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

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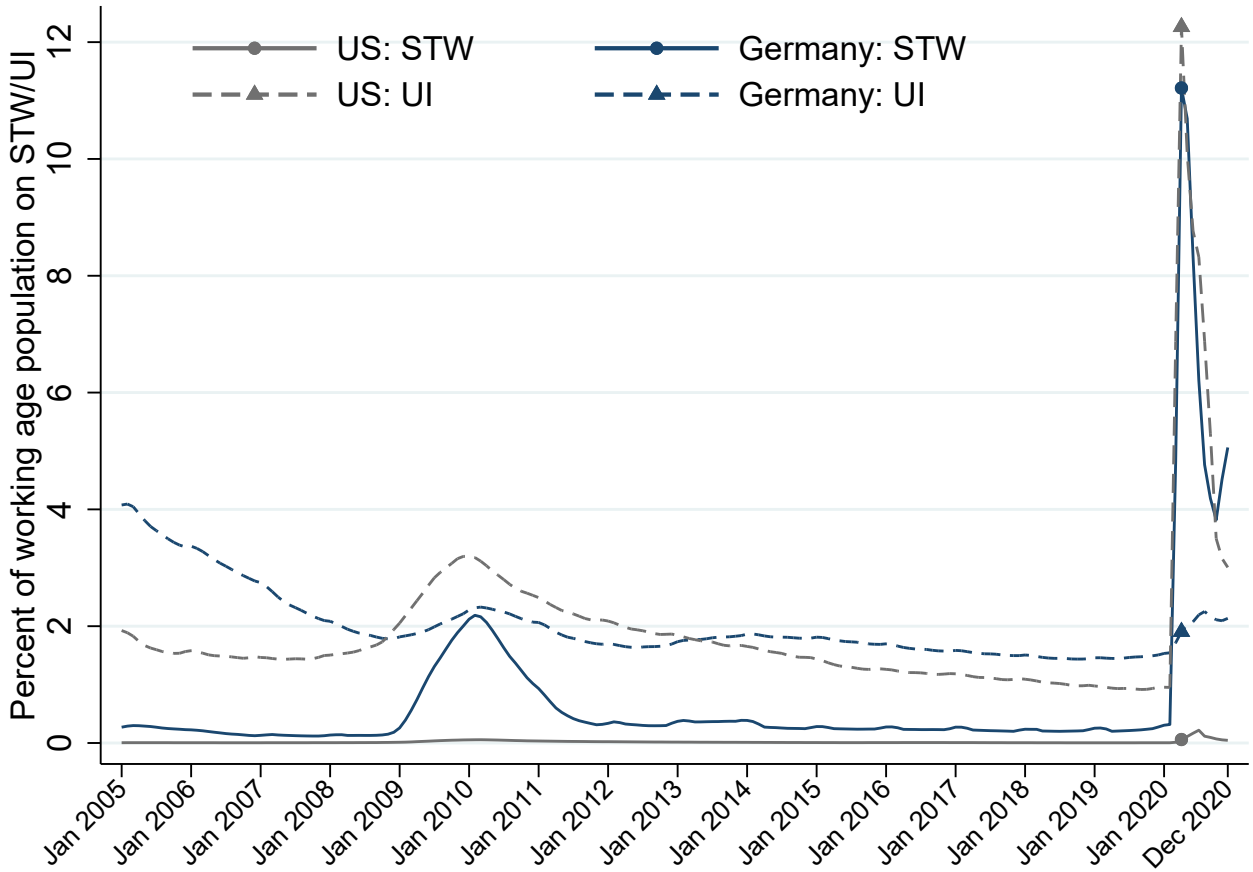
The findings and conclusions are solely those of the author and do not represent the views of INPS

Short-time work during COVID-19

- COVID-19 economic crisis has generated great renewal of interest in **short-time work programs (STW)**
  - Subsidies 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 and Italy, 4% in France
- ...but much more so during COVID-19 outbreak
  - 15% of employees in Germany, 31% in Italy and 35% in France in April 2020

Labor market policy response to COVID-19 crisis

Germany vs US



European countries | Non-employment rate

What do we know about effects of STW?

Key questions

- Is STW effective at **stabilizing employment**?
- Does it provide **insurance** to workers?
- If so, is this efficient? What are the **welfare implications** of STW?

So far, **limited evidence** mainly due to

- Scarcity of micro-level administrative **data** on STW
- Limited sources of credible **identification**, even more acute in current crisis
- Lack of **theoretical framework** to evaluate social desirability of STW

This paper

- Leverage Italian **social security data** and **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** outcomes
  - On short- and long-term **insurance** of workers
- Explore empirically **forces underlying the welfare trade-offs** of STW
  - Canonical moral hazard and insurance effects
  - Additional forces: **layoff** and **reallocation** inefficiencies

Main findings

- Effects on firm- and worker-level outcomes
  - Large $(-)$ effects on **hours** and large $(+)$ effects on **employment**, and $(+)$ effect on firms' **survival** probability
  - Short-run **insurance** to workers
- Is this **efficient**? Key to separate shocks by **persistence**
- Welfare trade-off when the shock is **temporary**:
  - Liquidity constraints and bargaining frictions can make level of labor hoarding inefficiently low in absence of STW
  - 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. Temporary shock: does STW prevent inefficient layoffs?
4. Persistent shock: does STW prevent efficient reallocation?

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Cassa Integrazione Guadagni Straordinaria (CIGS)

- CIGS has been main pillar of STW during Great Recession Other pillars
- Targets **firms experiencing shocks**: demand/revenue shocks, company crisis, restructuring, reorganization, insolvency Reason for application
- **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)

Eligibility for CIGS

- STW rules nearly unaltered since 1970
- Firm's eligibility for CIGS depends on Evidence
  - **Firm size** in six months prior to filing application > 15 on average
  - Eligible **contributory regime**: 5-digit industry $\times$ contributory code
- Contributory regime
  - Industry code defines sector of activity at fine level
  - Contributory (INPS) code complements industry code in specifying contributory obligations or exemptions
- **Variation** in eligibility **within 5-digit industries** across otherwise similar firms, due to regulations plausibly unrelated to economic conditions today

Data

- Administrative data from Italian social security (INPS) archives
- Universe of **matched employer-employee data** for the private sector
- Monthly data 2005-2015 and annual data 1983-2015
- 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%)

Sample and treatment-variable definition

Sample of firms

- Panel of all private sector firms that ever reach average 6-month FTE firm size between 5 and 25 in 2005-2014
- Balancing: keep firms even when size is no longer in that range and even after firm closure

Sample of workers

- Balanced panel of all workers ever working in these firms

Treatment definition

- STW event as any month in which authorized STW episode is reported in INPS records
- When aggregating at annual level, event is having at least one STW episode in the year

Descriptives firms | Descriptives workers | Fraction of workers on STW | Hour reductions

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Identification

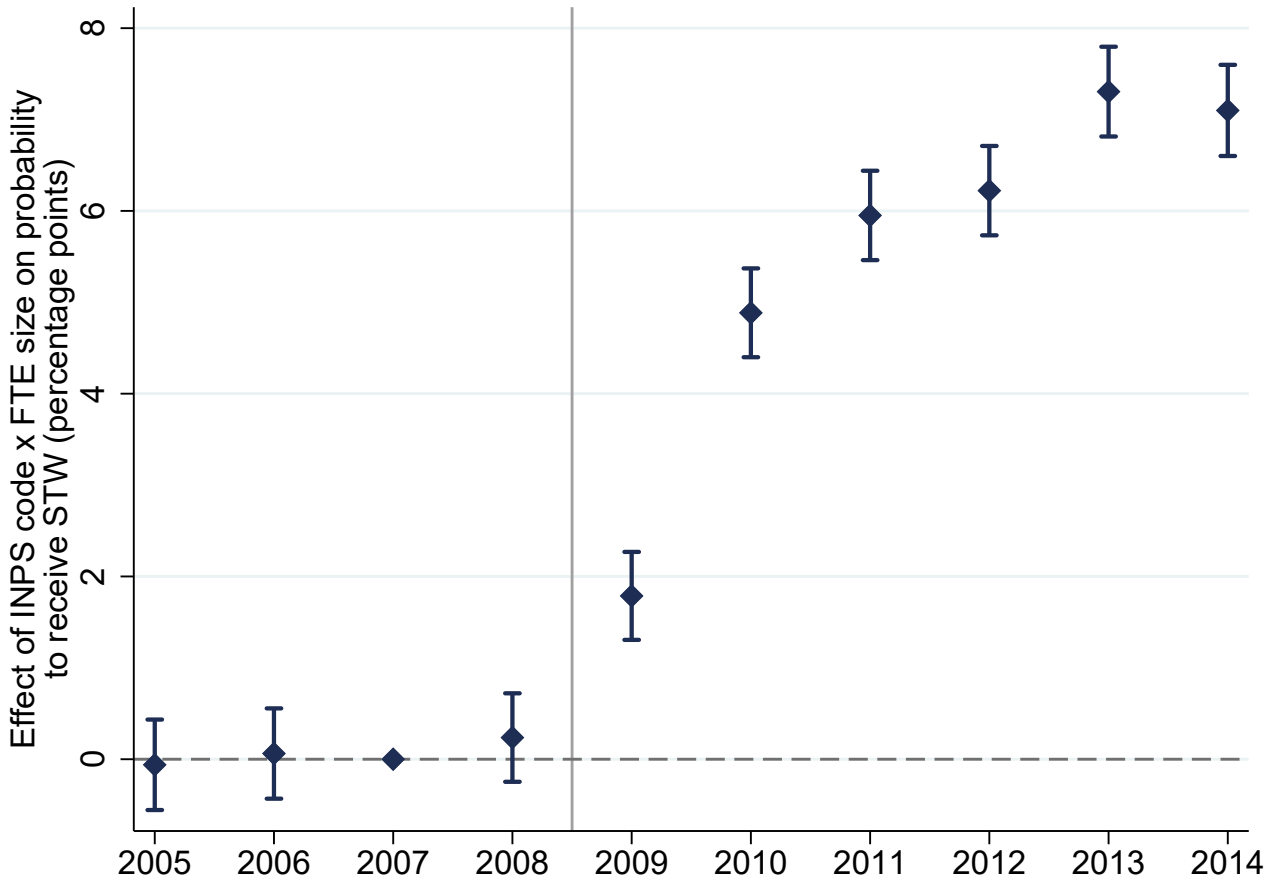
- Exploit variation in firm's eligibility for CIGS based on:
  - Firm's **industry** $\times$ **contributory codes**
  - **Size**: more than 15 FTE employees in 6 mths prior to application
- **Triple difference.** Compare outcomes of firms:
  1. In eligible vs non-eligible industry $\times$ contributory codes
  2. Just below vs just above 15 FTE-threshold
  3. Before vs after the start of the Great Recession Specification

Identifying assumption

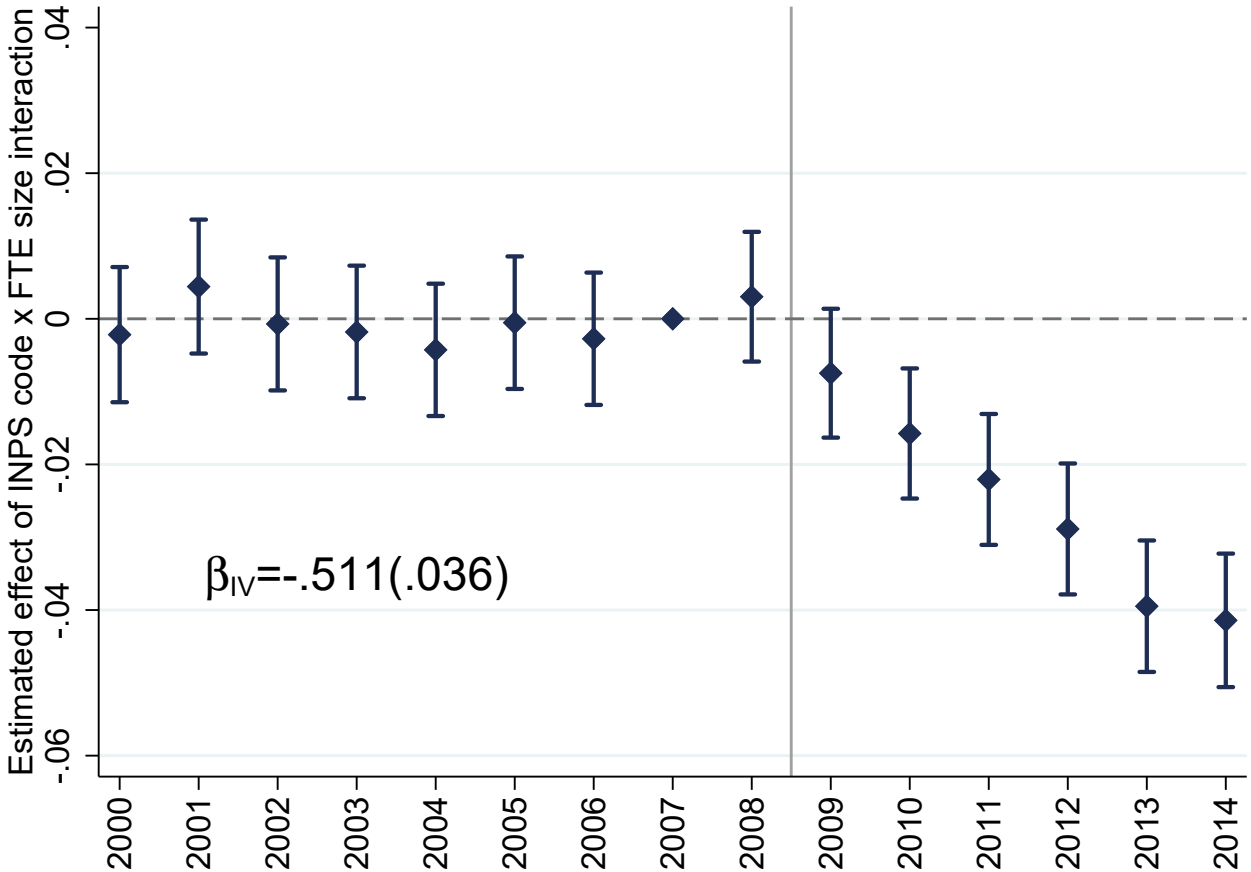
No unobservable time shocks that would be, within each 5-digit industry code, specific to firms that are eligible to CIGS *and* whose size is just above the 15 FTE threshold.

Probability of firm receiving STW

First stage

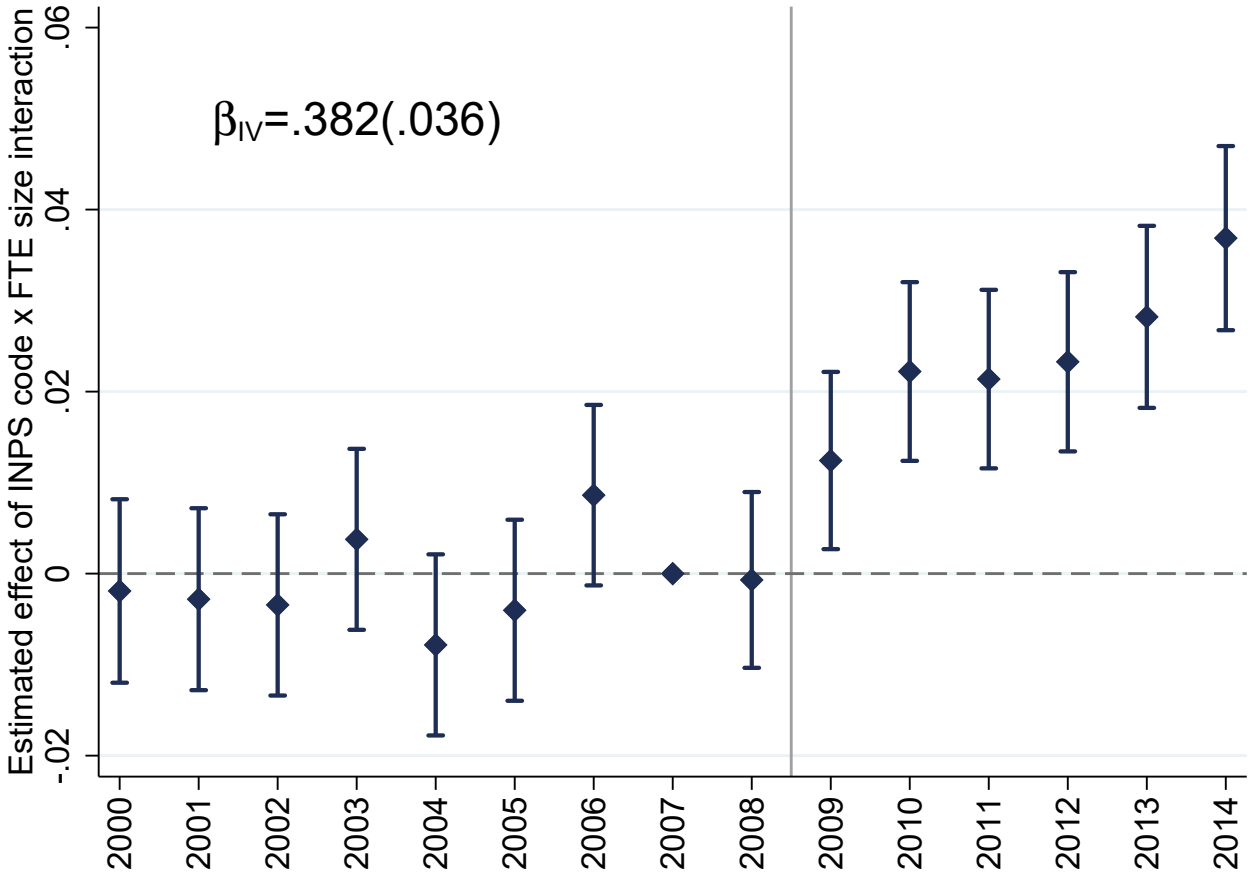


Intensive-margin employment: Log hours per employee



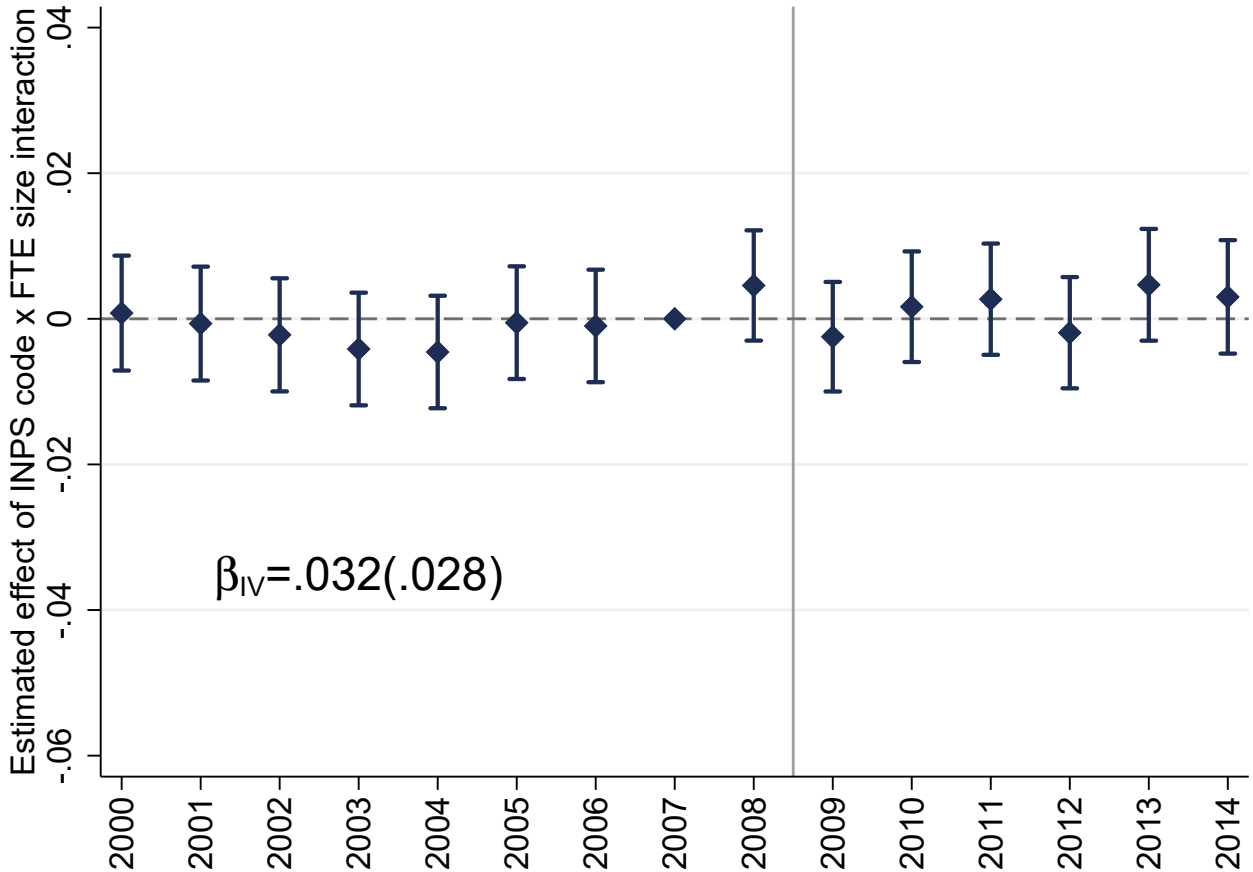
- STW decreases # of hours worked per employee by $\approx$ 40%

Extensive-margin employment: Log firm size headcount



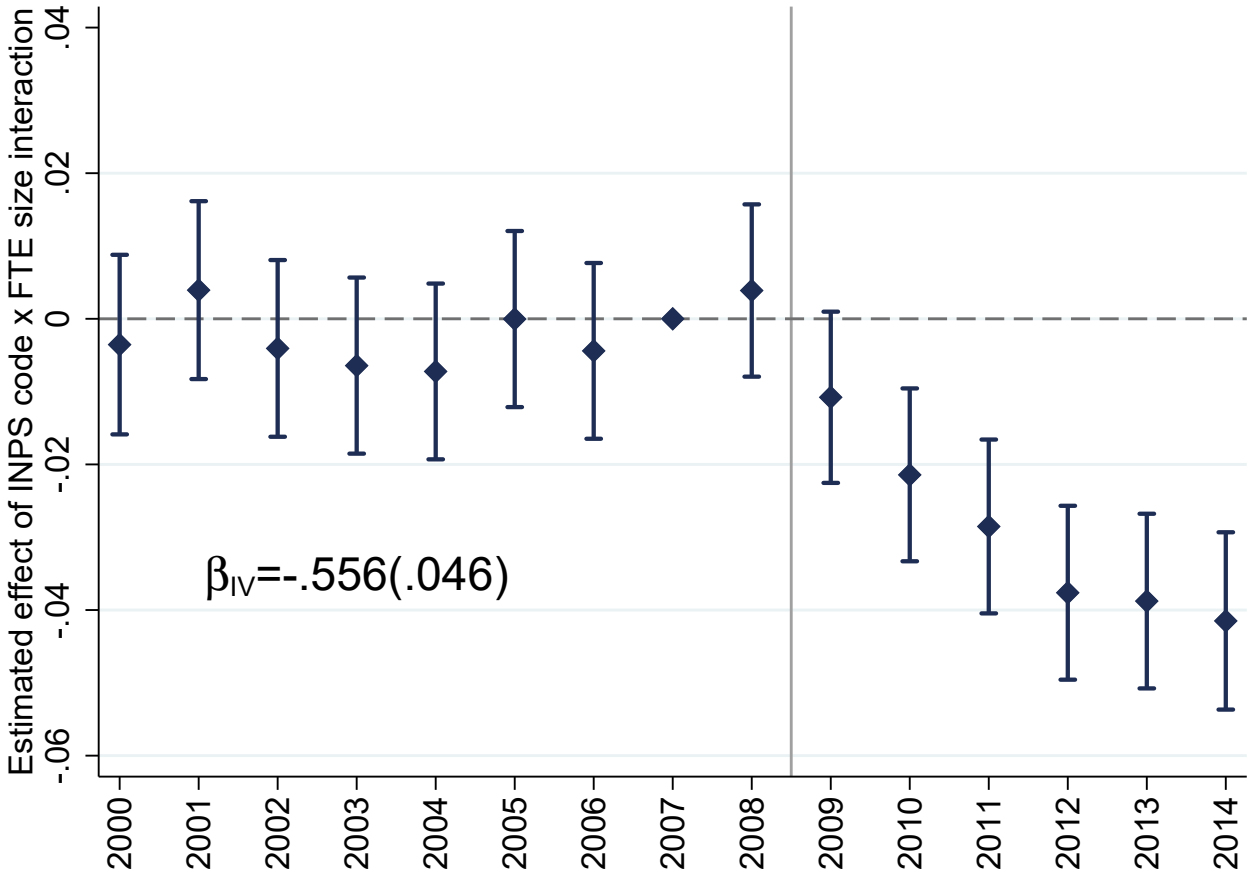
- STW increases headcount employment by $\approx$ 45%

Log hourly wage rate



- STW has no significant effect on wage rates

Log wage bill per employee



- STW decreases wage bill per employee by $\approx 45\%$

Additional results

- **Targeting** properties
  - STW well-targeted to firms predicted to be at risk of experiencing mass layoffs Results
- **Dual labor market** effects
  - Italian labor market characterized by strong duality between open-ended and temporary contracts
  - STW increases incentives to hire open-ended contracts (or to convert)
  - Employment effects driven by open-ended contracts Results
- Additional effects on **firms' outcomes** Results
  - Small $(+)$ effect on probability of firm survival
  - $(-)$ effect on value added per worker, not on value added per hour
  - No significant effects on balance sheet apart from liquidity $(+)$

Robustness

Identification checks

- No significant size manipulation Size manip. Doughnut regression
- No significant eligibility manipulation Eligibility manip.
- No significant differential trends between eligible and non-eligible, and above and below 15 Trends
- Similar effects for firms with no change in EPL at STW threshold No EPL

Program substitution

- First stage and IV robust to accounting for all CIG schemes CIG treatment

Alternative specification

- Robust to specification capturing average of contemporaneous and long-run effects of STW Alt. spec.

From employment effects to welfare: A roadmap

- Results indicate that **STW preserves employment**. But is this **efficient**?
- Answer depends critically on **nature of shock**
  - If **temporary**, STW can ↑ welfare if it prevents inefficient layoffs
  - If **permanent**, STW can ↓ welfare if it prevents reallocation
- In practice, hard to know nature of shock at its onset
  - Initial shock of financial crisis **perceived as transitory** Survey
  - But it ended up being **persistent** due to European debt crisis GDP p.c.
- **Roadmap**
  1. Document presence of **frictions** that would make layoffs inefficiently high (irrespective of realized nature of shock)
  2. Investigate impact of STW on **reallocation** in context of persistent shock

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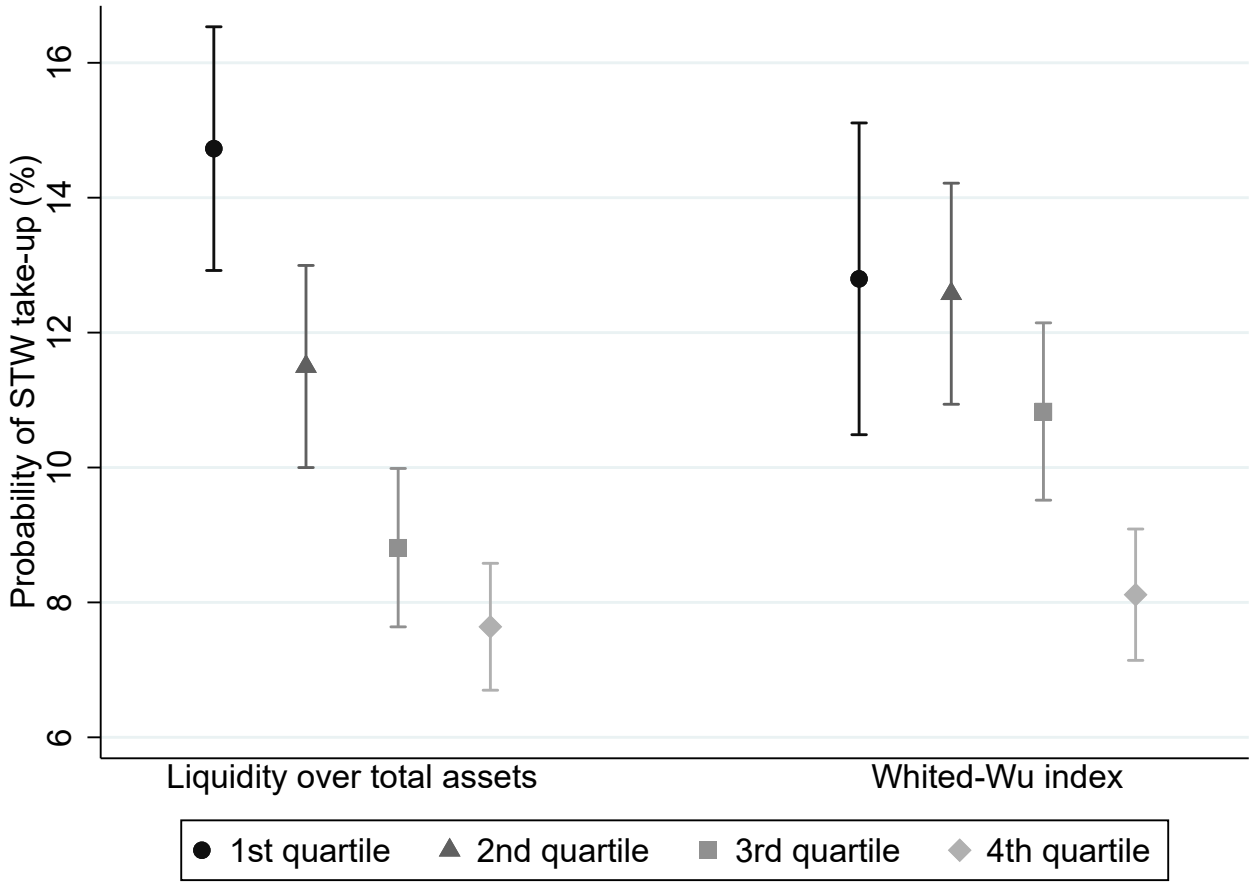
Does STW prevent inefficient layoffs?

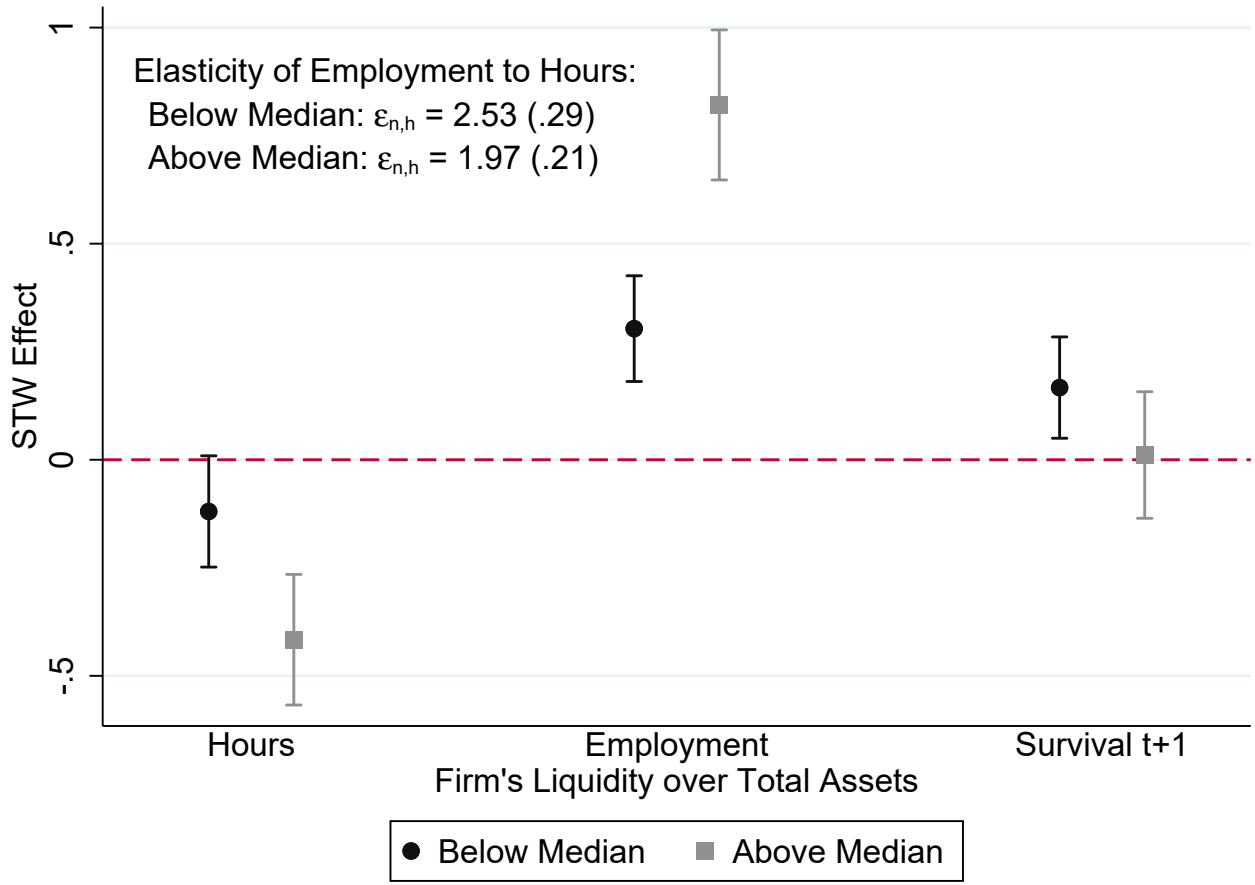
- Many reasons why preserving job matches can be valuable to firms and workers (hiring costs, human capital, scarring effects of layoffs)
- So why wouldn't firms hoard labor optimally?
- Two main mechanisms can make **labor hoarding inefficiently low**
  1. **Liquidity constraints**: inability to transfer 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 2008

Financially constrained firms benefit more from STW

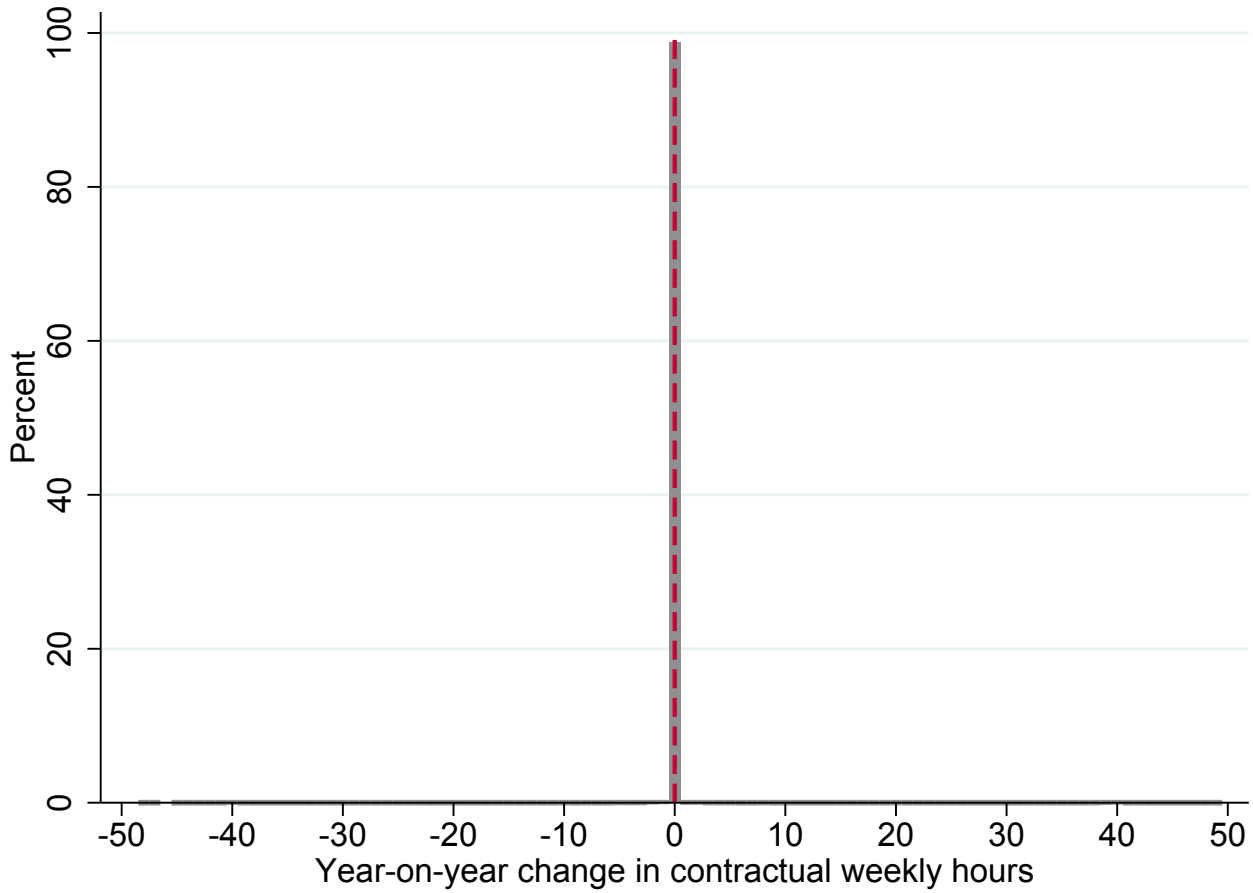


- Increase in employment per hour of STW larger in low-liquidity firms

Strong wage rigidities absent STW

- Density of y-o-y change in log contractual hourly wage for workers employed in non-eligible firms over two consecutive years (2010-2014)
- Also, substantial institutional wage rigidities in Italian labor market

Strong hour rigidities absent STW



- Density of y-o-y change in contractual weekly hours worked for workers employed in non-eligible firms over two consecutive years (2010-2014) LFS

Desirability of STW

- Liquidity constraints and inefficient bargaining suggest STW desirable
- Efficient level of STW: trade-off **welfare gains** from (i) insurance provision and (ii) inefficiency correction with (iii) **fiscal externality**

$$\boxed{\text{Value of Transfer} + \text{Labor Market Inefficiency Corr.} = \text{Fiscal Extern.}}$$

- FE ≈ 1.38, **small** if compared to UI, where FE $\in [1.5, 2.5]$ Detail
- FE low since cost of **behavioral response in hours** partially **compensated by positive employment effect**, which reduces cost to UI system
- If $\text{MV}^{STW} \approx \text{MV}^{UI}$, then STW more efficient than UI even for small inefficiency correction

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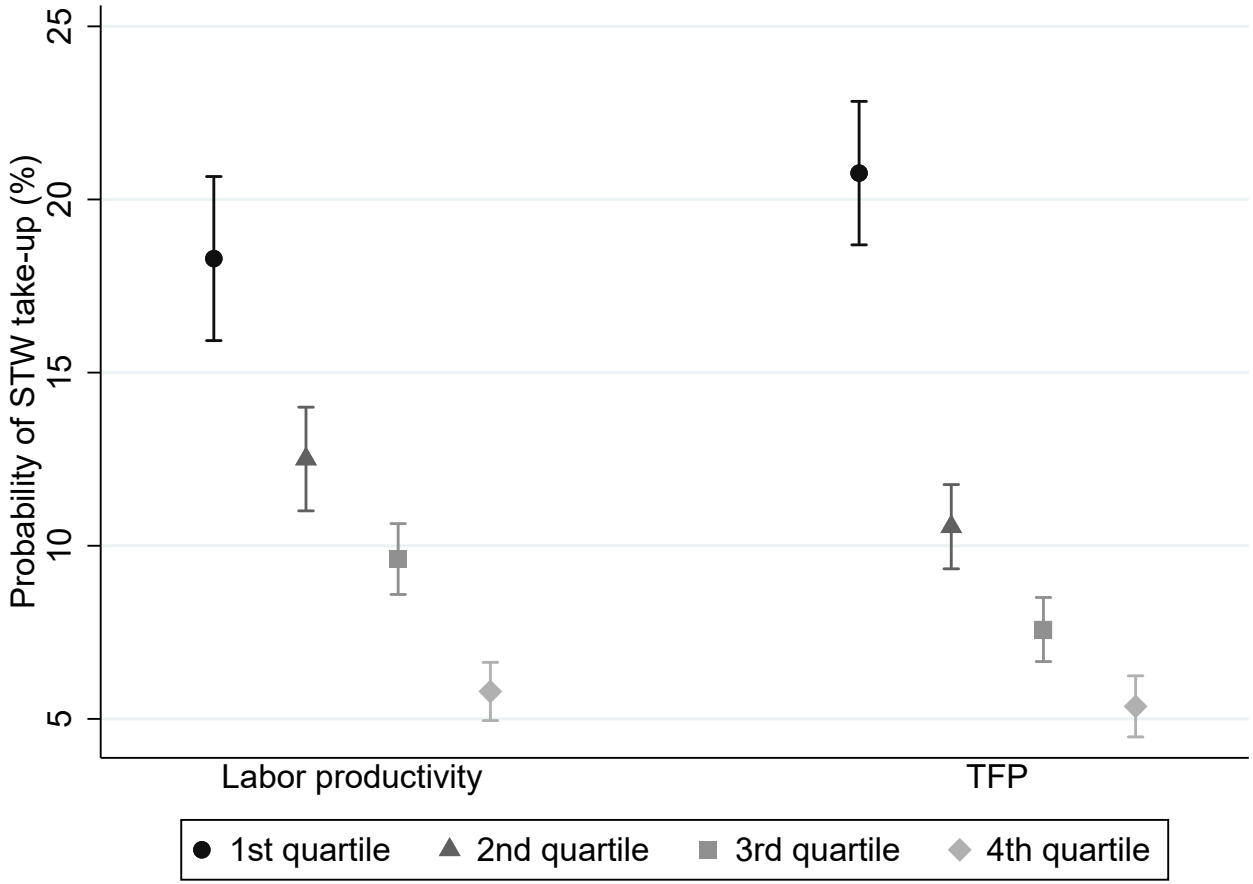
Temporary vs permanent shock

- 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

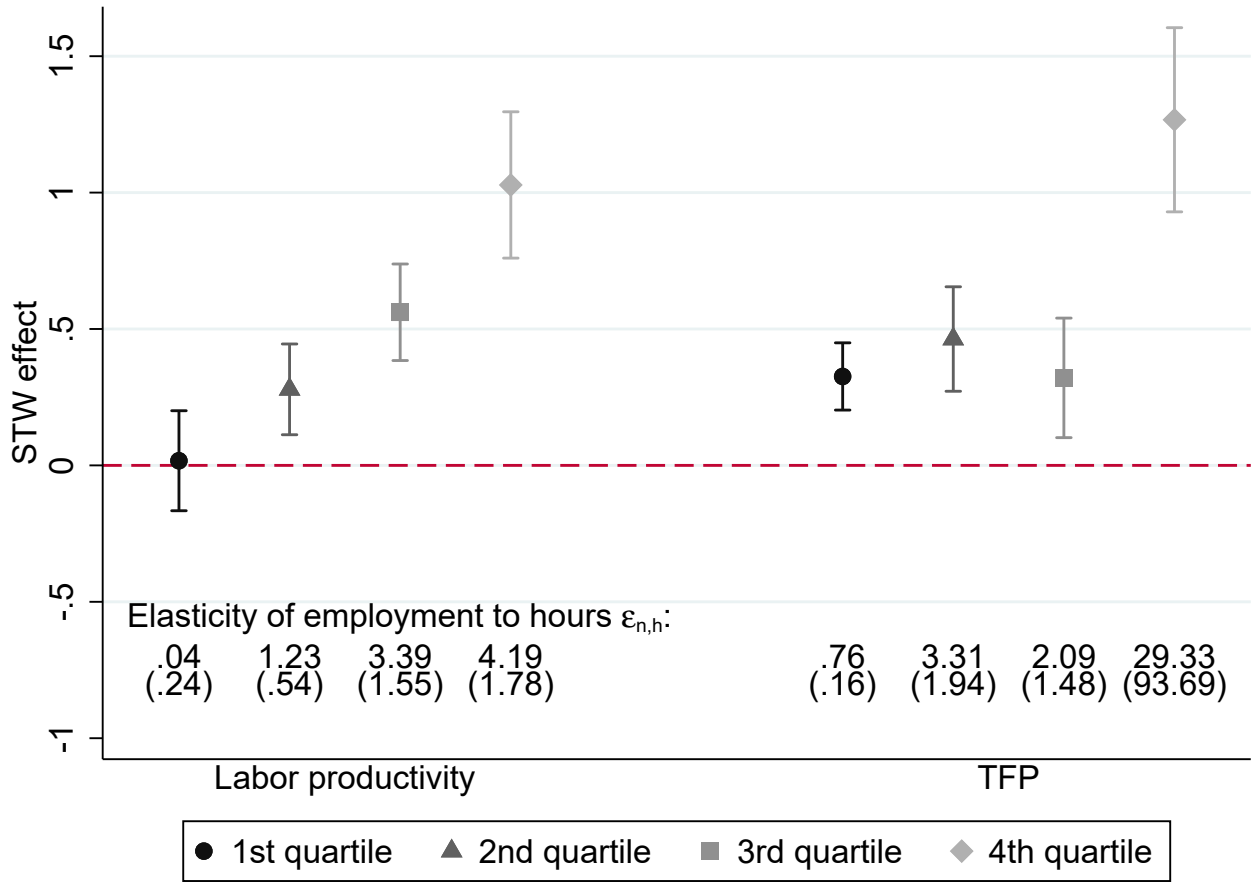
Low-productivity firms take-up substantially more



- Labor productivity (value added/hour worked) and TFP measured in 2008

Low-productivity firms benefit the least from STW

Employment effect



- Strong productivity gradient in employment effects and in hour elasticity of employment Hours Firm survival

Dynamic effects

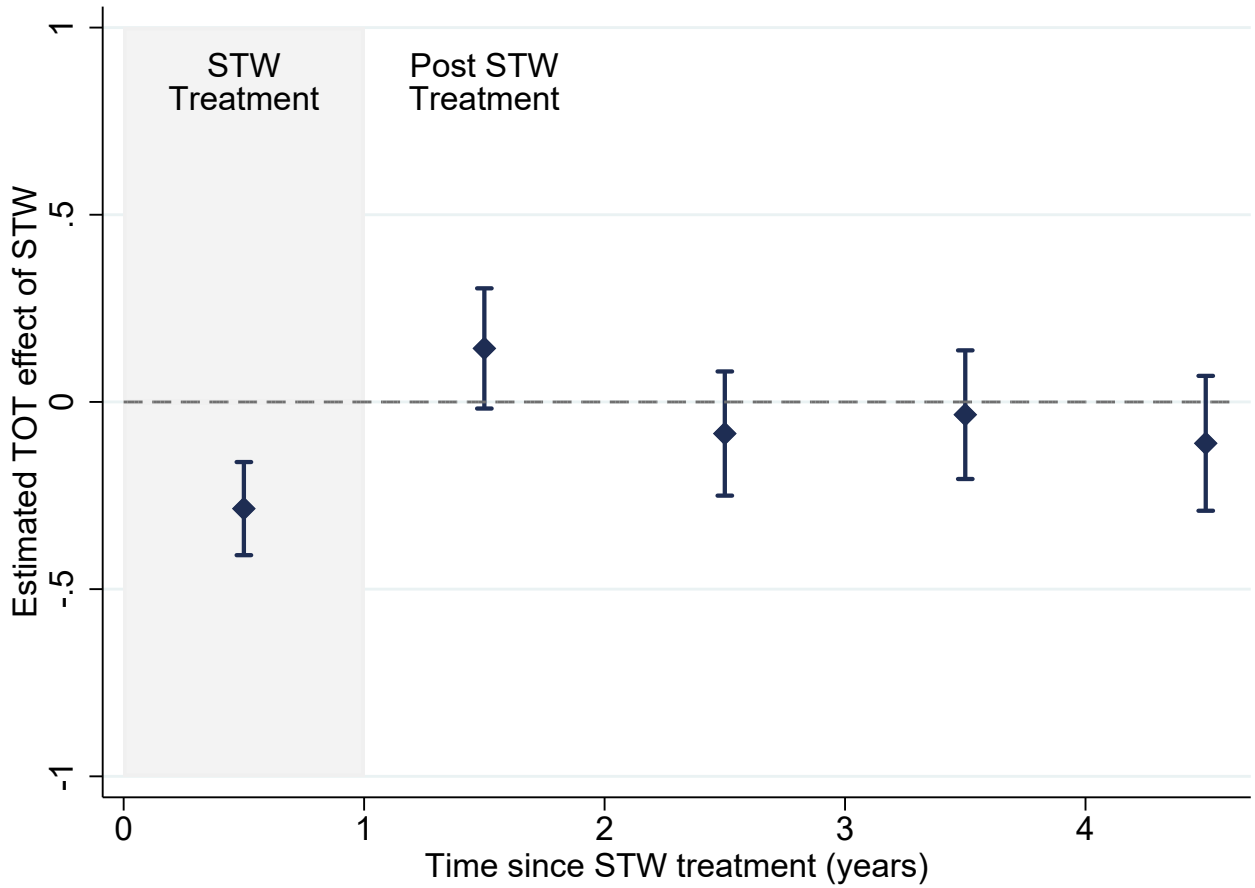
- Baseline IV estimates capture total effects of exposure to STW on firms
- Instrument predicts **both past and contemporaneous treatment** Detail
- Develop methodology similar to Cellini et al. [2010] for recursive identification of **dynamic effects** of STW
- Intuition: take firms active in 2009, and define instrument Z_{2009} as interaction between firm size and contributory code in 2009

$$\beta^{ITT}_{2009} = \beta^{TOT}_{0} \cdot \frac{\mathrm{d}\, T_{2009}}{\mathrm{d} Z_{2009}} \tag{1}$$

$$\beta^{ITT}_{2010} = \beta^{TOT}_{0} \cdot \frac{\mathrm{d}\, T_{2010}}{\mathrm{d} Z_{2009}} + \beta^{TOT}_{1} \cdot \frac{\mathrm{d}\, T_{2009}}{\mathrm{d} Z_{2009}} \tag{2}$$

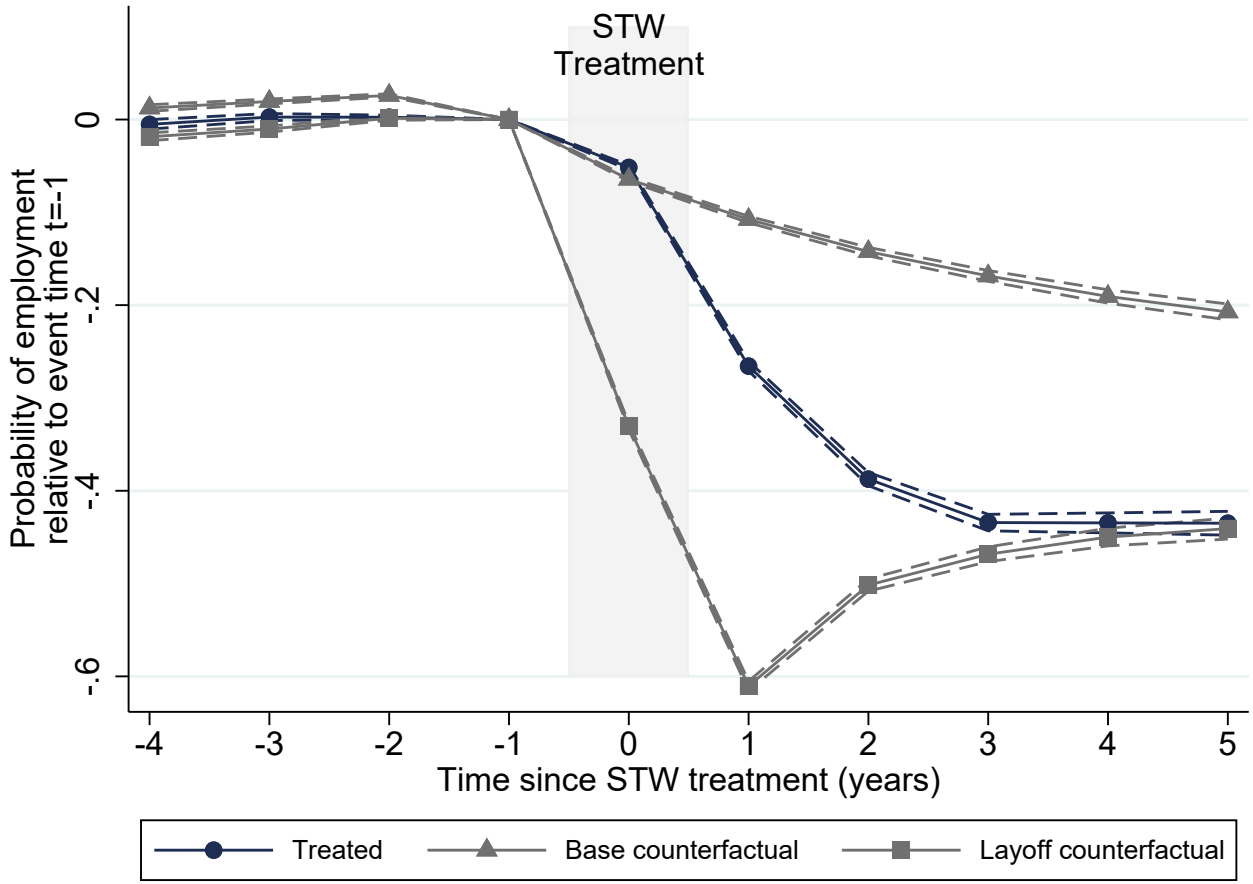
etc...

Intensive-margin effects dissipate after treatment



- Same happens for employment effects Employment

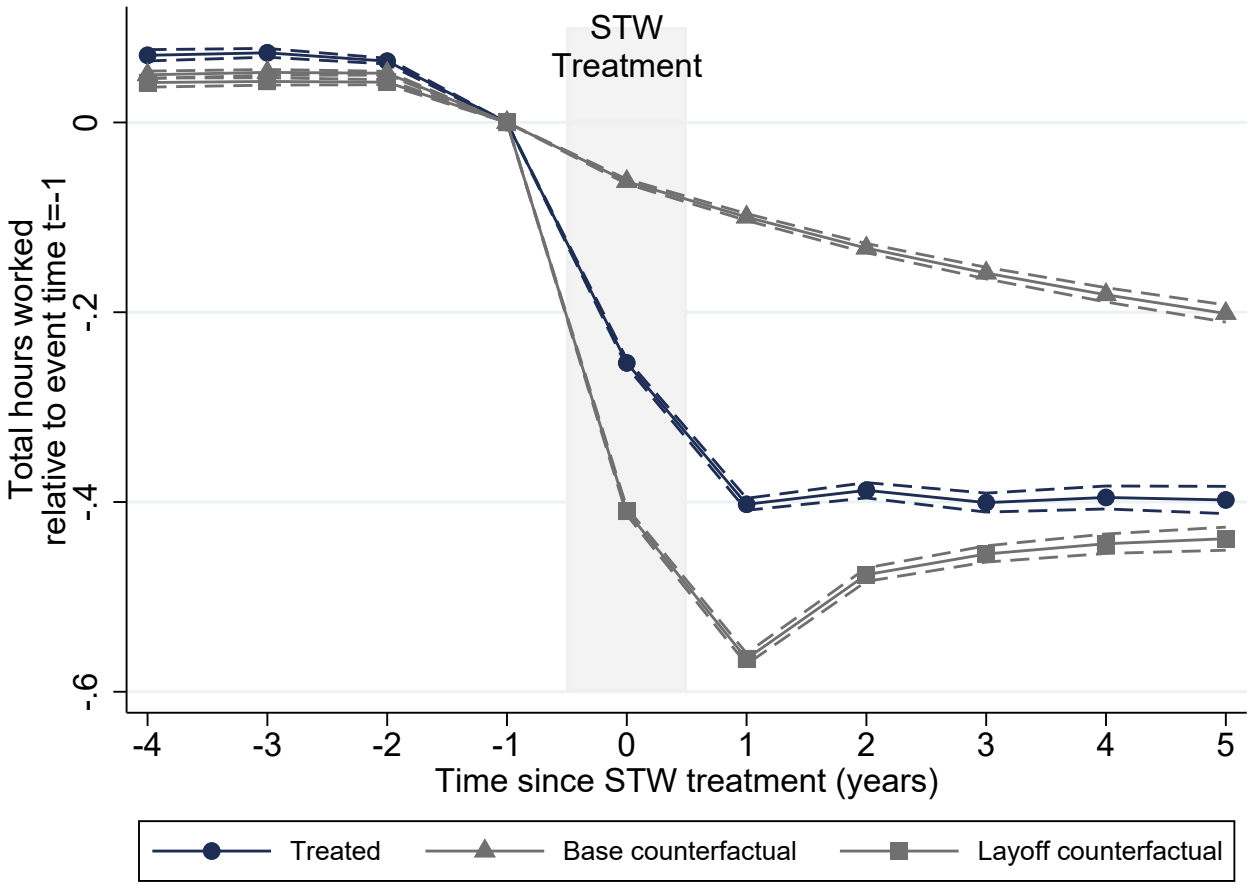
Workers' employment probability



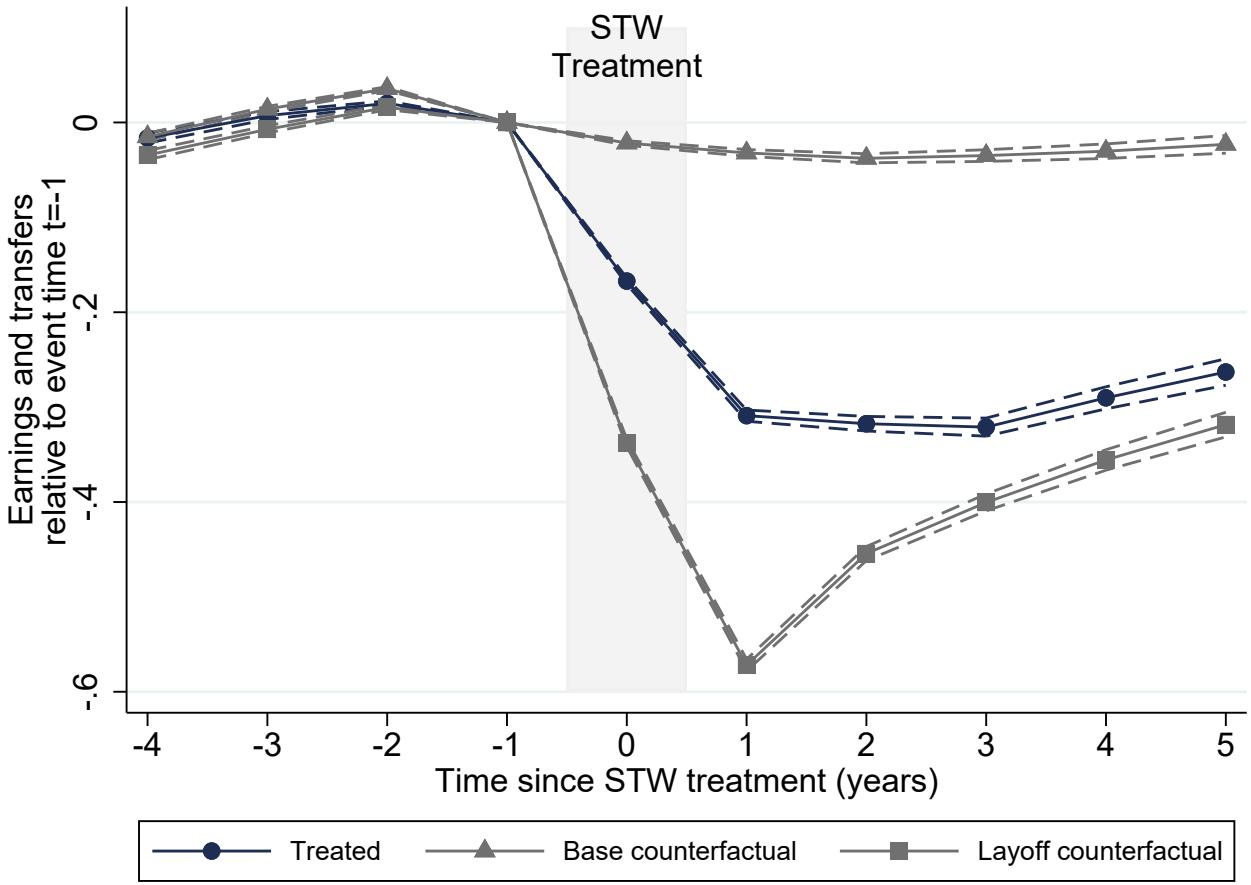
- Counterfactual 1 [upper bound]: **average worker** in non-eligible firms
- Counterfactual 2 [lower bound]: **laid-off worker** in non-eligible firms

Methodology | Bounds on dynamic treatment effects

Workers' total hours worked



Labor earnings plus transfers

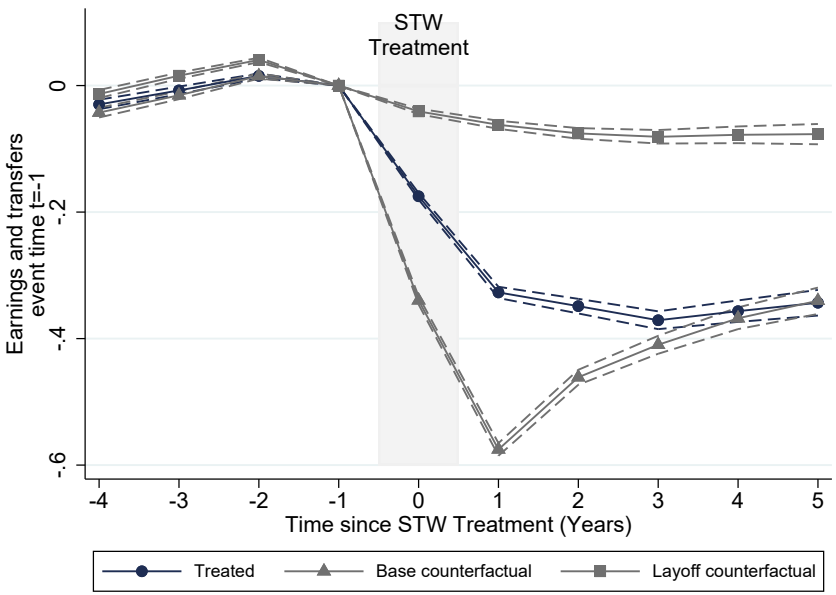


STW as social insurance program

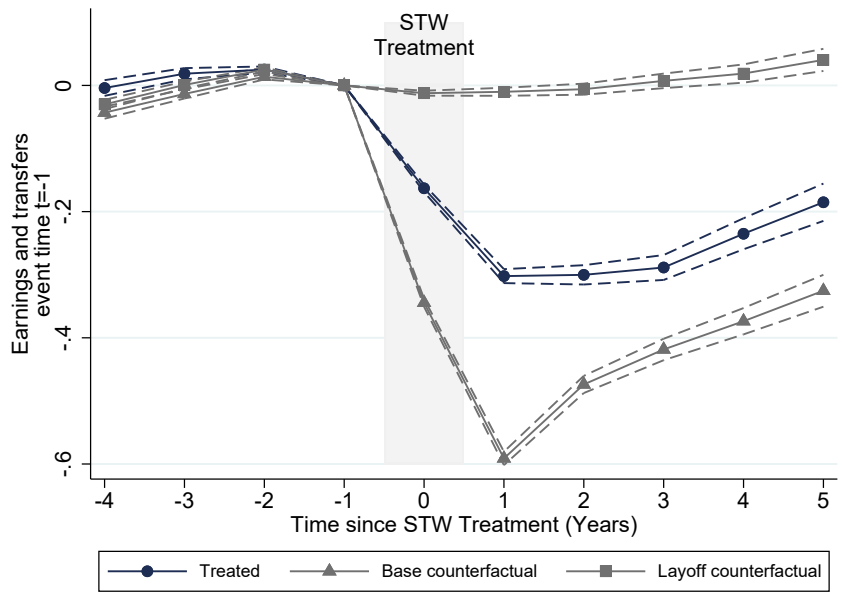
- STW provides **high** level of **insurance** in the **short run**
- But **no insurance** in the **long run**
- Limited role of STW in preserving experience and specific human capital
- Yet results are once again driven by negative selection of firms

Labor earnings plus transfers: High- vs. low-prod. firms

Low-productivity firms



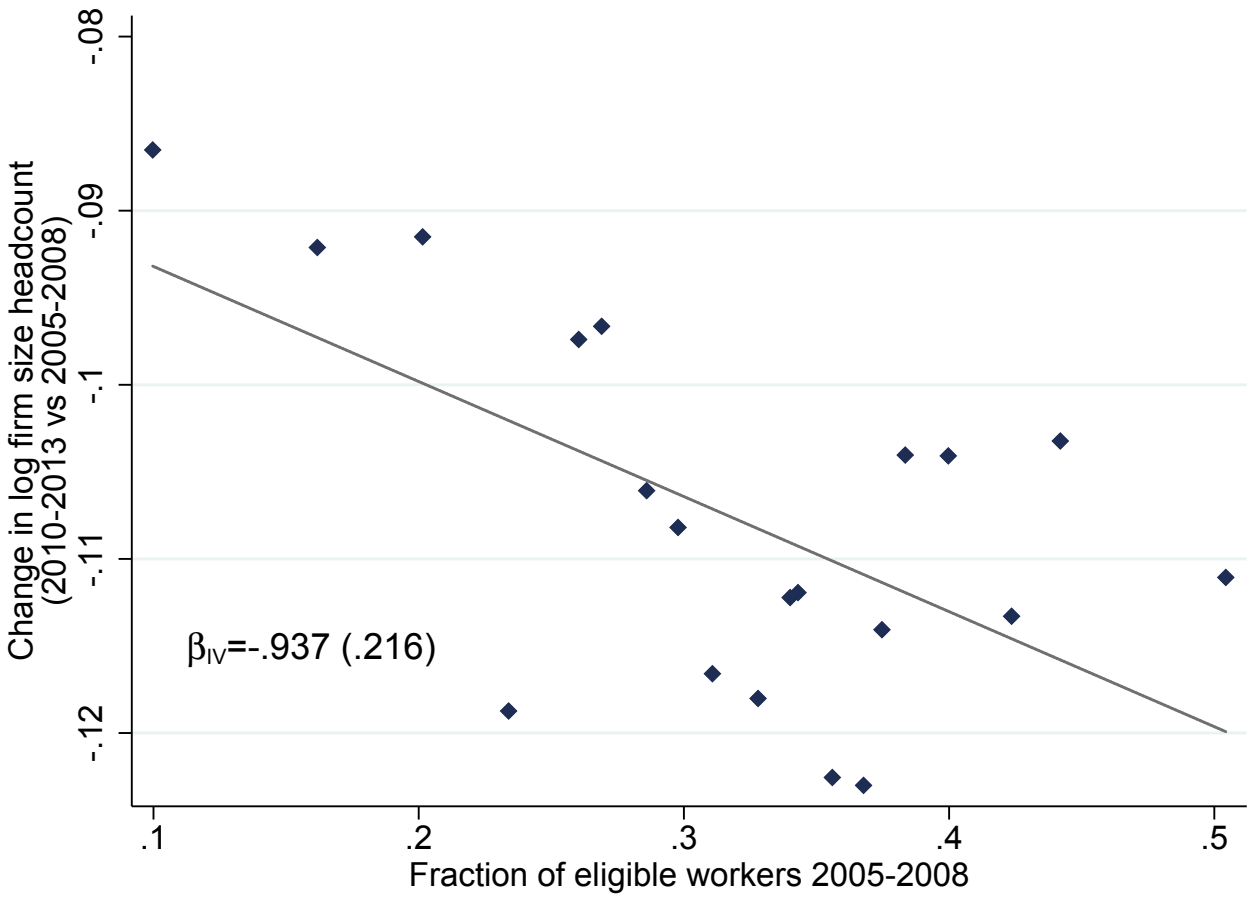
High-productivity firms



Reallocation: Equilibrium effects

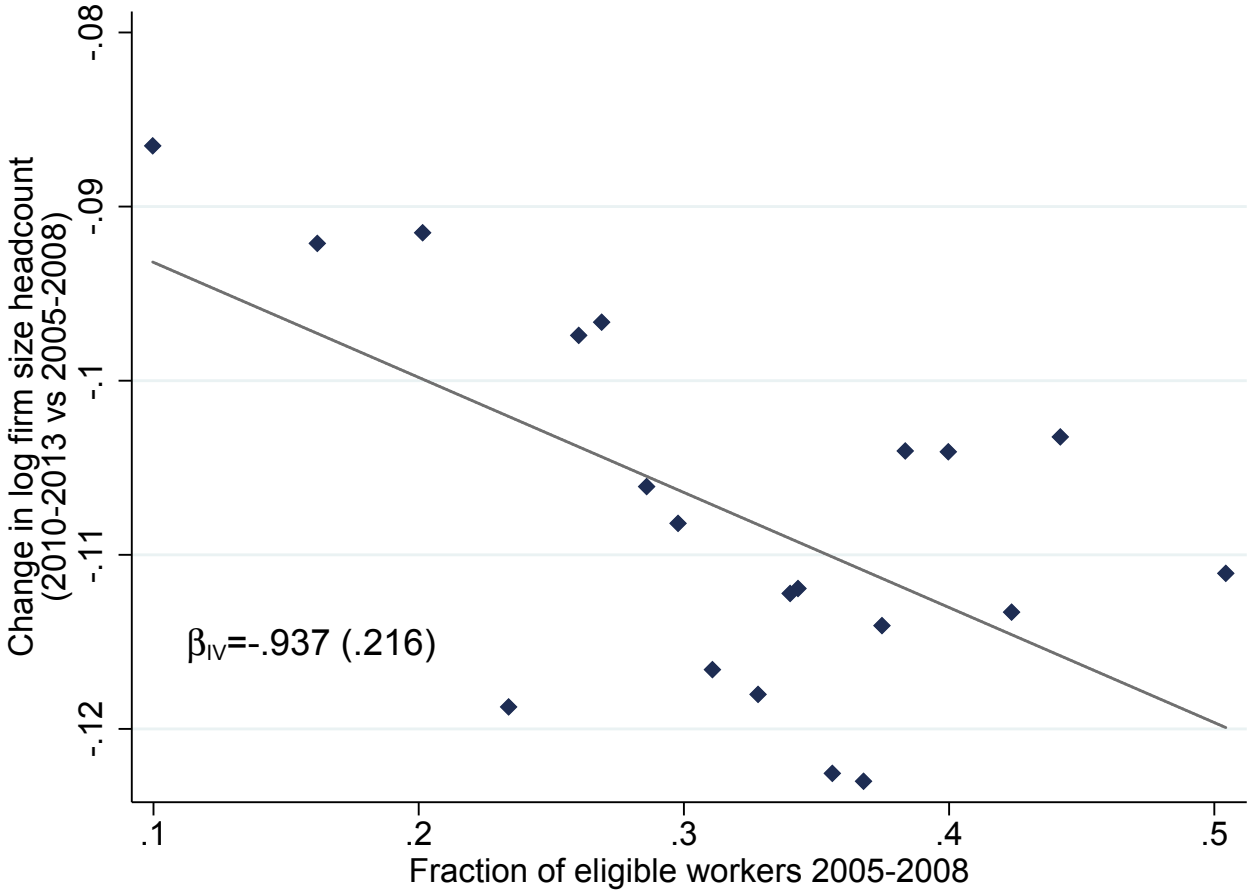
- Low productivity firms **select** more into STW
- By increasing employment in low-productivity firms, STW may **prevent reallocation** of workers to more **productive** firms
- **Identification of equilibrium effects** Identification details
  - Estimate effect of increase in fraction of workers treated 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



- 1 ppt $\uparrow$ in fraction on STW $\Rightarrow \approx 1\% \downarrow$ in empl. of non-eligible firms

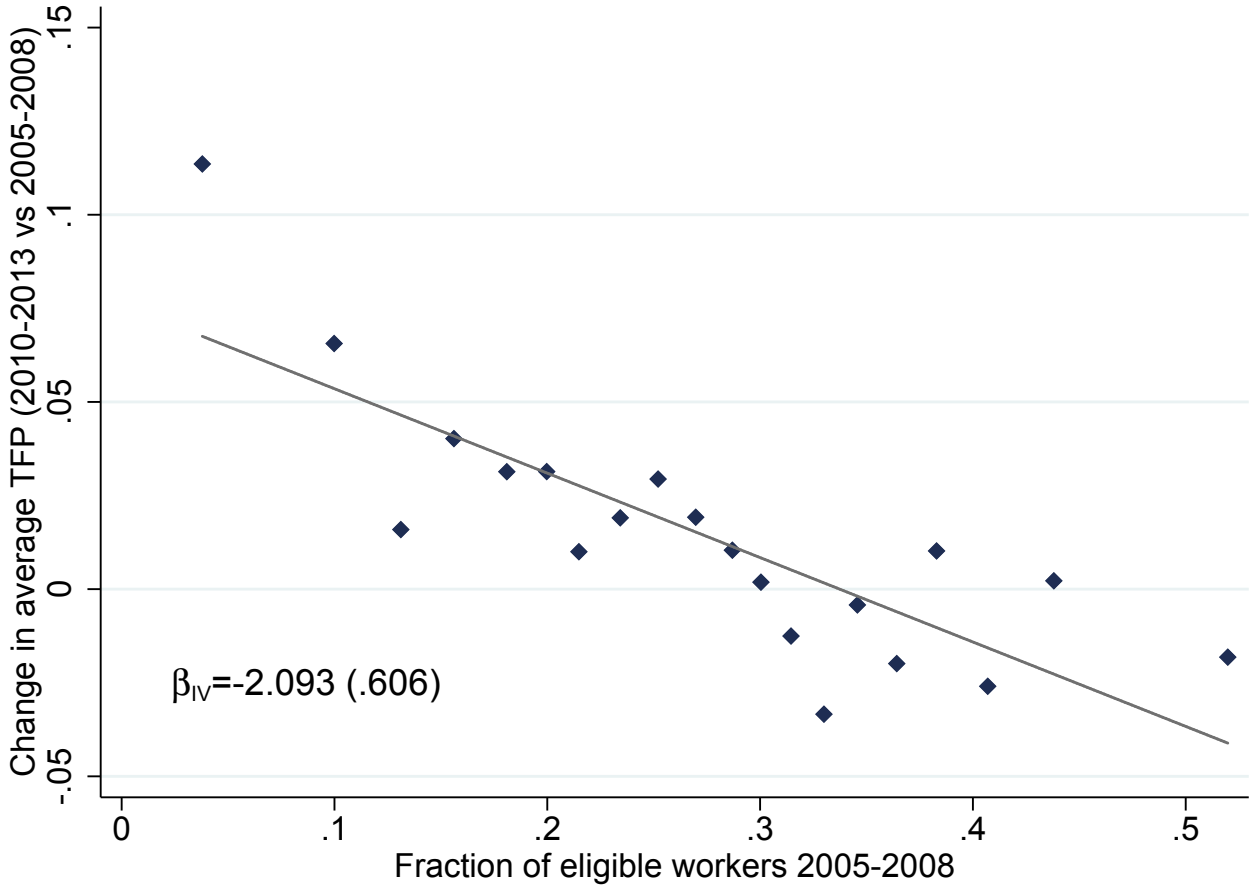
Equilibrium effects: Employment spillovers



- For each "saved" job, employment ↓ by 0.03 jobs in non-treated firms

Placebo

Equilibrium Effects: Total factor productivity in LLM



- 1 ppt $\uparrow$ in fraction on STW $\Rightarrow \approx 2\% \downarrow$ in empl. of non-eligible firms

Heterogeneous effects by persistence of shock

- No significant long-run effects of STW on employment in face of persistence shock
- Even if shock was on average persistent, we can exploit **variation in degree of persistence** across industries and local labor markets (LLMs)
- Derive data-driven classification of industries/LLMs by nature of shock Detail
- Document larger STW take-up and long-run employment effects when shock is less persistent Results

Policy take-aways

Main take-aways

- STW has positive and significant effects on employment
- Welfare effects of STW differ markedly by persistence of shock

Relevance for COVID-19 shock?

- External validity: size and nature of shock
- Limited identification opportunities during COVID-19
- Our results suggest that STW probably prevented large and inefficient surge in unemployment
- Reallocation effect depends on firm selection when shock persistent: contrary to Great Recession, COVID-19 orthogonal to productivity

Thank you!

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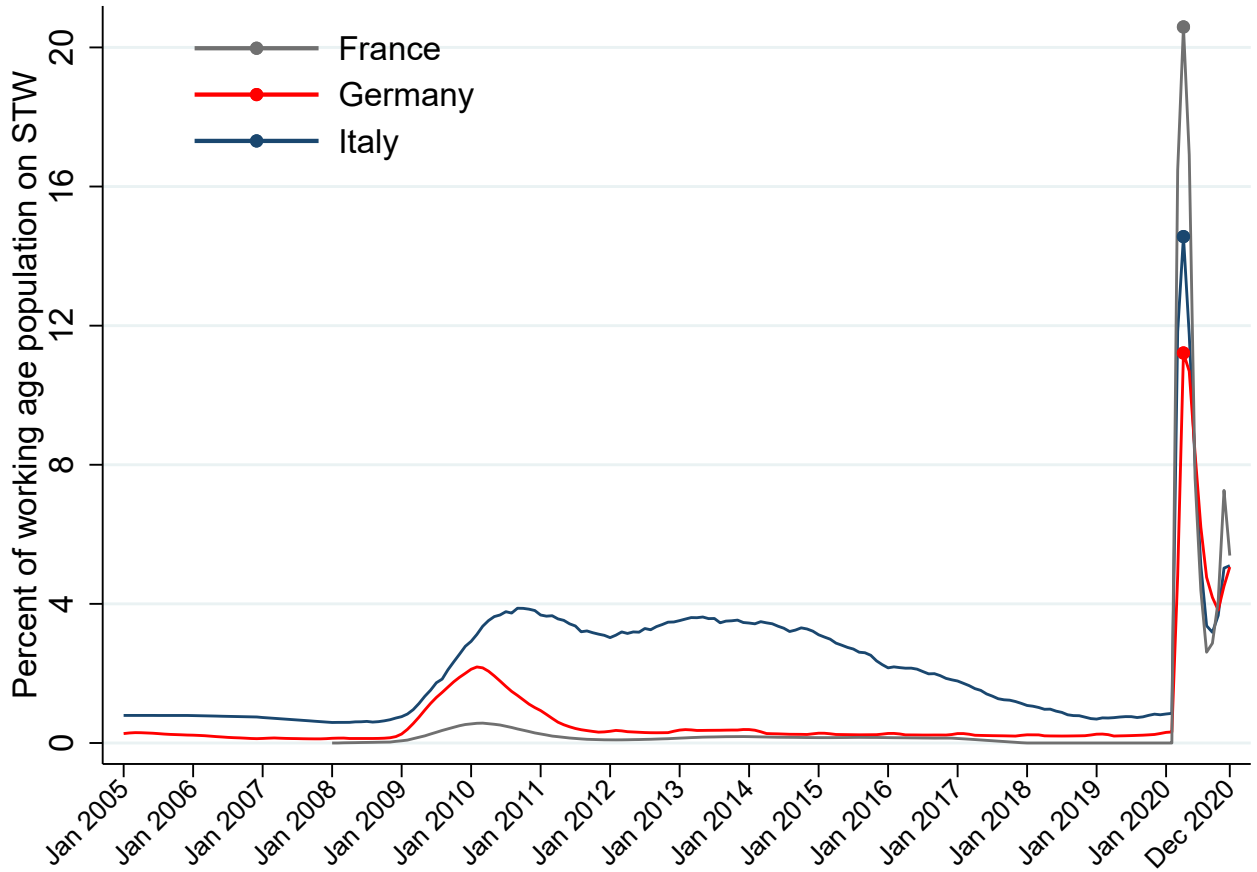
Appendix

Labor market policy response to COVID-19 crisis

European countries



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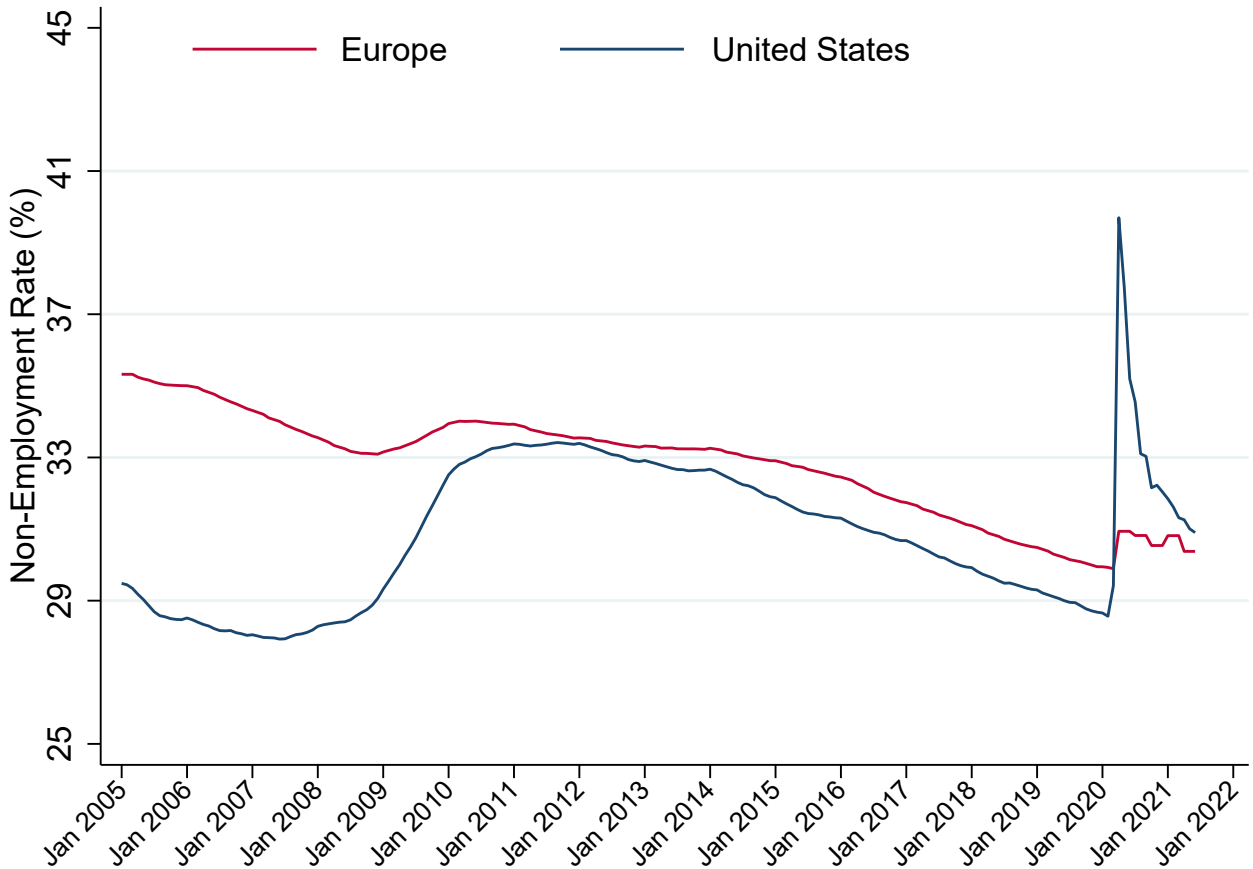
Non-employment rates in Europe and the US



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Other two pillars of Italian STW

Cassa Integrazione Guadagni Ordinaria (CIGO)

- Targets small transitory shocks: shocks to demand or production and *force majeure* (adverse weather, earthquakes, power cuts)
- Available to firms of any size in manufacturing and construction sectors
- Maximum duration of 13 weeks

Cassa Integrazione Guadagni in Deroga (CIGD)

- Additional pillar created in 2009
- Extends access to STW to firms and workers not eligible for CIGS
- Smaller in size compared to CIGS, administered at local level and granted on the basis of ad-hoc regional decrees

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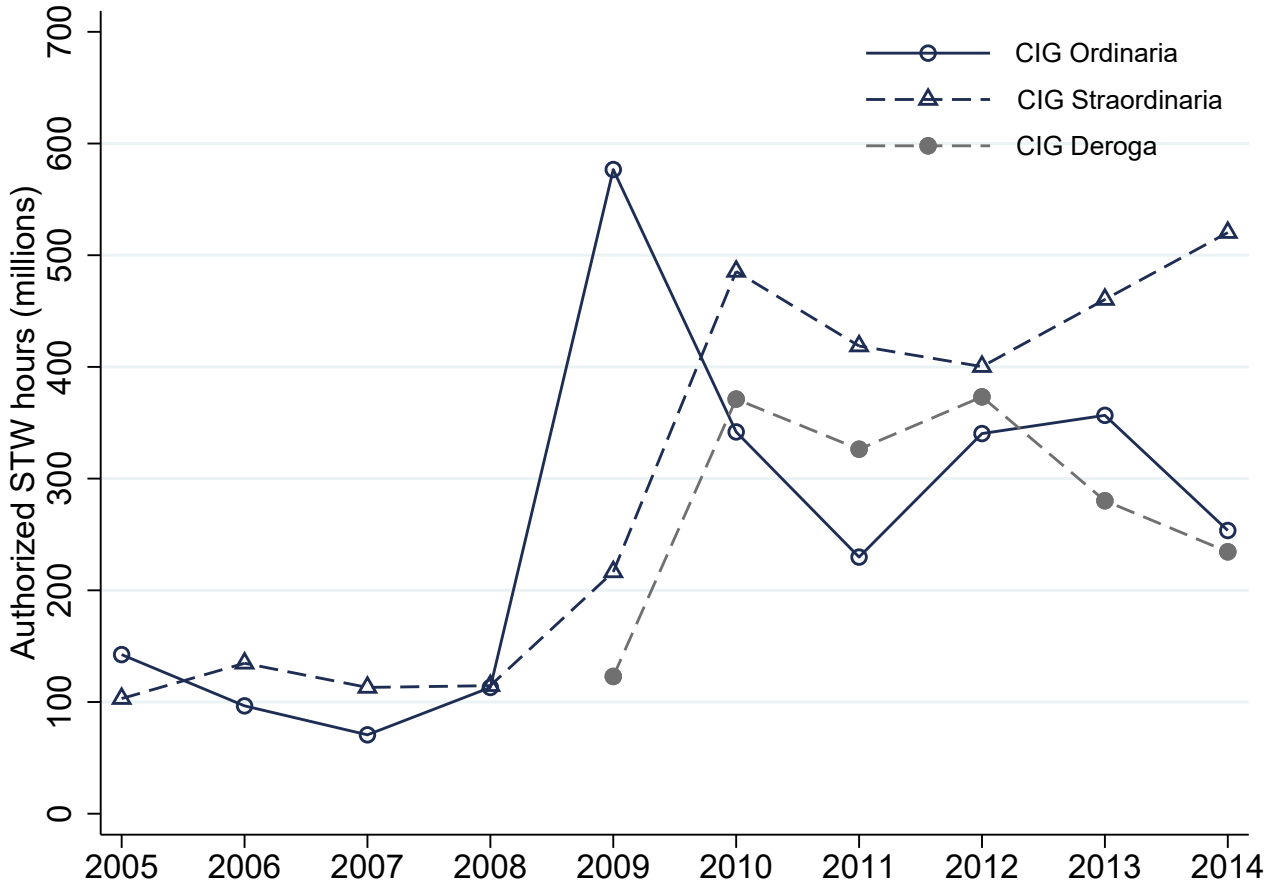
Authorized STW hours by program type



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Reason for application by program type

	Share of Authorized Hours		
	2005-2008	2009	2010-2014
Reason for application	(1)	(2)	(3)
CIGO			
Adverse weather conditions	.35	.07	.13
Market crisis	.03	.02	.16
Slump in demand	.59	.89	.68
Other	.03	.01	.03
CIGS			
Company crisis	.38	.65	.46
Restructuring/Reorganization	.25	.09	.18
Bankruptcy	.16	.09	.16
Special administration	.09	.04	.02
Business closure	.00	.00	.03
Other	.12	.13	.15
CIGD			
Total	-	1.0	1.0

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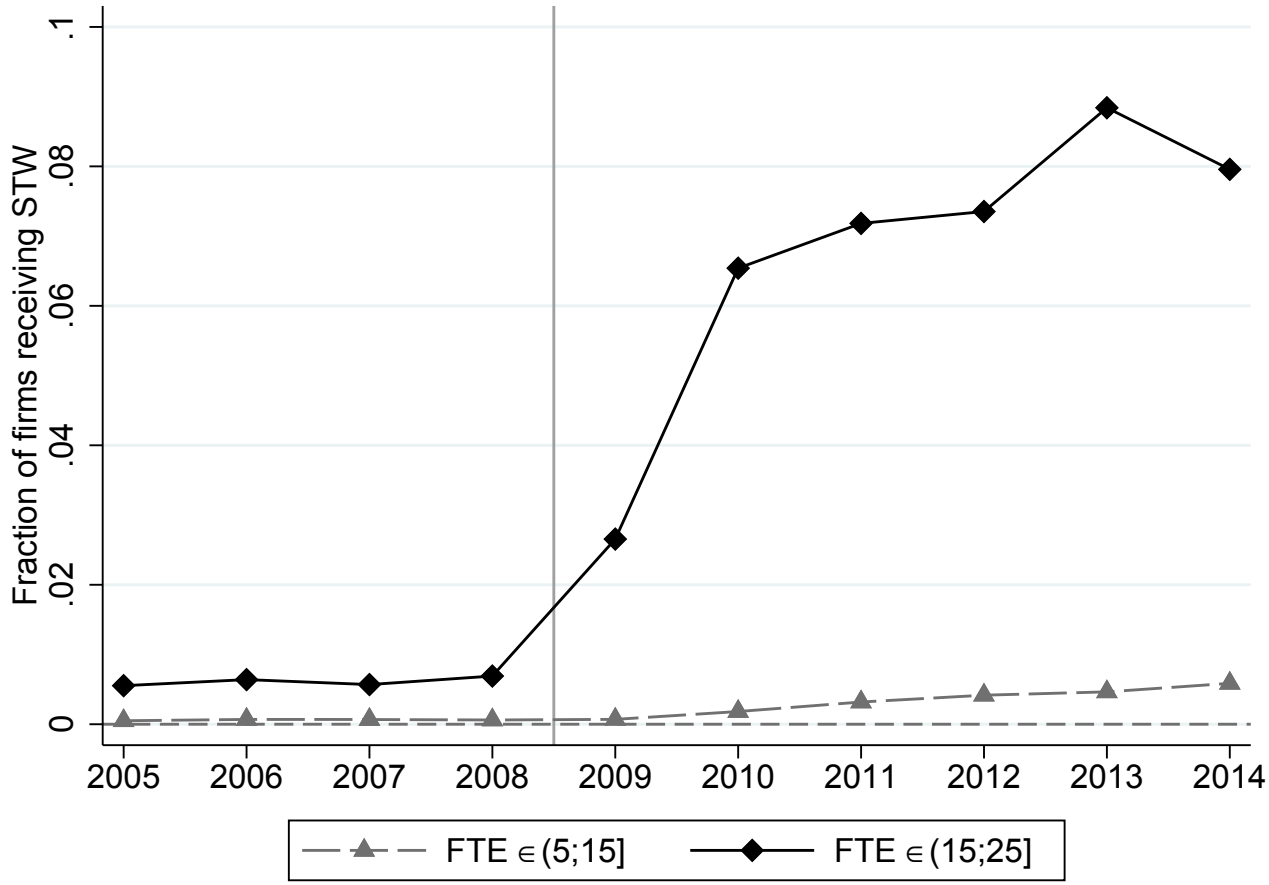
Probability of firm receiving STW

Eligible INPS codes



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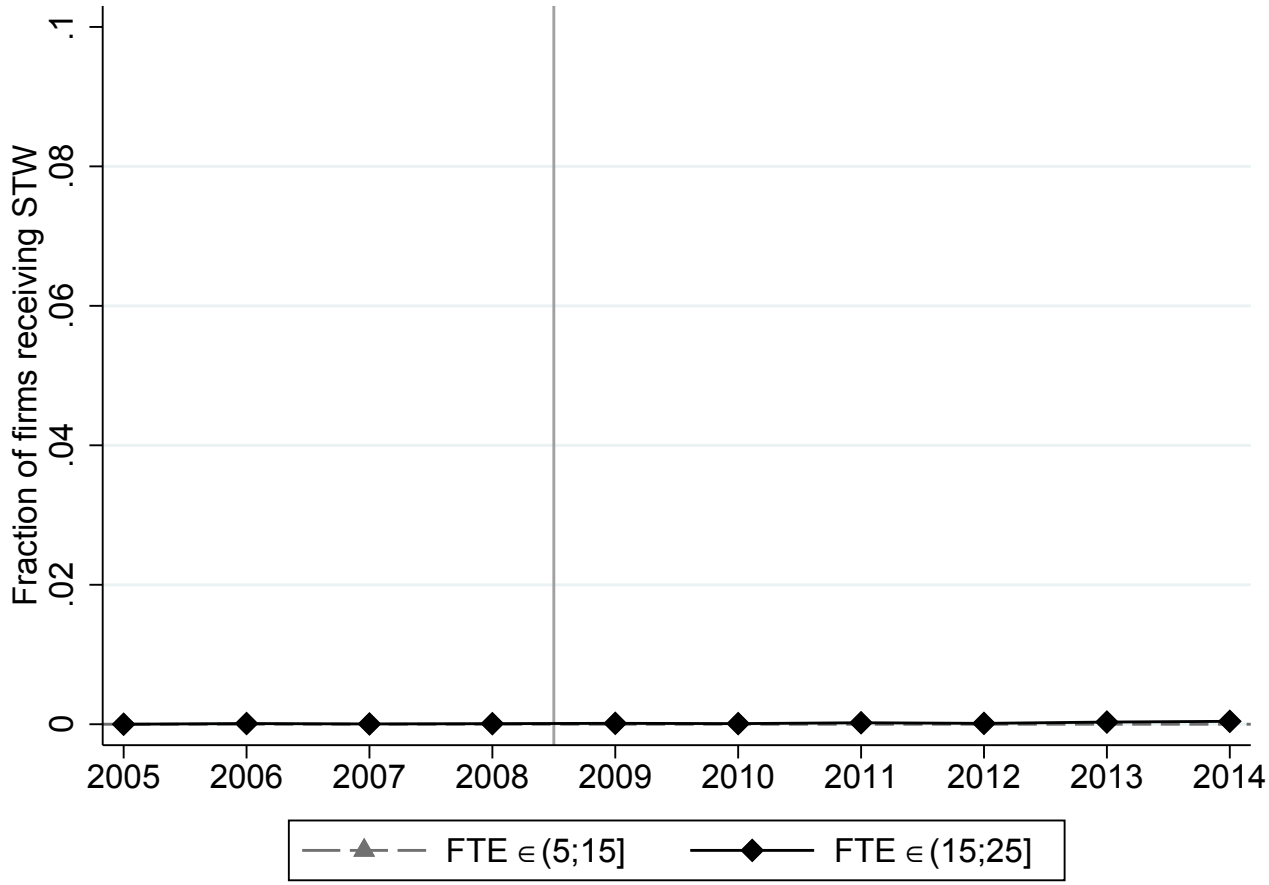
Probability of firm receiving STW

Non-eligible INPS codes



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Firm characteristics

Main sample, 2008

	(1) All INPS Codes		(2) Eligible INPS Codes		(3) Non-Eligible INPS Codes	
	Mean	SD	Mean	SD	Mean	SD
Employees (headcount)	8.72	5.16	9.78	5.55	8.22	4.90
Employees (FTE)	8.04	4.78	9.35	5.38	7.42	4.33
Annual hours worked per employee	2015.26	1008.70	2043.69	980.97	2001.86	1021.24
Annual wage bill per employee (000)	20.66	12.38	22.49	13.22	19.80	11.86
Net revenue per week worked (000)	6.22	49.55	5.94	52.77	6.48	46.31
Value added per week worked (000)	1.11	11.36	1.22	14.41	1.01	7.42
Liquidity	0.11	0.14	0.09	0.13	0.12	0.15
Observations	321580		102757		218823	

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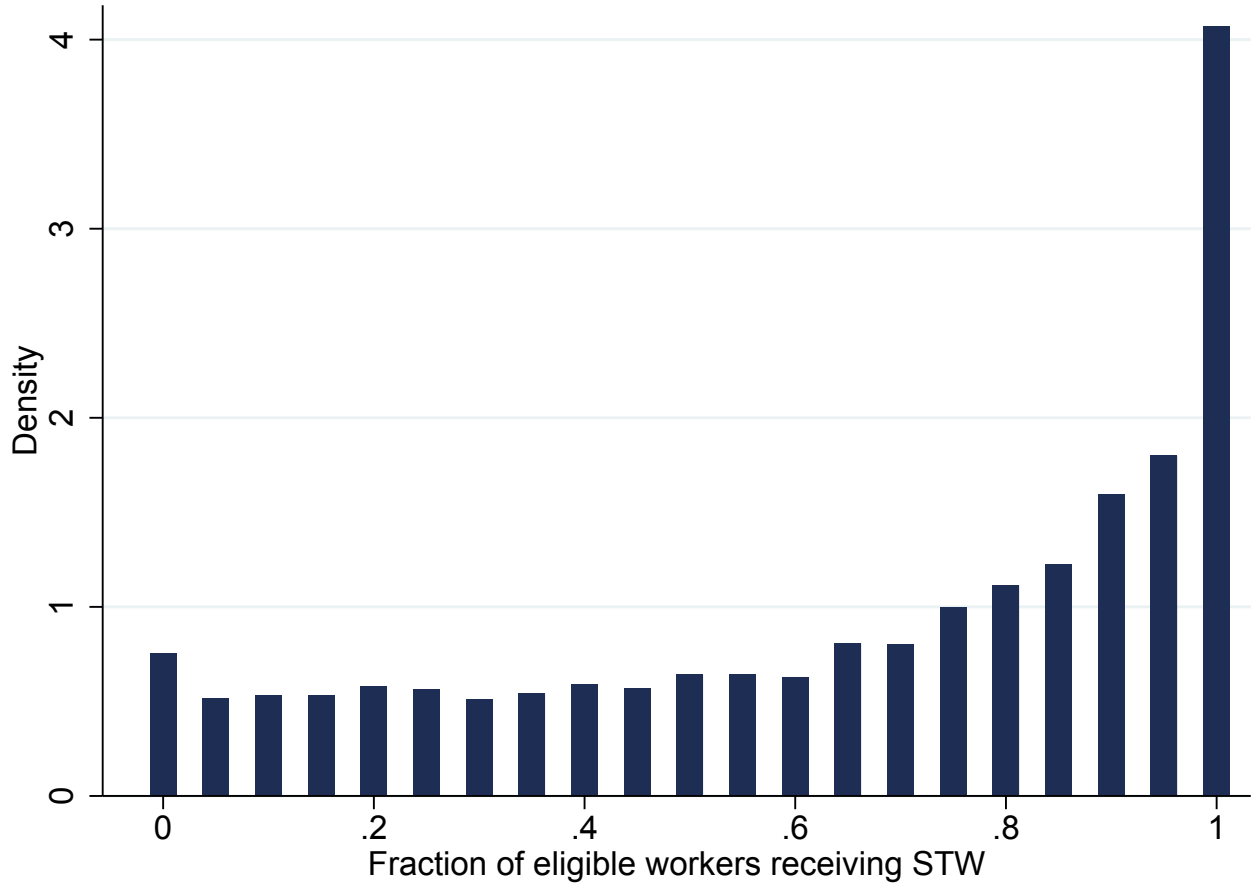
Worker characteristics

Main sample, 2008

	(1) All INPS Codes		(2) Eligible INPS Codes		(3) Non-Eligible INPS Codes	
	Mean	SD	Mean	SD	Mean	SD
Proportion female	0.38	0.48	0.24	0.43	0.45	0.50
Age	36.89	10.72	38.53	10.51	36.04	10.72
Experience (years)	14.23	10.58	16.04	10.81	13.30	10.34
Tenure (months)	59.49	71.52	66.72	76.83	55.75	68.31
Prop. on full-time contract	0.82	0.38	0.90	0.30	0.78	0.42
Prop. on open-ended contract	0.83	0.37	0.88	0.32	0.81	0.40
Prop. on fixed-term contract	0.15	0.36	0.12	0.32	0.17	0.38
Prop. on seasonal contract	0.02	0.13	0.00	0.05	0.02	0.15
Proportion blue collar	0.64	0.48	0.69	0.46	0.61	0.49
Proportion white collar	0.27	0.44	0.24	0.43	0.28	0.45
Proportion manager	0.00	0.05	0.00	0.06	0.00	0.05
Proportion apprentice	0.07	0.26	0.05	0.22	0.09	0.28
Observations	3350203		1140981		2209222	

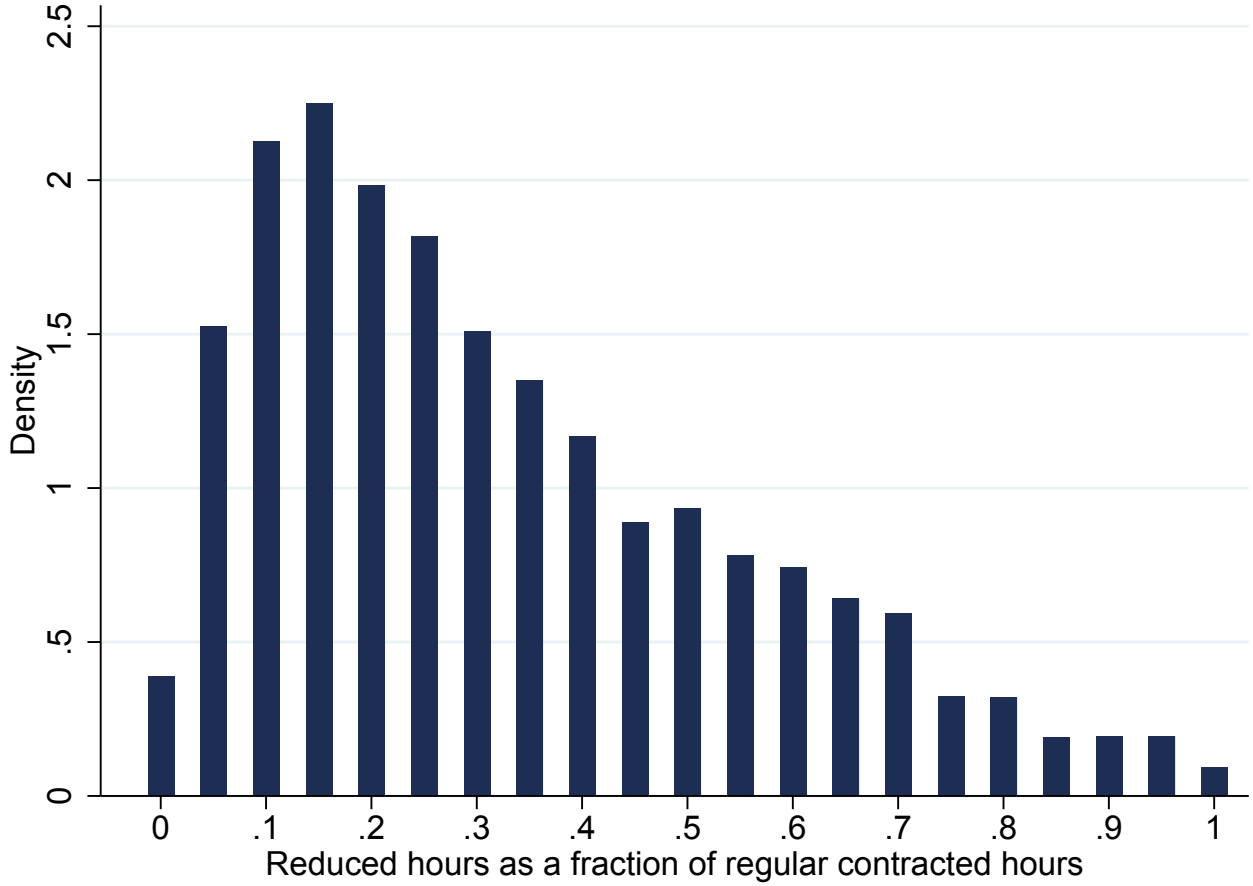
Back

Fraction of eligible workers on STW in treated firms



Back

Weekly hour reductions among treated workers



Back

Reduced-form specification: triple difference

$$
\begin{aligned}
Y_{igst} = & \sum_j \gamma_1^j \cdot \left\{ \mathbb{1}[g \in \mathcal{E}] \cdot \mathbb{1}[N_{i,t-1} > 15] \cdot \mathbb{1}[j = t] \right\} \\
& + \sum_j \sum_k \gamma_2^{jk} \cdot \left\{ \mathbb{1}[g \in \mathcal{E}] \cdot \mathbb{1}[j = t] \right\} \cdot \mathbb{1}[k = s] \\
& + \sum_j \sum_k \gamma_3^{jk} \cdot \left\{ \mathbb{1}[N_{i,t-1} > 15] \cdot \mathbb{1}[j = t] \right\} \cdot \mathbb{1}[k = s] \\
& + \sum_j \sum_k \gamma_4^{jk} \cdot \left\{ \mathbb{1}[j = t] \right\} \cdot \mathbb{1}[k = s] + \nu_{igst}
\end{aligned}
$$

- i is firm, s 5-digit industry code, t calendar year
- $g \in \mathcal{E}$ indicates set of contributory codes eligible for CIGS
- $N_{i,t-1}$ max 6-month average FTE size in calendar year $t-1$
- Plot estimated coefficients $\widehat{\gamma}_1^t$ for all years t Back

First-stage specification

$$
\begin{aligned}
T_{igst} = \quad & \kappa_1 \cdot \left\{ \mathbb{1}[g \in \mathcal{E}] \cdot \mathbb{1}[N_{i,t-1} > 15] \cdot \mathbb{1}[t > 2008] \right\} \\
& + \sum_j \sum_k \kappa_2^{jk} \cdot \left\{ \mathbb{1}[g \in \mathcal{E}] \cdot \mathbb{1}[j = t] \right\} * \mathbb{1}[k = s] \\
& + \sum_j \sum_k \kappa_3^{jk} \cdot \left\{ \mathbb{1}[N_{i,t-1} > 15] \cdot \mathbb{1}[j = t] \right\} \cdot \mathbb{1}[k = s] \\
& + \sum_j \sum_k \kappa_4^{jk} \cdot \left\{ \mathbb{1}[j = t] \right\} \cdot \mathbb{1}[k = s] + \nu_{igst}
\end{aligned}
$$

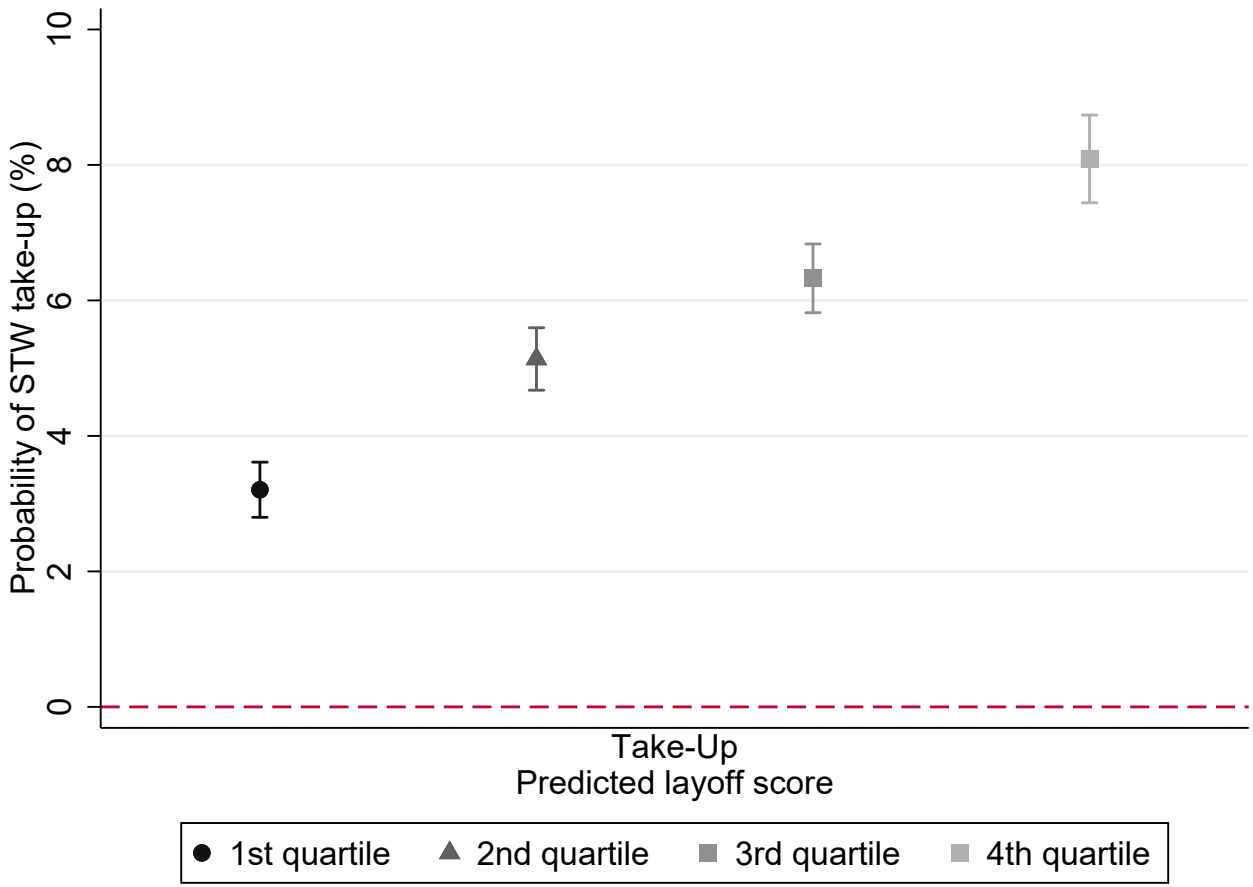
- T is indicator for firm i, in 5-digit industry code s and contributory-group code g having received STW in calendar year t Back

IV specification

$$
\begin{aligned}
Y_{igst} = \quad & \beta_{IV} \cdot T_{igst} \\
& + \sum_j \sum_k \eta_2^{jk} \cdot \left\{ \mathbb{1}[g \in \mathcal{E}] \cdot \mathbb{1}[j = t] \right\} \cdot \mathbb{1}[k = s] \\
& + \sum_j \sum_k \eta_3^{jk} \cdot \left\{ \mathbb{1}[N_{i,t-1} > 15] \cdot \mathbb{1}[j = t] \right\} \cdot \mathbb{1}[k = s] \\
& + \sum_j \sum_k \eta_4^{jk} \cdot \left\{ \mathbb{1}[j = t] \right\} \cdot \mathbb{1}[k = s] + \mu_{igst}
\end{aligned}
$$

- Instrument probability of STW treatment T by triple interaction of being after the onset of the recession, having eligible contributory code and having more than 15 FTE employees Back

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

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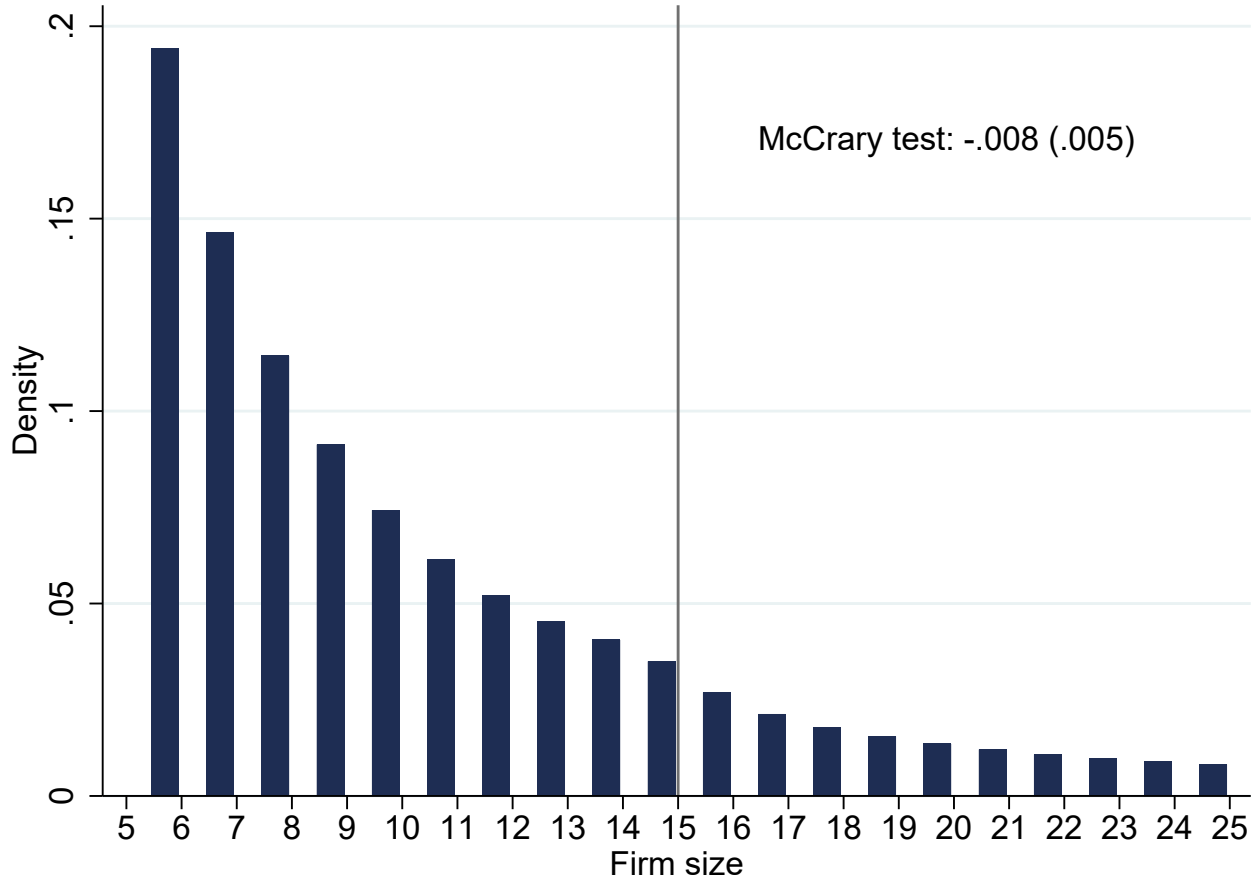
Additional firm-level results

	Estimate (1)	Std Error (2)	N (3)
	A. First Stage		
Probability of CIGS take-up	.054	(.001)	2843205
	B. Employment Outcomes (IV)		
Log number of open-ended contracts	.432	(.047)	2843205
Log number of fixed-term contracts	-.367	(.128)	2843205
Firm survival probability (in $t+1$)	.104	(.038)	2843205
	C. Balance-Sheet Outcomes (IV)		
Firm value added	.095	(.159)	873839
Value added per worker	-.508	(.120)	873839
Value added per hour worked	-.057	(.101)	873839
Liquidity	.939	(.461)	873839

Back

Size manipulation



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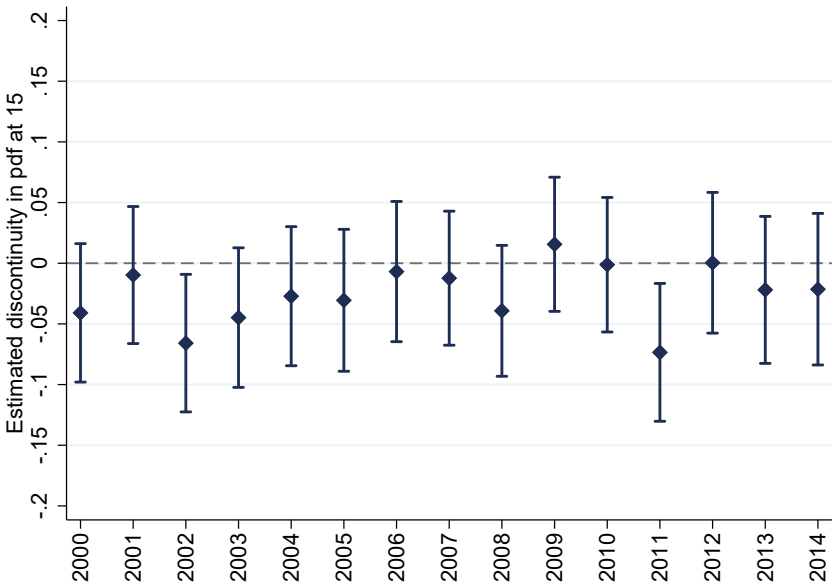
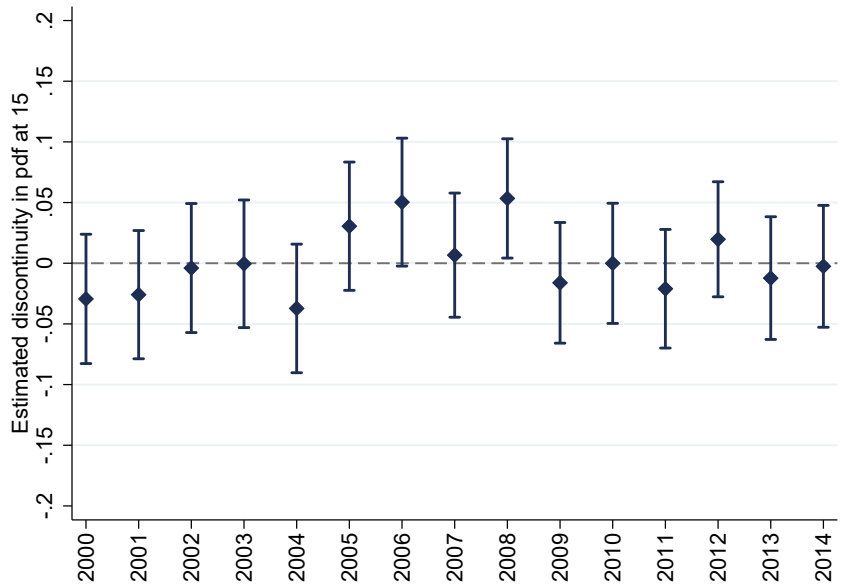
McCrary test for discontinuity in size distribution

Eligible INPS codes



Non-eligible INPS codes



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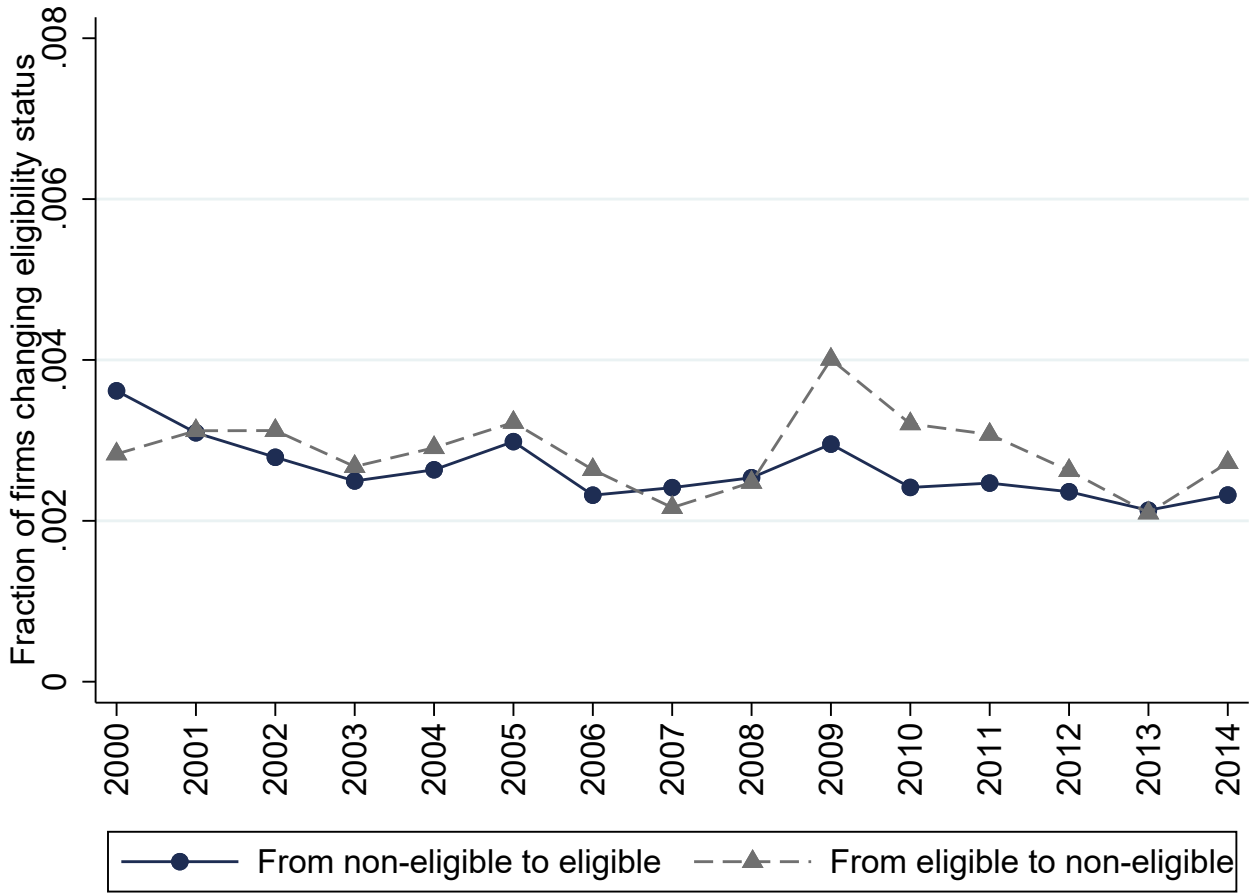
Eligibility manipulation



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Robustness of baseline effects

	"Doughnut" Regression	Only >15 FTE [DiD 1]	Only ≤ 15 FTE [DiD 2] (Placebo)	Only Eligible [DiD 3]	Only Non-Eligible [DiD 4] (Placebo)	No Dismissal Rule Change	
						>60FTE Across Italy	50FTE Threshold
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				A. First Stage			
Probability of CIGS take-up	.053	.051	.002	.058	.000	.055	.041
	(.002)	(.002)	(.000)	(.001)	(.000)	(.005)	(.004)
				B. Outcomes			
	IV	**IV**	**RF**	**IV**	**RF**	**IV**	**IV**
Log hours per employee	-.449	-.602	-.011	-.540	.018	-.670	-.156
	(.037)	(.081)	(.020)	(.045)	(.030)	(.230)	(.132)
Log employment	.284	.306	-.020	.383	.000	.848	.338
	(.032)	(.099)	(.030)	(.048)	(.003)	(.297)	(.258)
Log wage bill per employee	-.544	-.498	-.026	-0.592	.015	-.568	-.390
	(.049)	(.155)	(.030)	(.072)	(.005)	(.297)	(.709)
Observations	2686140	429490	2608383	59634	2978239	152753	44793

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Effects of overall CIG treatment

	Estimate (1)	Std Error (2)	N (3)
	A. First Stage		
Probability of any CIG take-up	.026	(.002)	2843205
Probability of CIGO take-up	.023	(.002)	2843205
Probability of CIGD take-up	-.023	(.002)	2843205
Probability of CIGO or CIGS take-up	.049	(.002)	2843205
	B. Employment Outcomes of CIG Treatment (IV)		
Log number of hours per employee	-.534	(.086)	2843205
Log number of full-time weeks per employee	-.553	(.083)	2843205
Log firm size (headcount)	.377	(.101)	2843205
Log wage rate	-.015	(.059)	2843205
Log wage bill per employee	-.693	(.107)	2843205
Log number of open-ended contracts	.441	(.106)	2843205
Log number of fixed-term contracts	-.557	(.276)	2843205
Firm survival probability (in $t+1$)	.069	(.023)	2843205

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Alternative specification

$$\Delta Y_{igs}^{2010-2014,2009} = \delta_1 \cdot \left\{ \mathbb{1}[g \in \mathcal{E}] \cdot \mathbb{1}[N_{i,2008} > 15] \right\} + \sum_k \delta_2^k \cdot \left\{ \mathbb{1}[g \in \mathcal{E}] \cdot \mathbb{1}[k = s] \right\} + \delta_3 \cdot \left\{ \mathbb{1}[N_{i,2008} > 15] \right\} + v_{igs}$$

	Estimate (1)	Std Error (2)	N (3)
	A. First Stage		
Probability of CIGS take-up	.091	(.004)	300795
	B. Employment Outcomes (IV)		
Hours per employee (inverse hyperbolic sine)	-.258	(.066)	300795
Firm size headcount (inverse hyperbolic sine)	.261	(.131)	300795
Firm survival probability	.248	(.037)	300795

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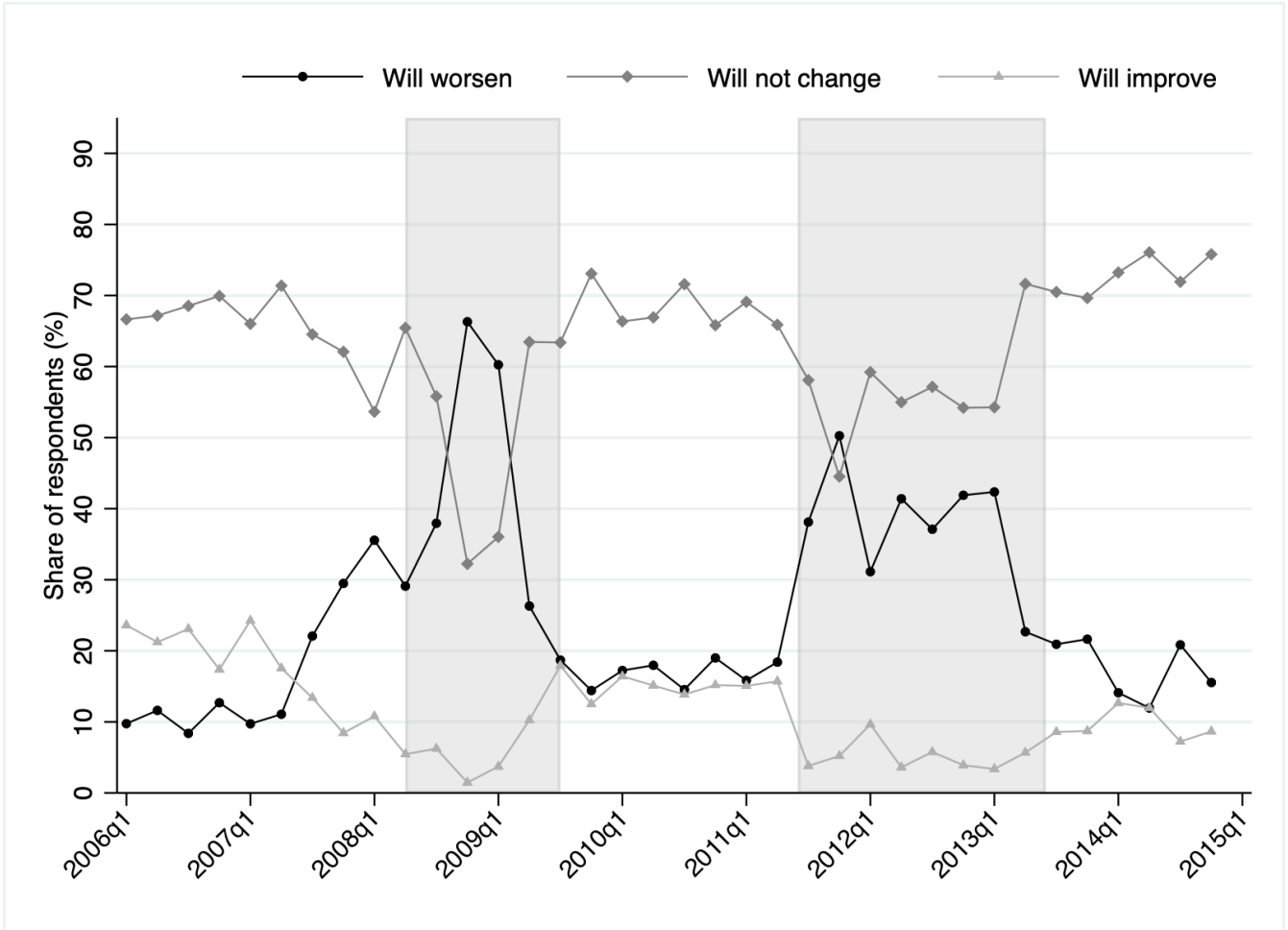
Firms' expectations about business conditions

Over the next three months

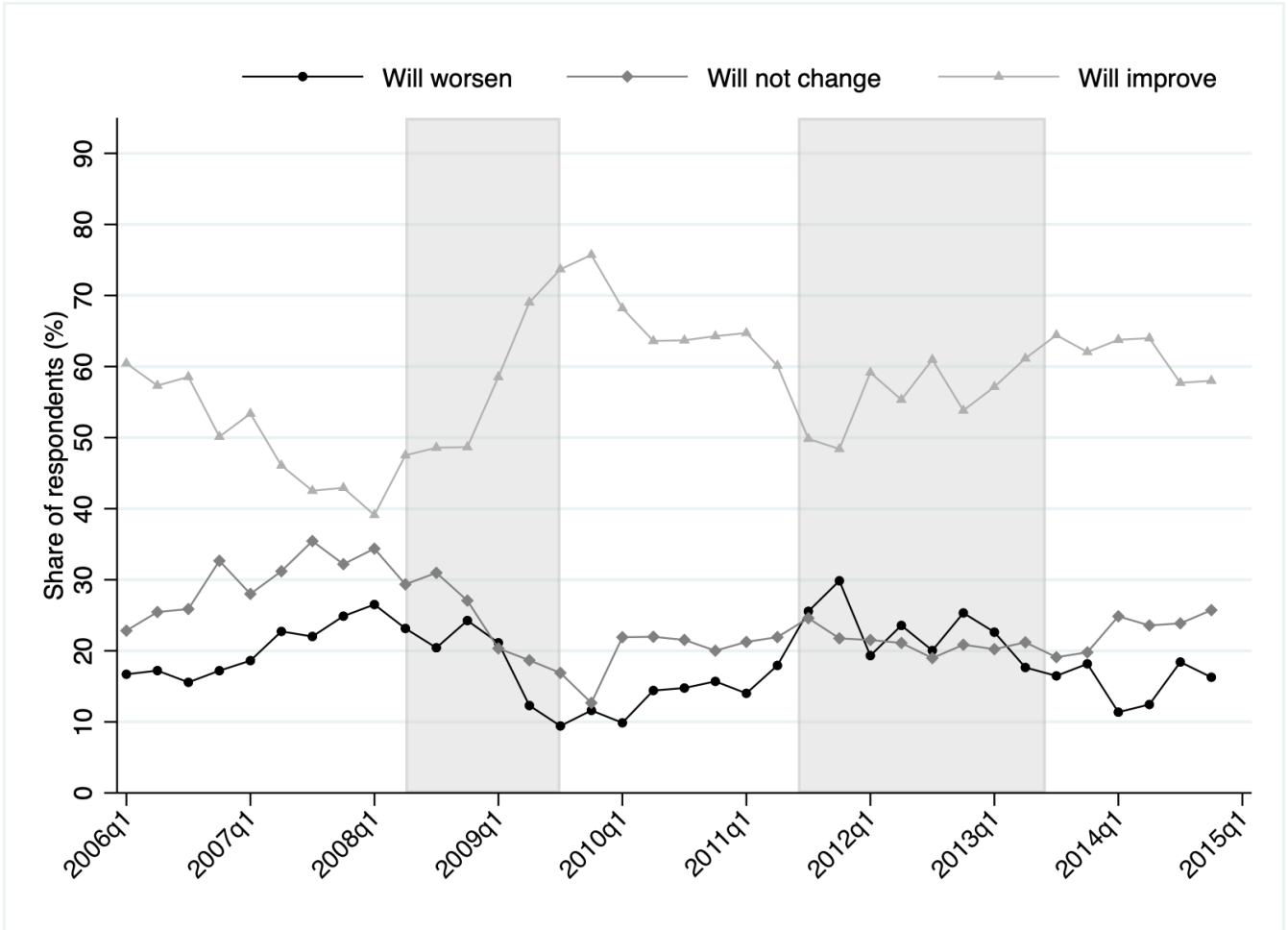


Source: Bank of Italy Survey on Inflation and Growth Expectations

Back

Firms' expectations about business conditions

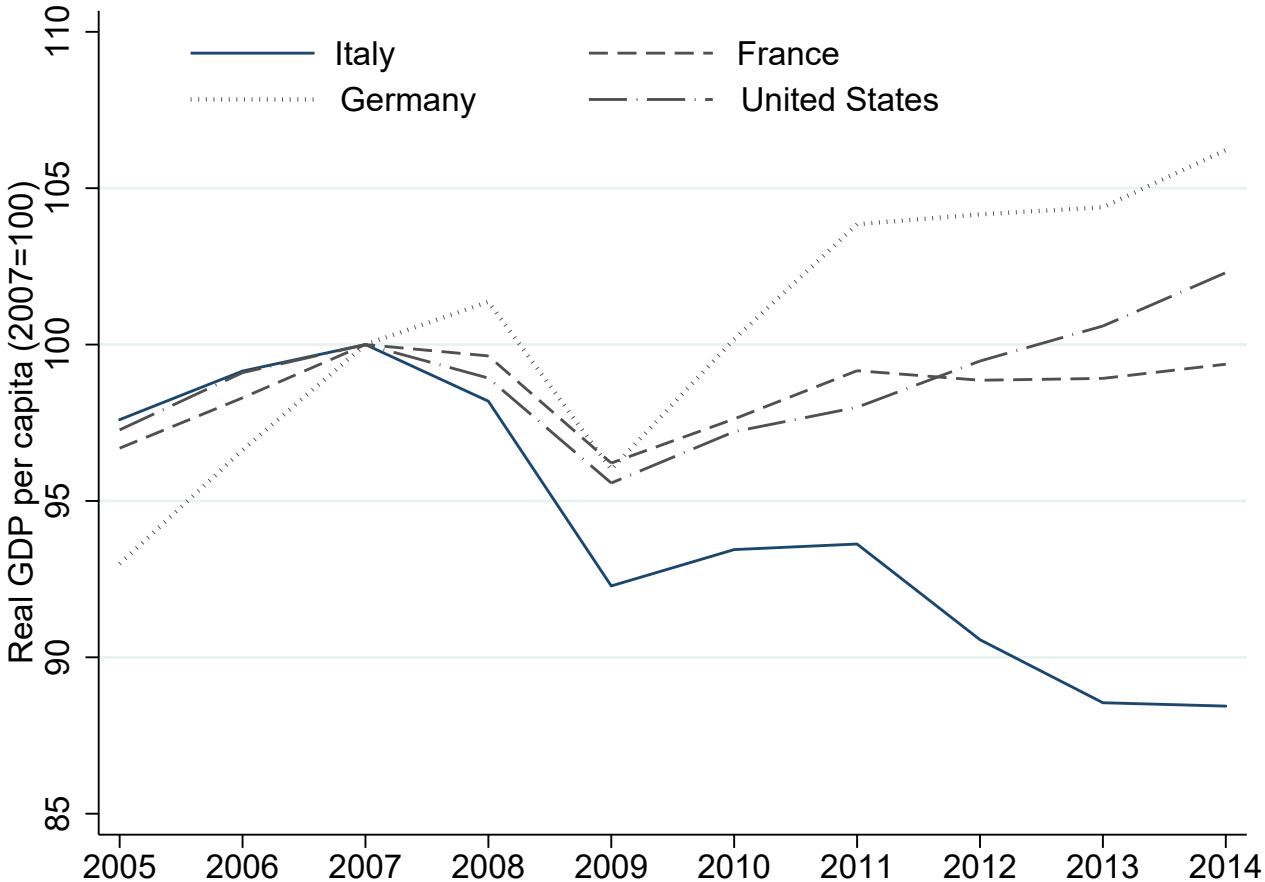
Over the next three years



Source: Bank of Italy Survey on Inflation and Growth Expectations

Back

Evolution of real GDP per capita in Europe and the US



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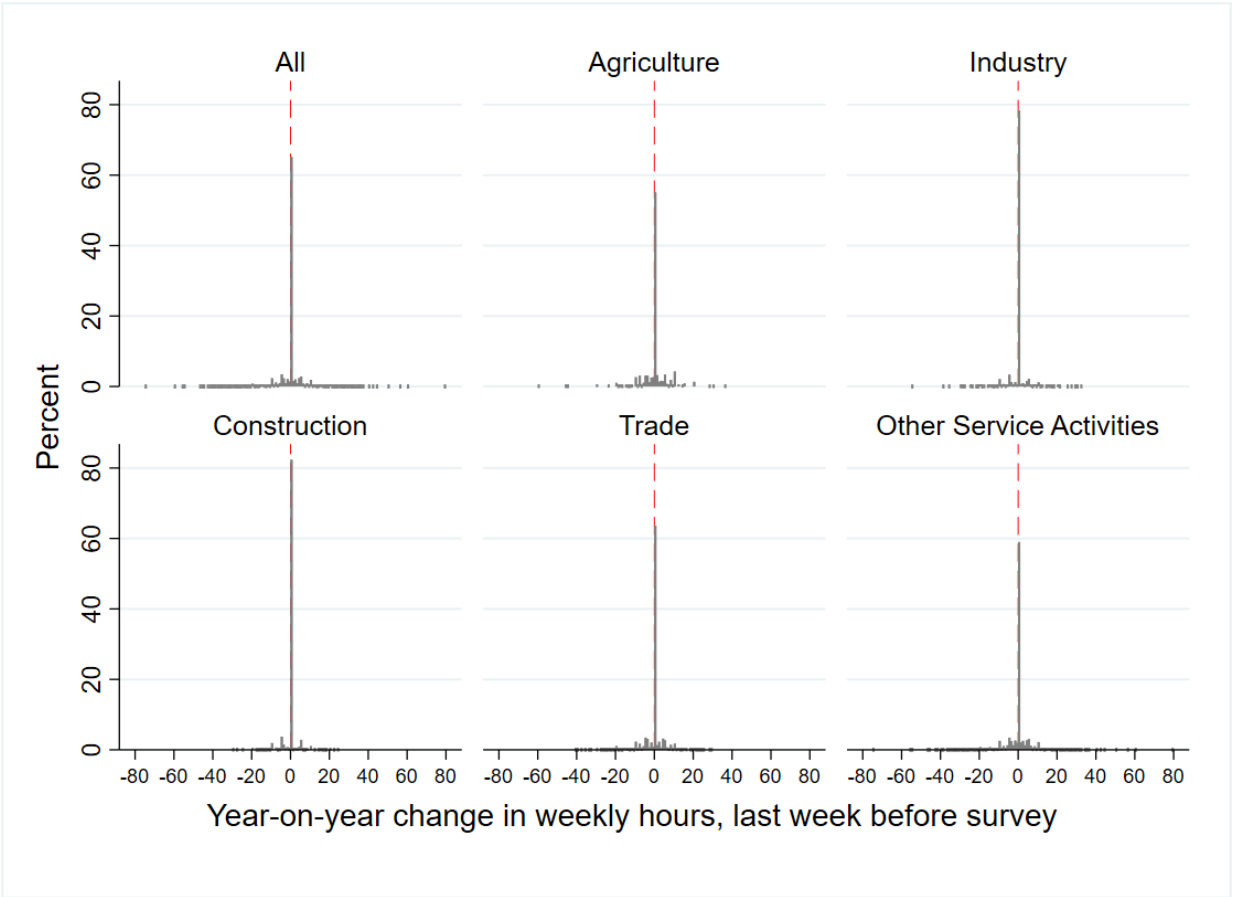
Strong hour rigidities absent STW

Labor Force Survey data



Density of y-o-y change in weekly hours worked for workers employed in non-eligible firms and in same occupation over two consecutive years (2005-2014) Back

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 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 τ
- Unemployed workers receive benefit b
- Government budget constraint reads

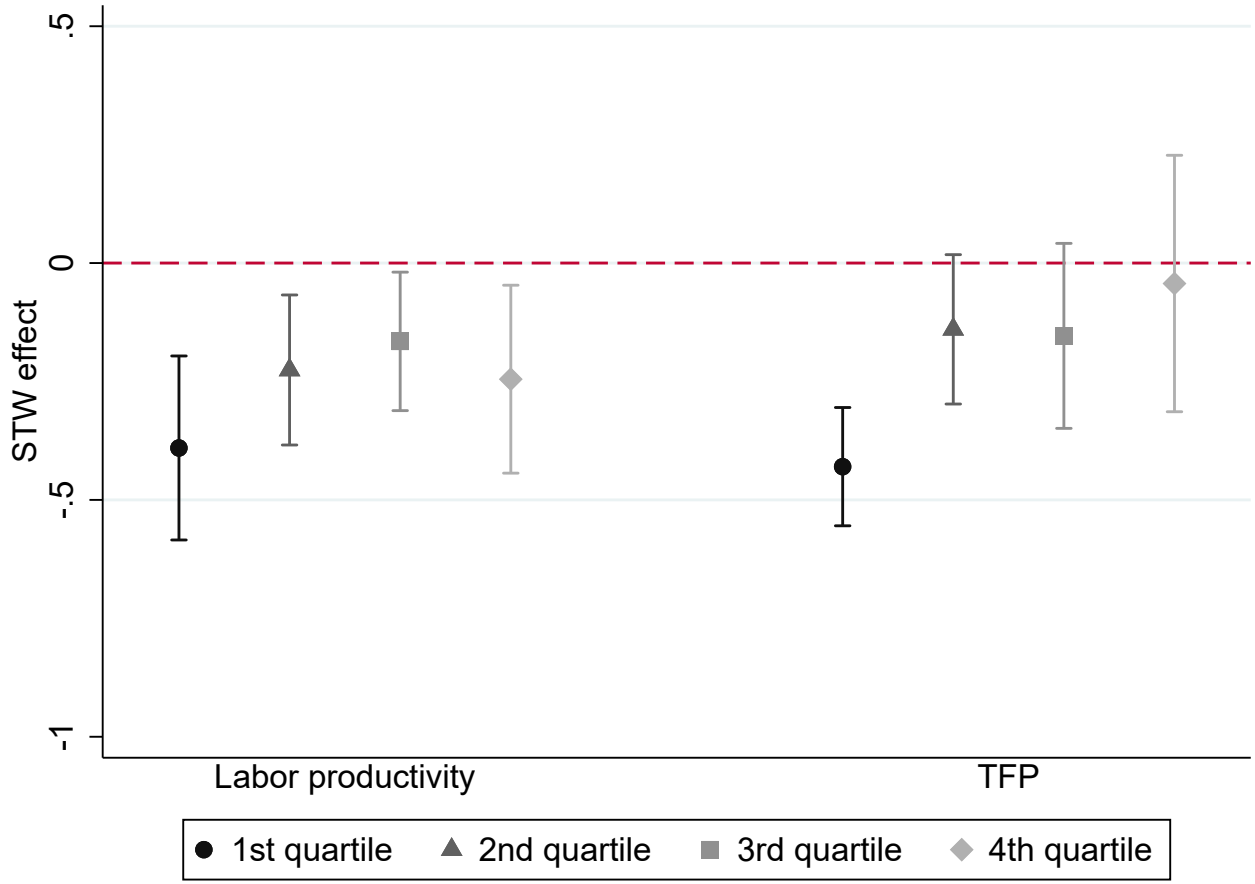
$$t \cdot w \cdot h \cdot n + t \cdot w \cdot \bar{h} \cdot (1-n-u) = b \cdot w \cdot \bar{h} \cdot u + \tau \cdot w \cdot (\bar{h}-h) \cdot n$$

- Differentiating budget with respect to τ, fiscal externality is

$$FE = 1 + \varepsilon_{n,\tau} \left(1 - \frac{b \cdot \bar{h}}{\tau \cdot (\bar{h}-h)}\right) - \varepsilon_{h,\tau} \cdot \frac{h}{(\bar{h}-h)}$$

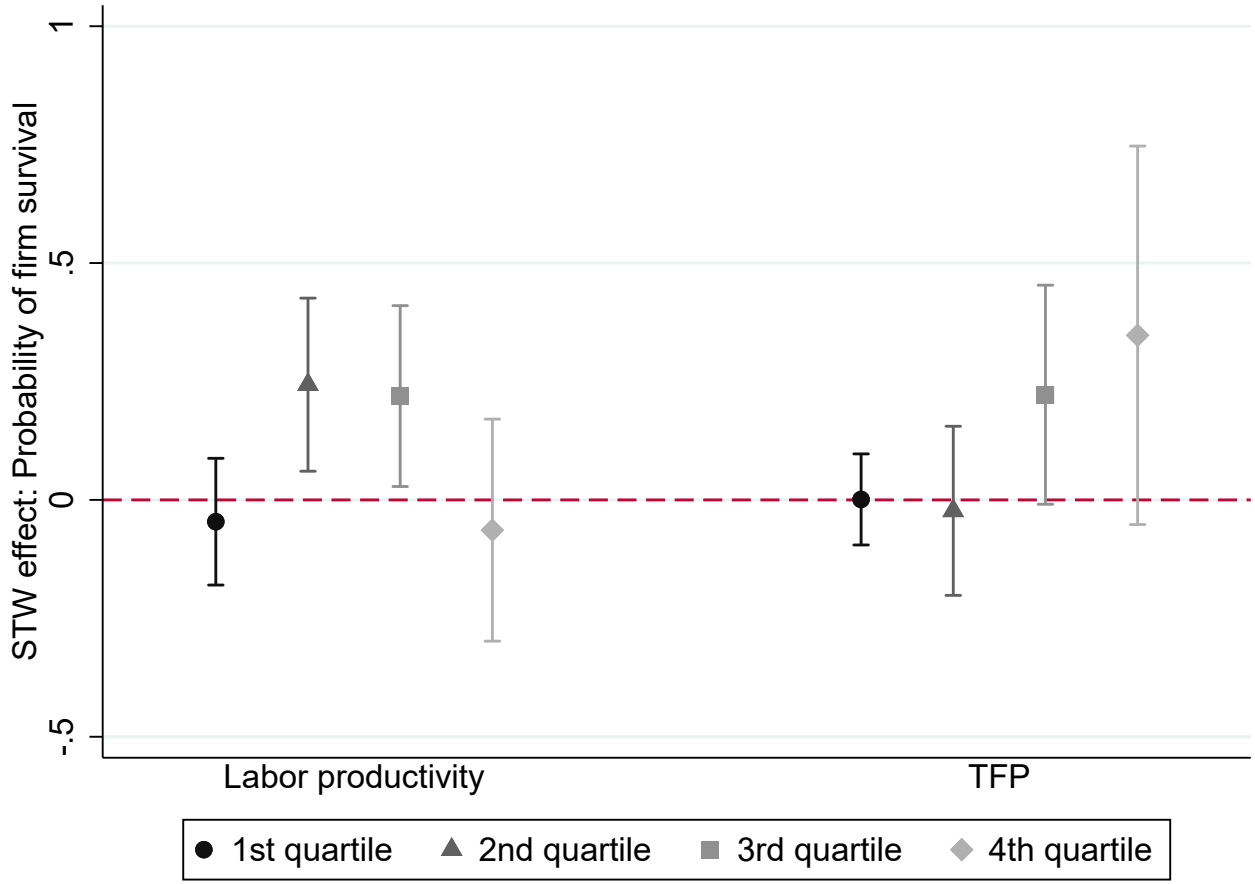
- Calibrating FE, we obtain a value of 1.38 Back

Heterogeneity in hour effects by firm productivity



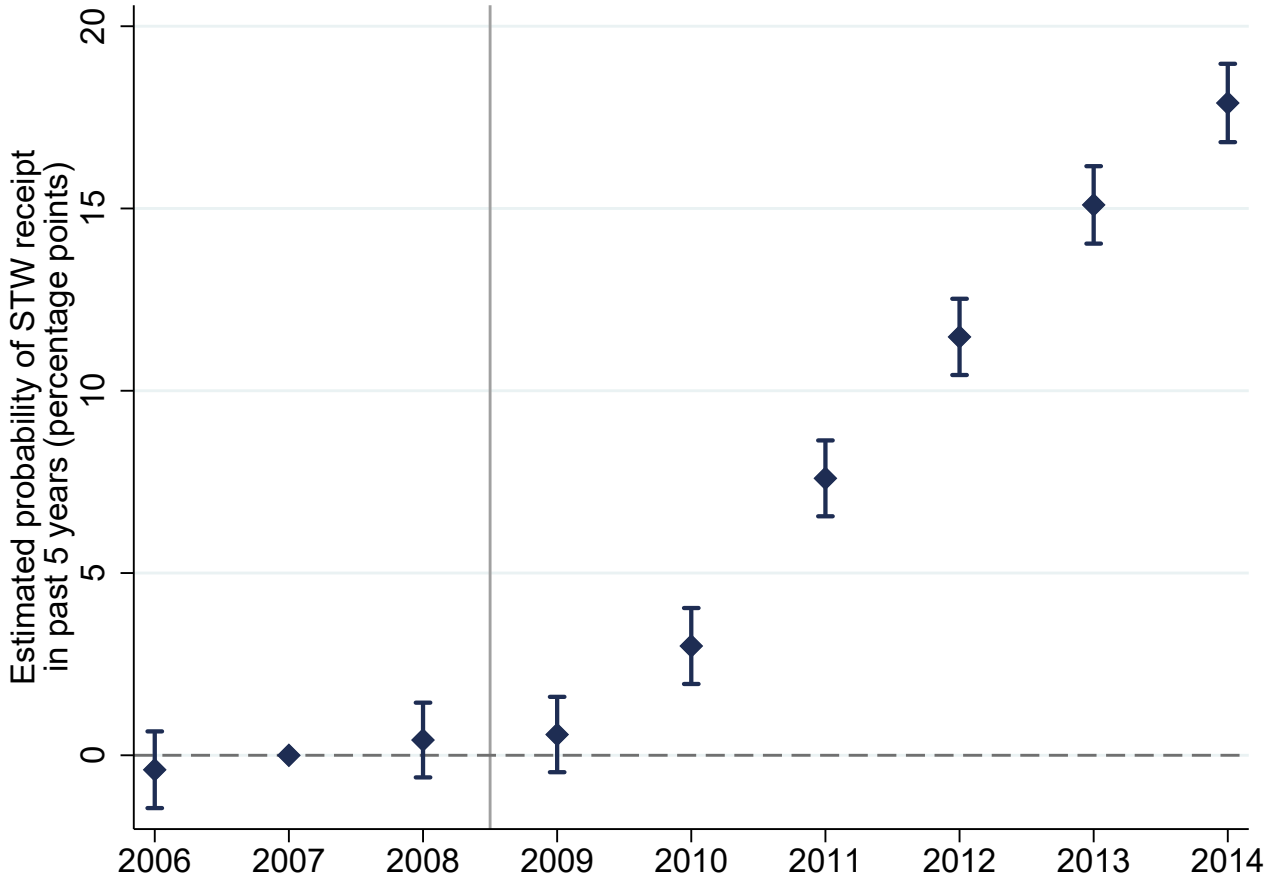
Back

Heterogeneity in survival effects by firm productivity



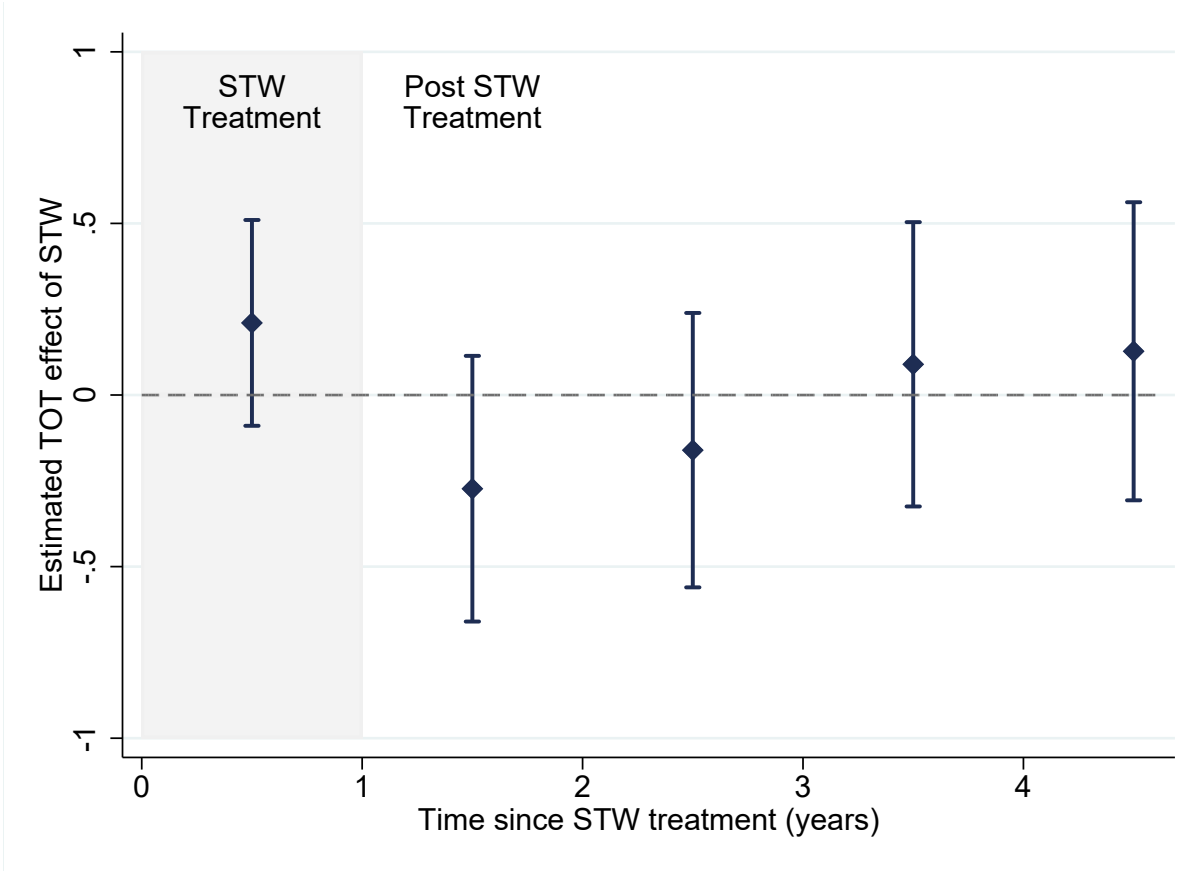
Back

Probability of CIG treatment in previous 5 yrs



Back

Dynamic extensive-margin response



- No significant long term effects on employment Back

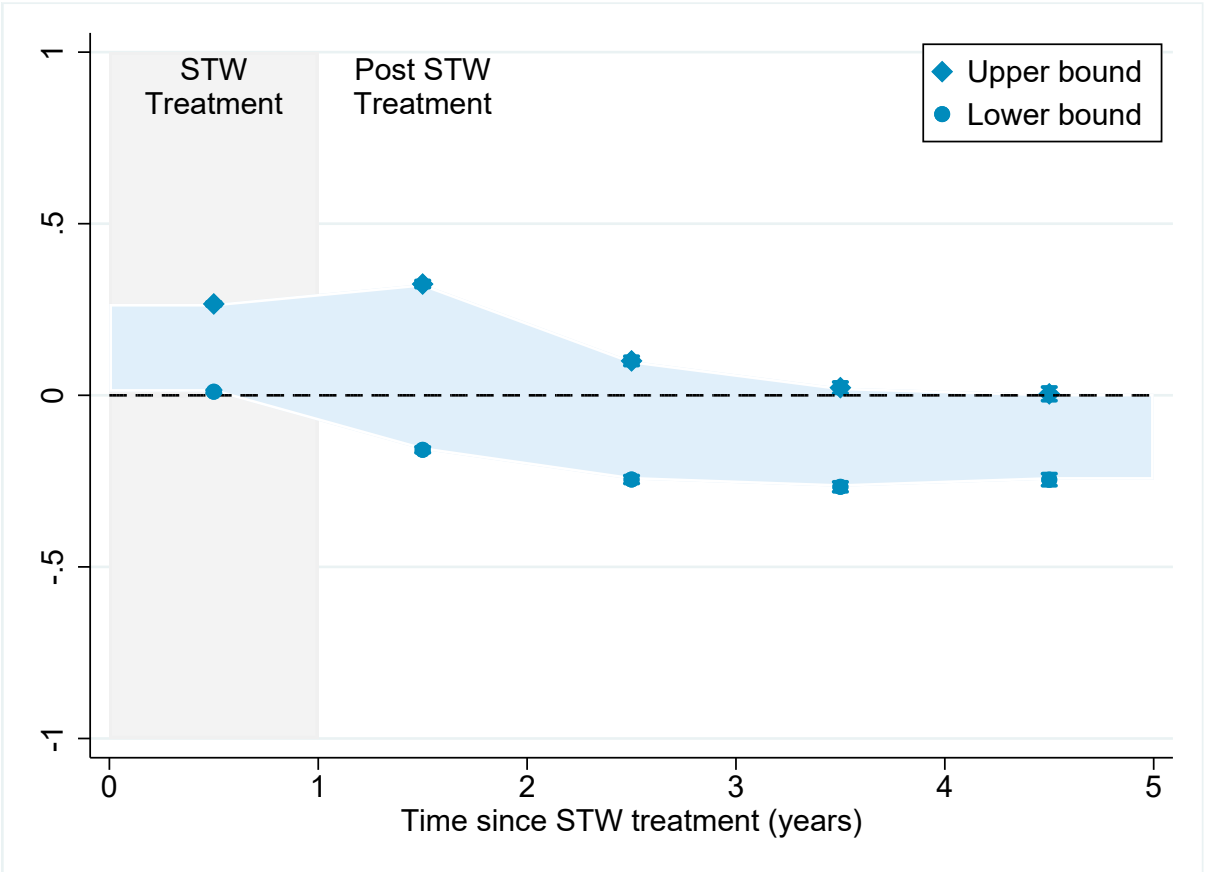
Event-study methodology

- 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

Back

Bounds on dynamic treatment effects at worker level

Probability of employment



Back

Identification of reallocation effects

- Use spatial variation across more than 600 LLM (j)
- Sample of non-eligible firms (i) irrespective of firm size
- Specification in first differences

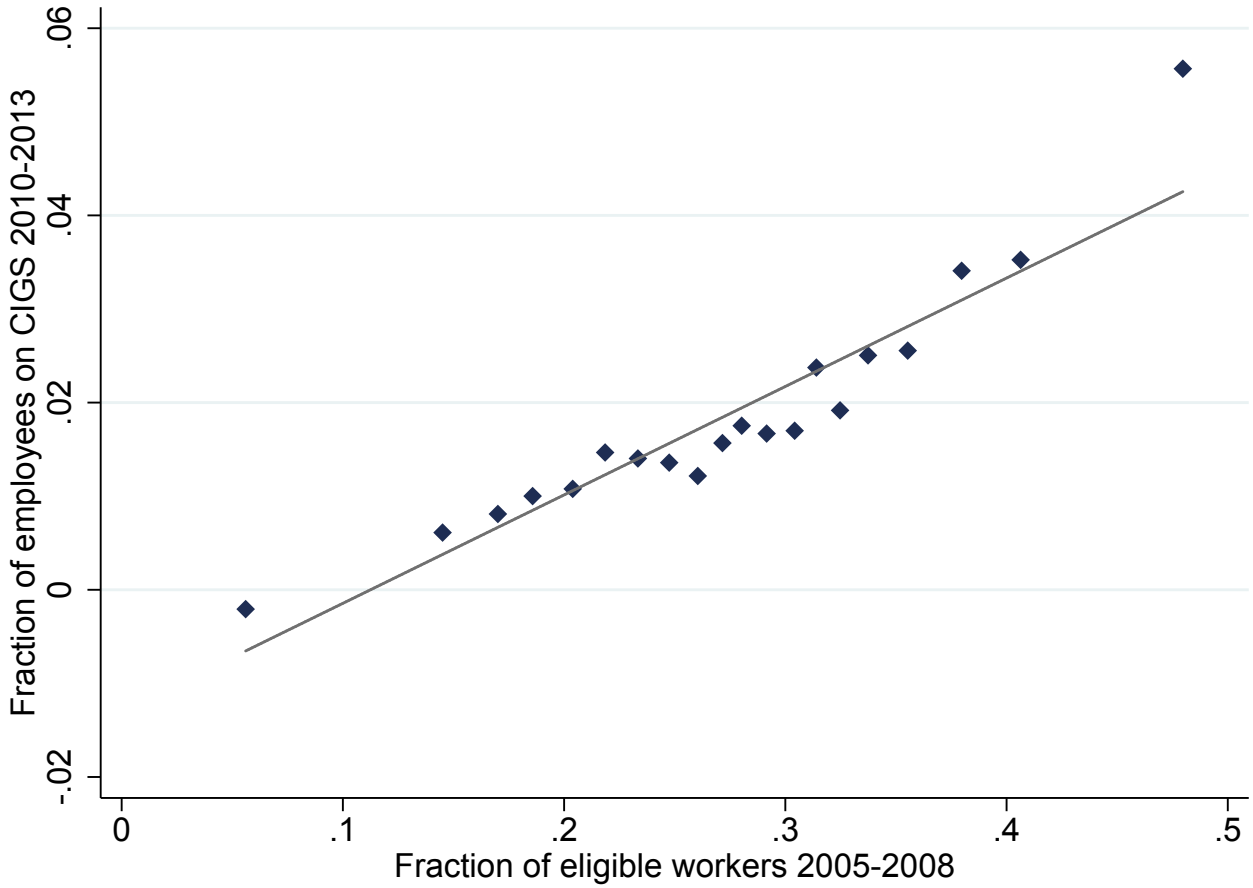
$$\Delta Y_{ij} = \Delta T_j + X_j' \beta + W_i' \gamma + \varepsilon_{ij}$$

$$\Delta T_j = \alpha Z_j^{PRE} + \eta_j$$

- Instrument: Z_j^{PRE} fraction of eligible workers from size and contributory codes in pre-recession period
- W includes 5-digit industry fixed effects, a dummy for eligible contributory code, 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

Back

Equilibrium Effects: First stage



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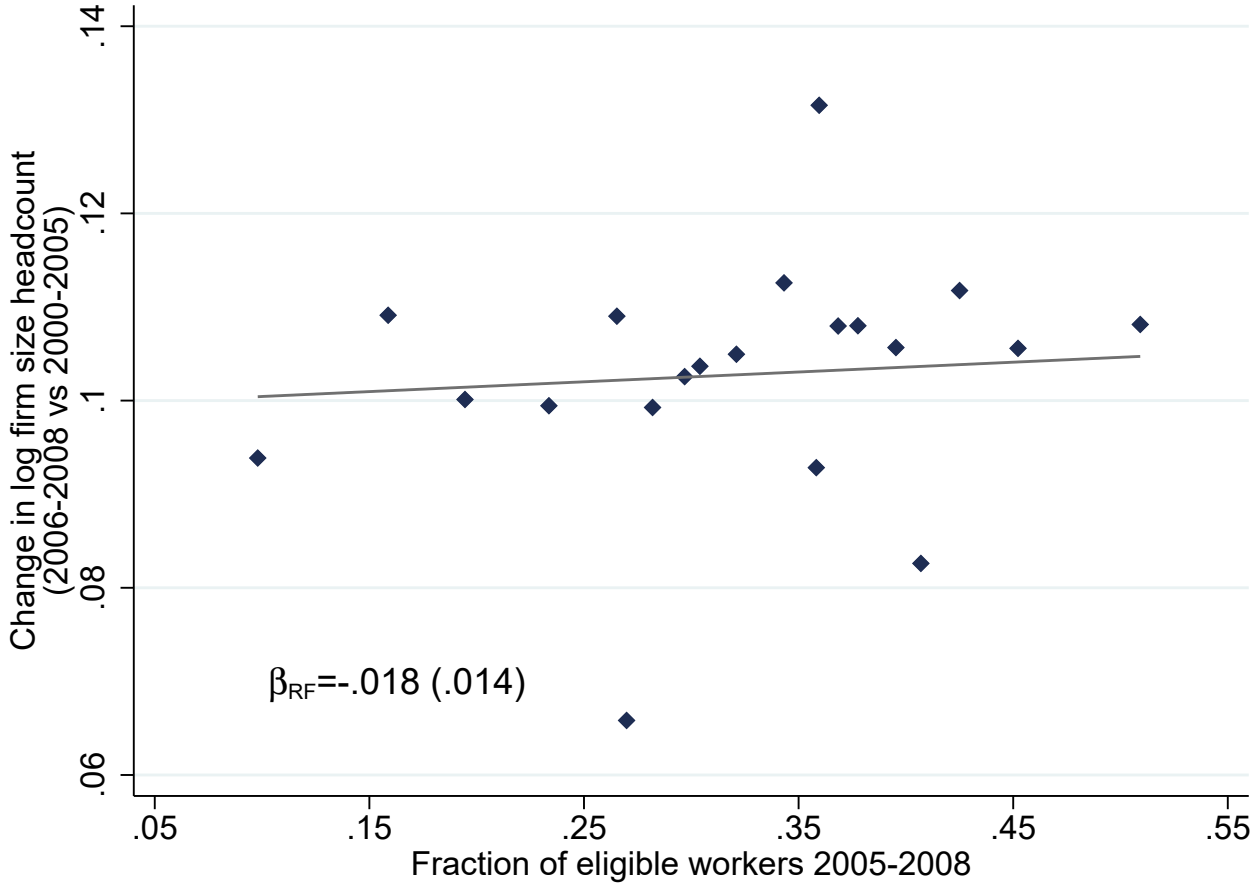
Placebo: Employment spillovers



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Heterogeneous effects by persistence of shock

- Construct panels of total employment counts by year at LLM or 3-digit industry level, using data on non-eligible firms, irrespective of firm size
- For each panel separately, estimate

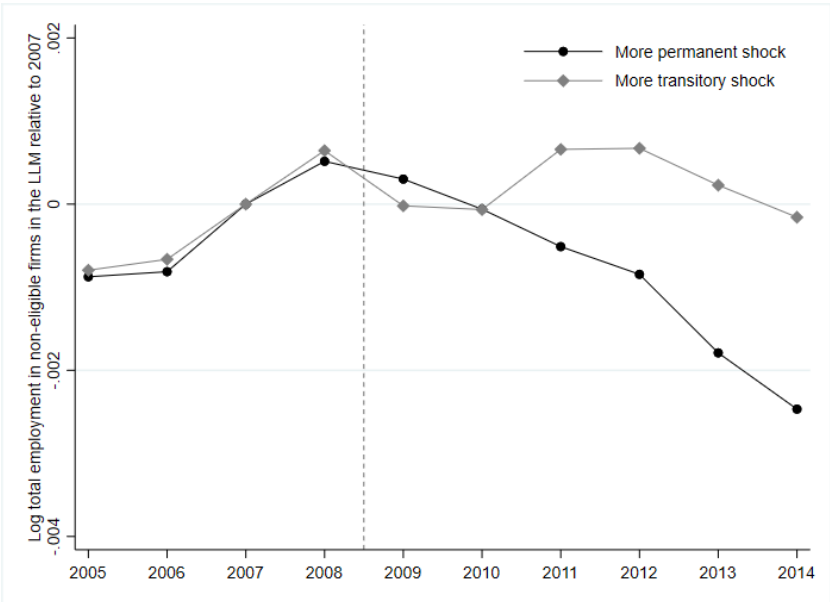
$$\Delta \log e_{j,2007-2014} = \alpha_S + \beta_S \Delta \log e_{j,2007-2009} + \varepsilon_j$$

- β_S captures average correlation between short-run and long-run employment growth
- Rank LLMs/industries into quantiles of distribution of $\widehat{\varepsilon}_j$
  - More negative values of $\widehat{\varepsilon}_j$ indicate more persistent shocks
  - Estimate model on non-eligible firms, but extend ranking to all firms
- Estimate "alternative specification"

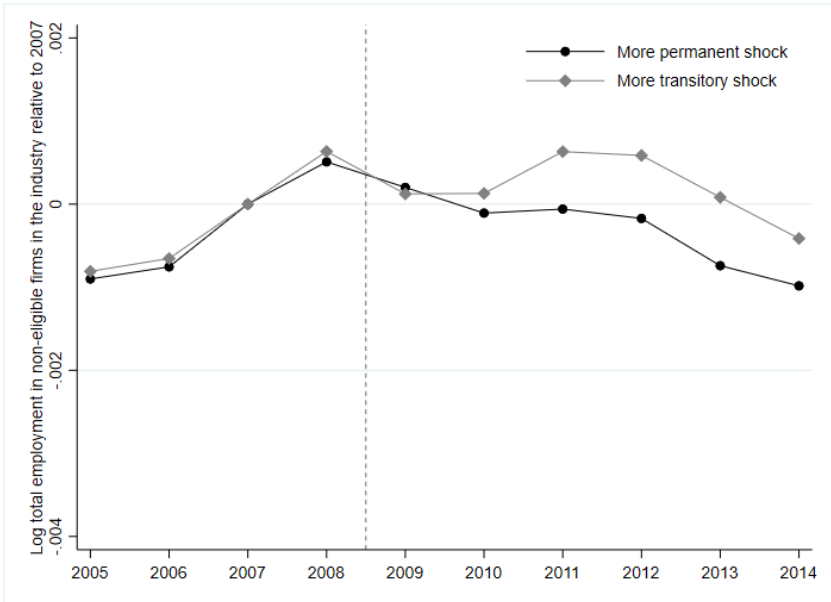
Back

Evolution of log employment by persistence of shock

A. Employment Shock at LLM Level



B. Employment Shock at Industry Level



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Heterogeneous effects by persistence of shock

Employment shock at LLM level

	Probability of CIG take-up (1)	Firm size headcount (inv. hyperbolic sine) (2)	Number of hours per employee (inv. hyperbolic sine) (3)
$\mathbb{1}[N_{i,2008} > 15] \times \mathbb{1}[g \in \mathcal{E}]$	.061***		
	(.009)		
$\mathbb{1}[N_{i,2008} > 15] \times \mathbb{1}[g \in \mathcal{E}] \times$ Temp.	.025**		
	(.012)		
$CIG^{2014-2010}$		.038	-.344*
		(.317)	(.176)
$CIG^{2014-2010} \times$ Temp.		.367	.064
		(.359)	(.199)
Obs.	300795	300795	300795

Back

Heterogeneous effects by persistence of shock

Employment shock at industry level

	Probability of CIG take-up (1)	Firm size headcount (inv. hyperbolic sine) (2)	Number of hours per employee (in. hyperbolic sine) (3)
$\mathbb{1}[N_{i,2008} > 15] \times \mathbb{1}[g \in \mathcal{E}]$	.060***		
	(.009)		
$\mathbb{1}[N_{i,2008} > 15] \times \mathbb{1}[g \in \mathcal{E}] \times$ Temp.	.032***		
	(.012)		
$CIG^{2014-2010}$		.062	-.315**
		(.300)	(.155)
$CIG^{2014-2010} \times$ Temp.		.427	-.002
		(.349)	(.180)
Obs.	300795	300795	300795

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