What is the Impact of Increased Business Competition?

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Motivation and Overview

- **Reduction in entry costs** $\rightarrow$ increased business competition
  - **Macro Effect:** aggregate employment
  - **Micro Channels:** entrants, incumbents
- Lack of evidence due to **identification challenges**
  - Implementation of reforms is *endogenous*
  - Behavior of entrants and incumbents is *endogenous*
- **Main contributions:**
  - **Novel causal evidence:** Entry reform in Portugal (2005) as *natural experiment*
  - **Theoretical framework:** consistent predictions

Preview of Empirical Results

Q1. Impact of reform on entry?

- **Entry increased** by 25% per year

Q2. Response of employment?

- **Employment increased** by 4% per year

Q3. Firm-level channels driving results?

- Majority of employment expansion due to **incumbent firms**
- Incumbents' expansion driven by **most productive ones**

Preview of Theoretical Model

Q4. Model rationalizing empirical findings?

- Heterogeneous firms & CES demand: inconsistent predictions

  $\longrightarrow$ *homogeneous reduction* in employment by incumbent firms

- **Heterogeneous firms & elasticities:** consistent predictions
  - Lower demand elasticity for more productive firms

    $\rightarrow$ *most productive firms expand employment*

    $\rightarrow$ *least productive firms cut employment*

Literature

Outline

- The Portuguese reform
- Identification strategy
- Empirical analysis
- Theoretical analysis

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- **The Portuguese reform**
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- Empirical analysis
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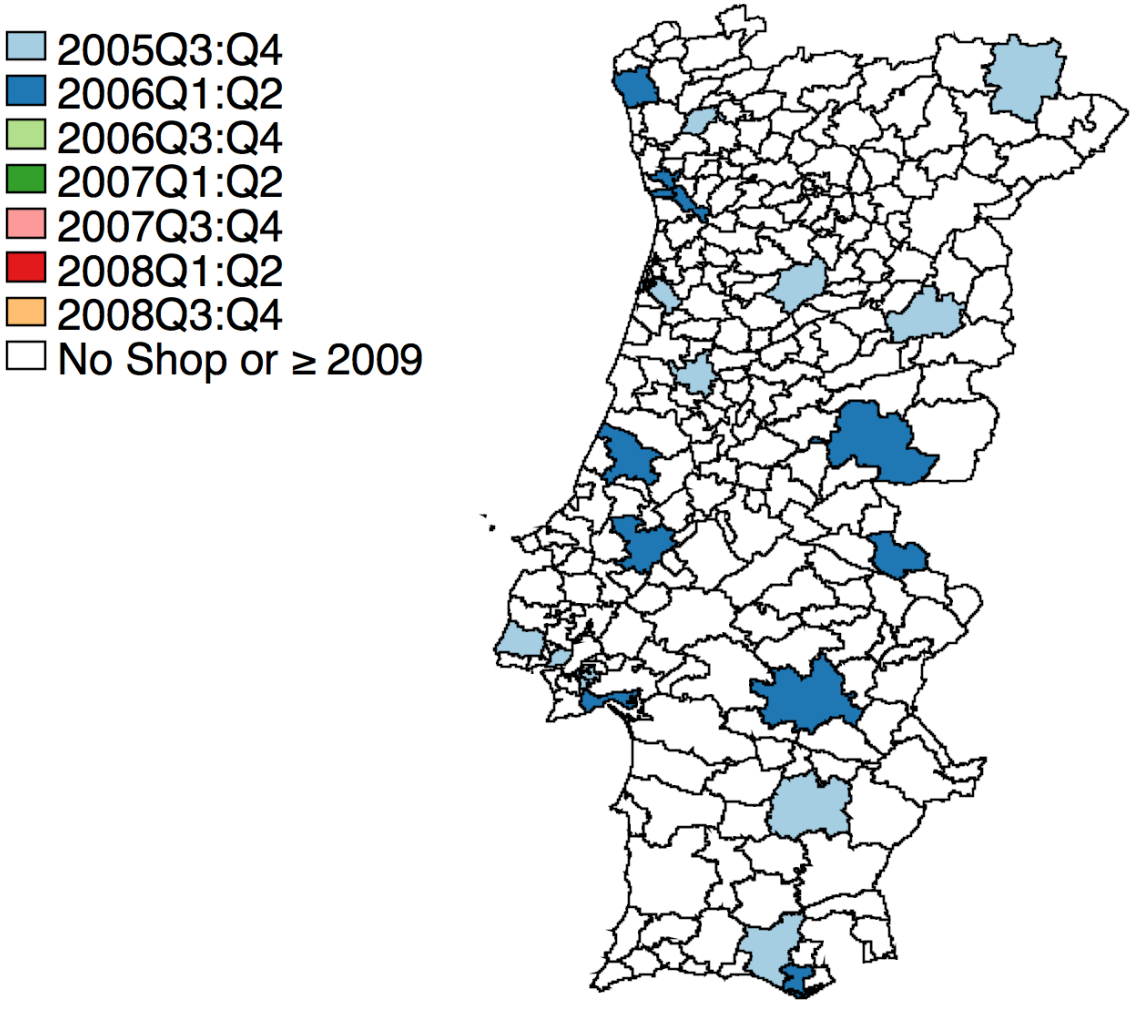
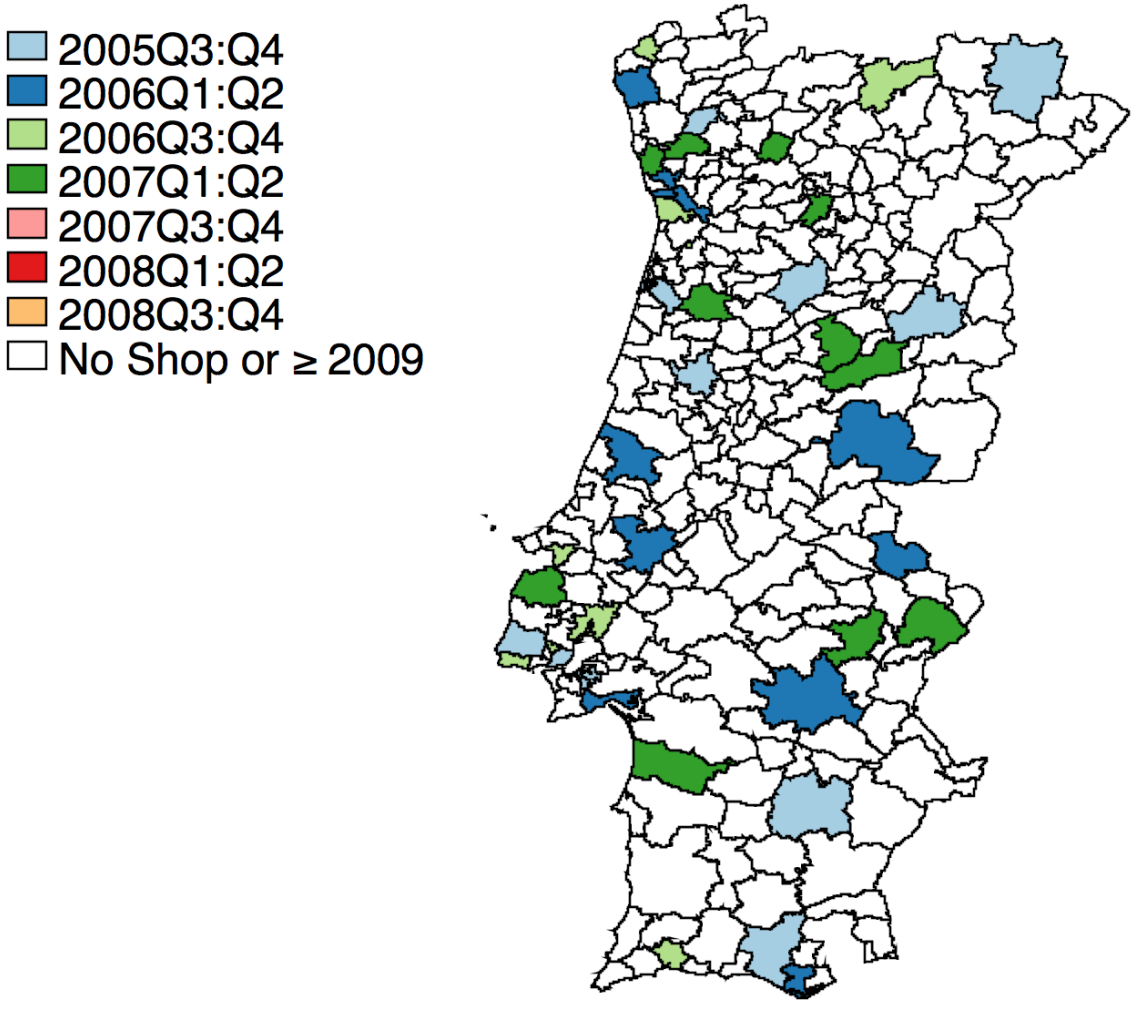
Empresa Na Hora

- 6 July 2005
  - Reduction in *time cost*: opening of **"One-Stop Shops"**
    - **Pre-reform:** 11 procedures, 20 forms, wait 54 - 78 days.
    - **Post-reform:** one office, one hour.
  - Reduction in *monetary cost*: from 2000 to 360 €.
- Portugal's Ranking in the "Doing Business Index": 113th $\rightarrow$ 33rd.
- Key features: $\rightarrow$ **staggered implementation** (limited resources)

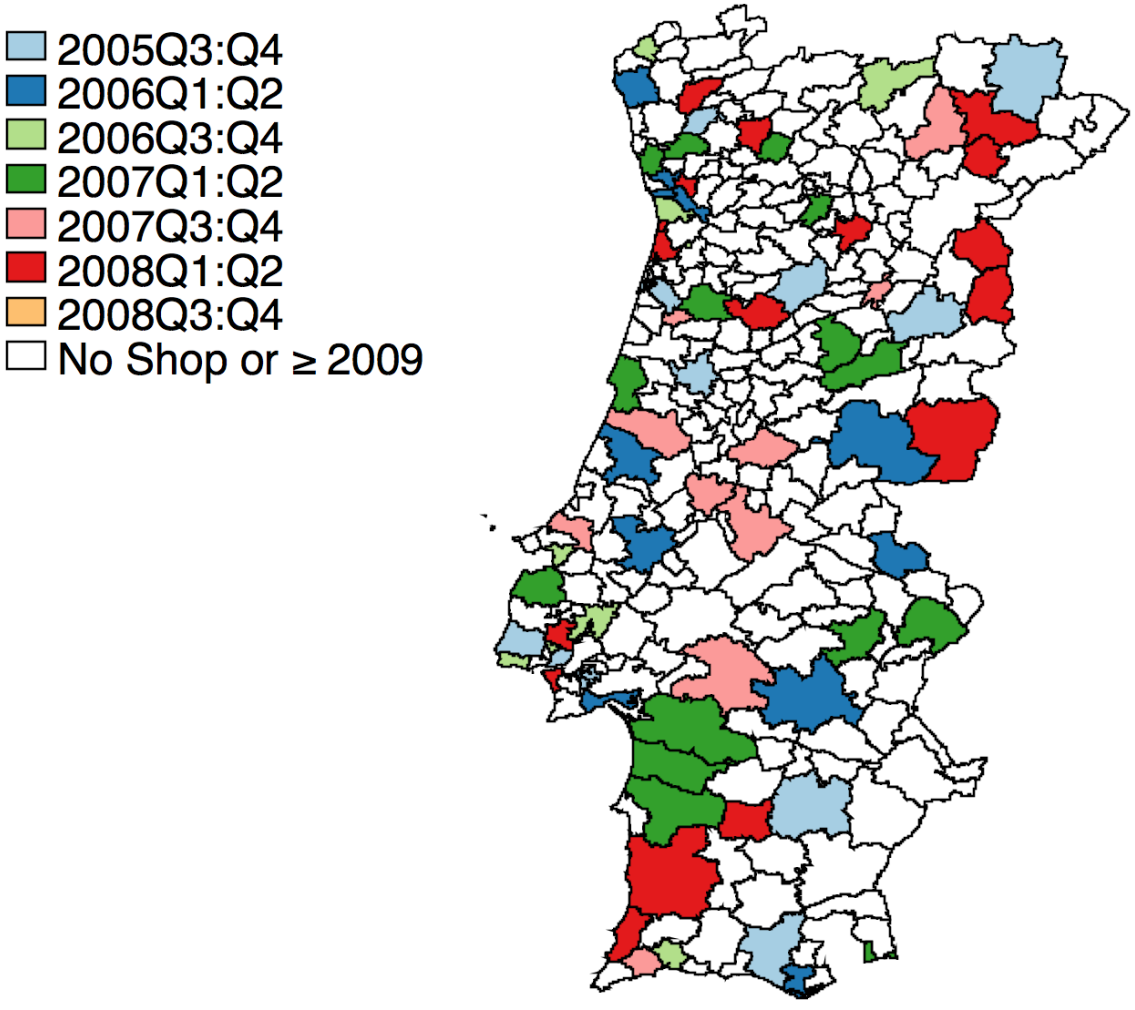
Phasing In of the Reform



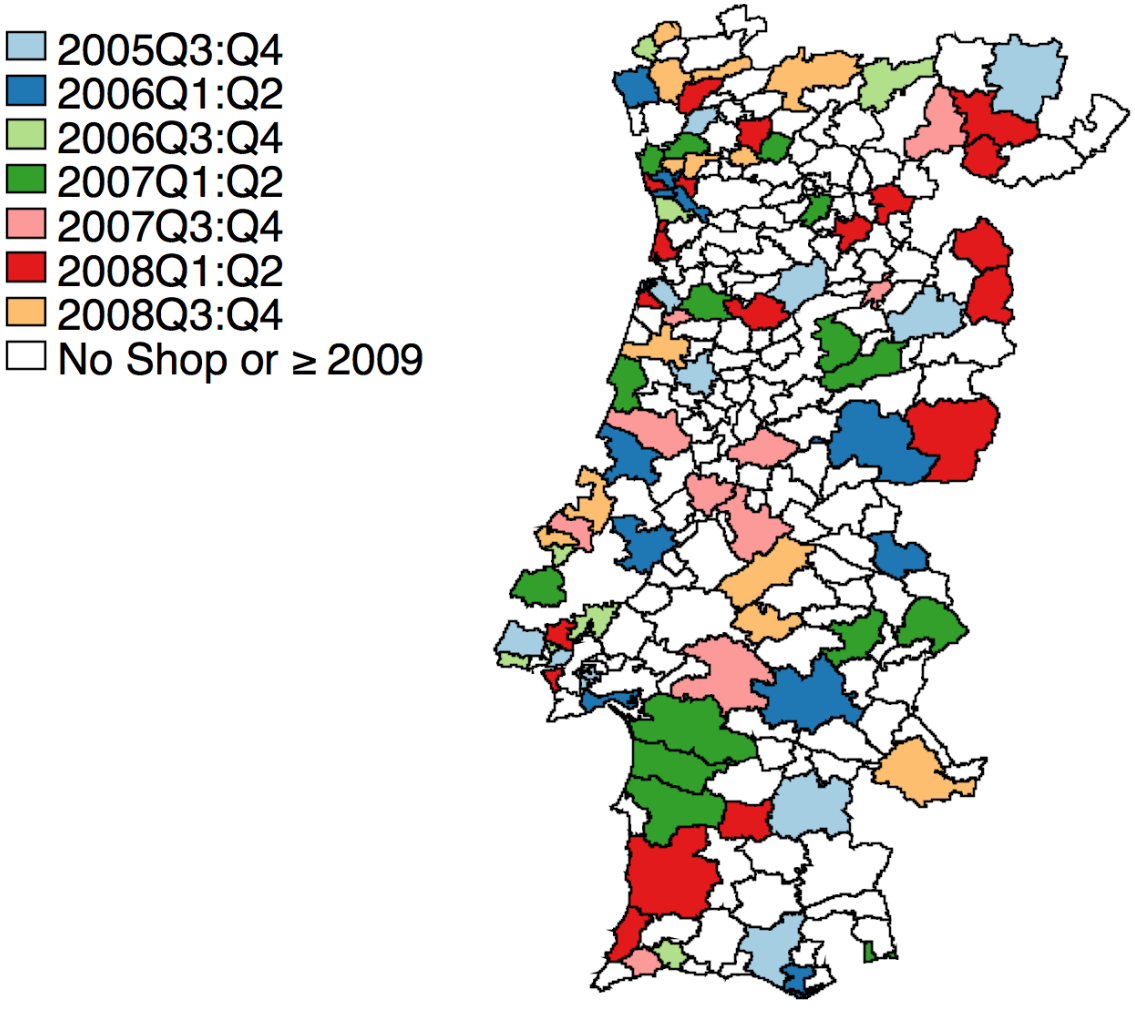
Phasing In of the Reform



Phasing In of the Reform



Phasing In of the Reform



Outline

- The Portuguese reform
- **Identification strategy**
- Empirical analysis
- Theoretical analysis

Identification Strategy

$\longrightarrow$ Exploit staggered opening of One-Stop Shops across the country.

$$y_{m,t} = \alpha_m + \delta_t + \sum_{\tau} \beta_\tau \mathbb{1}(t - \tau_{0,m} = \tau) + \gamma X_{m,t} + \epsilon_{m,t}.$$

$$\downarrow$$

$$\beta_\tau = \underbrace{E\left[y_{(\tau)}^{\text{treated}} - y_{(-1)}^{treated}\right]}_{\text{treated municipalities}} - \underbrace{E\left[y_{(\tau)}^{\text{control}} - y_{(-1)}^{control}\right]}_{\text{control municipalities}},$$

Parallel trends: control municipalities provide counterfactual

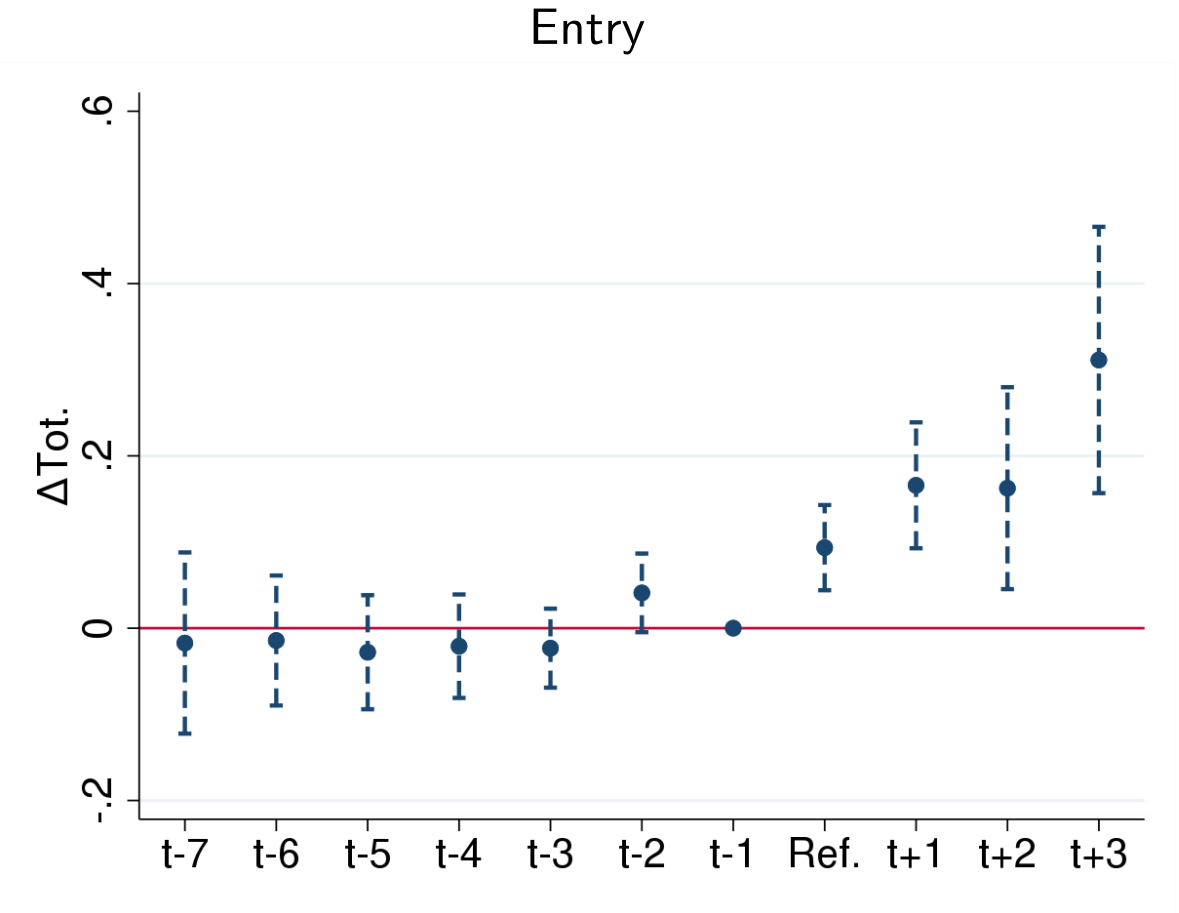
Parallel Trends

Outline

- The Portuguese reform
- Identification strategy
- **Empirical analysis**
- Theoretical analysis

The Impact of the Reform on Firm Entry

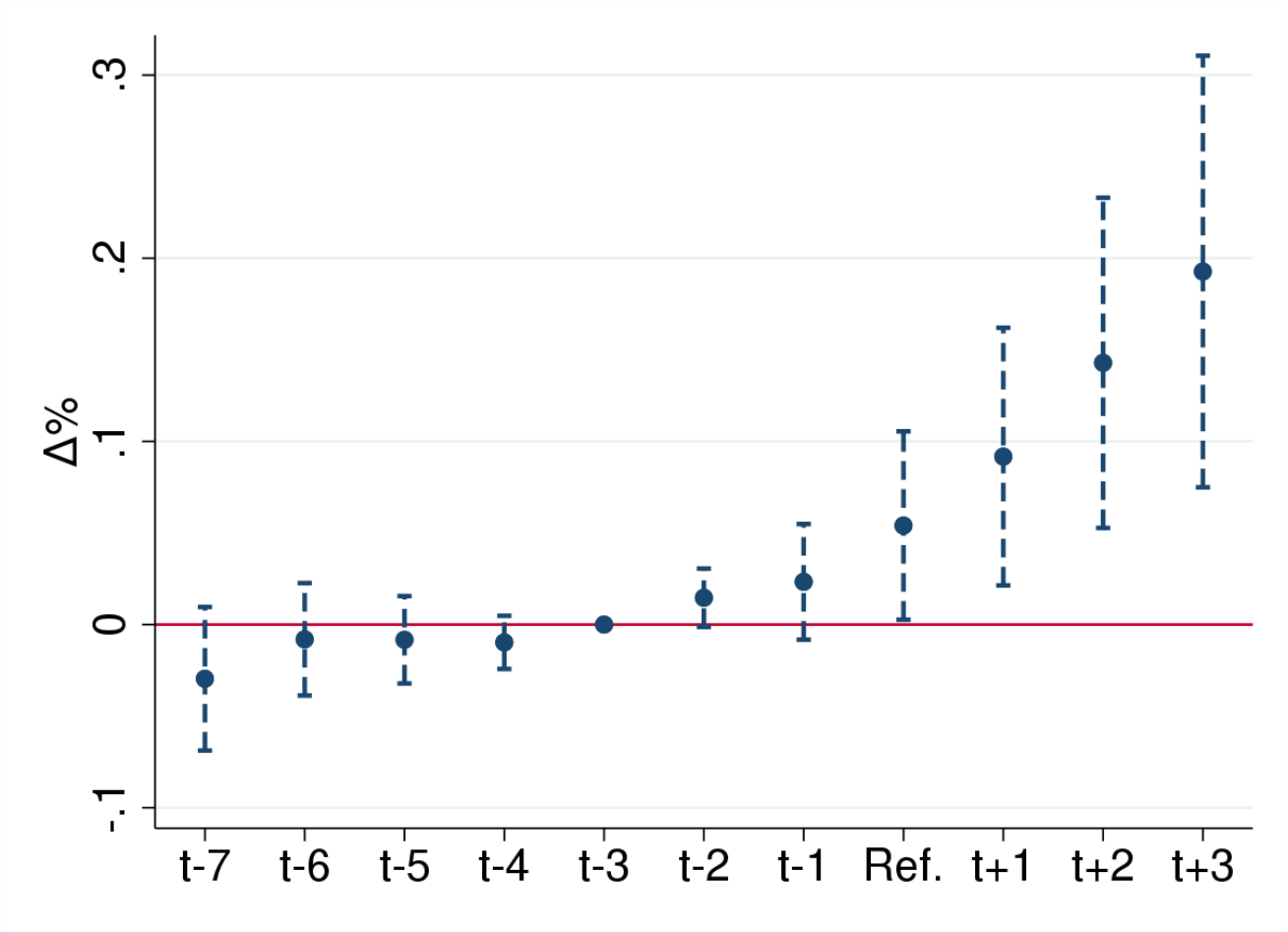
Finding 1: The reform increased entry by 25% per year.



$$y_{m,t} = \alpha_m + \delta_t + \sum_{\tau=-7}^{3} \beta_\tau \mathbb{1}(t = \tau_{0,m} + \tau) + \sum_m \gamma_m \mathbb{1}(Mun_m = 1)t + \epsilon_{m,t}.$$

The Impact of the Reform on Employment

Finding 2: The reform increased employment by 4% per year

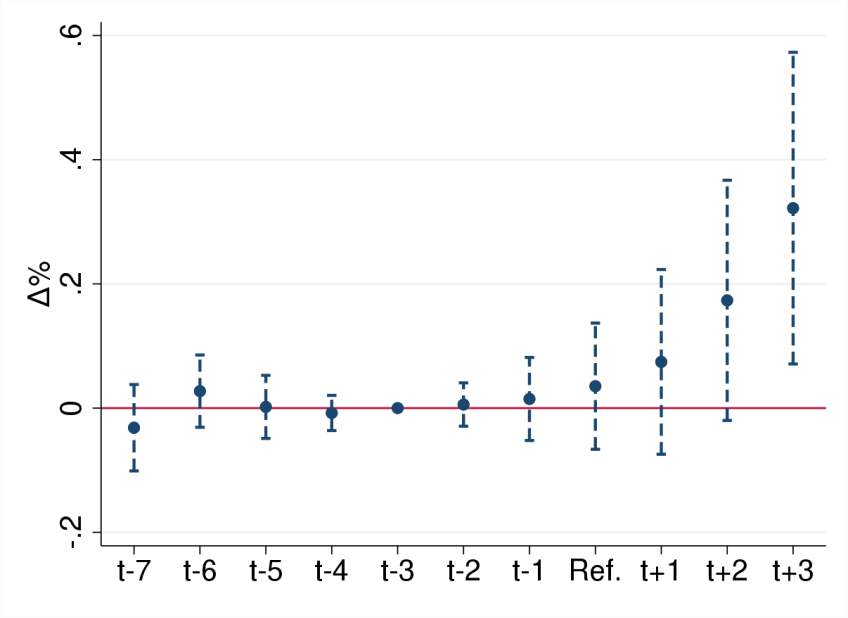


LF Particip. & Unempl.

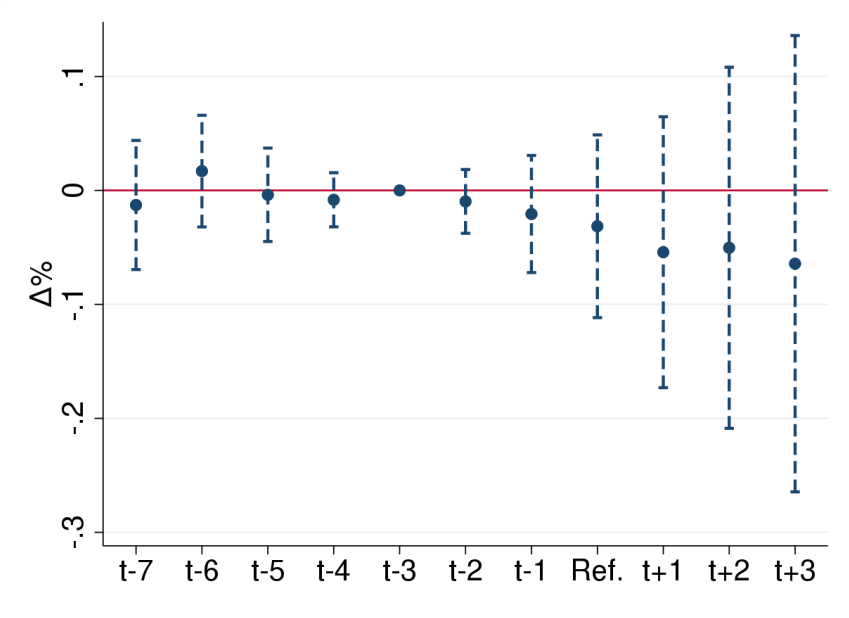
What is Driving the Increase in Employment?

Finding 3: Entrants and young firms contributed via extensive margin

Employment, Age 0-5



Average Size, Age 0-5

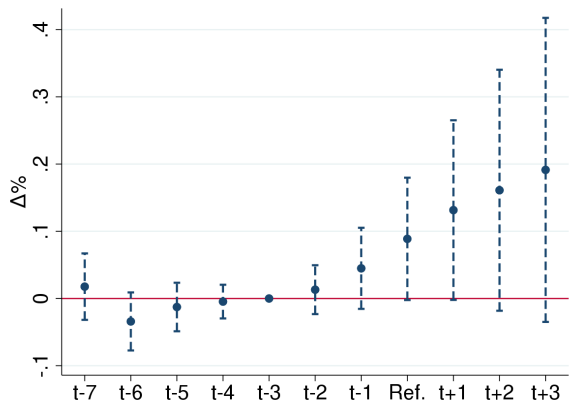


$\longrightarrow$ Entrants and young firms explain approx 43% of net employment growth

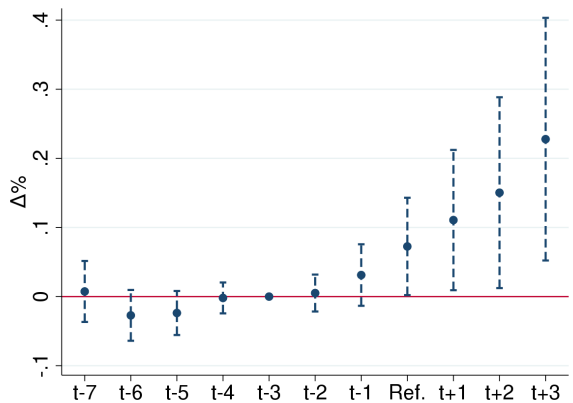
What is Driving the Increase in Employment?

Finding 4: Incumbent firms contributed via intensive margin

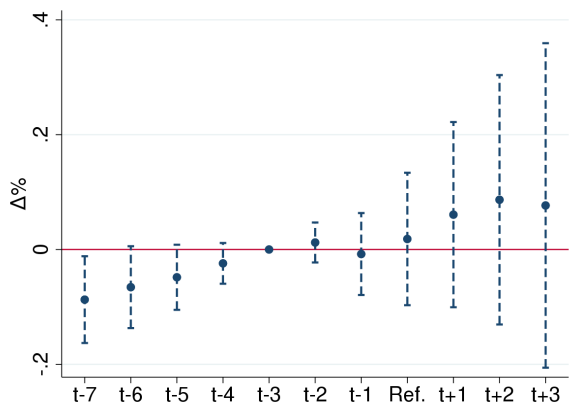
Employment, Age 6-15



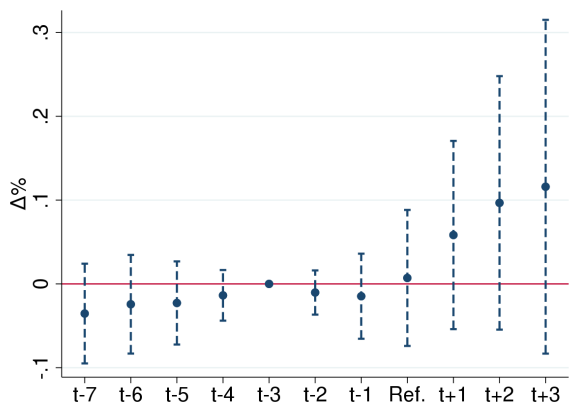
Average Size, Age 6-15



Employment, Age 15+



Average Size, Age 15+

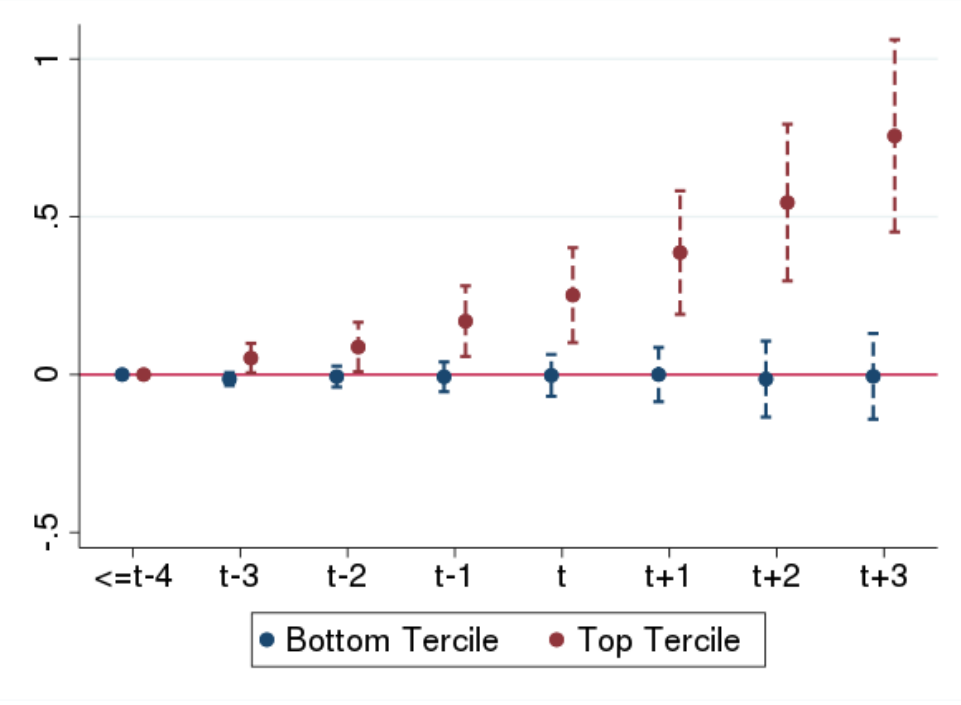


$\longrightarrow$ Incumbents explain approx 57% of net employment growth Sector

Heterogeneous Impact of the Reform - Employment

Finding 5: Employment growth by incumbents driven by most productive firms

Employment by Terciles of Revenue Labor Productivity in 2004

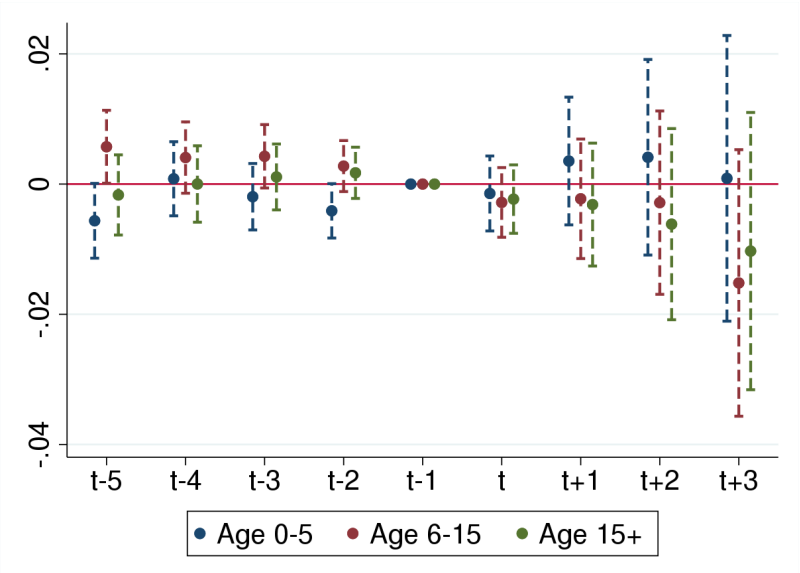


- Rank by municipality, age-group, 3-digit sector in 2004
- Aggregate top and bottom tercile firms at the municipality level

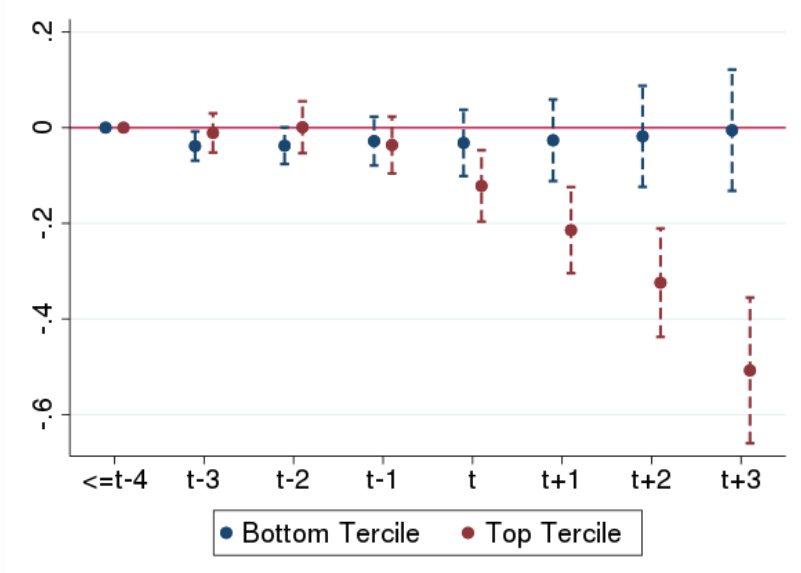
Heterogeneous Impact of the Reform - Exit

Finding 6: Exit decreased for the most productive firms

Exit Prob. by Age Group



Total Exit by Terciles of LP in 2004



Outline

- The Portuguese reform
- Data
- Identification strategy
- Empirical results
- **Theoretical analysis**

Overview of Theoretical Analysis

- Model rationalizes findings?

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- Model rationalizes findings?

General Static Framework: Heterogeneous firms, monopolistic competition

- **CES Demand**
  - Homogeneous and constant elasticity
- **Symmetric Translog Demand**
  - Heterogeneous and variable elasticity

$\rightarrow$ **Comparative statics**: firms' labor demand $\mathbf{l}_i$ and aggregate employment $\mathbf{L}$

CES and Translog Demand

- **CES Demand:**

$$\epsilon_i = \sigma \qquad \& \qquad \mu_i = \frac{\sigma}{\sigma - 1}$$

- **Translog Demand:**

$$\epsilon_i = 1 + \frac{\gamma}{s_i} \qquad \& \qquad \mu_i = \left(1 + \frac{s_i}{\gamma}\right), \text{ where}$$

$$s_i = \frac{1}{M} + \gamma[\ln P - \ln p_i] \qquad \text{and} \qquad p_i = \left(1 + \frac{s_i}{\gamma}\right)\frac{1}{a_i}$$

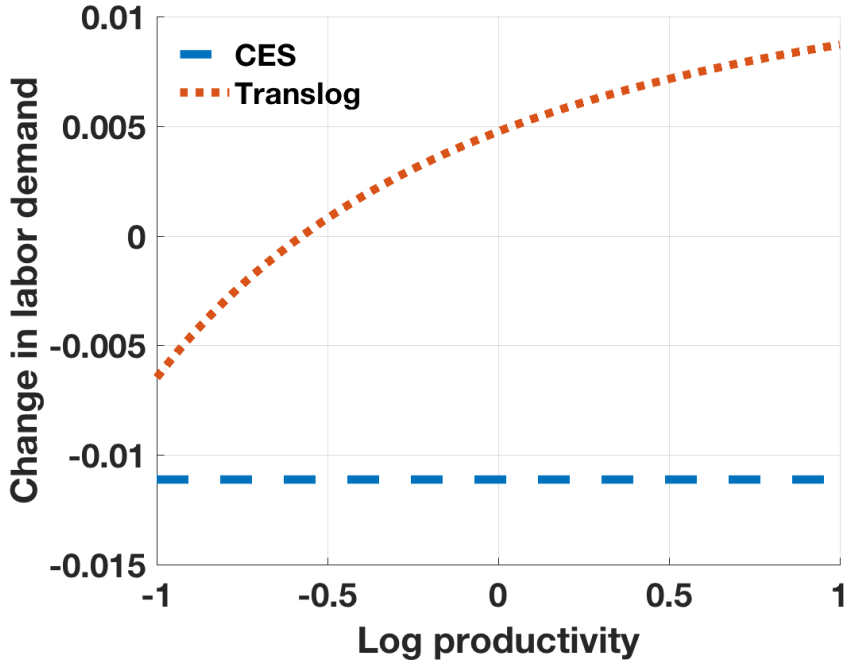
$$\Longrightarrow \epsilon_i \ (\mu_i) \text{ increasing (decreasing) in } M$$

$$\Longrightarrow \epsilon_i \ (\mu_i) \text{ decreasing (increasing) in } a_i$$

Demand and Price Level

CES & Translog - Firm-Level Labor Demand

Heterogeneous Impact of the Reform on l_i



- **CES Demand:** $\frac{\partial \ln l_i}{\partial M} < 0 \ (\sigma - 1 > \nu)$, $\frac{\partial^2 \ln l_i}{\partial M \partial \ln a_i} = 0$
- **Translog Demand:** $\frac{\partial^2 \ln l_i}{\partial M \partial \ln a_i} > 0$

Calibration

CES & Translog - Aggregate Employment

Aggregate Employment Response

Δ L	Entrants	Incumbents	Total
CES Demand	2.22%	−1.10%	1.12%
Translog Demand	2.26%	0.46%	2.73%

- **CES & Translog Demand:** $\frac{\partial L}{\partial M} > 0$

CES - Love of Var. Translog - Markup and Realloc.

CES & Translog - Intuition

Two forces triggered by reform:

- **Competition** - all incumbents worse off

  CES - homogeneous impact

  Translog - heterogeneous impact, productive hurt less

CES & Translog - Intuition

Two forces triggered by reform:

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- **Aggregate Demand** - homogeneously beneficial

CES & Translog - Intuition

Two forces triggered by reform:

- **Competition** - all incumbents worse off

  CES - homogeneous impact

  Translog - heterogeneous impact, productive hurt less

- **Aggregate Demand** - homogeneously beneficial

- **Overall Effect**

  CES - competition channel stronger under standard calibration

  Translog - most productive firms increase hiring and sales

Conclusions

- Portuguese reform as natural experiment
- Reform increased entry and employment
- Expansion by most productive incumbents
- Model with heterogeneous firms and elasticities - Beyond CES

Thank You!

Literature Review

- **Entry reforms: representative firm**
  - Blanchard and Giavazzi (2003)
  - New Keynesian models: Zero Lower Bound and representative firm (Eggertsson, 2012, Eggertsson et al, 2014)
  - Other GE model: Translog preferences and representative firm (Bilbiie et al, 2012, Cacciatore and Fiori, 2016)
- **Firm dynamics: heterogeneous firms + CES demand**
  - Hopenhayn (1992), Lee and Mukoyama (2013), Sedlaceck (2012), Clementi and Palazzo (2016)
- **Entrepreneurship: empirical analysis of firm entry**
  - Bertrand and Kramarz (2002), Viviano (2008), Kaplan et al. (2011), Branstetter et al (2014), Hombert et al. (2014)

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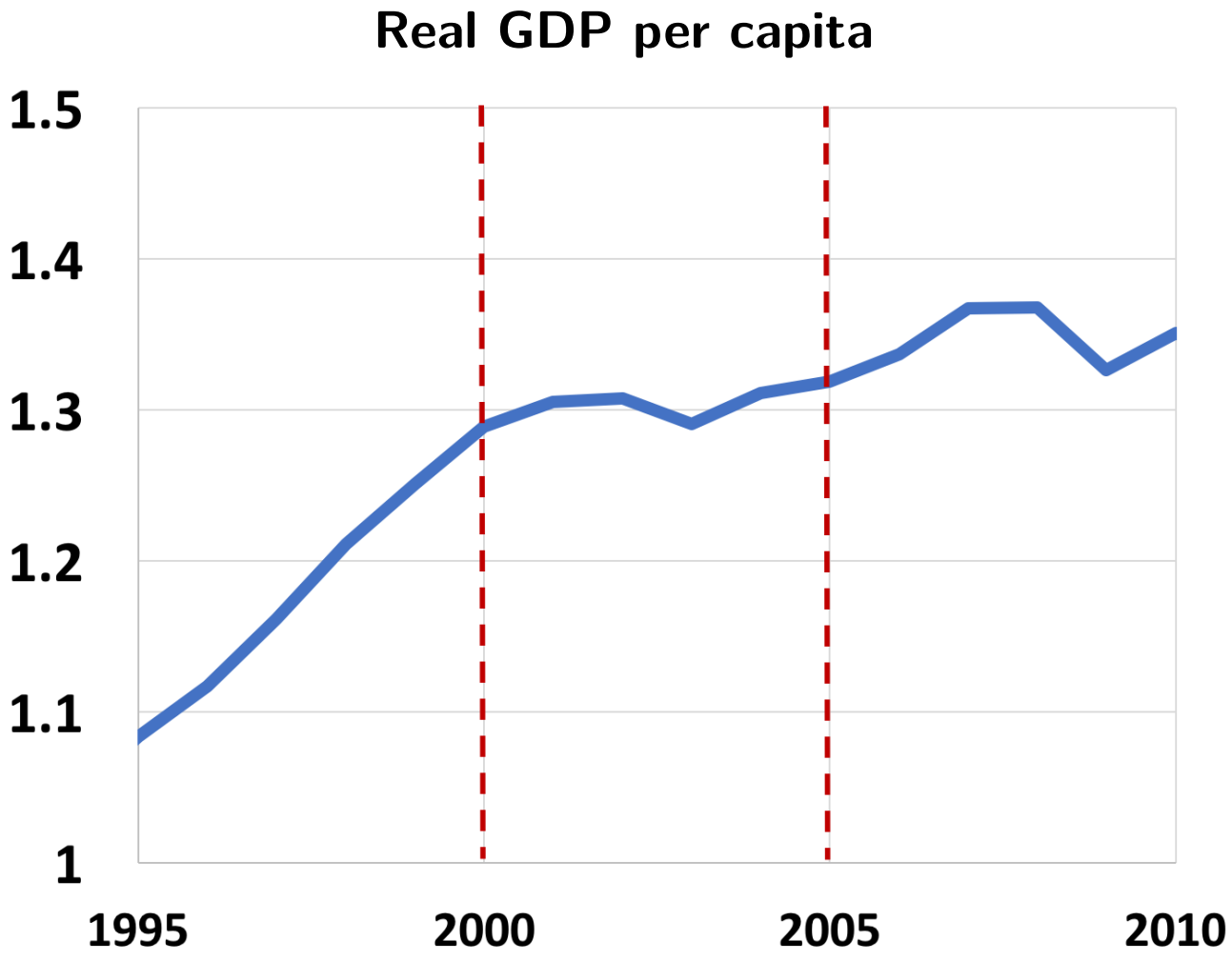
The Portuguese Slump



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Data

- **Quadros de Pessoal (2000 - 2008) -**
  - Universe of private limited-liability firms with at least 1 employee.
  - Relevant variables: date of incorporation, municipality, industry up to 5-digit, nominal sales, employment.

- **Instituto dos Registos e do Notariado -**
  - Opening date and venue of each One-Stop Shop.

- **National Statistics Institute -**
  - Municipality-level population demographics.

Descriptive Statistics

Descriptive Statistics

	yearly average
Relevant Statistics	
Entry Rate	7.5%
Exit Rate	9.3%
Operating Firms	125,015
Sales Sector Shares	
Agriculture	1.52%
Manufacturing	26.6%
Construction	10.14%
Services	61.74%

	*p*1	*p*25	*p*50	*mean*	*p*75	*p*99
Relevant Firm-Level Statistics						
Size Distribution	1	2	4	7.13	8	55
Age Distribution	0	2	6	10.87	15	59
Size of Entrants	1	1	2	3.75	4	27
Size of Young Firms ($\leq$ 5 yrs)	1	2	3	4.95	5	36
Size of Old Firms	1	3	5	8.96	10	64

Source: *Quadros de Pessoal and IES*

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Identification Assumption

Parallel trends: control municipalities provide counterfactual

- **Conversation with government officials**
  - Increase rankings
  - Offices availability
- **Differences in observables**
  - Not statistically significant
- **Estimation of pre-reform years**
  - Not statistically significant pre-reform trends

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Descriptive Statistics by Municipality Groups

	Treated Municipalities	Never-Treated	Early-Treated	Late-Treated
Firm Demographics				
Entry rate	8.5% (4.6%) [5.7%, 10.2%]	9.4% (6.9%) [5.4%, 11.9%]	7.9% (4%) [5.8%, 8.7%]	8.8% (5%) [5.6%, 10.8%]
Exit rate	8.4% (2.8%) [6.8%, 10%]	7.7% (4.1%) [5.3%, 10%]	8.5% (2.3%) [7%, 9.7%]	8.3% (3%) [6.6%, 9.9%]
Active firms per 1000 inhab	10.67 (3.8) [8.1, 12.9]	8.32 (3.4) [5.7, 10.4]	12.21 (3.8) [9.4, 15.1]	9.8 (3.5) [7.4, 11.7]
Macroeconomic Characteristics				
Employment rate (Census)	**47.2% (24%)** **[34.4%, 59.2%]**	**34.1% (21%)** **[25.8%, 44.3%]**	**53.7% (27%)** **[39.8%, 65.7%]**	**43.4% (18%)** **[30.6%, 54.9%]**
Residents (mean)	**66,896.1 (128,244)** **[17,852, 74,965]**	**18,540,7 (41,762.5)** **[6,396, 21,135]**	**114,213.3 (149,881.3)** **[44,162, 142,728]**	**39,421.6 (56,260.2)** **[14,241, 52,604]**
Macro-Sector of Activity				
Manufacturing - Sales	28.3% (19%) [11.1%, 40.5%]	27.2% (20%) [11.7%, 40.4%]	28.2% (20%) [14.3%, 45.4%]	28.3% (20%) [10.9%, 40.5%]
Services - Sales	46.66% (19%) [42.5%, 70.1%]	41.13% (15%) [39.6%, 65.3%]	53.76% (17%) [43.9%, 73.5%]	41.92% (16%) [42%, 66.2%]

Source: *Quadros de Pessoal and Portugal National Statistics Institute*

Mean with standard deviations in parenthesis. p25 and p75 in square parenthesis.

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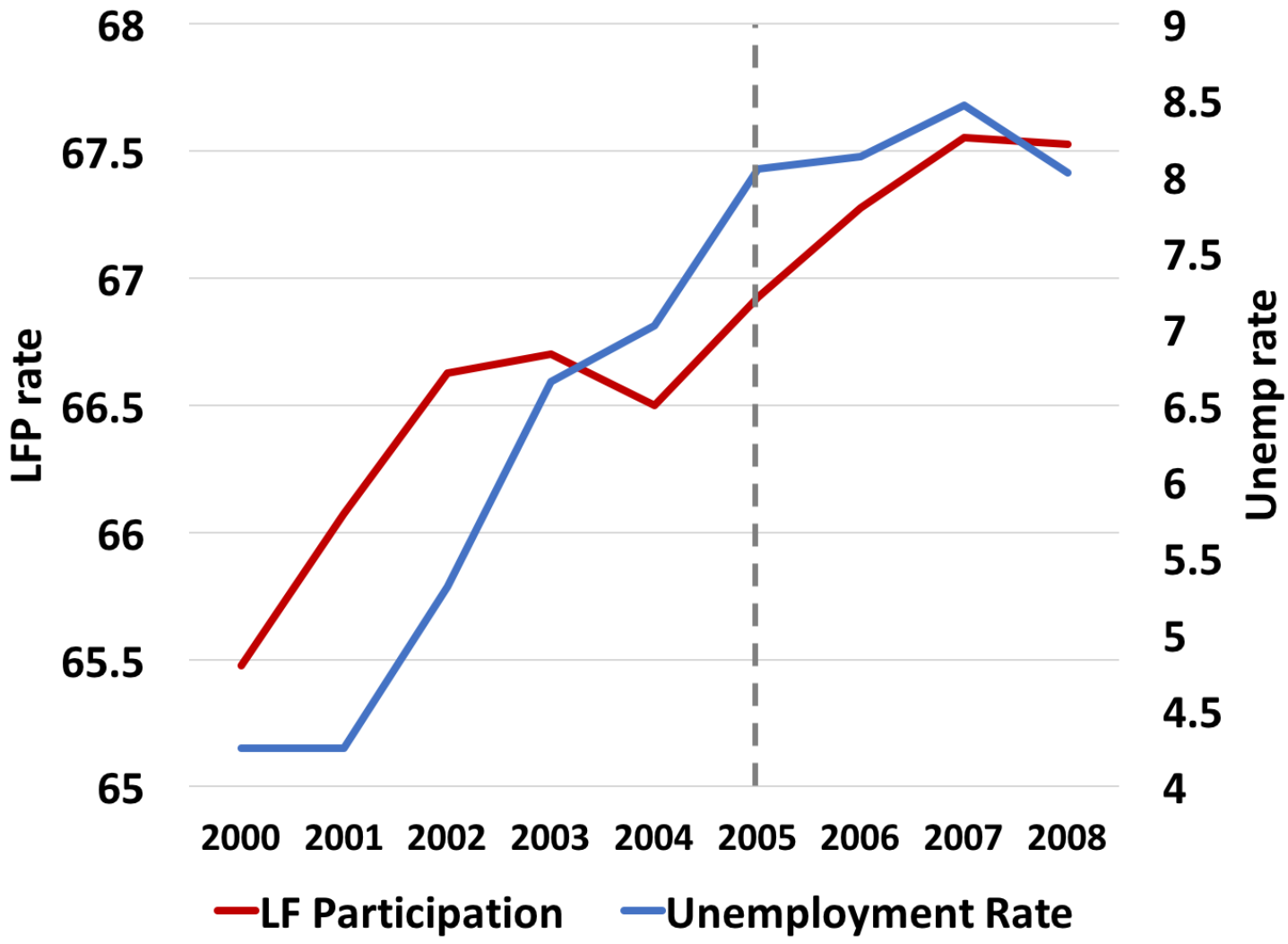
Labor Force Participation and Unemployment Rate



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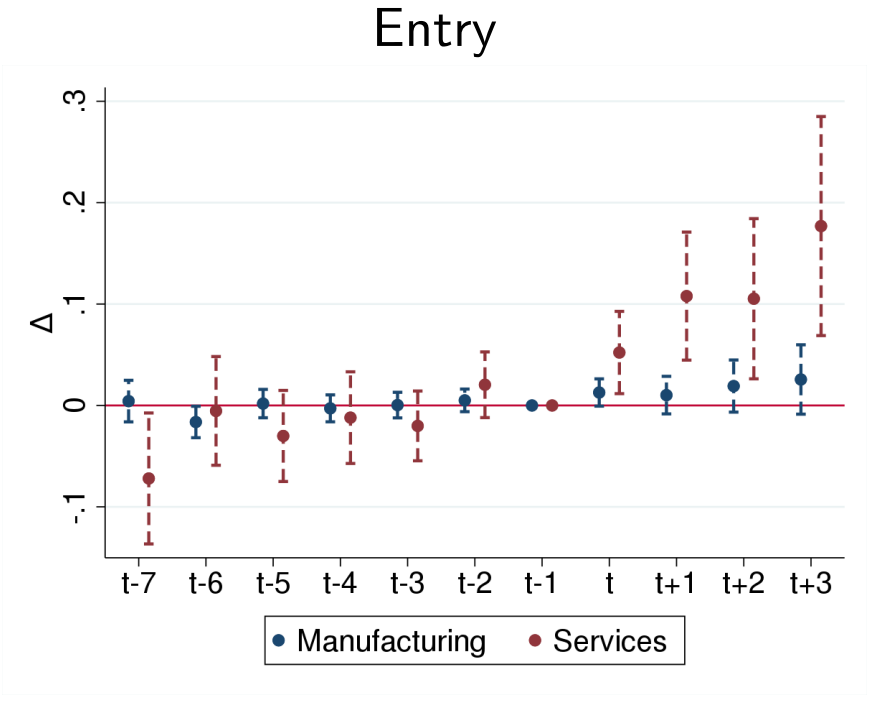
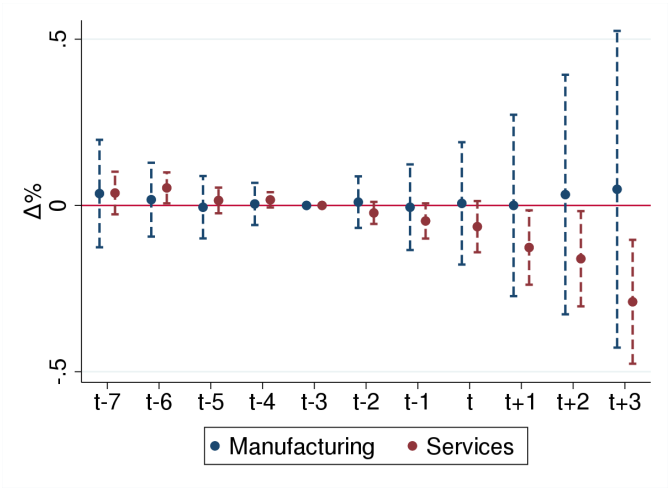
Sector-Level Evidence

Finding 7: Response to reform driven by service sector

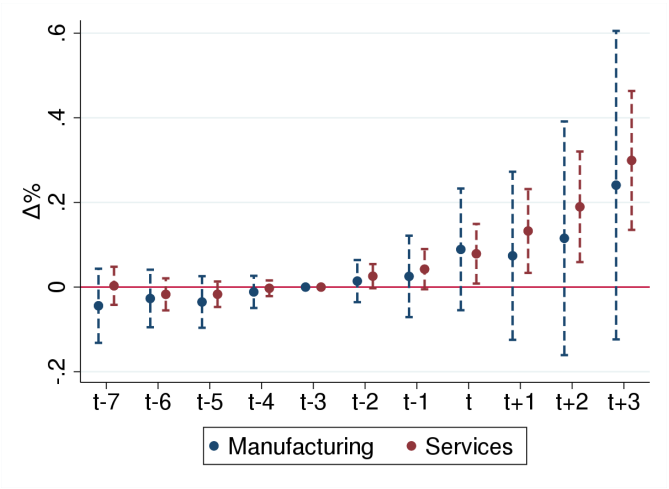


Sector-Level Evidence

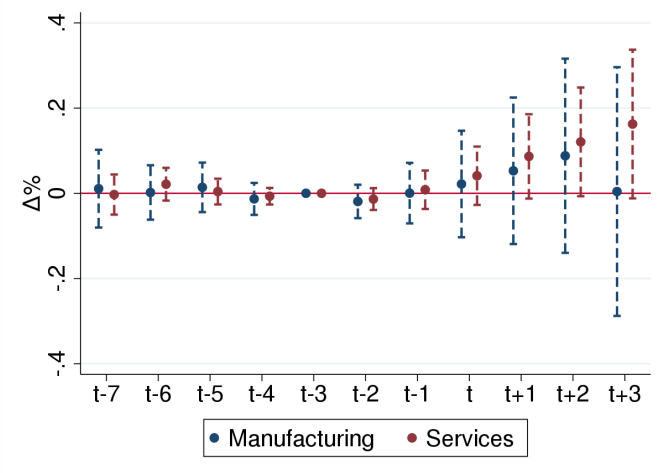
Average Size, Age 0-5



Average Size, Age 6-15



Average Size, Age 15+



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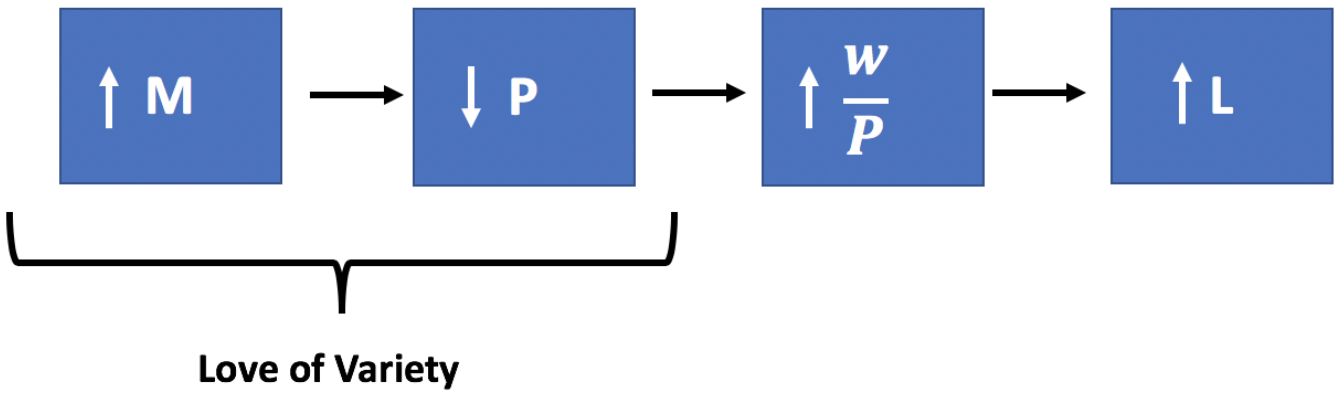
CES Demand - Love of Variety



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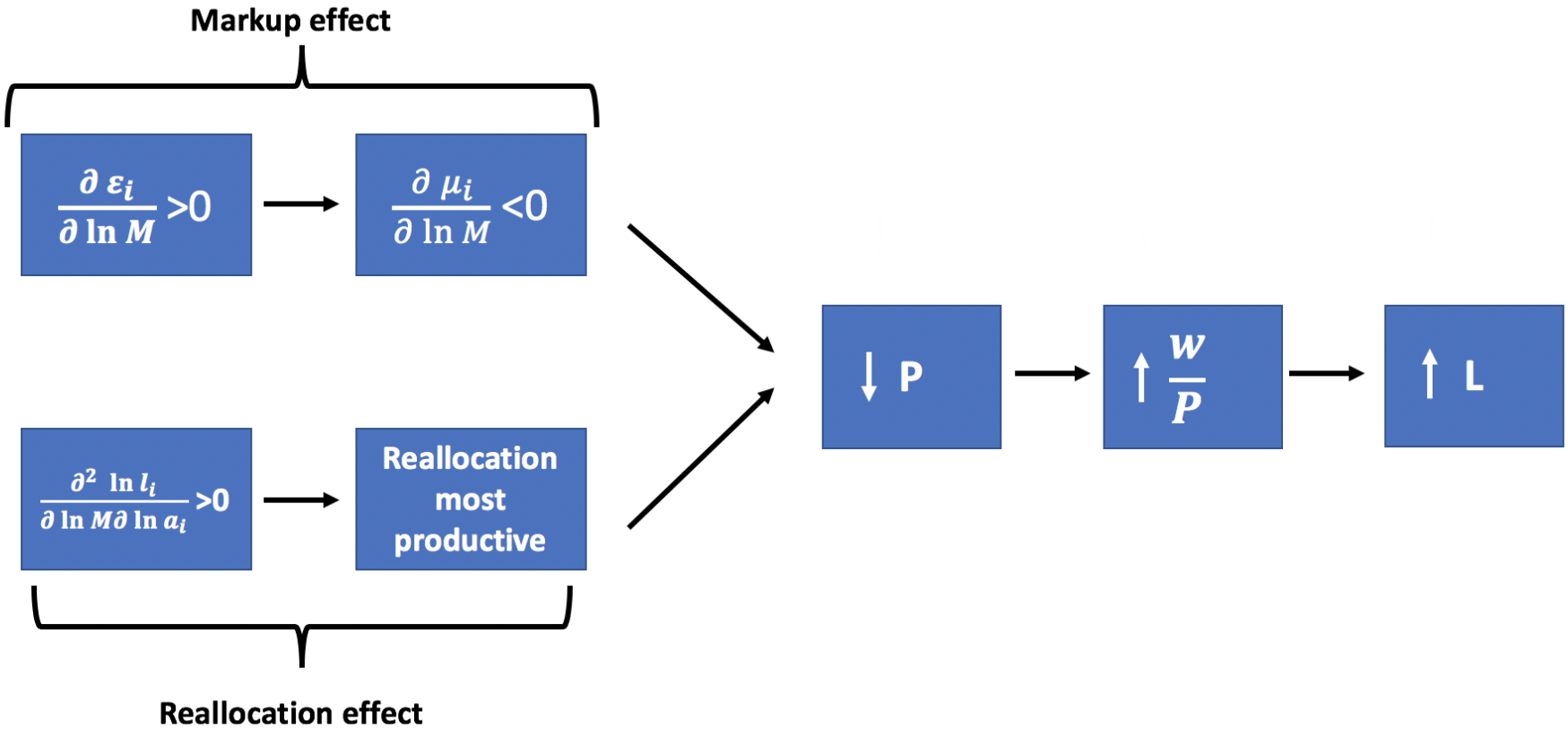
Translog Demand - Markup and Reallocation



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Proof 1

- Start from $\ln \varepsilon_i = \ln\left(1 + \frac{\gamma}{s_i}\right)$
- Derivative wrt $\ln M$

$$\frac{\partial \ln \varepsilon_i}{\partial \ln M} = \underbrace{-\gamma \frac{1}{\left(1 + \frac{\gamma}{s_i}\right)}}_{<0} \underbrace{\frac{\partial s_i}{\partial \ln M}}_{?}.$$

- To sign $\frac{\partial s_i}{\partial \ln M}$, plug p_i and $\overline{\ln p}$ in s_i

$$s_i = \frac{1}{M} + \gamma \left[\int_0^M \frac{1}{M} \ln\left(\frac{s_j}{\gamma} + 1\right) dj - \overline{\ln a}\right] - \gamma \ln\left(1 + \frac{s_i}{\gamma}\right) + \gamma \ln a_i.$$

- Get

$$\frac{\partial^2 s(a_i)}{\partial \ln M \partial \ln a_i} = -\overbrace{\frac{1}{1 + \frac{\gamma^2}{\gamma + s(a_i)}} \frac{1}{\left(1 + \frac{s(a_i)}{\gamma}\right)^2} \frac{\partial s(a_i)}{\partial \ln a_i}}^{>0} \frac{\partial s(a_i)}{\partial \ln M}.$$

- $\frac{\partial s(a_i)}{\partial \ln M}$ cannot change sign. If so, then by continuity there exists an a_i such that $\frac{\partial s(a_i)}{\partial \ln M} = 0$, implying that $\frac{\partial s(a_i)}{\partial \ln M} = 0 \ \forall i$.
- By totally differentiating the both side of $\int s(a_i) dF(a_i) = \frac{1}{M}$ by $\ln M$ we get

$$\int \frac{\partial s(a_i)}{\partial \ln M} dF(a_i) = -\frac{1}{M}.$$

- Hence $\frac{\partial s(a_i)}{\partial \ln M} < 0 \quad \forall i$ and $\frac{\partial \ln \varepsilon_i}{\partial \ln M} > 0 \quad \forall i$.

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Proof 2

- Start from $l_i = \frac{s_i E}{p_i a_i}$. Get

$$\ln l_i = \underbrace{\ln s_i - \ln\left(1 + \frac{s_i}{\gamma}\right)}_{\equiv \Phi(s_i)} + \ln E - \ln a_i.$$

-

$$\frac{\partial \Phi(s_i)}{\partial \ln M} = \frac{\gamma}{s_i(\gamma + s_i)} \frac{\partial s_i}{\partial \ln M}.$$

- Then

$$\frac{\partial^2 \ln l_i}{\partial \ln M \partial \ln a_i} = -\frac{\gamma}{(s_i(\gamma + s_i))^2} \underbrace{\frac{\partial s_i}{\partial \ln a_i}}_{>0} (2s_i + \gamma) \underbrace{\frac{\partial s_i}{\partial \ln M}}_{<0} + \frac{\gamma}{(s_i(\gamma + s_i))} \underbrace{\frac{\partial^2 s_i}{\partial \ln M \partial \ln a_i}}_{>0} > 0.$$

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Proof 3

- $L = P^{-\nu}$, where $w = 1$.
- We know $P = exp(\overline{\log P})$, with $\overline{\log P} = \int \left(\log\left(1 + \frac{s_i}{\gamma}\right) - \log a_i\right) dF(a_i)$
- Then $\frac{\partial \overline{\log P}}{\partial \log M} = \frac{1}{1+\frac{s_i}{\gamma}} \frac{\partial s_i}{\partial \log M}$
- Since $\frac{\partial s_i}{\partial \log M} < 0$ from Prop.2, then $\frac{\partial \overline{\log P}}{\partial \log M} < 0$.
- Since $\log L = -\nu \overline{\log P}$, aggregate labor L increases after the reform.

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Demand and Price Level Specifications

- **CES:**

$$q_i = \left(\frac{p_i}{P}\right)^{-\sigma} \frac{E}{P} \qquad P = \left(\int_0^M p_i^{1-\sigma} di\right)^{\frac{1}{1-\sigma}}$$

- **Translog:**

$$q_i = \left[\frac{1}{M} - \gamma \ln \frac{p_i}{P}\right] \frac{E}{p_i} \qquad P = \exp\left(\frac{1}{M} \int_0^M \ln p_i di\right)$$

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Calibration

- $\sigma = 4$
- $\nu = 2$
- $M_I = 1.7$
- $M_E = 0.09 * (M_I/(M_E + M_I))$
- $\mu_a = 0$ and $\sigma_a = 0.25$.
- $\gamma = 0.35$ (Bilbiie et al, 2012)

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