Paying for others’ protection: Causal evidence on wages in a two-tier system

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Synopsis


Two-tier system: In a segmented labor market there maybe a spillover to wages of (non-protected) fixed-term contracts (Boeri, 2010).

Widening the protection gap between contracts causes wages of new contracts to pay for the extra protection. But, a large burden of the costs falls on fixed-term contracts.

Strong substitutability of contract types.
Outline

1 Mandated protection in two-tier systems

2 Portuguese labor market institutions

3 The 2004 Labor Code reform: A quasi-experiment

4 Data

5 Quasi-experiment
1 Mandated protection in two-tier systems
Employment protection and wages: the theory

1. Lazear (1990) – Demand shift may cause wages to fall

2. Lindbeck & Snower (2001) – Bargaining model, insiders are shielded

3. Summers (1989) – Mandated benefits cause a supply shift, which may contain employment losses, but magnify wage losses
Segmentation and spillovers

The wedge of protection between fixed-term contracts and open-ended contracts generates two-tier systems.

Boeri (2010), Bentolila, Cahuc, Dolado & Le Barbanchon (2011), and Cahuc, Charlot, & Malherbet (2012)


For Portugal, Centeno & Novo (2012) show that firms adjust turnover. But an important question remains, do they adjust workers’ wages?
Differentiated impact of two-tier reforms on wages and flows

<table>
<thead>
<tr>
<th>Increase in:</th>
<th>Employment protection for permanent jobs</th>
<th>UI replacement rate</th>
<th>Employment subsidies for entry jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Job loss rate (from entry jobs)</td>
<td>+</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>Job loss rate (from continuing jobs)</td>
<td>−</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>Job finding rate</td>
<td>+</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>Premium on permanent contracts</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Conversion temporary to permanent</td>
<td>−</td>
<td>+</td>
<td>−</td>
</tr>
<tr>
<td>Entry jobs as % of total employment</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Source: Boeri (2010)
2 Portuguese labor market institutions
FTC introduced in \textbf{1976}, but revised several times since.

1. Offered \textit{concurrently} with permanent contracts.

2. Can be used for \textbf{all levels} of qualifications and most tasks.

3. Could be renewed for \textbf{up to 3 years}; in 2004-09, \textbf{up to 6}.

4. \textbf{Severance payment}: 2 days/month if tenure $> 1$ year; 3 days otherwise. In permanent contracts typically 2.5 days (1 month/year)

5. \textbf{Procedural costs}: largest difference; absent at end of FTC.
OECD’s EPL Indicator:

Portugal has the strictest legislation on permanent contracts. But an average strictness on FTC. It creates a large wedge.

Quadros de Pessoal: The share of FTC increased from 20.8% in 2002, to 27.9% in 2008; +7.1 p.p.
3 The 2004 Labor Code reform: A quasi-experiment
The differences in severance payments for OEC and FTC are minor. The largest contribution to the gap: **procedural costs**, which are absent at the expiration of FTC, but not for OEC.

Firing a worker implies: (i) written procedures; (ii) witnesses interviews involving the works council and (iii), if the worker is a union delegate, the union itself.

Altogether, the procedures extend the dismissal process typically **2 months**, involving legal counselors and administrative costs.

Often, to avoid the costs of long and uncertain judicial processes, firms reach **out-of-court agreements**, typically exceeding the amount legally required.
In 2004, a labor market reform increased the procedural costs for a subset of firms, generating a quasi-experimental setting.

Fair dismissals: firms with 11 to 20 workers have to comply with additional procedural requirements. Before 2004, only 21+ workers.

- Difference-in-differences analysis:
  - Treatment firms: 11-20 workers
  - Control firms: 21-50 workers
  - Before: 2002-2003
  - After: 2004-2008
4 Data
An employer-employee matched administrative source.

1. **Quadros de Pessoal**: Annual, 2002 – 2008
   
   a) Covers ‘all’ firms; widely used to study the Portuguese economy.
   
   b) Sample: Matches in firms with more than 10 workers and less than 50 workers.
   
   c) Our analysis starts in 2002, the first year for which the information on the type of contract is available, and ends in 2008, to avoid the influence of the 2009 Labor Code revision.
Quadros de Pessoal: Sample size, 2002-2008

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
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<tbody>
<tr>
<td>Number of matches</td>
<td>1,405,800</td>
</tr>
<tr>
<td>Number of workers</td>
<td>1,302,865</td>
</tr>
<tr>
<td>Number of firms</td>
<td>56,680</td>
</tr>
<tr>
<td>Number of observations (matches × year)</td>
<td>3,581,305</td>
</tr>
<tr>
<td>Open-ended contract</td>
<td>2,656,122</td>
</tr>
<tr>
<td>Fixed-term contract</td>
<td>925,183</td>
</tr>
<tr>
<td>Before</td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>372,770</td>
</tr>
<tr>
<td>Control</td>
<td>513,638</td>
</tr>
<tr>
<td>After</td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>1,128,155</td>
</tr>
<tr>
<td>Control</td>
<td>1,566,742</td>
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</tbody>
</table>

Notes: *Quadros de Pessoal*, match-level values 2002-2008. The “Before” period corresponds to 2002-2003 and the “After” period to 2004-2008. Each period, a treatment match is in a firm with 11 to 20 workers and a control match in a firm with 21 to 50 workers.

Large sample

- **3.5 million** match × year pairs.
- **1.4m matches**
- **57k firms**
### Quadros de Pessoal: Average 2002-2008

<table>
<thead>
<tr>
<th>Variable (match level)</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed-term contracts (in %)</td>
<td>25.8</td>
<td>43.8</td>
</tr>
<tr>
<td>Base wage</td>
<td>657.4</td>
<td>356.1</td>
</tr>
<tr>
<td>Hourly base wage</td>
<td>4.0</td>
<td>2.3</td>
</tr>
<tr>
<td><strong>Total wage</strong></td>
<td><strong>807.8</strong></td>
<td><strong>442.2</strong></td>
</tr>
<tr>
<td>Hourly total wage</td>
<td>4.8</td>
<td>2.8</td>
</tr>
<tr>
<td>Age (in years)</td>
<td>37.4</td>
<td>10.9</td>
</tr>
<tr>
<td>Educational level, percentage of workers with:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 or less years</td>
<td>27.9</td>
<td>44.9</td>
</tr>
<tr>
<td>4-6 years</td>
<td>23.9</td>
<td>42.6</td>
</tr>
<tr>
<td>7-9 years</td>
<td>20.7</td>
<td>40.5</td>
</tr>
<tr>
<td>10-12 years</td>
<td>17.9</td>
<td>38.3</td>
</tr>
<tr>
<td>College</td>
<td>9.6</td>
<td>29.5</td>
</tr>
<tr>
<td>Females (in %)</td>
<td>41.6</td>
<td>49.3</td>
</tr>
<tr>
<td>Immigrants (in %)</td>
<td>4.0</td>
<td>19.5</td>
</tr>
<tr>
<td>Minimum wage (in %)</td>
<td>8.3</td>
<td>27.5</td>
</tr>
<tr>
<td>Tenure (in months)</td>
<td>84.1</td>
<td>89.5</td>
</tr>
<tr>
<td>Firm size (average number of workers)</td>
<td>25.6</td>
<td>11.2</td>
</tr>
<tr>
<td>Foreign ownership (in %)</td>
<td>3.5</td>
<td>18.3</td>
</tr>
</tbody>
</table>

Number of observations (matches × year) 3 581 305

Notes: Quadros de Pessoal, match-level values 2002-2008.

1. More than a quarter of a typical firm’s workforce is on FTC.

2. Average wages:
   - base 657 euros and total 808 euros.

3. Minimum wage earners: 8.3%.

4. Tenure: 84 months.
Two-tier data

- Total wages:
  - FTC €757; OEC €825
  - Low tenure (< 36 months) €760;
    High tenure (≥ 36 months) €838
  - Treated firms (11-20 workers): €773
    Control firms (21-50 workers): €833
    Larger firms (51-100 workers): €893
• Tenure:

  – OEC share of low tenure ($< 36$ months): 25%

  – Large variance for high tenure ($\geq 36$ months): 94 months
  More than $1/4$ has at least 15 years.
5 Quasi-experiment
Common trend

\[ y_{it} = \theta_1 \text{Treat}_{it} + \theta_2 \text{Time}_t + \theta_3 \text{Treat}_{it} \text{Time}_t + X_{it} \Phi + \varepsilon_{it} \]

The firm characteristics included in matrix \( X_{it} \) are: (i) the logarithm of the number of workers as a proxy for firm size, (ii) the firm age (indicator variables: 1, 2, . . . , 10, 11-15, 16-20, and more than 20 years), (iii) the sector of activity (at 2-digits), (iv) the region (the 23 Portuguese districts), and (v) an indicator of foreign ownership majority. On the worker side, we control for: (vi) gender, (vii) nationality, (viii) age, entering as a quadratic polynomial, and also for (ix) five levels of education (4 or less years; 6 years; 9 years; high school; and college degree). In terms of match characteristics, we control for: (x) white and blue collar positions, (xi) workers on a (regulated) minimum wage, with an indicator variable, and for (xii) tenure, entering as a quadratic polynomial.

\( \varepsilon_{it} \) – Match (worker \( \times \) firm) fixed-effects.
Common trend

<table>
<thead>
<tr>
<th></th>
<th>Base wage</th>
<th></th>
<th>Total wage</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Monthly</td>
<td>Hourly</td>
<td>Monthly</td>
<td>Hourly</td>
</tr>
<tr>
<td><strong>Treat × Time</strong></td>
<td>0.051</td>
<td>-0.009</td>
<td>-0.001</td>
<td>-0.067</td>
</tr>
<tr>
<td></td>
<td>(0.302)</td>
<td>(0.855)</td>
<td>(0.987)</td>
<td>(0.445)</td>
</tr>
<tr>
<td>Treat</td>
<td>0.112</td>
<td>0.181</td>
<td>0.332</td>
<td>0.436</td>
</tr>
<tr>
<td></td>
<td>(0.338)</td>
<td>(0.126)</td>
<td>(0.111)</td>
<td>(0.036)</td>
</tr>
<tr>
<td>Time</td>
<td>3.501</td>
<td>3.481</td>
<td>4.096</td>
<td>4.021</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>No of observations</td>
<td></td>
<td></td>
<td>886408</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Match (worker-firm) fixed effects estimates. Values in percentage points with \( p \)-values in parentheses. The estimation window corresponds to the “before” period, 2002 and 2003. Treatment units identify workers in firm with 11 to 20 workers and a control units workers in firm with 21 to 50 workers. The estimates are computed for all workers. See paper for a list of control variables included in the regressions.

Test if treatment and control have a common trend in log-wages in the before period:

- A common trend is not rejected

The parallel paths of treatment and control groups is key for the identification process.
Difference-in-differences estimator

\[ \log(y_{it}) = \psi_1 \text{Treat}_{it} + \psi_2 \text{After}_{it} + \psi_3 \text{After}_{it} \times \text{Treat}_{it} + X_{it}\beta + \varepsilon_{it} \]
Quasi-experimental evidence: Impact on wages

<table>
<thead>
<tr>
<th></th>
<th>Base wage</th>
<th></th>
<th>Total wage</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Monthly</td>
<td>Hourly</td>
<td>Monthly</td>
<td>Hourly</td>
</tr>
<tr>
<td>All contracts</td>
<td>-0.289</td>
<td>-0.317</td>
<td>-0.272</td>
<td>-0.308</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
</tbody>
</table>

Notes: **Match (worker-firm) fixed effects** estimates of the After $\times$ Treat coefficient; values in percentage points with $p$-values in parentheses. The “before” period corresponds to 2002 and 2003; the “after” period to 2004-2008. For each period, treatment units identify workers in firm with 11 to 20 workers and a control units workers in firm with 21 to 50 workers.

After the reform firms with 11–20 workers have a more stringent OEC fair dismissals law, causing:

1. a **reduction** in the level of all wage measures of around 0.3 p.p..

2. with a **larger** wage fall for hourly measures.
### Impact on wages by contract type

<table>
<thead>
<tr>
<th>Contract Type</th>
<th>Base wage</th>
<th>Total wage</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Monthly</td>
<td>Hourly</td>
<td>Monthly</td>
<td>Hourly</td>
</tr>
<tr>
<td>Open-ended contracts</td>
<td>-0.227</td>
<td>-0.226</td>
<td>-0.213</td>
<td>-0.227</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2656122</td>
<td></td>
</tr>
<tr>
<td>Fixed-term contracts</td>
<td>-0.644</td>
<td>-0.735</td>
<td>-0.508</td>
<td>-0.537</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.004)</td>
<td>(0.002)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>925183</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:** Match (worker-firm) fixed effects estimates of the After × Treat coefficient; values in percentage points with *p*-values in parentheses.

**Fixed-term contracts** suffer a larger wage drop . . .

1. a **reduction** of 0.5 p.p. to 0.7 p.p. for fixed-term contracts.
2. **smaller** reduction for open-ended contracts, around 0.2 p.p..
Open-ended: New contracts vs. Older contracts

<table>
<thead>
<tr>
<th>Open-ended contracts</th>
<th>Base wage</th>
<th>Total wage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Monthly</td>
<td>Hourly</td>
</tr>
<tr>
<td>Older ($\geq 36$)</td>
<td>-0.094</td>
<td>-0.103</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>Newer ($&lt; 36$)</td>
<td>-0.623</td>
<td>-0.707</td>
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<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
</tbody>
</table>

New contracts, with less than 36 months of tenure, have large wage falls . . .

1. Larger than for FTC (previous table).

2. NO reduction for more tenured OEC ($\geq 36$ months).
Do all workers pay the same?
### Age and gender

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Gender</th>
<th>Sector</th>
<th>Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;35 (A)</td>
<td>≥35 (B)</td>
<td>Manuf (C)</td>
<td>White (H)</td>
</tr>
<tr>
<td>Gender</td>
<td>Male (C)</td>
<td>Female (D)</td>
<td>Constr (E)</td>
<td>Blue (I)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Services (F)</td>
<td></td>
</tr>
</tbody>
</table>

**Older open-ended contracts**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.095</td>
<td>-0.032</td>
<td>0.157</td>
<td>-0.119</td>
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<tr>
<td></td>
<td>(0.436)</td>
<td>(0.685)</td>
<td>(0.002)</td>
<td>(0.003)</td>
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<td>1149562</td>
<td>423839</td>
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<td>781101</td>
<td>1149562</td>
<td>841191</td>
<td>1566914</td>
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</table>

**New open-ended contracts**

<p>| | | | | |</p>
<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.933</td>
<td>-0.653</td>
<td>-1.194</td>
<td>-0.784</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.037)</td>
<td>(0.000)</td>
<td>(0.000)</td>
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<tr>
<td></td>
<td>383644</td>
<td>281725</td>
<td>407159</td>
<td>538772</td>
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**Fixed-term contracts**

<p>| | | | | |</p>
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<tr>
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<td></td>
<td>-0.382</td>
<td>-0.296</td>
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<td>0.078</td>
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<td>(0.108)</td>
<td>(0.269)</td>
<td>(0.000)</td>
<td>(0.000)</td>
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<tr>
<td></td>
<td>545352</td>
<td>379831</td>
<td>534680</td>
<td>781666</td>
</tr>
</tbody>
</table>

**Notes:** Match (worker-firm) fixed effects estimates of the average treatment effect on the treated (After × Treat variable). Values in percentage points with p-values in parentheses.

1. **Younger** workers, with lower bargaining power, have larger wage drops. Larger for new OEC.

2. **Male** workers, with more inelastic labor supply, lose more. This is true for all types of contracts and tenure.
### Sectors

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Sector</th>
<th>Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 35</td>
<td>Male</td>
<td>White</td>
<td></td>
</tr>
<tr>
<td>≥ 35</td>
<td>Female</td>
<td>Blue</td>
<td></td>
</tr>
</tbody>
</table>

#### Older open-ended contracts

- **Construction**
  - New OEC: lower wages. Note that wages of FTC are not affected. FTC in this sector are not very prevalent.

- **Services**, where turnover is higher and specific human capital less important, have larger losses.

#### Notes:
- Match (worker-firm) fixed effects estimates of the average treatment effect on the treated (After × Treat variable). Values in percentage points with *p*-values in parentheses.
## Skills

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Sector</th>
<th>Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 35</td>
<td>Male</td>
<td>Manuf</td>
<td>White</td>
</tr>
<tr>
<td>≥ 35</td>
<td>Female</td>
<td>Constr</td>
<td>Blue</td>
</tr>
</tbody>
</table>

### Older open-ended contracts

<table>
<thead>
<tr>
<th></th>
<th>Skill</th>
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<tbody>
<tr>
<td></td>
<td>White</td>
<td>Blue</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>0.095</td>
<td>-0.032</td>
<td>-0.272</td>
<td>0.157</td>
<td>-0.119</td>
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<td></td>
<td>(0.436)</td>
<td>(0.685)</td>
<td>(0.002)</td>
<td>(0.079)</td>
<td>(0.229)</td>
<td>(0.002)</td>
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<td>841191</td>
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### New open-ended contracts

<table>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
<td>Blue</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.933</td>
<td>-0.653</td>
<td>-1.194</td>
<td>-0.310</td>
<td>-0.784</td>
<td>-2.149</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.037)</td>
<td>(0.000)</td>
<td>(0.287)</td>
<td>(0.013)</td>
<td>(0.000)</td>
</tr>
<tr>
<td></td>
<td>38364</td>
<td>281725</td>
<td>407159</td>
<td>258210</td>
<td>390503</td>
<td>198343</td>
</tr>
</tbody>
</table>

### Fixed-term contracts

<table>
<thead>
<tr>
<th></th>
<th>Skill</th>
<th></th>
<th></th>
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<th></th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>White</td>
<td>Blue</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>-0.296</td>
<td>-0.966</td>
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<td></td>
<td>(0.108)</td>
<td>(0.269)</td>
<td>(0.000)</td>
<td>(0.741)</td>
<td>(0.396)</td>
<td>(0.001)</td>
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<td>534680</td>
<td>390503</td>
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<td>117447</td>
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</tbody>
</table>

Notes: Match (worker-firm) fixed effects estimates of the average treatment effect on the treated (After × Treat variable). Values in percentage points with p-values in parentheses.

1. **Blue-collars** with OEC have a 0.9 p.p. reduction in wages. It can be rationalized with their lower bargaining power.

2. **White-collars** OEC with high tenure also lose 0.4 p.p., a quite unique result for tenure OEC. It can be due to higher expected layoff costs; these workers are more likely to litigate in court.
**Threats to the identification**

As in all quasi-experiments, we can think of drawbacks of our identification strategy. Two leading examples are:

1. **Other reforms occurring at the same time.** The Labor Code reform was not restricted to dismissal costs, but other reforms applied equally to treatment and control firms. Example: extension of FTC.

2. **Selection issues.** We perform several robustness checks and a falsification exercise.
**Worker robustness: Worker fixed-effects**

<table>
<thead>
<tr>
<th>Workers</th>
<th>Falsification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worker FE</td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>pT: [21,30];</td>
</tr>
<tr>
<td>same status</td>
<td>pC: [31,50]</td>
</tr>
<tr>
<td>(E)</td>
<td>(F)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Older open-ended contracts</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.008</td>
<td>-0.179</td>
<td>0.074</td>
</tr>
<tr>
<td>(0.898)</td>
<td>(0.014)</td>
<td>(0.372)</td>
</tr>
<tr>
<td>1990753</td>
<td>1535549</td>
<td>1156160</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>New open-ended contracts</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.748</td>
<td>-0.682</td>
<td>-0.284</td>
</tr>
<tr>
<td>(0.000)</td>
<td>(0.011)</td>
<td>(0.324)</td>
</tr>
<tr>
<td>665369</td>
<td>500132</td>
<td>338382</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fixed-term contracts</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.554</td>
<td>-0.613</td>
<td>0.250</td>
</tr>
<tr>
<td>(0.002)</td>
<td>(0.005)</td>
<td>(0.250)</td>
</tr>
<tr>
<td>925183</td>
<td>720490</td>
<td>545451</td>
</tr>
</tbody>
</table>

We estimate the base model controlling for **worker fixed effects**, instead of match fixed effects.

The results are robust...

1. wage losses only for new OEC and FTC, **-.75 and -.55p.p.**

2. tenured OEC are shielded.
Worker robustness: Always same treatment status

<table>
<thead>
<tr>
<th>Workers</th>
<th>Falsification</th>
<th>pT: [21,30]; pC: [31,50]</th>
</tr>
</thead>
<tbody>
<tr>
<td>FE</td>
<td>same status</td>
<td>(E) (F) (G)</td>
</tr>
<tr>
<td>Older open-ended contracts</td>
<td></td>
<td>-0.008 -0.179 0.074</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.898) (0.014) (0.372)</td>
</tr>
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<td></td>
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</tr>
<tr>
<td></td>
<td>925183 720490</td>
<td>545451</td>
</tr>
</tbody>
</table>

Consider only workers that **never changed treatment status** throughout entire sample period.

The results are robust...

1. **wage penalties**, -0.7 to -0.6, for new OEC and FTC.

2. But now we have a wage penalty for **more tenured OEC workers**. Maybe these workers are less mobile and the results with movers capture some selection.
We estimate the model controlling for firm fixed effects, instead of match fixed effects.

1. significant wage losses for all contracts and tenure duration.

2. the results for more tenured OEC show that the selection behavior of workers (not captured by firm fixed-effects) is important.
### Firm robustness: Treatment status set in “before” period

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Firm</td>
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<tr>
<td>Fixed-E set before</td>
<td>A</td>
</tr>
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<td>Older open-ended contracts</td>
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<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>New open-ended contracts</td>
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</tbody>
</table>

Treatment status defined in the before period and kept the same each year. The results are robust...

- **same impact** as the base model.
Firm robustness: Always same treatment status

<table>
<thead>
<tr>
<th>Firm</th>
<th>Status set before</th>
<th>Always same status</th>
<th>Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed-E (A)</td>
<td>(B)</td>
<td>(C)</td>
<td>(D)</td>
</tr>
<tr>
<td>Older open-ended contracts</td>
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<tr>
<td>-0.482</td>
<td>0.084</td>
<td>-0.210</td>
<td>0.043</td>
</tr>
<tr>
<td>(0.000)</td>
<td>(0.212)</td>
<td>(0.004)</td>
<td>(0.588)</td>
</tr>
<tr>
<td>1990753</td>
<td>1581376</td>
<td>1550470</td>
<td>1719743</td>
</tr>
<tr>
<td>New open-ended contracts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-0.745</td>
<td>-0.936</td>
<td>-0.533</td>
<td>-1.055</td>
</tr>
<tr>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.041)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>665369</td>
<td>414408</td>
<td>480867</td>
<td>554046</td>
</tr>
<tr>
<td>Fixed-term contracts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-0.763</td>
<td>-0.417</td>
<td>-0.502</td>
<td>-0.558</td>
</tr>
<tr>
<td>(0.000)</td>
<td>(0.031)</td>
<td>(0.020)</td>
<td>(0.010)</td>
</tr>
<tr>
<td>925183</td>
<td>581116</td>
<td>657333</td>
<td>806001</td>
</tr>
</tbody>
</table>

Keep only firms that never changed treatment status (always “small” or always “big”).

The results confirm the ones obtained for the workers that do not change status, with a reduction in wages for all groups considered.

As in the case of workers with the same treatment status, there is a significant reduction in the wages of older OEC, with similar magnitudes, -0.21 vs -0.18.
### Firm robustness: Exclude firms around thresholds

<table>
<thead>
<tr>
<th>Firm Status</th>
<th>Always same status</th>
<th>T: [13,17]; C: [26,50]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed-E (A)</td>
<td>(B) (C) (D)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Older open-ended contracts</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>0.084</td>
<td>-0.210</td>
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<tr>
<td>(0.000)</td>
<td>(0.212)</td>
<td>(0.004)</td>
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<tr>
<td></td>
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<td>0.043</td>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>-0.936</td>
<td>-0.533</td>
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<tr>
<td>(0.000)</td>
<td>(0.041)</td>
<td>(0.000)</td>
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<td>414408</td>
<td>480867</td>
</tr>
<tr>
<td></td>
<td>-1.055</td>
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<td>(0.000)</td>
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<tr>
<td>665369</td>
<td>414408</td>
<td>480867</td>
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<table>
<thead>
<tr>
<th>Fixed-term contracts</th>
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<tbody>
<tr>
<td></td>
<td>-0.417</td>
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<tr>
<td>925183</td>
<td>581116</td>
<td>657333</td>
</tr>
</tbody>
</table>

The results again show no sign of selection.

Drop, in the before period, with a 20-worker threshold, **firms with 18–25 workers**.

Drop, in the after period, with a 10-worker threshold, **firms with 11 or 12**.
The falsification exercise consists of:

1. **pseudo-treatment** matches: in firms sized [21, 30]

2. **control** matches: in firms sized [31,50]; part of previous control group.

As expected, the estimated treatment effect is **non-significant**.
Conclusion

1. The Portuguese labor market fit stylized facts of segmented economies. Despite Labor Code rigidity, there is an intense reallocation of workers.

2. Theoretically, an increase in protection of OEC should reduce wages, specially of new contracts. FTC share a larger burden of the adjustment, even without benefiting of the extra protection. Our results adhere to this theoretical framework.

3. Wages adjust downwards to more stringent mandated employment protection. The causal evidence gathered shows that workers pay the extra protection in the form of lower wages.
4. **Stringent OEC** legislation led to (i) large wage drop of new OEC; (ii) significant fall in wages of FTC; (iii) no impact on wages of more tenured (incumbents) OEC.

5. Clear signs of a high **substitutability** of contract types. A (non)fair share of the burden of adjustment falls upon workers on FTC.
Danke.