Hiring Subsidies and Female Employment

Mimosa Distefano [1 2] Lorenzo Incoronato [24] Anna Raute [235]

[1] Centre for Economic Performance, LSE

[2] CReAM, UCL

[3] Queen Mary University

[4] University College London (UCL)

[5] CEPR

EEA Barcelona, August 2023

Motivation

- Persistent gender gaps in employment and wages across countries
- Much of remaining inequality can be explained by arrival of children (Kleven et al. 2019)
- In Italy, only 54% of mothers with young child are employed (OECD: 72%)
- Potential significant economic loss due to under-representation of women in labour market and loss of talent (e.g. Hsieh et al., 2019)

$\rightarrow$ Increase female participation in labour market to promote equity but also improve allocation of talent in economy

Italian Hiring Subsidy

- Nearly all OECD countries have implemented family policies to target female labour supply, but little emphasis on role of firms
- We focus on the role of a specific **government policy** targeted at employers to **increase female employment**
- We focus on a **hiring subsidy**: temporary cut to employer's payroll tax rate , implemented in **Italy** since 2013
  - targeted at **women out of employment**
  - provided **1 year 50% cut** to **employer's payroll tax rate**

    $\rightarrow$ **11% p cut to the labor cost** (employers rate around 22%)
  - effectively decreasing **hiring costs of non-employed women**

Our paper

Investigate the effectiveness of the hiring subsidy from the *employer perspective*

1. *Worker* level-analysis: Dynamic evolution of wages and employment of workers hired under subsidy

2. Investigate dynamic changes in hiring and firm composition in response to subsidy take-up
   - Are new hires better or worse compared to the average hire in the firm?
   - Do firms hire more **mothers**?
   - Do newly hired workers remain **employed in the longer-run**?
   - Effect on firm outcomes: e.g. labor costs, growth?

3. Subsidy as a means to learn about quality of women with long employment gaps?

Our paper

Investigate the effectiveness of the hiring subsidy from the *employer perspective*

1. *Worker* level-analysis: Dynamic evolution of wages and employment of workers hired under subsidy

2. Investigate dynamic changes in hiring and firm composition in response to subsidy take-up
   - Are new hires better or worse compared to the average hire in the firm?
   - Do firms hire more **mothers**?
   - Do newly hired workers remain **employed in the longer-run**?
   - Effect on firm outcomes: e.g. labor costs, growth?

3. Subsidy as a means to learn about quality of women with long employment gaps?

Our paper

Investigate the effectiveness of the hiring subsidy from the *employer perspective*

1. *Worker* level-analysis: Dynamic evolution of wages and employment of workers hired under subsidy

2. Investigate dynamic changes in hiring and firm composition in response to subsidy take-up
   - Are new hires better or worse compared to the average hire in the firm?
   - Do firms hire more **mothers**?
   - Do newly hired workers remain **employed in the longer-run**?
   - Effect on firm outcomes: e.g. labor costs, growth?

3. Subsidy as a means to learn about quality of women with long employment gaps?

Our paper

Investigate the effectiveness of the hiring subsidy from the *employer perspective*

1. *Worker* level-analysis: Dynamic evolution of wages and employment of workers hired under subsidy

2. Investigate dynamic changes in hiring and firm composition in response to subsidy take-up
   - Are new hires better or worse compared to the average hire in the firm?
   - Do firms hire more **mothers**?
   - Do newly hired workers remain **employed in the longer-run**?
   - Effect on firm outcomes: e.g. labor costs, growth?

3. Subsidy as a means to learn about quality of women with long employment gaps?

Data

- **Universe** of workers and firms of the Italian private sector
- Years 2005-2019
- Provided by the Italian Social Security Institute (on-site access)
- **Workers**: hether the worker was **hired under the subsidy**
- **Firms**: Balance sheet information: value added, total labor costs

$\Rightarrow$ Data allows us to follow treated (and control) workers and firms over time (N=26,500 firms that use subsidy and 183,615 female workers hired between 2013-2019)

Staggered Event Study

Matched difference-in-differences staggered event study design

$$y_{\tau jt} = \sum_{\tau=-5}^{-2} \beta_\tau Event_{j,t}^{\tau} + \sum_{\tau=0}^{5} \gamma_\tau Event_{j,t}^{\tau} + y_t + \theta_\tau + \xi_j + e_{\tau jt} \quad (1)$$

- y_{jt} outcome of firm j in calendar year t and in period τ
- τ is relative to year that treated firm adopts subsidy for first time (τ=0)- any year between 2013 and 2019
- $Event_{j,t}^{\tau} = 1$ for treated firm, 0 otherwise
- y_t year FE
- θ_τ time from event FE
- ξ_j firm FE
- Errors clustered at the firm level

- Matched analysis: on firm size, female share, wages, (quartiles of) the number of workers hired over the three years before the adoption of the policy, hiring a woman at 0; N=38,270

Worker-level event studies

Matched DiD staggered event study design estimated on female subsidised workers in treated firm (hired in $\tau = 0$) vs. female workers hired from non-employment in control firm (hired in $\tau = 0$).

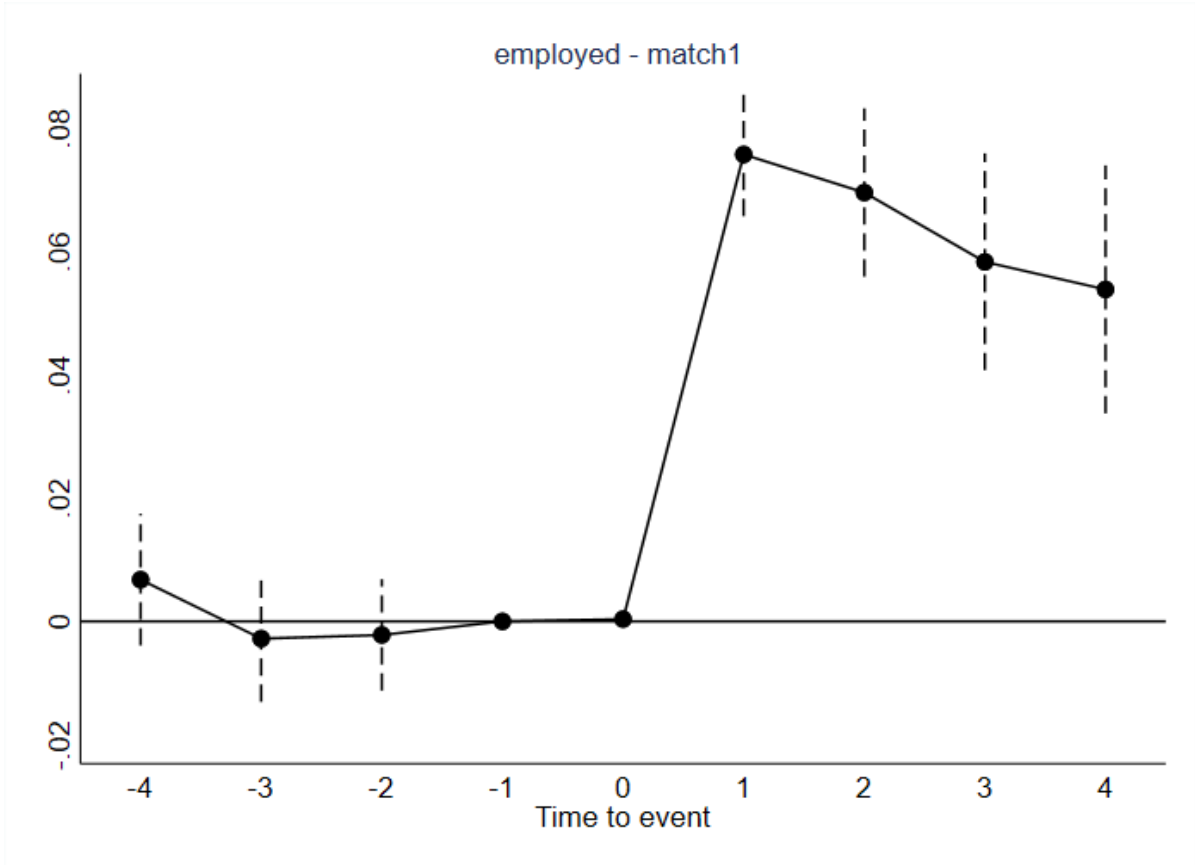
- Matching on age, contract status (perm, full time), occupation dummy, non-employment length before hiring: no differential pre-trends
- Attempt to net out changes in selection of workers and provide causal effect on worker

Findings:

1. No stat. significant effect on net (takehome) wages - suggest no pass-through
2. **Higher labour market attachment** of workers in treated firms - 6% points
3. **Larger propensity to remain in hiring firm** - 4% points

Specification

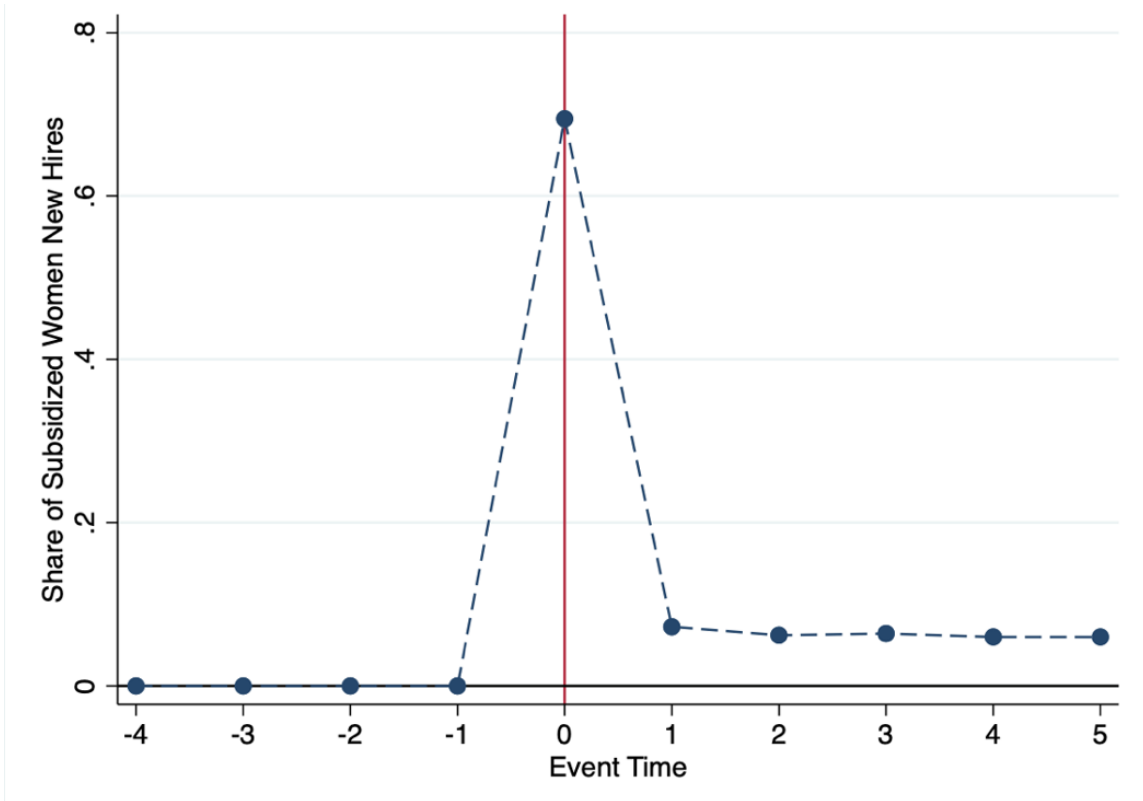
Worker-level - Probability of being employed



Probability to be employed after being hired in period 0

$\rightarrow$ Likely to translate into higher earnings of workers

Firm level: Take-up over time (for treated group)

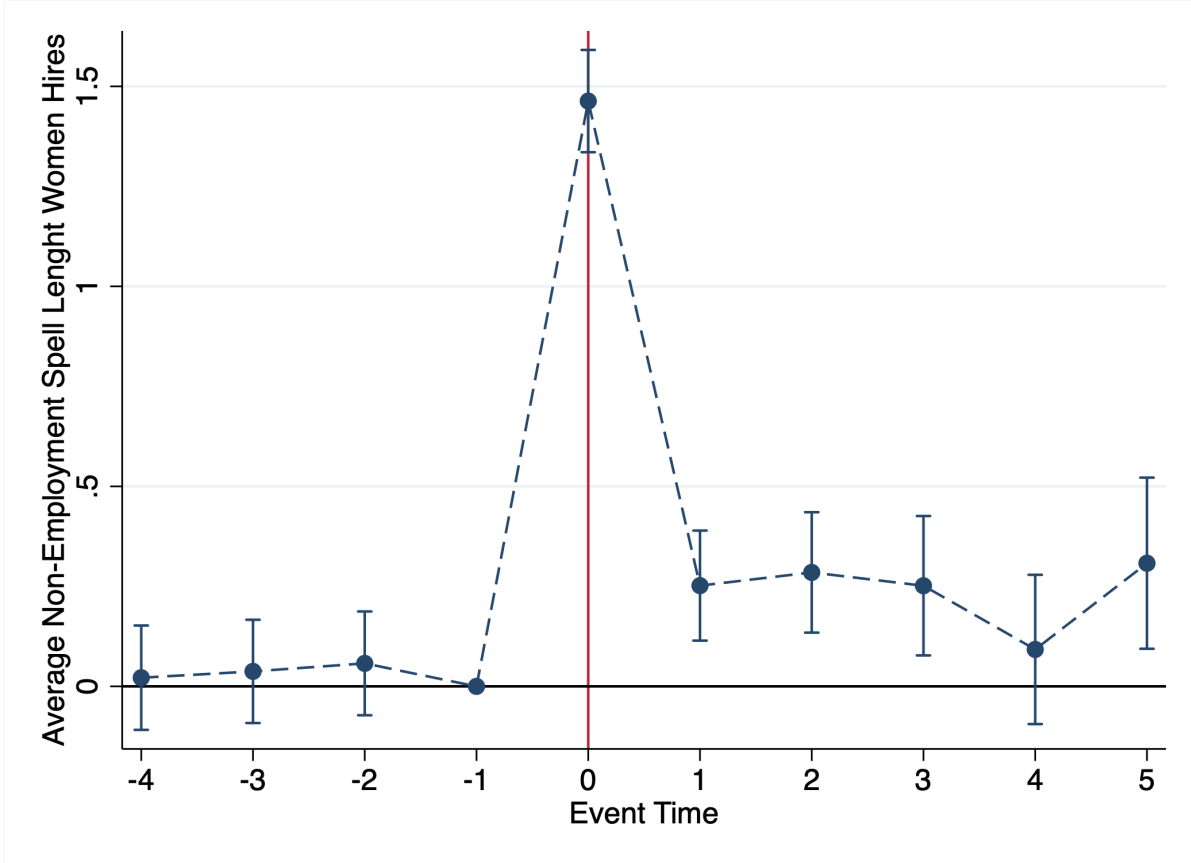


Share of female workers hired under the subsidy among new female hires

→ Increase in the share of female workers among new hires driven by subsidized workers (70%)

→ The majority of subsidized workers hired at time 0

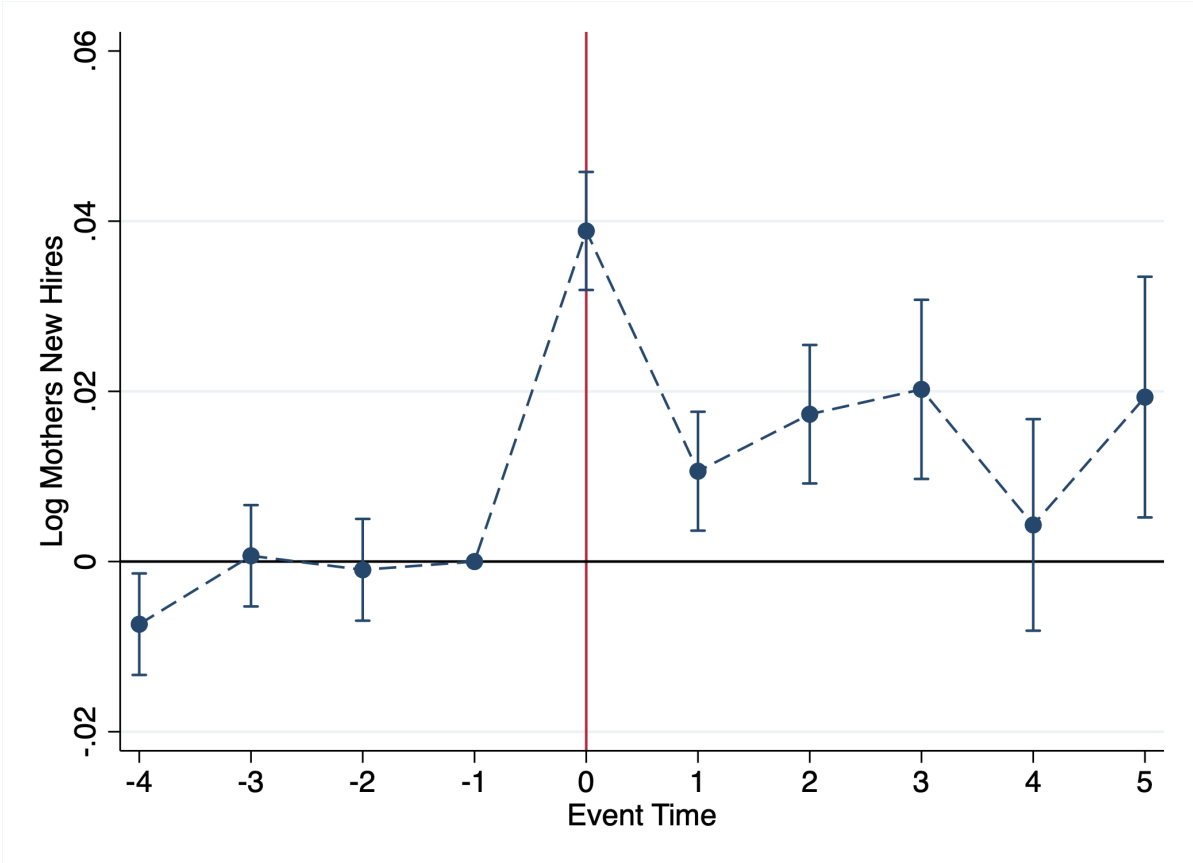
Average non-employment spell of female hires



Average length in years of non-employment spell

$\rightarrow$ Increase of average non-employment spell by 1.5 years initially, persistent change

Increase in mothers hired



ln number hires who are mothers

$\rightarrow$ Number of mothers hired increases in treated firms, also in medium-run

Share mothers Future childbearing

Findings - Compositional changes in hiring

Through the subsidy firms hire

1. 50% more female workers with lengthy employment interruptions
2. 21% higher share of mothers amongst female hires
3. 16% more female workers who are middle-skilled and with higher (previous) net wage
4. These women are 7% more likely to be converted to open-ended contract

Robustness check

Compositional changes at firm level

Changes in hiring composition translate into changes in firm size and composition:

1. share full-time and share permanent decrease
2. **Firms grow more in size** (both through female and male employees)
3. ln value added increases
4. ln assets increase
5. value added per FTE worker remain the same

Additional Firm Outcomes

Robustness checks

Findings on hiring composition - Learning as channel?

Why aren't these workers hired before?

- Higher uncertainty about the productivity of long-term non-employed and mothers?
- Hiring subsidy makes hiring (and retaining) these workers cheaper

$\rightarrow$ **Hiring through the subsidy incentivises firms to experiment and learn about workers' quality**

Good vs. Bad Draw

Investigate the differential hiring patterns across subsidized firms:

- Restrict to early adopters (2013-16) and exclude first hiring period
- Firms that receive a good draw vs. bad draw
  - Draw is defined by average wage residual across workers hired in $\tau = 0$

Compare differential hiring patterns of good vs. bad draw firms in DID analysis:

$$y_{jt} = \xi_j + \beta Post_{jt} + \gamma Post_{jt} * GoodDraw_{jt} + e_{jt} \quad (2)$$

- y_{jt} outcome of firm j at time t
- $GoodDraw_{jt}$ Indicator variable for good-draw (treatment) firm
- $Post_jt$ Binary variable for post-treatment period
- ξ_j firm FE
- Errors clustered at the firm level

In extension, also extend to triple DID design using matched control firms.

Good vs. Bad Draw

Investigate the differential hiring patterns across subsidized firms:

- Restrict to early adopters (2013-16) and exclude first hiring period
- Firms that receive a good draw vs. bad draw
  - Draw is defined by average wage residual across workers hired in $\tau = 0$

Compare differential hiring patterns of good vs. bad draw firms in DID analysis:

$$y_{jt} = \xi_j + \beta Post_{jt} + \gamma Post_{jt} * GoodDraw_{jt} + e_{jt} \quad (2)$$

- y_{jt} outcome of firm j at time t
- $GoodDraw_{jt}$ Indicator variable for good-draw (treatment) firm
- $Post_jt$ Binary variable for post-treatment period
- ξ_j firm FE
- Errors clustered at the firm level

In extension, also extend to triple DID design using matched control firms.

Findings - Good vs Bad Draw

	Subsidized Hires	Long Term Non employed Women	Mothers	Female Managers
Differential effect good draw vs bad draw	0.0211**	0.0284***	0.0197**	0.0126**
	(0.00938)	(0.00991)	(0.00800)	(0.00602)

Differential effect between firms that receive a good draw vs firms that receive a bad draw
(average coefficients between post-treatment 1 and 5).

$\rightarrow$ More sustained take-up ($>$2%) and larger increases in disadvantaged group (2-3%) following "higher quality" initial hire

Take-away

Study gender-specific hiring subsidy for women hired out of non-employment:

- Low take-up of reform, but...
- Treated workers have higher subsequent LM attachment
- Firms that make use of hiring subsidy change hiring and firm composition in short-and medium-run
  - increase hiring of disadvantage groups
  - positively selected in terms of skills and previous wage
  - firms grow more in size and VA
- Results suggest that subsidy serves as a source of learning about productivity of disadvantaged workers for the firm
- Hiring subsidy reduces frictions and could improve allocation of talent in the economy (if take-up was high enough)

Take-away

Study gender-specific hiring subsidy for women hired out of non-employment:

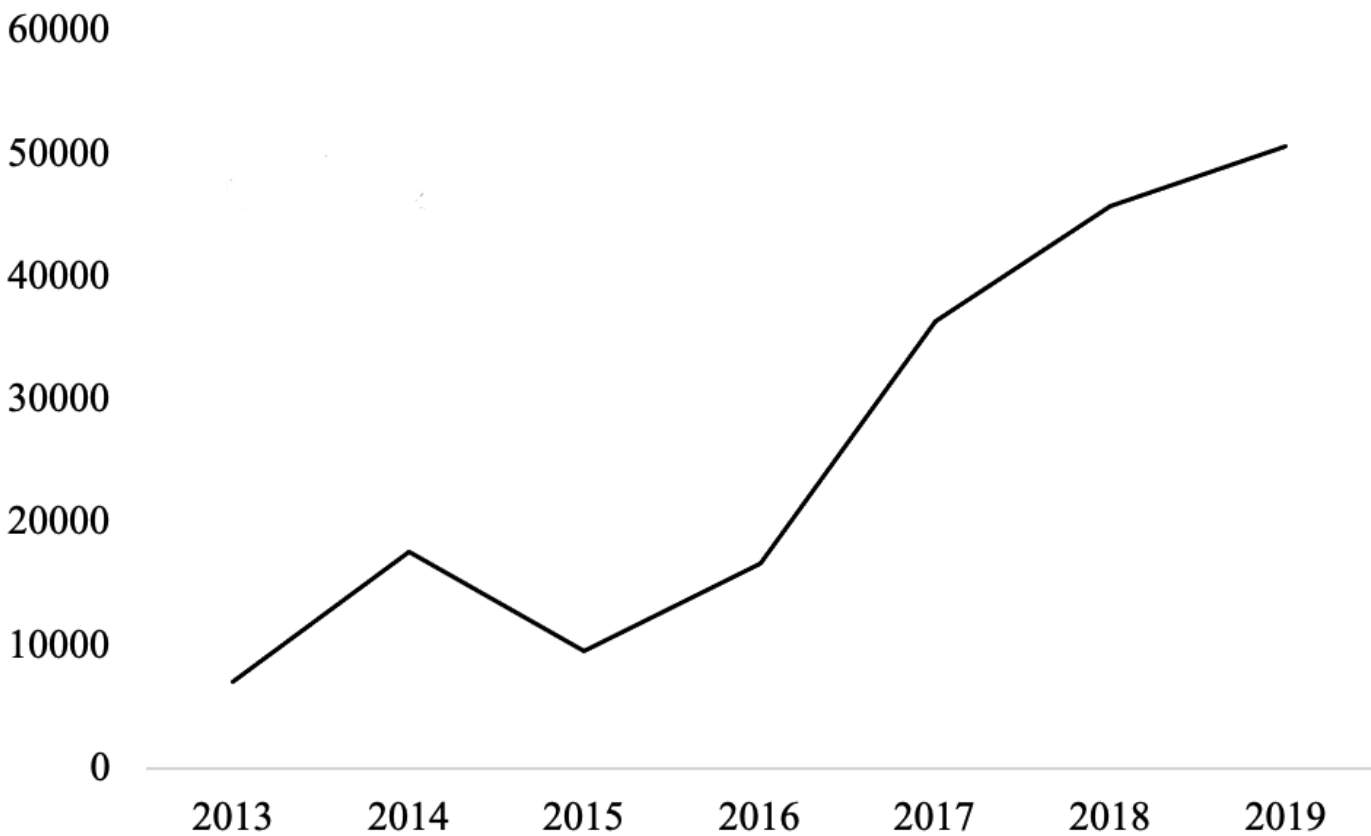
- Low take-up of reform, but...
- Treated workers have higher subsequent LM attachment
- Firms that make use of hiring subsidy change hiring and firm composition in short-and medium-run
  - increase hiring of disadvantage groups
  - positively selected in terms of skills and previous wage
  - firms grow more in size and VA
- Results suggest that subsidy serves as a source of learning about productivity of disadvantaged workers for the firm
- Hiring subsidy reduces frictions and could improve allocation of talent in the economy (if take-up was high enough)

Contribution

- Advantage of data: Panel dimension of workers and firms and **precise take-up info**
- Focus on **dynamic response** by firms to policy aimed to stimulate labour demand:
  - Track dynamic evolution of employment of treated workers
  - Zoom into the firms that use the subsidy
  - Investigate dynamic change in hiring patterns and firm composition and outcomes
  - Hiring subsidies as an incentive for firm to experiment with disadvantaged workers

Back

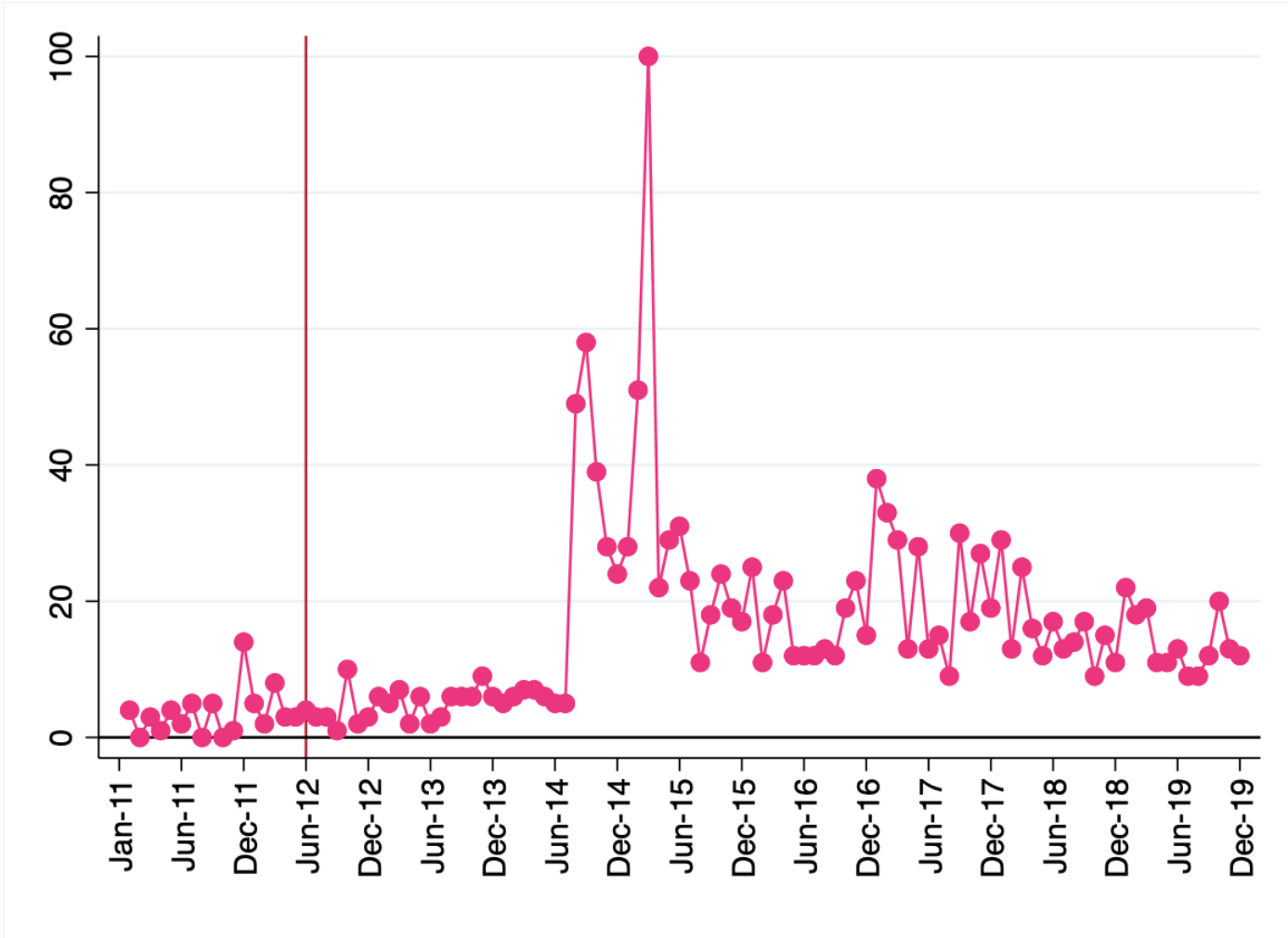
Take-up Over Time



Number of female workers hired under the subsidy over the years 2013-2019

⇒ Slow and gradual increase in number of female subsidised hires Back

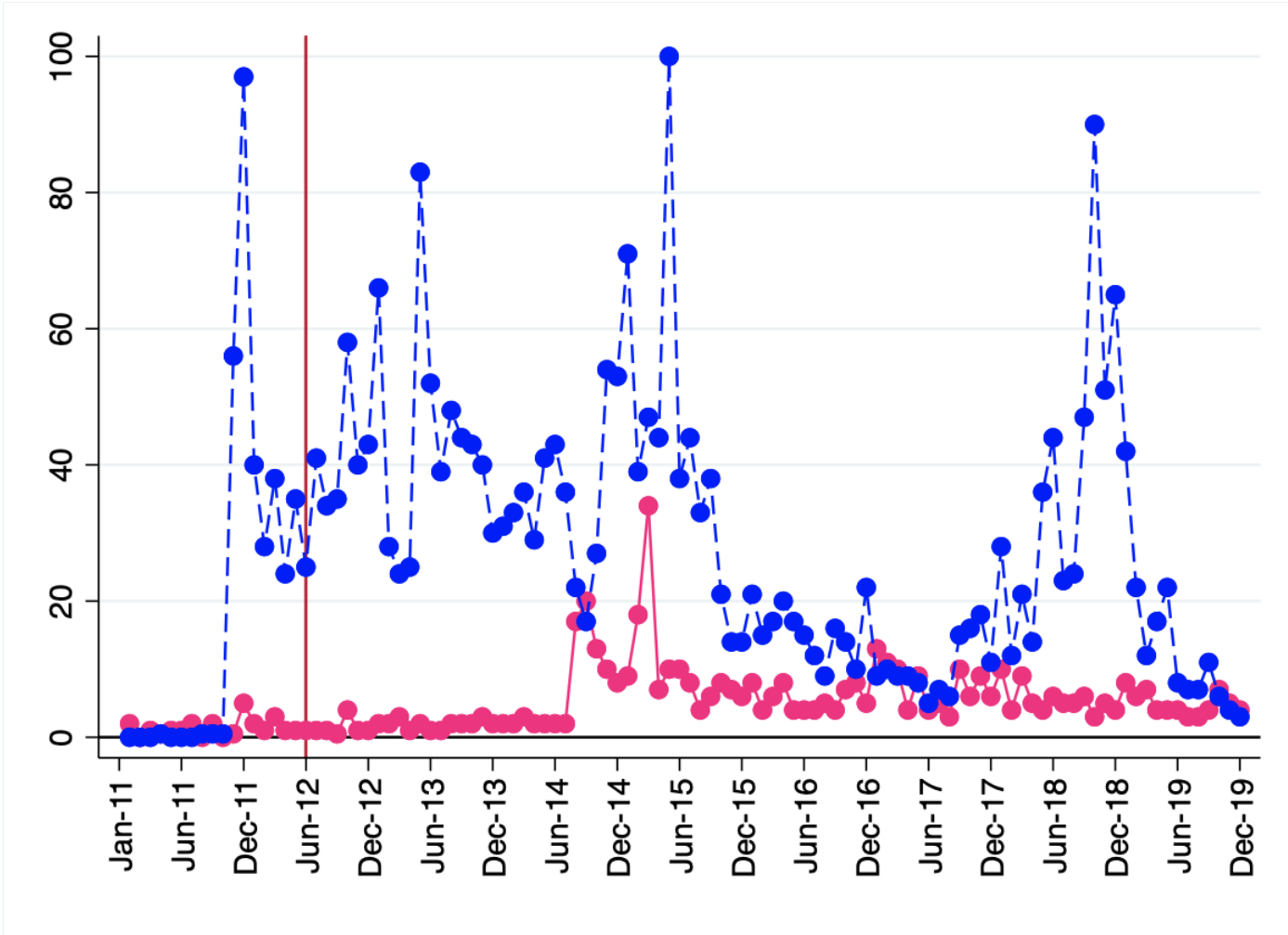
Google Searches Bonus Donne



Google Searches for item Bonus Donne (hiring subsidy) over the years 2011-2019

$\Rightarrow$ No searches at the time of approval (June 2012) and at introduction (2013) Back

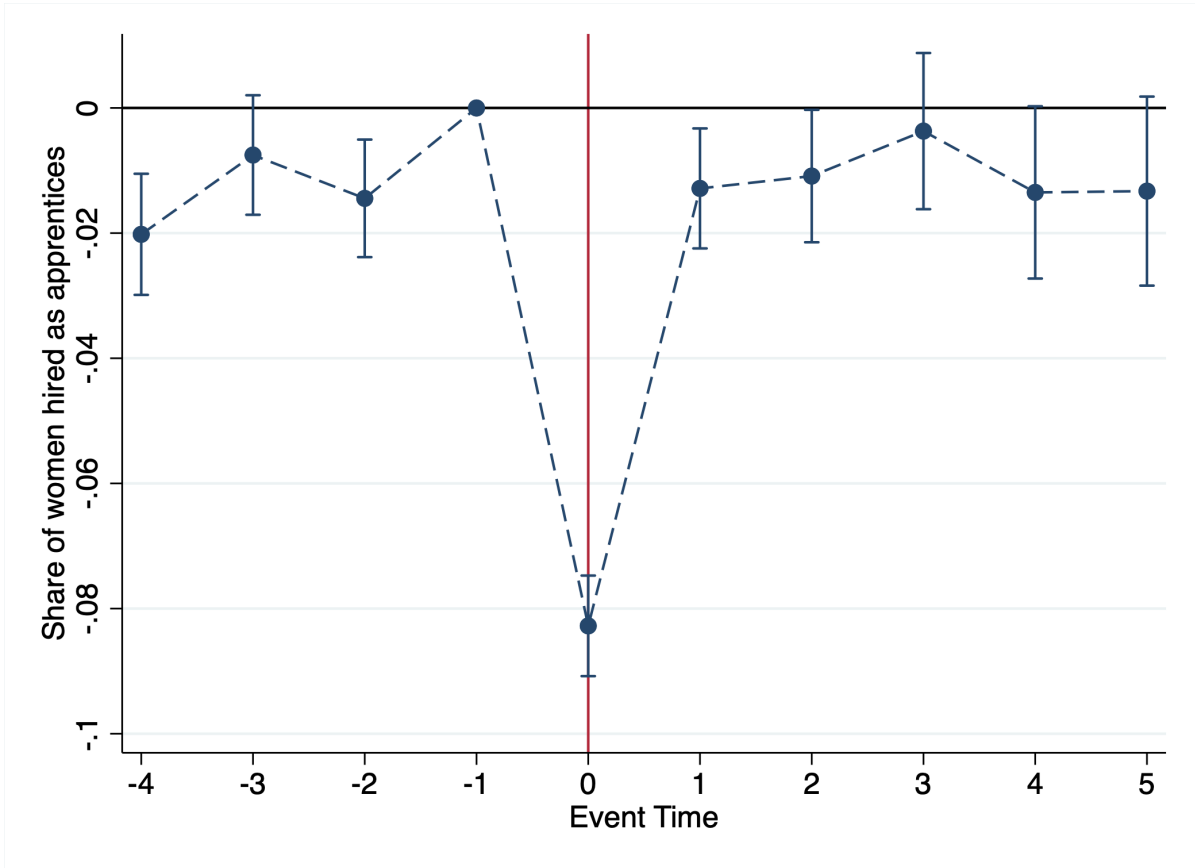
Google Searches Bonus Donne and Pensioni Forner



Google Searches for item Bonus Donne (in pink) and item Pensioni Fornero (in blue) over the years 2011-2019

$\Rightarrow$ Pension Reform dominated the public discussion Back

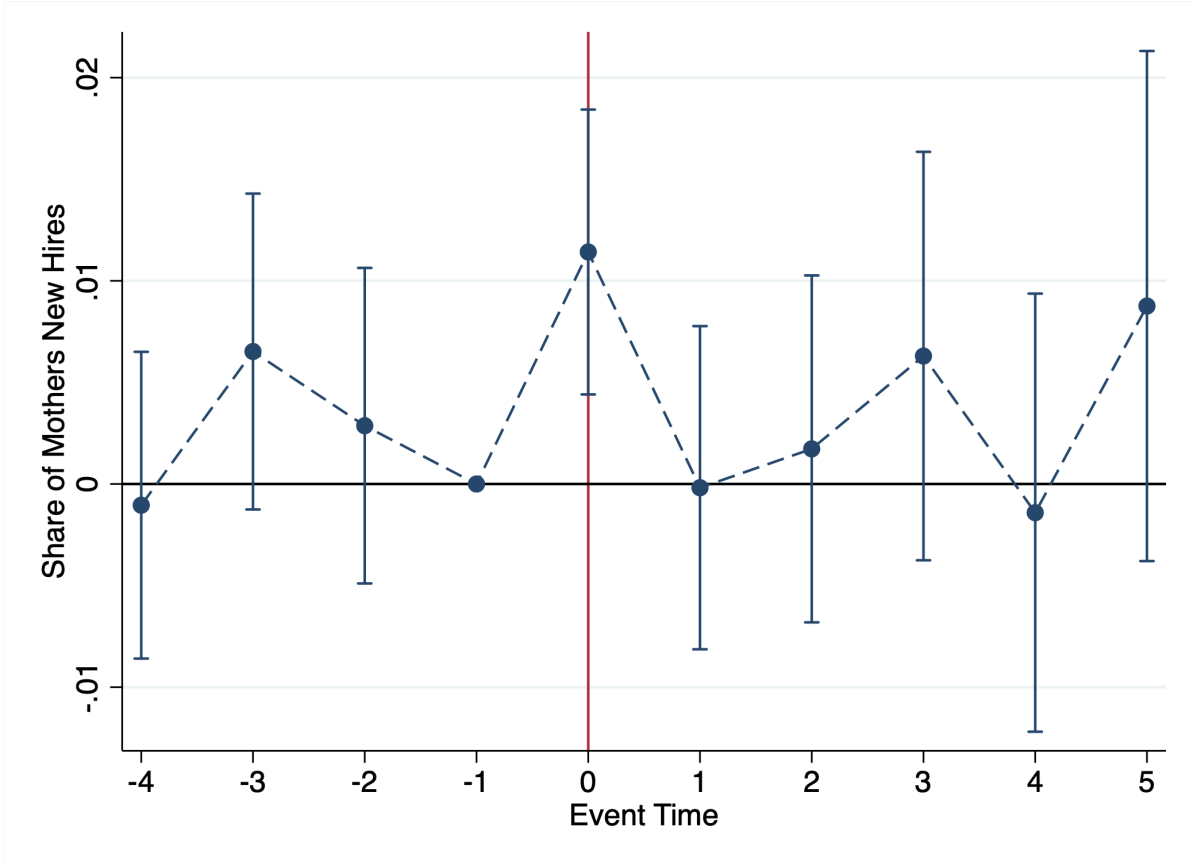
Share of apprentices



Share of women hired as apprentices among new female hires

Back

Share of mothers

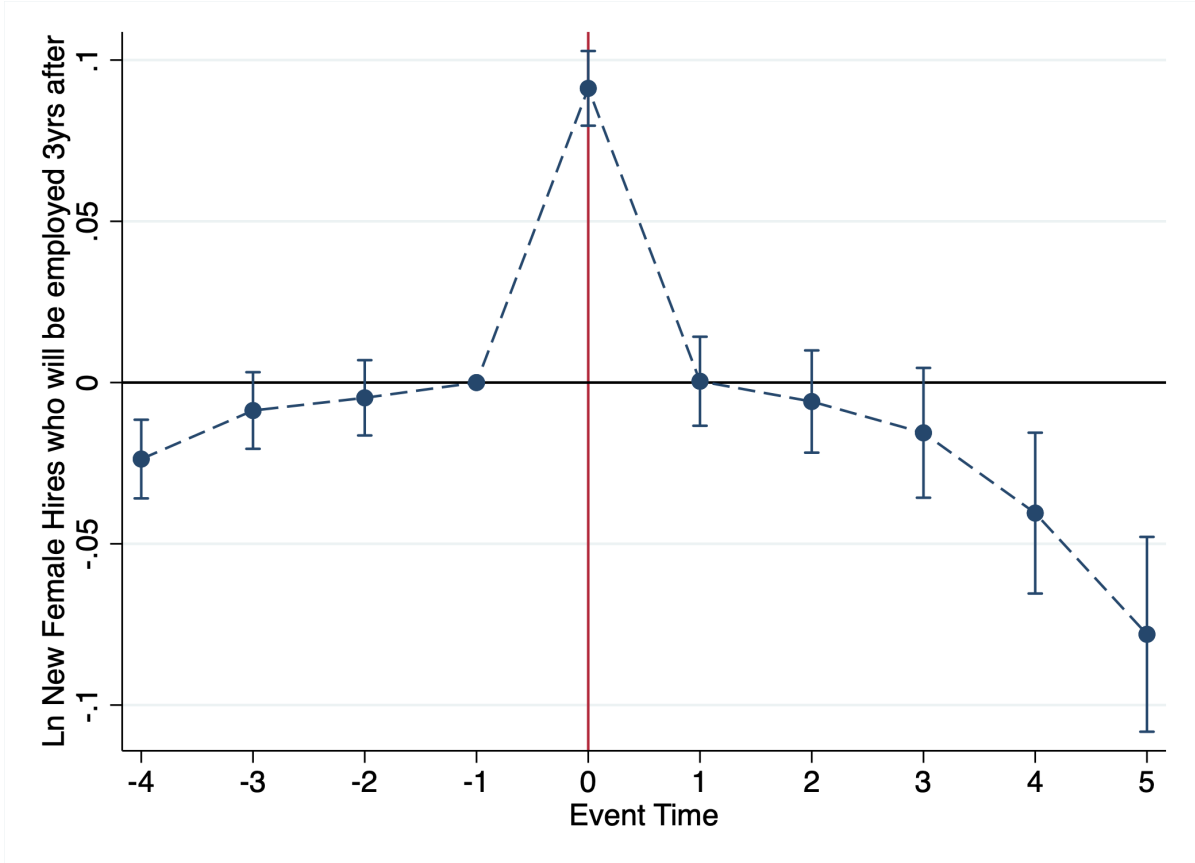


Workers who are already mothers as a share of new female hires

$\rightarrow$ New female hires are 21 percent more likely to be mothers

Number mothers

Female hires who will be employed in the firm 3 years after



ln total new female hires who are employed 3 years after hiring

$\rightarrow$ New female hires in hiring-subsidy firm are more likely to remain in firm

Back

Staggered Event Study

Matched DiD staggered event study design within sample of matched firms

$$y_{\tau ijt} = \sum_{\tau=-5}^{-2} \beta_\tau Treated_{ij,t}^{\tau} + \sum_{\tau=0}^{5} \gamma_\tau Treated_{ij,t}^{\tau} + y_t + \theta_\tau + \xi_i + e_{\tau ijt} \quad (3)$$

- y_{jt} outcome of worker i (hired by firm j) in calendar year t and in period τ
- $Treated_{ij,t}^{\tau} = 1$ for treated worker (i..e. hired under subsidy) in period τ
- y_t year FE
- θ_τ time from event FE
- ξ_i worker FE
- Errors clustered at the worker level

- Matching on age, contract status (perm, full time), occupation dummy, non-employment length before hiring: no differential pre-trends (N=26,672)

Back

Worker-level event studies

Matched DiD staggered event study design estimated on female subsidised workers in treated firm (hired in $\tau = 0$) vs. female workers hired from non-employment in control firm (hired in $\tau = 0$).

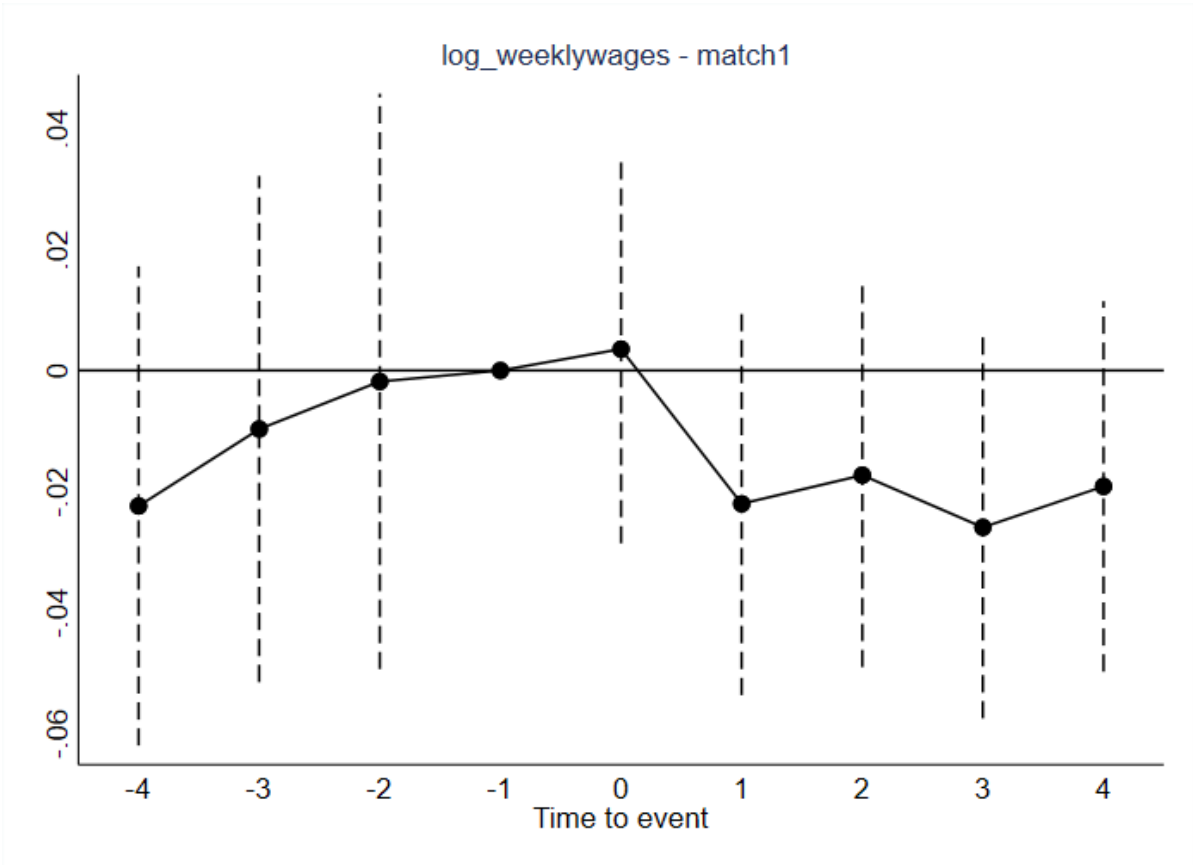
- Matching on age, contract status (perm, full time), occupation dummy, non-employment length before hiring: no differential pre-trends
- Attempt to net out changes in selection of workers and provide causal effect on worker

Findings:

1. No stat. significant effect on net (takehome) wages - suggest no pass-through
2. **Higher labour market attachment** of workers in treated firms - 6% points
3. **Larger propensity to remain in hiring firm** - 4% points

Back summary

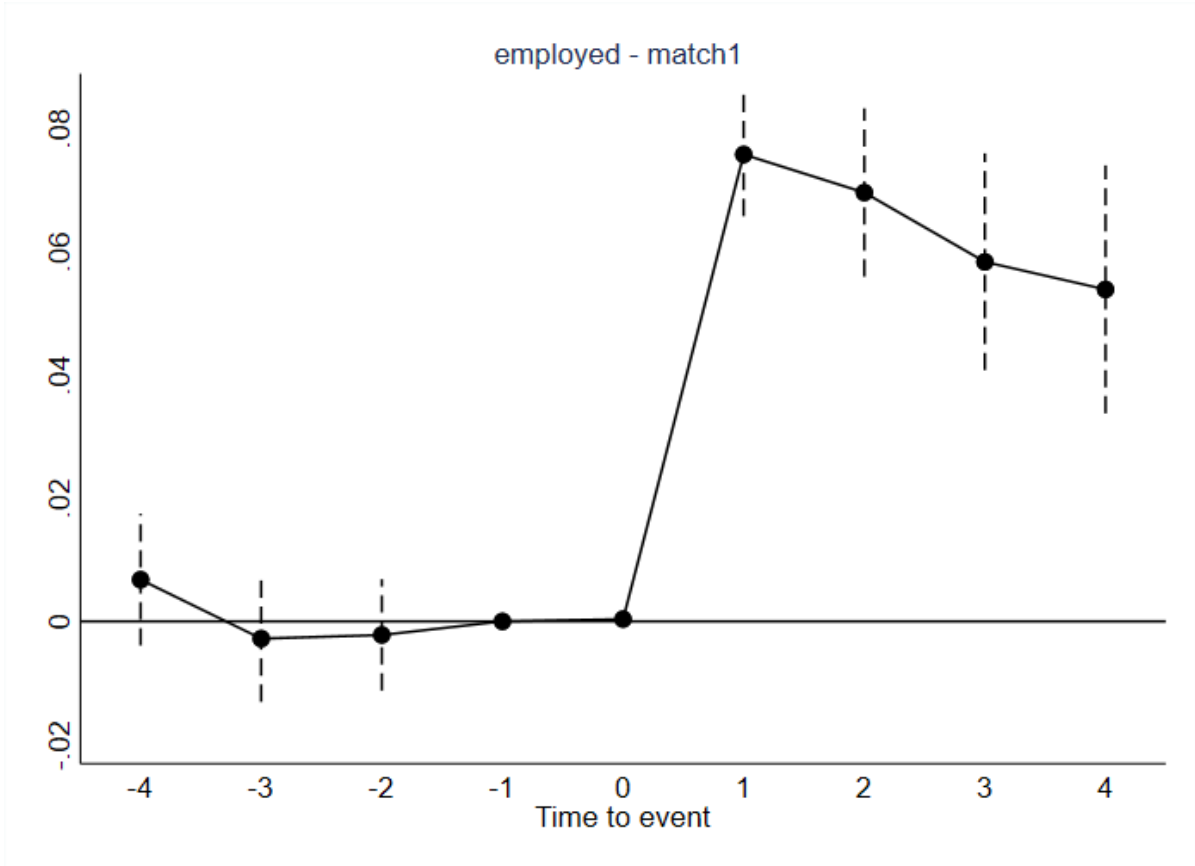
Worker-level - Evolution of wages



log weekly wages (cdt. on being employed)

Back summary

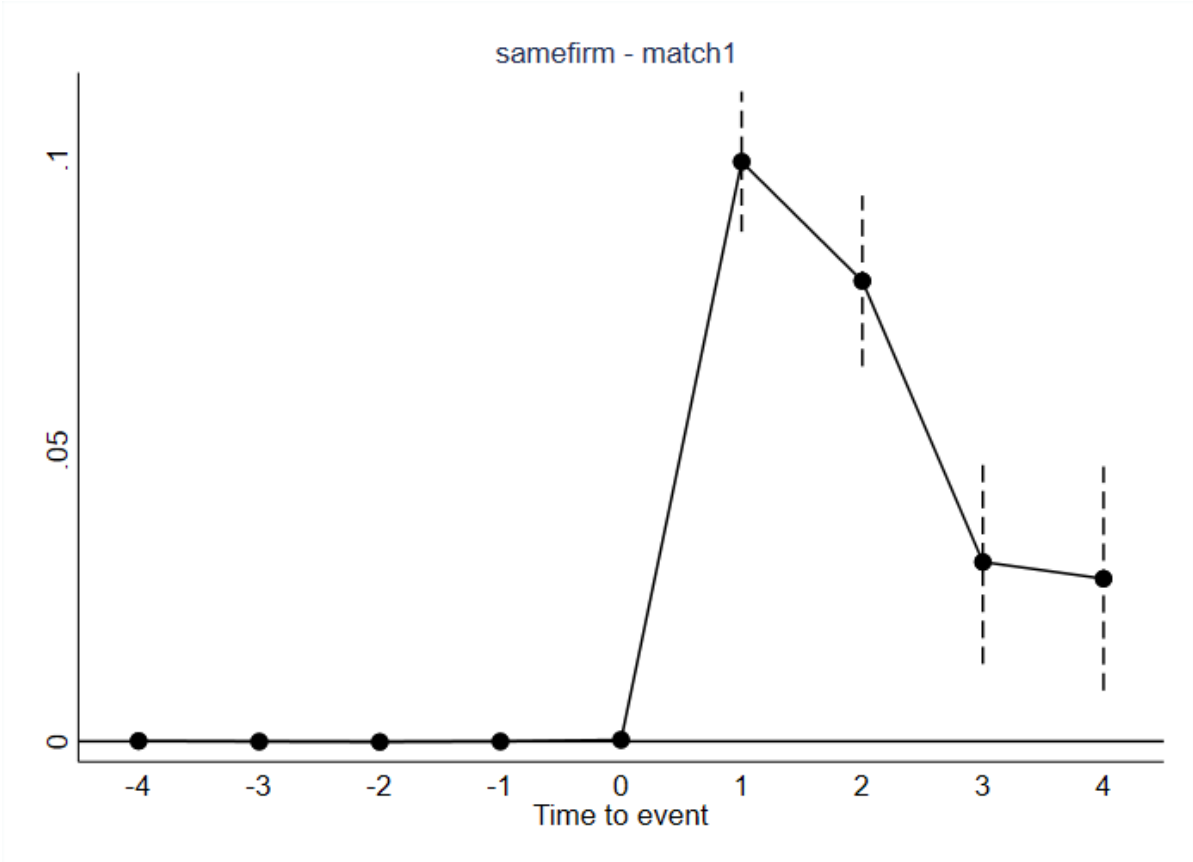
Worker-level - Probability of being employed



Probability to be employed after being hired in period 0

→ Likely to translate into higher earnings of workers Back summary

Worker-level - Probability of being in same firm

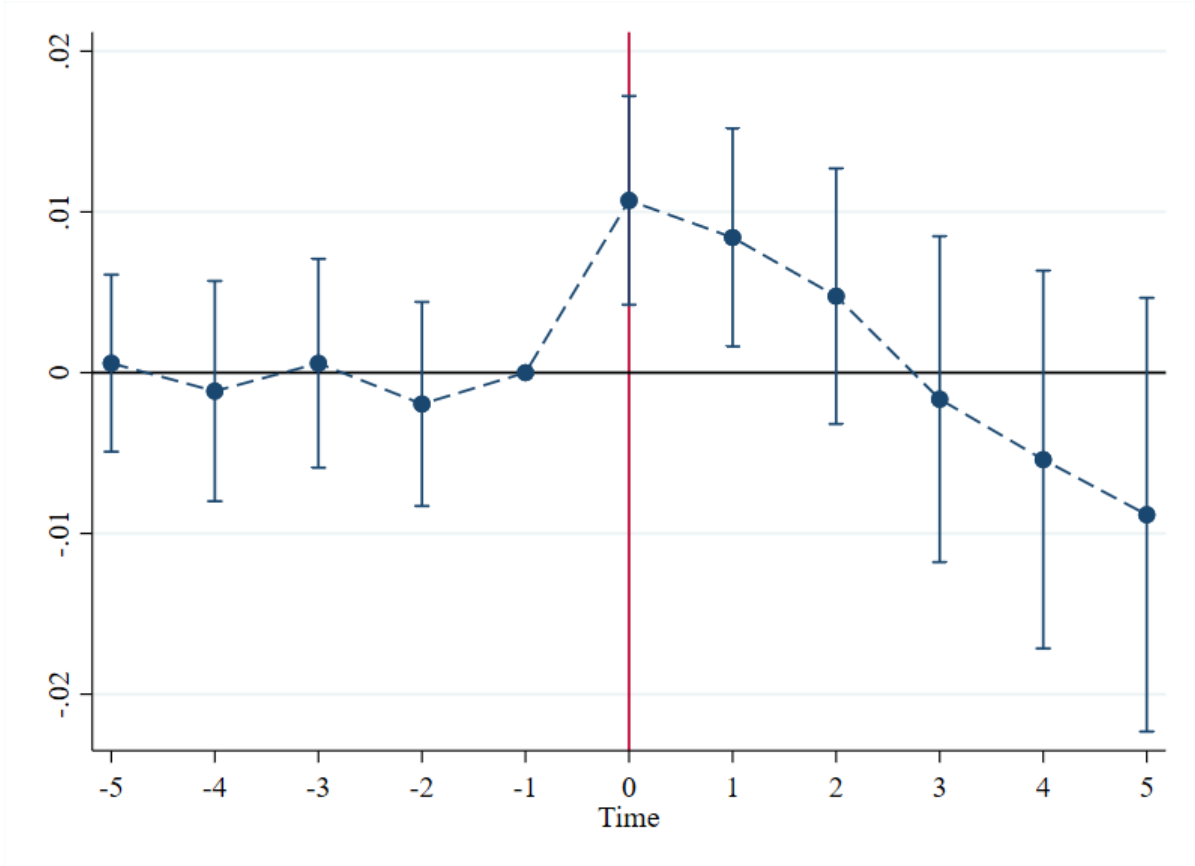


Probability to be employed in same firm as in hiring firm (period 0)

$\rightarrow$ Stronger medium-run attachment to the hiring firm $\rightarrow$ Likely to be (partially) caused by direct incentives of reform

Back summary

Short-run increase in future childbearing of hires

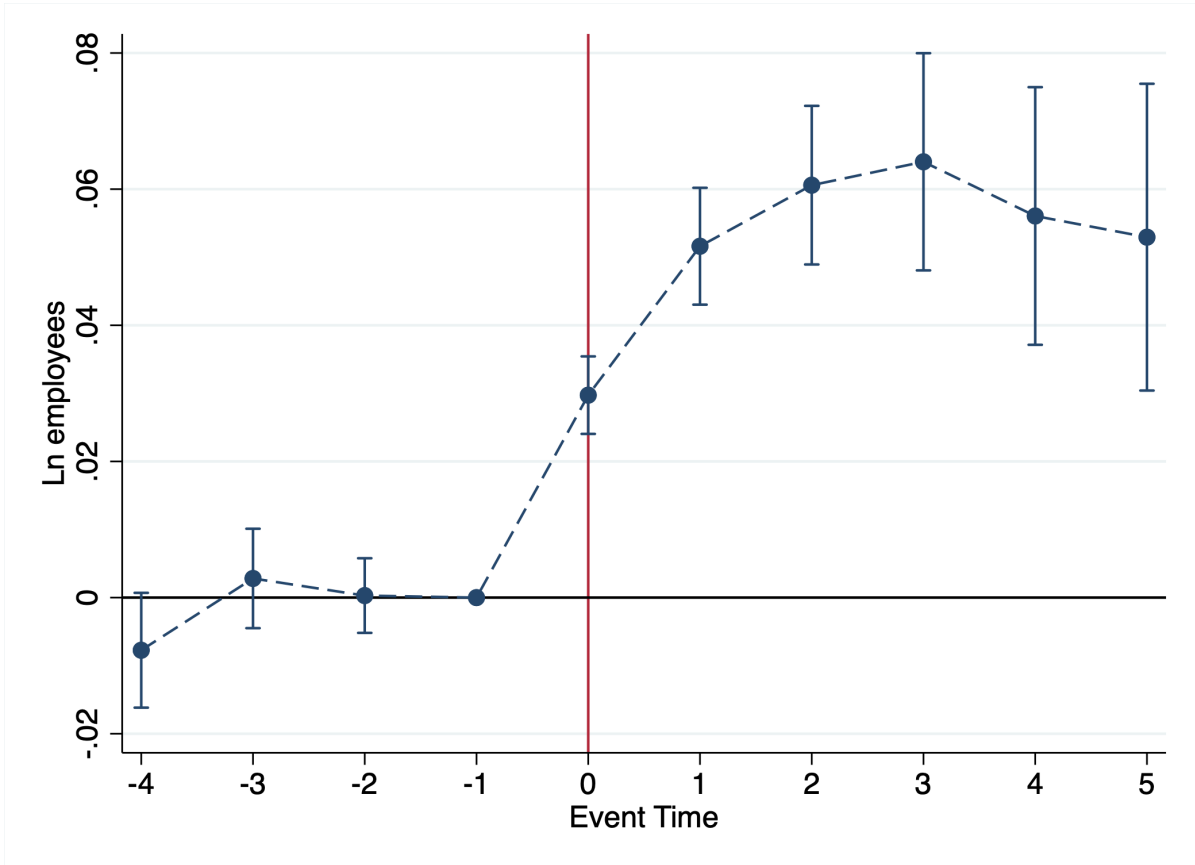


ln number hires who will become mothers

$\rightarrow$ Smaller increase in number of future mothers hired in treated firms

Back

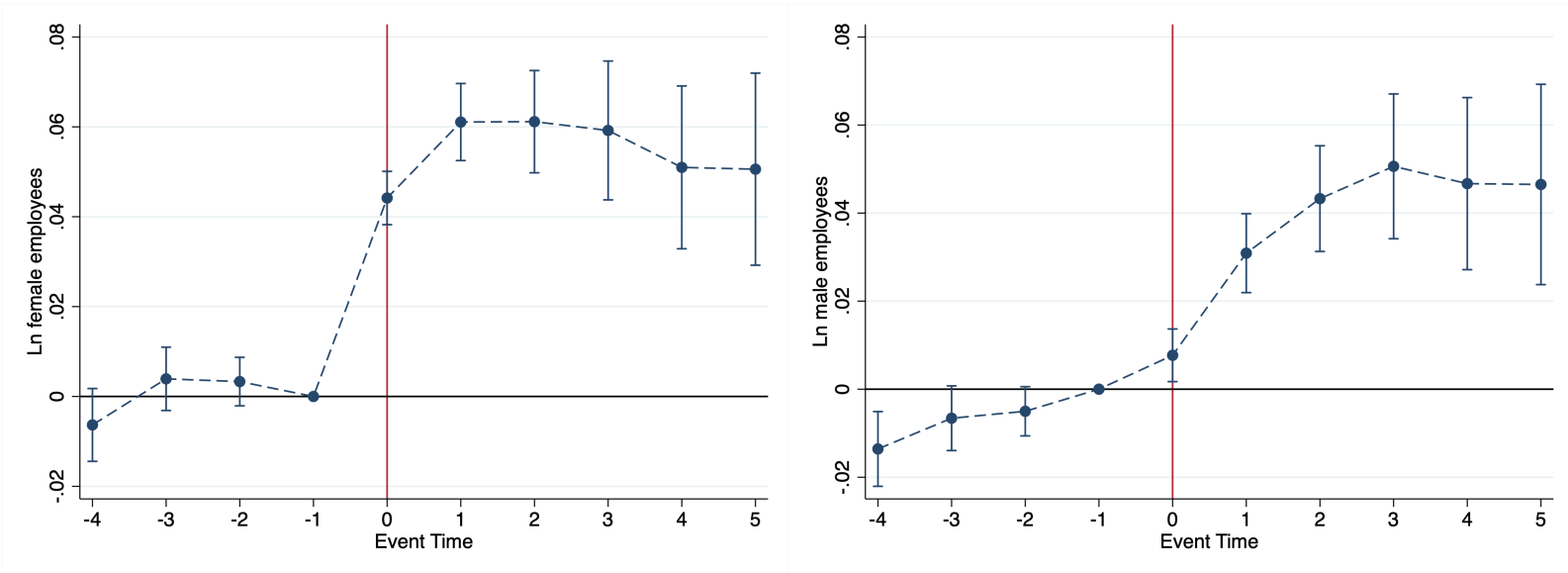
Firms grow more in size



Ln total number of employees

Back summary

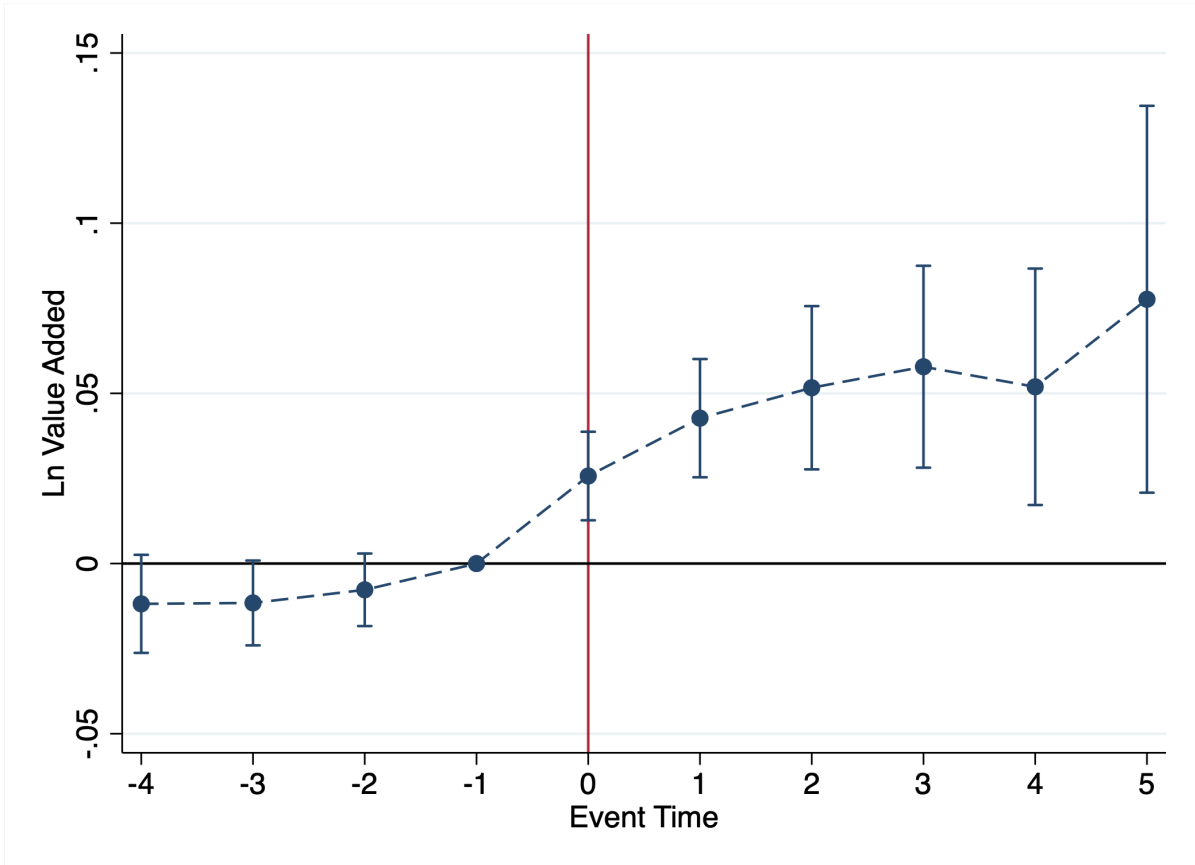
Firms grow more in size both through female and male employees



Ln total number of female (left) and male (right) employees

Back summary

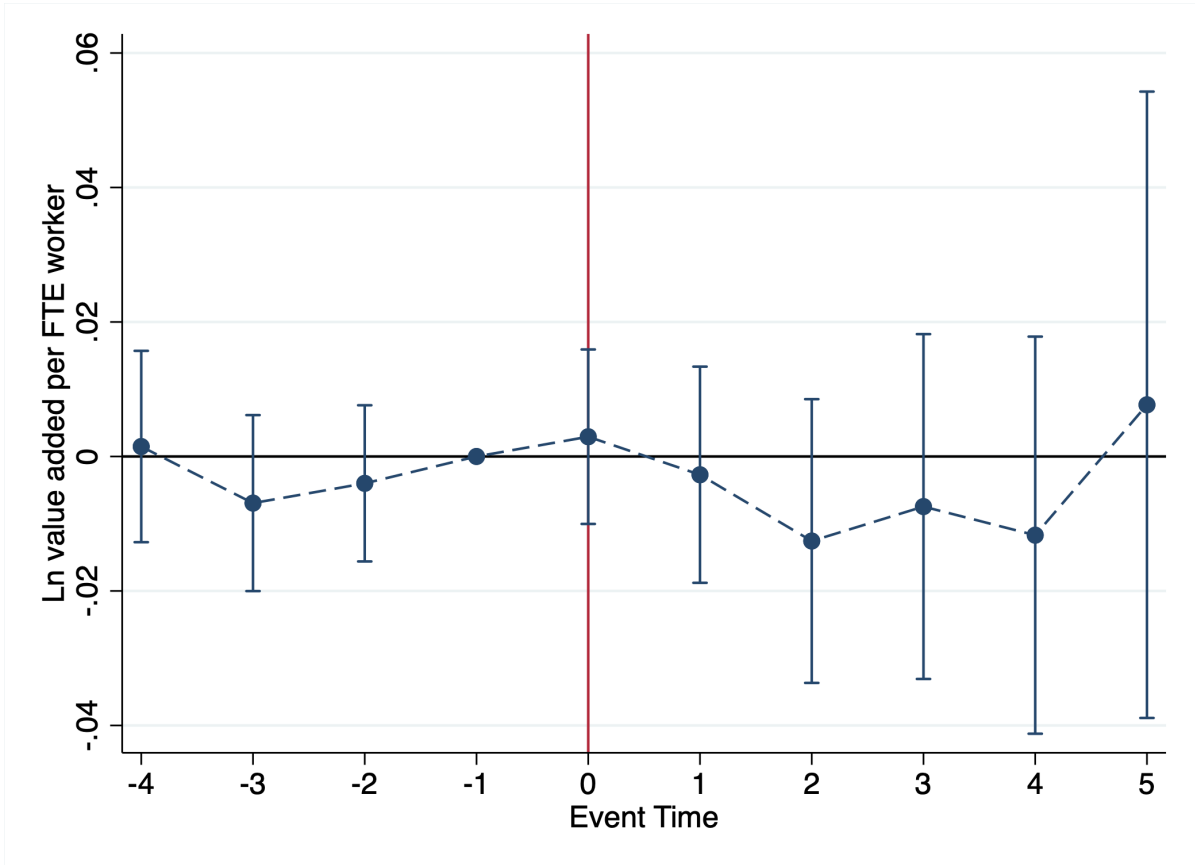
Value added increases



Ln value added

Back summary

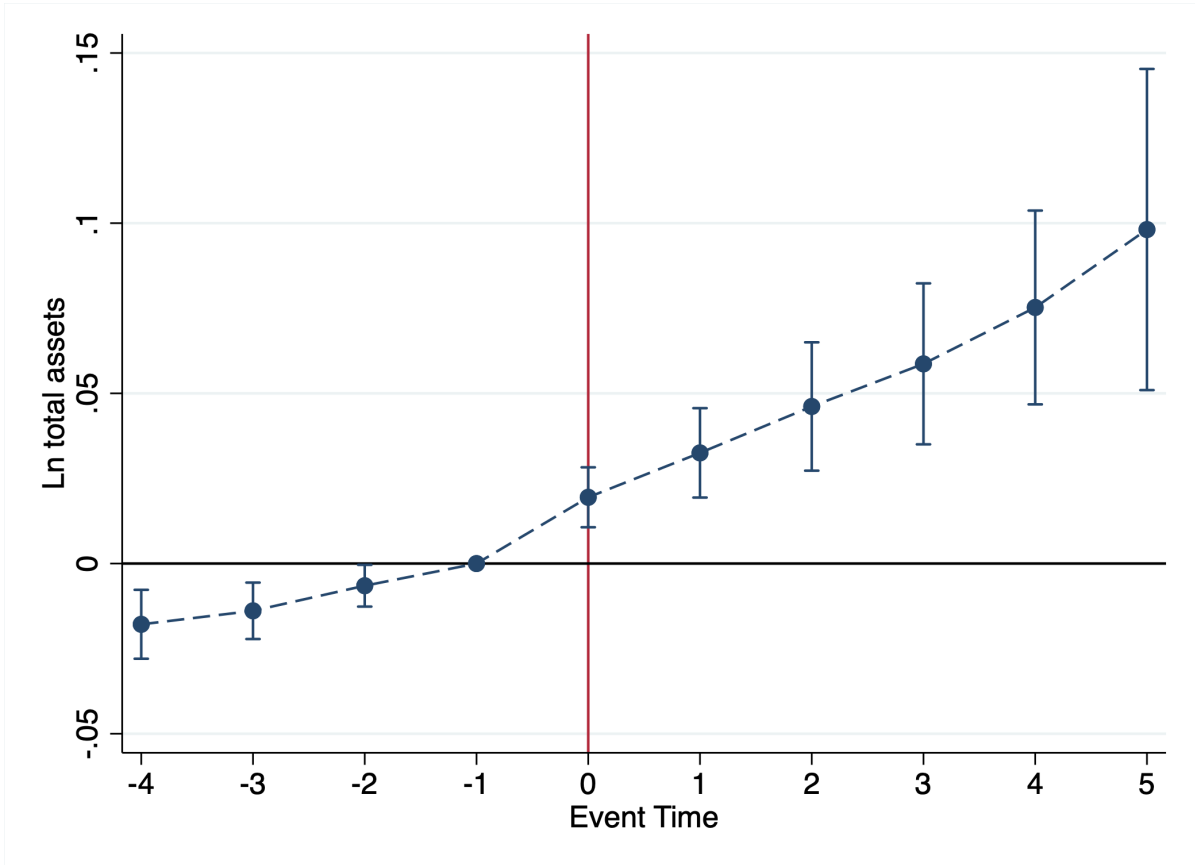
Value added per FTE workers does not



Ln value added per FTE worker

Back summary

Assets increase



Ln total assets

Back summary

Robustness checks

We perform several robustness checks

- account for province*year-FE and 2-digit industry*year-FE
- account for matched-pair* year FE
- estimate on balanced sample of leads and lags (i.e. early adopters 2013-16)

$\Rightarrow$ Results are robust

Robustness checks II

Active literature on potential bias in DiD designs with staggered treatment adoption in presence of heterogeneous treatment effects (e.g. Borusyak et al. 22, Goodman-Bacon, 2018)

- Baseline: Matching control firm (i.e. estimate dynamic DID) allows us to separately identify calendar date and time to event-FE

Additional checks:

- Apply alternative estimator by Sun and Abraham (2021) to account for heterogeneity of treatment effects across adoption years
- Restrict to sample of treated firms: Apply Sun and Abraham (2021) estimator to **sample of treated firms only**

$\Rightarrow$ Results are robust Back flows Back stock