

# Export financial support of Brazilian manufactured products: a microeconomic analysis

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Seminário em Macroeconomia Aplicada: Câmbio de Equilíbrio,  
Contrafactuais e Avaliação de Política Econômica

# Outline

- 1 Introduction
  - The Basic Problem That We Studied
  - Literature Review
  - Public Financing/Exemption for Exports in Brazil
- 2 Data and Methodology
  - Data Source and Methodology
  - Stylized Facts
- 3 Regression Models and Results
  - Models Estimated
  - Results
- 4 Conclusions

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- The international financial crisis in the late 2000s renewed interest in the role of export credit agencies (ECAs)
  - Providing credit to international trade under conditions of scarcity of liquidity
- ECAs alter the real sector of the economy by increasing exports.
  - There is little evidence of the importance of these agencies in the development of countries' exports due to the scarce availability of information.

# Public Financing to Exports

- Developing countries have credit restrictions as an important market failure
  - The provision of public credit for export financing through export credit agencies has alleviated the financial constraints of exporting firms
  - The public nature of the resource and the subsidized nature of the financing increases the relevance in evaluating the effectiveness of these instruments for emerging countries
- Brazil has some forms of official credit for exports carried out by public banks that play an important role.
- Banco do Brasil and BNDES are financial institutions that act in the form of ECA's

## Research Questions

- The aim of this paper is to determine whether the availability of export-supporting financial instruments affects:
  - 1 Firm survival in the export market,
  - 2 Companies' export value (as a measure of intensity in international trade)
  - 3 Number of export destinations served by entrants in the export market (as a measure of the extensiveness of international trade).
- We evaluate two export credit lines offered by the main Brazilian public banks:
  - Proex (Banco do Brasil)
  - Exim (BNDES)
  - Drawback regime

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- The combination of sunk costs and variable trade costs exacerbates exporters' need for financial capital, and thus financial constraints can be an obstruction to trade
- Thus credit constraints must reduce the number of firms that would otherwise be able to export (Manova (2013), Chaney (2013))
  - Predictions about intensive and extensive margins
  - Theoretical models recommend public policy that improves access to financial markets (and market operations).
- Empirical Evidence: using credit restriction measures from the private credit market
  - Heterogeneity in the access to external finance impacts export behavior
  - Greenaway et al. (2007), Minetti and Zhu (2011), Berman and Héricourt (2010), Muûls (2015)



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- The special customs drawback regime (Law n<sup>o</sup> 37, de 21/11/66)
  - Consists of the suspension or elimination of taxes levied on inputs imported for use in exported products.
- The mechanism acts as an incentive for exports, as it reduces the costs of producing exportable products, making them more competitive in the international market
- three modalities: exemption, suspension and refund of taxes.
- De Negri et. al. (2010) indicate that 2,804 firms made use of the Drawback program among the 17,903 companies that exported in the year 2007.
  - That is, 15.7% of the companies or approximately 30% of the value exported that year (corresponding to US \$ 50 billion in exports) made use of Drawback

# Export Financing Program (Proex)

- Brazilian government regulated the Export Financing Program (Proex)
  - Law No. 8187 of June 1991, replaces FINEX
- Proex has funds from the National Treasury and the operations are managed by Banco do Brasil (BB)
- Proex Financing: presents direct financing to the exporter or importer.
  - supports Brazilian exports of goods and services with gross annual sales of up to R\$ 600 million (except commodities)
  - terms vary from 60 days to 10 years of payment (most of them 24 months)
  - intended primarily to support micro, small and medium enterprises
- Proex Equalization: line of equalization of interest rates
  - The Libor is the interest rate charged, and the maximum spread is 2.5%.

- BNDES-EXIM

- linhas pré e pós-embarque
- Financing lines come from the Worker Support Fund (FAT) and external lines
- Financial Cost + BNDES Fee + Financial Agent Fee
- Concentrated its resources on supporting capital-intensive sectors, high value added products and mechanical machinery and equipment
- Caternol (2005) mentions that from 70% to 80% of the value disbursed by the BNDES export lines are to support the capital goods segments
- De Negri et. al. (2010), exports of companies represented 16.8% of total exports and 22.7% of industrial exports between 2003 and 2007

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- Sample to entrant firms in the export market belonging to the manufacturing industry
  - have used one, and only one, of the export support programs (Drawback, Exim or Proex) or never used any of the three programs.
  - The data are annual for the period 1996-2007.
  - We observe firm entry over during the years 1998 to 2003 and followed for a maximum of ten years
  - unbalanced panel of exporters
- The database is the result of integrating information from
  - the Annual Social Information (RAIS-MTE)
  - the Ministry of Development, Industry and Foreign Trade (MDIC);
  - the Secretary of Foreign Trade of the the Ministry of Development, Industry and Foreign Trade (SECEX-MDIC);
  - BNDES

# Identification Strategy

- Database to only include firms that are new to the international market
- Assumption that an entrant can only access the export support programmes from its second year of operating in a foreign market
- Define treatment and control groups for each instrument applying propensity score matching (PSM)
  - matching by creating a control group and one treatment group for each of the programs separately and for each year .
- use the panel structure to control for the self-selection of firms that accessed the financial support instruments
  - to mitigate endogeneity of the covariates, we included lagged by one year

# Firms by year of entry and the use of instruments

Year of entry	Drawback		BNDES Exim		Proex	
	<i>Use</i>	<i>Never use</i>	<i>Use</i>	<i>Never use</i>	<i>Use</i>	<i>Never use</i>
1998	53	139	6	21	14	55
1999	48	168	11	37	23	93
2000	46	133	4	15	15	65
2001	47	167	5	15	25	110
2002	54	192	2	6	18	60
2003	75	244	3	15	23	91
<b>Total</b>	<b>323</b>	<b>1043</b>	<b>31</b>	<b>109</b>	<b>118</b>	<b>474</b>

Figure: Matched Sample



# Descriptive statistics

Variable	Drawback		BNDES Exim		Proex	
	Treatment	Control	Treatment	Control	Treatment	Control
Export frequency	94.3%	75.1%	88.0%	71.2%	93.3%	73.8%
Employed persons up to high school	133.57	122.83	290.80	296.33	104.29	95.05
Employed persons in R&D	1.71	1.21	8.72	2.10	0.88	0.59
Average wage of employees	1147.89	1019.28	1034.91	975.63	775.01	807.45
Company age	16.16	16.55	18.49	19.42	15.96	16.22
Number of export destinations	4.22	3.01	7.51	3.76	5.33	3.23
Export value	2,109,613	717,430	4,834,330	1,074,964	1,051,566	667,607
Import frequency	73.9%	49.2%	60.0%	47.7%	36.0%	35.7%
Number of observations	2,188	5,295	220	575	802	2,394

Figure: Matched sample

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# Proportion of firms that export

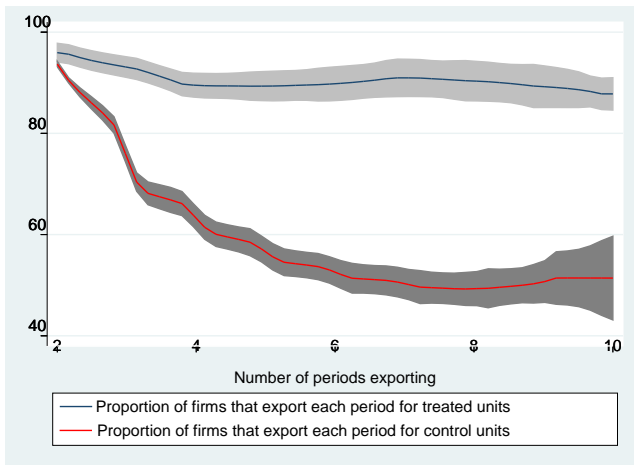


Figure: Local Regression 1

# Number of export destinations

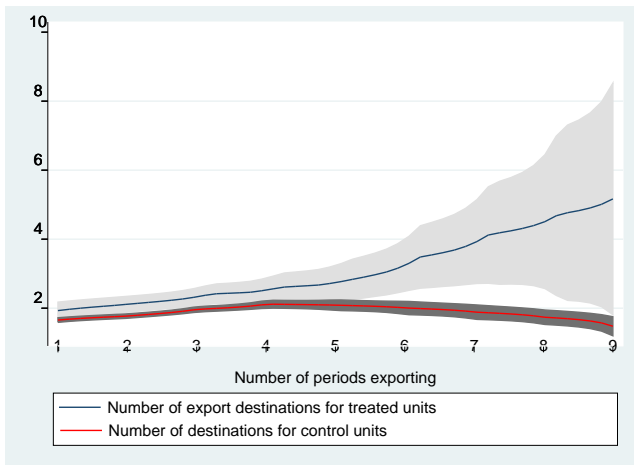


Figure: Local Regression 2

# Value exported in US\$ by firms

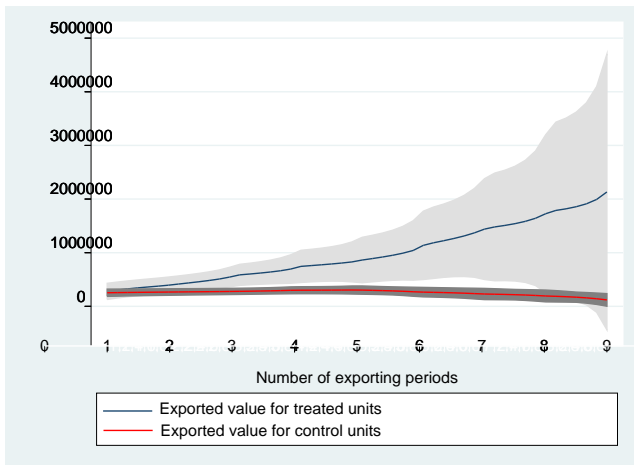


Figure: Local Regression 3

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- Likelihood to Export

$$Y_{it} = c_i + \delta_t + \gamma Y_{it-1} + \sum_{l=1}^4 \beta_l D_{j,t+l} + X'_{t-1} \theta + \varepsilon_{it}$$

- Extensive margin: number of export destinations

$$E(N_{it} | X_{i,t-1}, c_i) = \mu = \exp(c_i + \delta_t + \gamma V_{it-1} + \sum_{l=1}^4 \beta_l D_{j,t+l} + X'_{t-1} \theta)$$

- Intensive margin: export value

$$V_{it} = c_i + \delta_t + \gamma N_{it-1} + \sum_{l=1}^4 \beta_l D_{j,t+l} + X'_{t-1} \theta + \varepsilon_{it}$$

The vector of covariates (in logarithms) includes:

- the number of employees in a given year
- number of technical-scientific employees of the firm
- age of the firm
- average real wages of the firm
- a dummy defined as 1 if the firm imports
- and year dummies for 1998 through 2006



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# Dynamic linear probability model for exporting

Programme	Methodology	Effect size				
		Mean	$D_{t+1}$	$D_{t+2}$	$D_{t+3}$	$D_{t+4}$
Drawback	Fixed Effects	0.133 *** (0.01)	0.132 *** (0.02)	0.138 *** (0.03)	0.138 *** (0.03)	0.109 *** (0.03)
	Arellano-Bover	0.036 ** (0.02)	0.028 (0.03)	0.069 ** (0.03)	0.084 ** (0.04)	0.054 (0.05)
Exim	Fixed Effects	0.079 (0.05)	0.078 ** (0.03)	0.087 (0.06)	0.054 (0.05)	0.061 (0.06)
	Arellano-Bover	0.016 (0.71)	0.057 (0.75)	0.053 (0.46)	0.021 (0.40)	0.024 (0.29)
Proex	Fixed Effects	0.135 *** (0.02)	0.105 *** (0.03)	0.084 * (0.04)	0.066 * (0.03)	0.089 (0.05)
	Arellano-Bover	0.051 * (0.03)	0.055 * (0.03)	0.022 (0.04)	0.003 (0.04)	-0.024 (0.02)

Obs.: \*\*\*, \*\* and \* refer to the significance of the coefficient at the 1%, 5% and 10% levels, respectively.

The standard deviation is in parentheses.

Figure: Probability to Export

# Count model for the number of export destinations

Programme	Specification	Effect size					
		Mean	$D_t$	$D_{t+1}$	$D_{t+2}$	$D_{t+3}$	$D_{t+4}$
<b>Drawback</b>	Basic	1.143 *** (0.03)	1.163 *** (0.04)	1.174 *** (0.05)	1.074 (0.05)	1.039 (0.06)	1.067 (0.07)
	with Export Value (t-1)	1.125 *** (0.03)	1.146 *** (0.04)	1.153 *** (0.04)	1.057 (0.05)	1.025 (0.05)	1.061 (0.07)
<b>Exim</b>	Basic	1.218 ** (0.12)	1.180 (0.13)	1.190 (0.13)	1.058 (0.12)	1.157 (0.13)	0.998 (0.11)
	with Export Value (t-1)	1.177 * (0.12)	1.133 (0.12)	1.133 (0.13)	1.022 (0.11)	1.132 (0.12)	0.984 (0.11)
<b>Proex</b>	Basic	1.429 *** (0.06)	1.489 *** (0.07)	1.436 *** (0.07)	1.327 *** (0.08)	1.223 *** (0.08)	1.159 + (0.10)
	with Export Value (t-1)	1.387 *** (0.06)	1.453 *** (0.07)	1.376 *** (0.07)	1.288 *** (0.07)	1.199 *** (0.08)	1.139 (0.10)

Obs.: \*\*\*, \*\* and \* indicate that the coefficient is significant at the 1%, 5% and 10% levels, respectively.

The standard deviation is in parentheses.

Figure: Number of Export Destinations

# Intensive margin models (export value)

Programme	Specification	Effect size					
		Mean	$D_t$	$D_{t+1}$	$D_{t+2}$	$D_{t+3}$	$D_{t+4}$
<b>Drawback</b>	Basic	0,764 *** (0,09)	0,897 *** (0,10)	0,725 *** (0,09)	0,601 *** (0,126)	0,506 *** (0,171)	0,685 *** (0,233)
	with # of Destinations (t-1)	0,645 *** (0,09)	0,800 *** (0,10)	0,594 *** (0,10)	0,452 *** (0,12)	0,360 ** (0,16)	0,540 ** (0,196)
<b>Exim</b>	Basic	0,358 (0,31)	0,814 * (0,41)	0,718 ** (0,30)	0,152 (0,18)	-0,246 (0,394)	-0,330 (0,26)
	with # of Destinations (t-1)	0,081 (0,27)	0,627 (0,39)	0,461 (0,279)	-0,064 (0,18)	-0,443 (0,38)	-0,468 * (0,26)
<b>Proex</b>	Basic	0,792 *** (0,14)	1,139 *** (0,09)	0,693 *** (0,18)	0,511 *** (0,16)	0,230 (0,21)	0,128 (0,27)
	with # of Destinations (t-1)	0,554 *** (0,13)	0,969 *** (0,08)	0,385 ** (0,17)	0,248 * (0,14)	0,022 (0,198)	-0,067 (0,25)

Obs.: \*\*\*, \*\* and \* refer to the significance of the coefficient at the 1%, 5% and 10% levels, respectively.

The standard deviation is in parentheses.

Figure: Export Value

## Conclusions

- Public financing to exports is effective to increase exports in Brazil
- But, mainly for small and medium companies, where financing constraints are more noticeable
- The compensatory subsidy, Drawback, also produces positive impacts on export performance
- Proex and Drawback has similar impacts on probability to export, intensive, and extensive margins;
- BNDES-Exim appear not effective in promoting exports, possibly, because, it works as an alternative source of financial resources.
- The results obtained here also helps to reinforce arguments about the relationship between finance constraint and trade presented in trade literature .