Job Loss and Job Prospects: Estimating the Impact of Displacement on Job Security

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Introduction

"Scarring" effects of unemployment:

- Lasting mark in terms of wages and earnings (Ruhm, 1991; Jacobson et al., 1993; Arulampalam, 2001)
- Increased likelihood of repeated unemployment spells (Gregg, 2001; Schmillen and Umkehrer, 2017)

Recursive unemployment may be linked to post-displacement occupations' intrinsic job security:

- Job ladder models (Pinheiro and Visschers, 2015; Jarosch, 2023)
- Role of the occupational-sorting process after displacement underexplored

Underlying idea: displacement $\Longrightarrow$ labor market of limited opportunities

- Workers can only compete for less desirable occupations

$\rightarrow$ Do these occupations feature diminished job security?

What I do: data

Research question:

→ Does displacement lead to a decline in job security associated with the occupations found by dismissed individuals after displacement?

I propose a new measurement of sector-specific **occupational job security**:

- Exploiting key information included in the data
  - separation reason
  - hiring and separation dates
- **Outcome measures**
  1. *unemployment risk*
  2. *expected tenure*

What I do: methodology

I estimate the effect of displacement on the job security associated with the occupations matched by dismissed individuals after the layoff event using:

- Difference-in-differences analysis
- **Collective dismissals** as exogenous shocks
  - new instrument $\longrightarrow$ previously used labor demand shocks (mass layoffs, firm closures)
- **Staggered treatment timing** defining treatment and control groups
  - new identification $\longrightarrow$ wrt the standard approach using propensity score matching procedures

What I find

Main findings:

Being displaced leads to a 13% decline in job security attached to post-displacement occupations wrt to pre-displacement averages:

- Unemployment risk increases by about 2.38 percentage points
- Expected tenure decreases of approximately 156 days ($\sim$ 5 months)

Heterogeneous effects:

- Larger and more persistent for women
- Larger and more persistent in the North
- More persistent for lower-educated individuals

However, large CIs do not allow for establishing statistically significant differences.

Literature and contribution

Channels:

- Human capital models (Mincer and Ofek, 1982; Pissarides, 1992)
- Stigma/bad signal (Vishwanath, 1989; Gibbons and Katz, 1991; Omori, 1997)
- Match effects (Lachowska et al., 2020)
- Job ladder models

For simplicity, assume occupations only differ along two dimensions, complementary to each other:

a) Compensation
b) Job security

Previous literature investigated the effect of displacement on b by looking at individual probabilities of becoming unemployed once again, not as a feature of the occupation itself:

- Causal effects of displacement on occupational job security yet to be empirically estimated

Data and measurement

Data

Source, Campione Integrato delle Comunicazioni Obbligatorie (CICO):

- Sample of administrative data including workforce variations (i.e., hirings, firings, contract conversions)
- $\approx$ 22M observations and $\approx$ 4M individuals working in Italy
- Period covered $\longrightarrow$ 2010-2022.

Each observation contains...

- ... information on work spells' characteristics, such as:
  - $\rightarrow$ *separation reason*
  - $\rightarrow$ *hiring and termination dates*
  - $\rightarrow$ *occupations and economic sector*
  - contract type (temporary or permanent, part-time or full-time)
  - work region
- ... information on workers' characteristics:
  - year of birth
  - gender
  - education

Extraction of the sample of interest

Steps:

- Restructure dataset to yearly panel, each year reporting ids' main job (similar to Card et al., 2013)
- Extract "treated" individuals (ids who experienced a collective dismissal once)
- Keep only individuals of $30 \leq age \leq 54$
- Extract a balanced dataset (excluding workers with gap years $\implies$ no long-term unemployed)
- Exclude workers
  - In treated cohorts in the first three years of the panel (to inspect pre-trends)
  - Who found a new job before their prior contract's official termination with the dismissing firm
  - Who were dismissed from a secondary job
  - Who returned to the same firm that dismissed them

Final sample of treated units: 8256 individuals, 107328 observations.

sensitivity 120 days window

Measurement of sector-occupation job security

Job security indicators are obtained by computing within 6-digit sectors and occupations:

1. The probability of involuntary dismissal (L), using info on voluntary and involuntary job terminations
2. The average length of tenure (d), using info on hiring and separation dates

Then, average across sectors (j) and occupations (k) to get a single measure of job security for each sector-specific occupation:

1. $Unemployment\ risk = \frac{\left(\frac{\sum L_{itj}}{N_j} + \frac{\sum L_{itk}}{N_k}\right)}{2}$
2. $Expected\ tenure = \frac{\left(\frac{\sum d_{ij}}{N_j} + \frac{\sum d_{ik}}{N_k}\right)}{2}$

Low job security occupations: day laborers in the farming sector; professionals in the cinema industry.
High job security occupations: professionals in the banking sector; engineers in the automotive sector.

Validation of occupational job security measures

	Nonemployment days	
Variables	Unemployment risk	Expected tenure
Worse outcome after treat	4.59***	3.05***
	(0.50)	(0.51)
Time invariant observables	✓	✓
Year dummies	✓	✓
Constant	22.126***	22.309***
	(3.72)	(3.73)
Observations	50,561	50,561
R-squared	0.015	0.014

***p<0.01, **p<0.05, *p<0.1

Workers who found an occupation featuring a worse unemployment risk (*expected tenure*) wrt to the pre-displacement occupation suffer on avg 4.6 (*3.05*) more unemployment days. Compared to the average worker who moves to a more secure occupation:

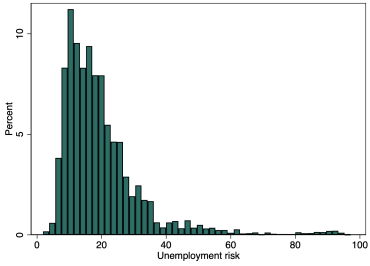
- unemployment risk $\rightarrow \approx 32\% \uparrow$ unemployment days
- expected tenure $\rightarrow \approx 20\% \uparrow$ unemployment days

Discussion of indicators

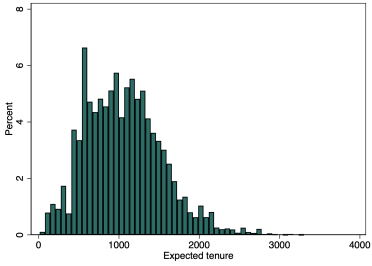
Why focus on heterogeneity in job security at the occupational level?

- Entry-level occupations → less stringent employment protection laws and diminished union protection
- Unions' presence stronger in certain sectors and occupations
- Some occupations may be more at risk of being offshored or replaced by technological change
- Seasonal and temporary work more prevalent

Histogram: unemployment risk



Histogram: expected tenure



Identification and empirical strategy

Identification strategy

Treatment $\longrightarrow$ being displaced as a result of a collective dismissal procedure

Collective dismissal procedures:

- Apply to firms with 15+ employees who intend to dismiss at least five employees within 120 days
- Are firm-level shocks similar in nature to mass layoffs (30% annual reduction in a firm's workforce)... but on average smaller in size!
- Spillover effects at the local or sectoral level (Cederlöf, 2021) less of a concern

Methodology: event-study difference in differences (staggered treatment adoption)

Novel approach $\rightarrow$ using not-yet-treated units as a control group rather than never-treaded ones

- Better comparison wrt never-treated units
- Unobserved workers' heterogeneity implicitly netted out

sensitivity multiple treated

Empirical model

Event-study, using the estimator proposed in Callaway and Sant'Anna, 2021:

$$y_{itg} = \sum_{e, e \neq -1} \beta_e \times D_{it} \times \mathbb{1}(t = g + e) + \pi X_i + \varepsilon_{itg}$$

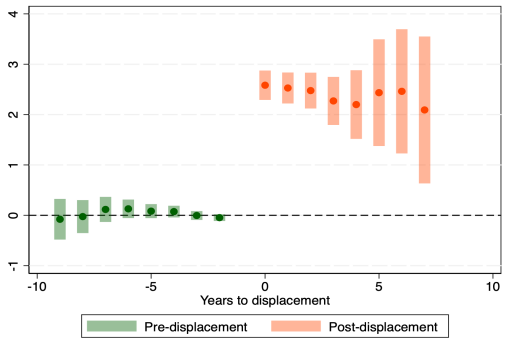
- y is the unemployment risk or expected tenure attached to the occupation matched by worker i of cohort g (cohorts are defined by the treatment year) in year $t \in \{2010, ..., 2022\}$
- D is a dummy taking value 1 from the year the effect of the event unfolds and onwards, and zero otherwise
- e is event time ($e = 0$ is first year of treatment)
- X are pre-treatment ($e = -1$) time-invariant covariates $\rightarrow$ age, gender, education, full-time and temporary job dummies, macro-region of work (North, Center, and South of Italy)

Standard errors clustered at the worker level.

I replicate the analysis using a stacking by event approach as in (Deshpande and Li, 2019; Cengiz et al., 2019).

Results

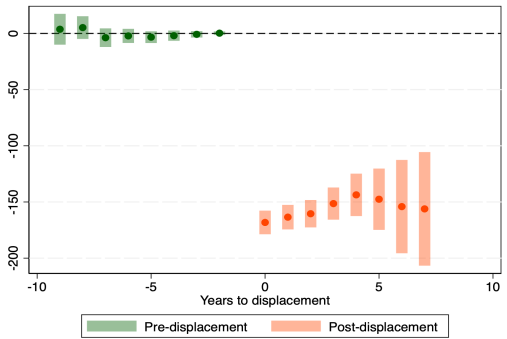
Results: unemployment risk



- Pre-treatment coefficients are close to zero and not significant
- → Parallel trends assumption holds
- Post-treatment estimates range between 2.58 pp and 2.09 pp
- Average post-treatment effect: ↑ 2.38 pp
- 13% rise over pre-displacement mean value

results using never-treated units as a control group | results unconditional specification

Results: expected tenure



- Pre-treatment coefficients are close to zero and not significant
- → Parallel trends assumption holds
- Post-treatment estimates range between -168 and -144 days
- Average post-treatment effect: ↓156 days
- 13.4% decline wrt pre-displacement mean value

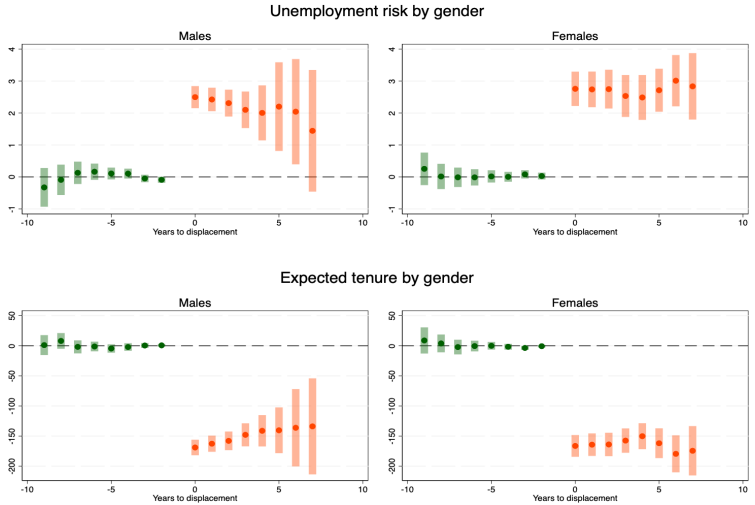
results using never-treated units as a control group | results unconditional specification

Heterogeneous effects

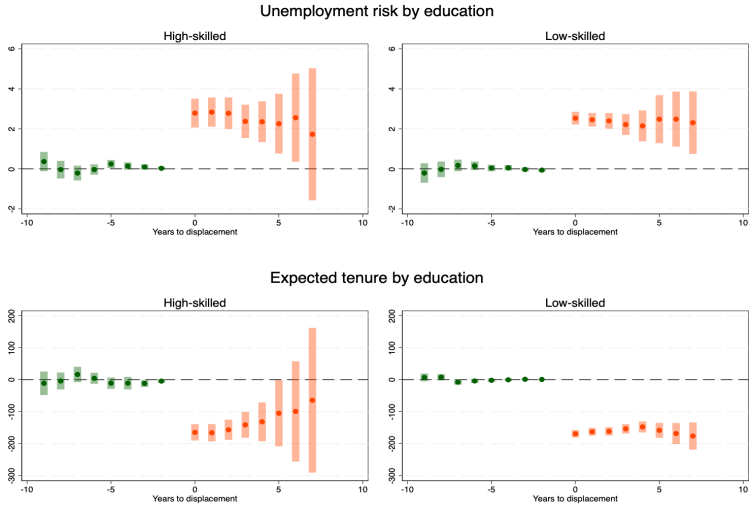
Are these effects homogeneous?

- Gender
  - Women sort into jobs with lower wage premia (Card et al., 2016) but reduced risk of dismissal (Wilkins and Wooden, 2013)
  - Job loss $\implies$ harsher and more persistent consequences on women (Illing et al., 2021)
  - Does displacement erode women's edge over men in terms of occupational job security?
- Level of education
  - Hypothesis $\rightarrow$ high-skilled workers might find it easier to readjust to new occupations
- Region of work
  - Workers who experience "nonemployment" when few workers are nonemployed are more severely stigmatized (Omori, 1997)

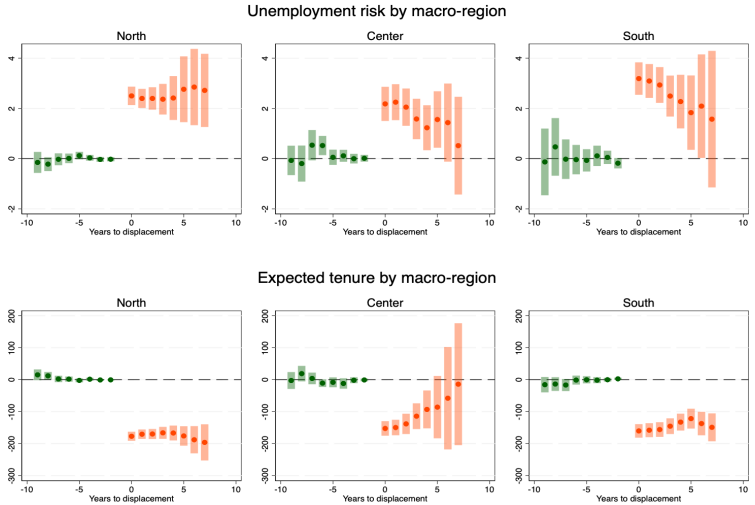
Heterogeneity - gender



Heterogeneity - education



Heterogeneity - Macro-region



Robustness and placebo

The main results hold after being tested with a battery of robustness checks and sensitivity analyses:

- Excluding sectors with few observations (in the original dataset) to construct outcome vars — Robustness I
- Computing indicators and results from two separate samples — Robustness II
- Excluding outlier obs in the outcome vars — Sensitivity I
- Considering individuals from all working ages — Sensitivity II
- Adding regional unemployment rates

Placebo:

- Re-assignment of treatment to 3 years earlier — Placebo I
- Re-assignment of treatment to 2 years earlier — Placebo II

Conclusions

Conclusions

Purpose of this study:

- Shedding light on recursive unemployment by examining displaced workers' occupational sorting

Findings in this study:

- Being displaced leads displaced workers to match occupations featuring...
  - a heightened probability of unemployment of around 2.38 pp
  - a lower expected tenure of around 156 days
- ...a ≈13% decrease in job security wrt to pre-displacement averages for both indicators
- Effects seem persistent after 8 years since the layoff
- Heterogeneous effects are detected, but no conclusive claim can be made due to overlapping CIs

Key insights:

i Occupations differ substantially in inherent risk of dismissal

ii Empirical assessment of the fall in the job ladder caused by displacement in terms of job security

iii Potential labor market demand-side deficiencies driving negative and long-lasting effects of job loss

Backup slides

Summary statistics

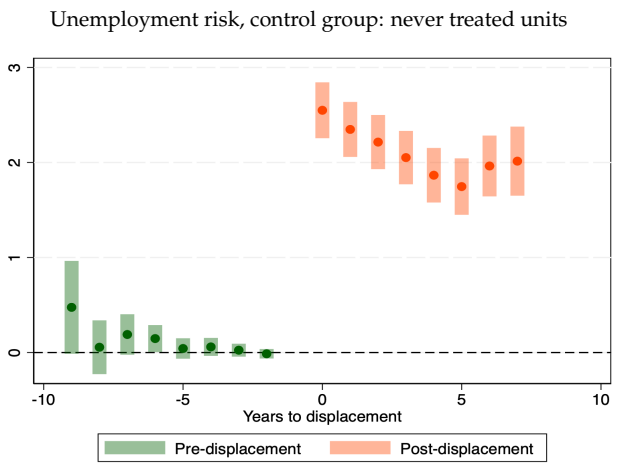
Workers in the sample are mostly employed in northern Italy ($\approx$ 58.4% of the total), have a high school diploma ($\approx$ 52%), are male ($\approx$ 67%), and, on average, are about 42 years old.

Mean value of the outcome variables in pre-treatment years

	Unemployment risk	Expected tenure
Region of work		
North	16.78	1239.97
Center	19.83	1110.45
South and Islands	21.62	999.10
Education		
None or elementary school	24.54	881.89
Middle school	20.89	1047.59
High school	17.57	1204.88
University degree or more	16.30	1254.17
Gender		
Male	18.53	1166.52
Female	18.17	1156.92

Results: unemployment risk (control group: never-treated)

back



Results: unemployment risk unconditional

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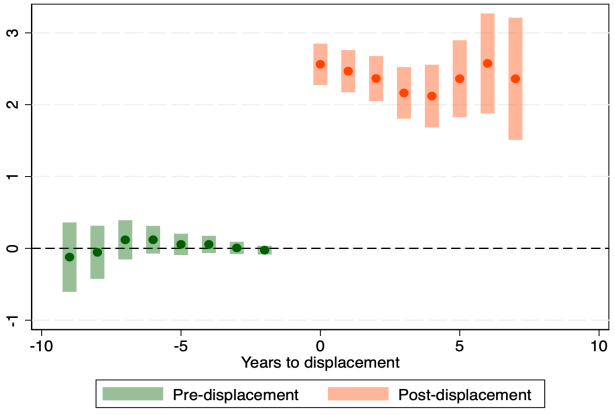
Unemployment risk, control group: later-treated units



Results: expected tenure (control group: never-treated)

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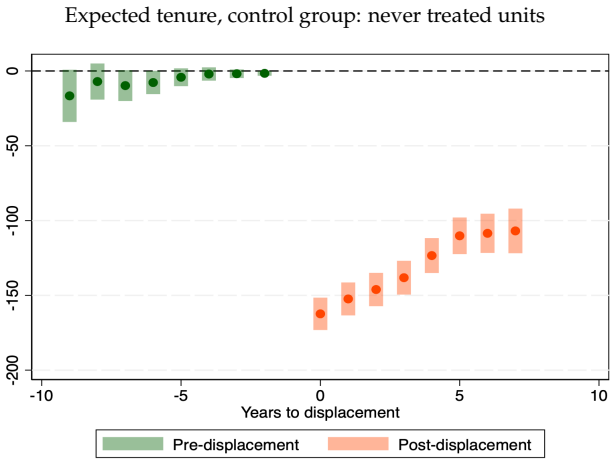

Results: expected tenure unconditional

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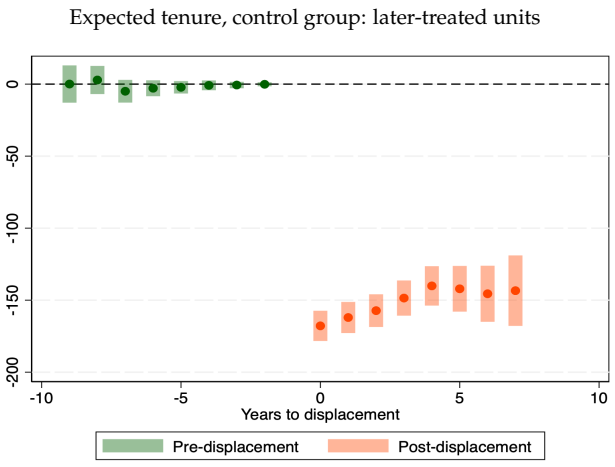

Summary table of main results

Results: Unconditional regression, stacking à la Cengiz et al. (2019) - control group: not-yet-treated units

	Unemployment risk	Expected tenure
Tm11	-0.039	6.707
Tm10	-0.201	4.639
Tm9	-0.188	14.375**
Tm8	-0.147	17.231***
Tm7	0.213	0.652
Tm6	0.239**	-3.220
Tm5	0.072	-1.683
Tm4	0.017	0.166
Tm3	0.012	-0.615
Tm2	-0.023	-0.153
Tp0	2.567***	-167.119***
Tp1	2.437***	-160.350***
Tp2	2.297***	-155.763***
Tp3	2.161***	-150.902***
Tp4	2.159***	-146.683***
Tp5	2.269***	-147.225***
Tp6	2.334***	-146.611***
Tp7	2.260***	-145.509***
Tp8	2.294***	-145.011***
Observations	279,924	279,924

Robustness I

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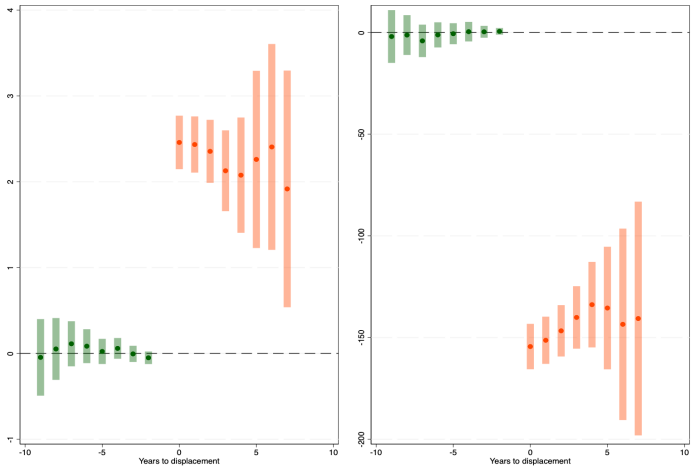
Unempl. risk (left) and expected tenure (right), control group: later-treated units



Robustness II

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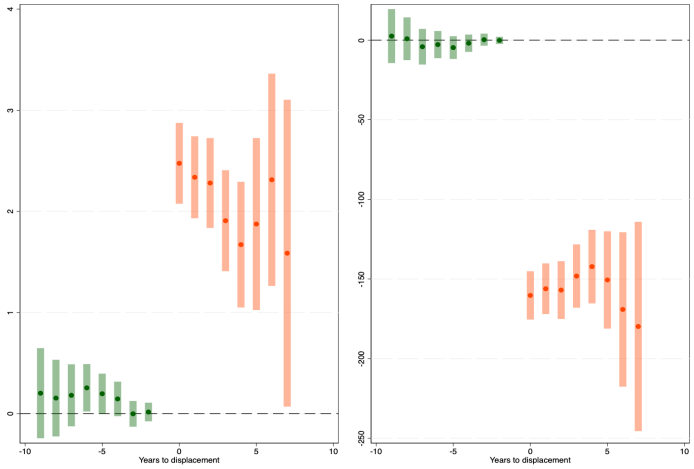
Unempl. risk (left) and expected tenure (right), control group: later-treated units



Sensitivity I

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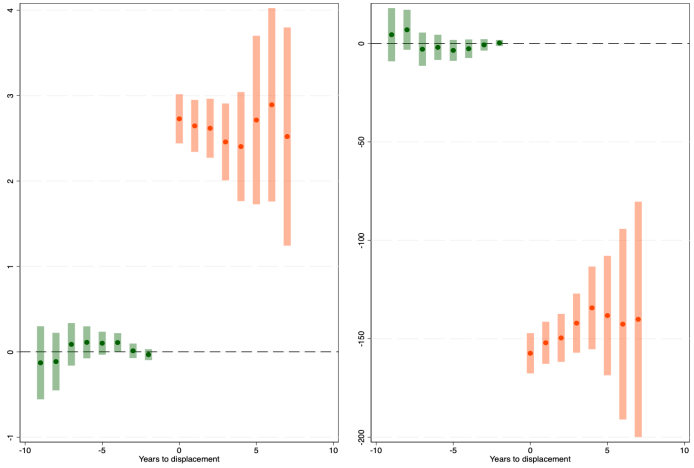
Unempl. risk (left) and expected tenure (right), control group: later-treated units



Sensitivity II: Including young and senior workers

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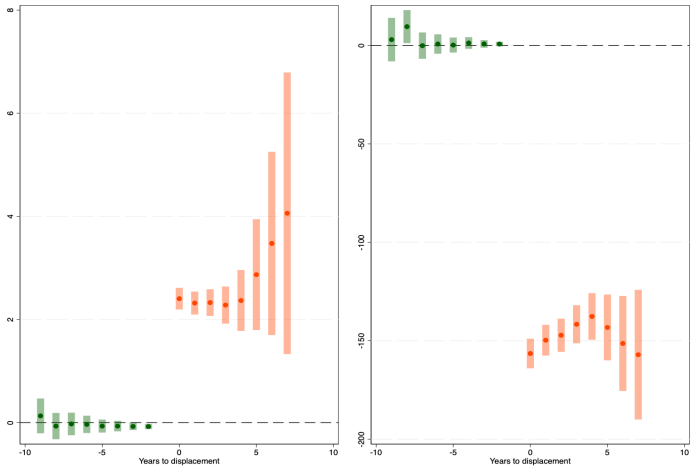
Unempl. risk (left) and expected tenure (right), control group: later-treated units



Sensitivity III: 120 days window

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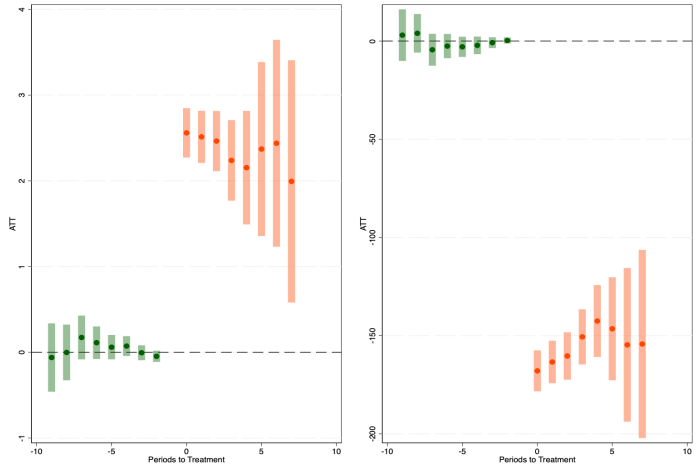
Unempl. risk (left) and expected tenure (right), control group: later-treated units



Sensitivity IV: including individuals treated more than once

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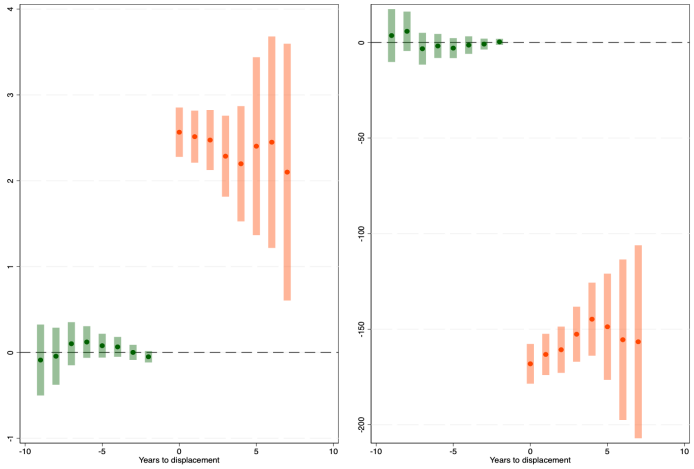
Unempl. risk (left) and expected tenure (right), control group: later-treated units



Placebo: reassignment of treatment to three years earlier

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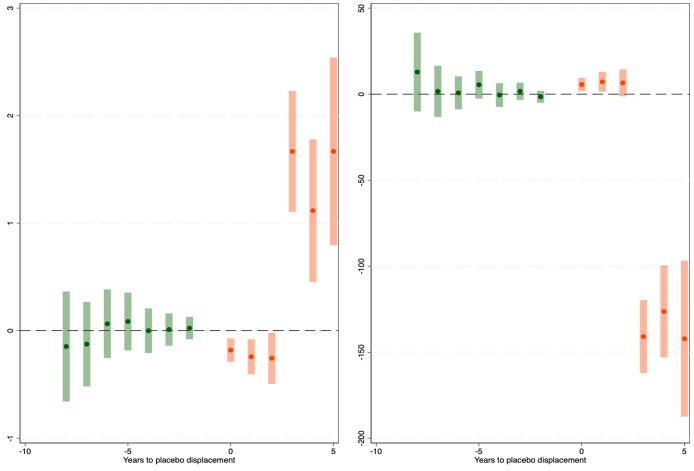
Unempl. risk (left) and expected tenure (right), control group: later-treated units



Placebo: reassignment of treatment to two years earlier

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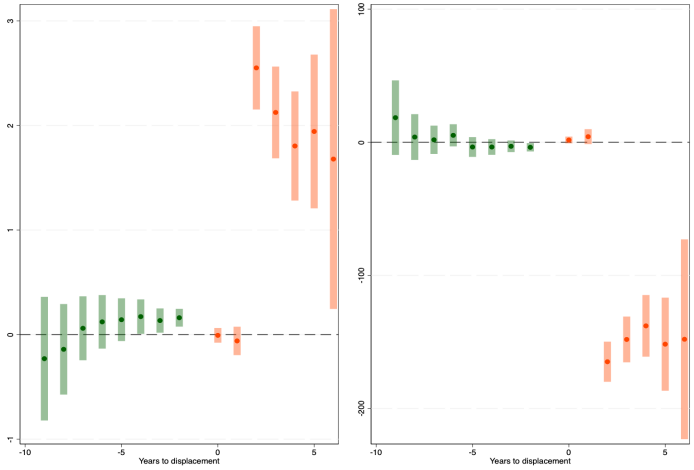
Unempl. risk (left) and expected tenure (right), control group: later-treated units



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