

# RETHINKING FOGAPE

## *Evaluating Chile's Partial Credit Guarantee Scheme*

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# Table of Contents

● Motivation

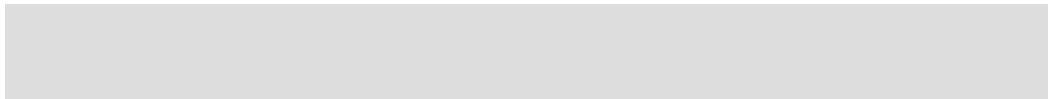
● Other programs

● What is FOGAPE

● Prior Evaluations

● Evaluation

● Final Remarks



# Motivation

- The need for public guarantees comes from firms being credit rationed.
- **SMES** are typically credit constrained:
  - Under – collateralization
  - Limited credit history
  - Lack expertise to produce sophisticated financial statements.
- Adverse Selection



# Motivation

- PCGS are a risk transfer mechanism
- The State or Private guarantee provider assumes a share of the lender's risk by ensuring the partial repayment of a loan in the event of a default.
- Lenders have more experience in treating with borrowers than the institution issuing the guarantees.



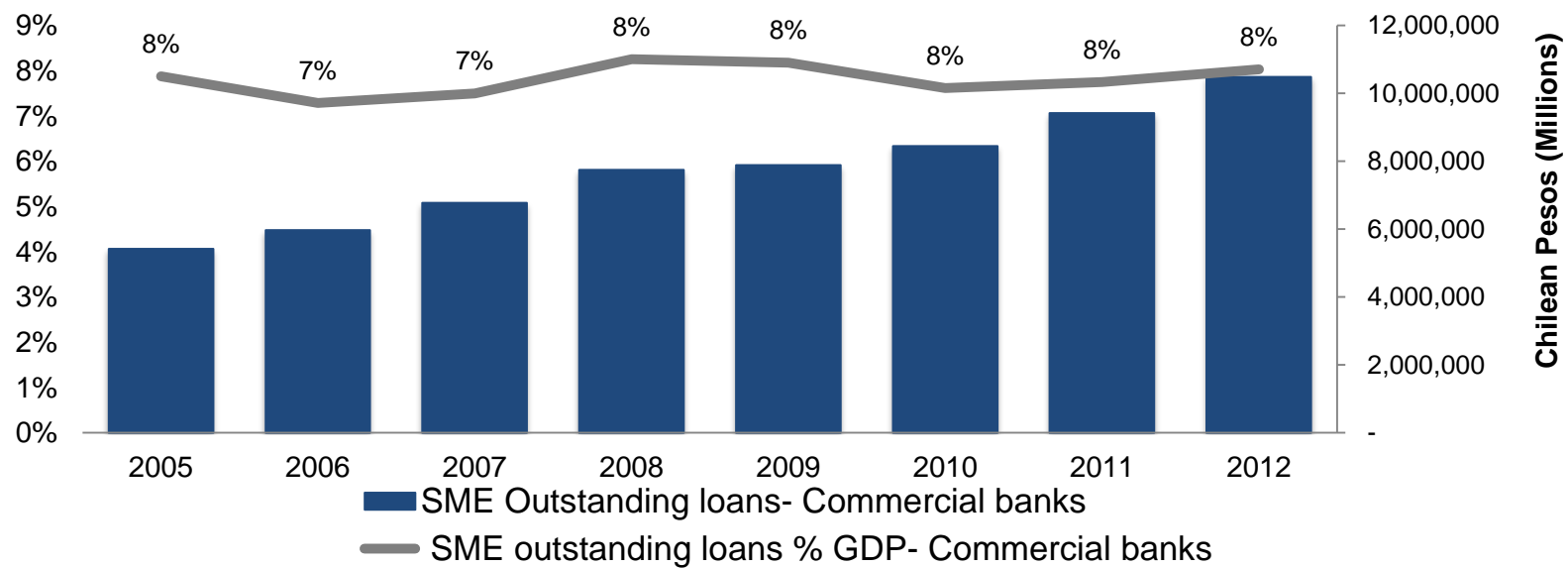
# Prior Evaluations

- Banerjee & Duflo (2012) MIT  
PCG India led to increase in production, and profits of targeted firms.
- D'Ignazio & Menon (2013) Banca D'Italia  
Italy, increase in default.
- Arráiz, Meléndez & Stucchi (2012) IDB  
Colombia. Increase of employment and output.



# Chile

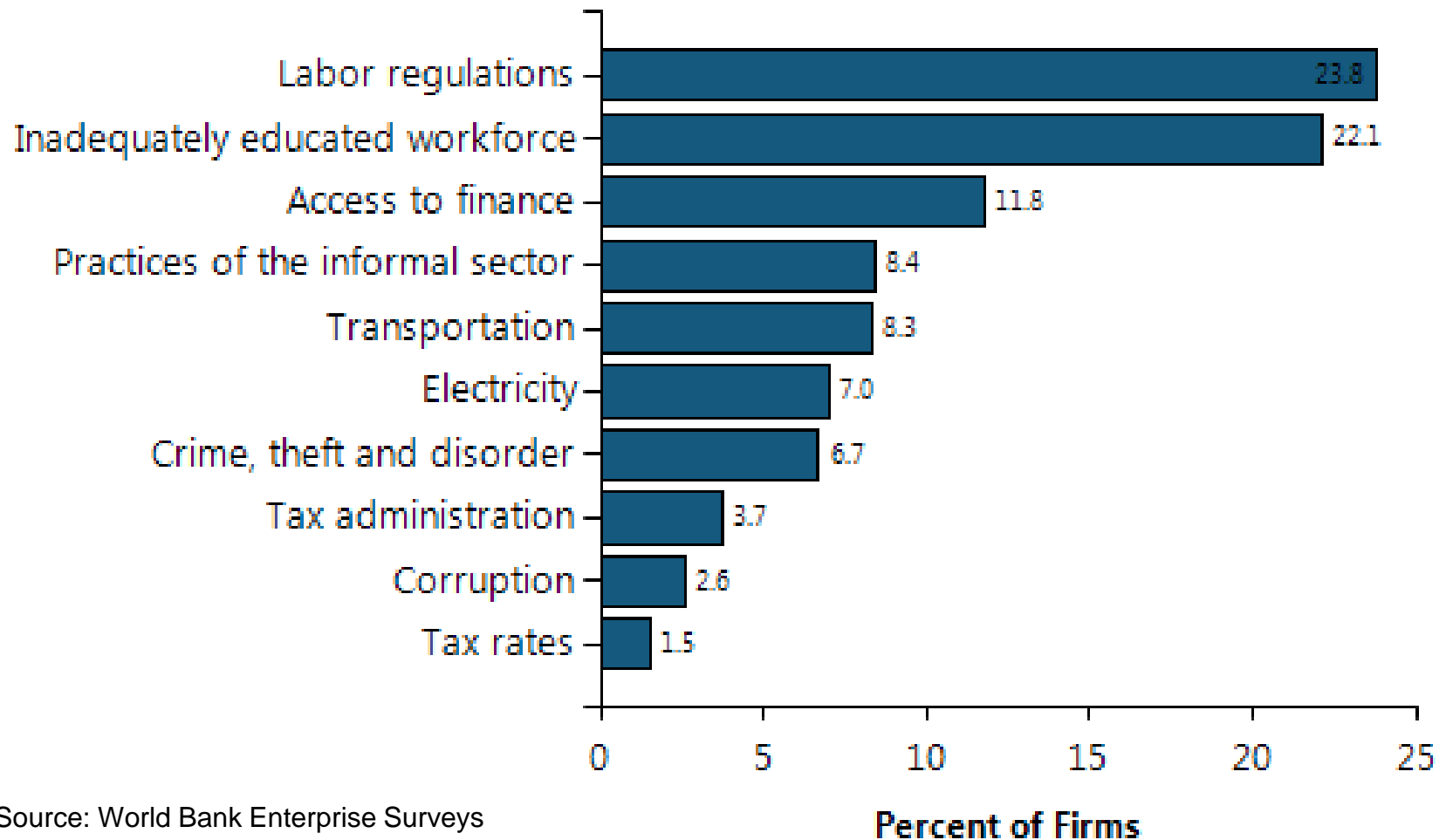
- SME sector in Chile contributes to 20% of GDP
- Over 50% of workforce employed in SMEs



Source: World Bank



# Constraints on Chilean Firms



Source: World Bank Enterprise Surveys  
(2010)



# Background of Fogape

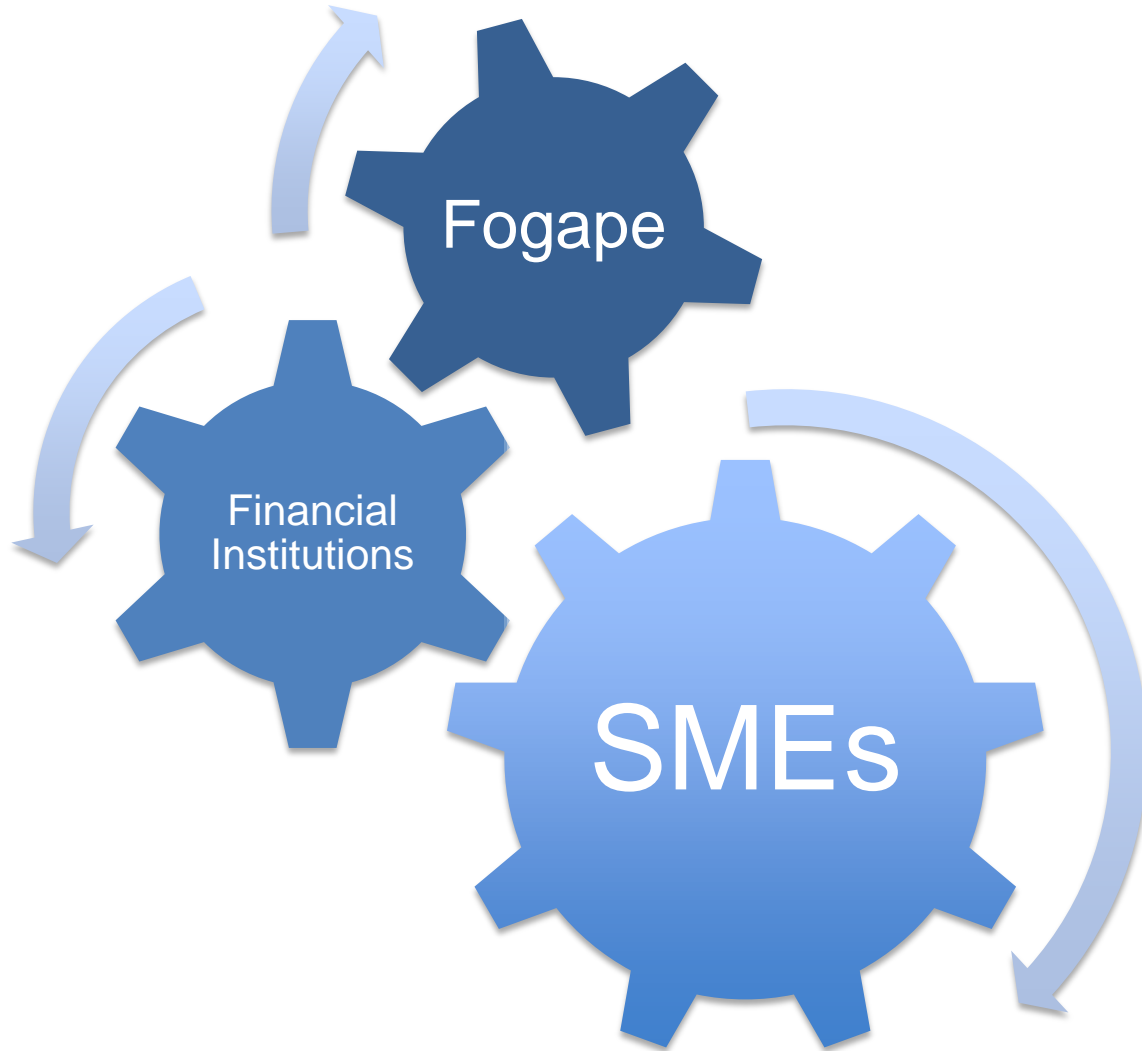
- Founded in 1982 but re-launched in 2000
  - Main goal → Guarantee loans of SMEs
- Initially endowed with \$13 million
  - By 2009 it consisted of \$130 million

Source: Fogape





# Guarantee Rights



# Eligibility of SMEs

- Only enterprises with total annual sales less than \$750,000 in previous year
- Enterprises are non-eligible if:
  - Existing arrears in the financial system
  - Expected loss at time of loan issuance greater than 3%



# Eligibility of Loans

- Short-term and long-term credit.
  - 60% to working capital
  - 40% to investment projects
- Maximum coverage rate is:
  - 80% for loans below \$120,000
  - 50% for loans above \$120,000
  - Average cover ratio 65% (Min 63%, Max 77%)
- Previously issued loans not eligible



# Eligibility of Lenders

- Auction system
  - Sealed Bids
  - Select the lowest bids
- Bidders:
  - 28- 32 participants
  - 90% guarantees ( 5 – 6 banks)



# Regulation of Lenders

- Lenders excluded if:
  - Previous default rates considered excessively high
  - Less than 80% of the guarantee rights used from past auctions
- If SME defaults, it is up to lender to recover loan
- Fogape charges a commission of 1 to 2% of the credit to be guaranteed



# Prior Evaluations

- Tan (2009), World Bank
  - Treated firms lowers sales growth.
- Larraín & Quiroz (2006), Banco de Estado de Chile
  - Increase in sales and profits after 5 years.
- Cowan, Drexler, Yañez (2009), Central Bank of Chile
  - Increase total amount lent to SME
  - Does not change the default rate



# Data Description

- Longitudinal surveys from Ministry of Economy
- Panel of 2,650 enterprises from 2007 to 2009
  - Formal enterprises with annual sales over \$35,000
- Over 500 variables
  - Firm-specific characteristics
- Representation of surveyed firms by size:
  - Micro (12%); Small (33%); Medium (19%); & Large (34%)



# Regression Discontinuity Design (RDD) Analysis

- Quasi-experimental research approach
  - Treatment depends discontinuously on observable characteristic(s) of subjects
- Intent to treat, or effect of eligibility
- Restriction of sample around eligibility threshold (\$750,000) within bandwidths:
  - 75% & 50% of threshold sales value of eligibility





# Outcome Variables

- $\text{Log } Sales_{i,2009} - \text{Log } Sales_{i,2007}$
- Profit margin in 2009
- Debt-to-equity ratio in 2009
- Long-term debt over total debt in 2009

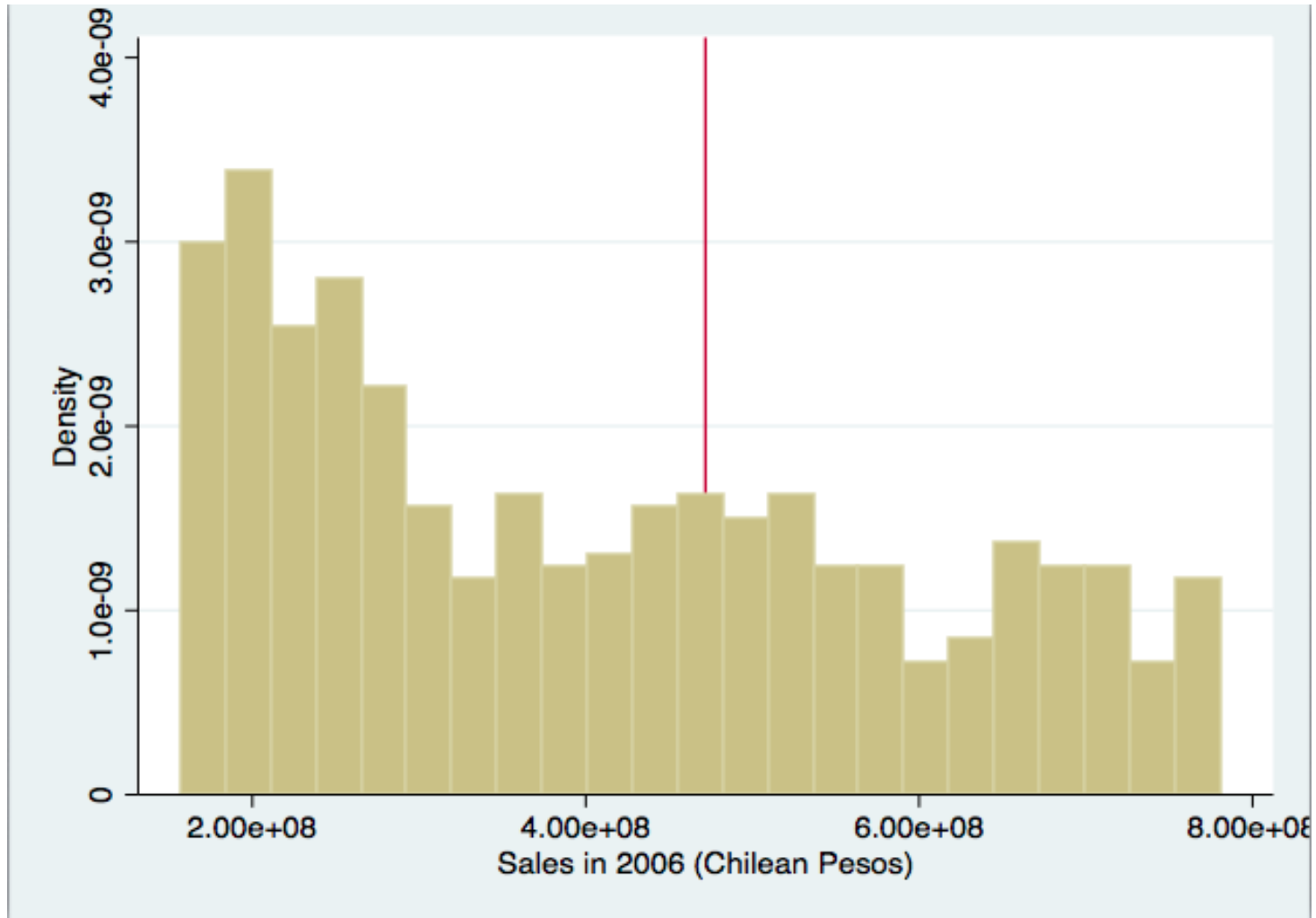


# Specification

$$y_i = \alpha + \beta T_i + \rho \cdot f(S_{i,2006} - S^*) + \varphi \cdot f\{(S_{i,2006} - S^*) \cdot T_i\} + X_i \gamma + \delta_r + \mu_c + \varepsilon_i$$

- $\alpha$ : constant
- $T_i$ : dummy equaling 1 if firm  $i$  eligible in 2007 and 0 otherwise
- $S_{i,2006}$ : firm  $i$ 's 2006 sales
- $S^*$ : sales eligibility threshold of \$750,000
- $(S_{i,2006} - S^*)$ : normalized support variable
- $f(\cdot)$ : a polynomial function
- $X_i$ : vector of controls
- $\delta_r$ : fixed effects for  $r$  regions
- $\mu_c$ : fixed effects for  $c$  sectors
- $\varepsilon_i$ : error term

# Validity Check



$\text{LogSales}_{i,2009} - \text{LogSales}_{i,2007}$

	(1) No Controls (+/- 50% of Threshold)	(2) Controls (+/- 50% of Threshold)	(3) No Controls (+/- 75% of Threshold)	(4) Controls (+/- 75% of Threshold)
Eligibility in 2007	-0.339 (0.326)	-0.343 (0.347)	-0.00837 (0.257)	-0.113 (0.268)
Normalized Sales in 2006	-2.21e-08* (1.12e-08)	-1.75e-08 (1.17e-08)	-3.53e-09 (5.80e-09)	-5.86e-09 (5.87e-09)
Normalized Sales in 2006 x Eligibility in 2007	1.99e-08 (1.39e-08)	1.92e-08 (1.45e-08)	2.07e-09 (7.51e-09)	5.51e-09 (7.55e-09)
(Normalized Sales in 2006) <sup>2</sup>	2.37e-16* (1.13e-16)	1.69e-16 (1.15e-16)	3.19e-17 (4.05e-17)	5.02e-17 (4.03e-17)
(Normalized Sales in 2006) <sup>2</sup> x Eligibility in 2007	-2.67e-16 (1.37e-16)	-1.59e-16 (1.36e-16)	-5.01e-17 (5.01e-17)	-5.96e-17 (4.95e-17)
(Normalized Sales in 2006) <sup>3</sup>	-6.55e-25* (3.17e-25)	-4.25e-25 (3.08e-25)	-7.14e-26 (7.59e-26)	-1.08e-25 (7.45e-26)
(Normalized Sales in 2006) <sup>3</sup> x Eligibility in 2007	5.68e-25 (3.82e-25)	4.44e-25 (3.92e-25)	2.85e-26 (9.15e-26)	8.19e-26 (9.16e-26)
No. of Workers in 2007		-0.000152 (0.000122)		-0.0000843 (0.000101)
Exporter in 2007		-0.292 (0.347)		-0.0822 (0.224)
No. of Years in Operation		-0.00629 (0.00467)		-0.00522 (0.00347)
Regions	No	Yes	No	Yes
Categories	No	Yes	No	Yes
Constant	0.458 (0.234)	0.392 (0.557)	0.130 (0.178)	0.143 (0.388)
N	380	375	663	655
R-sq	0.017	0.125	0.007	0.093

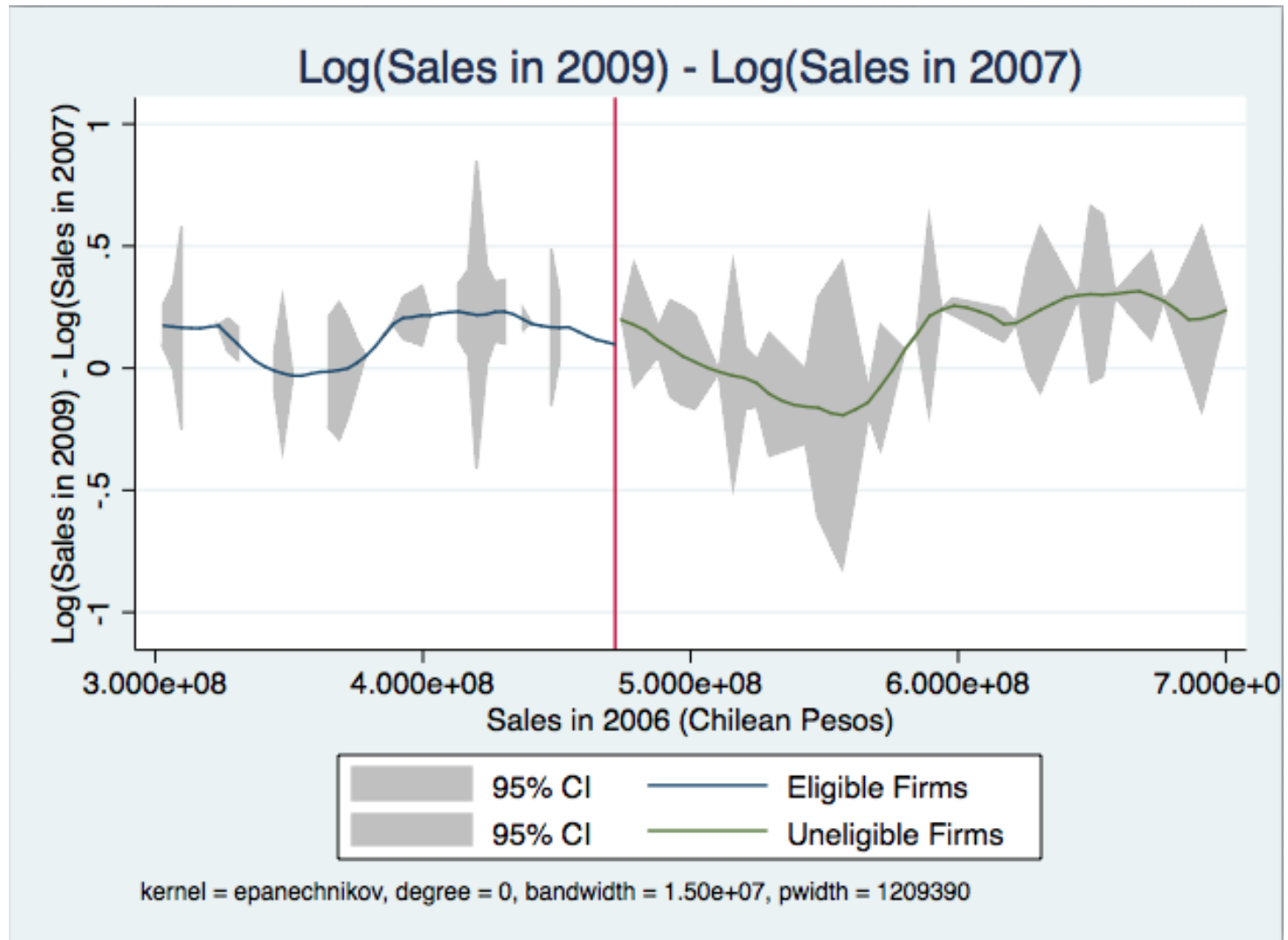


## Debt to Equity in 2009

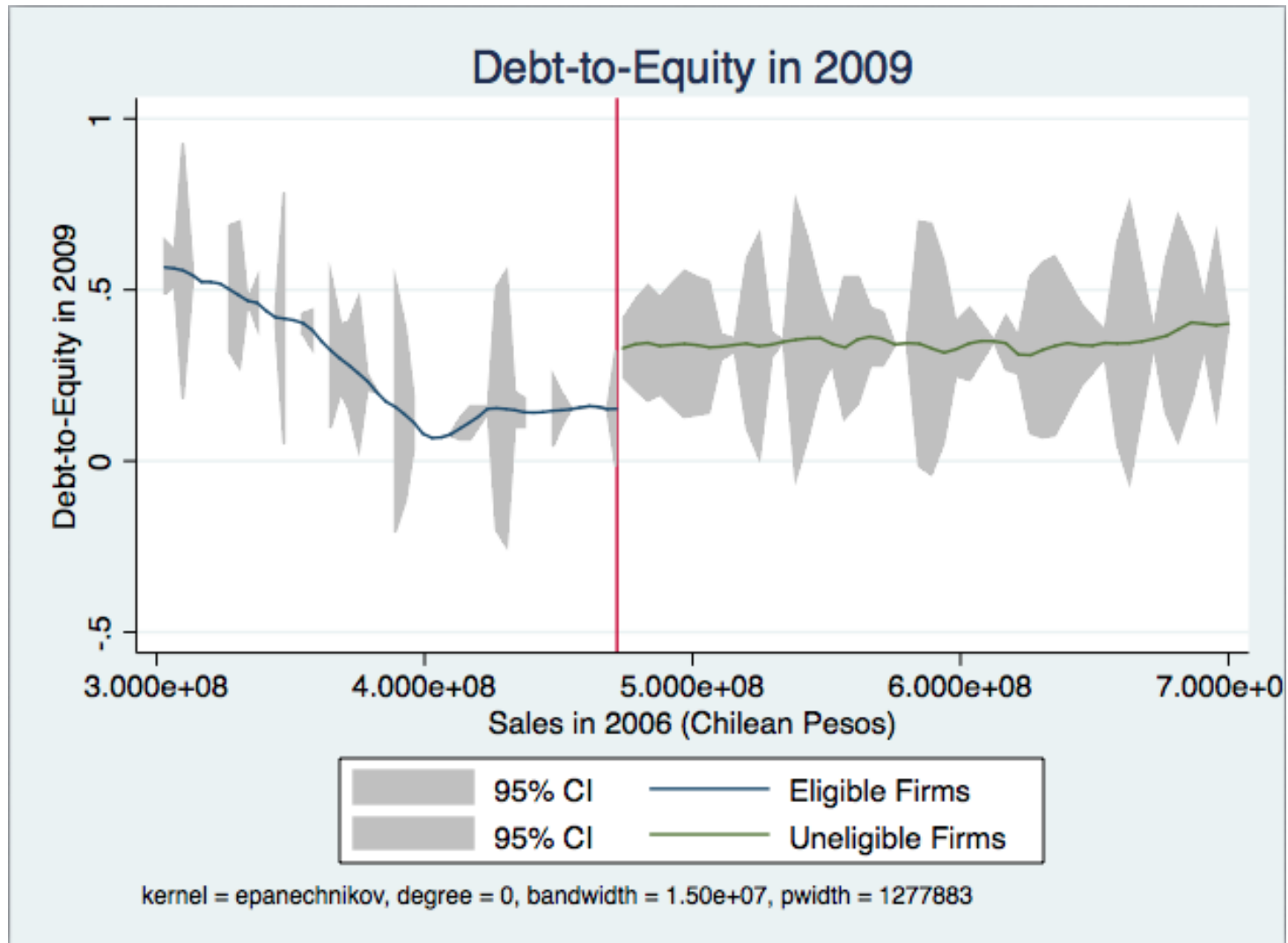
	(1) No Controls (+/- 50% of Threshold)	(2) Controls (+/- 50% of Threshold)	(3) No Controls (+/- 75% of Threshold)	(4) Controls (+/- 75% of Threshold)
Eligibility in 2007	-0.138 (0.201)	-0.101 (0.223)	-0.182 (0.150)	-0.192 (0.163)
Normalized Sales in 2006	-1.79e-09 (5.59e-09)	-2.21e-09 (5.91e-09)	-8.66e-10 (2.92e-09)	-1.38e-09 (3.07e-09)
Normalized Sales in 2006 x Eligibility in 2007	2.72e-09 (8.37e-09)	5.57e-09 (9.04e-09)	-1.29e-09 (4.03e-09)	-9.64e-10 (4.24e-09)
(Normalized Sales in 2006) <sup>2</sup>	1.31e-17 (5.89e-17)	1.68e-17 (6.28e-17)	7.65e-18 (2.01e-17)	1.09e-17 (2.11e-17)
(Normalized Sales in 2006) <sup>2</sup> x Eligibility in 2007	6.58e-18 (8.39e-17)	2.98e-17 (9.04e-17)	-1.56e-17 (2.63e-17)	-2.10e-17 (2.80e-17)
(Normalized Sales in 2006) <sup>3</sup>	-2.01e-26 (1.71e-25)	-3.09e-26 (1.82e-25)	-1.86e-26 (3.80e-26)	-2.41e-26 (3.98e-26)
(Normalized Sales in 2006) <sup>3</sup> x Eligibility in 2007	7.96e-26 (2.36e-25)	1.70e-25 (2.47e-25)	1.46e-26 (4.77e-26)	1.61e-26 (4.97e-26)
No. of Workers in 2007		0.0000427 (0.0000527)		0.00000829 (0.0000414)
Exporter in 2007		-0.0528 (0.103)		-0.0562 (0.0727)
No. of Years in Operation		-0.00334 (0.00228)		-0.00342* (0.00163)
Regions	No	Yes	No	Yes
Categories	No	Yes	No	Yes
Constant	0.340** (0.125)	0.624 (0.321)	0.318** (0.102)	0.572* (0.249)
N	363	358	634	626
R-sq	0.008	0.084	0.020	0.070



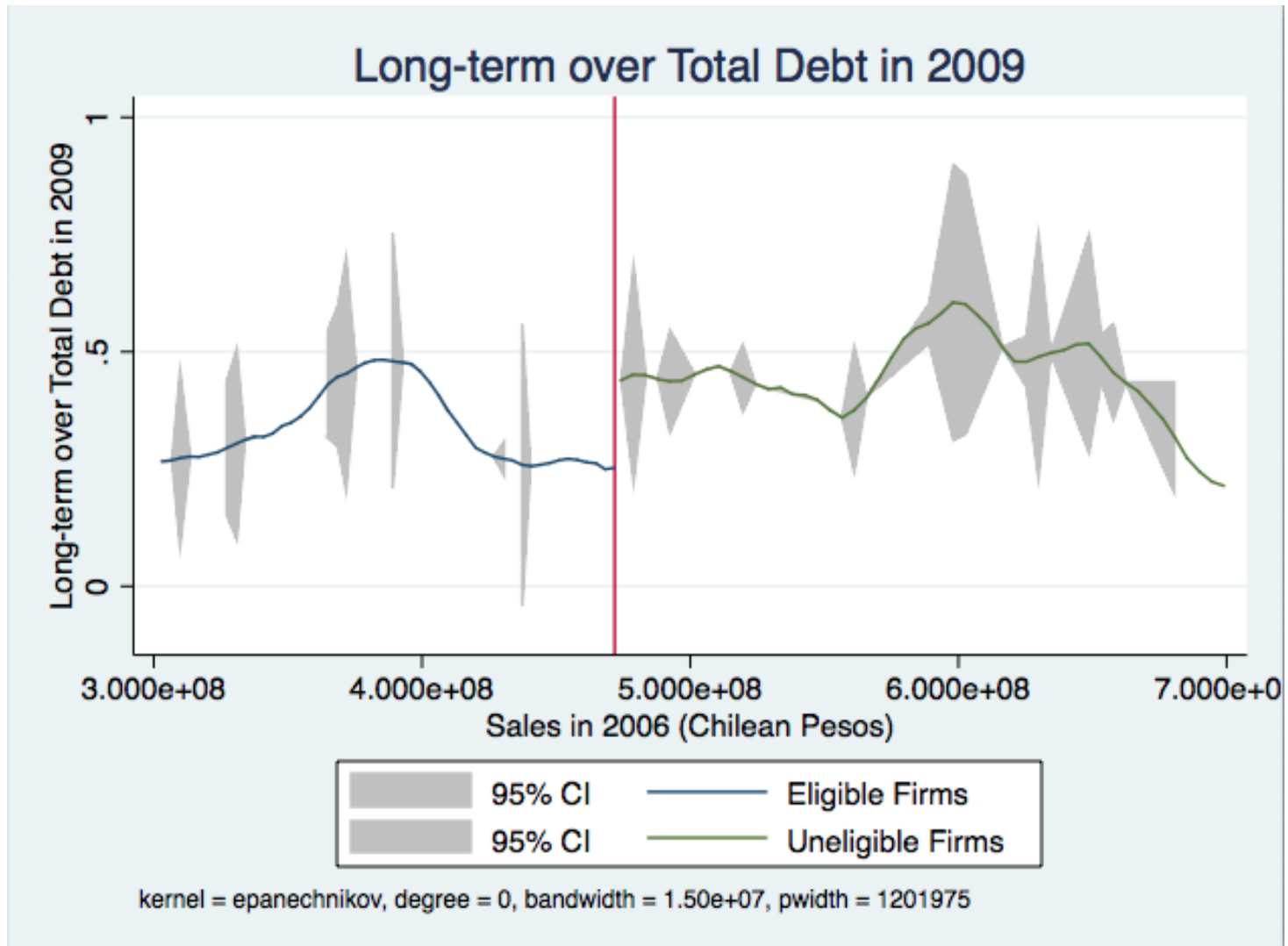
# Results ()



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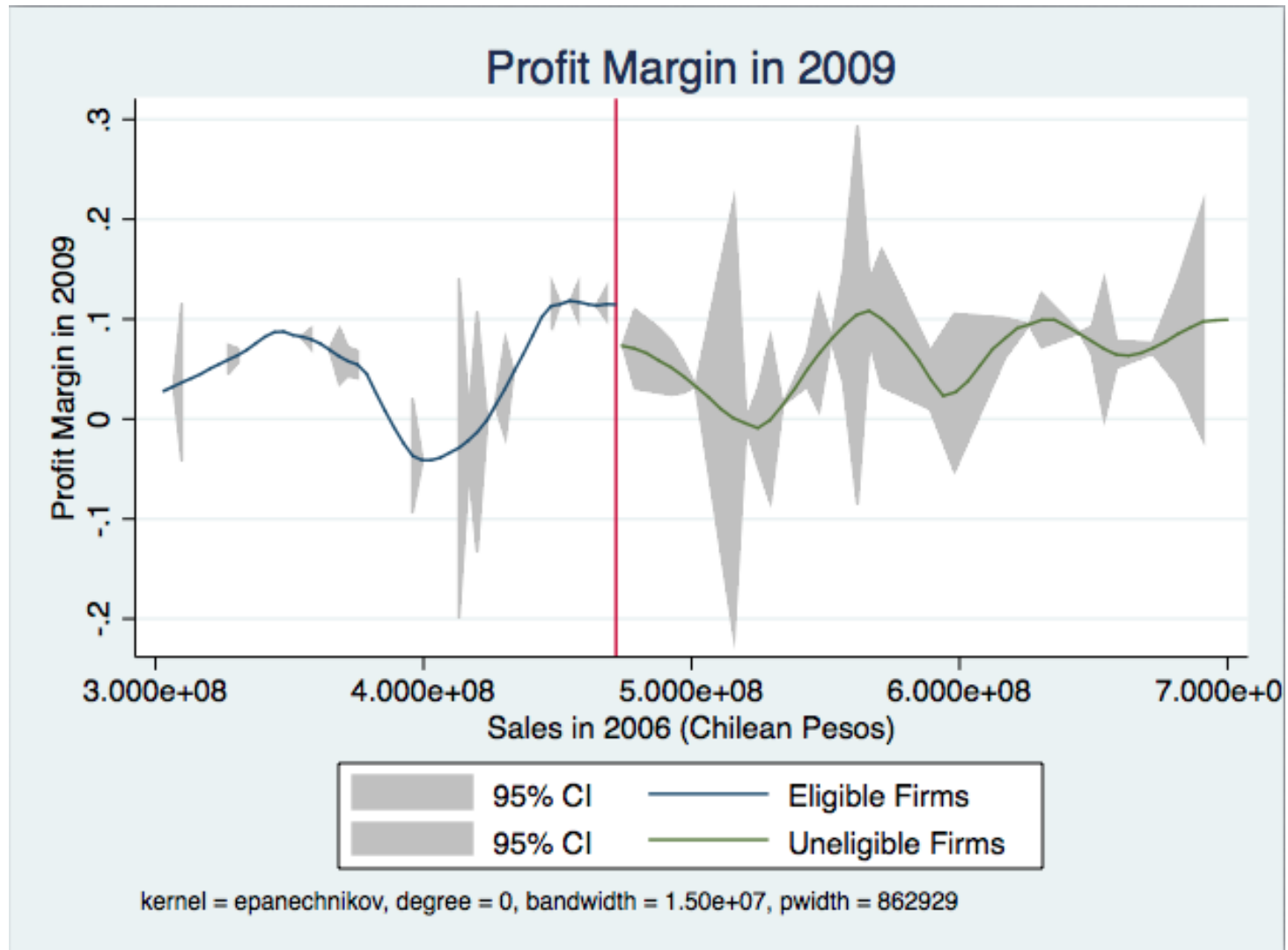


# Results ()





# Results ()



# Caveats & Limitations

- *As-if* randomly assigned
- Measurement error in survey data
- Longer time horizon
- Data coincides with financial crisis
- Local treatment effect



# Potential Problems



- Are firms really credit constrained?
- Are lenders substituting private for public guarantees?
- Do enterprises really have the expertise or productivity to undertake successful investments?



# Casting Doubt on Firm Productivity

- #2 constraint for Chilean enterprises, according to WB Enterprise Survey (2010), is:
  - “Inadequately educated workforce”
- Around 25% of Small and 22% of Medium firms identify Inadequate labor force as main obstacle



# Final Remarks

- Assessment on whether Fogape is truly easing financial constraints on the right firms
- Review loan portfolio of participating lenders
- Coordinate Fogape with other SME targeting programs



**Profit Margin in 2009**

	(1) No Controls (+/- 50% of Threshold)	(2) Controls (+/- 50% of Threshold)	(3) No Controls (+/- 75% of Threshold)	(4) Controls (+/- 75% of Threshold)
Eligibility in 2007	0.0614 (0.0583)	0.0351 (0.0657)	0.0310 (0.0485)	0.0170 (0.0529)
Normalized Sales in 2006	-6.69e-10 (1.83e-09)	-5.32e-10 (1.78e-09)	1.00e-10 (1.10e-09)	-6.45e-11 (1.10e-09)
Normalized Sales in 2006 x Eligibility in 2007	3.05e-09 (2.54e-09)	2.66e-09 (2.73e-09)	7.27e-11 (1.40e-09)	5.36e-10 (1.40e-09)
(Normalized Sales in 2006) <sup>2</sup>	6.62e-18 (1.89e-17)	3.20e-18 (1.76e-17)	-2.21e-19 (7.86e-18)	7.63e-19 (7.74e-18)
(Normalized Sales in 2006) <sup>2</sup> x Eligibility in 2007	1.33e-17 (2.59e-17)	1.40e-17 (2.66e-17)	-5.64e-19 (9.60e-18)	1.05e-18 (9.72e-18)
(Normalized Sales in 2006) <sup>3</sup>	-1.46e-26 (5.36e-26)	-1.75e-27 (4.82e-26)	3.93e-29 (1.48e-26)	-1.92e-27 (1.45e-26)
(Normalized Sales in 2006) <sup>3</sup> x Eligibility in 2007	6.08e-26 (7.29e-26)	3.89e-26 (7.32e-26)	-4.09e-27 (1.79e-26)	2.83e-27 (1.75e-26)
No. of Workers in 2007		-0.0000148 (0.0000290)		-0.00000945 (0.0000252)
Exporter in 2007		0.0422 (0.0525)		0.0616 (0.0362)
No. of Years in Operation		0.0000686 (0.000686)		0.000328 (0.000572)
Regions	No	Yes	No	Yes
Categories	No	Yes	No	Yes
Constant	0.0755* (0.0362)	0.0784 (0.0758)	0.0596 (0.0305)	0.0305 (0.0580)
N	376	371	656	648
R-sq	0.008	0.138	0.005	0.113

