WHAT IS THE IMPACT OF INCREASED BUSINESS COMPETITION?

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Motivation and Overview

- **Reduction in entry costs** → 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
Q4. Model rationalizing empirical findings?

- Heterogeneous firms & CES demand: inconsistent predictions
  \[\rightarrow \text{homogeneous reduction in employment by incumbent firms}\]

- **Heterogeneous firms & elasticities:** consistent predictions
  - Lower demand elasticity for more productive firms
    \[\rightarrow \text{most productive firms expand employment}\]
    \[\rightarrow \text{least productive firms cut employment}\]
Outline

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

- The Portuguese reform
- Identification strategy
- Empirical analysis
- Theoretical analysis
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 → 33rd.

- Key features: → **staggered implementation** (limited resources)
Phasing In of the Reform
Phasing In of the Reform

- 2005Q3:Q4
- 2006Q1:Q2
- 2006Q3:Q4
- 2007Q1:Q2
- 2007Q3:Q4
- 2008Q1:Q2
- 2008Q3:Q4
- No Shop or ≥ 2009
Phasing In of the Reform

- 2005Q3:Q4
- 2006Q1:Q2
- 2006Q3:Q4
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Phasing In of the Reform

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- 2008Q3:Q4
- No Shop or ≥ 2009
Outline

- The Portuguese reform

- Identification strategy

- Empirical analysis

- Theoretical analysis
Identification Strategy

→ Exploit staggered opening of One-Stop Shops across the country.

\[ y_{m,t} = \alpha_{m} + \delta_{t} + \sum_{\tau} \beta_{\tau} \mathbb{1}(t - \tau_{0,m} = \tau) + \gamma X_{m,t} + \epsilon_{m,t}. \]

↓

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

Parallel trends: control municipalities provide counterfactual
Introduction  The Portuguese Reform  Identification  Empirical Analysis  Theoretical Analysis  Conclusions

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
What is Driving the Increase in Employment?

Finding 3: Entrants and young firms contributed via extensive margin

→ 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+

→ Incumbents explain approx 57% of net employment growth
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
Finding 6: Exit decreased for the most productive firms
Outline

- The Portuguese reform
- Data
- Identification strategy
- Empirical results
- Theoretical analysis
Overview of Theoretical Analysis

- Model rationalizes findings?
Overview of Theoretical Analysis

- Model rationalizes findings?

**General Static Framework:** Heterogeneous firms, monopolistic competition

- **CES Demand**
  - Homogeneous and constant elasticity

- **Symmetric Translog Demand**
  - Heterogeneous and variable elasticity

→ **Comparative statics:** firms’ labor demand $l_i$ and aggregate employment $L$
CES and Translog Demand

- CES Demand:
  \[ \epsilon_i = \sigma \quad \& \quad \mu_i = \frac{\sigma}{\sigma - 1} \]

- Translog Demand:
  \[ \epsilon_i = 1 + \frac{\gamma}{s_i} \quad \& \quad \mu_i = \left(1 + \frac{s_i}{\gamma}\right), \text{ where} \]
  \[ s_i = \frac{1}{M} + \gamma[\ln P - \ln p_i] \quad \text{and} \quad p_i = \left(1 + \frac{s_i}{\gamma}\right) \frac{1}{a_i} \]

\[ \Rightarrow \epsilon_i (\mu_i) \text{ increasing (decreasing) in } M \]
\[ \Rightarrow \epsilon_i (\mu_i) \text{ decreasing (increasing) in } a_i \]
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:** $\frac{\partial^2 \ln l_i}{\partial M \partial \ln a_i} > 0$
CES & Translog - Aggregate Employment

Aggregate Employment Response

<table>
<thead>
<tr>
<th></th>
<th>Entrants</th>
<th>Incumbents</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CES Demand</td>
<td>2.22%</td>
<td>−1.10%</td>
<td>1.12%</td>
</tr>
<tr>
<td>Translog Demand</td>
<td>2.26%</td>
<td>0.46%</td>
<td>2.73%</td>
</tr>
</tbody>
</table>

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

- **Competition** - all incumbents worse off
  
  **CES** - homogeneous impact
  
  **Translog** - heterogeneous impact, productive hurt less

- **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
  - 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, Cacciatorre and Fiori, 2016)

- **Firm dynamics:** heterogeneous firms + CES demand

- **Entrepreneurship:** empirical analysis of firm entry
The Portuguese Slump

Real GDP per capita

1995  2000  2005  2010
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

<table>
<thead>
<tr>
<th>Relevant Statistics</th>
<th>yearly average</th>
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<tbody>
<tr>
<td>Entry Rate</td>
<td>7.5%</td>
</tr>
<tr>
<td>Exit Rate</td>
<td>9.3%</td>
</tr>
<tr>
<td>Operating Firms</td>
<td>125,015</td>
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</table>

<table>
<thead>
<tr>
<th>Sales Sector Shares</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>1.52%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>26.6%</td>
</tr>
<tr>
<td>Construction</td>
<td>10.14%</td>
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<tr>
<td>Services</td>
<td>61.74%</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Relevant Firm-Level Statistics</th>
<th>p1</th>
<th>p25</th>
<th>p50</th>
<th>mean</th>
<th>p75</th>
<th>p99</th>
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<tbody>
<tr>
<td>Size Distribution</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>7.13</td>
<td>8</td>
<td>55</td>
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<tr>
<td>Age Distribution</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>10.87</td>
<td>15</td>
<td>59</td>
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<tr>
<td>Size of Entrants</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3.75</td>
<td>4</td>
<td>27</td>
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<tr>
<td>Size of Young Firms (≤ 5 yrs)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4.95</td>
<td>5</td>
<td>36</td>
</tr>
<tr>
<td>Size of Old Firms</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>8.96</td>
<td>10</td>
<td>64</td>
</tr>
</tbody>
</table>

Source: *Quadros de Pessoal and IES*
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
# Descriptive Statistics by Municipality Groups

<table>
<thead>
<tr>
<th></th>
<th>Treated Municipalities</th>
<th>Never-Treated</th>
<th>Early-Treated</th>
<th>Late-Treated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Firm Demographics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entry rate</td>
<td>8.5% (4.6%)</td>
<td>9.4% (6.9%)</td>
<td>7.9% (4%)</td>
<td>8.8% (5%)</td>
</tr>
<tr>
<td></td>
<td>[5.7%, 10.2%]</td>
<td>[5.4%, 11.9%]</td>
<td>[5.8%, 8.7%]</td>
<td>[5.6%, 10.8%]</td>
</tr>
<tr>
<td>Exit rate</td>
<td>8.4% (2.8%)</td>
<td>7.7% (4.1%)</td>
<td>8.5% (2.3%)</td>
<td>8.3% (3%)</td>
</tr>
<tr>
<td></td>
<td>[6.8%, 10%]</td>
<td>[5.3%, 10%]</td>
<td>[7%, 9.7%]</td>
<td>[6.6%, 9.9%]</td>
</tr>
<tr>
<td>Active firms per 1000 inhab</td>
<td>10.67 (3.8)</td>
<td>8.32 (3.4)</td>
<td>12.21 (3.8)</td>
<td>9.8 (3.5)</td>
</tr>
<tr>
<td></td>
<td>[8.1, 12.9]</td>
<td>[5.7, 10.4]</td>
<td>[9.4, 15.1]</td>
<td>[7.4, 11.7]</td>
</tr>
<tr>
<td><strong>Macroeconomic Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment rate (Census)</td>
<td>47.2% (24%)</td>
<td>34.1% (21%)</td>
<td>53.7% (27%)</td>
<td>43.4% (18%)</td>
</tr>
<tr>
<td></td>
<td>[34.4%, 59.2%]</td>
<td>[25.8%, 44.3%]</td>
<td>[39.8%, 65.7%]</td>
<td>[30.6%, 54.9%]</td>
</tr>
<tr>
<td>Residents (mean)</td>
<td>66,896.1 (128,244)</td>
<td>18,540.7 (41,762.5)</td>
<td>114,213.3 (149,881.3)</td>
<td>39,421.6 (56,260.2)</td>
</tr>
<tr>
<td></td>
<td>[17,852, 74,965]</td>
<td>[6,396, 21,135]</td>
<td>[44,162, 142,728]</td>
<td>[14,241, 52,604]</td>
</tr>
<tr>
<td><strong>Macro-Sector of Activity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing - Sales</td>
<td>28.3% (19%)</td>
<td>27.2% (20%)</td>
<td>28.2% (20%)</td>
<td>28.3% (20%)</td>
</tr>
<tr>
<td></td>
<td>[11.1%, 40.5%]</td>
<td>[11.7%, 40.4%]</td>
<td>[14.3%, 45.4%]</td>
<td>[10.9%, 40.5%]</td>
</tr>
<tr>
<td>Services - Sales</td>
<td>46.66% (19%)</td>
<td>41.13% (15%)</td>
<td>53.76% (17%)</td>
<td>41.92% (16%)</td>
</tr>
<tr>
<td></td>
<td>[42.5%, 70.1%]</td>
<td>[39.6%, 65.3%]</td>
<td>[43.9%, 73.5%]</td>
<td>[42%, 66.2%]</td>
</tr>
</tbody>
</table>

Source: *Quadros de Pessoal and Portugal National Statistics Institute*
Mean with standard deviations in parenthesis. p25 and p75 in square parenthesis.
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+

Δ% vs. t-7 to t+3 for Manufacturing and Services in different age groups.
CES Demand - Love of Variety

Love of Variety

\[ M \uparrow \rightarrow P \downarrow \rightarrow \frac{w}{P} \uparrow \rightarrow L \uparrow \]
Proof 1

- Start from \( \ln \varepsilon_i = \ln \left(1 + \frac{\gamma}{s_i}\right) \)
- Derivative wrt \( \ln M \)
  \[
  \frac{\partial \ln \varepsilon_i}{\partial \ln M} = -\gamma \frac{1}{\left(1 + \frac{\gamma}{s_i}\right)} \frac{\partial s_i}{\partial \ln M} < 0
  \]

- To sign \( \frac{\partial s_i}{\partial \ln M} \), plug \( p_i \) and \( \ln p \) in \( s_i \)
  \[
  s_i = \frac{1}{M} + \gamma \left[ \int_0^M \frac{1}{M} \ln \left(\frac{s_j}{\gamma} + 1\right) \, dj - \ln a \right] - \gamma \ln \left(1 + \frac{s_i}{\gamma}\right) + \gamma \ln a_i.
  \]
- Get
  \[
  \frac{\partial^2 s(a_i)}{\partial \ln M \partial \ln a_i} = -\frac{1}{1 + \frac{\gamma^2}{\gamma + s(a_i)}} \frac{1}{\left(1 + \frac{s(a_i)}{\gamma}\right)^2} \frac{\partial s(a_i)}{\partial \ln a_i} \frac{\partial s(a_i)}{\partial \ln M} > 0
  \]

- \( \frac{\partial s(a_i)}{\partial \ln M} \) 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 \( \frac{\partial s(a_i)}{\partial \ln M} < 0 \ \forall i \) and \( \frac{\partial \ln \varepsilon_i}{\partial \ln M} > 0 \ \forall i \).
Proof 2

- Start from \( l_i = \frac{s_i E}{\rho_i a_i} \). Get

\[
\ln l_i = \ln s_i - \ln \left(1 + \frac{s_i}{\gamma}\right) + \ln E - \ln a_i.
\]

\[
\equiv \Phi(s_i)
\]

- \[
\frac{\partial \Phi(s_i)}{\partial \ln M} = \frac{\gamma}{s_i(\gamma + s_i)} \frac{\partial s_i}{\partial \ln M}.
\]

- Then

\[
\frac{\partial^2 \ln l_i}{\partial \ln M \partial \ln a_i} = -\frac{\gamma}{(s_i(\gamma + s_i))^2} \frac{\partial s_i}{\partial \ln a_i} (2s_i + \gamma) \frac{\partial s_i}{\partial \ln M} + \frac{\gamma}{(s_i(\gamma + s_i))^2} \frac{\partial^2 s_i}{\partial \ln M \partial \ln a_i} > 0.
\]
Proof 3

- \( L = P^{-\nu} \), where \( w = 1 \).

- We know \( P = \exp(\log P) \), with \( \log P = \int (\log (1 + \frac{s_i}{\gamma}) - \log a_i) \, dF(a_i) \)

- Then \( \frac{\partial \log P}{\partial \log M} = \frac{1}{1 + \frac{s_i}{\gamma}} \frac{\partial s_i}{\partial \log M} \)

- Since \( \frac{\partial s_i}{\partial \log M} < 0 \) from Prop.2, then \( \frac{\partial \log P}{\partial \log M} < 0 \).

- Since \( \log L = -\nu \log P \), aggregate labor \( L \) increases after the reform.
Demand and Price Level Specifications

- **CES:**

  \[ q_i = \left( \frac{p_i}{P} \right)^{-\sigma} \frac{E}{P} \quad P = \left( \int_0^M p_i^{1-\sigma} \, di \right)^{\frac{1}{1-\sigma}} \]

- **Translog:**

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

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