Longer careers: A barrier to hiring and coworker advancement?

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September 16, 2022

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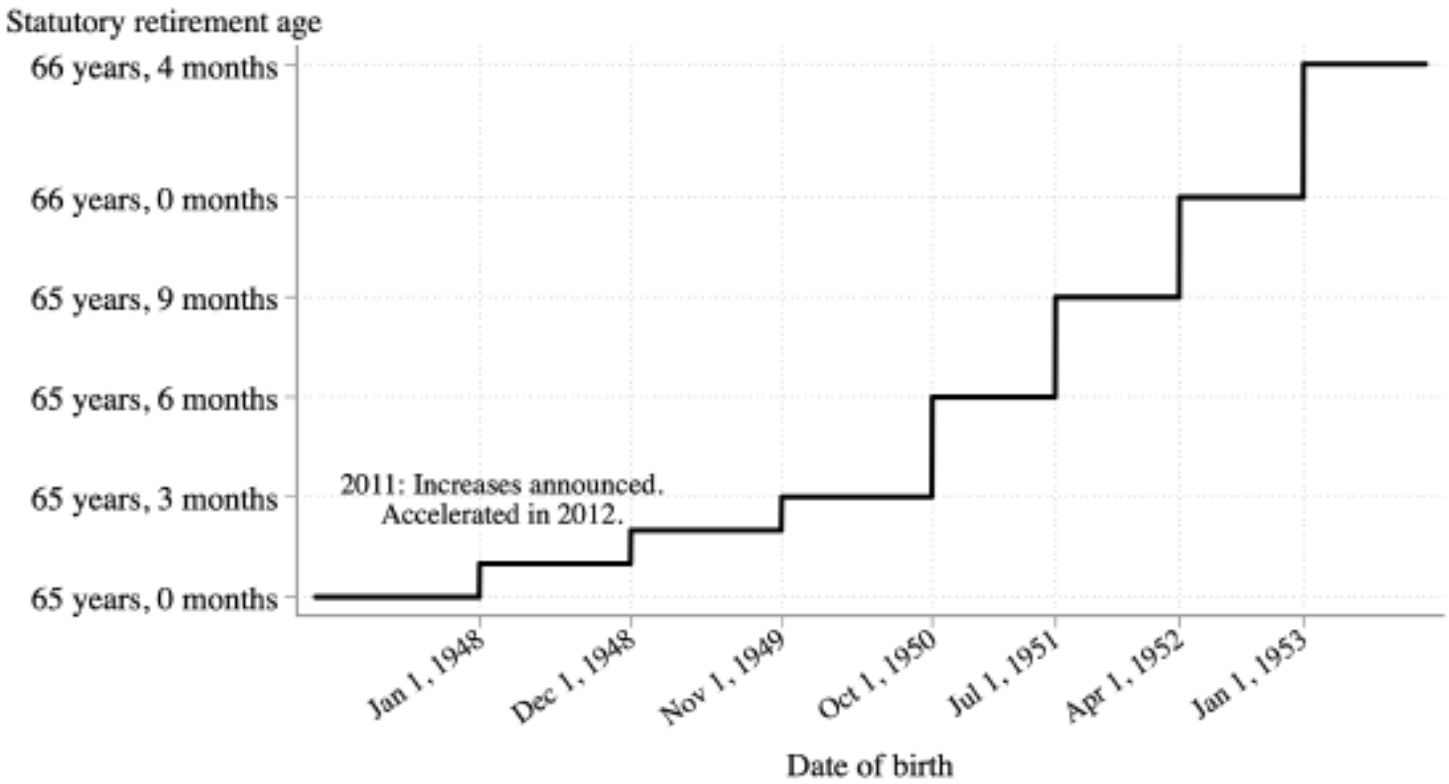
  3. Overall economic benefits may be smaller than anticipated
- Yet there is limited empirical evidence to date

What we do (1/2)

- We study a Dutch reform of the Statutory Retirement Age (SRA)



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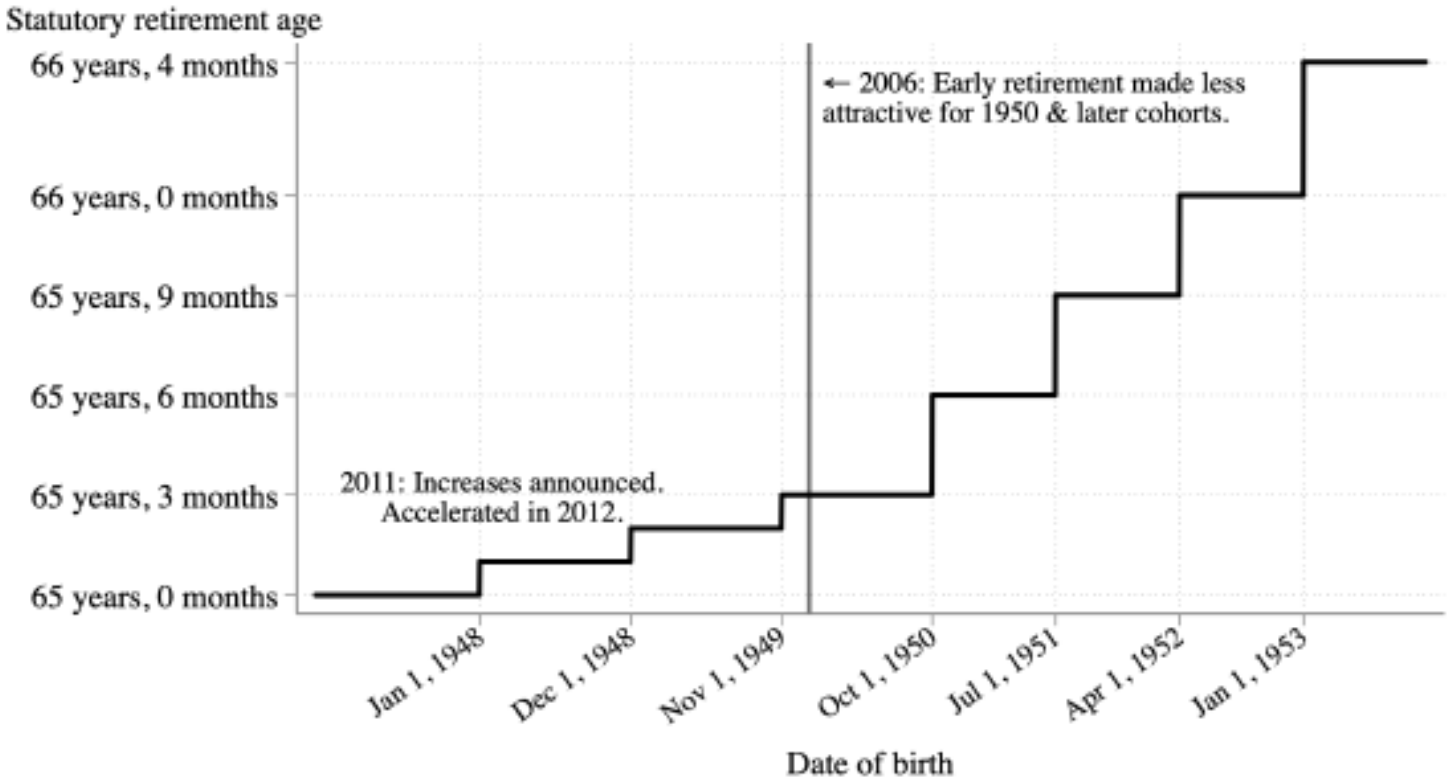

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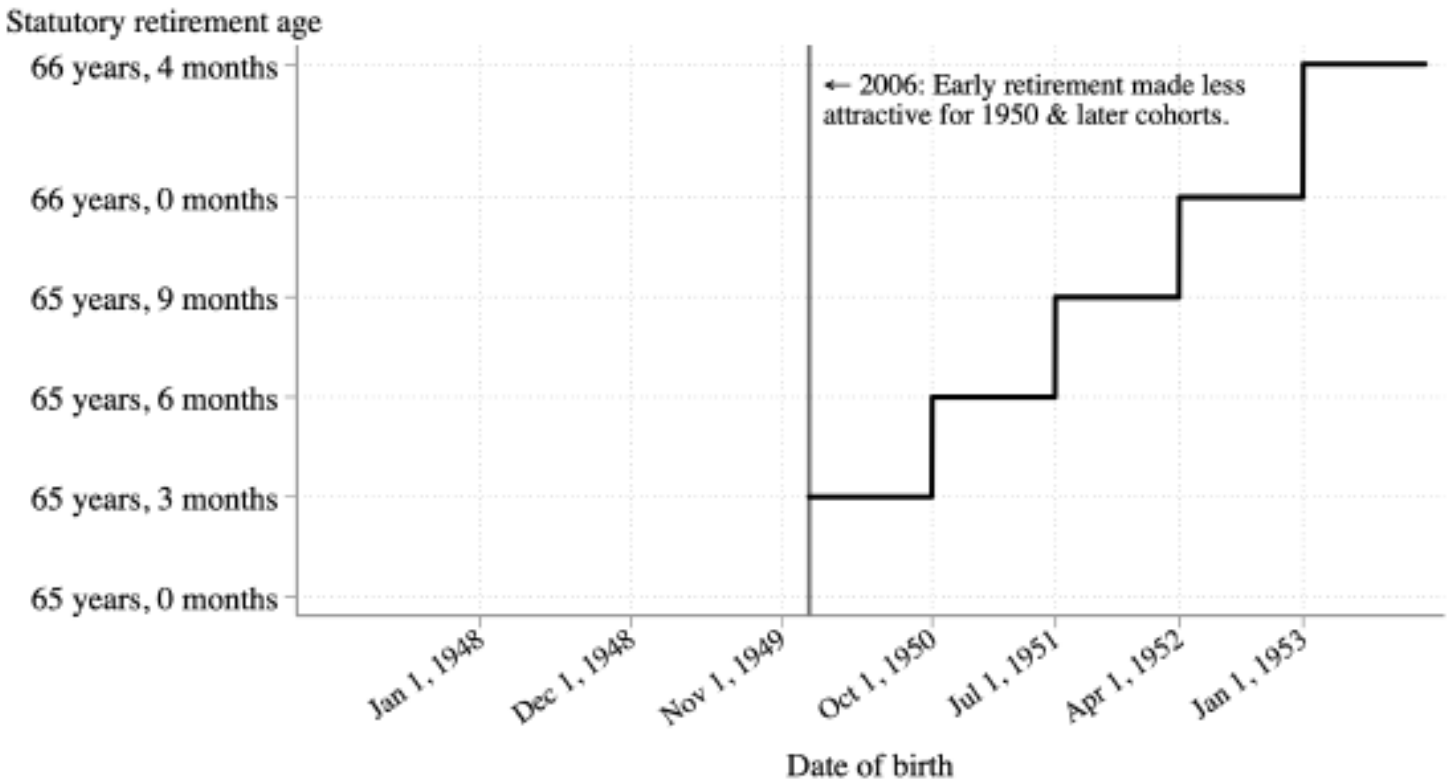

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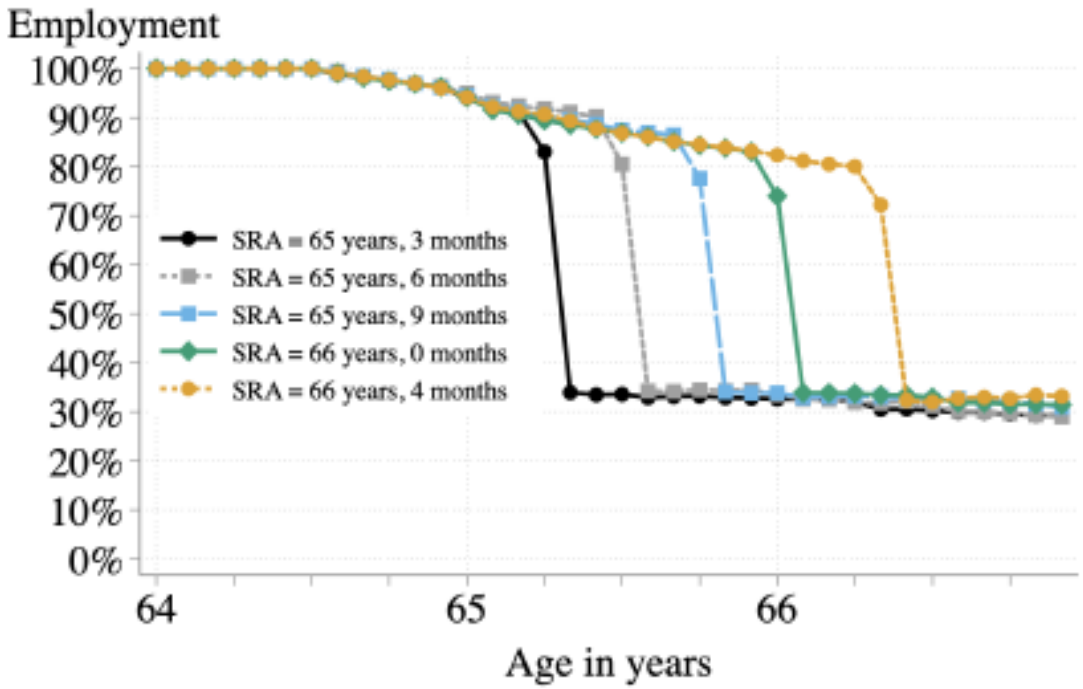

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- Use monthly linked employer-employee data to identify affected workers and their firms/coworkers
- Implement two new and complementary identification strategies:
  1. Event-study model around a focal worker's SRA
     - Hiring rates at their firm increase around the SRA
     - Increase in coworkers' earnings in the SRA month, driven by promotions
  2. Stacked DiD model of SRA increases in event time
     - Delay in hiring close to the SRA
     - Delay and decrease in coworkers' earnings/promotions

Related literature

Emerging literature on career spillovers within firms:

- deaths (Jäger and Heining, 2019; Illing & Schwank, 2022)
- parental leave (Brenoe et al., 2020; Ginja et al., forth.; Gallen, 2019; Johnsen et al., 2020; Schmutte and Skira, 2022; Huebener et al., 2022)
- **pension reforms** (Boeri et al., 2021; Bianchi et al., forth.; Carta et al., 2021; Eckrote-Nordland, 2021; Hut, 2019)

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Our contribution: Study a new context with sharp policy variation, better data and a more representative reform

- Data is monthly $\Rightarrow$ can pinpoint affected months for older workers and estimate effects on firms/coworkers in event time
- Information on work hours $\Rightarrow$ can study intensive margin responses and changes in hourly wages
- Reform phased in gradually across cohorts and pre announced

Conceptual framework: Set up

- We consider a simple three-period model of firms' labor demand to make predictions about the effects of anticipated retirement delays
- Firm maximizes its combined profits in the three periods
- Output depends on labor inputs: $F_t\left(\overline{H_{t,O}}, H_{t,I}, H_{t,N}\right)$
- Labor market frictions: (i) employment protection for older workers; (ii) hiring costs; (iii) adjustment costs; (iv) firing costs
- New hires are young and become incumbents if they stay with firm
- Younger workers stay with the firm with exogenous probability δ
- Firm is a price-taker in input (w_O, w_Y) and output markets $(p = 1)$

Conceptual framework: Firms' maximization problem

$$\max_{H_{1,N},H_{2,N},H_{3,N},i_2,i_3} \quad \underbrace{F_1\left(\overline{H_{1,O}},\overline{H_{1,I}},H_{1,N}\right)+F_2\left(\overline{H_{2,O}},H_{2,I},H_{2,N}\right)+F_3\left(\overline{H_{3,O}},H_{3,I},H_{3,N}\right)}_{\text{revenue}}$$

$$-\underbrace{\sum_{t=1}^{3}\left\{w_O\overline{H_{t,O}}+w_Y(H_{t,I}+H_{t,N})\right\}}_{\text{labor costs}}-\underbrace{\sum_{t=1}^{3}\left\{\frac{a_N(H_{t,N})^2}{2}\right\}}_{\text{hiring costs}}$$

$$-\underbrace{\sum_{t=2}^{3}\left\{\frac{a_I(i_t)^2}{2}\right\}}_{\text{adjustment costs}}-\underbrace{\sum_{t=2}^{3}\{1(i_t<0)T|i_t|\}}_{\text{firing costs}}$$

subject to:

$$H_{t,N},H_{t,I}\geq 0 \text{ for } t=1,2,3$$

$$H_{t,I}=\delta(H_{t-1,I}+H_{t-1,N})+i_t, \text{ for } t=2,3$$

Comparative statics

- At baseline, we assume that many older workers retire in period 1
- We consider the impacts of a pre-announced policy change that causes them to retire in period 2
- Step 1: Derive FOCs for firms' maximization problem See
- Step 2: Take partial derivatives of the FOCs with respect to $\overline{H_{2,O}}$

Comparative statics

Hiring (pre shock): $$\frac{\partial H^*_{1,N}}{\partial \overline{H}_{2,O}} = \left(F_{1,N;2,O}(\cdot) + \delta F_{2,I;2,O}(\cdot) + \delta^2 F_{3,I;2,O}(\cdot)\right)\left(\frac{1}{a_N}\right)$$

Hiring (mid shock): $$\frac{\partial H^*_{2,N}}{\partial \overline{H}_{2,O}} = \left(F_{2,N;2,O}(\cdot) + \delta F_{3,I;2,O}(\cdot)\right)\left(\frac{1}{a_N}\right)$$

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A note on liquidity constraints

- Baseline model assumes that firms are not liquidity constrained
- If firm is liquidity constrained, a one unit increase in $\overline{H_{2,O}}$ will reduce hours worked by younger workers by $\approx \frac{w_O}{w_Y}$
- $\Rightarrow$ demand for younger workers may fall, possibly across several periods (in addition to the dynamic pattern outlined above)

Background on Dutch pension system

Three pillars:

1. Flat-rate PAYG public pension financed by contributions
   - Individuals start receiving at Statutory Retirement Age (SRA)
   - Employment contracts terminated at SRA unless explicitly renewed
     - Important due to very strong employment protection in Netherlands
   - Monthly payments: €1,226.60 for singles and €838.55 for partnered
2. Firm- and sector-specific pension schemes
   - Can be claimed before the SRA with actuarial adjustment
   - Historically very generous
3. Voluntary savings (relatively unimportant)

Key reforms

Two reforms, both provide cohort variation in retirement incentives:

1. 2006 reform: Early retirement made less generous
   - Affected those born after 31 December 1949
   - Lindeboom & Montizaan (2020): Strong decrease in early retirement

2. **2011/12 reforms**: Gradual increases in the SRA from 65 to 66y4m
   - Atav, Jongen & Rabate (2021): Strong effects on old-age employment; effects concentrated between old and new SRA
   - Affected eligibility from 2013, a period when economy was growing

Data and sample construction

- Linked population register data from Statistics Netherlands
- Backbone: monthly tax-based records of all workers (2006–19)
  - Includes: earnings, hours worked, sector, and worker & firm IDs
- Identify affected firms and construct firm-level outcomes
  - E.g., monthly hiring rates, separation rates, promotion rates
- The IDs are also used to link information from other registers
  - E.g., demographics such as worker's gender, birth year & month

- **Sample:** those born in 01/1950–09/1953 & aged 63–66.99
  - Focus on small-to-medium firms (5–200 workers) with 1 establishment
  - Focus on those with strong labor-market and firm attachment
    - Same employer at ages 63–64.5 and worked >20 hours per week
    - Selection criterion not affected by reform ▸ RD estimates
  - 19,505 unique individuals in 12,159 firms ▸ Descriptives

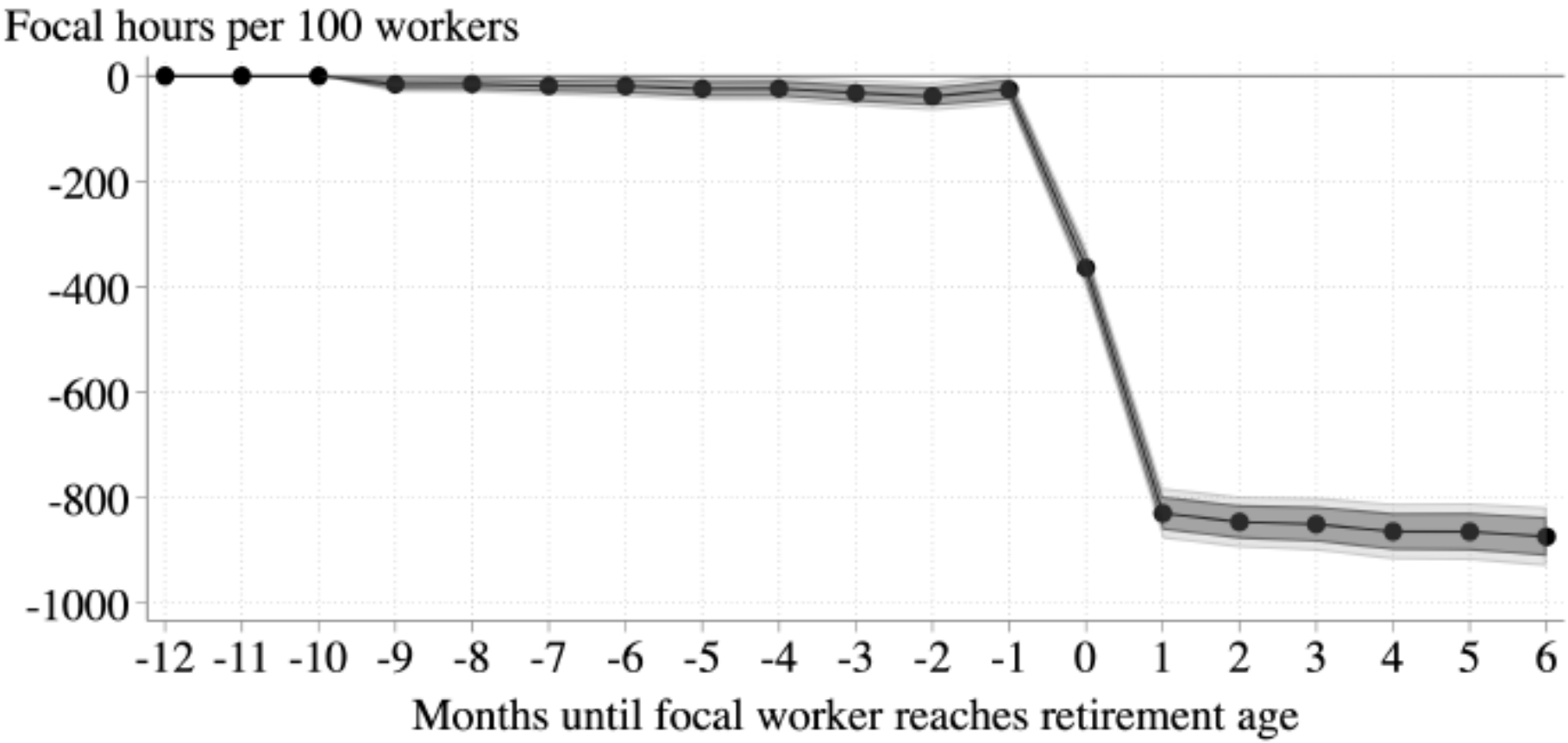
How do firm outcomes evolve around the SRA?

- We start by estimating an event-study to show how firm/coworker outcomes evolve around a focal worker's SRA
- Focus on a tight window around the SRA (event months -12 to +6)
- Estimate the following regressions:

$$y_{it} = \xi_i \left(\alpha + \sum_{\substack{j \\ j \neq \text{ref.}}} \gamma_j 1(\text{ev\_age}_{it} = j) \right) + \text{age}_{it} + \tau_t + \epsilon_{it} \quad (1)$$

  - y_{it}: firm-level outcome (e.g., new hires per 100 workers) linked to focal worker i in month-year t
  - age_{it} and τ_t: age-in-month and month-year fixed effects
  - γ_j terms measure the effect of the focal worker's proximity to the SRA on y_{it}, relative to the reference period (event months -12 to -10)
  - $\xi_i = \frac{10}{\text{firmsize}_i}$
  - Standard errors clustered by firm

Event study: Focal workers' hours



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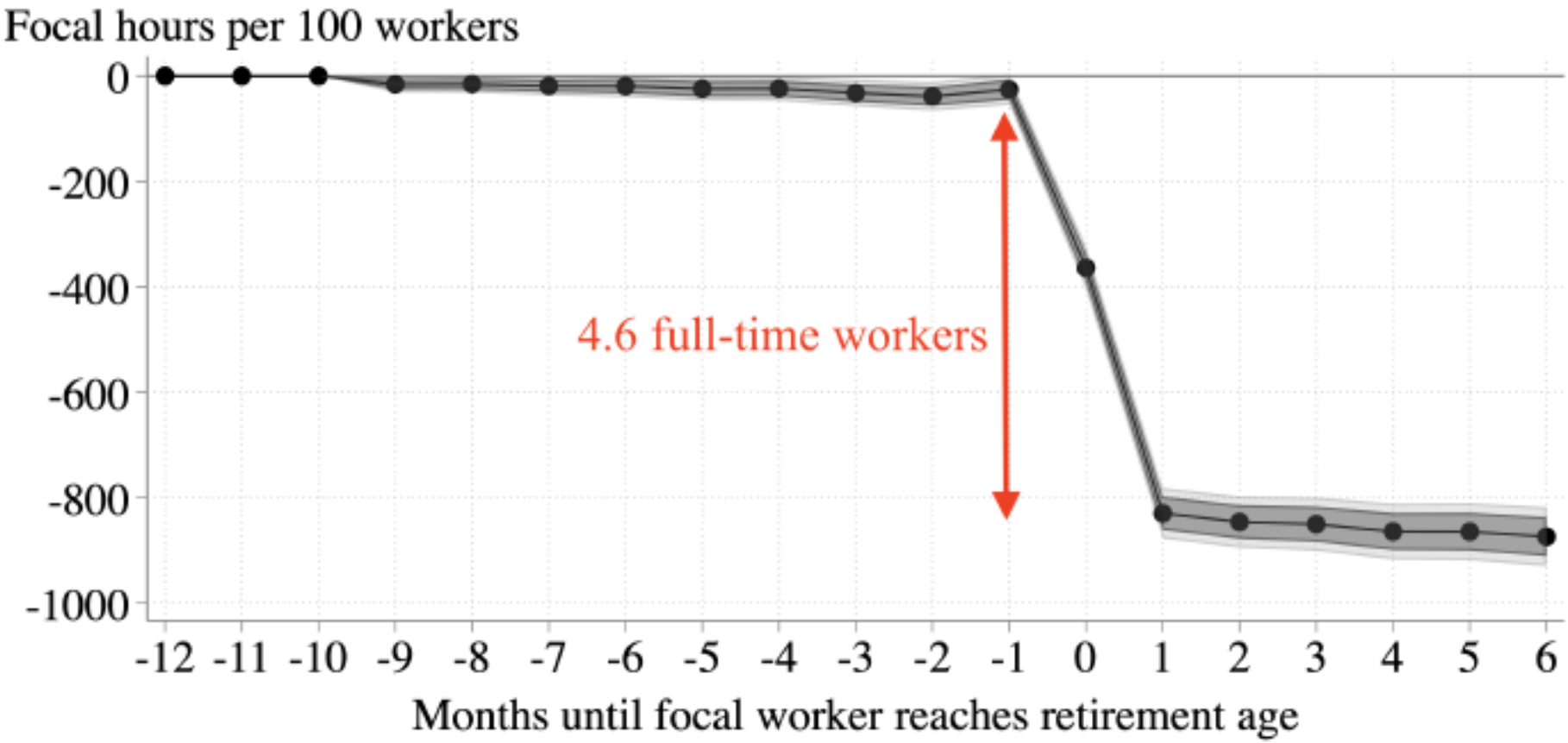
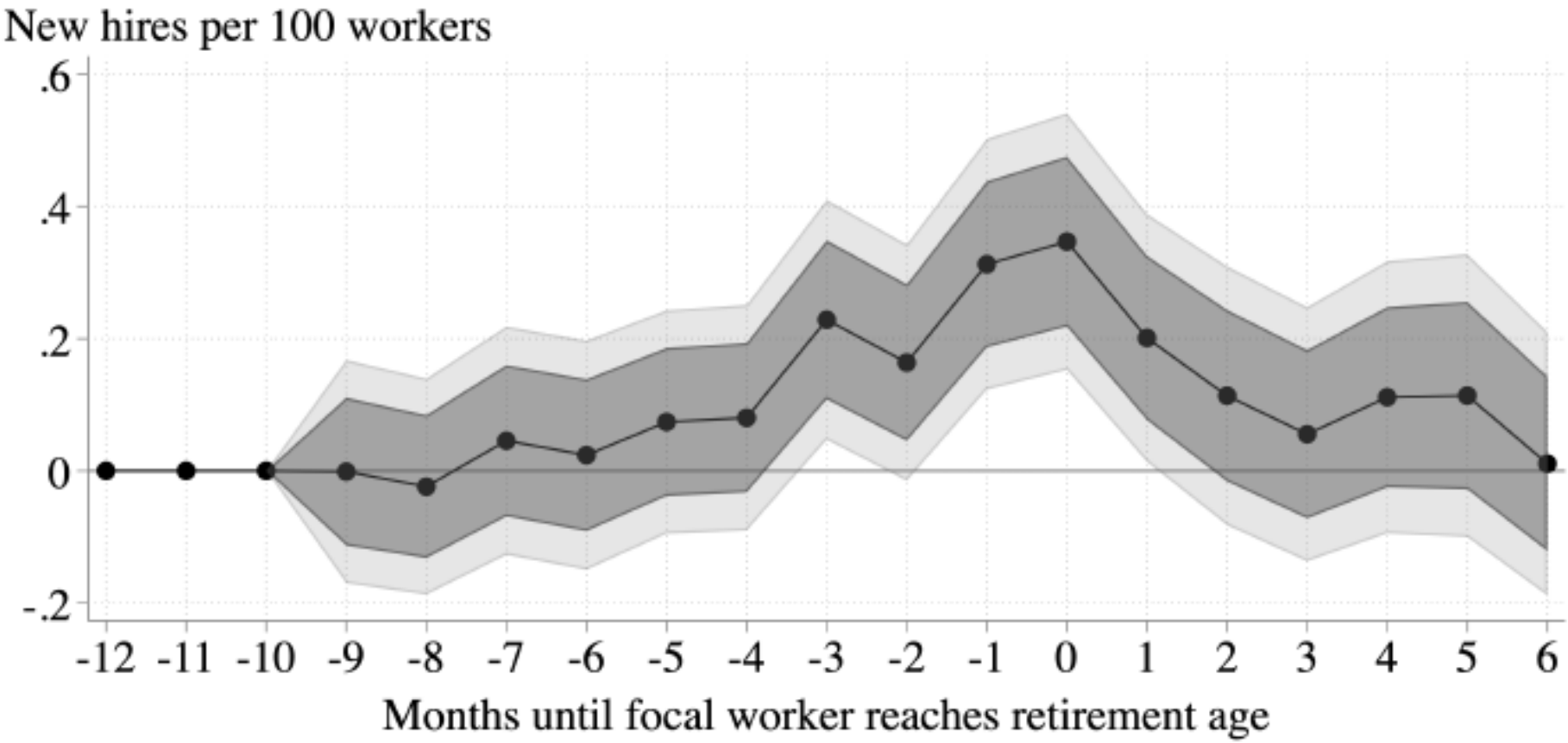


Event study: Hiring rates



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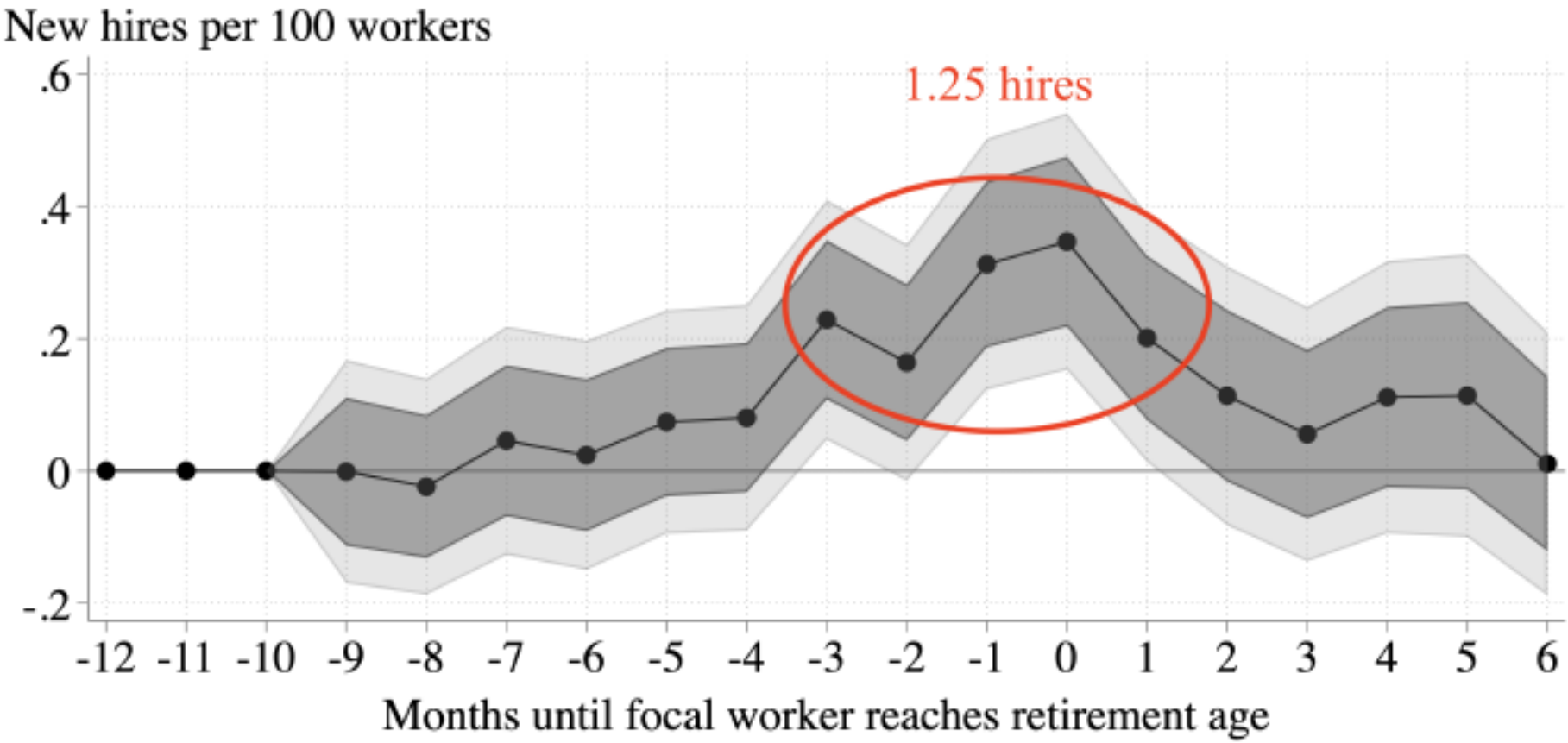
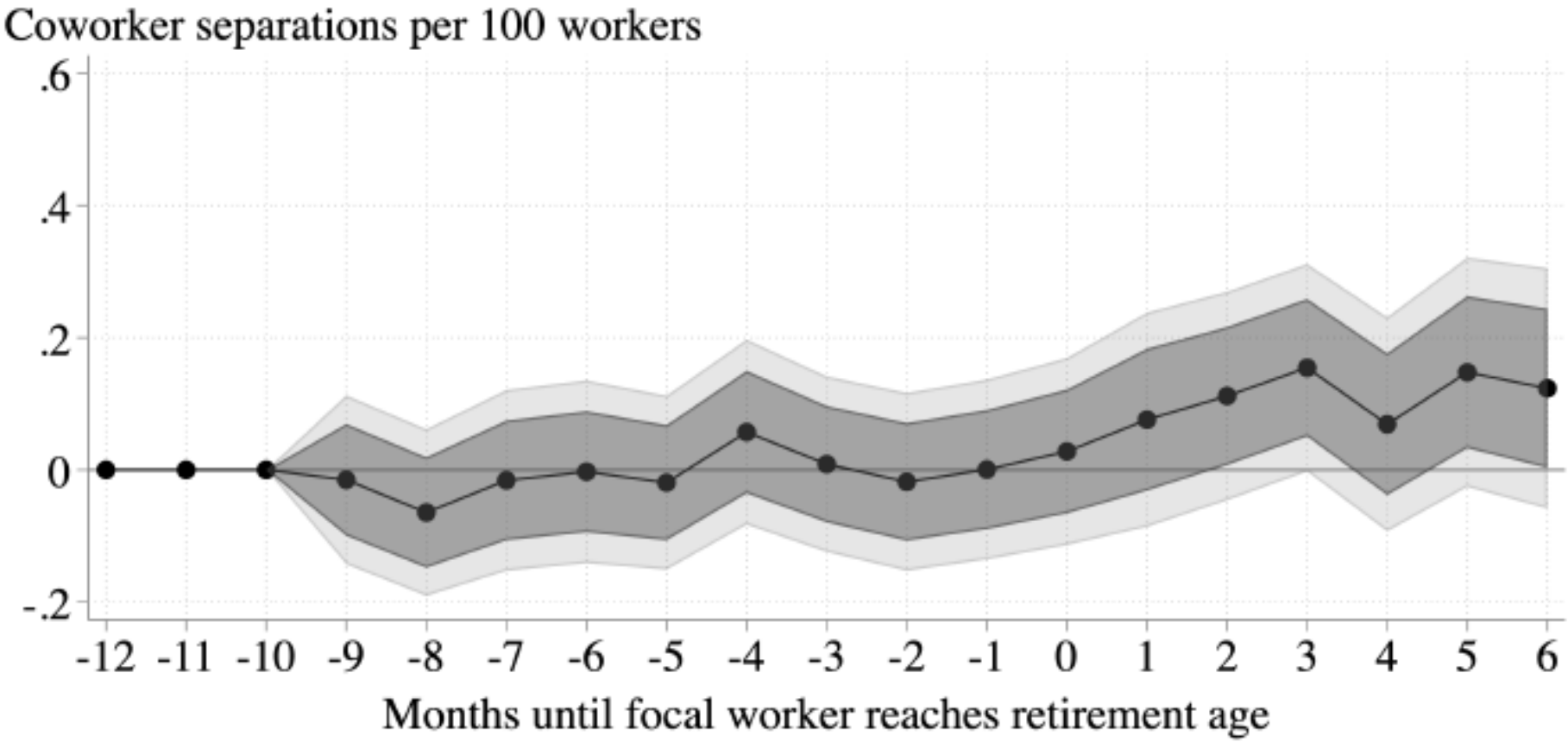
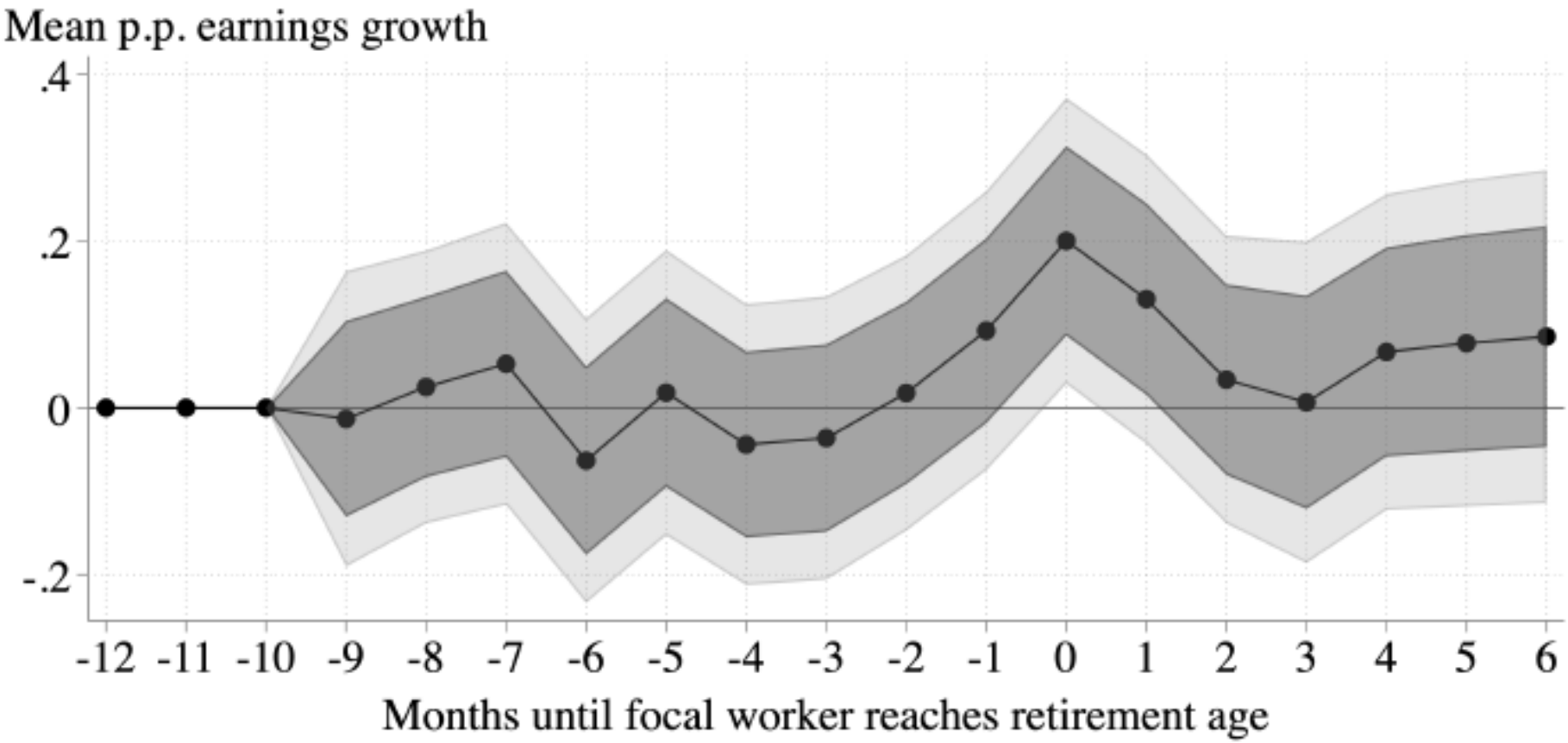


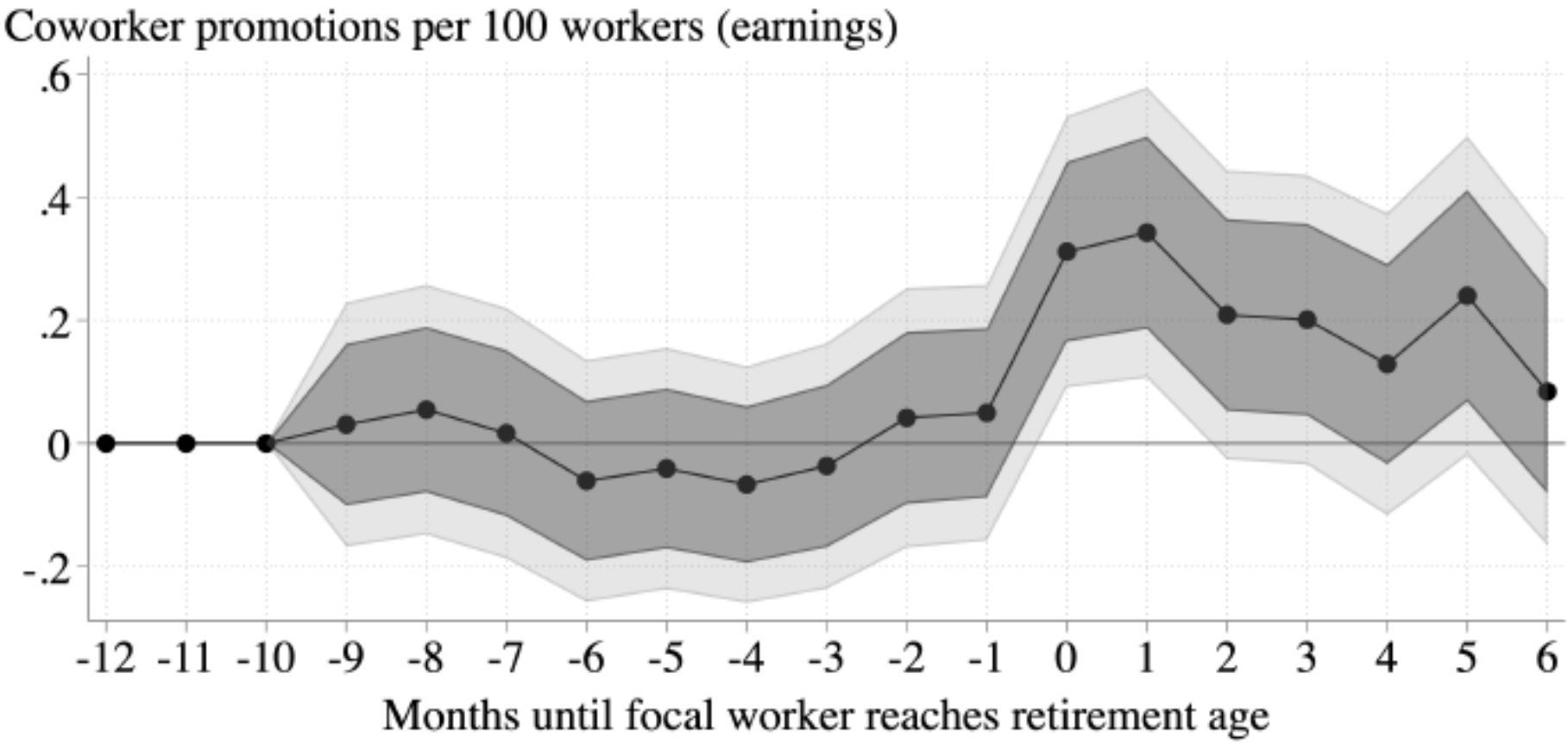
Event study: Coworker separation rates



Event study: Mean coworker earnings growth



Event study: Coworker promotion rates



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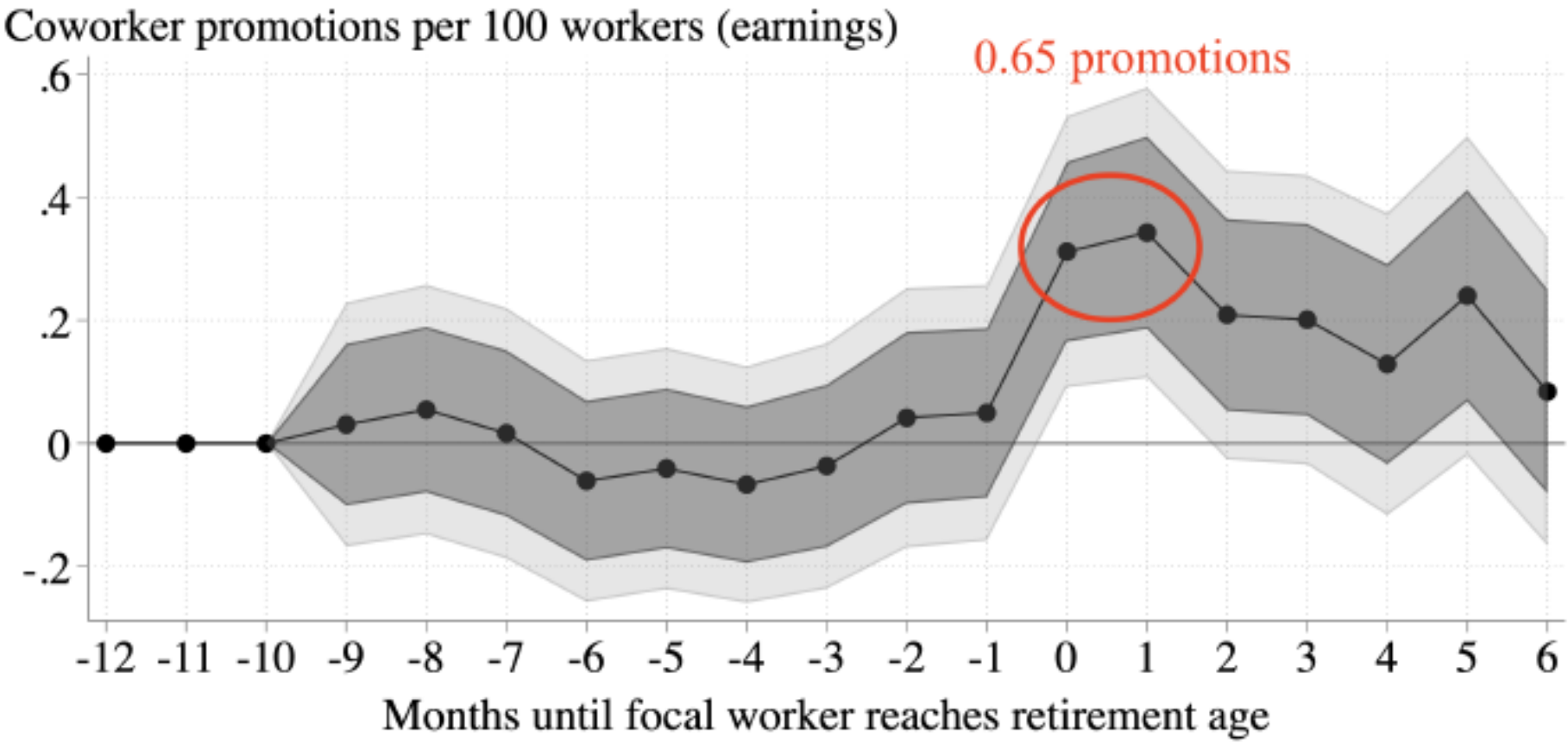

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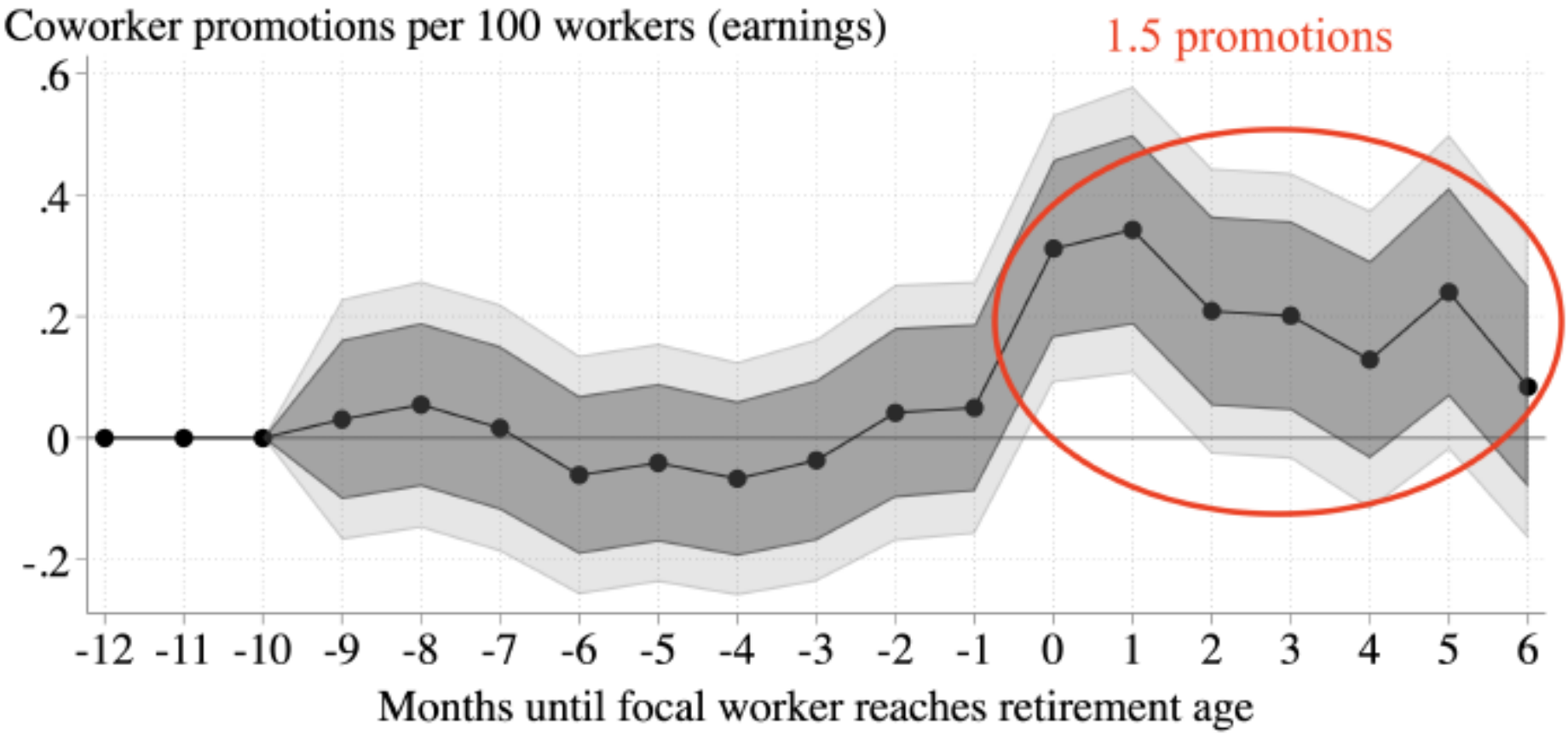
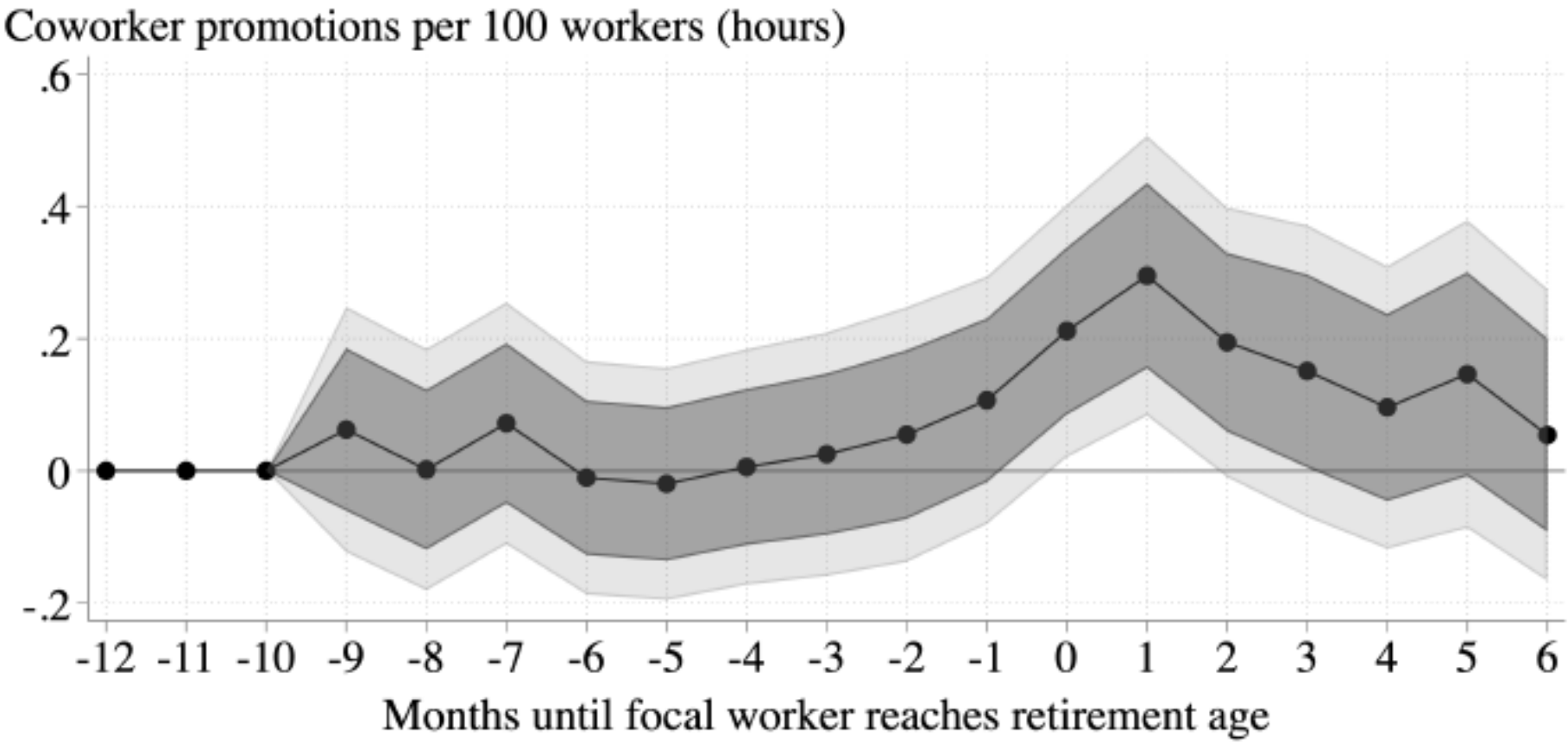
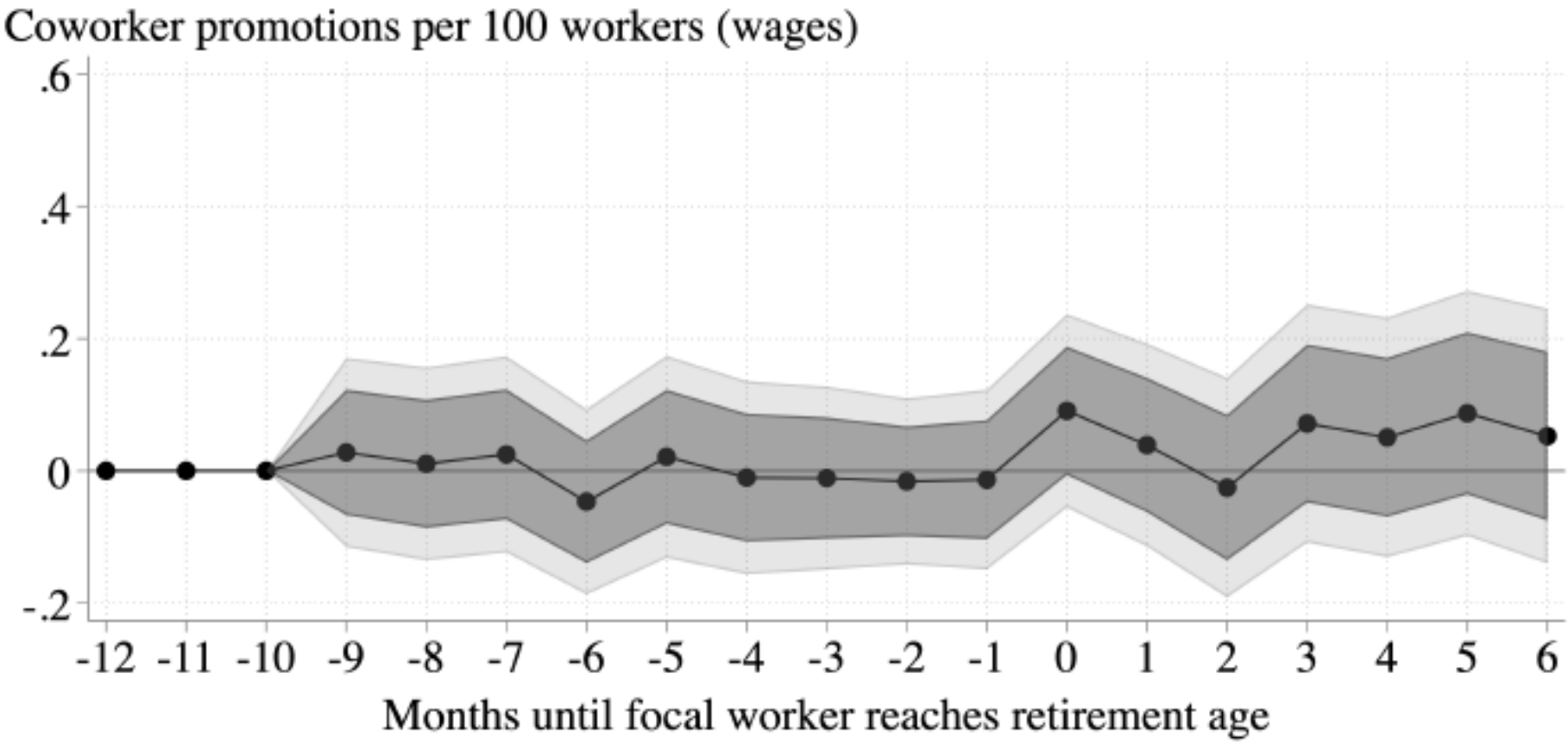


Event study: Coworker promotion rates (hours)



Event study: Coworker promotion rates (wages)



Empirical strategy: Effects of SRA increases

- Estimate effects of an SRA increment of 3 or 4 months
- Construct 4 cohort-pairs: (i) cohorts 1 & 2; (ii) 2 & 3; . . . (iv) 4 & 5
- In each pair, earlier cohort is control group for latter ▸ Balance tests
- Estimate a stacked regression (Cengiz et al. 2019)

Key regression equation:

$$y_{ipt} = \xi_i \left(\sum_j \sum_p 1(\text{ev\_age}_{ipt} = j) \times \text{pair}_{ip} + \sum_j \beta_j 1(\text{ev\_age}_{ipt} = j) \times \text{treat}_{ip} \right) + \tau_t + \epsilon_{ipt}$$

- ev_age_{ipt}: worker's age in qtrs, re-centered so 0 = SRA of ctrl group
- β_j coefficients: Treatment effects in event time
  - Coefficients for $j << 0$ used to assess parallel-trends
  - Then, we set a reference period (qtrs -9 to -3) to improve precision
- Study larger SRA increases by comparing non-adjacent cohorts

Empirical strategy: Effects of SRA increases

- Estimate effects of an SRA increment of 3 or 4 months
- Construct 4 cohort-pairs: (i) cohorts 1 & 2; (ii) 2 & 3; ...(iv) 4 & 5
- In each pair, earlier cohort is control group for latter ▸ Balance tests
- Estimate a stacked regression (Cengiz et al. 2019)

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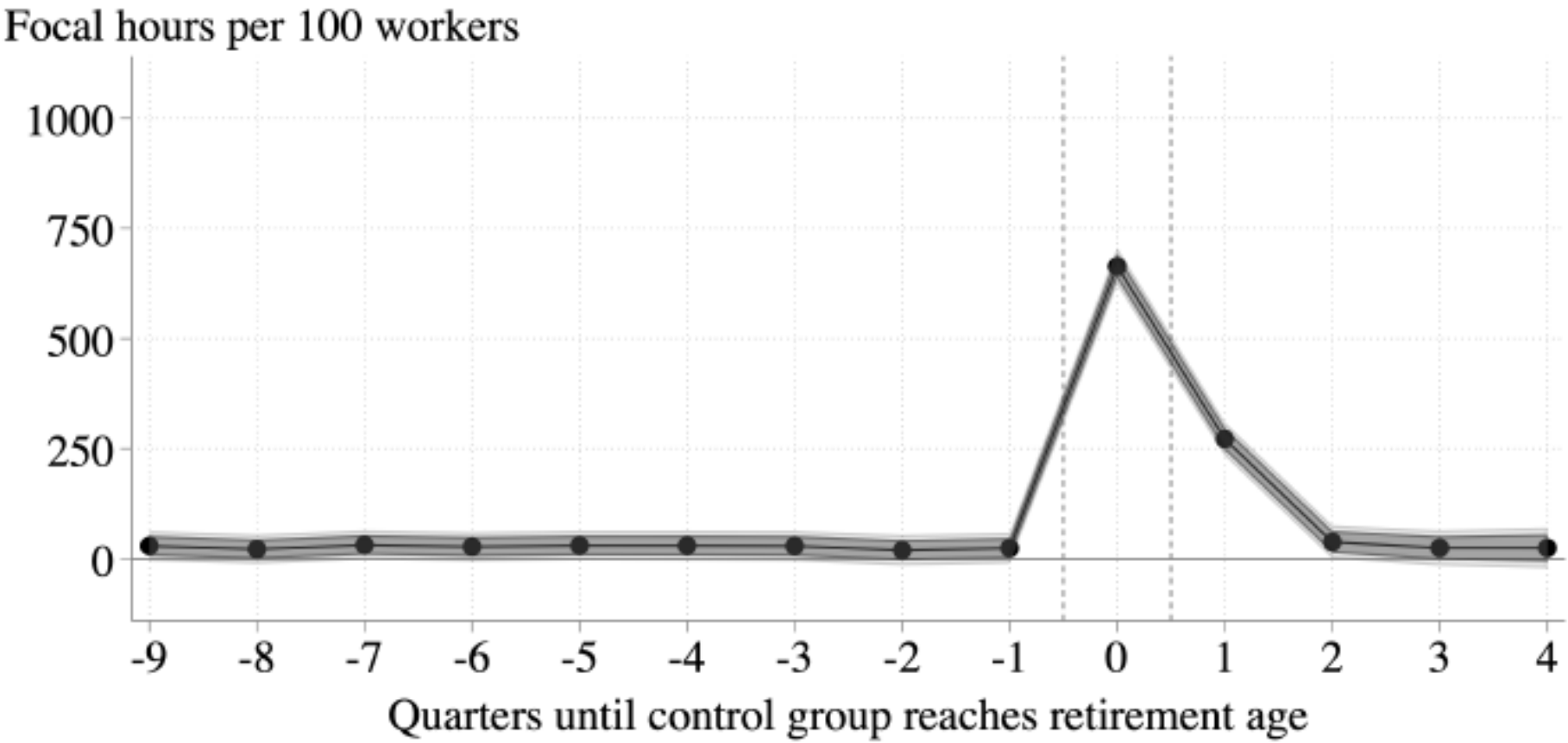
Effects of SRA increases: Hours worked by focal workers

Figure: Effect of an SRA increase of 3–4 months



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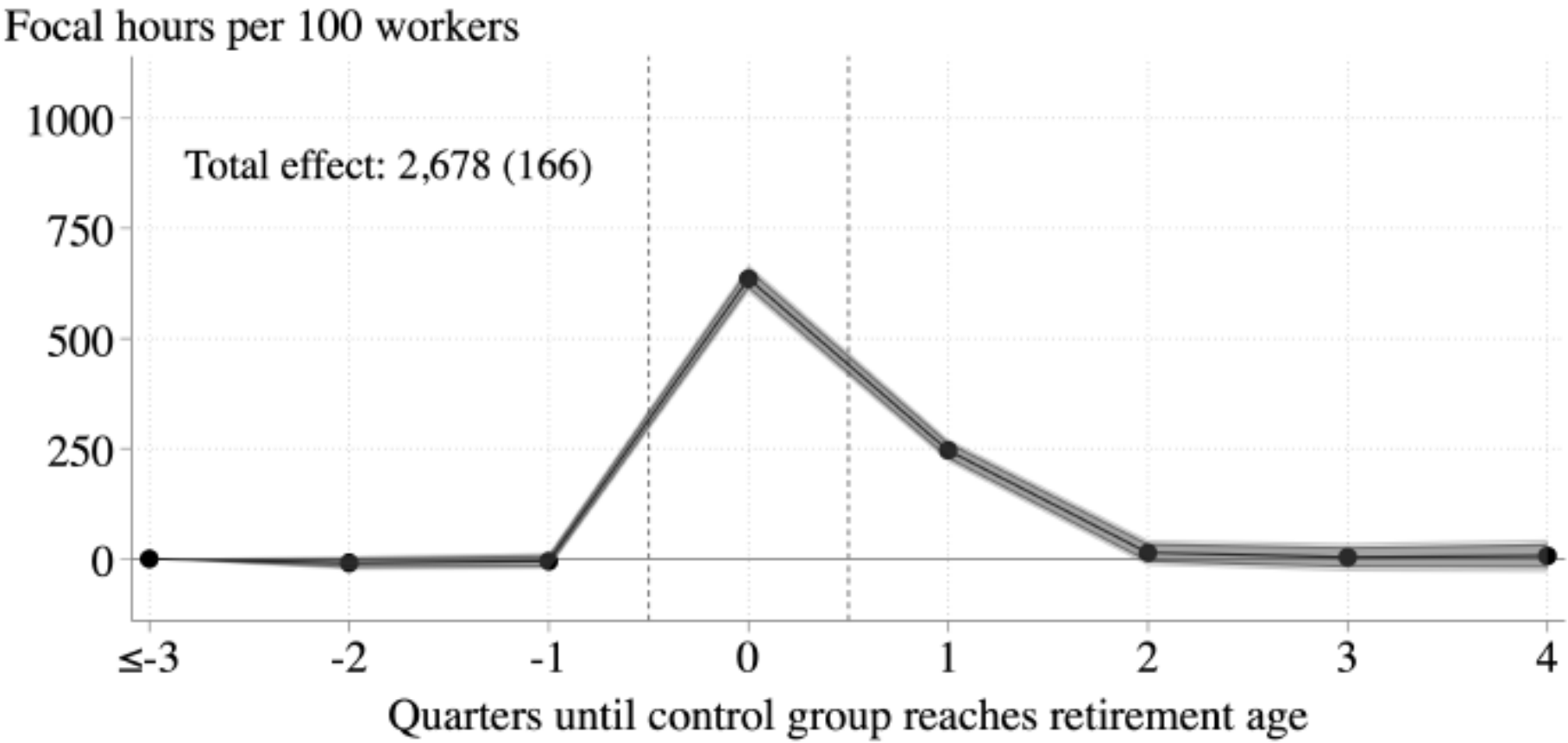

Effects of SRA increases: Hours worked by focal workers

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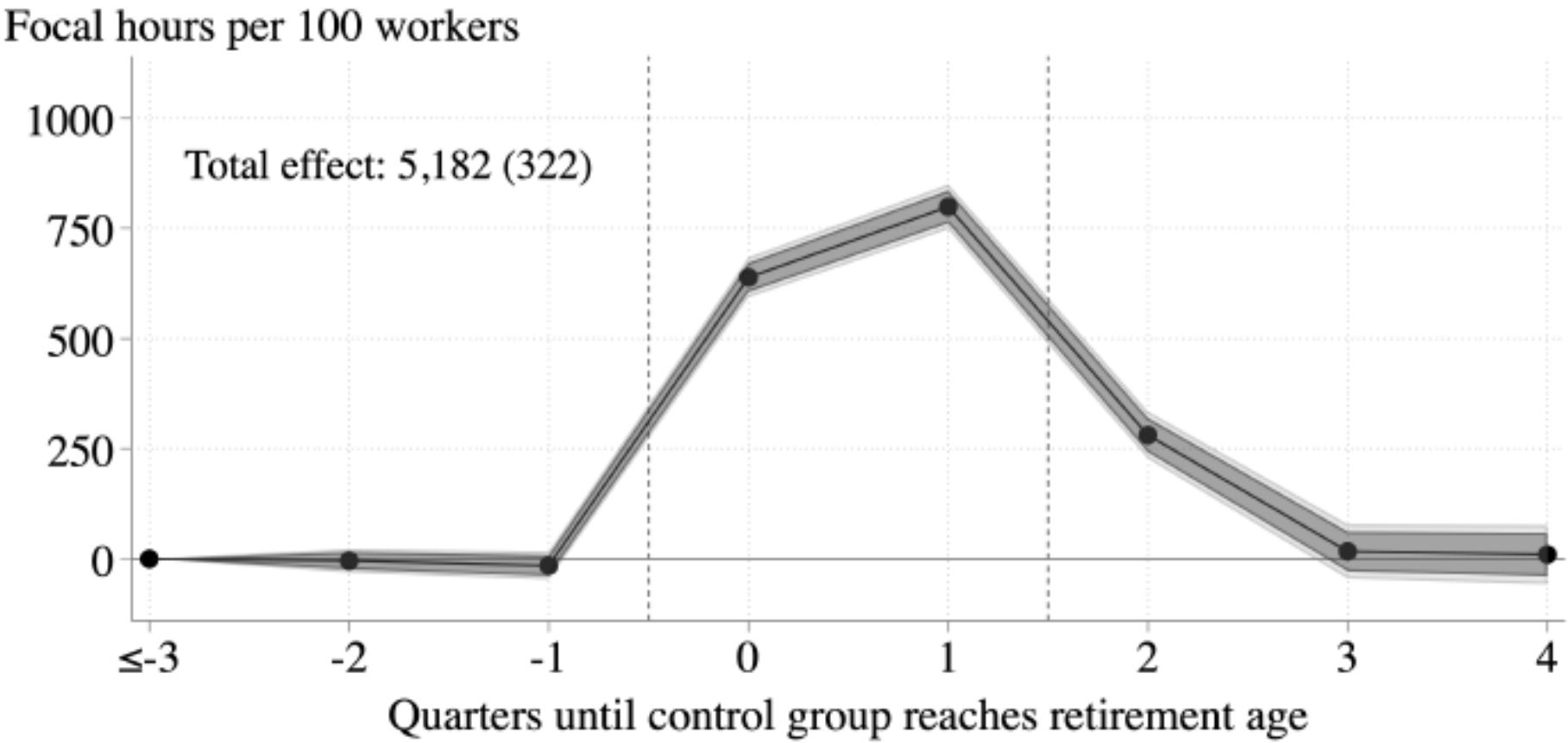

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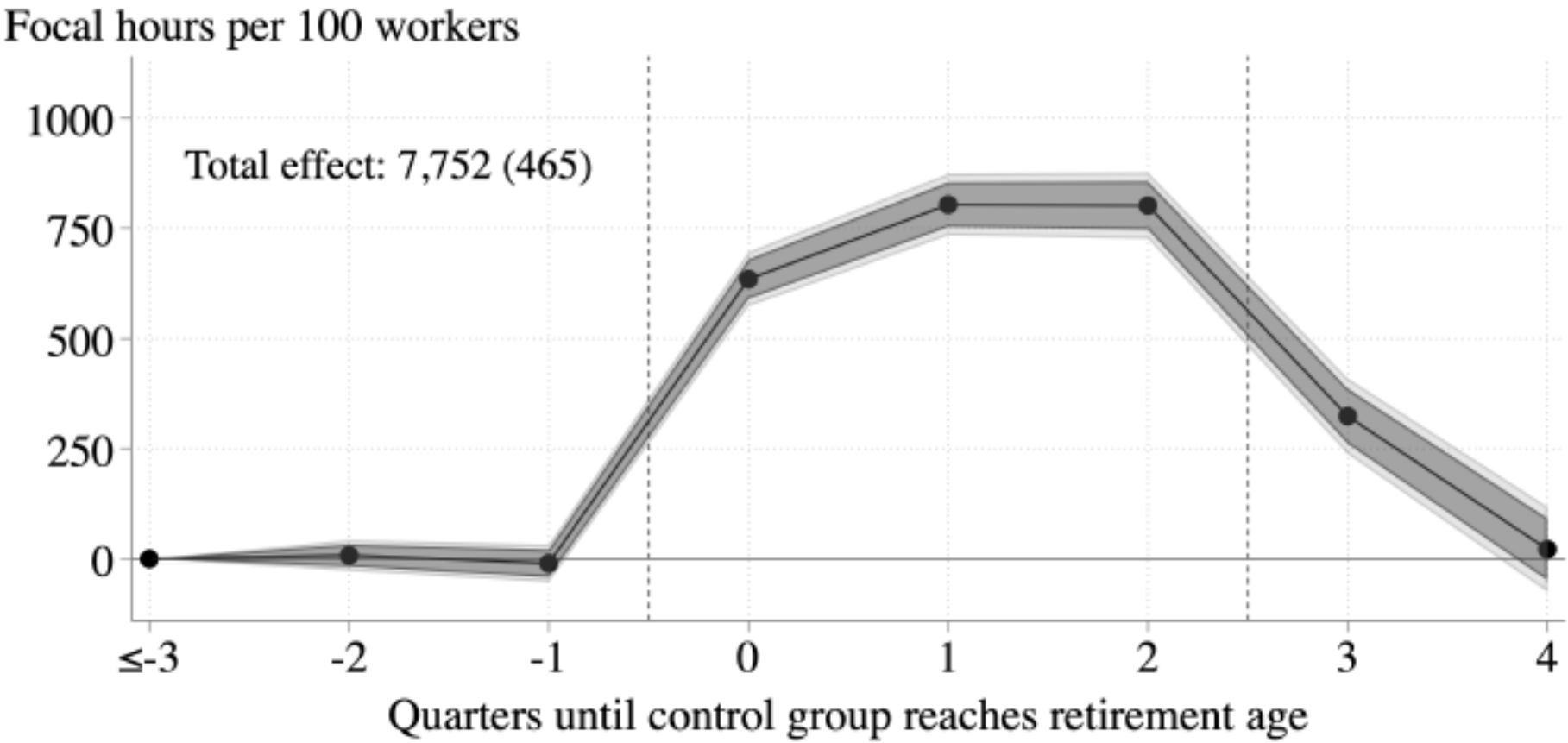
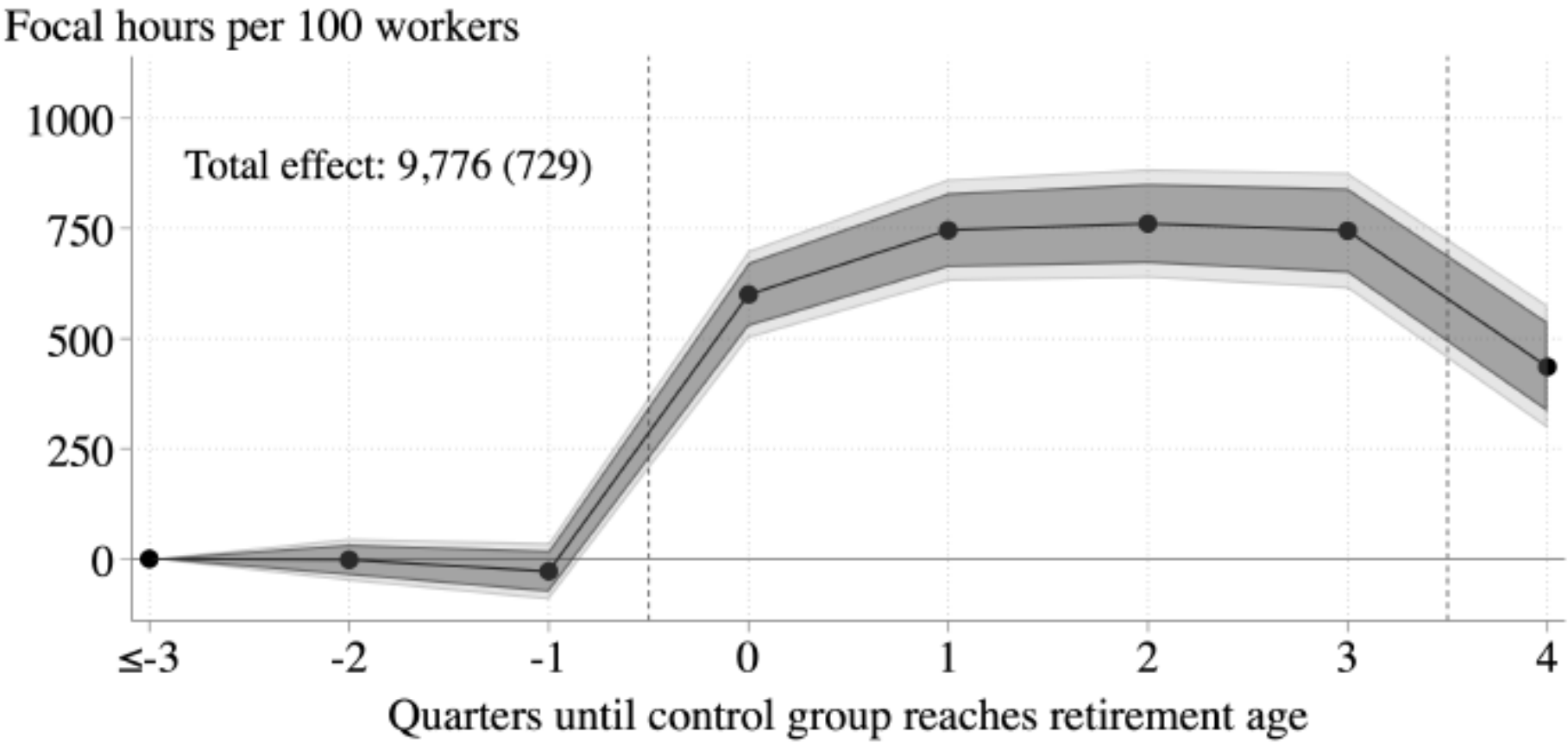


Effects of SRA increases: Hours worked by focal workers

Figure: Effect of an SRA increase of **13 months**



Effects of SRA increases: Hiring rates

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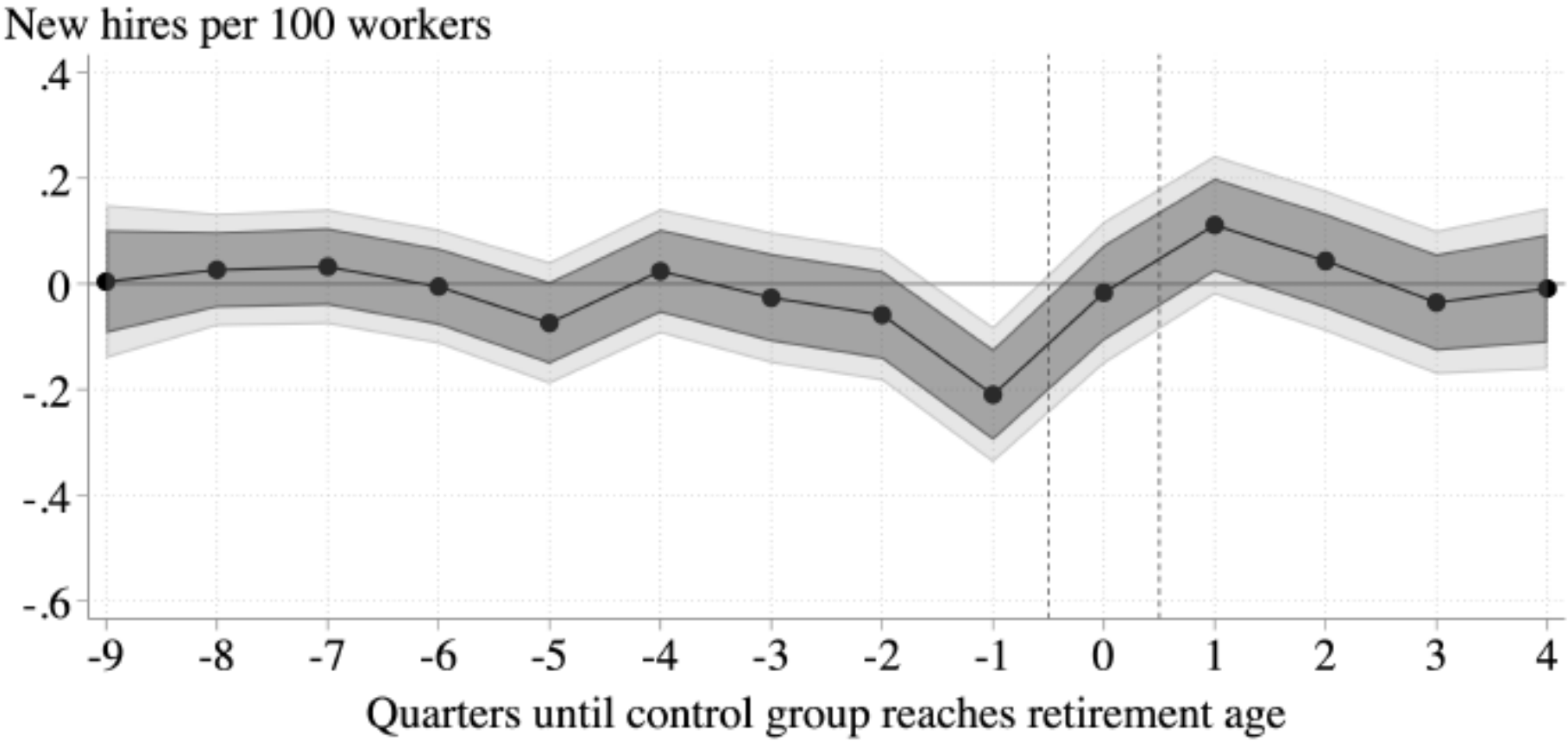

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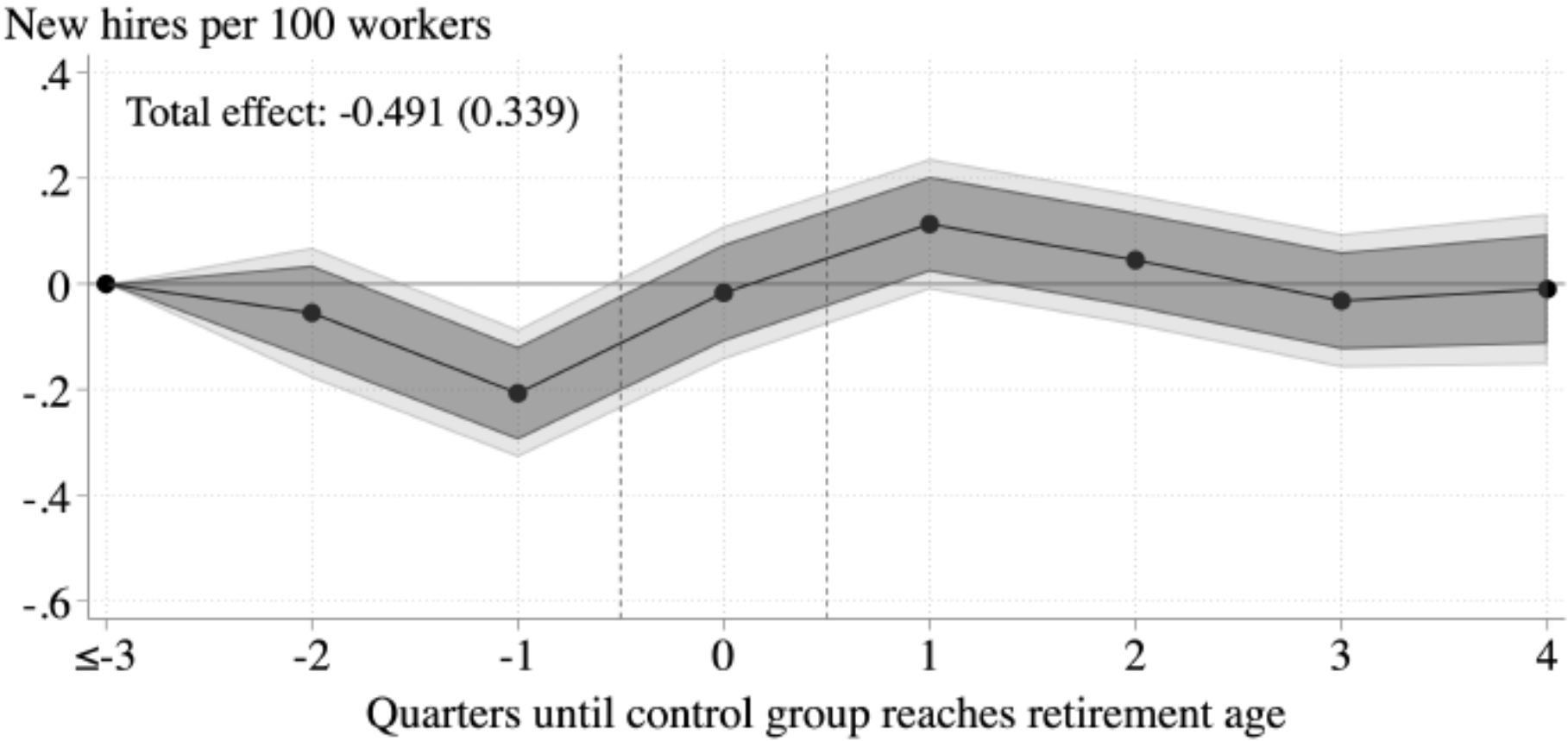

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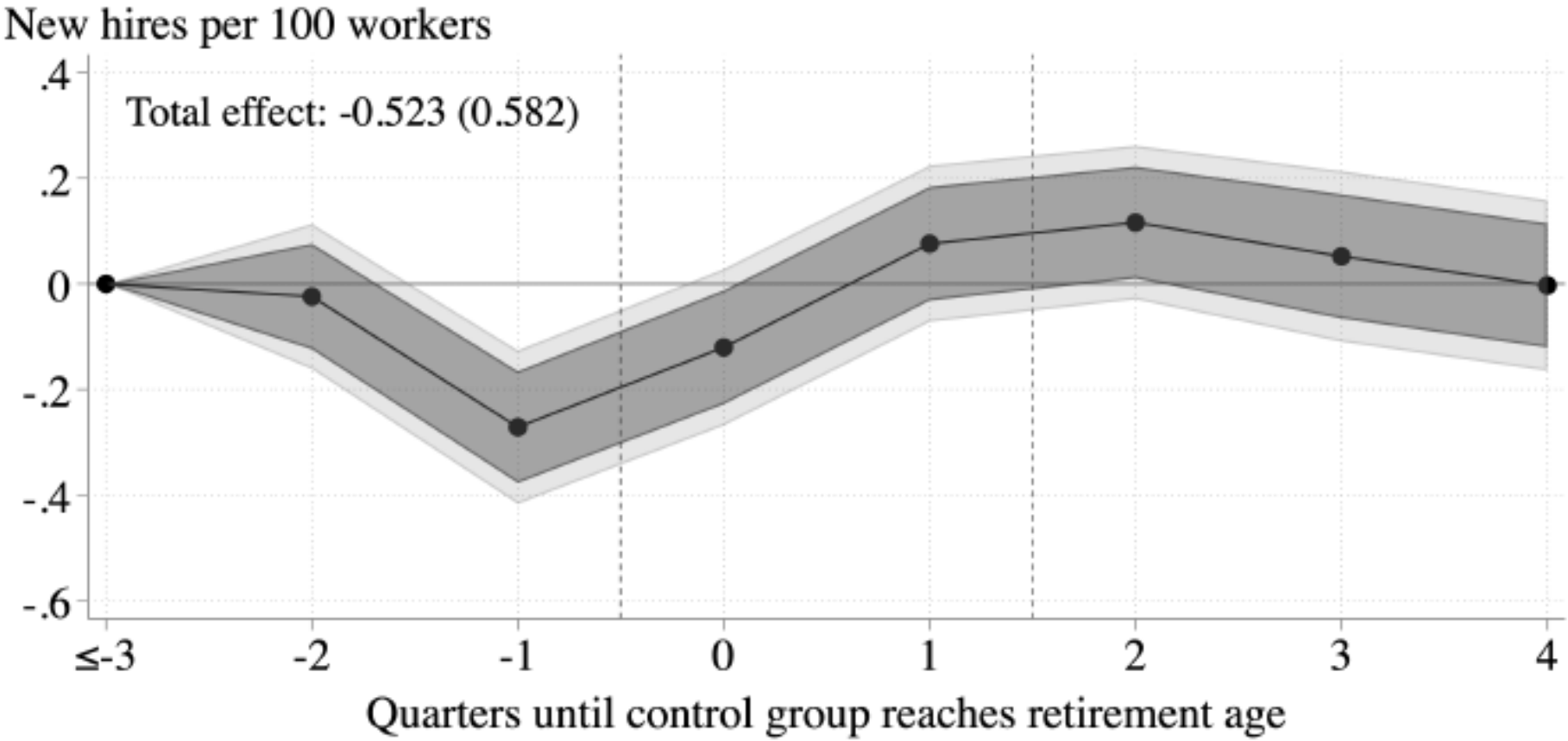

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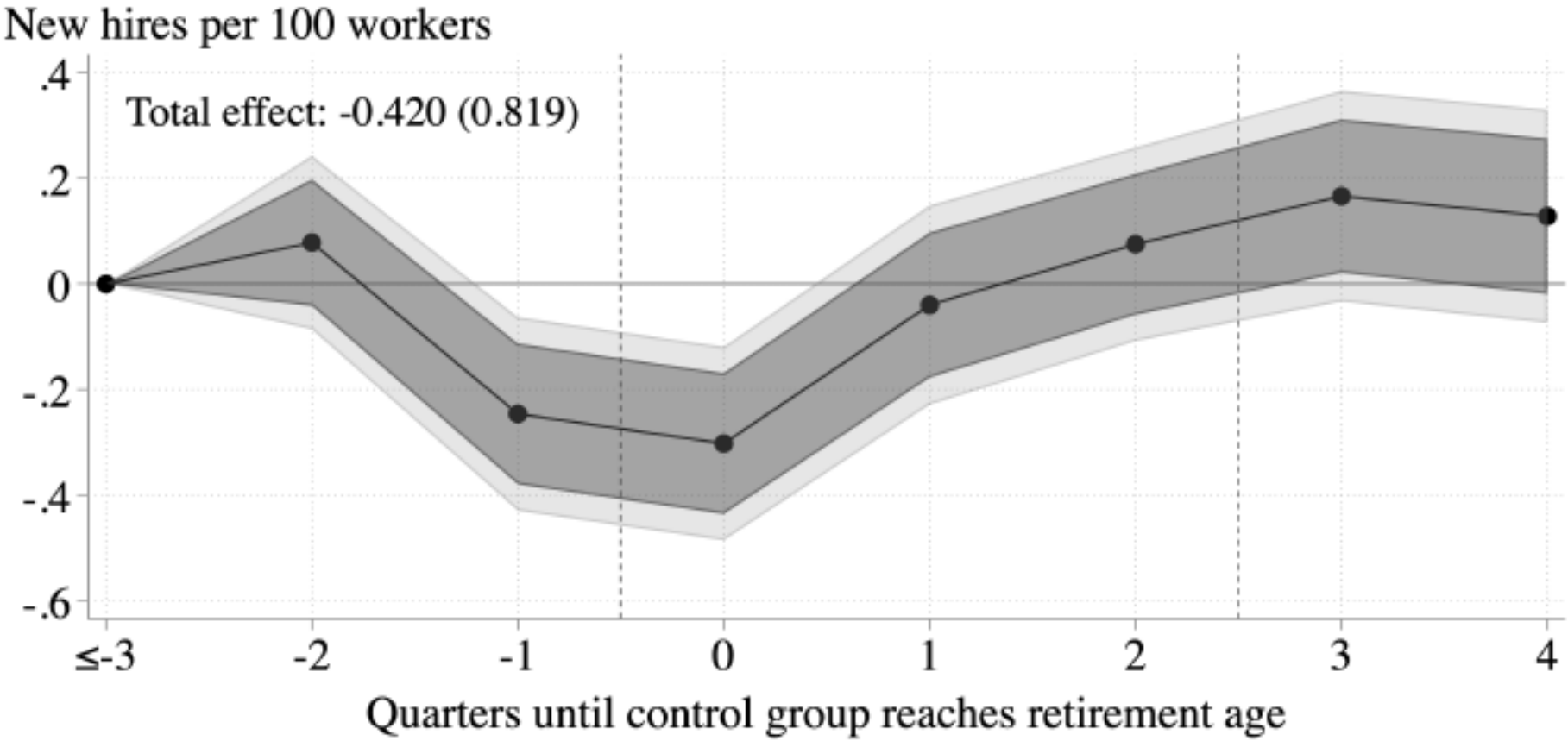

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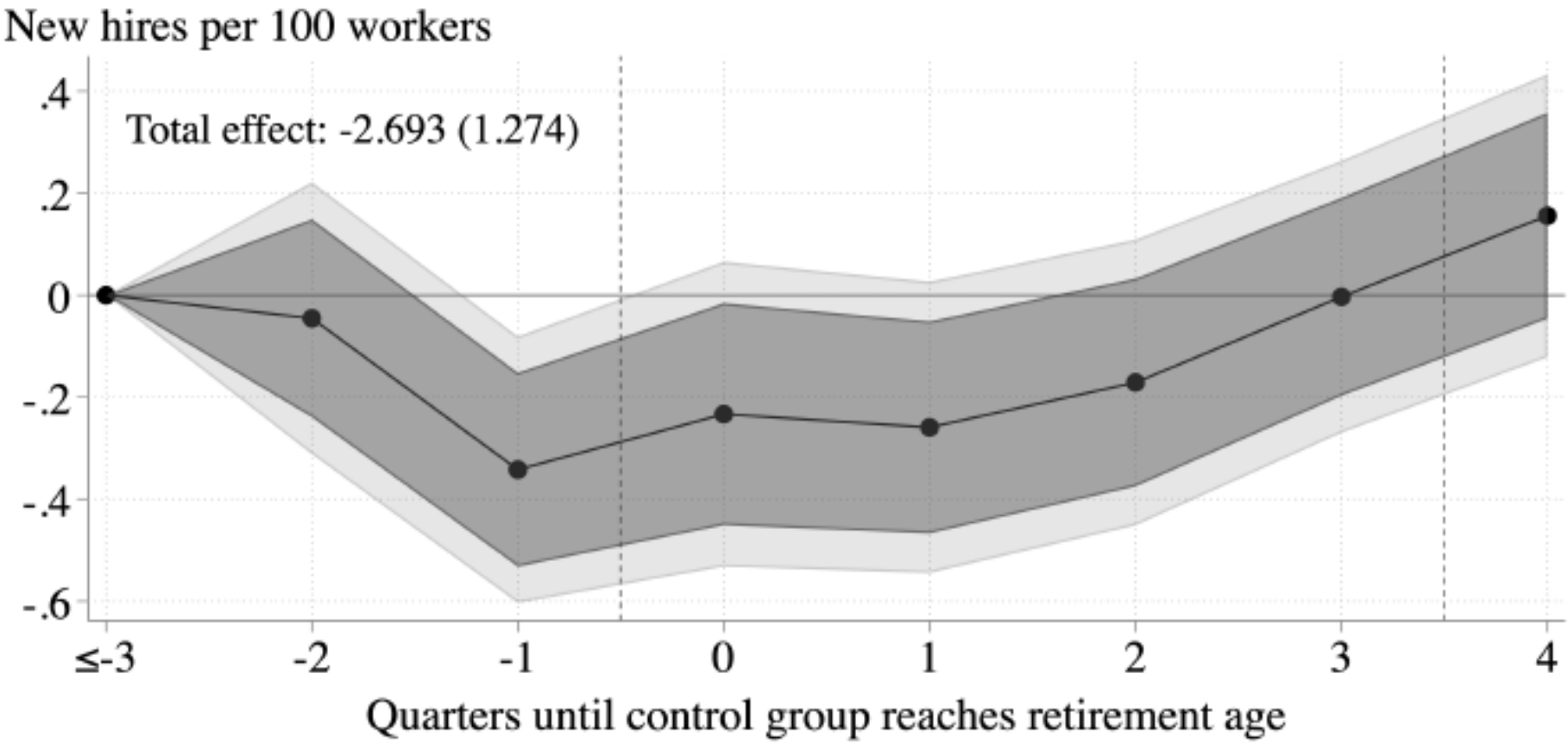

Effects of SRA increases: Coworker separation rates

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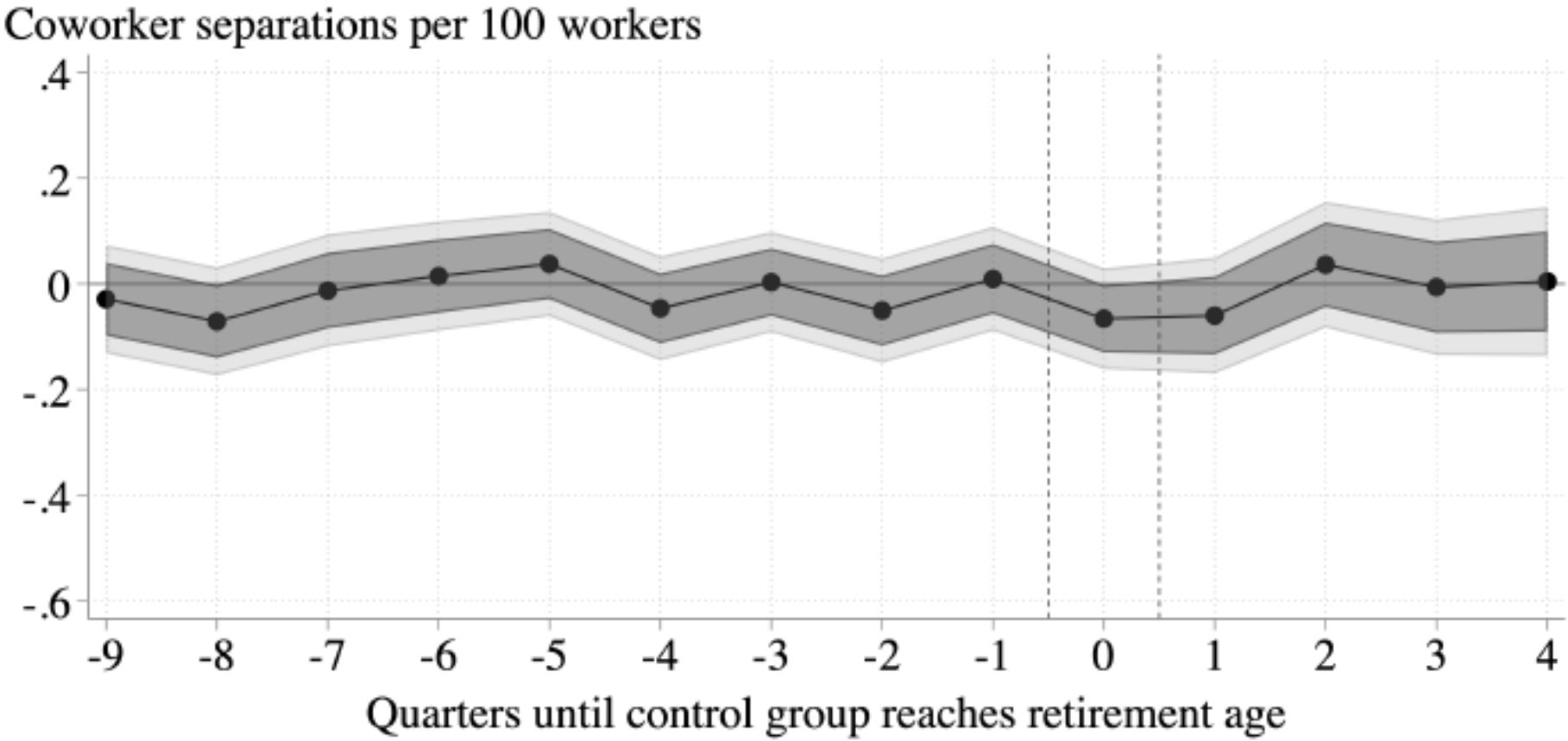

Effects of SRA increases: Coworker separation rates

- No stat. significant effects across any of the four treatments
- Also no effects if we disaggregate coworkers by job contracts: (i) secure (very hard to dismiss) and (ii) insecure (easier to dismiss)
  - $\Rightarrow$ likely small/no effects on both quits and layoffs

Effects of SRA increases: Coworker earnings growth

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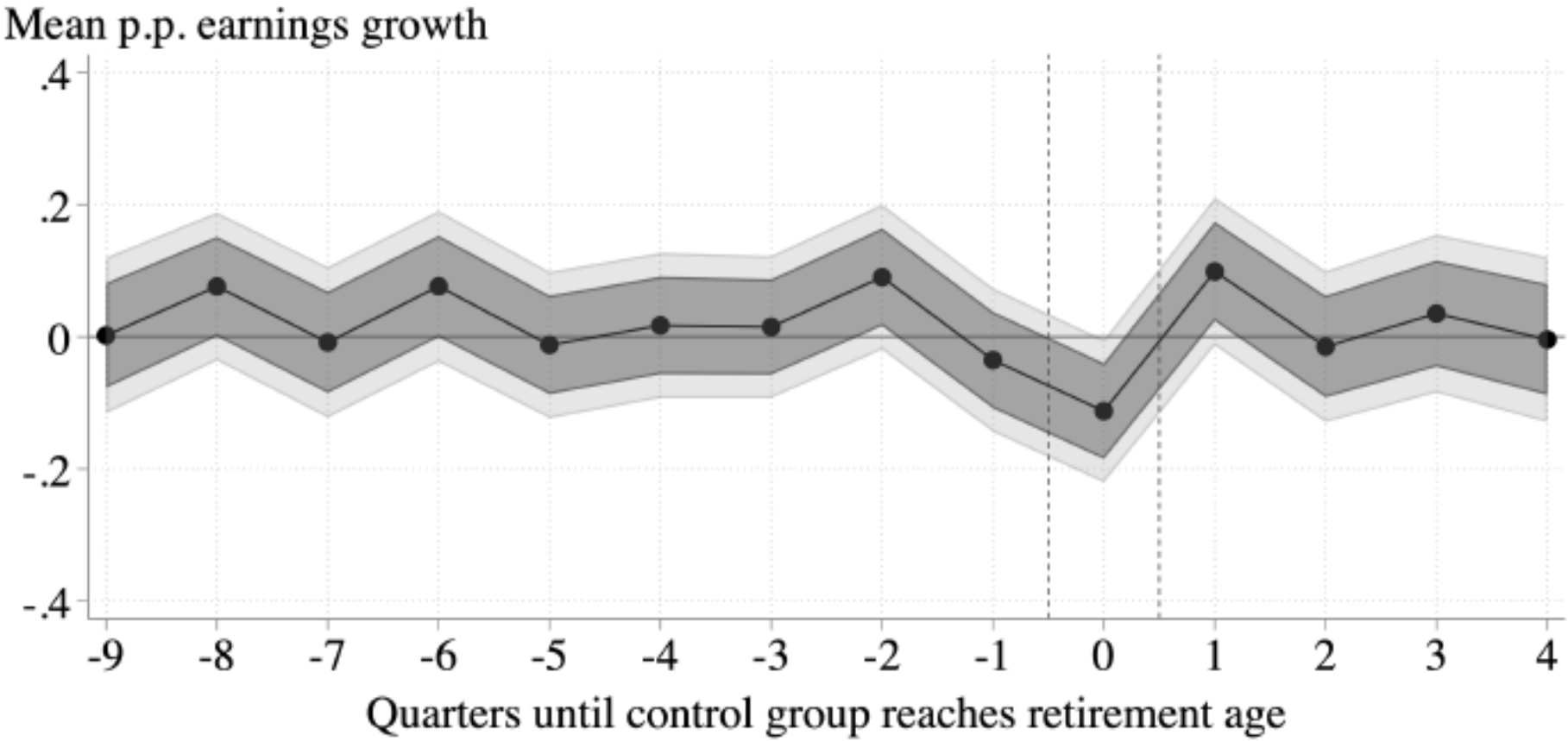

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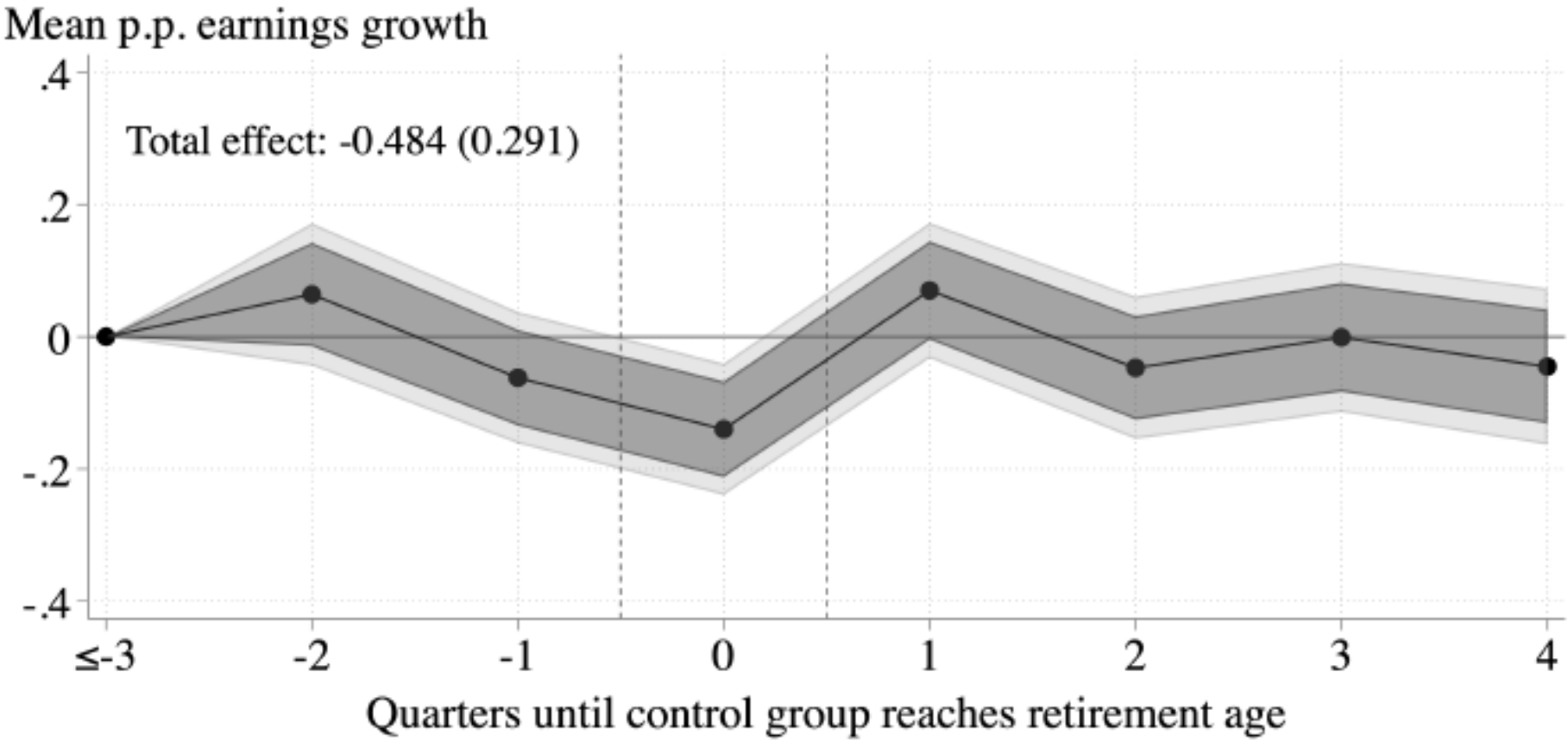

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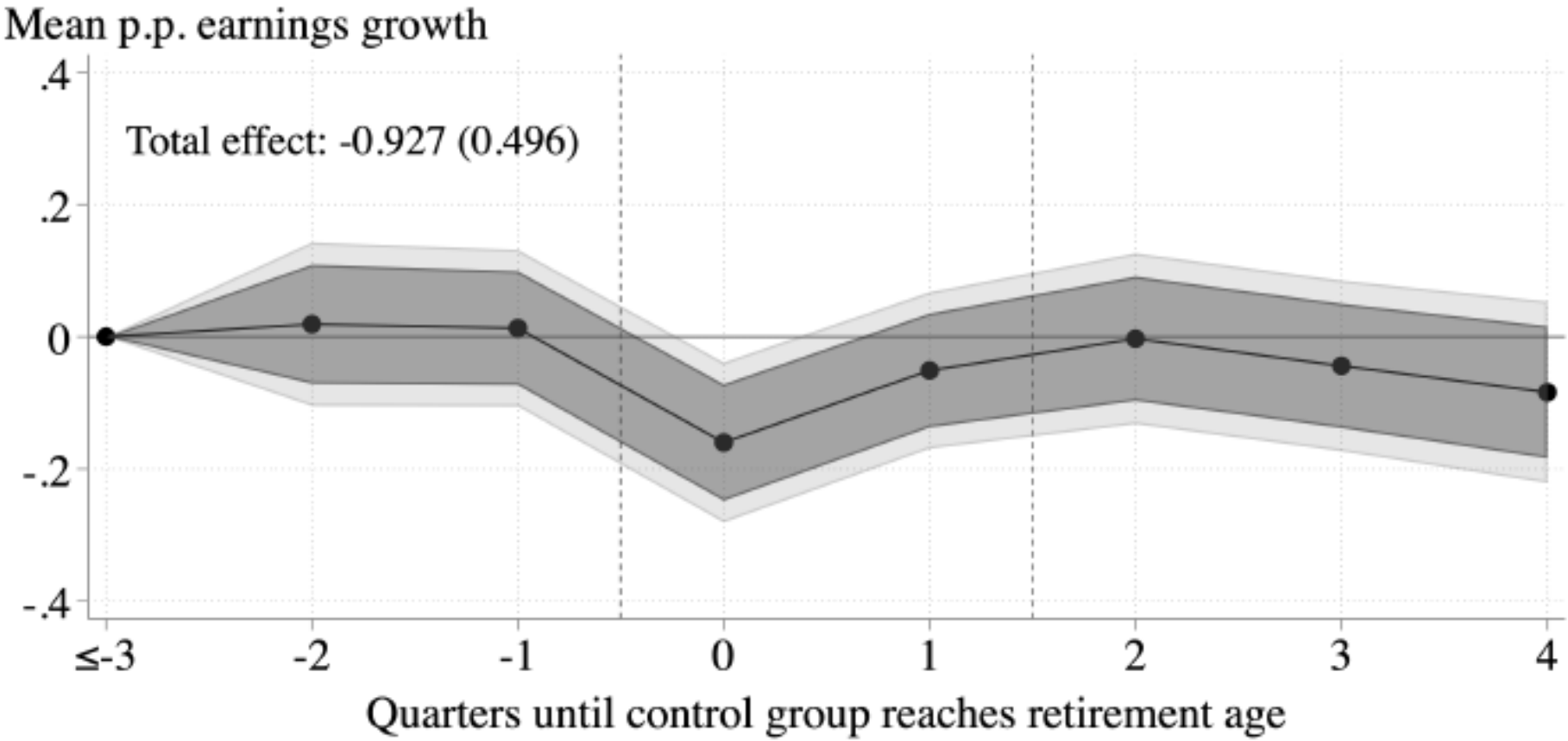

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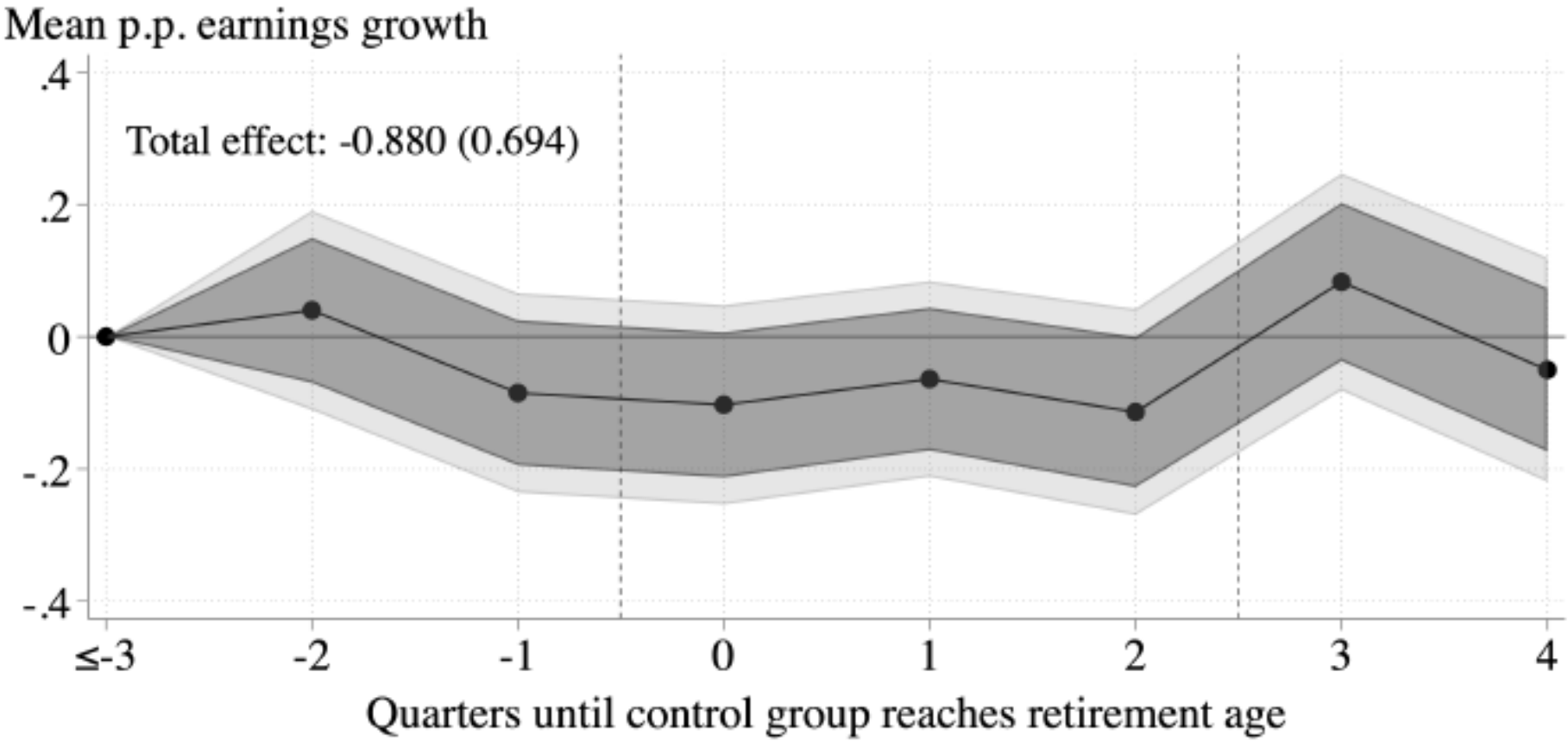

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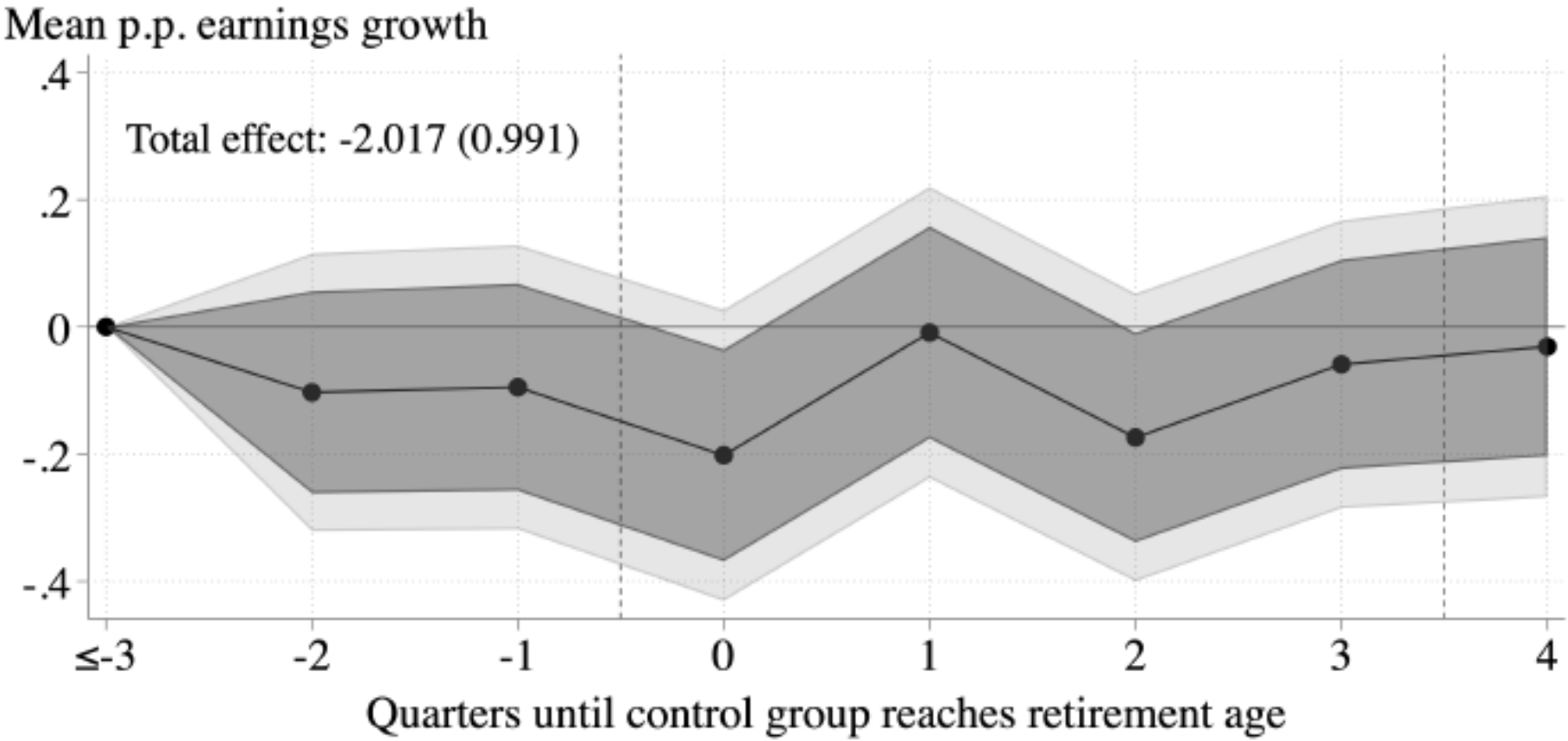

Effects of SRA increases: Coworker promotion rate

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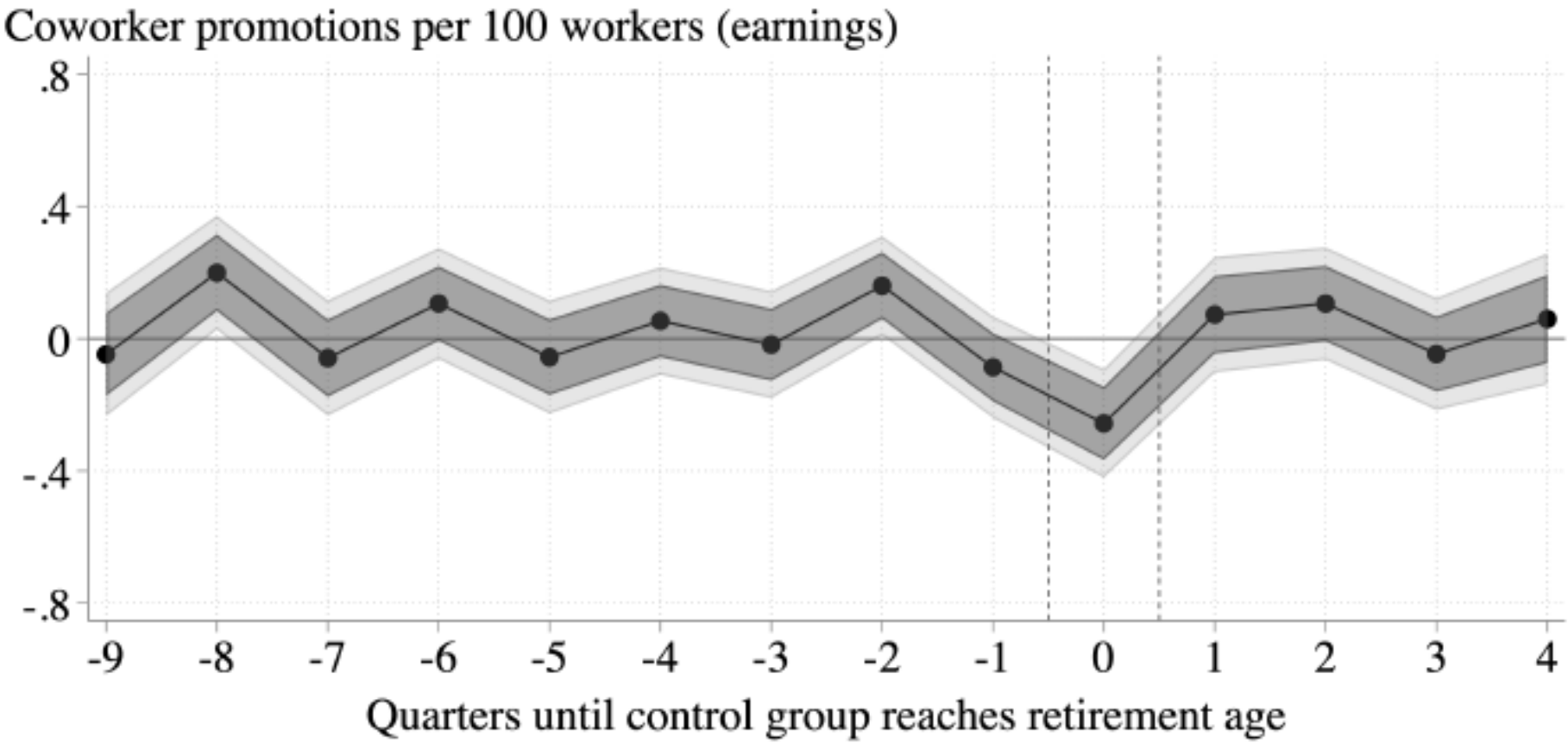

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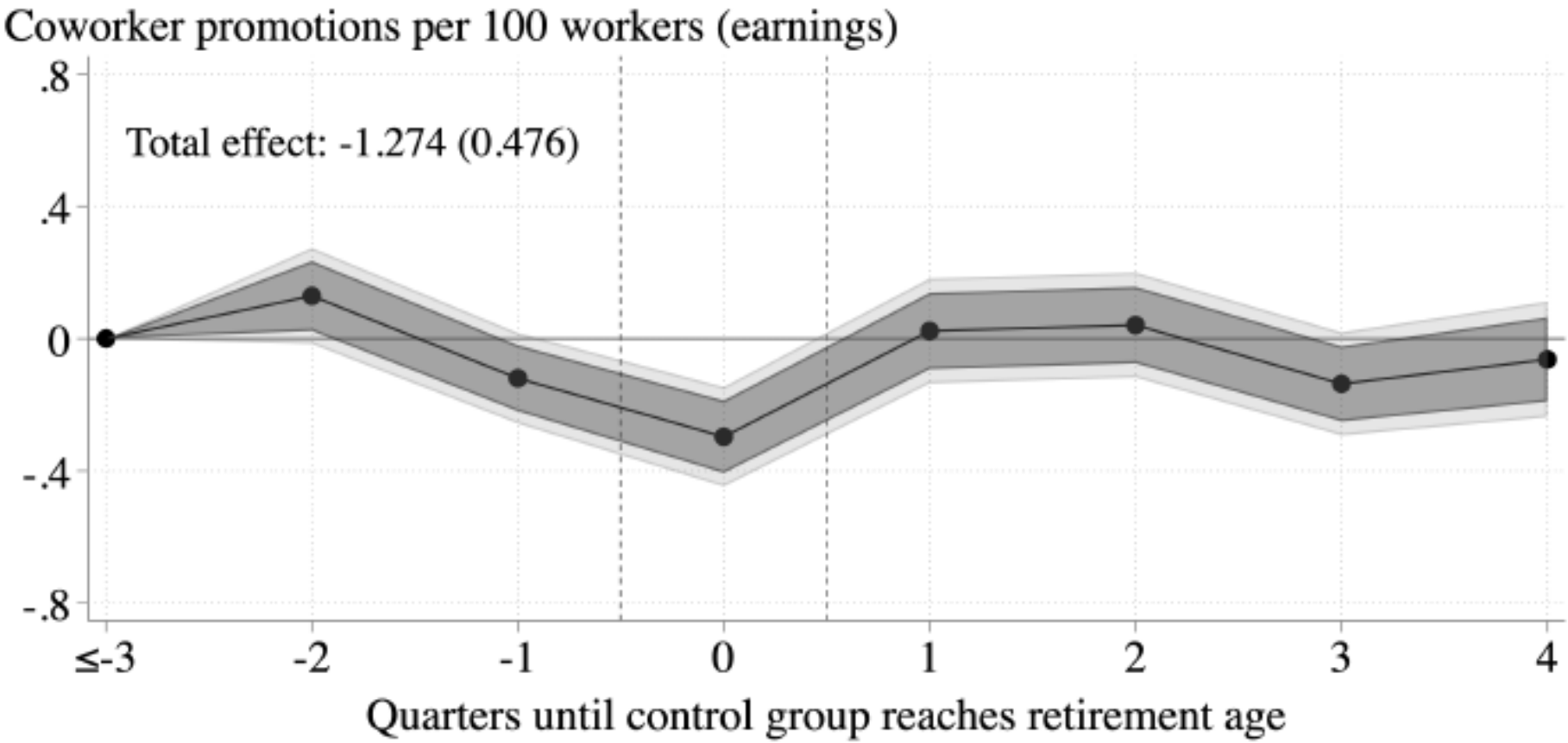

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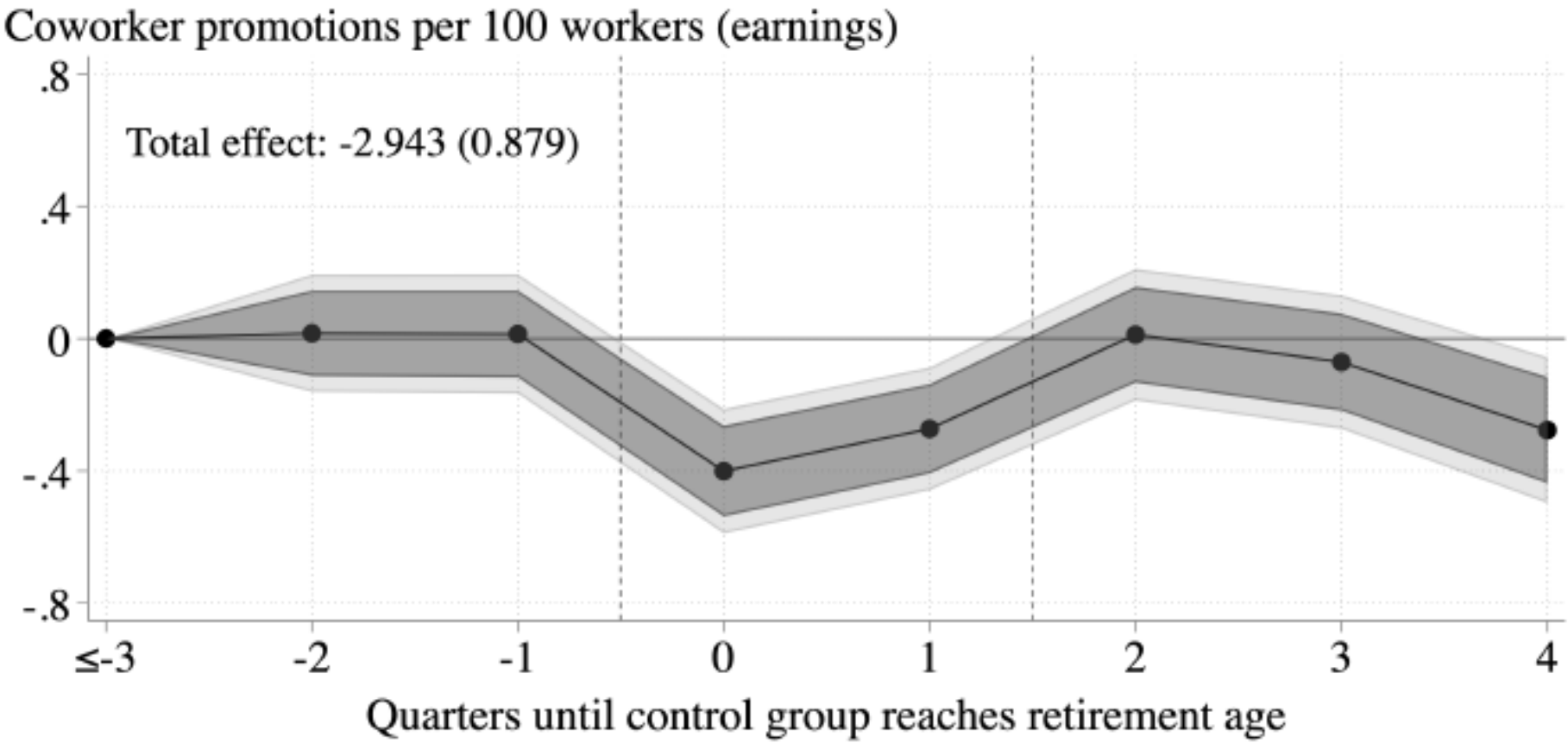

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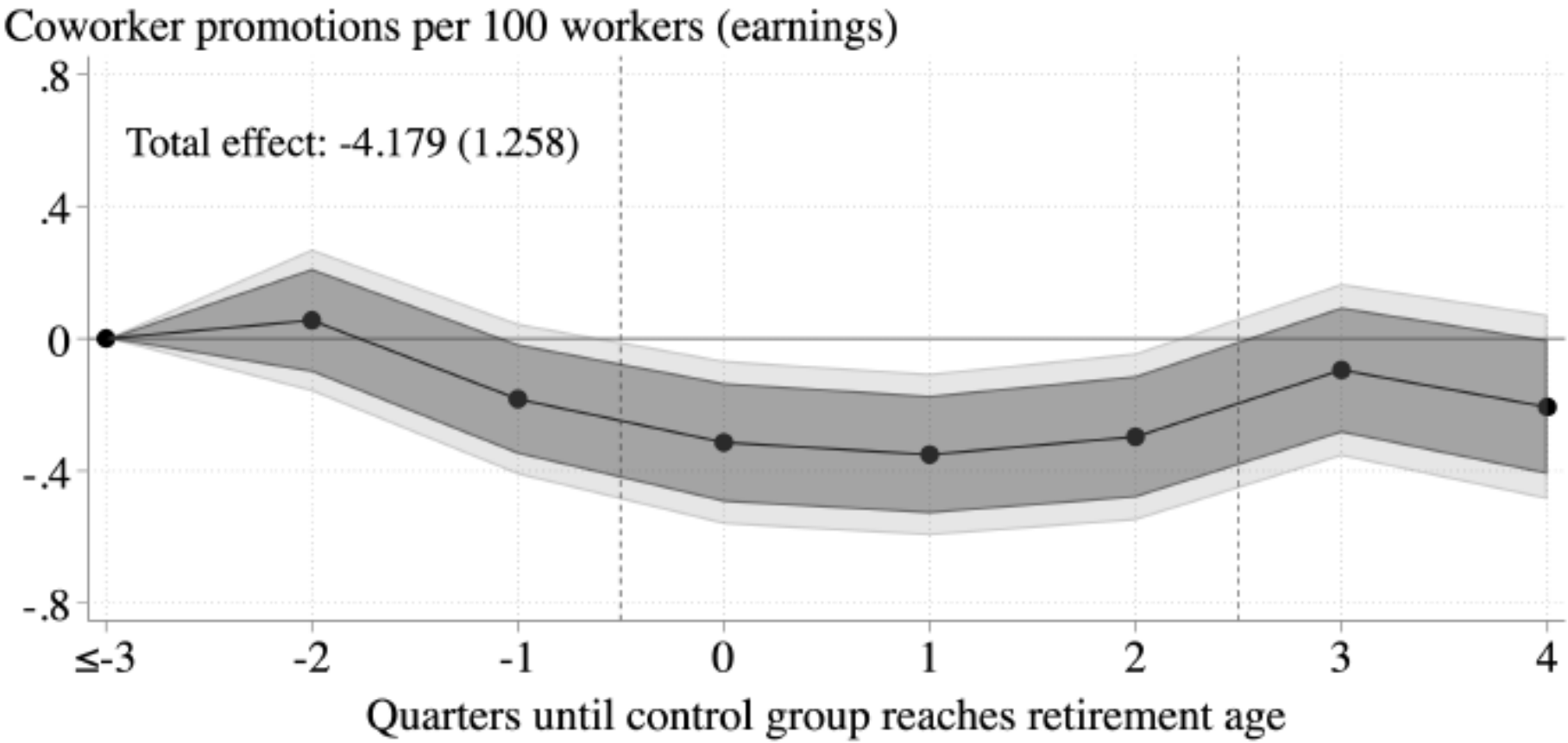

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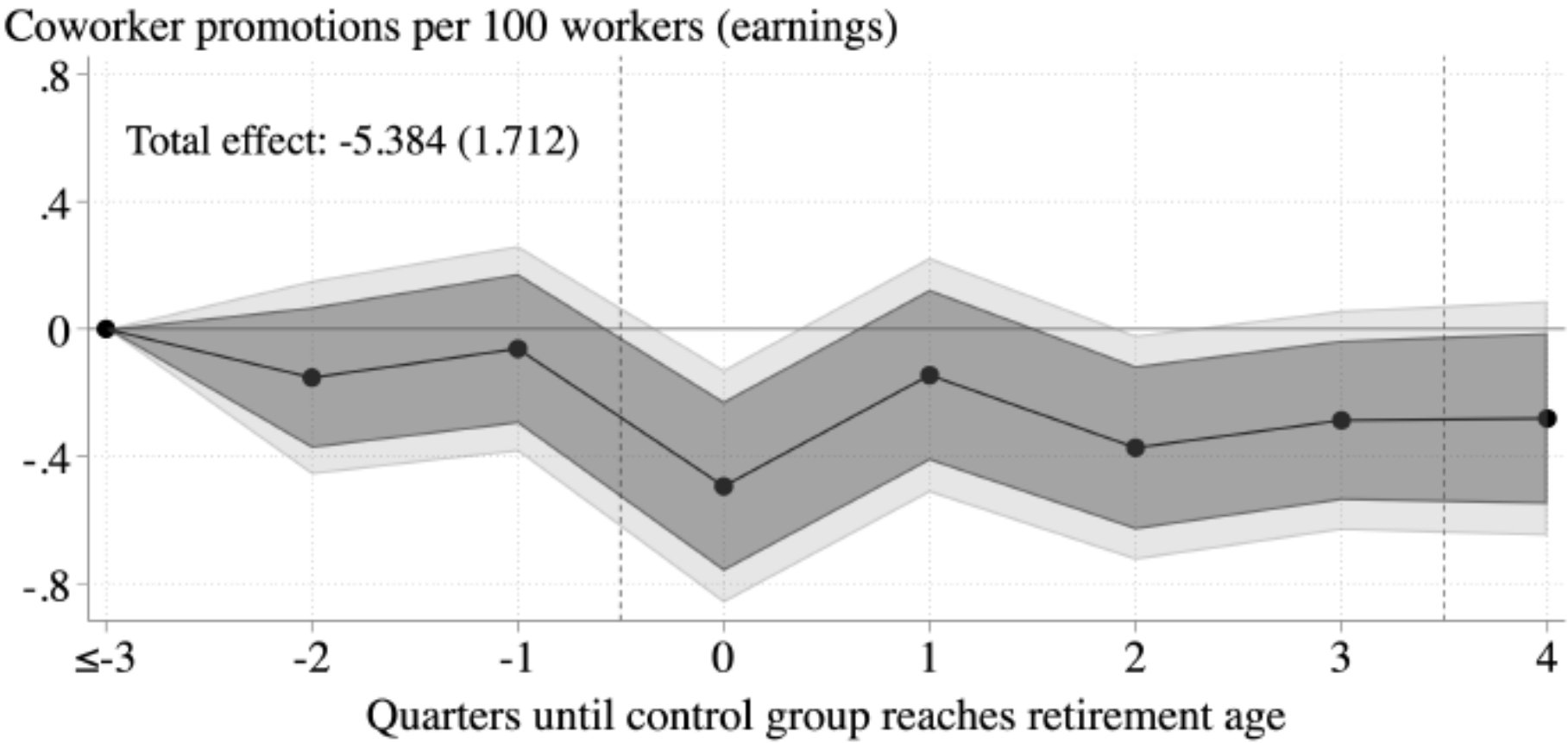

Effects of SRA increases: Coworker promotion rate (hours)

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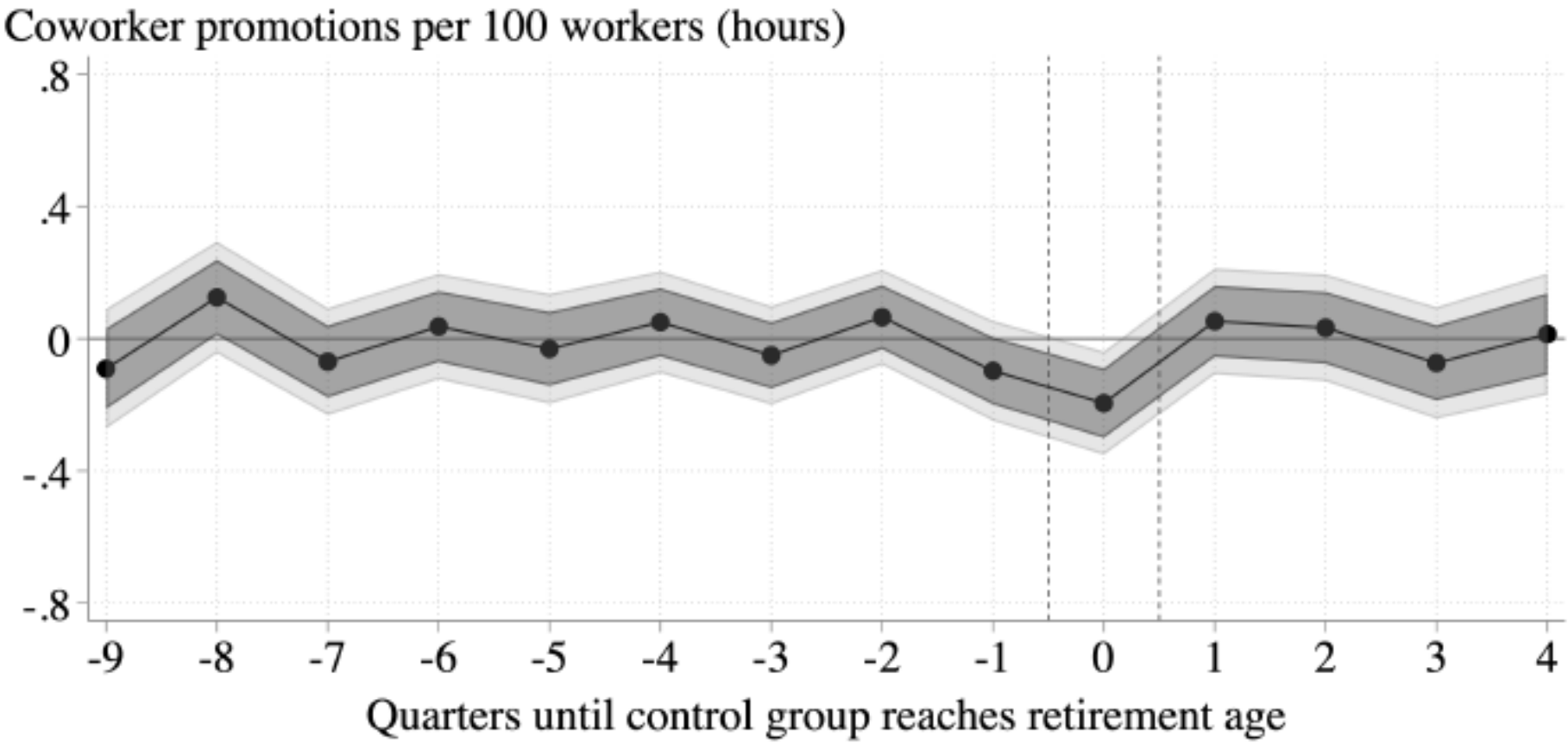

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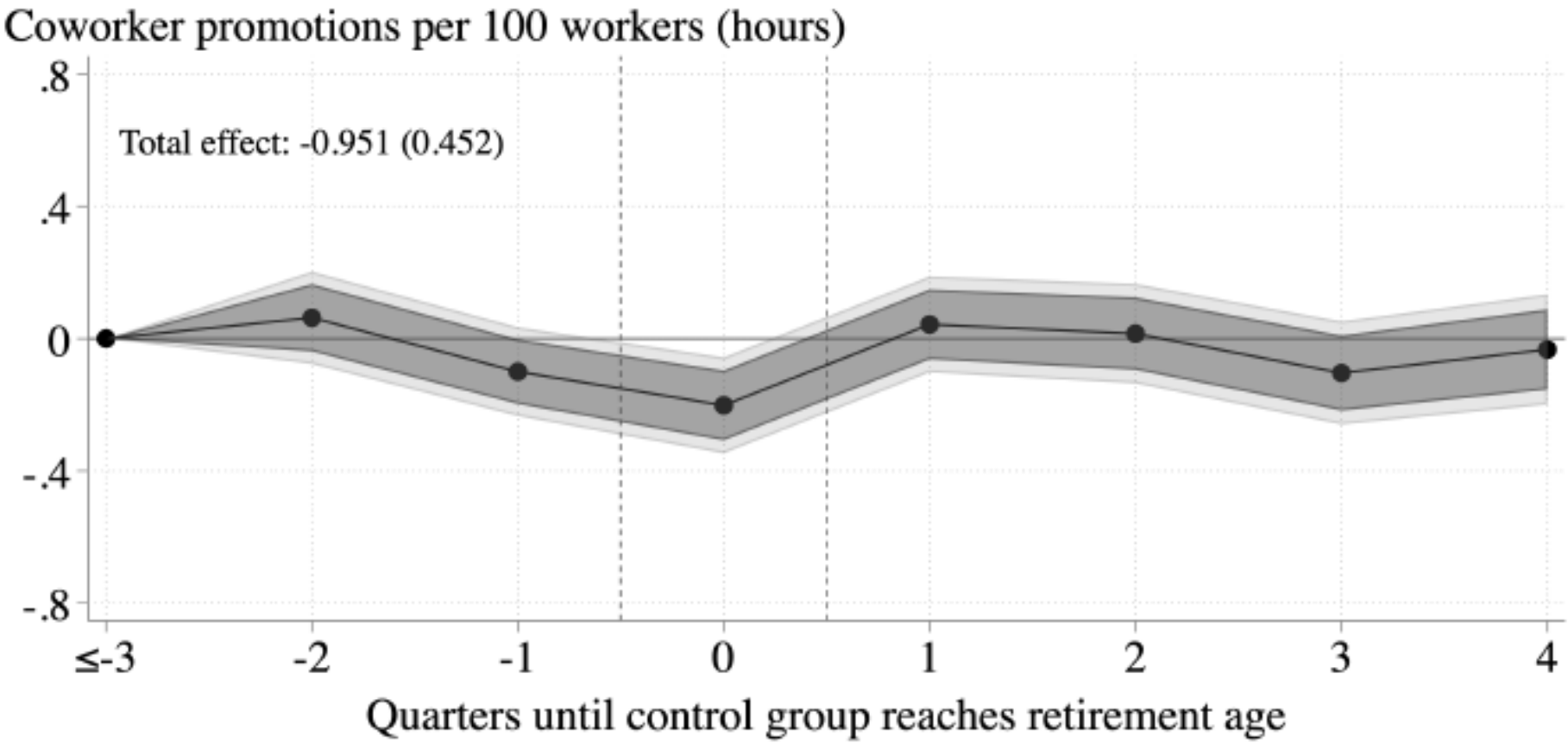

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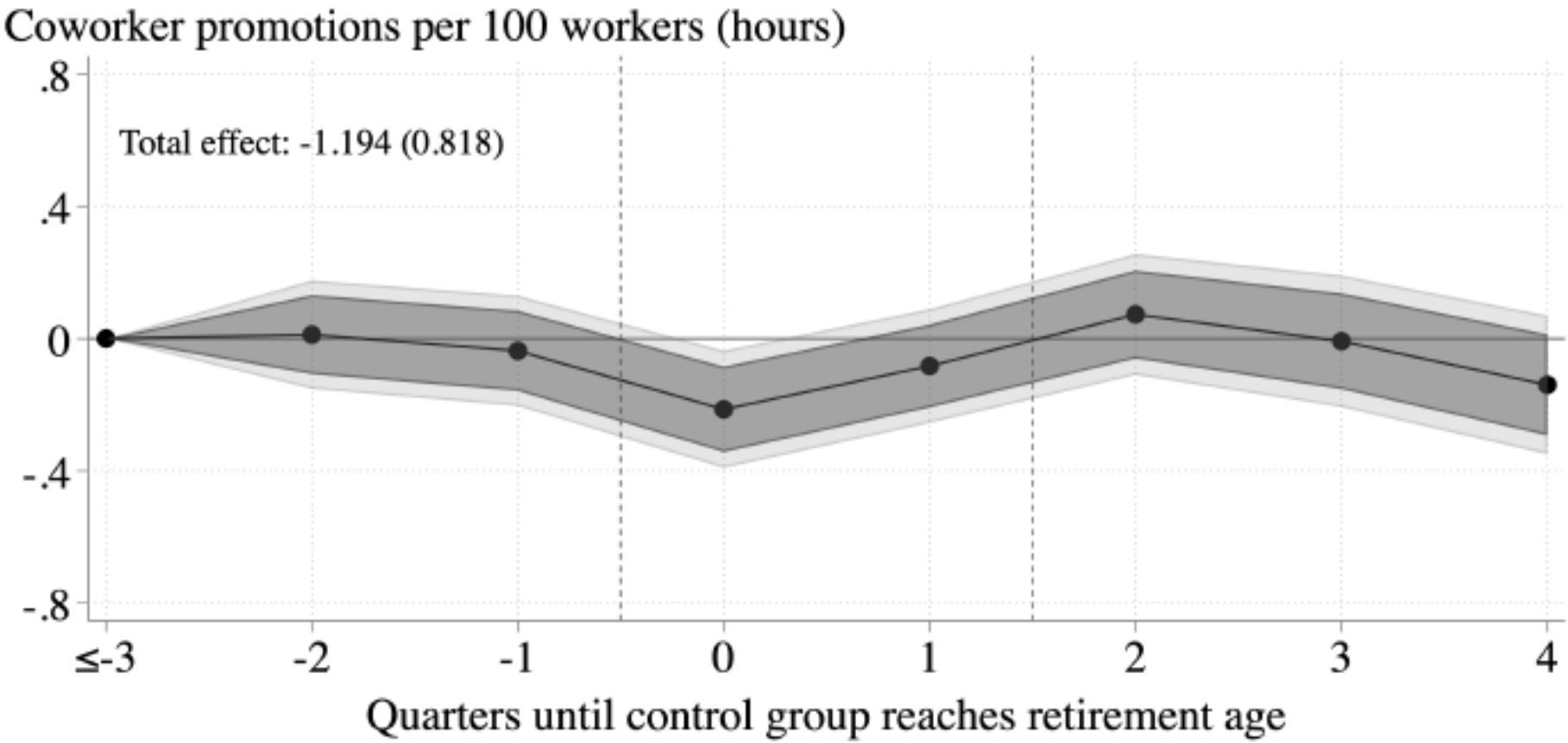

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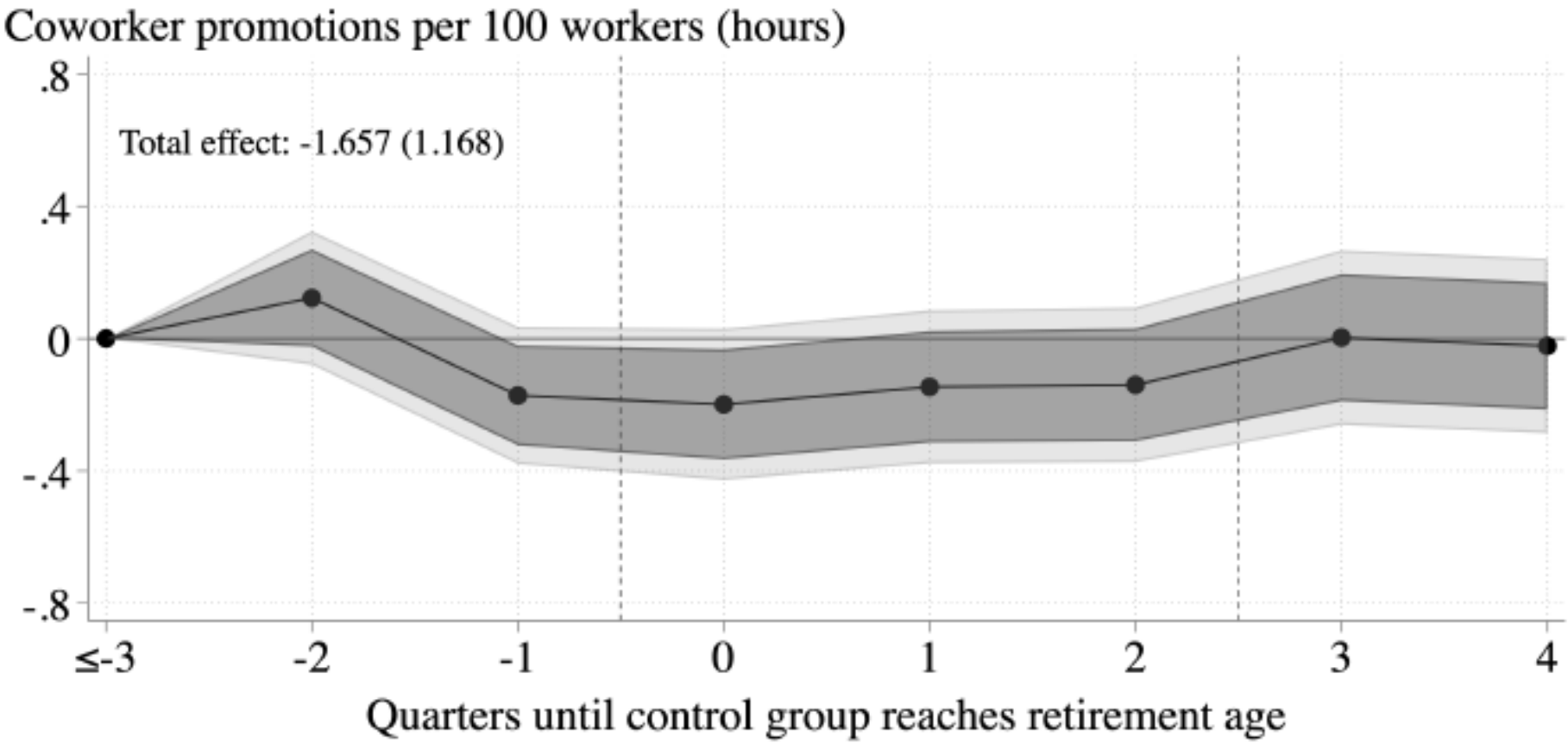

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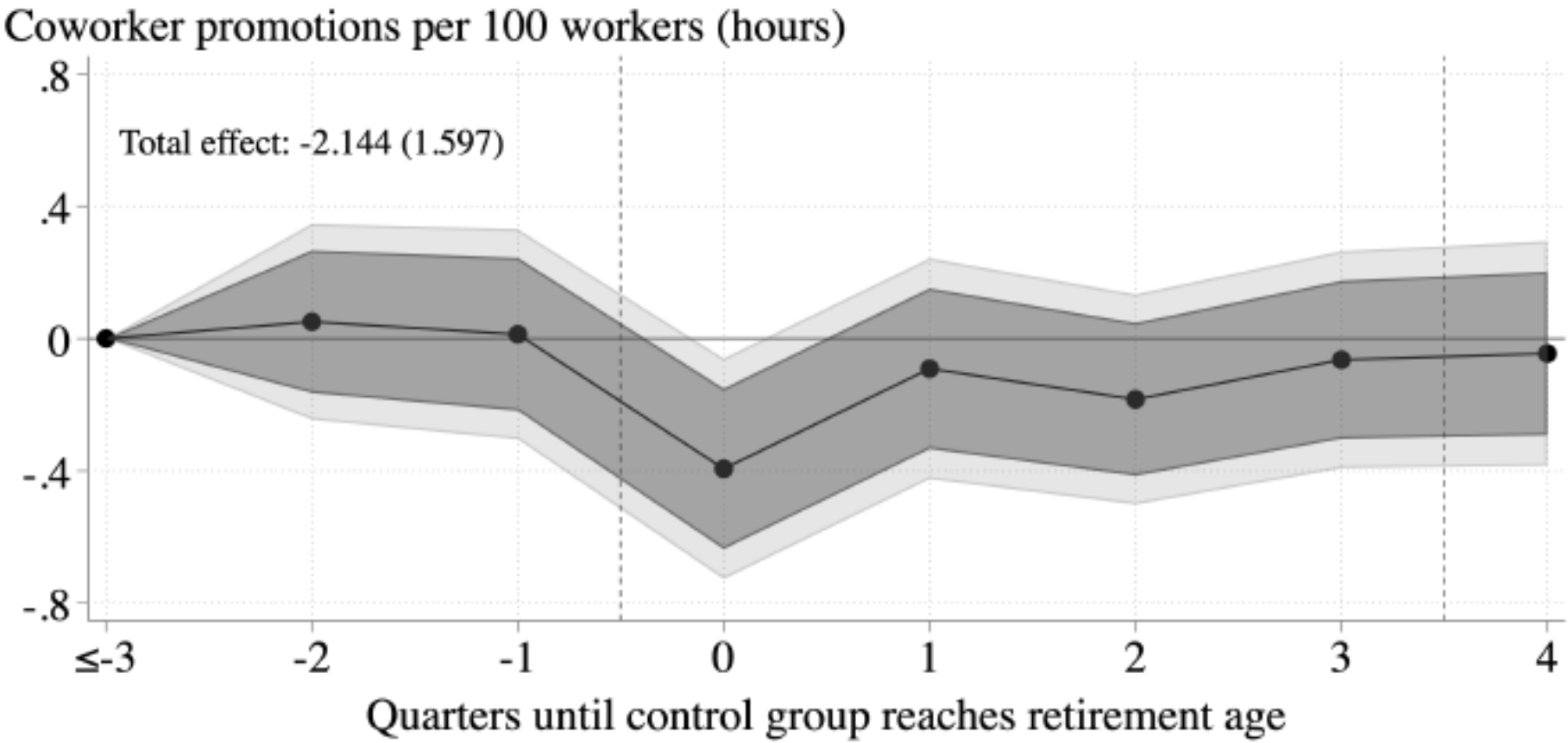

Effects of SRA increases: Coworker promotion rate (wages)

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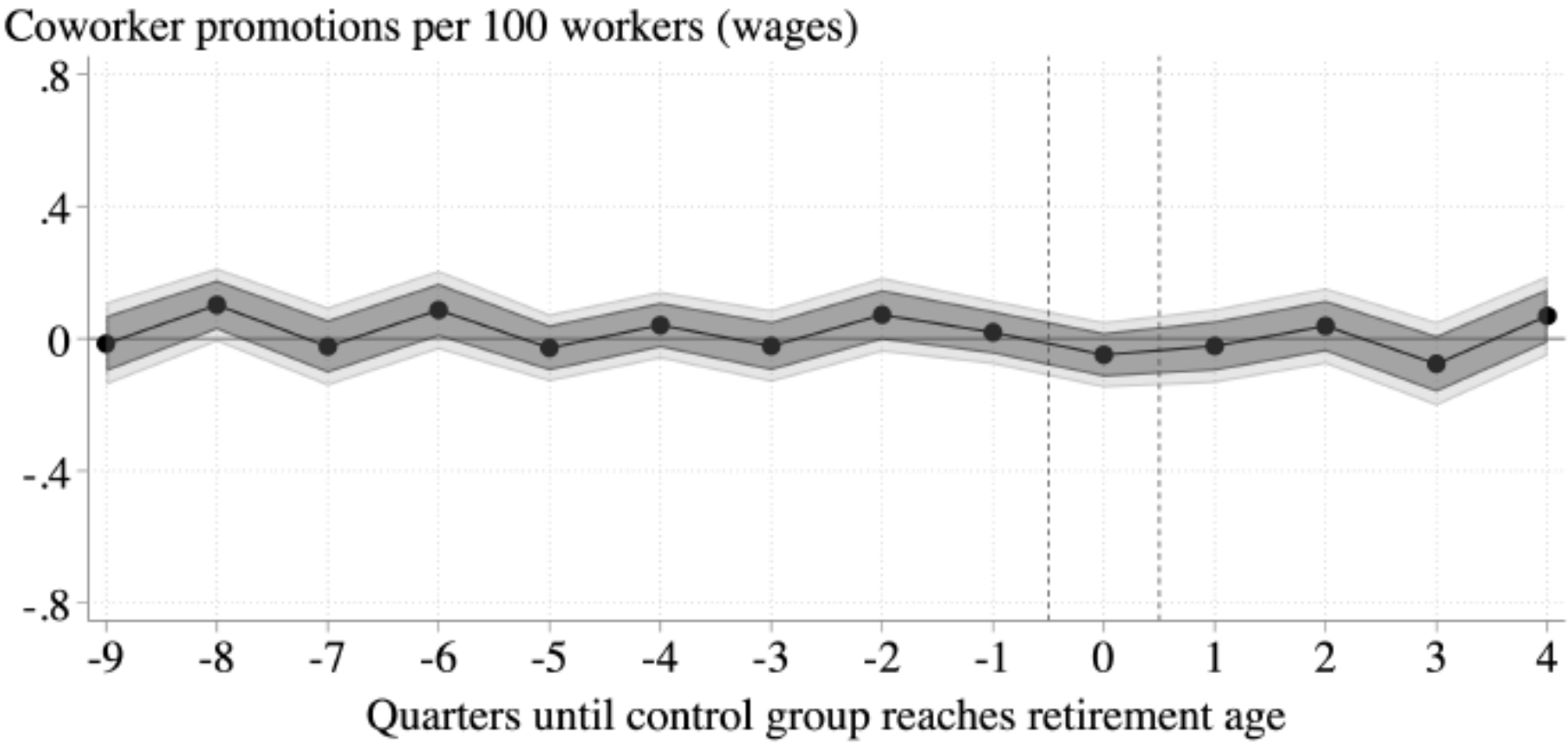

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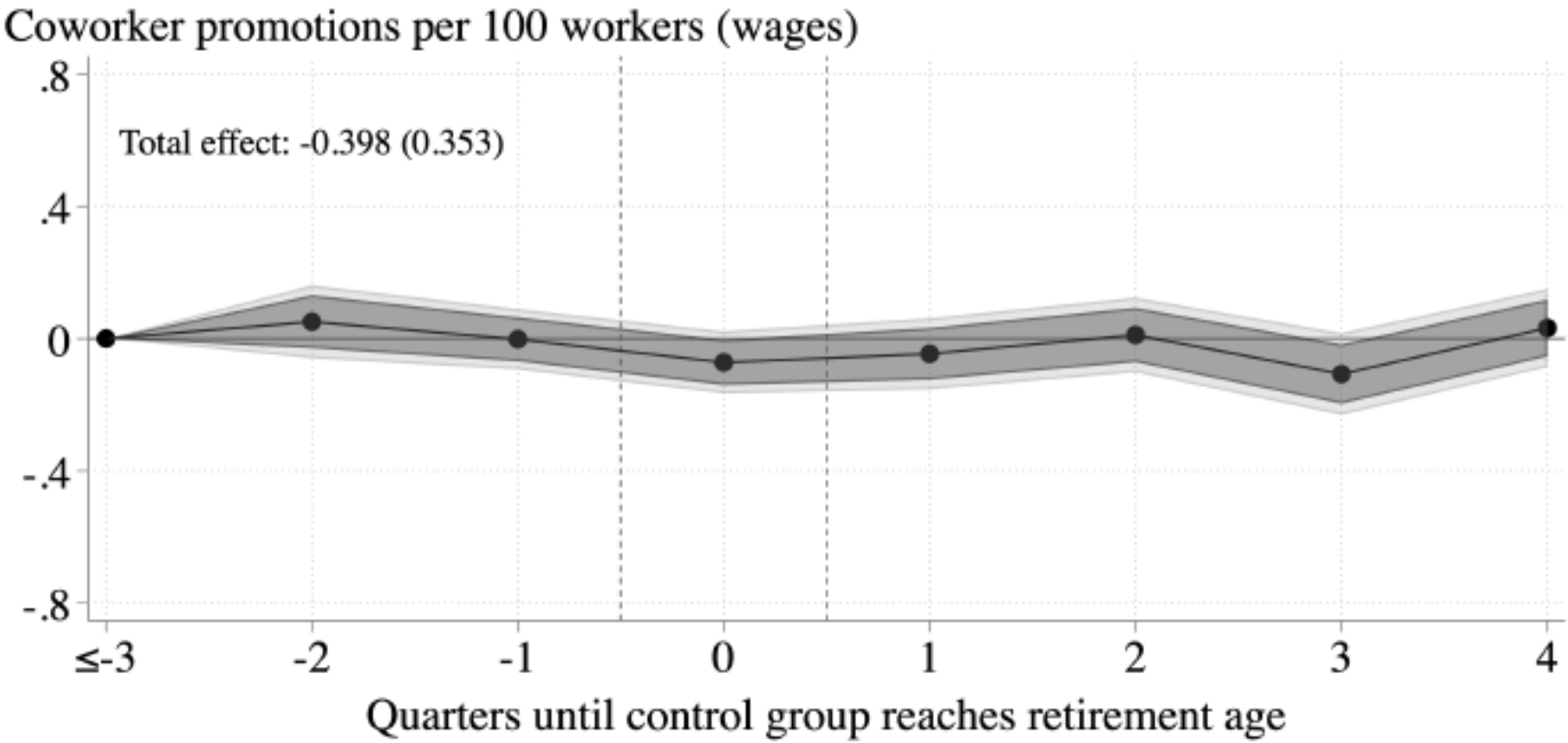

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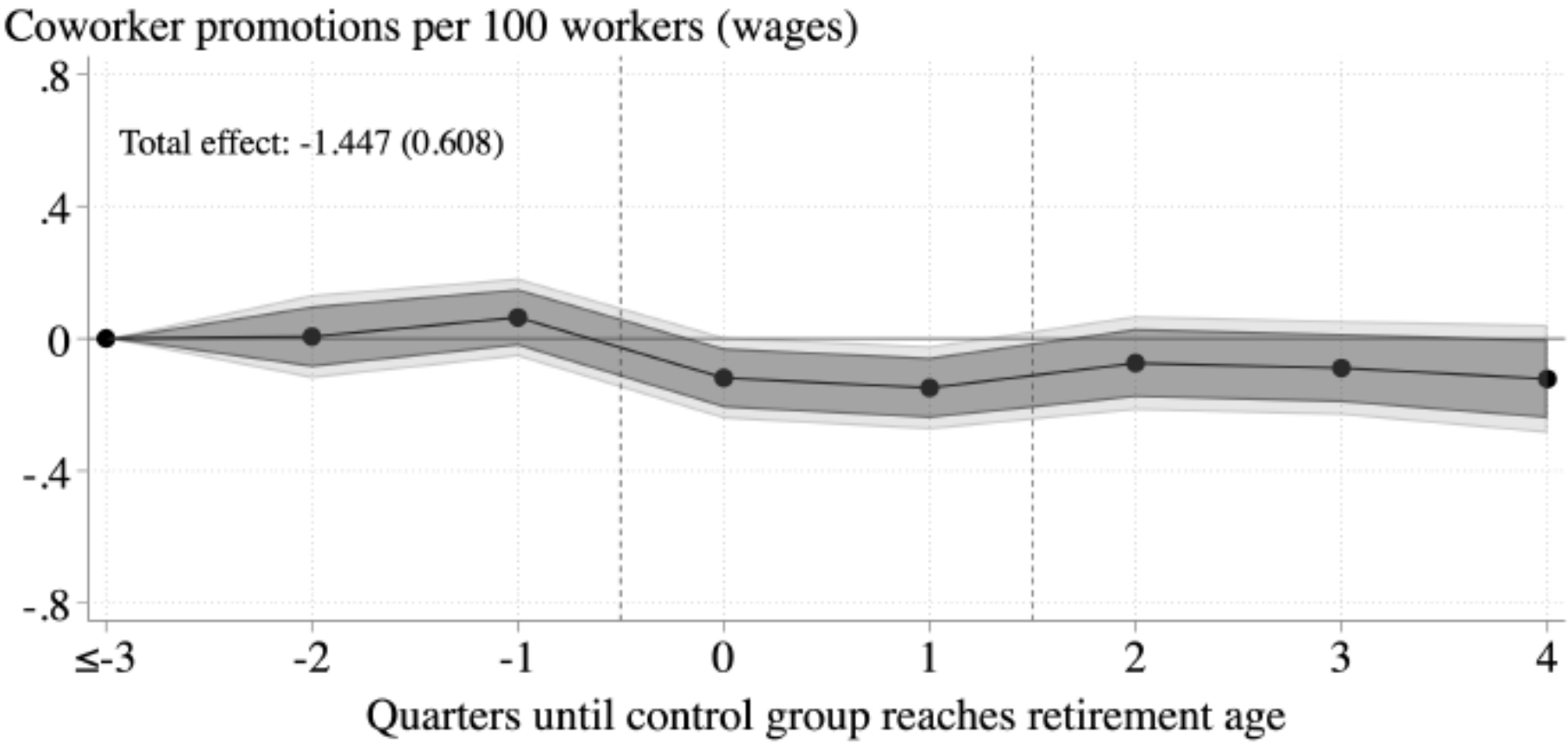

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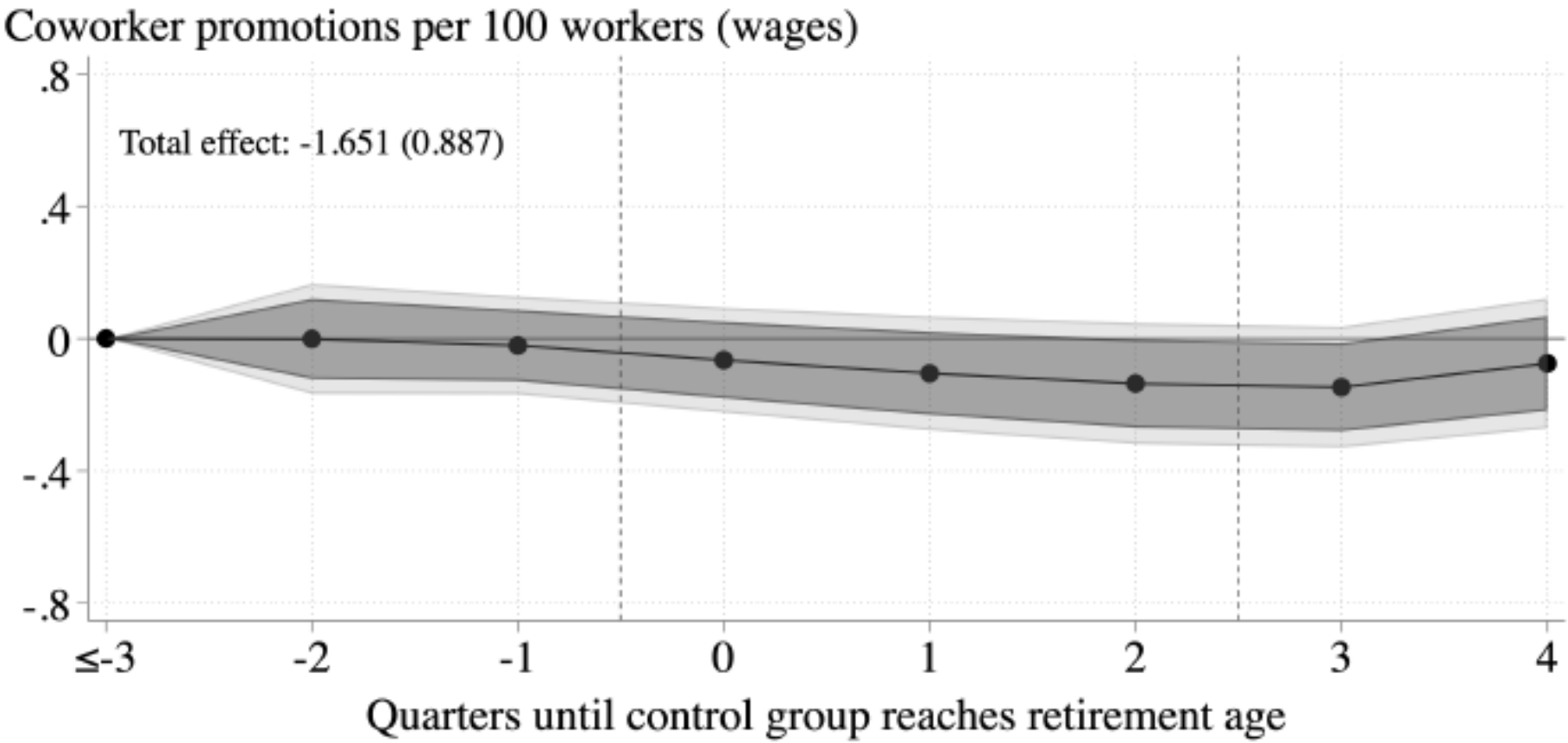

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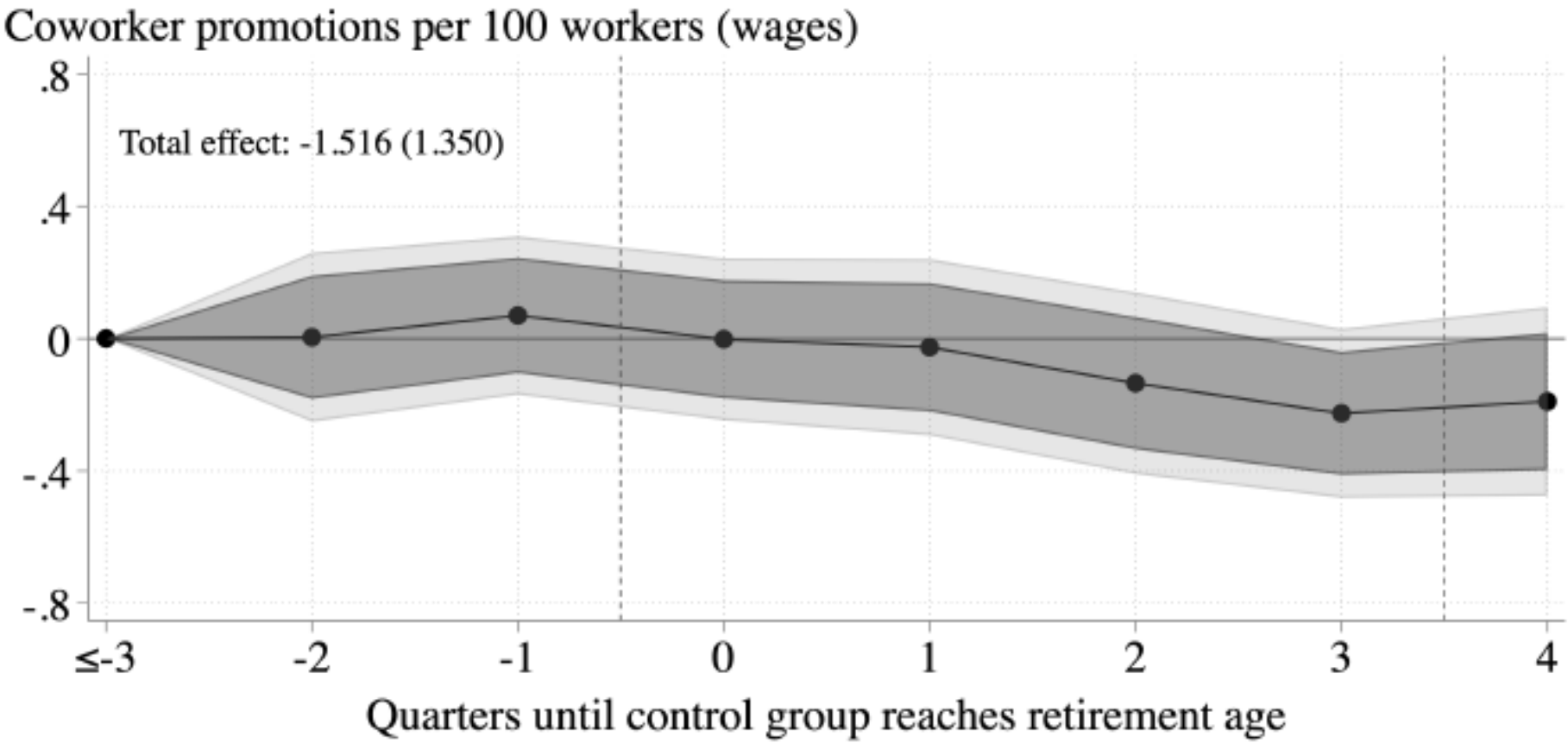
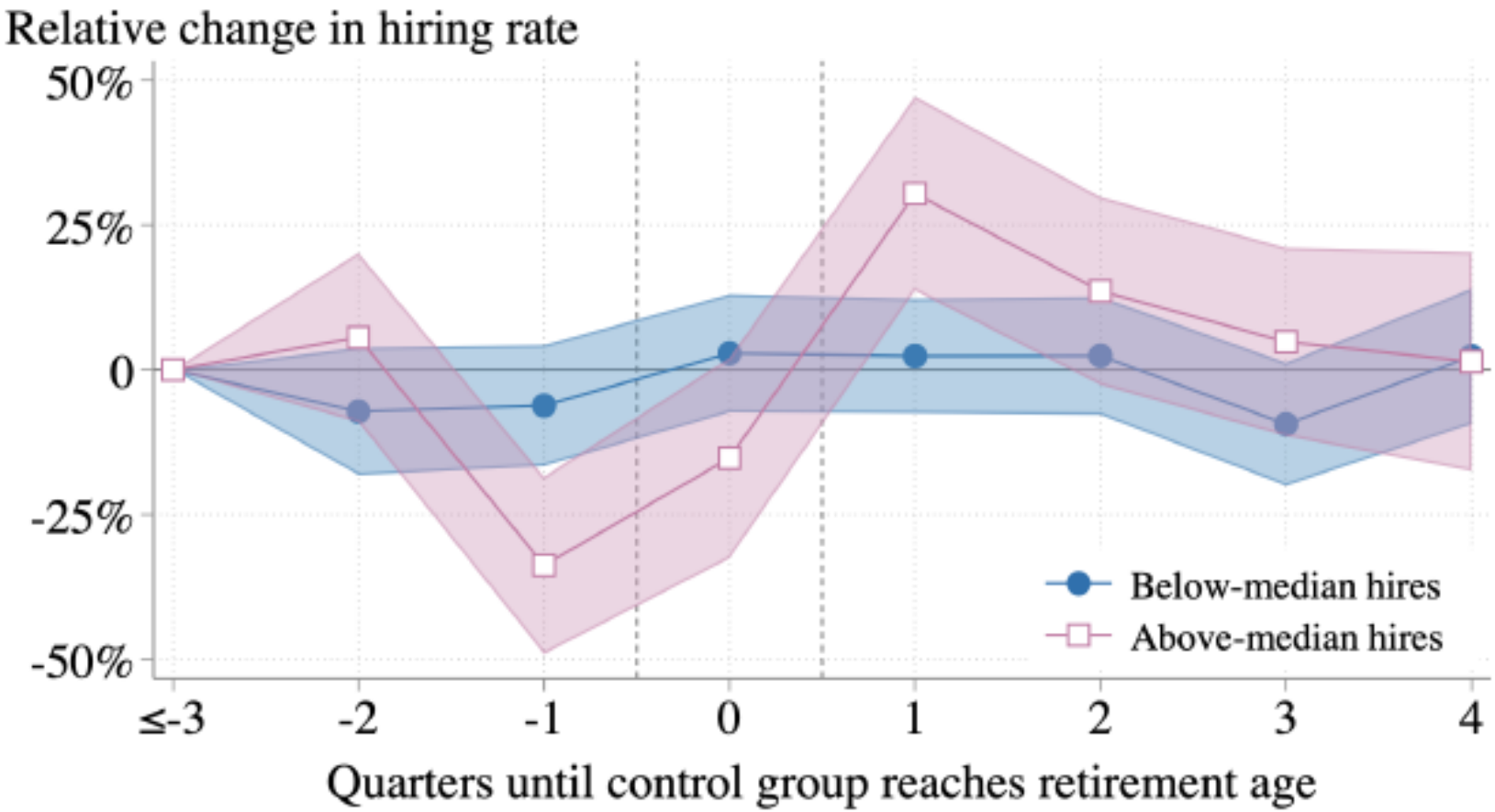


Robustness

1. Effects on combined earnings growth of stable coworkers ▸ See
   - Qualitatively similar patterns; mostly explained by changes in hours
2. Use different thresholds to define promotions based on earnings ▸ See
   - Smaller but qualitatively similar results for >20% and >40% increases
   - Effects observed for monthly increases of €250+, €500+ & €750+
3. Other choices make little difference: ▸ See
   a. Twoway clustering by focal worker's firm and month-year of birth
   b. Fixed denominator when defining rates of hiring, promotions etc
   c. Alternative samples:
      i. Allow firms to grow/shrink beyond 5–200 workers
      ii. Restrict firms to have single focal worker in each cohort-pair

Heterogeneity by relative earnings of workers: Hiring rates

Figure: Focal workers earning **above** the firm's median



Heterogeneity by relative earnings of workers: Hiring rates

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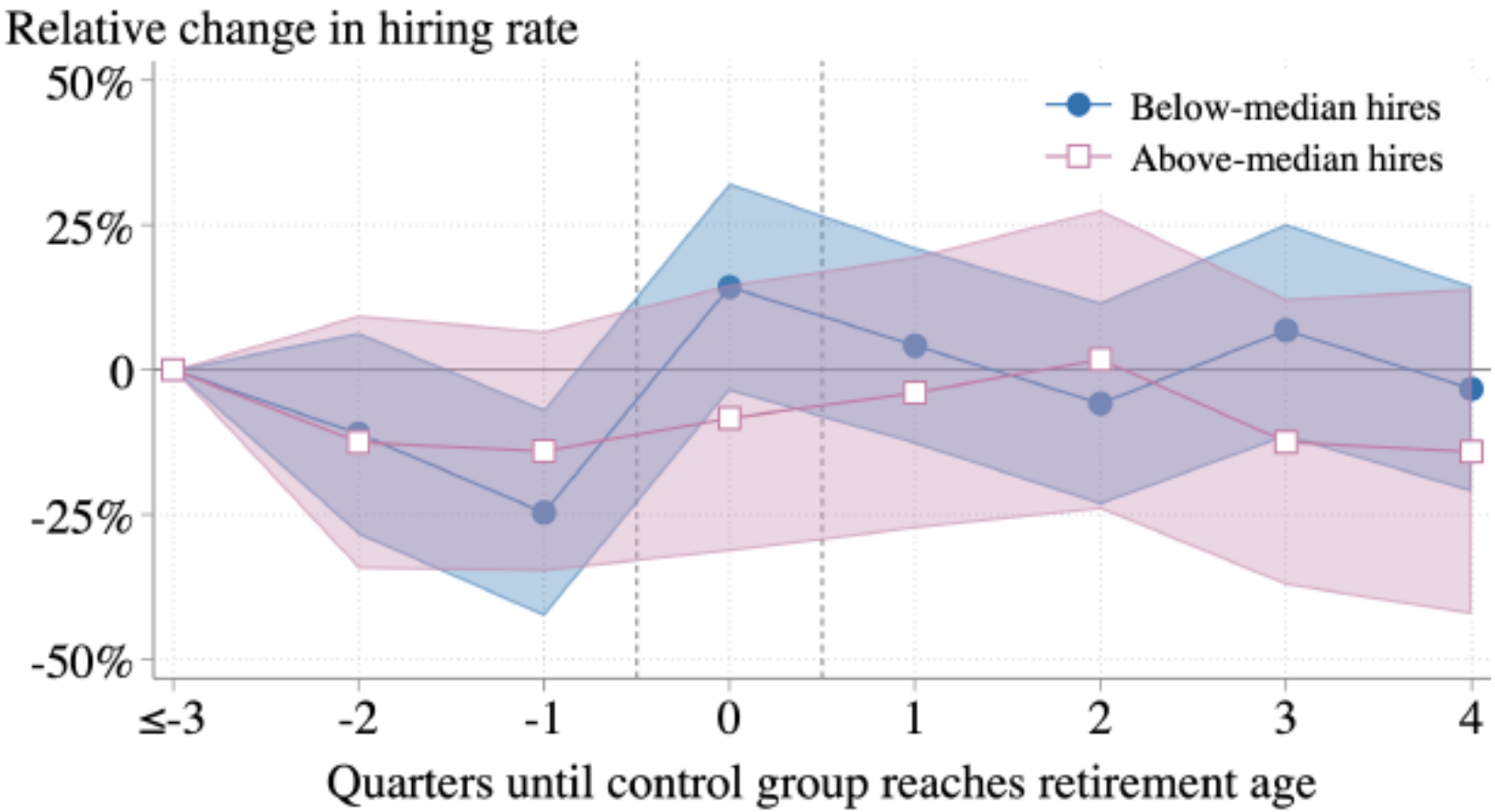

Heterogeneity by relative earnings of workers: Promotions

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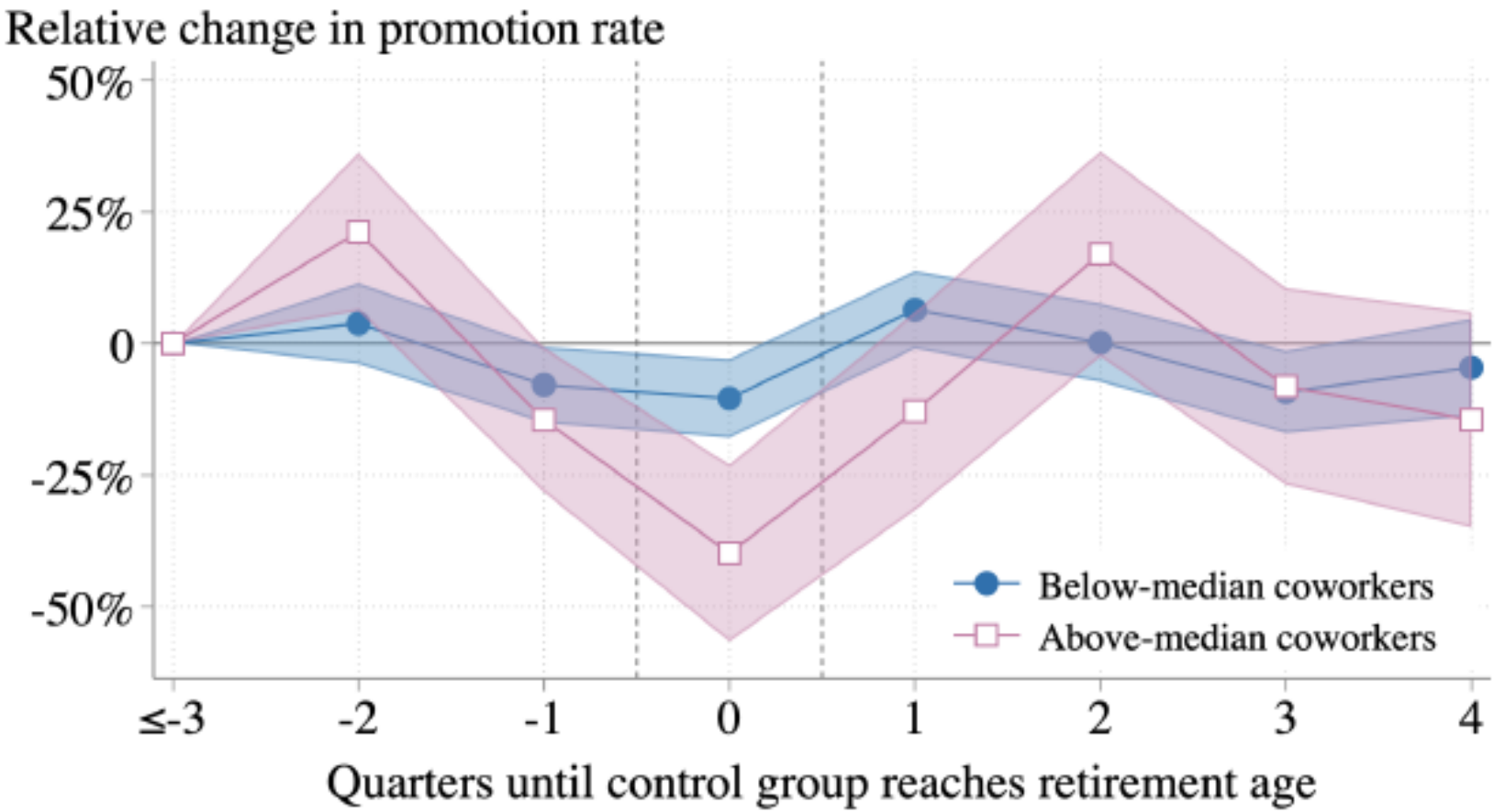

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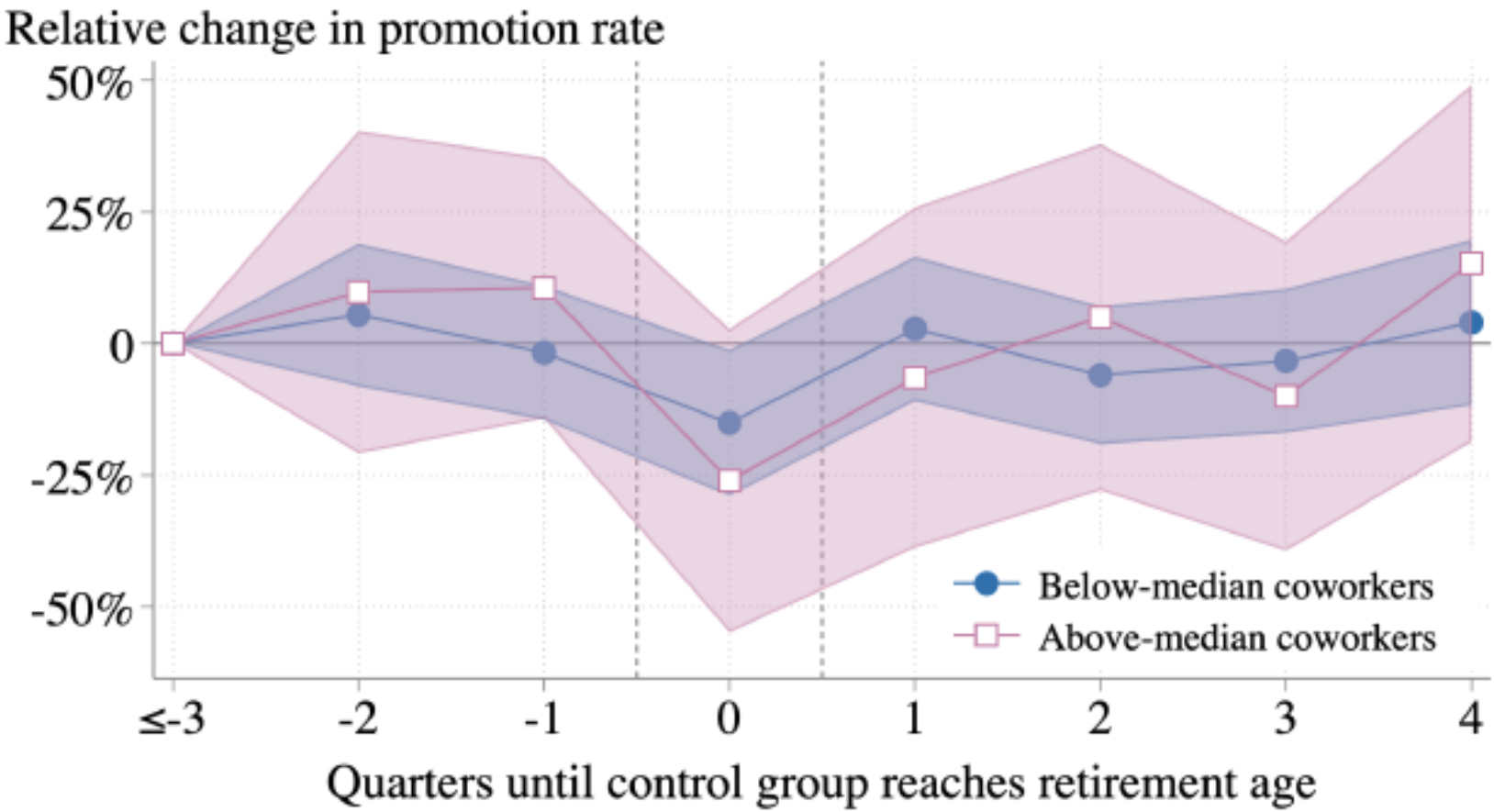

Heterogeneity by worker/firm characteristics

- Proportionately larger effects on female coworkers and middle-aged/older coworkers
- Not much heterogeneity by firm characeteristics for hiring
- Effects on promotions driven by smaller/less productive firms, and firms that are growing in size

Magnitudes: Incumbent coworkers' earnings

- Consider a firm with 10 workers (1 focal and 9 coworkers) — what is the impact of the focal worker delaying retirement by one month?

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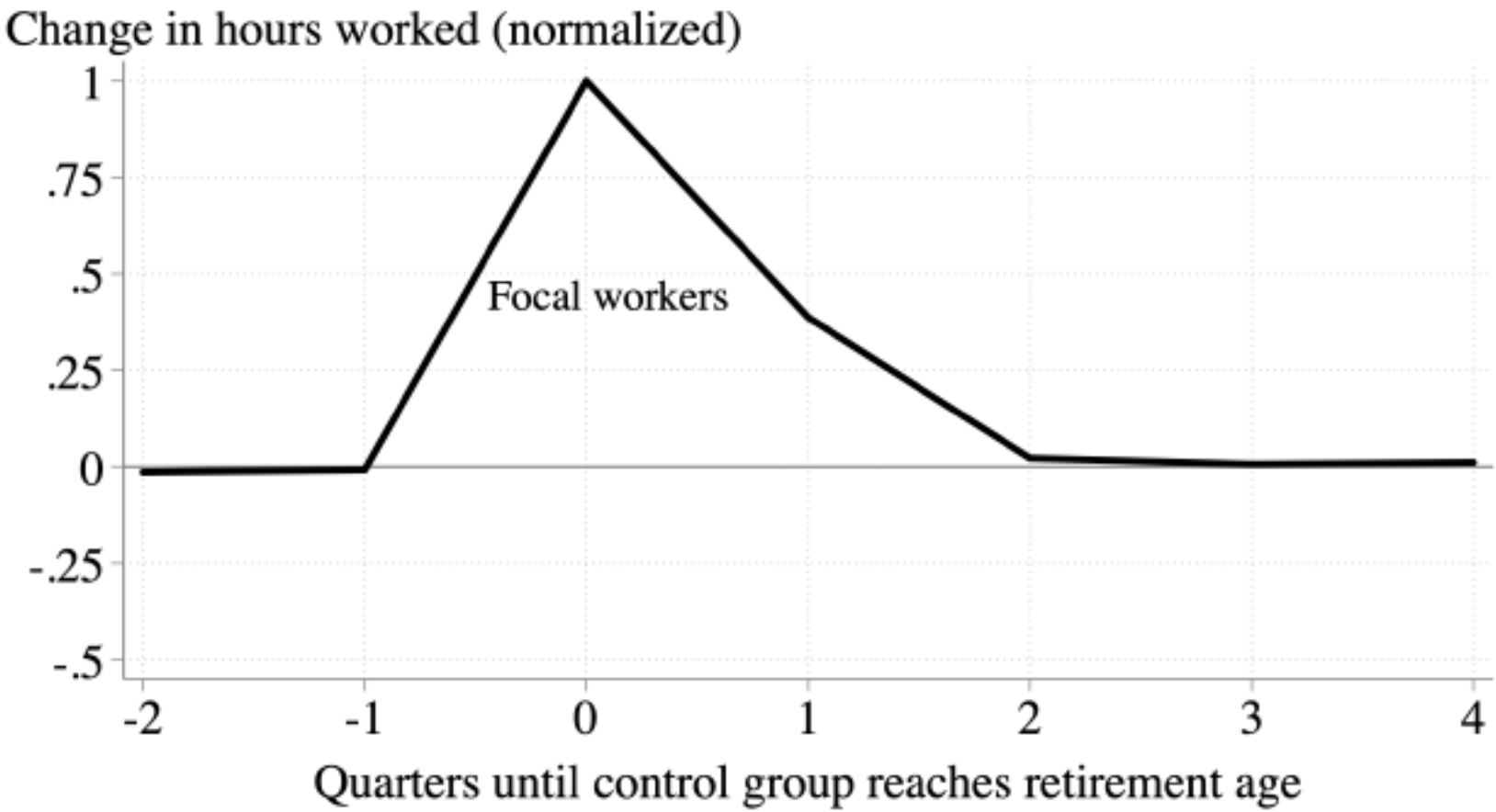
  - We estimate a reduction in coworkers' average earnings of €65–125 (€780–1500 for a one-year delay)
  - Aggregating across coworkers, decline offsets 16–32% of the increase in focal workers' earnings
- Effects concentrated among those who are delayed/denied promotions
- Large earnings losses of ∼€5,000 among these individuals

Magnitudes: Relative hours changes at affected firms

Figure: SRA increase of 3–4 months



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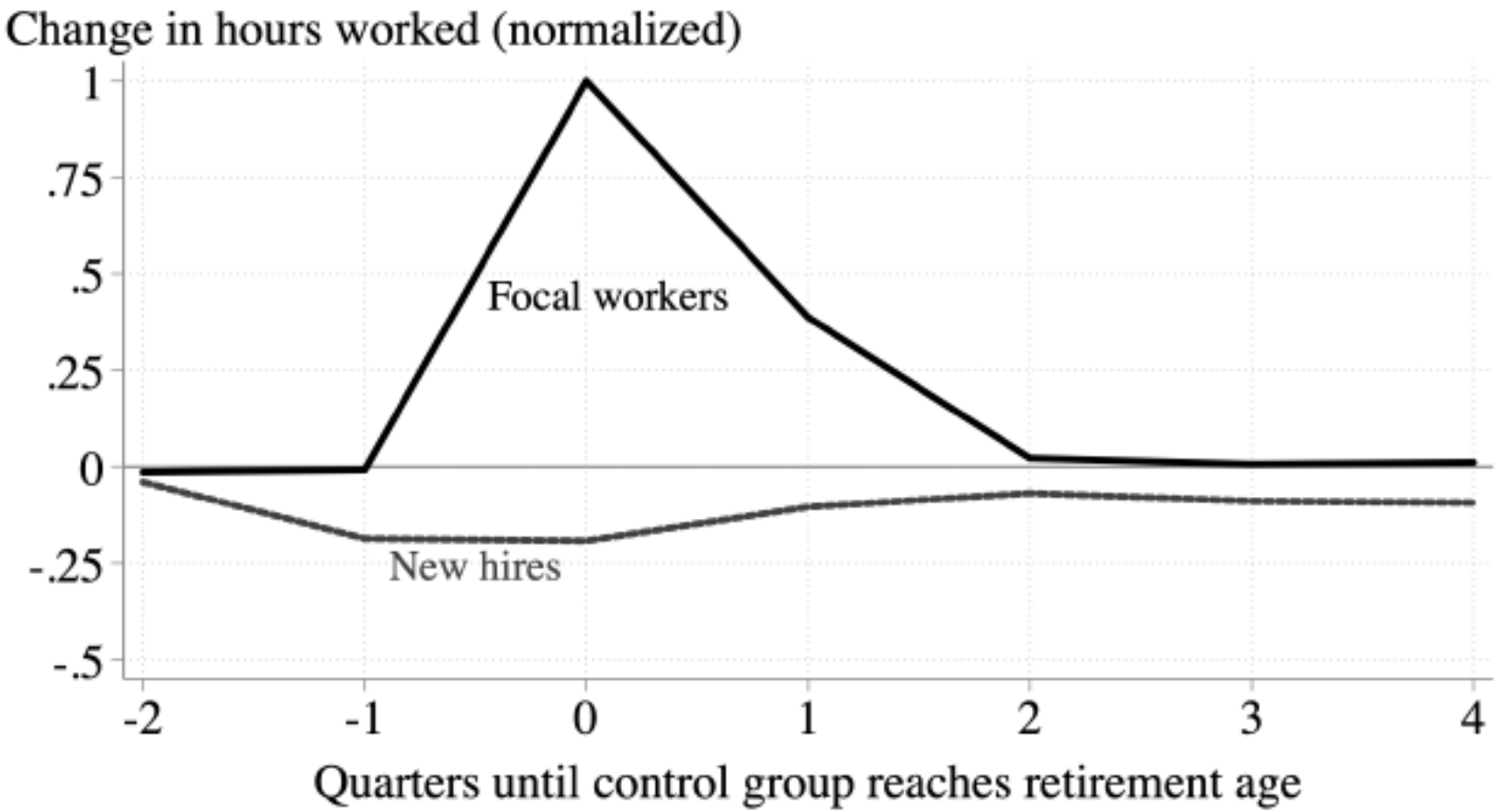

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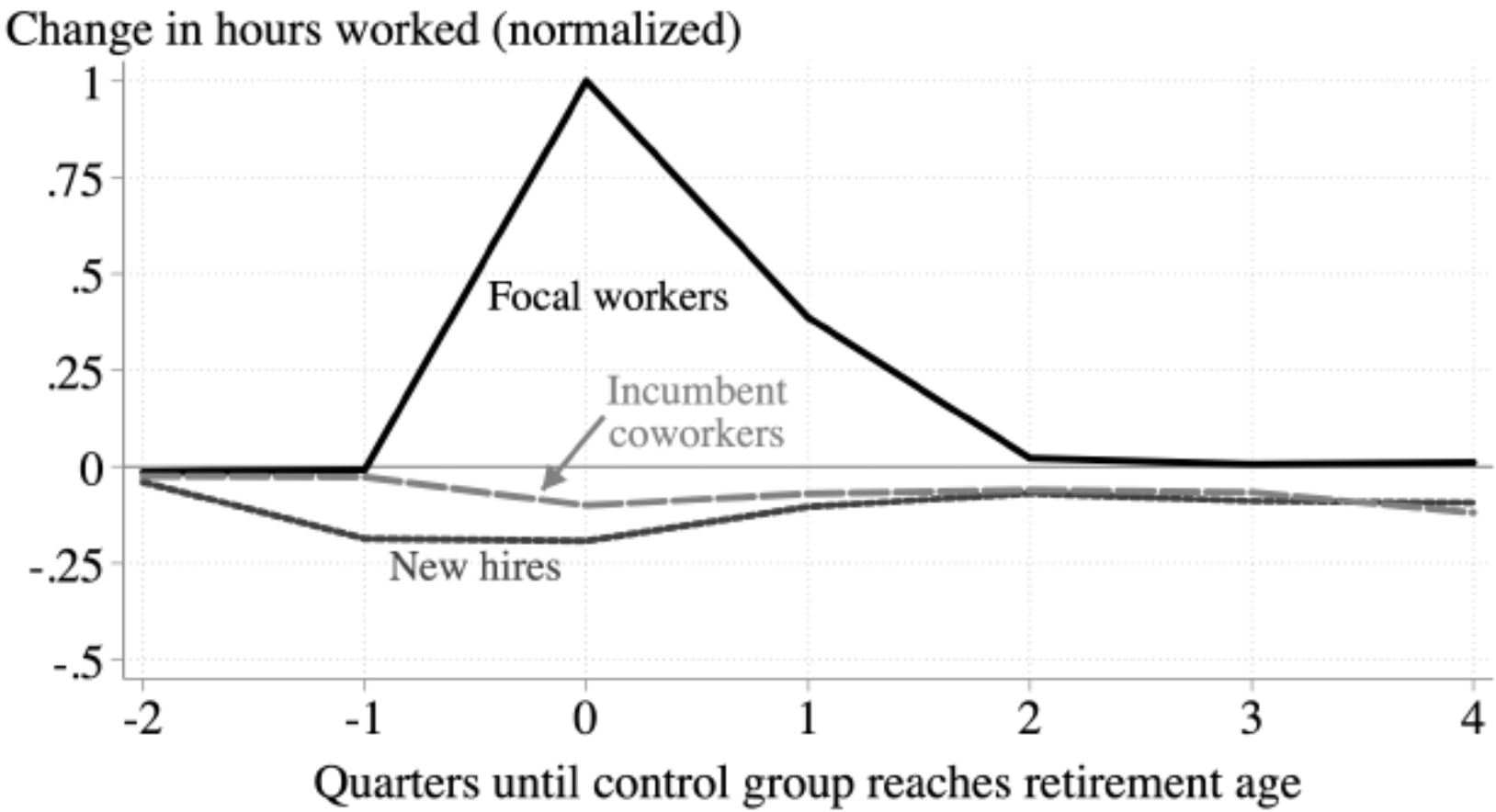

Magnitudes: Cumulative hours changes at affected firms

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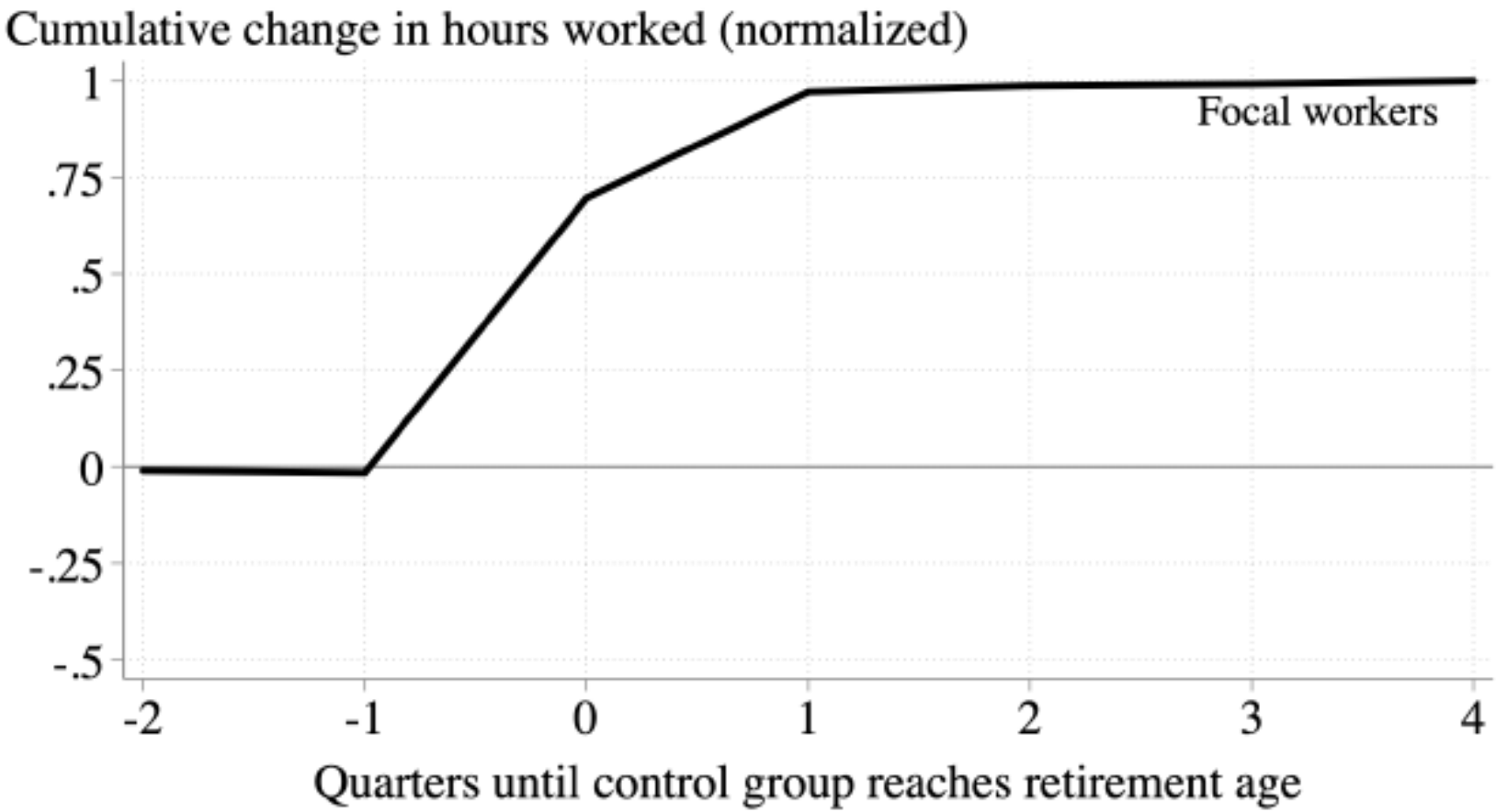

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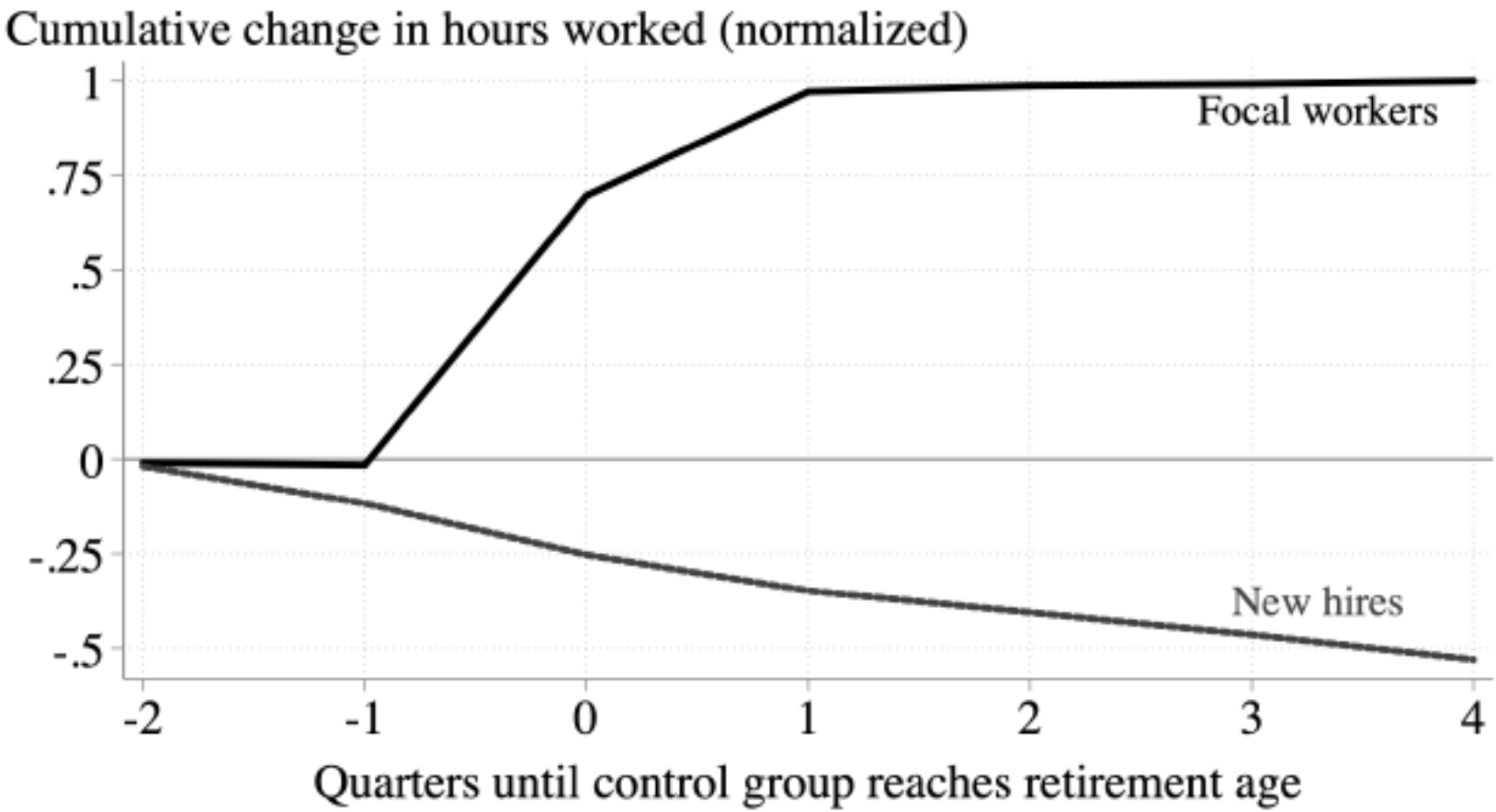

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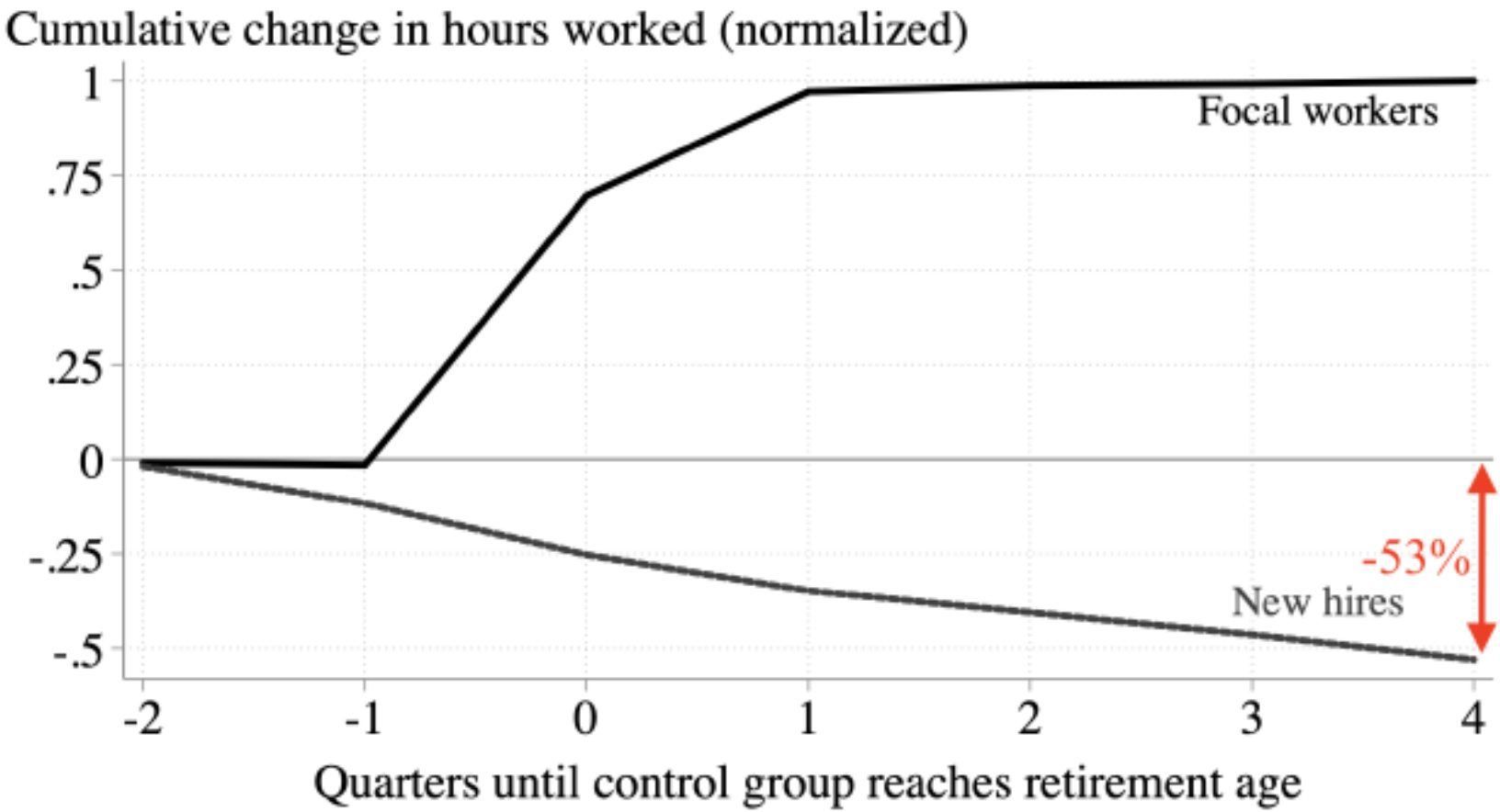

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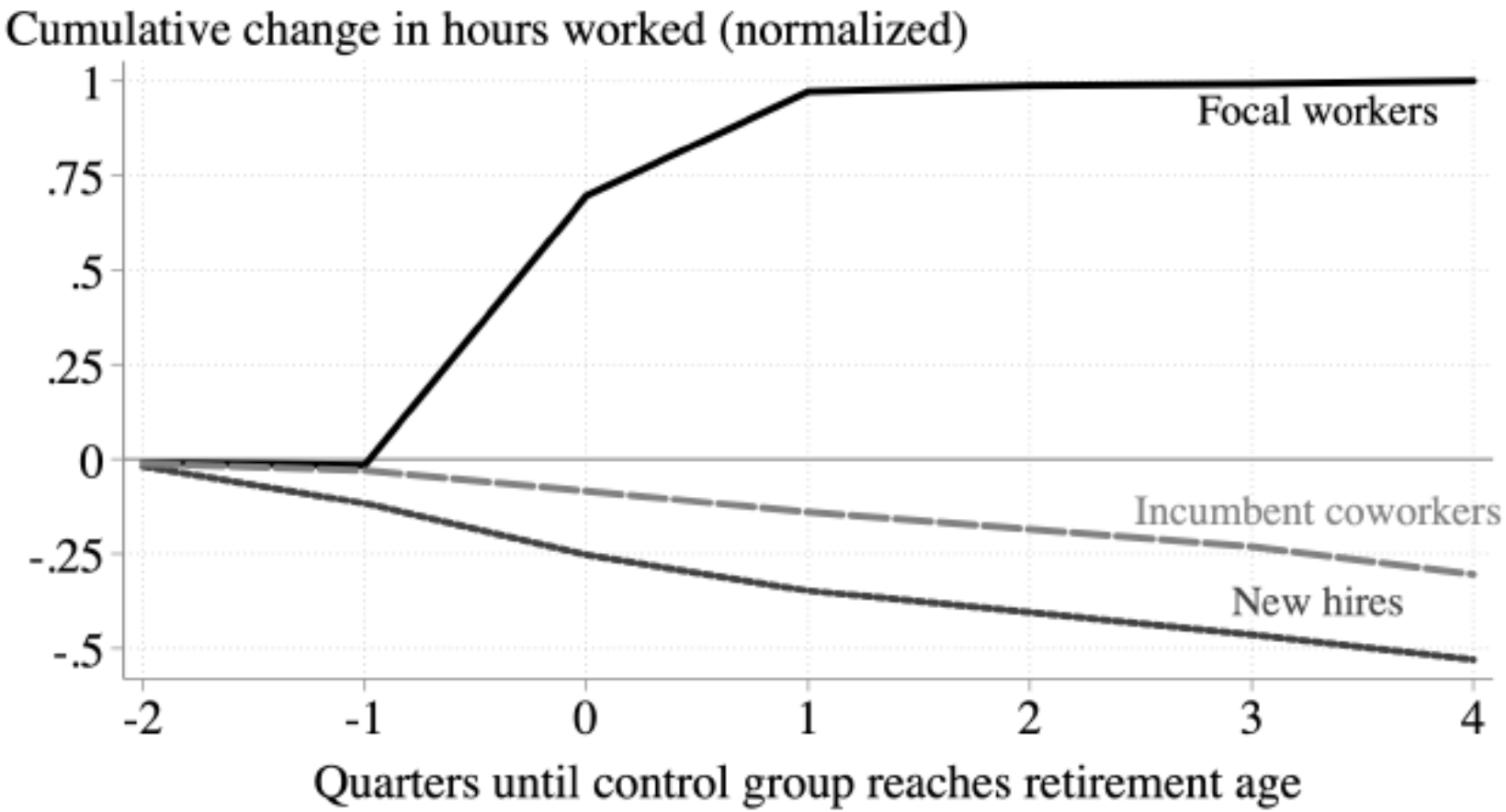

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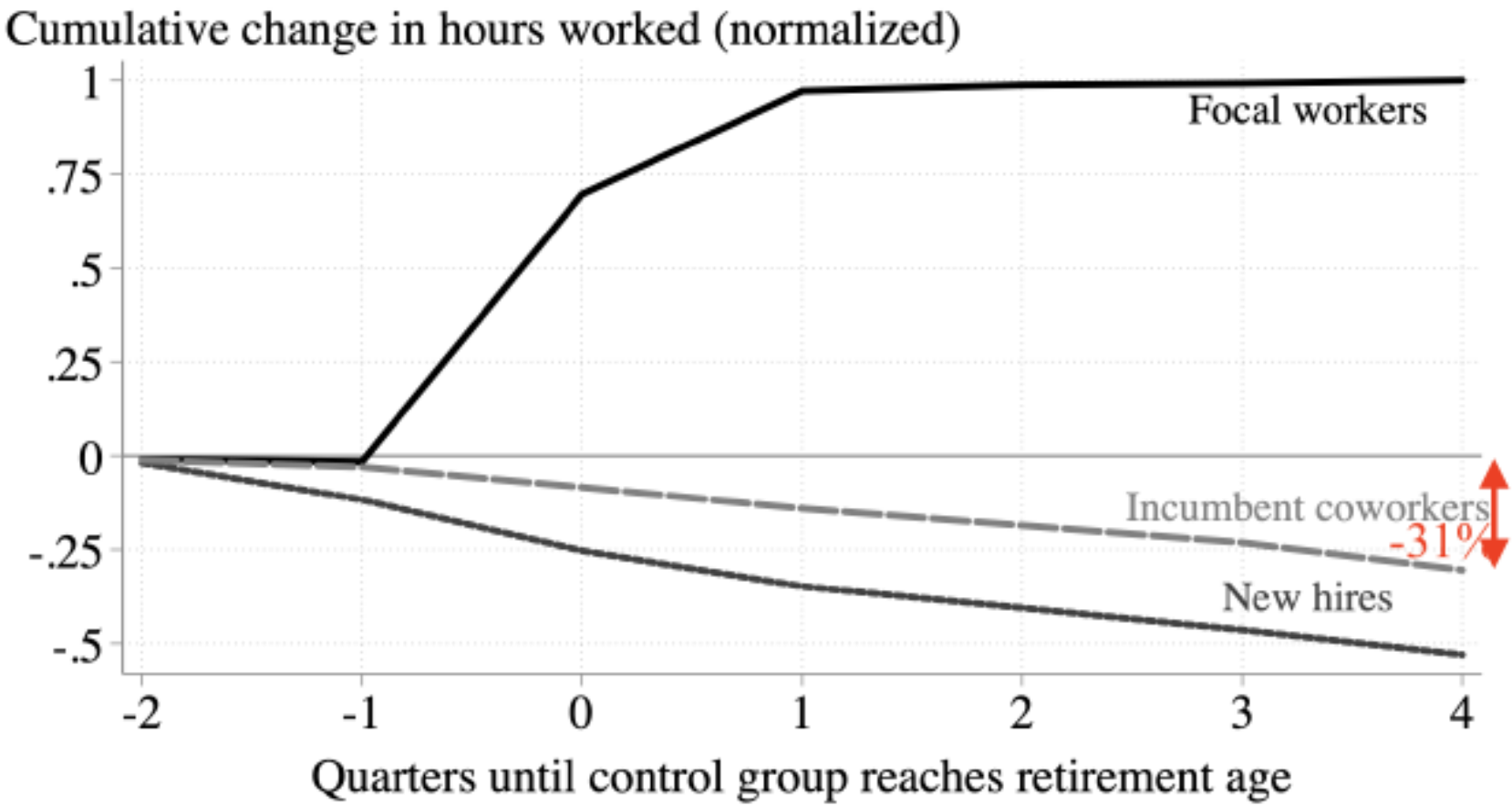

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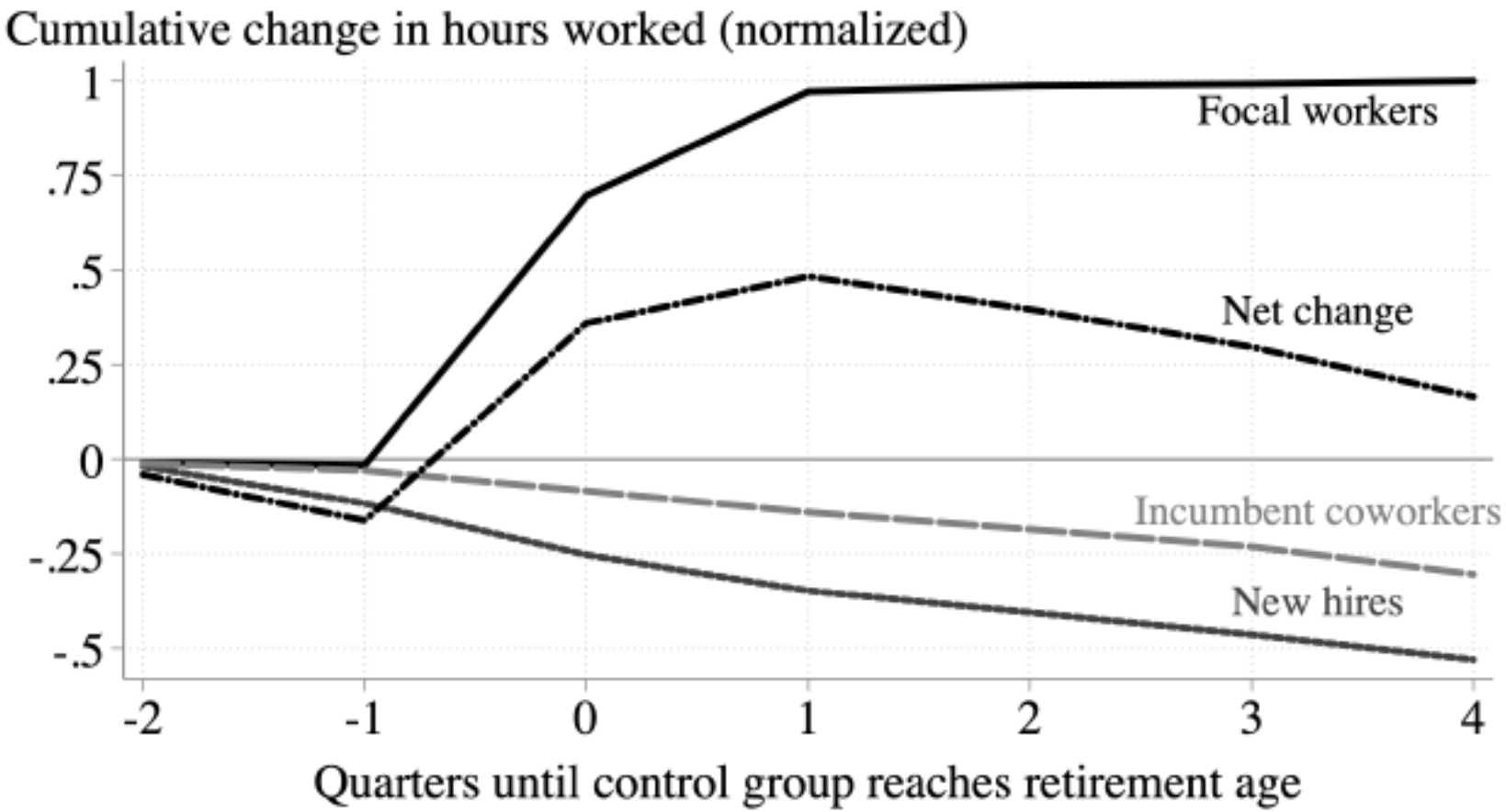
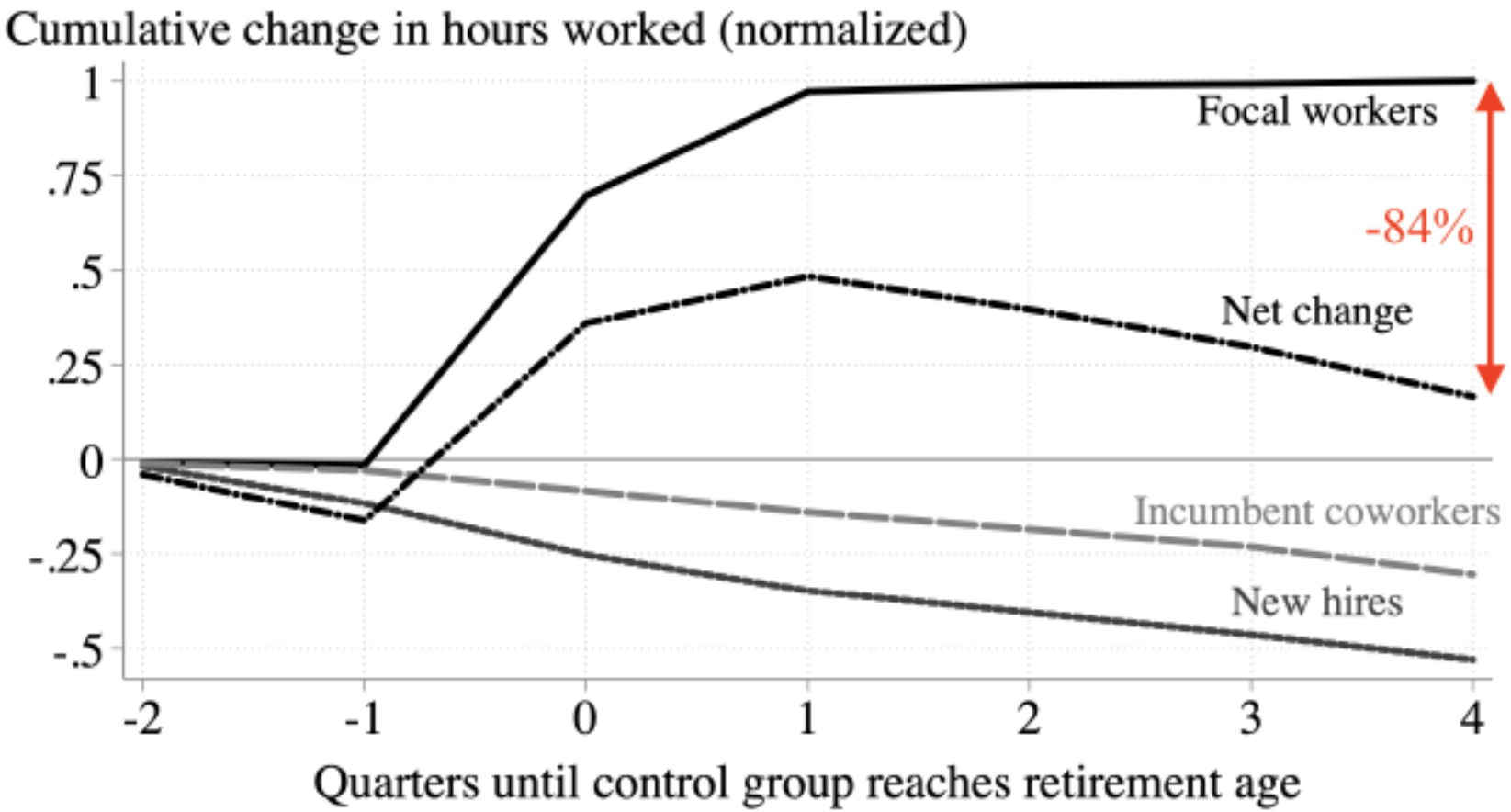


Magnitudes: Cumulative hours changes at affected firms

Figure: SRA increase of 3–4 months



Conclusion

- We show that firms significantly adjust their workforce when older workers delay retirement
- Mainly by delaying and decreasing hiring and coworker promotions
- At affected firms, most of the increase in hours/earnings is offset
- But reform still had positive net effects on workers' earnings/hours
- When thinking about the overall implications of our results, it's important to emphasize the following caveats:
  1. The decrease in hiring may mainly shift workers between firms
  2. Reform may have boosted consumption
  3. We focus on small-to-medium firms in private sector

First order conditions

$$H_{1,N}: \; H^*_{1,N} \geq \left(F_{1,N}(\cdot) + \delta F_{2,I}(\cdot) + \delta^2 F_{3,I}(\cdot) - \left(1 + \delta + \delta^2\right) w_Y\right)\left(\frac{1}{a_N}\right)$$

$$H_{2,N}: \; H^*_{2,N} \geq \left(F_{2,N}(\cdot) + \delta F_{3,I}(\cdot) - (1+\delta) w_Y\right)\left(\frac{1}{a_N}\right)$$

$$H_{3,N}: \; H^*_{3,N} \geq \left(F_{3,N}(\cdot) - w_Y\right)\left(\frac{1}{a_N}\right)$$

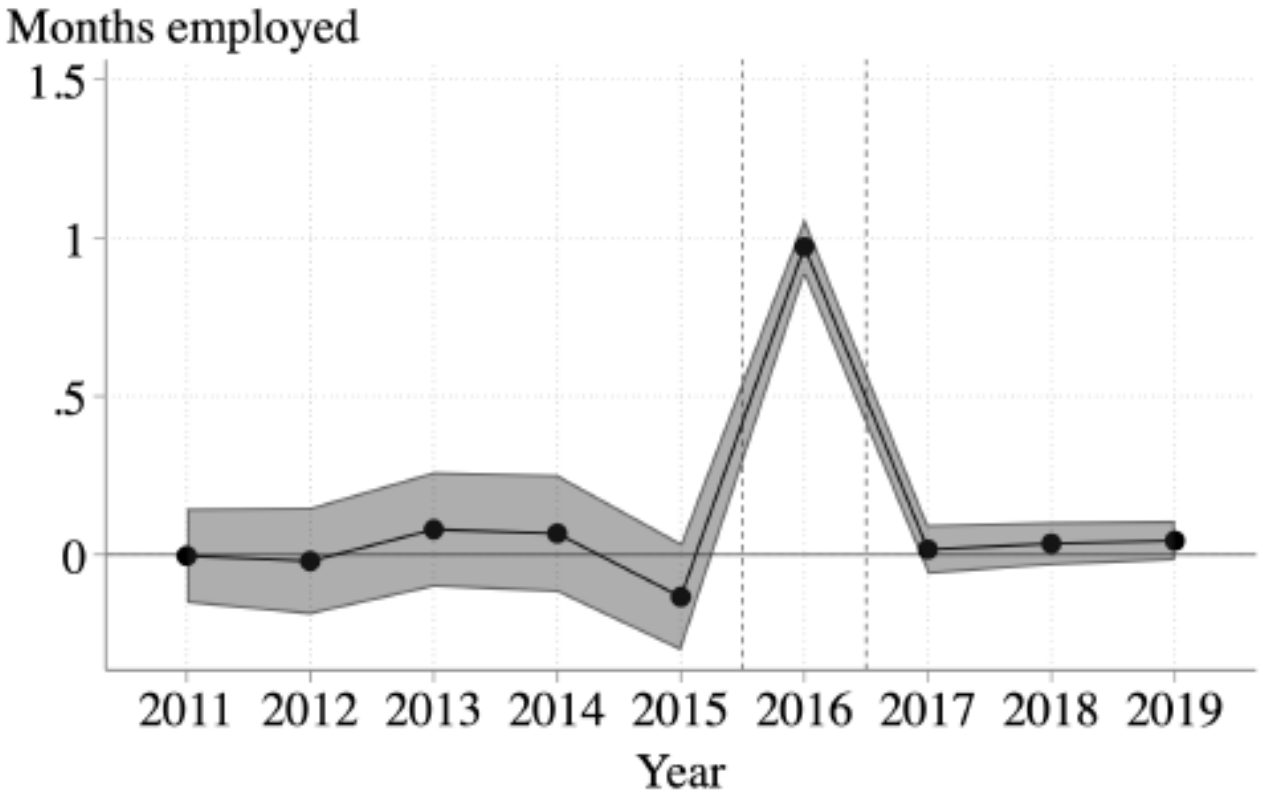
$$i_2: \quad \begin{cases} i_2^* \geq \left(F_{2,I}(\cdot) + \delta F_{3,I}(\cdot) - (1+\delta) w_Y\right)\left(\frac{1}{a_I}\right), & \text{if} \quad i_2^* \geq 0 \\ i_2^* = \left(F_{2,I}(\cdot) + \delta F_{3,I}(\cdot) - (1+\delta) w_Y + T\right)\left(\frac{1}{a_I}\right), & \text{if} \quad i_2^* < 0 \end{cases}$$

$$i_3: \quad \begin{cases} i_3^* \geq \left(F_{3,I}(\cdot) - w_Y\right)\left(\frac{1}{a_I}\right), & \text{if} \quad i_3^* \geq 0 \\ i_3^* = \left(F_{3,I}(\cdot) - w_Y + T\right)\left(\frac{1}{a_I}\right), & \text{if} \quad i_3^* < 0 \end{cases}$$

◂ Back

RD estimates by year

Figure: Employment effects of SRA increase from 65.25 to 65.5



◂ Back

Descriptive statistics when focal worker is aged 64.5

	Mean	Std. Dev.
Focal worker characteristics		
Age in years	64.5	0
Employed	100%	0
Monthly contractual work hours	152	31
Monthly contractual earnings	€3,306	€1,652
Contractual hourly wage	€21.6	€9.9
Share male	79.4%	
Firm/coworker characteristics		
Number of workers	46.0	40.7
Young workers (age 20–34)	11.2	12.1
Middle-age workers (age 35–49)	16.9	17.0
Older workers (age 50+)	17.8	17.2
Focal workers	2.3	1.9
Total monthly contractual wage costs	€144,340	€150,069
No. of coworker separations per month per 100 workers	1.08	2.51
No. of new hires per month per 100 workers	1.11	2.77
Average p.p. coworker earnings increase	0.87	4.15
Average p.p. coworker hours increase	0.85	5.73
Average p.p. coworker wage increase	0.46	4.21
No. of coworkers with 10% earnings increases per 100 workers	1.70	4.09
No. of coworkers with 10% hours increases per 100 workers	1.39	3.96
No. of coworkers with 10% wage increases per 100 workers	0.96	3.19
Percent change in combined earnings of stable coworkers	0.13	4.53
Percent change in combined hours of stable coworkers	0.11	6.44
Mean earnings of stable coworkers in $t - 1$	€3,003	€951
Mean hours of stable coworkers in $t - 1$	148	24
Combined earnings of stable coworkers in $t - 1$	€127,357	€136,945
Combined hours of stable coworkers in $t - 1$	6,032	5,915
Individuals (focal workers)	19,505	
Firms	12,159	

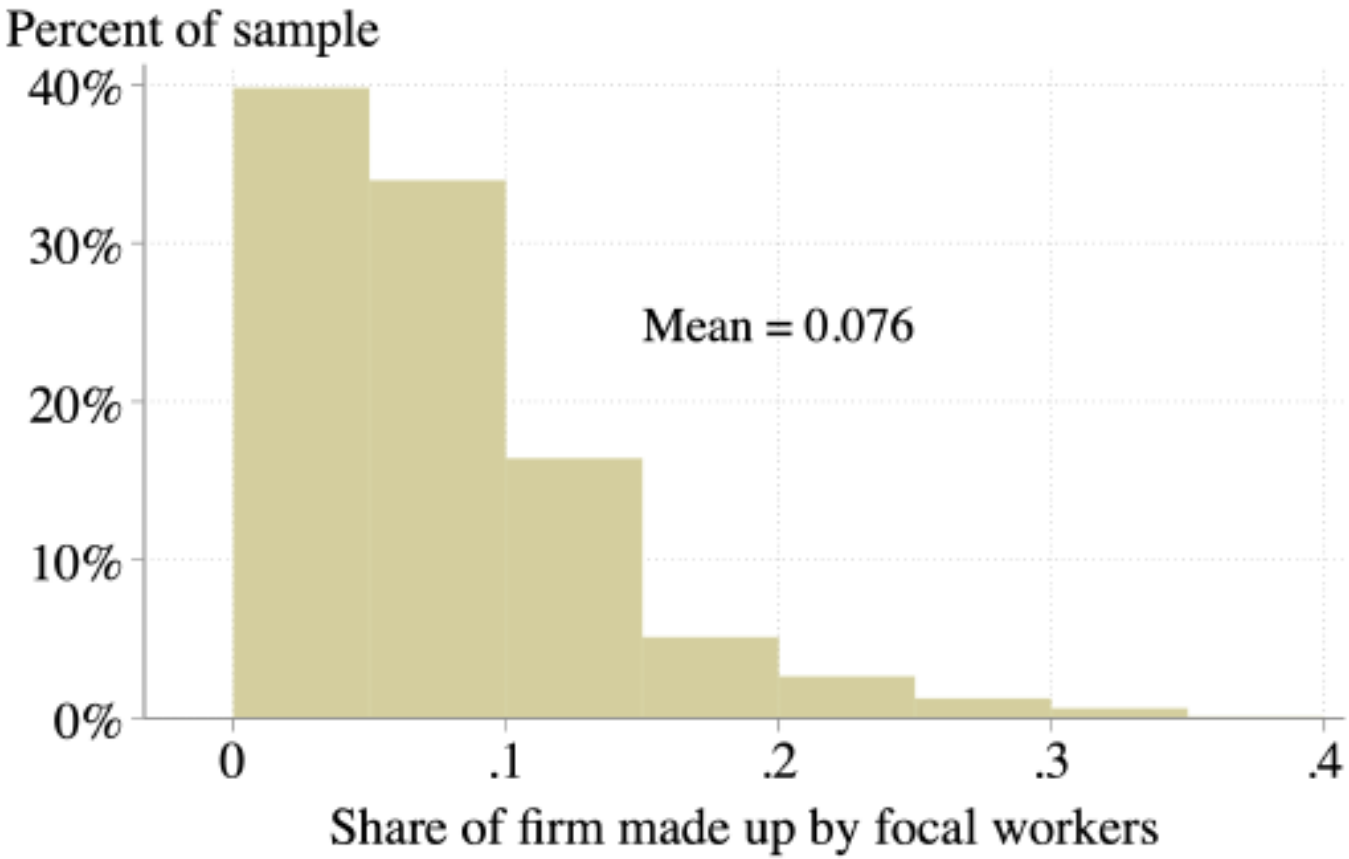
▸ Firm size ◂ Back

Testing for balance across treatment and control groups

	Difference: Treatment *minus* control	Control mean
Focal worker labor supply		
Focal worker hours per 100 workers	41	1,192
	(25)	
Focal worker earnings per 100 workers	653	25,867
	(615)	
Firm size, labor costs and job flows		
Number of workers	1.9	44.5
	(1.0)	
Total labor costs per month	7,191	138,145
	(3,682)	
Monthly hires per 100 workers	0.028	1.012
	(0.025)	
Monthly separations per 100 workers	0.008	1.052
	(0.024)	
Monthly growth in coworkers' earnings, hours and wages		
Average earnings growth (p.p.)	-0.003	0.878
	(0.032)	
Average hours growth (p.p.)	0.034	0.879
	(0.035)	
Average wage growth (p.p.)	-0.013	0.477
	(0.014)	
Coworker promotions: Sustained 10% increases per 100 workers		
Earnings	-0.036	1.732
	(0.062)	
Hours	-0.028	1.441
	(0.058)	
Wages	-0.012	0.989
	(0.032)	
Percent change in combined coworker earnings/hours		
Earnings	0.026	0.129
	(0.031)	
Hours	0.014	0.111
	(0.020)	

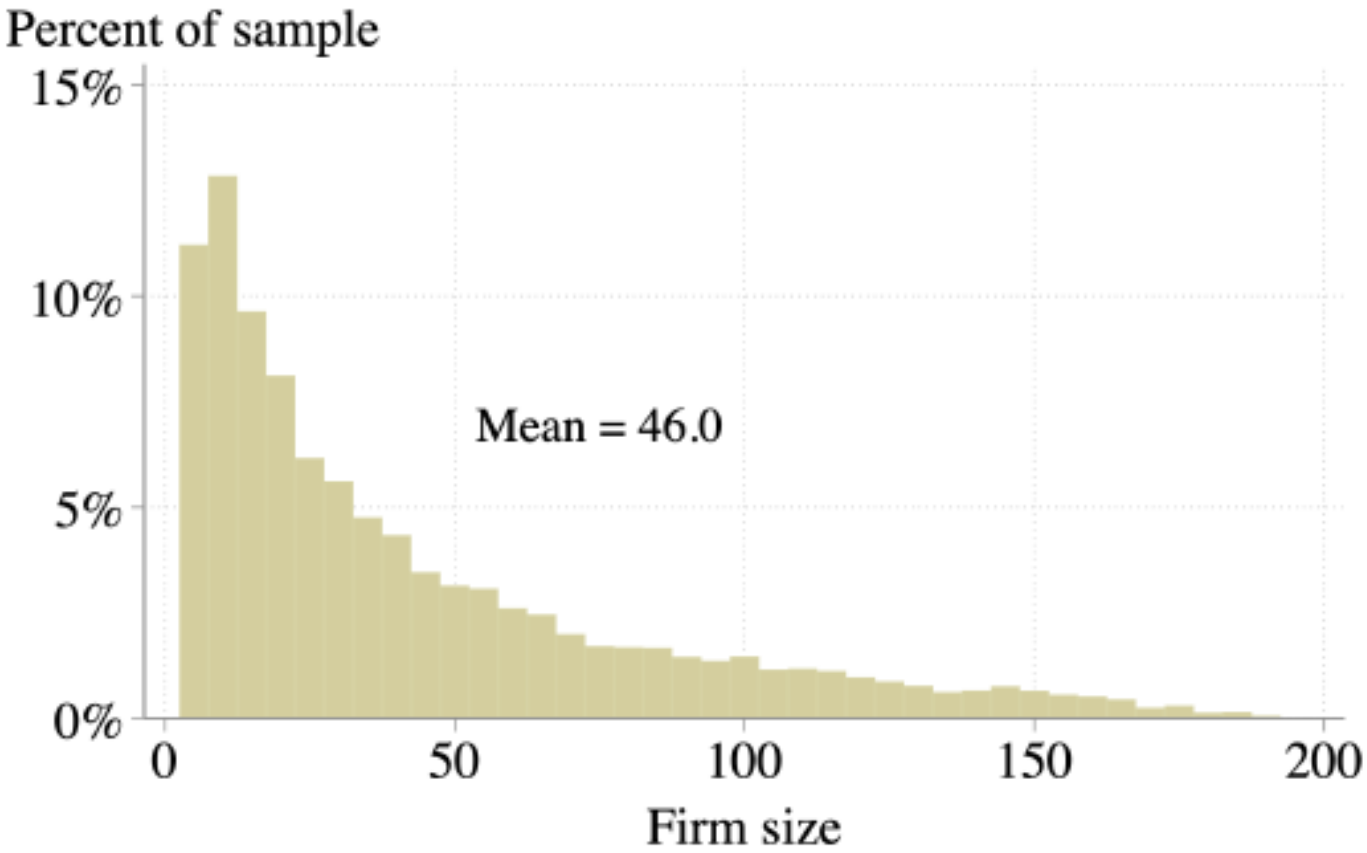
◂ Back

Distribution of treatment variable



Back

Distribution of firm size



◂ Sample selection

Combined earnings/hours

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	p.p. change in combined earnings				p.p. change in combined hours			
	Treatment: SRA increase (months)				Treatment: SRA increase (months)			
	3 or 4	6 or 7	9 or 10	13	3 or 4	6 or 7	9 or 10	13
Quarter								
-2	0.103	-0.007	0.069	-0.054	-0.039	-0.145	-0.004	-0.025
	(0.050)	(0.058)	(0.073)	(0.088)	(0.068)	(0.076)	(0.070)	(0.113)
-1	-0.077	0.006	-0.109	-0.075	-0.005	-0.068	-0.101	-0.047
	(0.045)	(0.051)	(0.069)	(0.087)	(0.055)	(0.057)	(0.062)	(0.094)
0	-0.143**	-0.232**	-0.185	-0.165	-0.122	-0.131	-0.108	-0.116
	(0.045)	(0.055)	(0.072)	(0.092)	(0.046)	(0.064)	(0.068)	(0.103)
1	0.101	-0.011	-0.162	0.004	0.045	-0.018	-0.072	-0.025
	(0.047)	(0.051)	(0.069)	(0.099)	(0.049)	(0.054)	(0.065)	(0.100)
2	0.029	0.028	-0.072	-0.144	0.011	0.019	-0.024	-0.045
	(0.048)	(0.053)	(0.072)	(0.091)	(0.052)	(0.054)	(0.065)	(0.094)
3	-0.054	-0.042	-0.010	-0.163	-0.013	0.005	0.029	-0.021
	(0.048)	(0.054)	(0.073)	(0.087)	(0.054)	(0.057)	(0.064)	(0.097)
4	-0.094	-0.154	-0.054	-0.095	-0.091	-0.106	0.041	-0.055
	(0.052)	(0.058)	(0.079)	(0.080)	(0.055)	(0.063)	(0.071)	(0.095)
Total effect	-0.407	-1.236	-1.571	-2.072	-0.645	-1.331	-0.720	-1.001
	(0.313)	(0.533)	(0.976)	(0.942)	(0.351)	(0.560)	(0.704)	(1.134)
R-squared	0.034	0.034	0.034	0.035	0.187	0.186	0.186	0.182
Observations	1,466,233	1,094,089	739,273	367,129	1,466,233	1,094,089	739,273	367,129

◂ Back

Robustness: Promotion threshold

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Promotions per 100 workers, based on monthly earnings increase of at least						
	10%	20%	40%	€250	€500	€750	€1000
	Treatment: SRA increase of 3–4 months						
Quarter							
-2	0.129	0.096	0.036	0.100	0.054	0.021	0.004
	(0.054)	(0.038)	(0.026)	(0.047)	(0.029)	(0.022)	(0.015)
-1	-0.120	-0.062	-0.030	-0.136**	-0.038	-0.021	-0.011
	(0.051)	(0.038)	(0.026)	(0.043)	(0.026)	(0.019)	(0.014)
0	-0.297**	-0.220**	-0.107**	-0.171**	-0.103**	-0.048	-0.013
	(0.056)	(0.040)	(0.026)	(0.050)	(0.031)	(0.020)	(0.014)
1	0.023	0.050	0.034	0.022	0.018	-0.002	-0.020
	(0.059)	(0.043)	(0.027)	(0.052)	(0.032)	(0.022)	(0.016)
2	0.041	0.024	-0.028	0.057	0.022	-0.010	-0.008
	(0.059)	(0.041)	(0.027)	(0.052)	(0.031)	(0.021)	(0.016)
3	-0.137	-0.049	-0.011	-0.142*	-0.026	0.006	-0.012
	(0.058)	(0.043)	(0.030)	(0.049)	(0.030)	(0.021)	(0.015)
4	-0.063	-0.033	0.001	-0.019	-0.028	-0.023	-0.005
	(0.065)	(0.049)	(0.035)	(0.056)	(0.034)	(0.025)	(0.018)
Total effect	-1.274	-0.586	-0.313	-0.868	-0.301	-0.228	-0.197
	(0.476)	(0.345)	(0.244)	(0.402)	(0.241)	(0.169)	(0.120)
R-squared	0.010	0.005	0.003	0.024	0.009	0.006	0.004
Observations	1,466,233	1,466,233	1,466,233	1,466,233	1,466,233	1,466,233	1,466,233

◂ Back

Robustness

	(1) Main estimate	(2) Twoway clustering	(3) Fixed denominator	(4) Relaxing size restriction	(5) One focal worker per firm-pair
	New hires per 100 workers				
Quarter					
-2	-0.055	-0.055	-0.047	-0.046	-0.031
	(0.046)	(0.051)	(0.047)	(0.039)	(0.050)
-1	-0.207**	-0.207**	-0.231**	-0.165**	-0.230**
	(0.045)	(0.047)	(0.046)	(0.039)	(0.050)
0	-0.017	-0.017	0.002	-0.022	-0.028
	(0.047)	(0.045)	(0.048)	(0.041)	(0.052)
1	0.113	0.113	0.143*	0.118*	0.111
	(0.046)	(0.045)	(0.047)	(0.040)	(0.050)
2	0.045	0.045	0.043	0.020	0.035
	(0.046)	(0.051)	(0.048)	(0.041)	(0.051)
3	-0.032	-0.032	-0.032	0.015	-0.044
	(0.047)	(0.042)	(0.047)	(0.041)	(0.052)
4	-0.010	-0.010	-0.036	-0.027	0.040
	(0.053)	(0.043)	(0.055)	(0.044)	(0.058)
Total effect	-0.491	-0.491	-0.474	-0.325	-0.439
	(0.339)	(0.343)	(0.353)	(0.321)	(0.388)
R-squared	0.013	0.013	0.015	0.005	0.010

◂ Back