17)	(0.24)	(0.26)	(0.18)	(0.45)	(0.34)	(0.34)
Firm and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	18,711	13,345	11,969	18,711	12,421	11,253	12,421
Number of clusters/groups	1,696	1,636	1,618	1,696	1,000	873	1,000
Number of successful firms	920	920	920	1,000	873	775	775
Adjusted R^2	0.271	0.256	0.236	0.271	0.324	0.358	0.329

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, clustered at the firm level, shown in parenthesis. *Financially Vulnerable* (FV) equals one if the firm is financially constrained and zero otherwise. *Successful* equals one if the firm exports for more than one year. *Short run* is the immediate effect, the year the firm exports. *Medium run* is the effect between year 1 and year 4 after first exporting. *Long run* is the effect 5 or more years after exporting. I use the inverse hyperbolic sine transformation of Cash Flow/Total Assets to handle extreme values; winsorizing the data gives similar results. Onetime exporters are the excluded group. *Base* is from column (4) of Table 2; "$Y \leq 2007$" excludes the years after 2007; "$Y \leq 2006$" excludes the years after 2006; "$Unsuc: 1y$" defines unsuccessful as firms that export only in one calendar year,: "$Unsuc: 2y$" defines unsuccessful as firms that export only in two calendar years ($Unsuc: 1y$ are dropped); "$Unsuc: 3y$" defines unsuccessful as firms that export only in three calendar years ($Unsuc: 1y$ and $Unsuc: 2y$ are dropped); and "$Unsuc: 2/3$" defines unsuccessful as firms that export two or three calendar years ($Unsuc: 1y$ are dropped).

Table C.13: SITC Sector: Code and Name

Code	Sector Name
0	Food and live animals
1	Beverages and tobacco
2	Crude materials, inedible, except fuels
3	Mineral fuels and related materials
4	Animal and vegetable oils, fats and waxes
5	Chemicals and related products, n.e.s
6	Manufactured goods
7	Machinery and transport equipment
8	Miscellaneous manufactured articles
9	Goods not classified elsewhere

Table C.14: Financially Constrained are the lowest 25% of firms

Dependent Var. ⇒	Cashflow/Tot. Assets		Ln(Dom. Rev.)	
	(1)	(2)	(3)	(4)
Short Run (t=0)	-0.01	0.03***	-0.03	0.05
	(0.01)	(0.01)	(0.03)	(0.03)
Medium Run (t=1 to 4)	-0.02***	-0.01	-0.22***	-0.09*
	(0.01)	(0.01)	(0.05)	(0.05)
Long Run (5 or more)	-0.03**	-0.02*	-0.44***	-0.27***
	(0.01)	(0.01)	(0.08)	(0.09)
Successful*Short Run		-0.14***		-0.33***
		(0.02)		(0.07)
Successful*Medium Run		-0.04*		-0.54***
		(0.02)		(0.12)
Successful*Long Run		-0.01		-0.65***
		(0.02)		(0.18)
Short Run*FV	0.02**	0.01	0.17***	0.14***
	(0.01)	(0.01)	(0.04)	(0.04)
Medium Run*FV	0.03***	0.02**	0.36***	0.26***
	(0.01)	(0.01)	(0.06)	(0.06)
Long Run*FV	0.03***	0.01	0.50***	0.37***
	(0.01)	(0.01)	(0.09)	(0.09)
Successful*Short Run*FV		0.04*		0.08
		(0.02)		(0.11)
Successful*Medium Run*FV		0.04		0.38**
		(0.03)		(0.15)
Successful*Long Run*FV		0.07**		0.51**
		(0.03)		(0.22)
Firm and year fixed effects	Yes	Yes	Yes	Yes
Number of observations	19,073	19,073	18,711	18,711
Number of clusters/groups	1,696	1,696	1,696	1,696
Adjusted R^2	0.006	0.019	0.264	0.270

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, clustered at the firm level, shown in parenthesis. *Financially Vulnerable* (FV) equals one if the firm is financially constrained and zero otherwise. *Successful* equals one if the firm exports for more than one year. *Short run* is the immediate effect, the year the firm exports. *Medium run* is the effect between year 1 and year 4 after first exporting. *Long run* is the effect 5 or more years after exporting. I use the inverse hyperbolic sine transformation of Cash Flow/Total Assets to handle extreme values; winsorizing the data gives similar results. Onetime exporters are the excluded group.

Table C.15: Exit Estimates: Financial Constrained is top 25% of firms

Dependent Var. ⇒	Survived SR		Survived MR		Survived LR	
	(1)	(2)	(3)	(4)	(5)	(6)
Successful	0.06***	0.05***	0.18***	0.16***	0.06***	0.07***
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Successful*FV	0.09***	0.09***	0.08*	0.06	-0.02	-0.02
	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)
Fin. Vulnerable (FV)	-0.09***	-0.08***	-0.09***	-0.05	-0.04	-0.03
	(0.02)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)
First Export Value$_{t=0}$		0.01		0.04***		-0.00
		(0.01)		(0.01)		(0.01)
Avg. Long-Term Labor$_{t<0}$		0.00		0.01**		0.00
		(0.00)		(0.00)		(0.00)
Avg. Revenue$_{t<0}$		0.00		-0.01***		0.00
		(0.00)		(0.00)		(0.00)
Avg. Profits$_{t<0}$		-0.00		0.00		-0.00
		(0.00)		(0.00)		(0.00)
Firm-Level Controls	No	Yes	No	Yes	No	Yes
Exp. Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,696	1,687	1,640	1,631	1,437	1,430
Adjusted R^2	0.084	0.084	0.137	0.151	0.126	0.128

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parenthesis. *Financially Vulnerable*(FV) equals one is the firm is financially vulnerable. *Successful* equals one if the firm exports for more than one year. SR is one for firms that survive past the short run, MR is one for firms that survive past the medium run (excluding firms that exit in SR), and LR is one if the firm does not exit during the period of observation (excluding firms that exit in SR and MR). The regressions also control for *short-term labor, investment, and debt; long-term labor, investment, and debt; and inventory, property, domestic revenue, intangibles, total assets, profits, and cash flow.* All of these variables transformed using an inverse hyperbolic sine transformation. Onetime exporters are the excluded group.

Table C.16: Revenue Growth Regressions: Instrumental Variable Approach

Dep. Var. ⇒	Domestic Revenue Growth		
	All	FC	FH
Short Run ($t = 0$)	-0.03	-0.38***	0.03
	(0.09)	(0.13)	(0.08)
Medium Run ($t = 1$ *to* 4)	-0.36***	-0.41***	-0.39***
	(0.07)	(0.14)	(0.08)
Long Run ($t \geq 5$)	-0.92***	-0.83***	-0.97***
	(0.12)	(0.15)	(0.16)
Successful*Short Run	-0.05	0.60**	-0.14
	(0.14)	(0.25)	(0.10)
Successful*Medium Run	0.36***	0.49**	0.34***
	(0.09)	(0.25)	(0.10)
Successful*Long Run	1.01***	0.99***	0.99***
	(0.13)	(0.26)	(0.17)
Firm and year fixed effects	Yes	Yes	Yes
Number of observations	14,963	7,449	7,514
Number of clusters/groups	1,469	724	745

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; robust standard errors, clustered at the firm level, in parenthesis. *IV* is the instrumental variable: weighted demand (WD) for a particular product abroad. *Successful* equals one if the firm exports more than one year. *Short run* is the immediate effect, the year the firm exports. *Medium run* is the effect between year 1 and year 4 after first exporting. *Long run* is the effect 5 or more years after exporting. *CF/TA* is the ratio of Cash Flow to Total Assets; I use the inverse hyperbolic sine transformation of Cash Flow/Total Assets to handle extreme values; winsorizing the data gives similar results. Lastly, *Dom. Rev.* is the log of domestic revenue. Onetime exporters are the excluded group. *Dom. Rev. growth* is the log difference of domestic revenue.