

Export Failure and Its Consequences: Evidence from Colombian Exporters

Jesse Mora

UC Santa Cruz

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- I. Exporting has a lot of benefits and yet few firms export (Bernard and Jensen, 2004; Brooks, 2006)

- II. Fixed export costs play a particularly important role in limiting international trade
 - ⇒ Estimates: around half a million US dollars for a single firm in Latin America (Das, Roberts, and Tybout, 2007; Morales, Sheu, and Zahler, 2011)

- III. Fixed export costs may exceed export revenue
 - ⇒ First time exporters tend to start small (Rauch and Watson, 2003)

- I. The majority of firms are unable to export beyond one year (Eaton, Eslava, Kugler, and Tybout, 2007)
 - ⇒ Exporting likely resulted in profit losses

- II. Trade literature treats exporting as a harmless exercise and largely ignores export failure

- III. What if exporting is not a harmless exercise?

Firms After They Try to Export and Fail

- I. Firms rely on external financing for exporting (Amiti and Weinstein, 2011)

- II. For some firms, export profit losses may result in lower financing
 - ⇒ limit hiring, marketing, capital investments, etc.

- III. So export costs are uncertain and the costs of export failure—not just the probability of export failure—result in
 - ⇒ lowers expected returns from exporting
 - ⇒ fewer firms exporting

Example: InterSoftware/Air-Go Tech. (Mexico)

- I. Established in 1996
- II. Exported to the U.S. in 2001
- III. Went bankrupt in 2002
- IV. Hector Obregon, Chief Executive Officer, in *Software Guru* (2008)
 - ⇒ “The most serious issue was that the expansions distracted us from paying attention to issues with our principal business”
 - ⇒ “Short-term cash flow became an issue and our credit lines were quickly saturated”

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 - ⇒ For lower productivity firms, export failure tightens the financial constraint, decreases domestic sales, or even results in default

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- II. ***Stylized Facts:*** Export failure is associated with reduced domestic-market performance for financially constrained firms
 - 1) Higher probability of going out of business
 - 2) For surviving firms, decrease in domestic revenue and
 - 3) lower domestic revenue growth

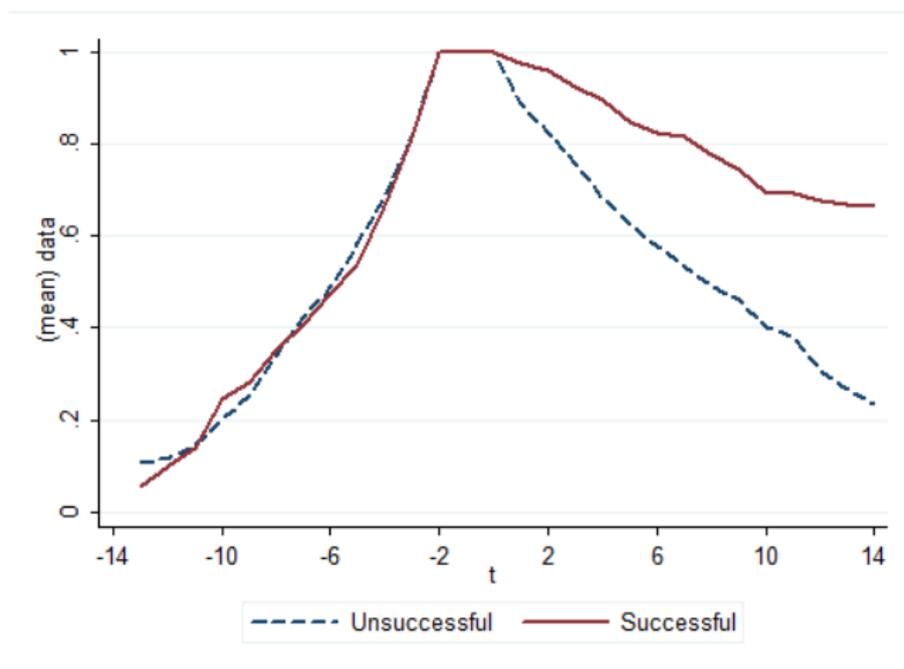
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- III. ***Empirics:*** Quantify the consequences of export failure
 - ⇒ ***Identification:*** Difference-in-difference, PSM, and IV estimates using Colombian firm-level data

Does Export Failure Result in Domestic-Market Exit?

Figure 1: Firm Entry and Exit



Note: The Figure shows the average share of firms in the data by cohort and firm type at time t . By design, the number of firms in the data do not change at $t = -2, -1, 0$. [Figure for Matched Data](#)

I. Financial frictions matter

- ⇒ Can affect which firms export and how much they export (Manova, 2013)
- ⇒ Exporters are more likely to face liquidity constraints (Chaney, 2013)
- ⇒ Exporters are more risky because they have higher rates of default rates, conditional on exit (Antunes, Opromolla, and Russ, 2014)

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II. Developing countries are different

- ⇒ Export survival is lower in developing countries (Besedes and Prusa, 2011, 2006a & 2006b)
- ⇒ "Underdeveloped countries often have underdeveloped financial markets" (Moll, 2014)

I. There are trade offs between the home and foreign market

- ⇒ There is an immediate opportunity costs to exporting
 - See Ahn and McQuoid (2013); McQuoid and Rubini (2014); Rho and Rodrigue (2010)
- ⇒ Other trade offs result from various firm decisions:
 - investment (Spearot, 2013)
 - pricing (Soderbery, 2014)
 - entry and exit (Blum, Claro, and Horstmann, 2013)

I. A Model with Export Failure, Marketing Costs, and Financial Frictions

A Melitz-Type Model with Export Failure

- I. Financing need and financial frictions (Manova, 2013)

- II. Firm must spend on marketing in each market (Arkolakis, 2010)

- III. I add an element of uncertainty in export success:
 - ⇒ Firms are randomly matched with foreign partners
 - ⇒ Unsuccessful matches result in export failure
 - ⇒ So similar productivity firms may differ in export success

Consumers Maximize Utility

I. Individual demand of variety i : $c_i = A \cdot p_i^{-\sigma}$

⇒ Assumes CES preferences

⇒ p_i is the price of variety i

⇒ A is a demand parameter

⇒ $\sigma > 1$ is the elasticity of substitution between two goods

II. Total demand: $q_i = L_i \cdot c_i = L_i \cdot A \cdot p_i^{-\sigma}$

⇒ L_i is the number of consumers

⇒ L_i is endogenously determined by a firm's marketing expenditure

Sequence of Events

1. Pay entry fee, f_e , get productivity draw (ϕ_i), and decide whether or not to enter the domestic market
2. Borrow, if exporting is desirable, to pay for an export entry fee, f_x
 $\Rightarrow f_x$ is a matching fee
3. Realization of matching draw determines export success
4. Borrow for marketing costs, $F(L_i)$, and overhead labor costs, f_d
5. Produce, sell, and pay off loans

All Firms: *Ex Ante* Maximization Problem

The maximization problem for potential exporter i :

$$E\pi_x(\phi_i) = \gamma E\pi_x^{succ}(\phi_i) + (1 - \gamma)E\pi_x^{fail}(\phi_i)$$

⇒ γ = the probability that a firm is successfully matched with a foreign partner

⇒ Export if $E\pi_x(\phi_i) > 0$

Figure: The Ex Ante Export Entry Decision

The Profit Function:

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

Subject to:

Total Demand:

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

Marketing Expenditure:

$$F(L_i) = L_i^\beta$$

The Firm's Liquidity Constraint:

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

Creditors' Constraint:

$$\lambda B_i + (1 - \lambda) f_e \geq f_x + f_d + F(L_i)$$

Definitions

The Profit Function:

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

Where:

Loan Repayment:	B_i
Probability of Repayment:	λ
Collateral/Entry Fee:	f_e
Export Fixed Costs/Matching Fee:	f_x
Overhead Labor Costs:	f_d

Key Assumptions:

Assumption 1) It is more expensive to export: $f_x > f_d$

Assumption 2) Default is not desirable: $\max \left\{ \frac{f_e - f_d}{f_e}, \frac{1}{\beta} \right\} < \lambda$

The Profit Function:

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

Subject to:

Total Demand:

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

Marketing Expenditure:

$$F(L_i) = L_i^\beta, \quad \beta > 1$$

The Firm's Liquidity Constraint:

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

Creditors' Constraint:

$$\lambda B_i + (1 - \lambda) f_e \geq f_x + f_d + F(L_i)$$

Summary of Theoretical Propositions

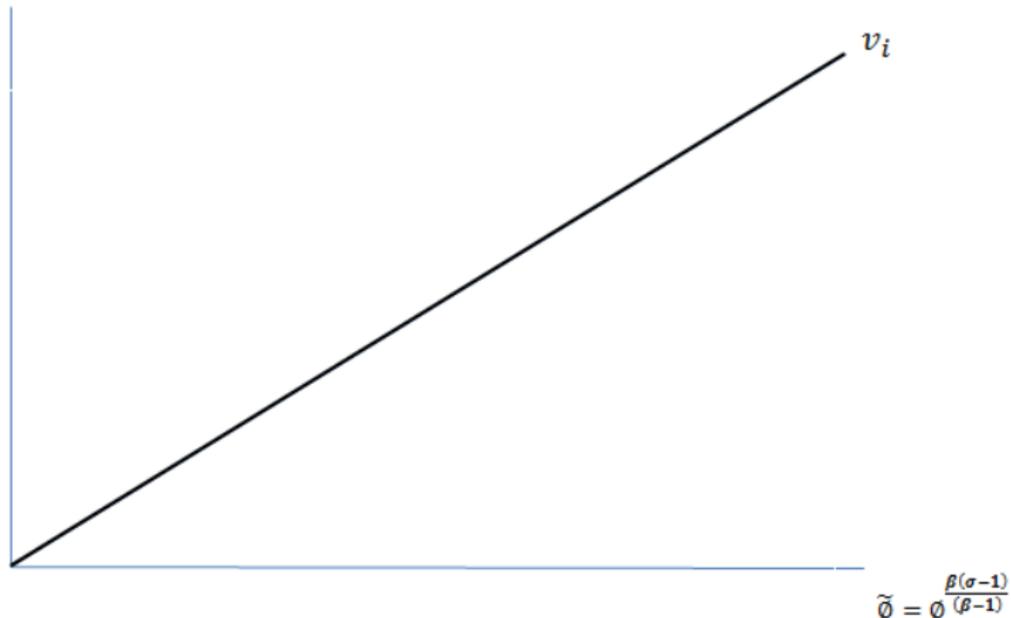
For some failed exporters—relative to similar non-exporters and successful exporters—entering a foreign market results in

- I. firms becoming *financially constrained*,
- II. financially constrained firms *decreasing domestic sales*,
⇒ Results from a decrease in borrowing for marketing
- III. firms *exiting* the domestic market

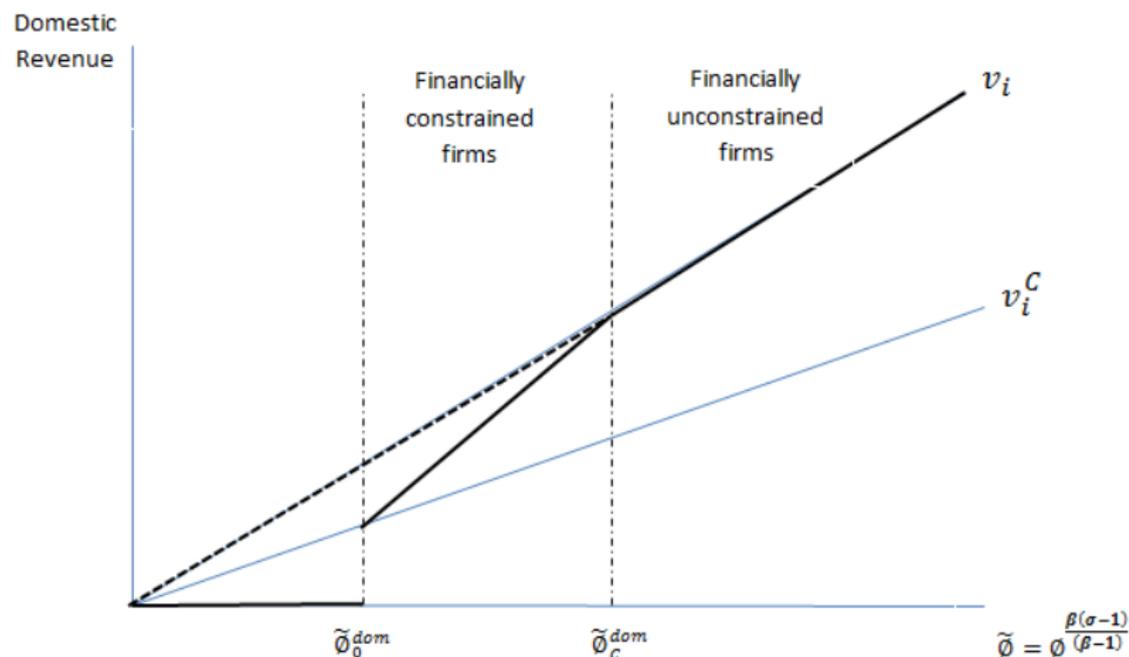
Details

With No Fin. Frictions or Exp. Failure (Melitz, 2003)

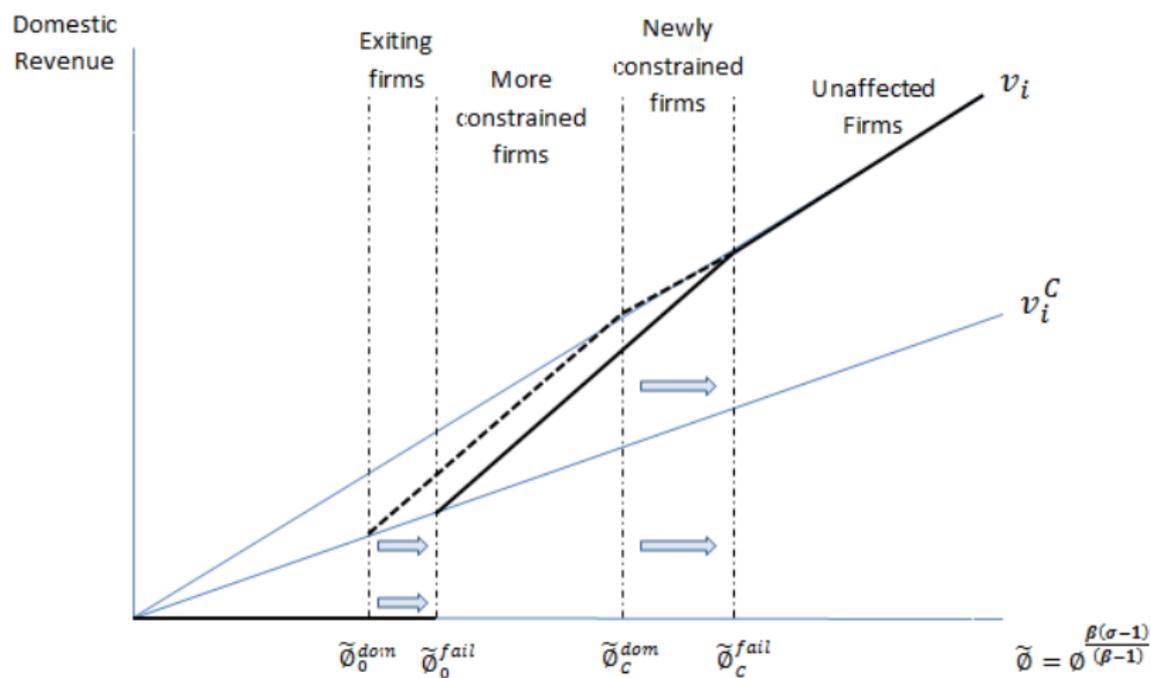
Domestic
Revenue



With Fin. Frictions, No Exp. Failure (Manova, 2013)



With Financial Frictions and Export Failure



II. Export failure is associated with reduced domestic-market performance.

I. **Exports Data (1994–2011):** Disaggregated data for all exporters

⇒ *Source:* Colombian Customs Agency (DIAN)

II. **Domestic Data (1995–2011):** Financial data for firms under the jurisdiction of the “Superintendencia de Sociedades”

⇒ *Source:* El sistema de Información y Reporte Empresarial (SIREM), reported by Superintendencia de Sociedades

Firm-type availability

Definitions: Outcome Variables

- I. ***Firm Exits_i*** — Equals one if the firm exits the domestic market and zero otherwise

- II. ***Domestic Revenue_{it}*** — Domestic revenue for firm i at time t

⇒ Subtract exports from revenue to calculate the domestic revenue

- III. ***Ln(Domestic Revenue_{it})*** — Log domestic revenue for firm i at time t

- IV. ***Domestic Revenue Growth_i*** — Difference in log domestic revenue between time t and time $t - 1$

Definitions: Covariates

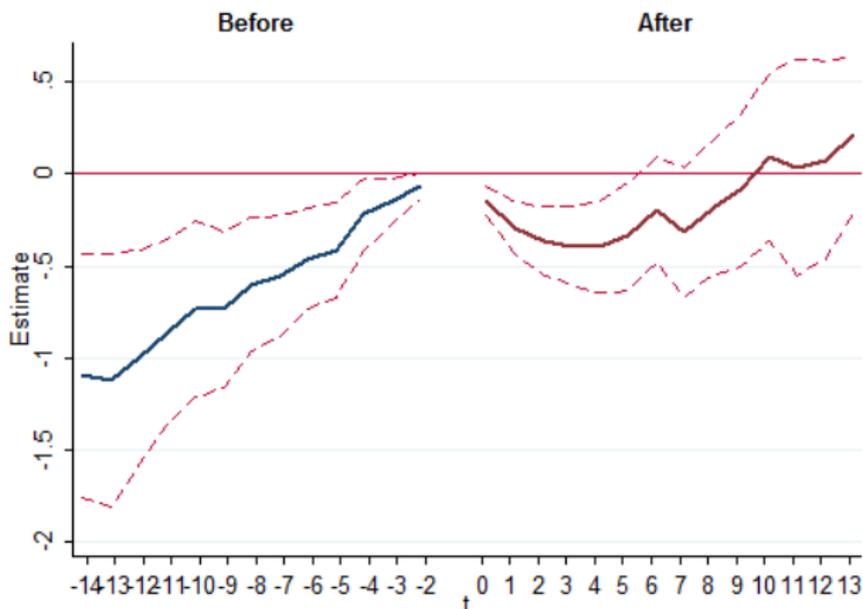
- I. **Successful Exporter**_{*t*} — Equals one if the firm exports beyond one year and zero otherwise
 - ⇒ Classification does not vary by firm
 - ⇒ Includes firms going in and out of the export market

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- I. **Successful Exporter**_{*t*} — Equals one if the firm exports beyond one year and zero otherwise
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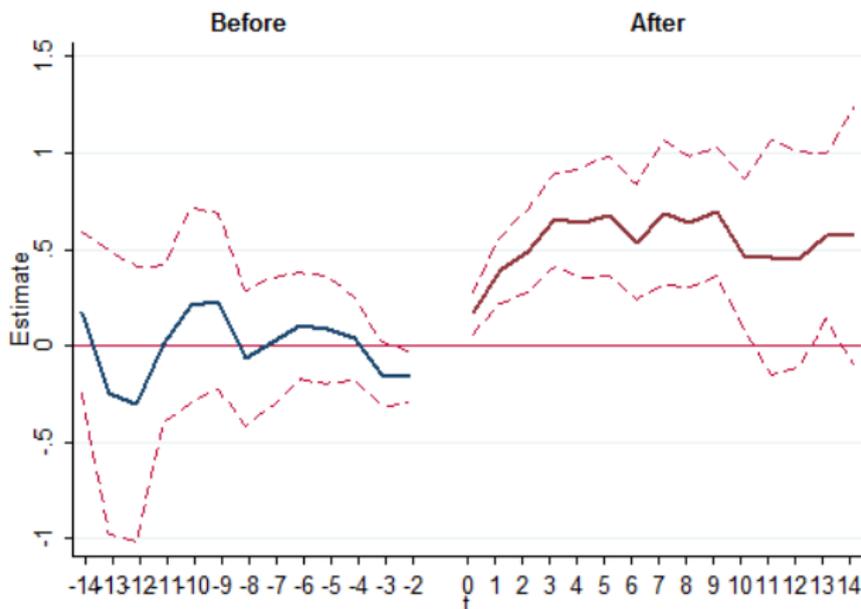
- II. **Not Financially Vulnerable**_{*i*} (NFV_{*i*}) — Equals one if the ratio of cash flow from operations to total assets is greater than the median at time of first exporting ($t = 0$) and zero otherwise
 - ⇒ Classification does not vary by firm
 - ⇒ A lower ratio implies a firm will have less cash available for future periods
 - ⇒ The ratio is widely use in the literature (Ahn and McQuoid, 2013; Whited and Wu, 2006; Kaplan and Zingales, 1997).

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



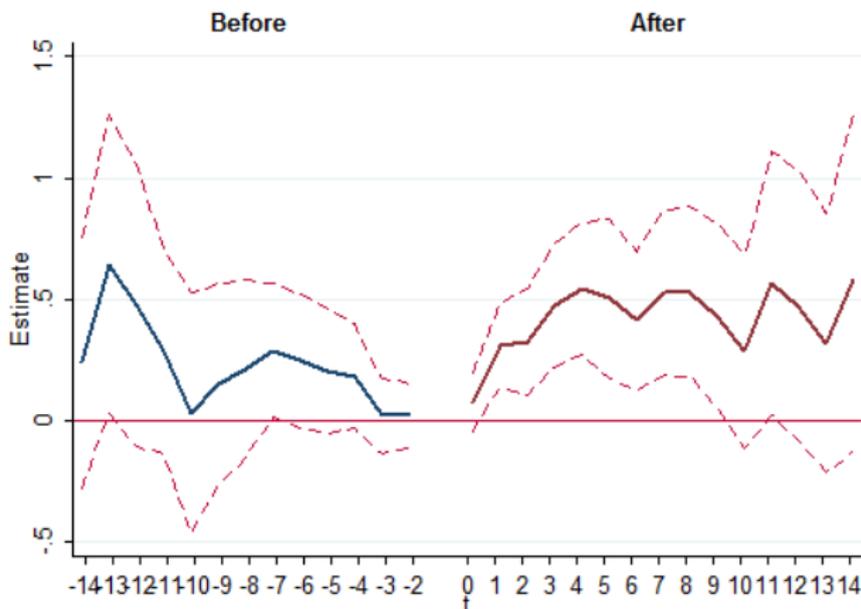
Note: Regression includes firm fixed effects and year fixed effects. The periods are interacted with not financially constrained, non-exporters, and successful exporters. The omitted group is constrained, unsuccessful exporters at time $t = -1$.

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



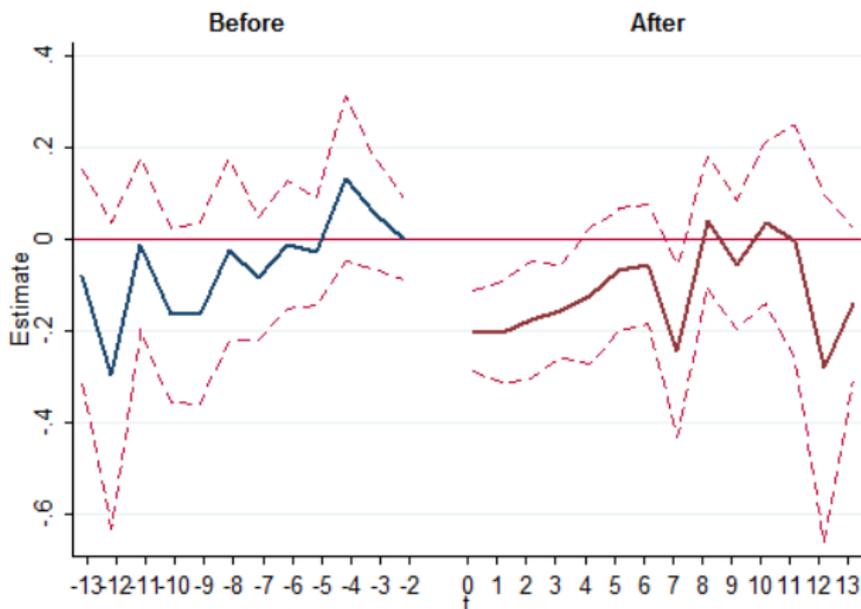
Note: Regression includes firm fixed effects and year fixed effects. The periods are interacted with not financially constrained, non-exporters, and successful exporters. The omitted group is constrained, unsuccessful exporters at time $t = -1$.

Figure 4: Ln(Domestic Revenue): Unsuccessful Exporters vs. Non-Exporters
(Constrained Firms)



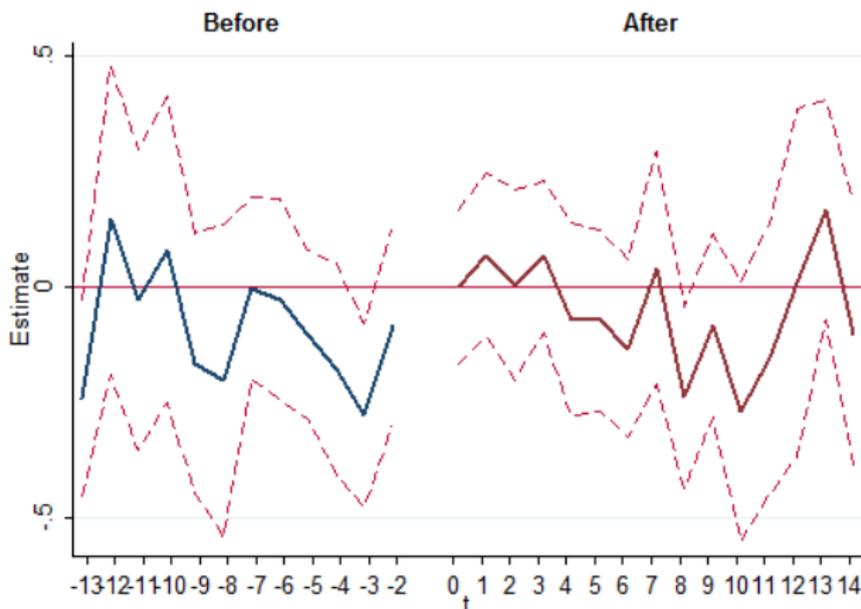
Note: Regression includes firm fixed effects and year fixed effects. The periods are interacted with not financially constrained, non-exporters, and successful exporters. The omitted group is constrained, unsuccessful exporters at time $t = -1$.

Figure 5: $\Delta \text{Ln}(\text{Dom. Revenue})$ for Unsuccessful Exporters
(*Constrained Firms*)



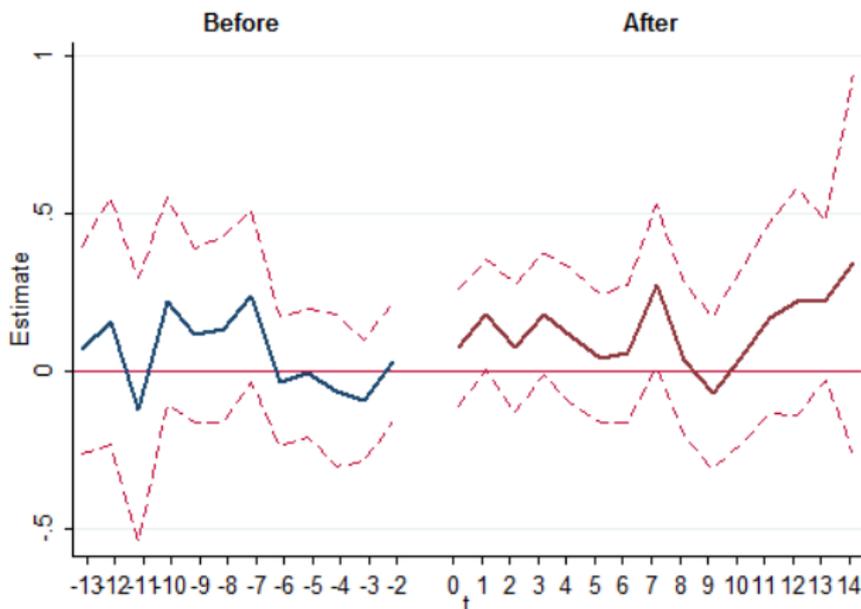
Note: Regression includes firm fixed effects and year fixed effects. The periods are interacted with not financially constrained, non-exporters, and successful exporters. The omitted group is constrained, unsuccessful exporters at time $t = -1$.

Figure 6: $\Delta \text{Ln}(\text{Dom. Revenue})$: Unsuccessful vs. Successful Exporters
(Constrained Firms)



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

Figure 7: $\Delta \text{Ln}(\text{Dom. Revenue})$: Unsuccessful Exporters vs. Non-Exporters
(Constrained Firms)



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

III. The Consequences of Export Failure

Identification Strategy

- I. **Baseline estimates:** Difference-in-difference with firm fixed effects
 - ⇒ **Outcome variables:** log domestic revenue, Δ log domestic revenue, domestic revenue, and firm exits

- II. **PSM estimates:** Match unsuccessful exporters to successful exporter and non-exporting firms
 - ⇒ **Matched based on pre-exporting variables:** revenue, revenue growth, cash flow/total assets, short-term and long-term debt, short-term and long-term labor, short-term and long-term investment, inventory, property, and intangibles

- III. **IV estimates:** Attempt to bring in external variation to address endogeneity concerns

Estimation Model

$$Y_{it} = \alpha_j + \delta_t + \beta_1 \mathbf{After}_{it} + \beta_2 \mathbf{After}_{it} \cdot \mathbf{Successful}_i + u_{it}$$

Where:

- ⇒ Y_{it} is a measurement of success in the domestic market
- ⇒ α_j are firm fixed effects
- ⇒ δ_t are year fixed effects
- ⇒ $\mathbf{After}_{it} = 1$ for all periods after first exporting and zero otherwise
 - In estimates: $\beta_1 \mathbf{After}_{it} \rightarrow \beta_{11} \mathbf{After}(t = 0)_{it} + \beta_{12} \mathbf{After}(t = 1 \text{ to } 5)_{it} + \beta_{13} \mathbf{After}(\text{rest})_{it}$
- ⇒ $\mathbf{Successful}_i = 1$ for firms exporting more than one year and zero otherwise
 - Since I use within firm variation, *successful* is not included in the model
 - In estimates:

$$\beta_2 \mathbf{After}_{it} \cdot \mathbf{Successful}_i \rightarrow \beta_{21} \mathbf{After}(t = 0)_{it} \cdot \mathbf{Successful}_i + \beta_{22} \mathbf{After}(t = 1 \text{ to } 5)_{it} \cdot \mathbf{Successful}_i + \beta_{23} \mathbf{After}(\text{rest})_{it} \cdot \mathbf{Successful}_i$$

Table 1: Exporting Increases the Probability of Going Out of Business

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

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

Table 2: Baseline Estimates: All Data

<i>Dependent</i> →	$\Delta \ln(\text{Dom. Rev.})$		$\ln(\text{Dom. Rev.})$	
	(1)	(2) Base*NFV	(3)	(4) Base*NFV
Year of exp	-0.16*** (0.03)		-0.07** (0.03)	
After (t=1 to 5)	-0.19*** (0.03)		-0.32*** (0.05)	
After (rest)	-0.15*** (0.04)		-0.56*** (0.09)	
Successful*(Year of exp)	0.05 (0.03)		0.17*** (0.04)	
Successful*After(t=1 to 5)	0.04 (0.03)		0.35*** (0.06)	
Successful*After(rest)	-0.05 (0.03)		0.45*** (0.09)	
Firm and year fixed effects	Yes		Yes	
Number of observations	15,381		16,161	
Number of clusters/groups	1,412		1,412	
Adjusted R2	0.042		0.252	

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

Table 2: Baseline Estimates: All Data

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

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

Table 3: Matched Estimates: Probability of Going Out of Business

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

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

Table 4: Matched Estimates: All Data

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

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

I. Data for Instrumental Variables

- ⇒ Disaggregated non-Colombian imports (HS 1996, 6 digit) for all of Colombia's trading partners (Source: UN COMTRADE)
- ⇒ I only have this data starting in 2000. So all firms in export cohorts earlier than 2000 are excluded from the IV estimates

II. Instrument

- ⇒ Demand change in a firms' export market between the year a firm first exports and the following year
 - Similar to that used in Hummels, Jørgensen, Munch, and Xiang (2014)
- ⇒ A market is defined as the value of *non-Colombian* imports at the product (HS 1996, 6-digit) level in a firm's destination

Table 5: First Stage: Probability of Going Out of Business

Dependent = <i>Successful</i>	All	Survived SR	Survived SR and MR
Demand Change	-0.0011** (0.0005)	-0.0011** (0.0005)	-0.0056 (0.0102)
Number of observations	904	870	720

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parenthesis. The regressions control for industry, export cohort, and initial domestic revenue. **Angrist-Pischke multivariate F test** of excluded instruments is 5.13/4.93/0.30.

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

Dependent = <i>Exit</i>	All	Survived SR	Survived SR and MR
Successful	-2.64** (1.20)	-2.73** (1.26)	0.07 (0.55)
Number of observations	904	870	720

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parenthesis. The regressions control for industry, export cohort, and initial domestic revenue.

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

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

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

Table 8: IV Estimates: All Data

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

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

IV. Conclusion and Future Work

Conclusion

- I. Showed, theoretically and empirically, that export failure can lead to negative domestic-market outcomes

- II. For failed exporters, exporting is associated with the following:
 - ⇒ lower domestic revenue
 - ⇒ slower domestic growth
 - ⇒ higher probability of going out of business

Conclusion

- I. Showed, theoretically and empirically, that export failure can lead to negative domestic-market outcomes

- II. For failed exporters, exporting is associated with the following:
 - ⇒ lower domestic revenue
 - ⇒ slower domestic growth
 - ⇒ higher probability of going out of business

- III. **Implications:** The uncertainty in export costs, not just export failure, might lead to fewer firms exporting.

- IV. **Policy implications:** focus beyond market entry and lowering foreign trade barrier
 - ⇒ subsidize the cost of finding a good match (e.g. USITA)
 - ⇒ lowering the cost of financing exports (e.g. EX-IM Bank)

I. **Short Term:** Modify question

- ⇒ Are there negative consequences to exporters that try to enter a new foreign market and fail?

Conclusion: Future Work

I. **Short Term:** Modify question

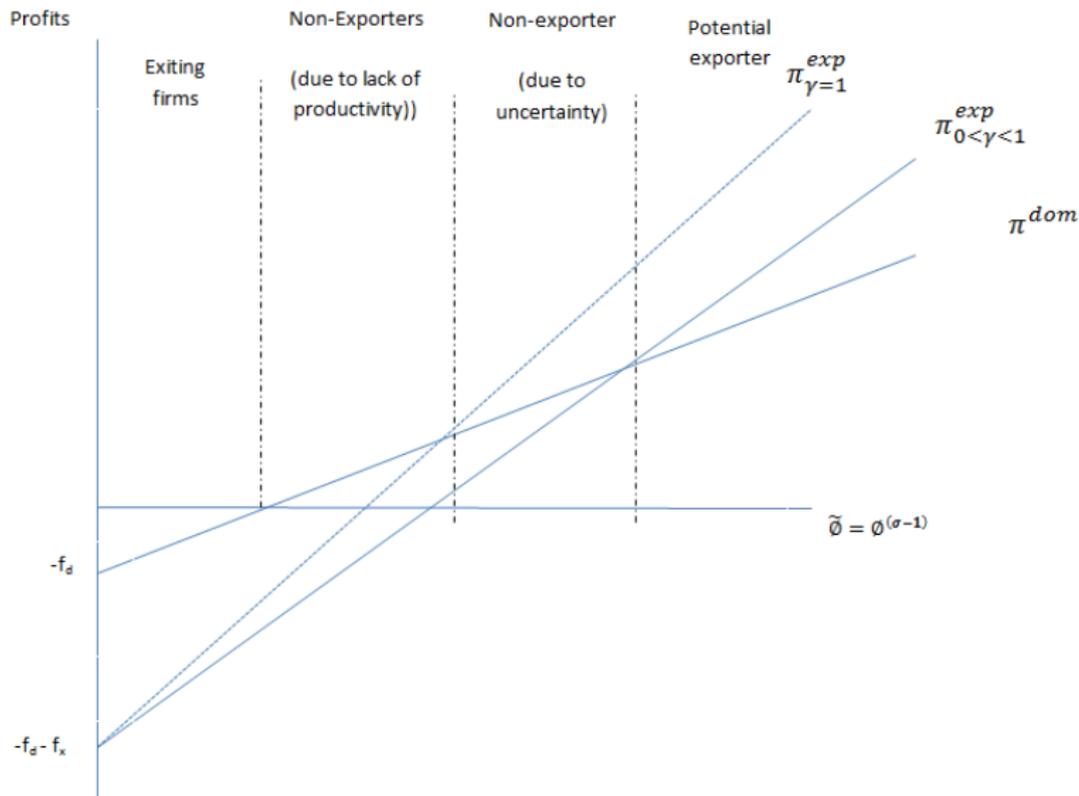
- ⇒ Are there negative consequences to exporters that try to enter a new foreign market and fail?

II. **Long Term:** Export failure in a general equilibrium framework

- ⇒ Does export failure limit the number of exporters and aggregate exports?
- ⇒ Likewise, does it hamper aggregate productivity gains through an inefficient allocation of resources? learning by exporting?

Thank You!

Figure 8: Unsuccessful exporters: before and after export failure



Unconstrained Firms

The maximization problem for unconstrained, unsuccessful exporters:

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

The profit-maximizing price:

$$p_i^* = \frac{\sigma}{\sigma - 1} \frac{1}{\phi_i} = \frac{\mu}{\phi_i} \quad (1)$$

The profit-maximizing marketing expenditure:

$$L_i^* = \left(\frac{A}{\sigma\beta} \right)^{\frac{1}{\beta-1}} \left(\frac{\mu}{\phi_i} \right)^{\frac{1-\sigma}{\beta-1}} \quad (2)$$

Financially-constrained Firms

- I. The liquidity constraint binds with the choice of L_i^* and p_i^* for financially-constrained firms

⇒ That is, $p_i q_i - \frac{q_i}{\phi_i} = B_i$

- II. To find the firm at the unconstrained/constrained threshold:

⇒ substitute L_i^* and p_i^* into the firm's liquidity constraint

⇒ bind the constraint and substitute in the creditor's constraint

⇒ solve for ϕ_i

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Exporting Makes Some Firms Financially Constrained

The financially-constrained cutoff for non-exporters:

$$\phi_C^{dom} = \mu \left(\frac{A}{\sigma\beta} \right)^{\frac{1}{1-\sigma}} \left(\frac{f_d - (1-\lambda)f_e}{\lambda\beta - 1} \right)^{\frac{1-\beta}{\beta(1-\sigma)}} \quad (3)$$

For successful exporters in N markets:

$$\phi_C^{succ} = \mu \left(\frac{A}{\sigma\beta} \right)^{\frac{1}{1-\sigma}} \left(\frac{Nf_x + f_d - (1-\lambda)f_e}{(N+1)(\lambda\beta - 1)} \right)^{\frac{1-\beta}{\beta(1-\sigma)}} \quad (4)$$

For unsuccessful exporters:

$$\phi_C^{fail} = \mu \left(\frac{A}{\sigma\beta} \right)^{\frac{1}{1-\sigma}} \left(\frac{f_x + f_d - (1-\lambda)f_e}{\lambda\beta - 1} \right)^{\frac{1-\beta}{\beta(1-\sigma)}} \quad (5)$$

Proposition 1: *As a result of exporting, both successful and failed exporters are more likely to become financially constrained:*

$$\phi_C^{fail} > \phi_C^{succ} > \phi_C^{dom}$$

Credit-constrained Firms

- I. Firms reduce financing need by choosing a lower L_i (i.e. $L_i < L_i^*$)
- II. How does a lower L_i loosen the constraint?

⇒ The Firm's Liquidity Constraint: $p_i q_i - \frac{q_i}{\phi_i} \geq B_i$

– Substituting and simplifying: $\frac{L_i A}{\sigma} \left(\frac{\mu}{\phi_i}\right)^{1-\sigma} \geq \frac{L_i^\beta + f_x + f_d - (1-\lambda)f_e}{\lambda}$

⇒ A decrease of L_i ,

– lowers **net revenue** by $\frac{\partial LHS}{\partial L_i} = -\frac{A}{\sigma} \left(\frac{\mu}{\phi_i}\right)^{1-\sigma}$

– lowers the **loan repayment** by $\frac{\partial RHS}{\partial L_i} = -\frac{\beta L_i^{\beta-1}}{\lambda}$

– credit constraint loosens when $\frac{\partial RHS}{\partial L_i} < \frac{\partial LHS}{\partial L_i}$.

⇒ Credit constraint loosens as L_i decreases away from L_i^*

- III. Since deviation from L_i^* lowers profits, firms deviate as little as possible from L_i^*

Credit-constrained Firm Marketing Decision

Profit-maximizing L_i for non-exporters:

$$\frac{L_i A}{\sigma} \left(\frac{\mu}{\phi_i} \right)^{1-\sigma} - \frac{L_i^\beta}{\lambda} = \frac{f_d - (1-\lambda)f_e}{\lambda} \quad (6)$$

For successful exporters in N markets:

$$\frac{L_i A}{\sigma} \left(\frac{\mu}{\phi_i} \right)^{1-\sigma} - \frac{L_i^\beta}{\lambda} = \frac{Nf_x + f_d - (1-\lambda)f_e}{(N+1)\lambda} \quad (7)$$

For unsuccessful exporters:

$$\frac{L_i A}{\sigma} \left(\frac{\mu}{\phi_i} \right)^{1-\sigma} - \frac{L_i^\beta}{\lambda} = \frac{f_x + f_d - (1-\lambda)f_e}{\lambda} \quad (8)$$

Takeaway: For credit constrained firms, exporting lowers the number of consumers a firm can reach in the domestic market

Lower Bound for L_i in the Domestic Market

I. For financially-constrained firms, can't solve for L_i

⇒ L_i is between L_i^* and the L_i that maximizes the left-hand side of equations (6) to (8)

II. The lower bound L_i in the domestic market is

$$L_C = \lambda^{\frac{1}{\beta-1}} \left(\frac{A}{\sigma\beta} \right)^{\frac{1}{\beta-1}} \left(\frac{\mu}{\phi_i} \right)^{\frac{1-\sigma}{\beta-1}} \quad (9)$$

III. There is no incentive to lower L_i below this level

Exporting May Lower Domestic Revenue

- I. Domestic revenue for all firms is $v_i = p_i q_i = L_i A \left(\frac{\mu}{\phi_i} \right)^{1-\sigma}$
- II. Domestic revenues for *unconstrained* firms ($L_i = L_i^*$):

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

- III. Domestic revenues for *constrained* firms will be between L_i^* and a lower bound, L_C :

$$v_C = A^{\frac{\beta}{\beta-1}} \left(\frac{\lambda}{\sigma\beta} \right)^{\frac{1}{\beta-1}} \left(\frac{\mu}{\phi_i} \right)^{\frac{\beta(1-\sigma)}{\beta-1}} \quad (11)$$

Proposition 2: As a result of exporting, financially-constrained firms—irrespective of their success abroad—have lower domestic revenues: $v_i^{fail}, v_i^{succ} < v_i^{dom}$

- I. Some *ex ante* profitable firms are unable to produce at home
 - ⇒ Even if all profits went to the creditor, the creditor still does not break even.

- II. The cutoff is defined by the constrained firm, ϕ_0 , whose L_i choice equals L_C (Eg. 9).

Export Failure May Cause Firms to Default

The production cutoff for non-exporters:

$$\phi_0^{dom} = \mu \left(\frac{A\lambda}{\sigma\beta} \right)^{\frac{1}{1-\sigma}} \left(\frac{f_d - (1-\lambda)f_e}{\beta-1} \right)^{\frac{1-\beta}{\beta(1-\sigma)}} \quad (12)$$

For unsuccessful exporters:

$$\phi_0^{fail} = \mu \left(\frac{A\lambda}{\sigma} \right)^{\frac{1}{1-\sigma}} \left(\frac{f_x + f_d - (1-\lambda)f_e}{\beta-1} \right)^{\frac{1-\beta}{\beta(1-\sigma)}} \quad (13)$$

Proposition 3: *As a result of exporting, some failed exporters are unable to borrow and default: $\phi_0^{fail} > \phi_0^{dom}$*

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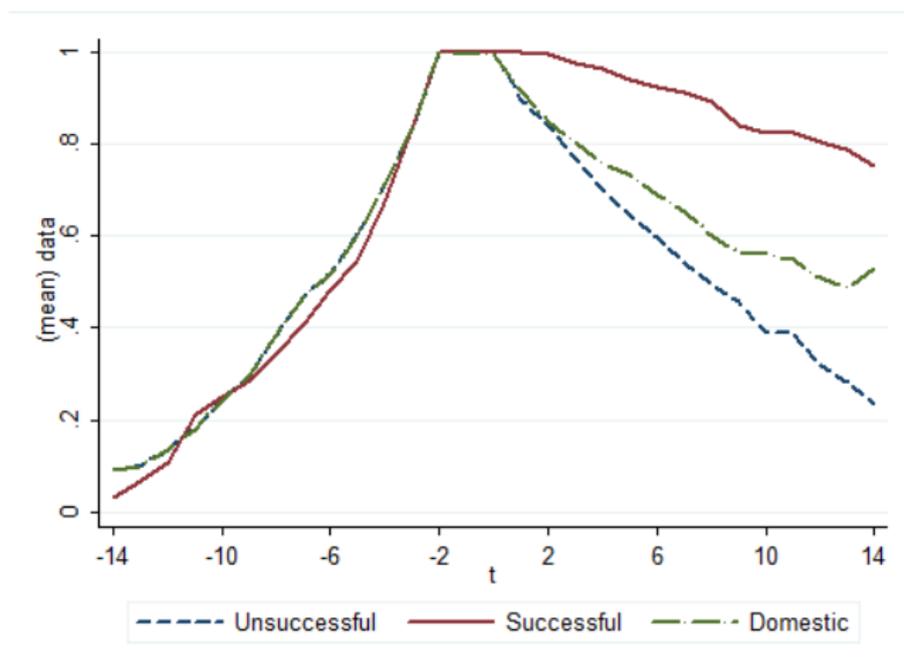
Summary Statistics: Average Firm Per Year

Firm Type	Colombian Pesos (2 Mn)		
	Revenue	Domestic Revenue	Profits
Continuous Exporter	16,883	15,020	510
Successful exporter	15,204	14,385	596
Onetime exporter	5,901	5,884	104
Non-exporter	2,219	2,219	86

Firm Type	Col. Pesos (2 Mn)		USD (Thns)	
	1 st Exp.	Avg. Exp.	1 st Exp.	Avg. Exp.
Continuous Exporter	–	2,411	–	2,431
Successful exporter	310	1,149	294	1,125
Onetime exporter	66	65	69	68

Does Export Failure Result in Domestic-Market Exit?

Figure 9: Firm Entry and Exit



Note: The Figure shows the average share of firms in the data by cohort and firm type at time t . By design, the number of firms in the data do not change at $t = -2, -1, 0$. [Back.](#)

Export Failure and Its Consequences

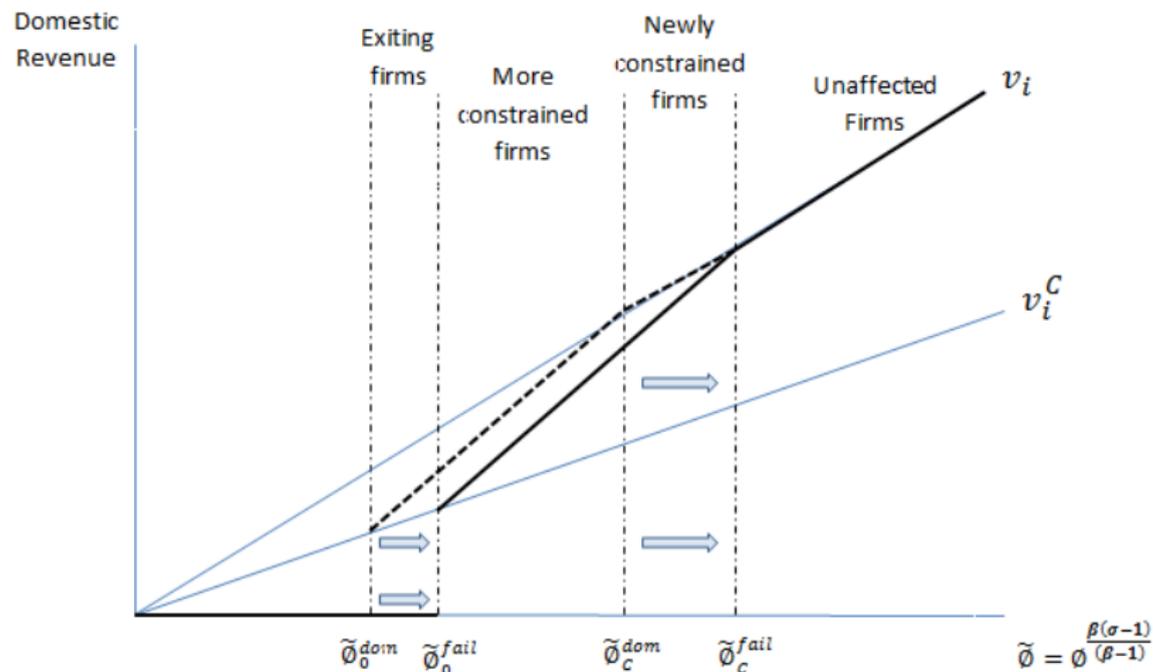


Table 9: Business Classifications and availability

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	??	
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

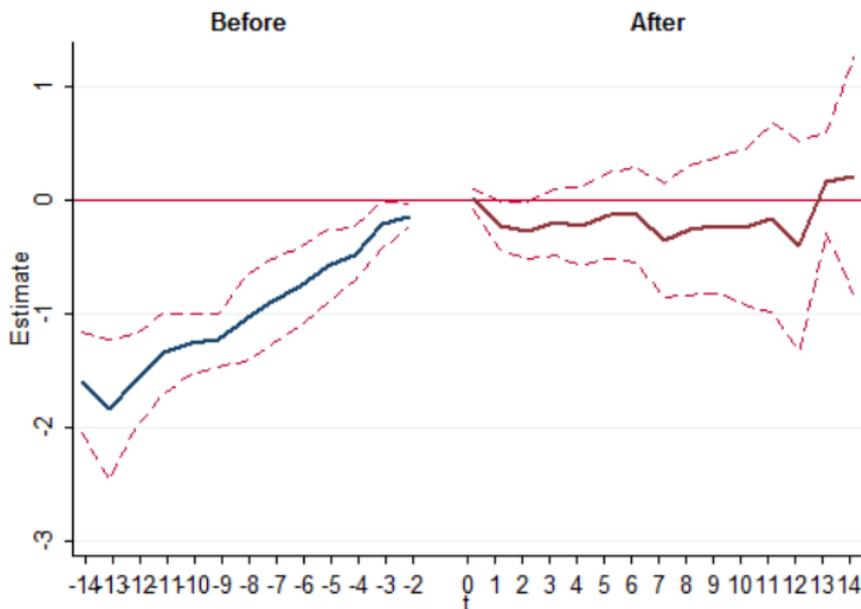
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Summary Statistics: Median Firm

Firm Type	Colombian Pesos (2 Mn)		
	Revenue	Domestic Revenue	Profits
Continuous Exporter	3,264	2,901	30
Successful exporter	4,270	4,051	92
Onetime exporter	1,679	1,668	27
Non-exporter	497	497	10

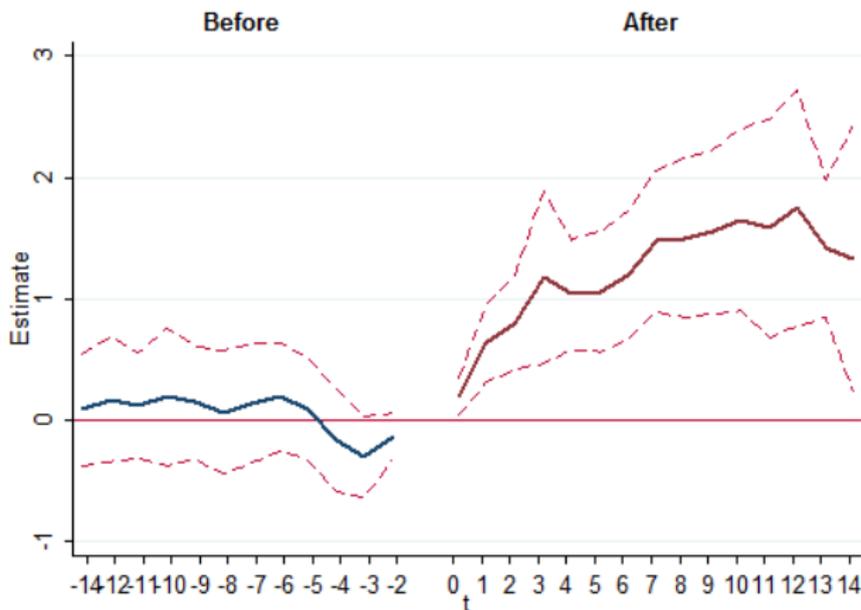
Firm Type	Col. Pesos (2 Mn)		USD (Thns)	
	1 st Exp.	Avg. Exp.	1 st Exp.	Avg. Exp.
Continuous Exporter	–	222	–	261
Successful exporter	17	54	19	56
Onetime exporter	9	9	9	10

Figure 10: PPML(Domestic Revenue) for Constrained Unsuccessful Exporters



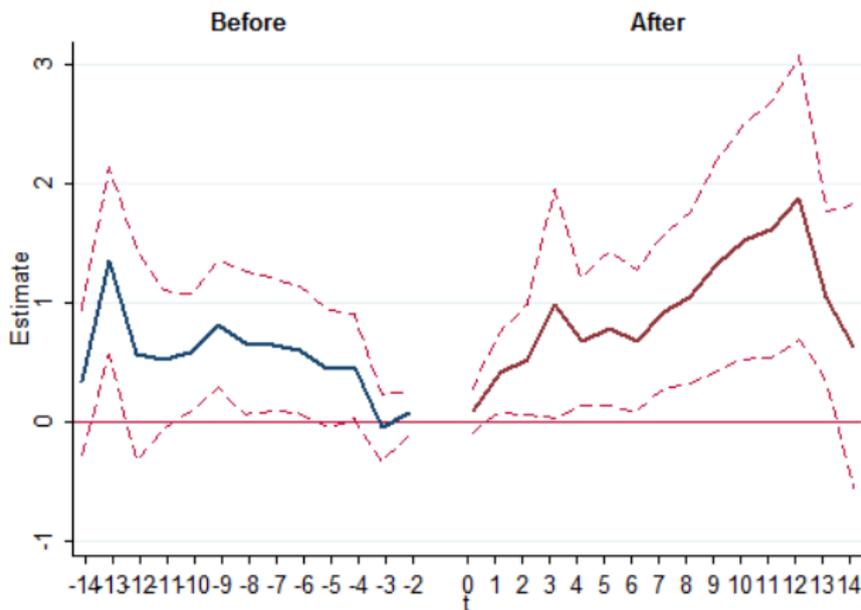
Note: Regression includes firm fixed effects and year fixed effects. The periods are interacted with not financially constrained, non-exporters, and successful exporters. The omitted group is constrained, unsuccessful exporters at time $t = -1$.

Figure 11: PPML(Domestic Revenue), Unsuccessful vs. Successful Exporters



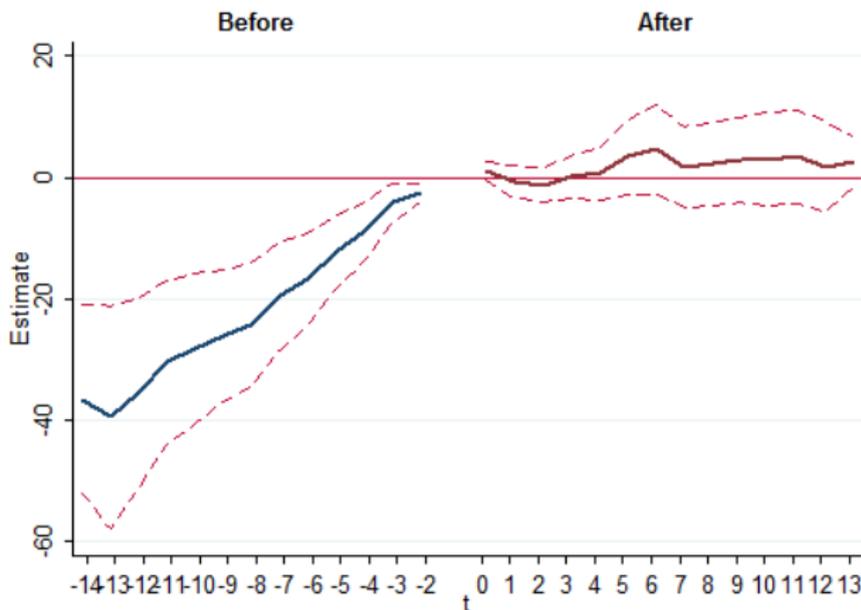
Note: Regression includes firm fixed effects and year fixed effects. The periods are interacted with not financially constrained, non-exporters, and successful exporters. The omitted group is constrained, unsuccessful exporters at time $t = -1$.

Figure 12: PPML(Domestic Revenue), Unsuccessful Exporters vs. Non-Exporters



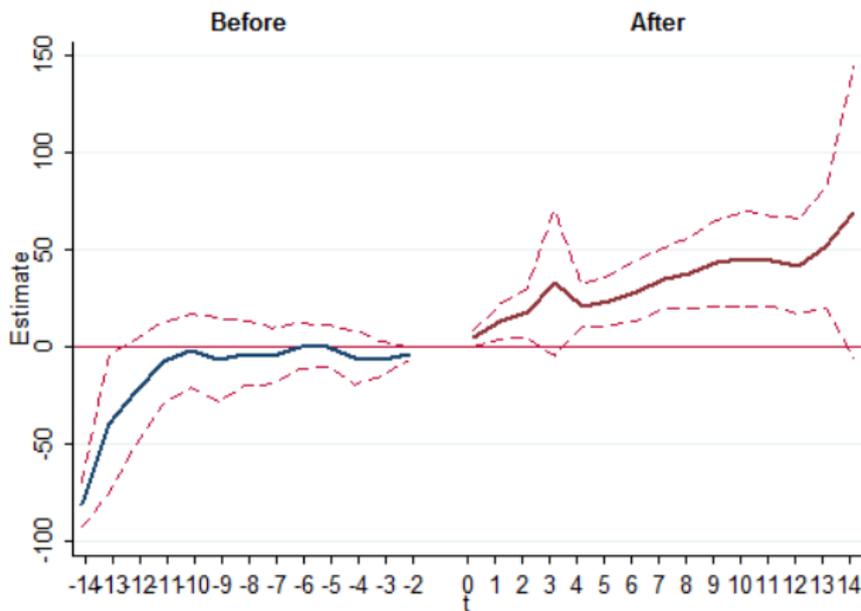
Note: Regression includes firm fixed effects and year fixed effects. The periods are interacted with not financially constrained, non-exporters, and successful exporters. The omitted group is constrained, unsuccessful exporters at time $t = -1$.

Figure 13: Domestic Revenue for Constrained Unsuccessful Exporters
(billions, Col. Pesos)



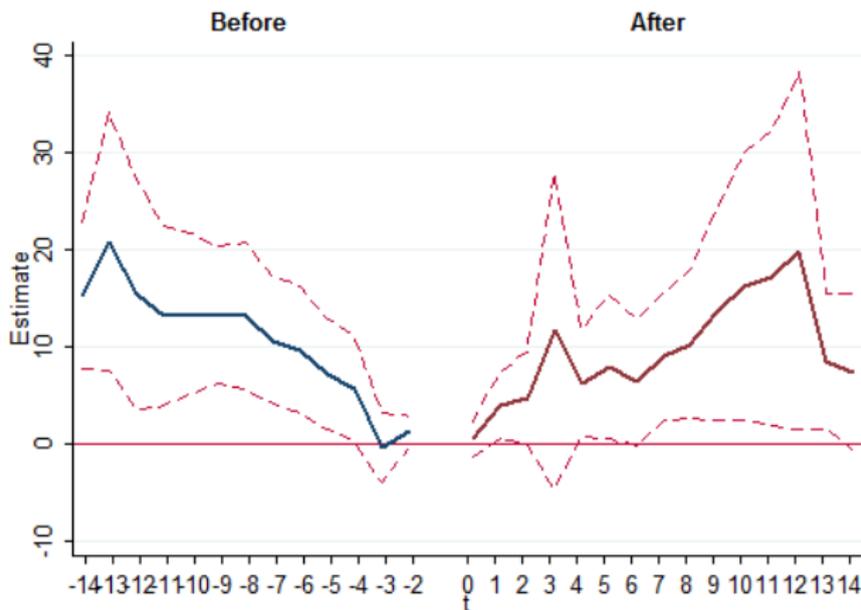
Note: Regression includes firm fixed effects and year fixed effects. The periods are interacted with not financially constrained, non-exporters, and successful exporters. The omitted group is constrained, unsuccessful exporters at time $t = -1$.

Figure 14: Domestic Revenue, Unsuccessful vs. Successful Exporters
(billions, Col. Pesos)



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

Figure 15: Domestic Revenue, Unsuccessful Exporters vs. Non-Exporters (billions, Col. Pesos)



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

Table 10: Baseline Estimates: All Data

<i>Dependent</i> →	Poisson			Levels (2 billion Pesos)		
	(1)	Base	(2) Base*NFV	(3)	Base	(4) Base*NFV
Year of exp	0.21** (0.10)	0.25* (0.15)	-0.12 (0.16)	1.23 (1.73)	2.57 (3.54)	-2.88 (3.94)
After (t=1 to 5)	0.14 (0.21)	0.05 (0.32)	0.22 (0.41)	0.23 (3.26)	0.97 (6.18)	-1.63 (7.42)
After (rest)	-0.31 (0.26)	-0.49 (0.45)	0.48 (0.51)	-7.66*** (2.66)	-7.71 (4.95)	0.44 (6.64)
Successful*(Year of exp)	0.03 (0.11)	-0.08 (0.17)	0.23 (0.19)	0.94 (2.00)	-1.15 (3.80)	4.23 (4.11)
Successful*After(t=1 to 5)	0.19 (0.23)	0.21 (0.38)	-0.10 (0.45)	3.96 (4.38)	1.07 (7.08)	5.67 (8.31)
Successful*After(rest)	0.57* (0.31)	0.58 (0.50)	-0.20 (0.56)	11.10** (4.57)	7.25 (6.59)	7.32 (8.53)
Number of observations	18,741		18,741	18,741		18,741
Groups	1,412		1,412	1,412		1,412
Cluster by Group	No		No	Yes		Yes
Adjusted R²				0.019		0.019

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

Table 11: Baseline Estimates: Dropping Firms with 1 trillion or More Pesos

<i>Dependent</i> →	Poisson		Levels (2 billion Pesos)			
	(1) Base	(2) Base*NFV	(3) Base	(4) Base*NFV		
		Base	Base*NFV	Base	Base*NFV	
Year of exp	0.07 (0.05)	0.01 (0.07)	0.11 (0.08)	-0.69 (0.62)	-1.28* (0.66)	1.08 (0.84)
After (t=1 to 5)	-0.07 (0.19)	-0.50*** (0.18)	0.80*** (0.29)	-2.87* (1.62)	-5.51*** (1.25)	5.53* (2.96)
After (rest)	-0.57*** (0.22)	-1.12*** (0.27)	1.17*** (0.33)	-9.84*** (1.98)	-12.80*** (2.07)	6.91*** (2.54)
Successful*(Year of exp)	0.15** (0.06)	0.15 (0.10)	-0.03 (0.12)	2.56*** (0.86)	2.36* (1.24)	0.31 (1.65)
Successful*After(t=1 to 5)	0.36* (0.20)	0.75*** (0.25)	-0.76** (0.34)	5.51*** (2.06)	7.20*** (2.79)	-3.88 (4.04)
Successful*After(rest)	0.78*** (0.23)	1.23*** (0.31)	-1.02*** (0.38)	12.16*** (2.28)	12.97*** (2.83)	-2.74 (4.50)
Number of observations	18,718	18,718	18,718	18,718	18,718	18,718
Groups	1,410	1,410	1,410	1,410	1,410	1,410
Cluster by Group	No	No	Yes	Yes	Yes	Yes
Adjusted R²				0.040	0.042	

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

Table 12: Matched Estimates: All Data

<i>Dependent=Domestic Revenue</i>	Poisson			Levels (2 billion Pesos)		
		Base	Base*NFV		Base	Base*NFV
Year of Exp.	0.05 (0.05)	0.01 (0.07)	0.07 (0.08)	-0.18 (0.60)	-0.31 (0.72)	0.20 (0.80)
After (t=1 to 5)	-0.30** (0.12)	-0.55*** (0.18)	0.50** (0.20)	-3.15*** (0.95)	-4.32*** (1.25)	2.43* (1.46)
After (t=rest)	-0.74*** (0.19)	-1.19*** (0.27)	0.97*** (0.31)	-8.52*** (1.61)	-10.60*** (1.83)	5.13** (2.21)
Successful*Year of Exp.	0.18*** (0.07)	0.22** (0.10)	-0.08 (0.13)	2.76*** (1.03)	3.53** (1.69)	-1.42 (2.05)
Successful*After(t=1 to 5)	0.71*** (0.16)	0.99*** (0.27)	-0.58* (0.31)	10.61*** (3.39)	11.89*** (4.44)	-2.71 (6.23)
Successful*After(t=rest)	1.13*** (0.23)	1.48*** (0.32)	-0.81** (0.41)	19.53*** (4.53)	20.92*** (4.78)	-3.83 (8.93)
Domestic*Year of Exp.	0.00 (0.07)	-0.13 (0.09)	0.24* (0.12)	-0.42 (0.61)	-1.58** (0.64)	2.87** (1.33)
Domestic*After(t=1 to 5)	0.36** (0.17)	0.48* (0.29)	-0.28 (0.34)	1.62 (1.30)	1.54 (1.67)	0.56 (2.64)
Domestic*After(t=rest)	0.59** (0.25)	0.93** (0.36)	-0.78* (0.42)	3.11* (1.71)	4.03* (2.19)	-2.16 (3.39)
Number of observations	19,259	19,259		19,259	19,259	
Groups	1,473	1,473		1,473	1,473	
Cluster by Group	No	No		Yes	Yes	
Adjusted R²				0.023	0.023	

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