Subsidizing Labor Hoarding in Recessions: Employment and Welfare Effects of Short Time Work

Giulia Giupponi (IFS) Camille Landais (LSE)

International Monetary Fund
June 25, 2020

The findings and conclusions are solely those of the author and do not represent the views of INPS
Six months ago...
Motivation

- Great renewal of interest in Short Time Work programs (STW)
  - Subsidy for hour reductions to firms experiencing temporary shocks
  - Main policy tool to encourage labor hoarding

- Aggressively used during Great Recession
  - 7% of employees in Belgium, 5% in Germany & Italy, 4% in France
  - Large cost (.5-1% GDP)
Today…
Labor market policy response to COVID-19 crisis

The graph illustrates the percent of labor force on Short-Time Working (STW) in Italy, Germany, and France from 2004 to 2020. The x-axis represents the years, while the y-axis shows the percentage of the labor force on STW. The graph highlights a significant increase in STW usage in Italy in 2020, indicating a strong policy response to the COVID-19 crisis.
Why subsidize labor hoarding?

- **Matches are valuable**
  - Frictions in the labor market, hiring/training costs
  - Specific human capital
  - Long run scarring effects of layoffs

- **Why would firms not hoard labor optimally?**
  - Liquidity constraints
  - Firms do/can not internalize workers’ surplus
  - Other factors: commitment issues, UI, etc.
Why subsidize labor hoarding?

- **Matches are valuable**
  - Frictions in the labor market, hiring/training costs
  - Specific human capital
  - Long run scarring effects of layoffs

- **Why would firms not hoard labor optimally?**
  - Liquidity constraints
  - Firms do/can not internalize workers’ surplus
  - Other factors: commitment issues, UI, etc.

⇒ Subsidizing labor hoarding might be desirable

**But what do we know about its effectiveness and welfare trade-offs?**
This project

- Leverage data from INPS records and Italian policy setting
  - Universe of administrative data on STW at individual and firm level
  - Quasi-experimental variation from Italian STW policy rules

- Offer evidence on effects of STW
  - On firms’ employment, survival and balance sheet
  - On short- and long-term insurance of workers

- Explore empirically forces underlying the welfare trade-offs of STW
  - Canonical moral hazard and insurance effects
  - Sources of inefficient labor hoarding
  - Reallocation effects
Main findings

- Effects on firm-level outcomes
  - Large (-) effects on **hours** and large (+) effects on **employment**
  - Positive effect on firms survival probability

- Welfare trade-off when the shock is **temporary**:
  - Liquidity constraints and bargaining frictions may make level of labor hoarding inefficiently low
  - STW desirable in this case, also in light of low fiscal externality

- Welfare trade-off different if shock is **persistent**:
  - Long-run employment and insurance effects depend on firm selection
  - Selection of firms determines severity of reallocation effects
Outline

1. Institutional background and data

2. Effects of STW on firm-level outcomes

3. Does STW prevent inefficient layoffs?

4. Does STW prevent efficient reallocation?
Outline

1. Institutional background and data

2. Effects of STW on firm-level outcomes

3. Does STW prevent inefficient layoffs?

4. Does STW prevent efficient reallocation?
Cassa Integrazione Guadagni Straordinaria (CIGS)

- CIGS has been main pillar of STW during Great Recession
  - Targets **firms experiencing shocks**, such as demand/revenue shocks, company crisis, restructuring, reorganization, insolvency

- **Subsidy for hour reductions**, remitted directly to workers
  - Replaces about 80% of foregone earnings due to hours not worked

- **Weak conditionality requirements**:  
  - Firm provides justification for economic need and recovery plan  
  - No prohibition of dismissals/layoffs  
  - No training provision or search requirements for workers

- **Minimal cost to firm** $\approx 3-4.5\%$ of subsidy

- Duration: up to 12 months (with limited possibility of extension)
Data

- Administrative data from Italian Social Security Archives
- Universe of **matched employer-employee data** for the private sector
- Information on workers (working histories, social insurance) and firms (size, sector)
- Information on **CIG** eligibility, applications, authorizations, duration and payment for the years 2005-2015
- Matching with firm-level **balance-sheet data** (approx. 50%)
Outline

1. Institutional background and data

2. Effects of STW on firm-level outcomes

3. Does STW prevent inefficient layoffs?

4. Does STW prevent efficient reallocation?
Identification

• Exploit variation in firm’s eligibility for CIGS based on:
  • Firm’s industry × contributory codes: Details
  • Size: more than 15 FTE employees in 6 mths prior to application

• Triple difference. Compare outcomes of firms:
  1. In eligible vs non-eligible industry × contributory codes
  2. Just below vs just above 15 FTE-threshold
  3. Before vs after the start of the Great Recession

Identifying assumption

No unobservable time shocks that would be, within each 5-digit industry code, specific to firms that are eligible to CIGS and whose size is just above the 15 FTE threshold.
Probability of firm receiving STW: First stage

Effect of INPS code x FTE size on probability to receive STW (percentage points)
Intensive-margin employment: Log hours per employee

\[ \beta_{IV} = -0.511(0.036) \]

- STW decreases \# of hours worked per employee by \( \approx 40\% \)
Extensive-margin employment: Log firm size headcount

- STW increases headcount employment by \( \approx 45\% \)
Log hourly wage rate

- STW has no significant effect on wage rates
STW decreases wage bill per employee by $\approx 45\%$
Additional results & Robustness

- **Dual labor market effects**
  - Open-ended vs fixed-term

- **Additional effects on firms’ outcomes**
  - Small positive effect on probability of firm survival
  - Negative effect on output per worker
  - No significant effects on balance-sheet apart from liquidity (+)

- **Robustness**
  - No significant size manipulation
  - No significant eligibility manipulation
  - No significant differential trend btw eligible & non-eligible
  - Placebos & permutation-based s.e.
  - Similar effects for firms without change in EPL at 15FTE
STW well-targeted to firms at risk of experiencing layoffs

- Score is predicted prob. of mass layoff based on rich set of $X$ and LASSO
Outline

1. Institutional background and data

2. Effects of STW on firm-level outcomes

3. Does STW prevent inefficient layoffs?

4. Does STW prevent efficient reallocation?
Does STW prevent inefficient layoffs?

- STW does increase employment, but is this efficient?
- Need to know if – absent STW – level of employment would be inefficiently low, and level of layoffs inefficiently large
- Two main mechanisms may make layoffs inefficiently high
  1. **Liquidity constraints**: inability to transfer resources over time
  2. **Inefficient bargaining**: wage/hour rigidities and inability to transfer surplus between workers and firms
Financially constrained firms take up STW more

- Whited-Wu index is increasing in financial health
- Both liquidity/total assets and Whited-Wu index measured in 2007-2008
Financially constrained firms benefit more from STW

- Increase in employment per hour of STW stronger in low-liquidity firms
Strong hour rigidities absent STW

• Empirical density of year-on-year change in weekly hours worked for workers employed in non-eligible firms over two consecutive years (2010-2014)
• Also, substantial institutional wage rigidities in Italian labor market
Firms do not internalize workers’ surplus

- UI duration ↑ sharply at age 50 → Wkrs’ surplus from employment ↓ at 50
- Yet, conditional on firm taking up STW, no change in labor hoarding at 50
Desirability of STW

- Liquidity constraints and inefficient bargaining suggest STW desirable

- Efficient level of STW: trade-off welfare gains from insurance provision and efficiency correction with fiscal externality

- \( FE \approx 1.07 \), small if compared to UI (\( \approx 1.5 \))

- FE low since cost of behavioral response in hours partially compensated by positive employment effect, which reduces cost to UI system

- If \( MV^{STW} \approx MV^{UI} \), then STW more efficient than UI even for small inefficiency correction
Outline

1. Institutional background and data

2. Effects of STW on firm-level outcomes

3. Does STW prevent inefficient layoffs?

4. Does STW prevent efficient reallocation?
Temporary vs permanent shock

- What if shock becomes **persistent**?

- Does it prevent **efficient reallocation** in the labor market?

- Three pieces of evidence on reallocation effects:
  1. STW subsidizes low-productivity matches
  2. Effects of STW are temporary and dissipate when program lapses
  3. Labor reallocation and productivity growth significantly lower in local labor markets that are more intensely treated
Low-productivity firms take-up substantially more

- Labor productivity (value added/hour worked) and TFP measured in 2007-2008
Low-productivity firms benefit the least from STW

**Employment effect**

- **Elasticity of employment to hours** $\varepsilon_{n,h}$:
  - 0.04 (0.24)
  - 1.23 (0.54)
  - 3.39 (1.55)
  - 4.19 (1.78)
  - 0.76 (0.16)
  - 3.31 (1.94)
  - 2.09 (1.48)
  - 29.33 (93.69)

- **STW effect**
  - Labor productivity
  - TFP

- 1st quartile
- 2nd quartile
- 3rd quartile
- 4th quartile

- **Strong productivity gradient in employment effects and in hour elasticity of employment**
Dynamic effects

- IV estimates capture total effects on firms of exposure to STW
  - Instrument determines both past + current treatment

- Develop methodology similar to Cellini & al. [2010] for recursive identification of dynamic effects of STW

- Intuition:

\[
\beta_{DDD}^{2009} = \beta_0^{TOT} \cdot \frac{dT_{2009}}{dZ_{2009}} \\
\beta_{DDD}^{2010} = \beta_0^{TOT} \cdot \frac{dT_{2010}}{dZ_{2009}} + \beta_1^{TOT} \cdot \frac{dT_{2009}}{dZ_{2009}}
\] (1)

(2)

etc...
Intensive-margin effects dissipate after treatment

- Same happens for employment effects
Workers’ employment probability

Methodology
Workers’ total hours worked
Labor earnings plus transfers

![Graph showing labor earnings plus transfers with time since STW treatment (years) on the x-axis and earnings and transfers relative to event time t=-1 on the y-axis. The graph includes lines for Treated, Base counterfactual, and Layoff counterfactual scenarios. The STW Treatment period is highlighted with a shaded area.](image-url)
STW as social insurance program

- STW provides **high insurance** level in the **short run**
- But **no insurance** in the **long run**
- Limited role of STW in preserving experience and specific human capital
- Yet results are once again driven by negative selection of firms
Labor earnings plus transfers: High- vs. low-prod. firms

Low-productivity firms

High-productivity firms
Reallcation: Equilibrium effects

• Low productivity firms select more into STW

• By increasing employment in low-productivity firms, STW may prevent reallocation of workers to more productive firms

• Identification of equilibrium effects Identification details

  • Estimate effect of increase in fraction of workers treated by STW in LLM on employment outcomes of non-eligible firms

  • Instrument fraction of workers treated by STW with fraction of workers eligible in LLM due to size and INPS codes in pre-recession period First stage
Equilibrium effects: Employment spillovers

\[ \beta_{IV} = -0.937 \pm 0.216 \]

Change in log firm size headcount (2010-2013 vs 2005-2008)

- 1 ppt ↑ in fraction treated by STW ⇒ ≈ 1% ↓ in empl. of non-eligible firms
Equilibrium effects: Employment spillovers

- For 1 job “saved” by STW, employment in non-treated firms ↓ 0.03 job
Equilibrium Effects: Total factor productivity in LLM

\[ \beta_{IV} = -3.960 (1.537) \]

Change in aggregate TFP (2010-2013 vs 2005-2008)

Fraction of eligible workers 2005-2008
Policy take-aways

- Substantial divergence in policy choices in US and Europe during COVID-19 crisis

- If shock is **temporary**: STW $\gg$ UI
  - Various frictions to optimal labor hoarding
  - Frictions not easily/quickly addressable by other policy tools
  - Moral hazard cost of STW can be limited

- If shock becomes **persistent**: no longer clear dominance
  - Reallocation may become necessary
  - Allow workers to take jobs while on STW
  - Incentivize training/search while on STW
Thank you!

giulia.giupponi@ifs.org.uk
Appendix
<table>
<thead>
<tr>
<th></th>
<th>(1) All INPS Codes</th>
<th>(2) Eligible INPS Codes</th>
<th>(3) Non-Eligible INPS Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Employees (headcount)</td>
<td>8.72</td>
<td>5.16</td>
<td>9.78</td>
</tr>
<tr>
<td>Employees (FTE)</td>
<td>8.04</td>
<td>4.78</td>
<td>9.35</td>
</tr>
<tr>
<td>Annual hours worked per employee</td>
<td>2015.26</td>
<td>1008.70</td>
<td>2043.69</td>
</tr>
<tr>
<td>Annual wage bill per employee (000)</td>
<td>20.66</td>
<td>12.38</td>
<td>22.49</td>
</tr>
<tr>
<td>Net revenue per week worked (000)</td>
<td>6.22</td>
<td>49.55</td>
<td>5.94</td>
</tr>
<tr>
<td>Value added per week worked (000)</td>
<td>1.11</td>
<td>11.36</td>
<td>1.22</td>
</tr>
<tr>
<td>Liquidity</td>
<td>0.11</td>
<td>0.14</td>
<td>0.09</td>
</tr>
<tr>
<td>Observations</td>
<td>321580</td>
<td></td>
<td>102757</td>
</tr>
<tr>
<td></td>
<td>All INPS Codes</td>
<td>Eligible INPS Codes</td>
<td>Non-Eligible INPS Codes</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------</td>
<td>---------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Proportion female</td>
<td>0.38</td>
<td>0.48</td>
<td>0.24</td>
</tr>
<tr>
<td>Age</td>
<td>36.89</td>
<td>10.72</td>
<td>38.53</td>
</tr>
<tr>
<td>Experience (years)</td>
<td>14.23</td>
<td>10.58</td>
<td>16.04</td>
</tr>
<tr>
<td>Tenure (months)</td>
<td>59.49</td>
<td>71.52</td>
<td>66.72</td>
</tr>
<tr>
<td>Prop. on full-time contract</td>
<td>0.82</td>
<td>0.38</td>
<td>0.90</td>
</tr>
<tr>
<td>Prop. on open-ended contract</td>
<td>0.83</td>
<td>0.37</td>
<td>0.88</td>
</tr>
<tr>
<td>Prop. on fixed-term contract</td>
<td>0.15</td>
<td>0.36</td>
<td>0.12</td>
</tr>
<tr>
<td>Prop. on seasonal contract</td>
<td>0.02</td>
<td>0.13</td>
<td>0.00</td>
</tr>
<tr>
<td>Proportion blue collar</td>
<td>0.64</td>
<td>0.48</td>
<td>0.69</td>
</tr>
<tr>
<td>Proportion white collar</td>
<td>0.27</td>
<td>0.44</td>
<td>0.24</td>
</tr>
<tr>
<td>Proportion manager</td>
<td>0.00</td>
<td>0.05</td>
<td>0.00</td>
</tr>
<tr>
<td>Proportion apprentice</td>
<td>0.07</td>
<td>0.26</td>
<td>0.05</td>
</tr>
<tr>
<td>Observations</td>
<td>3350203</td>
<td></td>
<td>1140981</td>
</tr>
</tbody>
</table>
Distribution of fraction of eligible workers on STW in treated firms
Distribution of reported weekly hour reductions among treated workers

![Bar chart showing the distribution of reported weekly hour reductions among treated workers. The x-axis represents the reduced hours as a fraction of regular contracted hours, ranging from 0 to 1. The y-axis represents the density, ranging from 0 to 2.5. The chart shows a peak in the distribution between 0.1 and 0.2, with a gradual decrease as the fraction of reduced hours increases.](image_url)
Firm eligibility

- Eligibility is assigned on the basis of an INPS circular that regulates the implementation of the STW law
- STW legislation by the Ministry of Labor, and the rules that determine its application as made operational by INPS, date back to the 1970s
- INPS uses 5-digit INPS industry codes × additional administrative codes (called codice autorizzazione) to determine eligibility
- ⇒ within 5-digit INPS industry codes, some firms are deemed eligible, other ineligible
- We exploit variation in eligibility within these fine-grained 5-digit industry codes (594 industries)
Triple-difference specification

\[ Y_{igst} = \sum_j \gamma_1^j \cdot \left\{ \mathbbm{1}[g \in \mathcal{E}] \ast \mathbbm{1}[N_{i,t-1} > 15] \ast \mathbbm{1}[j = t] \right\} \\
+ \sum_j \sum_k \gamma_2^{jk} \cdot \left\{ \mathbbm{1}[g \in \mathcal{E}] \ast \mathbbm{1}[k = s] \ast \mathbbm{1}[j = t] \right\} \\
+ \sum_j \sum_k \gamma_3^{jk} \cdot \left\{ \mathbbm{1}[k = s] \ast \mathbbm{1}[N_{i,t-1} > 15] \ast \mathbbm{1}[j = t] \right\} \\
+ \sum_j \sum_k \gamma_4^{jk} \cdot \left\{ \mathbbm{1}[k = s] \ast \mathbbm{1}[j = t] \right\} \\
+ \sum_k \gamma_5^k \cdot \left\{ \mathbbm{1}[g \in \mathcal{E}] \ast \mathbbm{1}[k = s] \ast \mathbbm{1}[N_{i,t-1} > 15] \right\} \\
+ \sum_k \gamma_6^k \cdot \left\{ \mathbbm{1}[g \in \mathcal{E}] \ast \mathbbm{1}[k = s] \right\} + v_{igst} \] (3)

- \textit{i} is firm, s 5-digit industry code, \textit{t} calendar year
- Industry group \textit{g}. Group of industries eligible to receive CIGS: \( g \in \mathcal{E} \)
- \( N_{i,t-1} \) max 6 month window FTE size in calendar year \( t-1 \).
- Plot estimated coefficients \( \hat{\gamma}_1^t \) for all years \( t \)
First-stage specification

\[ T_{igst} = \kappa_1 \cdot \left\{ 1[g \in E] \ast 1[N_{i,t-1} > 15] \ast 1[t > 2008] \right\} \]
\[ + \sum_j \sum_k \kappa_{2}^{jk} \cdot \left\{ 1[g \in E] \ast 1[k = s] \ast 1[j = t] \right\} \]
\[ + \sum_j \sum_k \kappa_{3}^{jk} \cdot \left\{ 1[k = s] \ast 1[N_{i,t-1} > 15] \ast 1[j = t] \right\} \]
\[ + \sum_j \sum_k \kappa_{4}^{jk} \cdot \left\{ 1[k = s] \ast 1[j = t] \right\} \]
\[ + \sum \kappa_{5}^{k} \cdot \left\{ 1[g \in E] \ast 1[k = s] \ast 1[N_{i,t-1} > 15] \right\} \]
\[ + \sum \kappa_{6}^{k} \cdot \left\{ 1[g \in E] \ast 1[k = s] \right\} + \nu_{igst} \]

- \( i \) is firm, \( s \) 5-digit industry code, \( t \) calendar year
- Industry group \( g \). Group of industries eligible to receive CIGS: \( g \in E \)
- \( N_{i,t-1} \) max 6 month window FTE size in calendar year \( t - 1 \).
Employment: Dual labor market effects

\[ \beta_{IV} = -0.616(0.043) \]

- Open-ended employment largely benefits from STW: \( \uparrow \) by \( \approx 85\% \)
Employment: Dual labor market effects

While fixed-term contracts are substituted away: ↓ by \( \approx 35\% \)
<table>
<thead>
<tr>
<th></th>
<th>Estimate (1)</th>
<th>Std Error (2)</th>
<th>N (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimate</td>
<td>Std Error</td>
<td>N</td>
</tr>
<tr>
<td>A. First Stage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probability of CIGS take-up</td>
<td>0.05</td>
<td>0.002</td>
<td>3029855</td>
</tr>
<tr>
<td>B. Firm survival (IV)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm survival probability (in t + 1)</td>
<td>0.104</td>
<td>0.038</td>
<td>2843205</td>
</tr>
<tr>
<td>C. Balance-Sheet Outcomes (IV)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm value added</td>
<td>0.095</td>
<td>0.159</td>
<td>873839</td>
</tr>
<tr>
<td>Value added per worker</td>
<td>-0.508</td>
<td>0.120</td>
<td>873839</td>
</tr>
<tr>
<td>Tangible investment</td>
<td>-0.003</td>
<td>0.672</td>
<td>873839</td>
</tr>
<tr>
<td>Liquidity</td>
<td>0.939</td>
<td>0.461</td>
<td>873839</td>
</tr>
</tbody>
</table>
Size manipulation

McCrary test: -.008 (.005)

Density

Firm size

McCrary test: -.008 (.005)
McCrary test for discontinuity in size distribution

Eligible INPS codes

Non-eligible INPS codes
Eligibility manipulation

Diagram showing the fraction of firms changing eligibility status from non-eligible to eligible and from eligible to non-eligible over the years 2000 to 2014.
## A. First Stage

<table>
<thead>
<tr>
<th>Probability of CIGS take-up</th>
<th>IV</th>
<th>RF</th>
<th>IV</th>
<th>RF</th>
<th>IV</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.053</td>
<td>.002</td>
<td>.051</td>
<td>.000</td>
<td>.055</td>
<td>.041</td>
</tr>
<tr>
<td>(Placebo)</td>
<td>(.002)</td>
<td>(.000)</td>
<td>(.002)</td>
<td>(.000)</td>
<td>(.005)</td>
<td>(.004)</td>
</tr>
</tbody>
</table>

## B. Outcomes

<table>
<thead>
<tr>
<th>Log hours per worker</th>
<th>IV</th>
<th>RF</th>
<th>IV</th>
<th>RF</th>
<th>IV</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-.449</td>
<td>-.011</td>
<td>-.602</td>
<td>.000</td>
<td>-.670</td>
<td>-.156</td>
</tr>
<tr>
<td>(Placebo)</td>
<td>(.037)</td>
<td>(.020)</td>
<td>(.081)</td>
<td>(.010)</td>
<td>(.230)</td>
<td>(.132)</td>
</tr>
</tbody>
</table>

| Log employment              | .284     | -.020    | .306     | -.001    | .848 | .338 |
| (Placebo)                   | (.032)   | (.030)   | (.099)   | (.009)   | (.297)| (.258)|

| Log wage bill               | -.544    | -.026    | -.498    | .000     | -.568| -.390|
| (Placebo)                   | (.049)   | (.030)   | (.155)   | (.013)   | (.297)| (.709)|

| N                           | 2686140  | 2608383  | 429490   | 2978239  | 152753| 44793|

*Permutation p-values*
P-values of permutation test

A. Log Hours per Employee

B. Log Firm Size (Headcount)

C. Log Wage Rate

D. Log Wage Bill per Employee
Fiscal externality

- Unit mass of identical workers, who can be employed \((1 - u)\) or unemployed \(u\). Share \(n\) of employed on STW
- If employed full time, work \(\bar{h}\) hours; if on STW work \(h < \bar{h}\); wage \(w\)
- All employed workers pay a tax \(t\) on their labor income
- STW hours \((\bar{h} - h)\) subsidized at replacement rate \(\tau\)
- Unemployed workers receive benefit \(b\)
- Government budget constraint reads
  \[ t \cdot w \cdot h \cdot n + t \cdot w \cdot \bar{h} \cdot (1 - n - u) = b \cdot w \cdot \bar{h} \cdot u + \tau \cdot w \cdot (\bar{h} - h) \cdot n \]
- Differentiating budget with respect to \(\tau\), fiscal externality is
  \[ FE = 1 + \varepsilon_{n,\tau} \left(1 - \frac{b \cdot \bar{h}}{\tau \cdot (\bar{h} - h)}\right) - \varepsilon_{h,\tau} \cdot \frac{h}{(\bar{h} - h)} \]
- Calibrating \(FE\), we obtain a value of 1.07
Heterogeneity in hour effects by firm productivity
Heterogeneity in survival effects by firm productivity

STW effect: Probability of firm survival

Labor productivity vs. TFP

1st quartile 2nd quartile 3rd quartile 4th quartile

1

0

-.5

-.5

Back
Probability of CIG treatment in previous 5 yrs

Estimated probability of STW receipt in past 5 years (percentage points)
Dynamic extensive-margin response

- No significant long term effects on employment
Event-study methodology

- Panel of all employees of firms active between 2000 and 2015 and with firm size $\in (5; 25]$ in the year prior to the worker’s first STW spell

- Treated individuals: workers with a STW event

- Control individuals: NN matching based on pre-event characteristics

- **Selection:**
  - Focus on control individuals who cannot access STW because of firm size or firm eligibility

- **Bounds on selection:**
  - Counterfactual 1 [upper bound]: *average worker* in non-eligible firms
  - Counterfactual 2 [lower bound]: *laid-off worker* in non-eligible firms
Identification of reallocation effects

- Use spatial variation across more than 500 LLM
- Specification, first difference firm / LLM fixed effects

\[ \Delta Y_{ij} = \Delta T_j + X'_j \beta + W'_i \gamma + \varepsilon_{ij} \quad (5) \]

\[ \Delta T_j = \alpha Z_{j}^{PRE} + \eta_j \quad (6) \]

- Firm \( i \), LLM \( j \)
- Instrument: \( Z_j^{PRE} \) fraction of eligible workers from size and INPS codes in pre-recession period

- \( W \) includes 5-digit industry fixed effects, a dummy for eligible codice autorizzazione, firm size in 2008 and a dummy for STW treatment

- \( X \) includes the industry composition of the LLM and the initial unemployment rate in the LLM prior to the recession
Equilibrium Effects: First stage

The graph illustrates the relationship between the fraction of eligible workers (2005-2008) and the fraction of employees on CIGS (2010-2013). The data points are plotted on a linear scale, showing a positive correlation. The graph suggests that as the fraction of eligible workers increases, the fraction of employees on CIGS also increases.
Placebo: Employment spillovers

\[ \beta_{RF} = -0.021 (0.013) \]

Change in log firm size headcount (2006-2008 vs 2000-2005)

Fraction of eligible workers 2000-2005