Gender Differences in Mobility after Childbirth and Implications for the Gender Gap in Employment

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Luxembourg National Research Fund

Motivation

- Over last decades, children have become the main driver of gender inequality in the labour market (Kleven et al., 2019)
- Mothers experience a large decline in many labour market outcomes following childbirth:
  - Labour market participation (Angrist and Evans, 1998; Kleven et al., 2019)
  - Employment (Cristia, 2008; Michaud and Tatsiramos, 2011)
  - Working hours (Lundberg and Rose, 2000; Kleven et al., 2019)
  - Occupational status (Cools et al., 2017; Kleven et al., 2019)
  - High-paid private sector employment (Fernández-Kranz et al., 2013; Lundborg et al., 2017; Kleven et al., 2019)

Motivation

- Little is known about the role of job location adjustments due to the time constraints imposed by childbirth
- Labour mobility is increasing and non-local jobs are more common
  - EU27: 7.3% in 2020, +36% from 2005 (NUTS2 regions)
  - But gender gap for non-local jobs has increased by 25% (Eurostat, 2022)
- Women commute less, resulting in gender differences in earnings and employment (Hassink and Meekes, 2019; Petrongolo and Ronchi, 2020; Le Barbanchon et al., 2021; Bütikofer et al., 2021)

Our Research Questions & Contributions

- Causal evidence on the role of job location for the effect of childbirth on the gender gap in employment
- Quantify how much of the overall gender gap in employment accounted by gender divergences in local and non-local employment following childbirth
- Investigate potential mechanisms:
  - Individual opportunity cost of home production
  - Partners' labour status
  - Local labour market condition
- Methodological contribution: use event-study design accounting for treatment effect heterogeneity

Overview of Results

- Childbirth generates a gender gap in employment
- 75% of this gap is driven by non-local employment
- Mothers give up non-local jobs regardless of the opportunity cost of home production, partner's labour status and local unemployment
- Mothers prioritize childcare provision following childbirth
- Fathers trade off better employment opportunities with longer commuting following childbirth
- Fathers do not give up non-local employment when high opportunity cost, the partner is inactive, or face adverse local labour market conditions

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6 Results: mechanisms

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Data

- Administrative data of Belgian Social Security (BCSS)
- Longitudinal information on individuals from 2007–2017
- Household composition, age of the members, quarter of birth
- Quarterly employment history
- Yearly information on district of residence (NUTS-3)
- Semester information on municipality of work & work abroad
- Matched with Tom-Tom GPS data (2019):
  - Distance to municipality of work in minutes by car during rush hours (or to Luxembourg city if working in Luxembourg)

Data

- Sample of individuals:
  - born between 1973 and 1990
  - ever lived in areas of Wallonia not far from the Luxembourgish border (province of Luxembourg and Liege) in 2007–2017
- Area has high level of geographical mobility → 32% of workers commuted beyond the border (Eurostat, 2022)
- Every day 50,000 Belgian residents commute to Luxembourg (11% workers of Luxembourg)
- Better employment opportunities but longer commuting time
- Household disposable income 30% higher than in BE (Eurostat)
- 98% of our sample working abroad works in Luxembourg

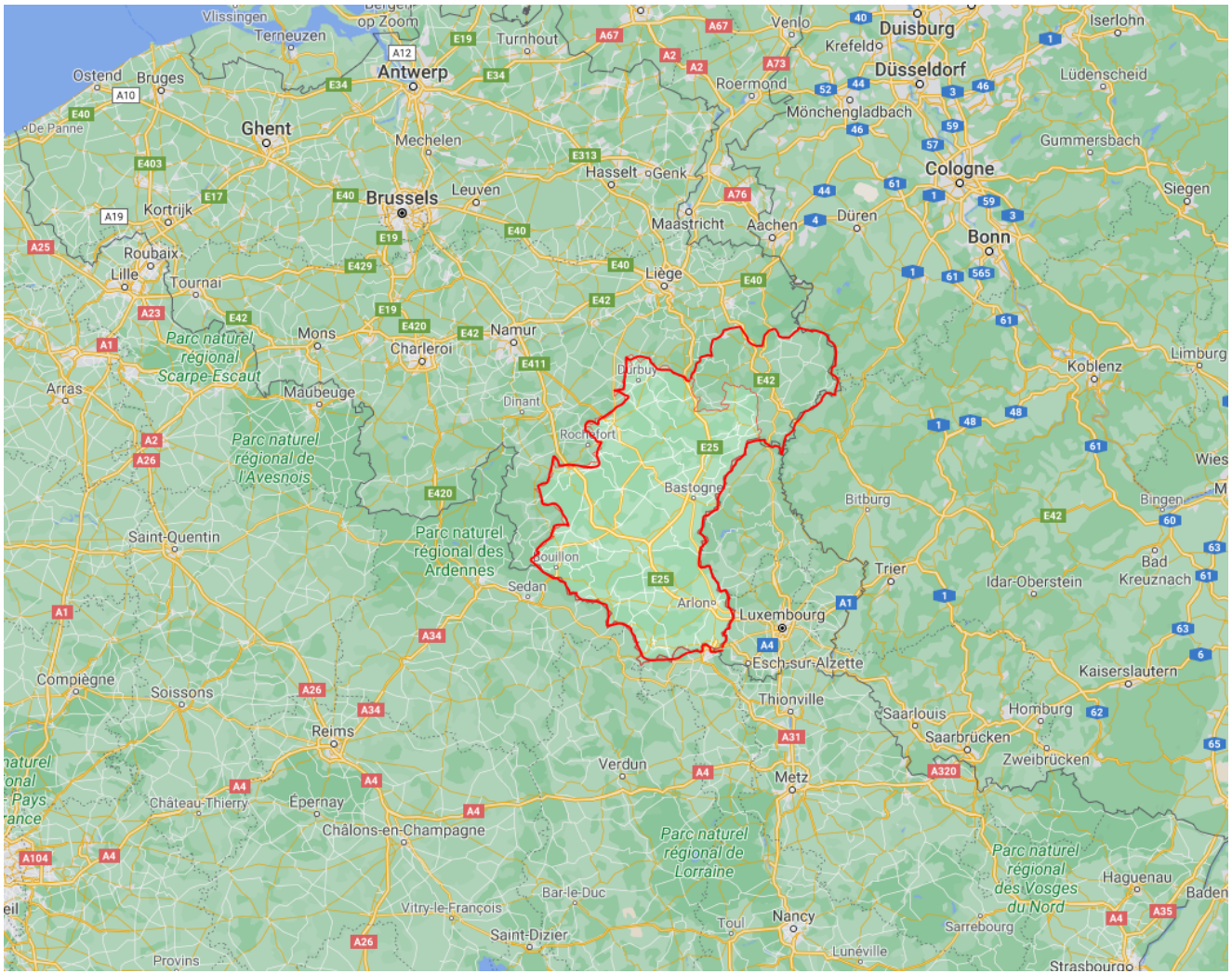

Figure 1: Sampling area

Descriptives

- We follow 53,494 individuals having either the first child (N=20,619) or not (N=32,875) during 2007-2017
- 74% of the population
- Almost 2 million individual–quarter observations
- Main outcomes: employment, employment in the same (another) district of residence, employment abroad, theoretical commuting time by car, changing district of residence, employment in a higher or lower paying job (above or below the daily salary median; 109 and 114 euros/day for women and men)

Descriptives

	Women all (mean/sd)	Men all (mean/sd)	Women after birth (mean/sd)	Men after birth (mean/sd)
Age	28.10	28.97	31.41	33.12
	(5.48)	(5.69)	(4.30)	(4.28)
Employment rate	0.66	0.68	0.79	0.88
	(0.47)	(0.47)	(0.41)	(0.33)
Local employment rate	0.28	0.25	0.35	0.30
	(0.45)	(0.44)	(0.48)	(0.46)
Non-local employment rate (including cross-border)	0.33	0.38	0.40	0.55
	(0.47)	(0.49)	(0.49)	(0.50)
Cross-border employment rate	0.12	0.16	0.14	0.25
	(0.32)	(0.37)	(0.35)	(0.43)
Change place of residence (NUTS3)	0.10	0.10	0.05	0.04
	(0.29)	(0.30)	(0.21)	(0.20)
Commuting time by car (minutes)	34.08	38.03	31.08	39.29
	(30.93)	(32.41)	(27.69)	(30.04)
N	879,885	1,068,822	211,863	176,894

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Identification

- Treatment is occurrence of the first child
- Staggered setting: individuals have child in different moments
- Recent literature on gender gap (e.g. Kleven et al., 2019) relied on two-way fixed effects estimators to take time-invariant unobserved heterogeneity into account
- Identifying assumption: parallel trend in the absence of treatment
- Separately estimated by gender, compare relative effects
- However, this estimator is biased in presence of treatment effect heterogeneity across birth cohorts and time periods (Goodman-Bacon, 2021)

Estimation

- We implement Callaway and Sant'Anna (2020) diff-in-diff
- Many diff-in-diff estimators to obtain average treatment effects $ATT(d,t)$ for each
  - birth cohort i.e. individuals starting the treatment at time d (D_d=1, 0 otherwise)
  - calendar time period t
- In each diff-in-diff, it uses as controls the individuals not (yet) treated by time t (C=1, 0 otherwise)

$$\widehat{ATT}(d,t) = E\left[\left(\frac{D_d}{E[D_d]} - \frac{C}{E[C]}\right)\left(Y_t - Y_{d-\delta-1}\right)\right] \quad (1)$$

- Y_t: observed outcome at time t
- $Y_{d-\delta-1}$: outcome at reference pre-treatment period (1 year anticip.)

Estimation

- Ex-post aggregation of the $\widehat{ATT}(d,t)$ to obtain event-study dynamic effects by elapsed time e: $\widehat{\theta}(e)$
- To get relative effects we divide $\widehat{\theta}(e)$ by the predicted average outcome in the absence of treatment for the treated $\widehat{Y}_0(e)$
- Similar to previous literature, parallel trend assumption imposed only conditional on age (yearly dummies): conditional diff-in-diff
  - In a robustness also last job information before birth
- Callaway and Sant'Anna (2020) implement a doubly robust estimator

Doubly robust estimator (Callaway and Sant'Anna (2020))

$$\widehat{ATT}(d,t) = E\left[\left(\frac{D_d}{E\left[D_d\right]} - \frac{\frac{\widehat{p}_d(X)C}{1-\widehat{p}_d(X)}}{E\left[\frac{\widehat{p}_d(X)C}{1-\widehat{p}_d(X)}\right]}\right)\left(Y_t - Y_{d-\delta-1} - \widehat{m}_{d,t,\delta}(X)\right)\right] \tag{2}$$

- Abadie (2005): reweight controls by the propensity score of being treated at time d given covariates X ($\widehat{p}_d(X)$)
- Heckman et al. (1997): predict the common time effect i.e. evolution of the outcome in the absence of treatment given X (done on the control group): $\widehat{m}_{d,t,\delta}(X) = E[Y_t - Y_{d-\delta-1}|X, C = 1]$
- Only one of the two models needs to be correctly specified

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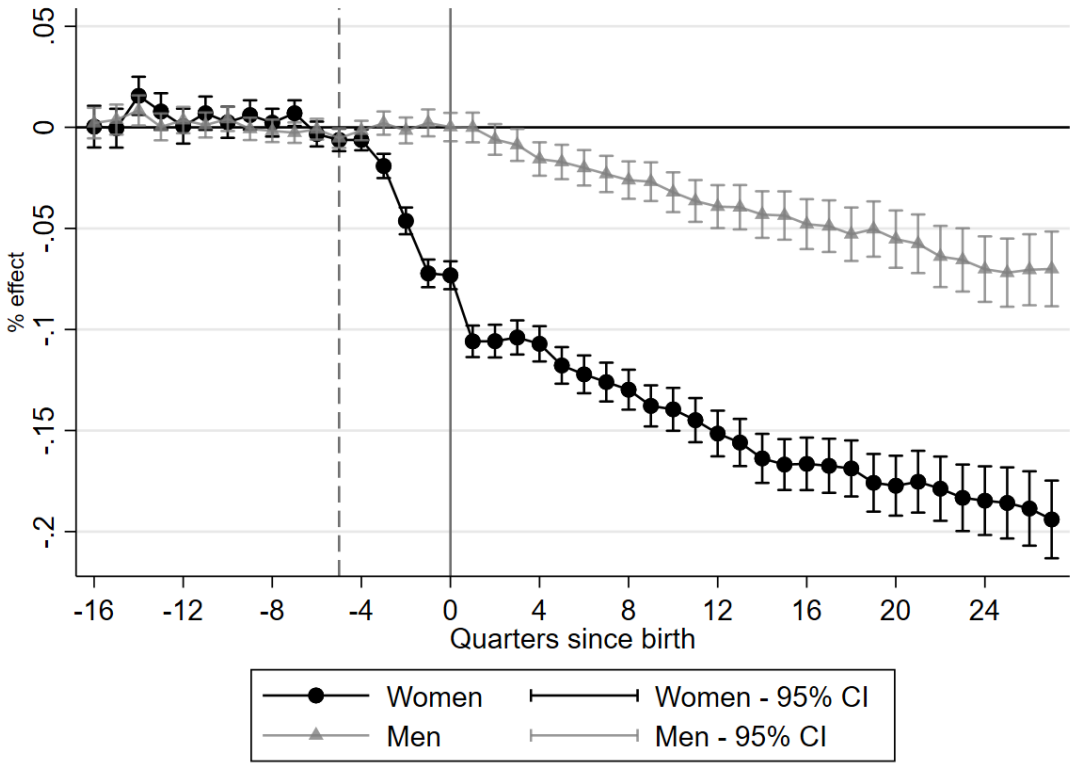
Employment Rate

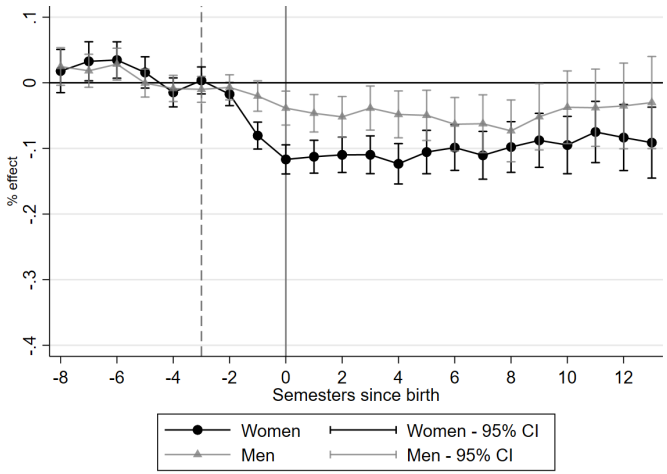
Figure 2: Employment Rate



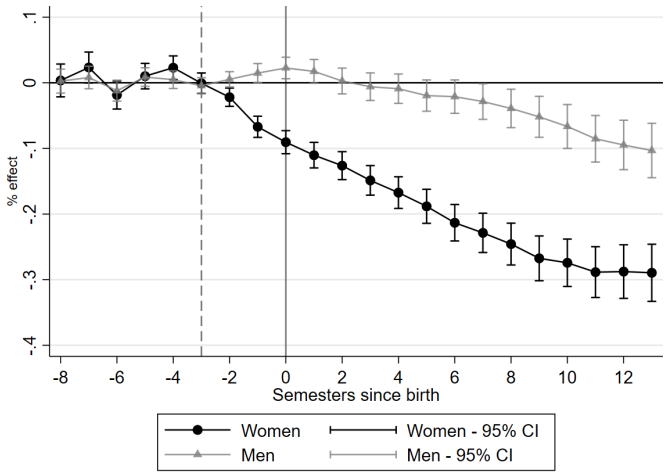
Other Outcomes | Child Penalties | Absolute Effects

Employment in local or non-local jobs

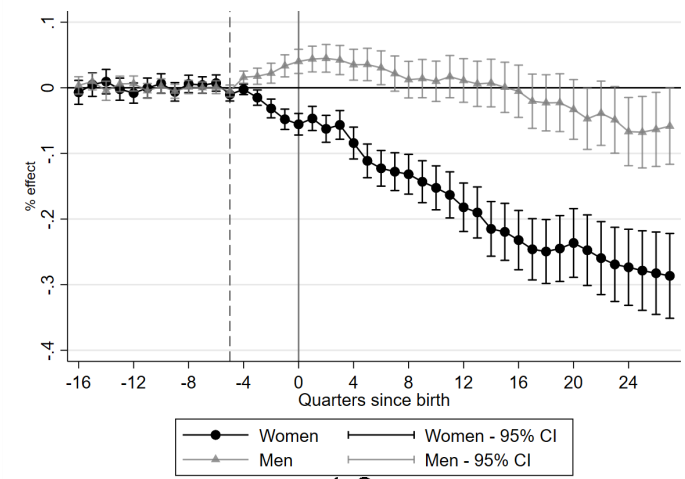
(a) Local employment



(b) Non-local employment



(c) Cross-border employment



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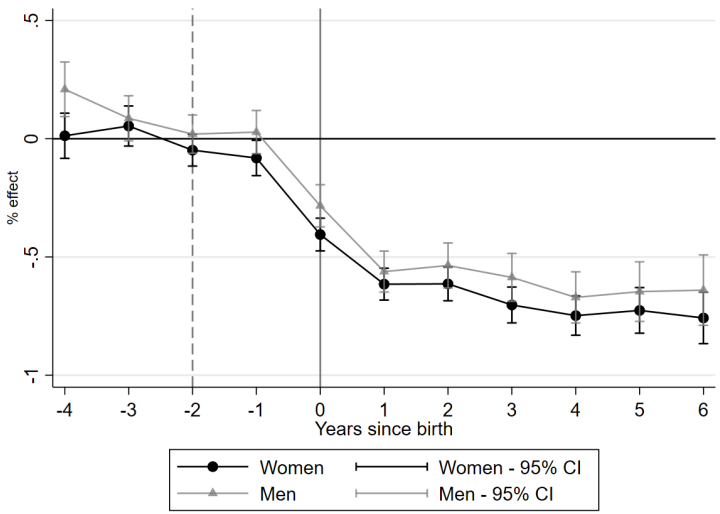
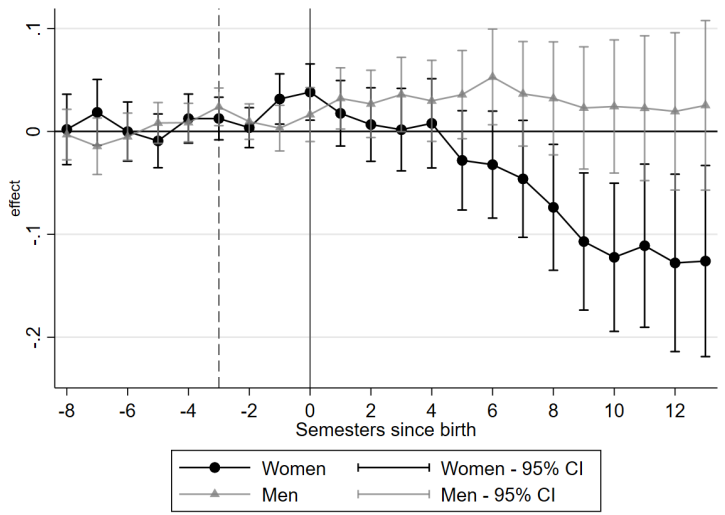
Residential mobility and commuting

(a) Changing place of residence (NUTS3)



(b) Log of Commuting time



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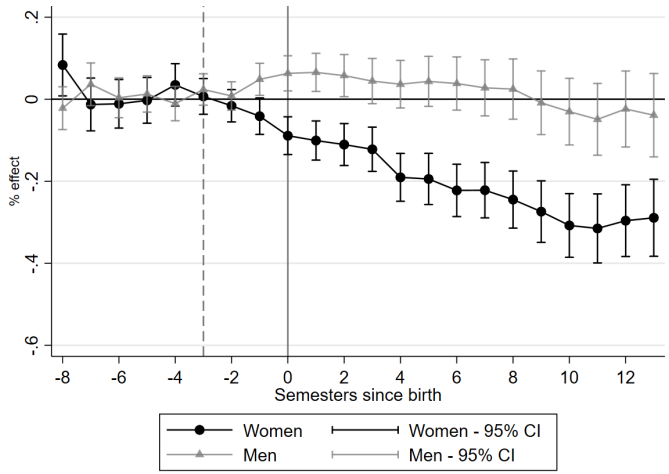
Mechanisms

- 75% of the childbirth gender gap is due to non-local gap
- Non-local employment imposes greater time constraints but provides better job opportunities
- Mothers specialize on labour statuses allowing childcare provision
- More insights on the mechanisms:
  - Opportunity cost of home production: higher vs lower paying jobs
  - Partner's labour status: subgroup analysis
  - Local labour market conditions: subgroup analysis

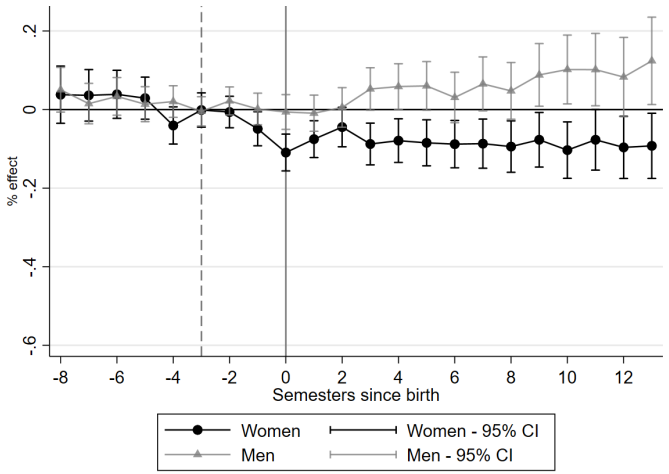
Employment rate by location and daily salary

Cross-border

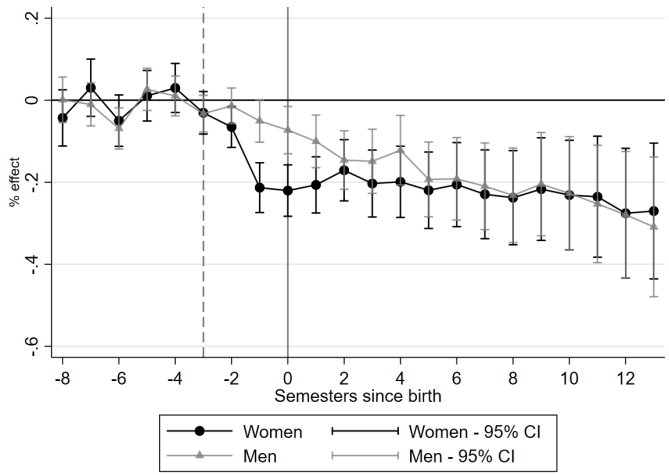
(a) High-Paid Non-Local Jobs



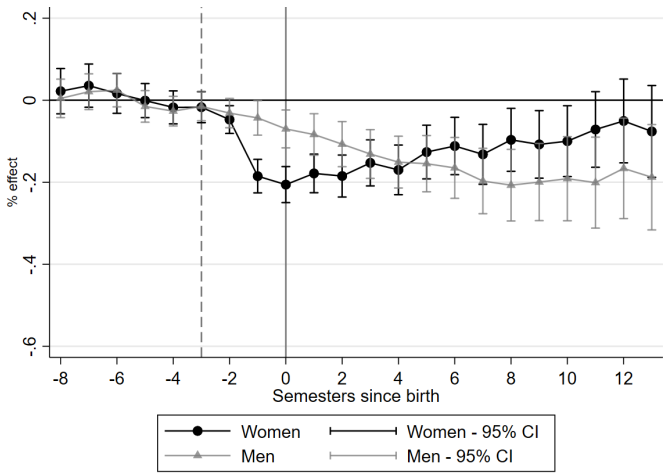
(b) High-Paid Local Jobs



(c) Low-Paid Non-Local Jobs

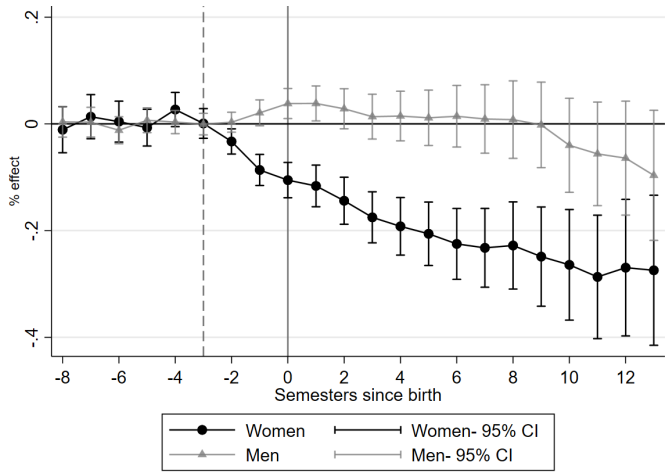


(d) Low-Paid Local Jobs

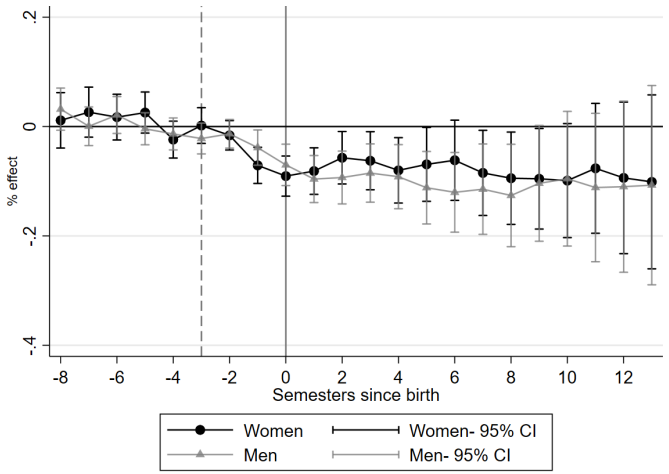


Heterogeneous effects: partner's labour status

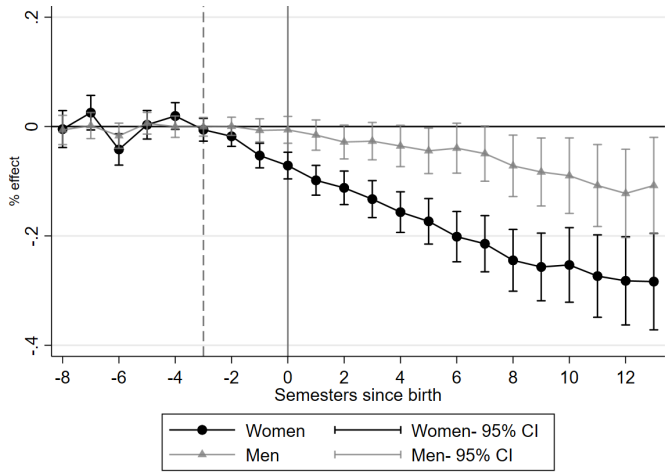
(a) Inact Partn Non-local Job



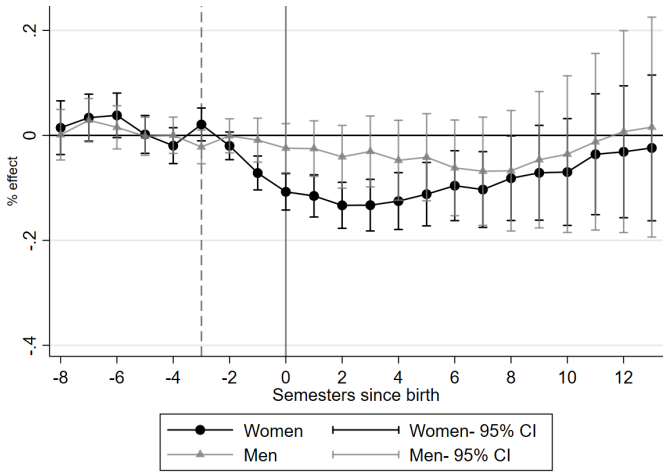
(b) Inactive Partner Local Jobs



(c) Act Partner Non-local Jobs



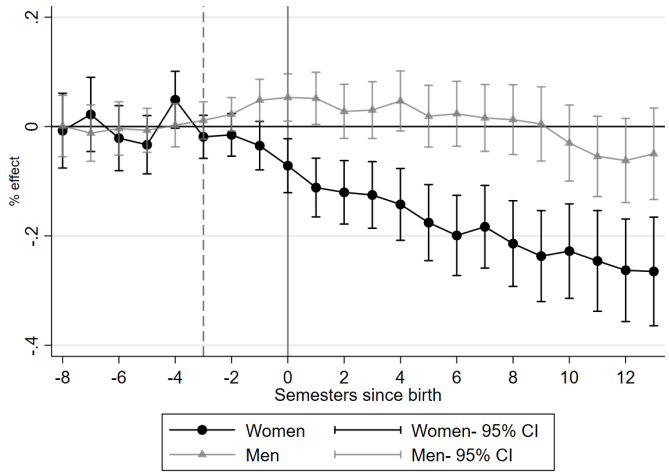
(d) Active Partner Local Jobs



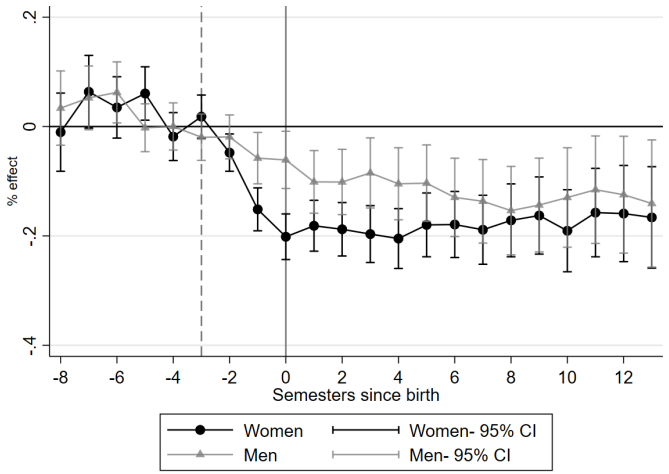
Heterogeneous effects: local unemployment

Total

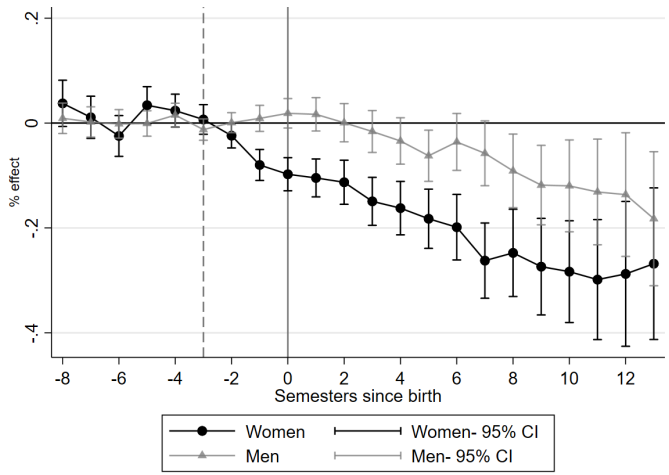
(a) High Unemp Non-local Jobs



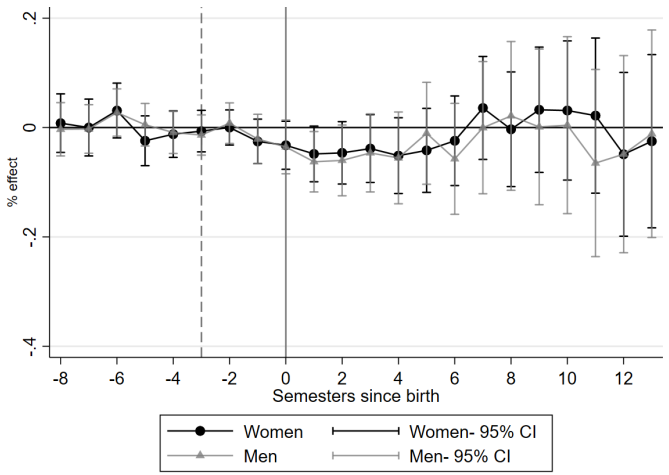
(b) High Unemp Local Jobs



(c) Low Unemp Non-local Jobs



(d) Low Unemp Local Jobs



Robustness Checks

- The estimates are robust to:
  - Controlling for quadratic age instead of age dummies Age
  - Controlling for last job type in baseline period (white/blue collar, public servant, salary, working hours) and district X
  - Extended two-way (Mundlak) fixed-effect (Wooldridge, 2021) Wooldridge
  - Classical two-way fixed-effect event study estimator Event
  - Alternative control groups Never treated Not yet treated
  - Balanced panel Balanced
  - Changing distance to work definition for cross-border workers Commuting

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Conclusions

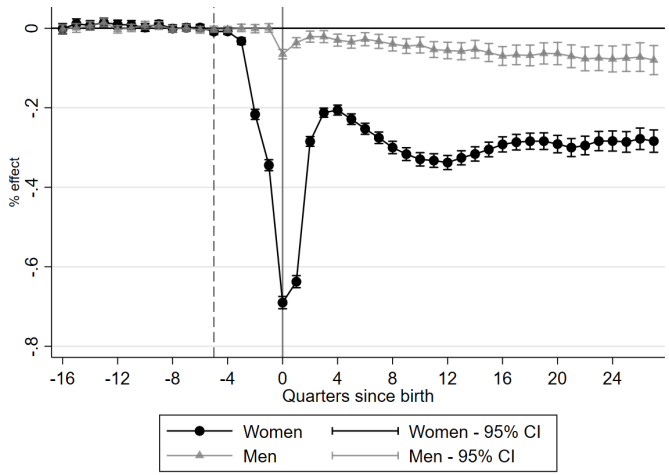
- Childbirth leads to a gender gap in employment
- 75% of this is due to the gender gap in non-local employment
- Men do not give up non-local employment after childbirth when:
  - higher opportunity cost of home production
  - their partner not participating in the labour market
  - adverse local labour market conditions
- Mothers drop out from non-local jobs irrespectively due to time constraints
- Low access to non-local labour market is a source of concern for gender inequality
- Prevents women from accessing better job opportunities and makes them + vulnerable to local labour market shocks

Thank you!

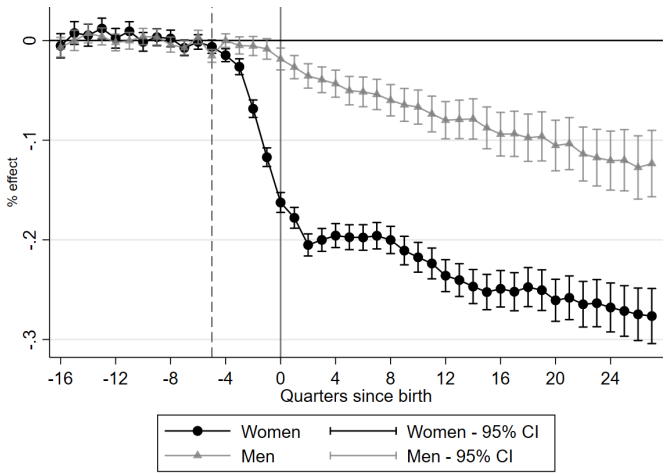
Contact e-mail: andrea.albanese@liser.lu

Other outcomes (in Belgium)

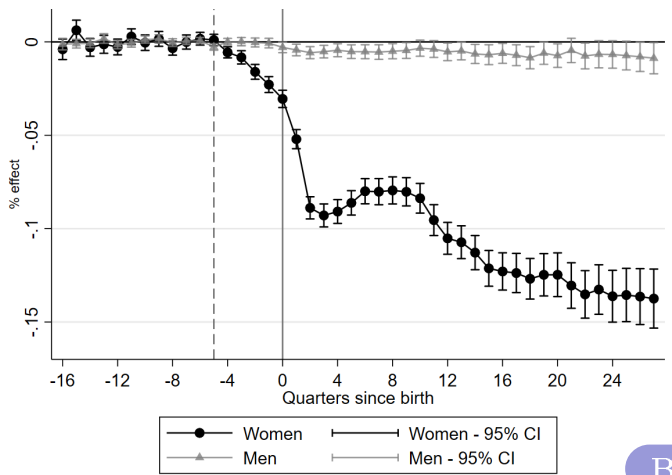
(a) Gross labour income



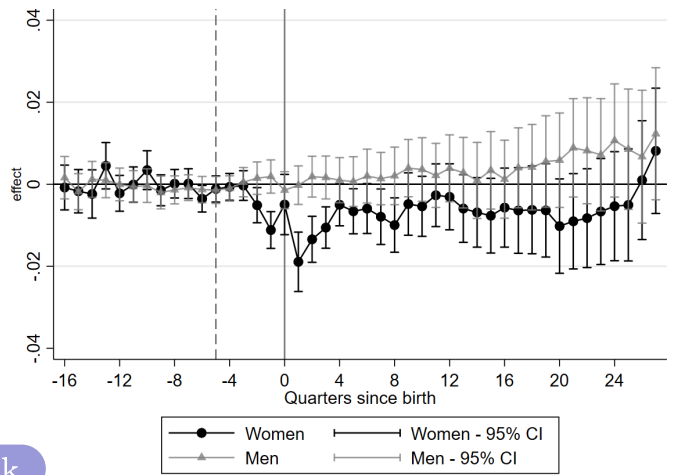
(b) Total hours of Work



(c) Hours of Work (cond)



(d) Log of Daily Wage (cond)



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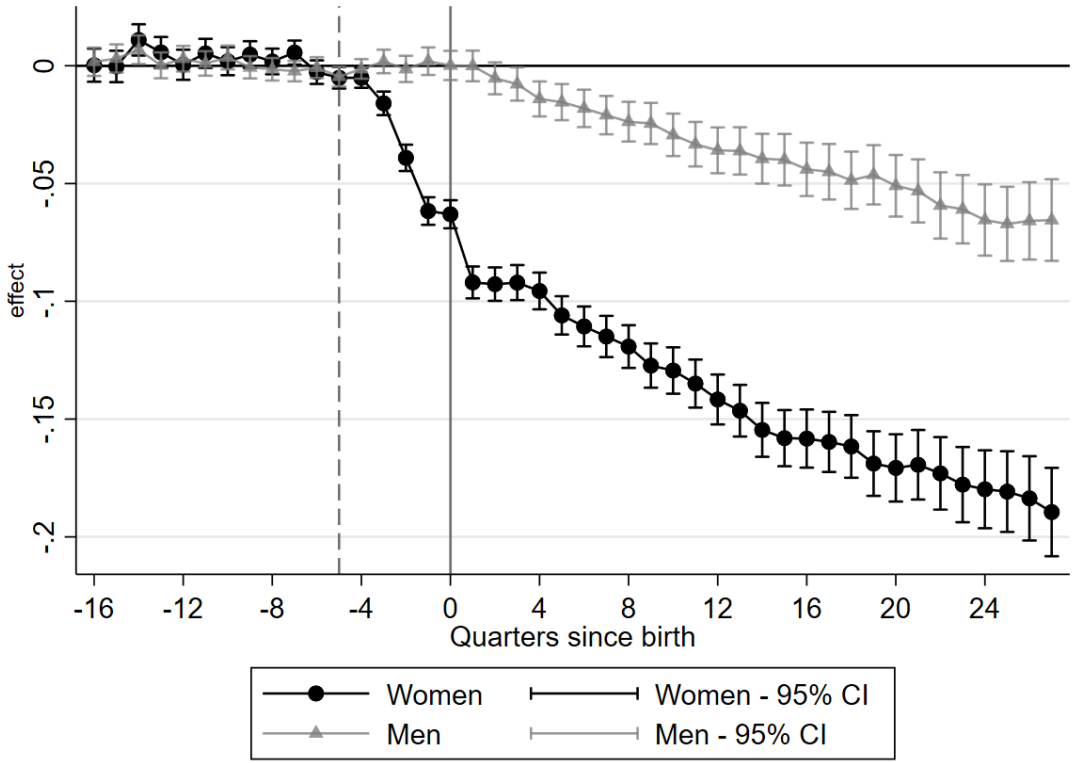
Absolute effects

Figure 9: Employment Rate



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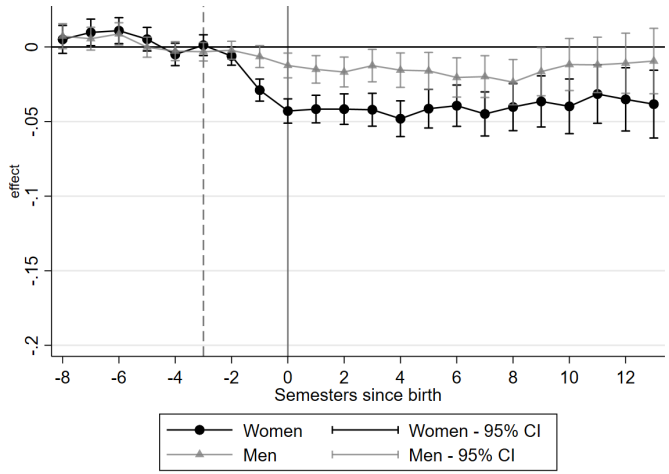
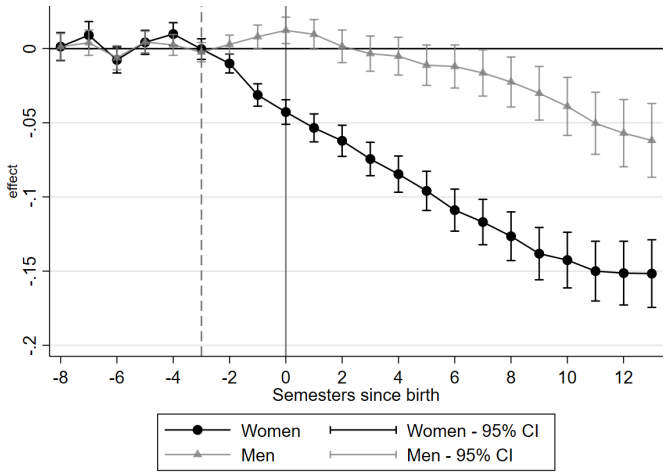
Absolute effects

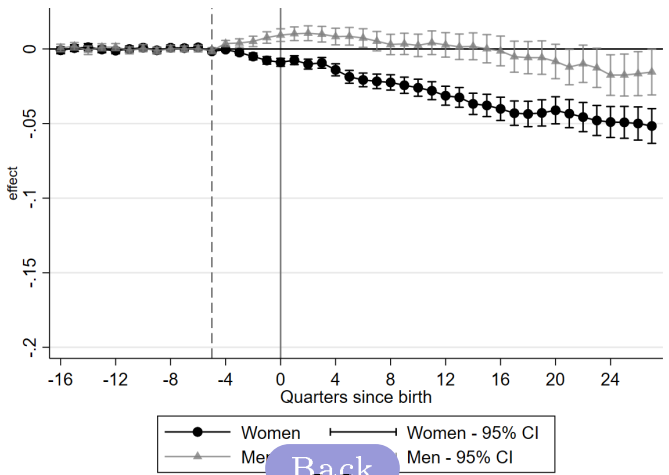
(a) Local employment



(b) Non-local employment



(c) Cross-border employment



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Absolute effects

Figure 11: Changing place of residence (NUTS3)

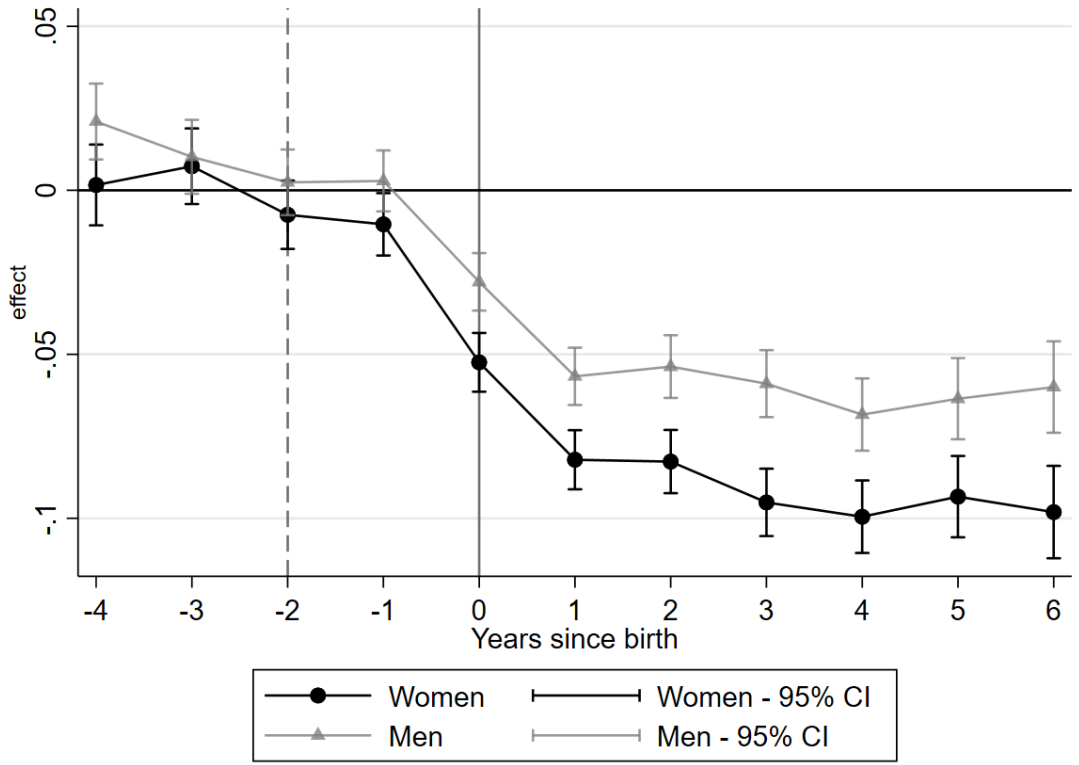

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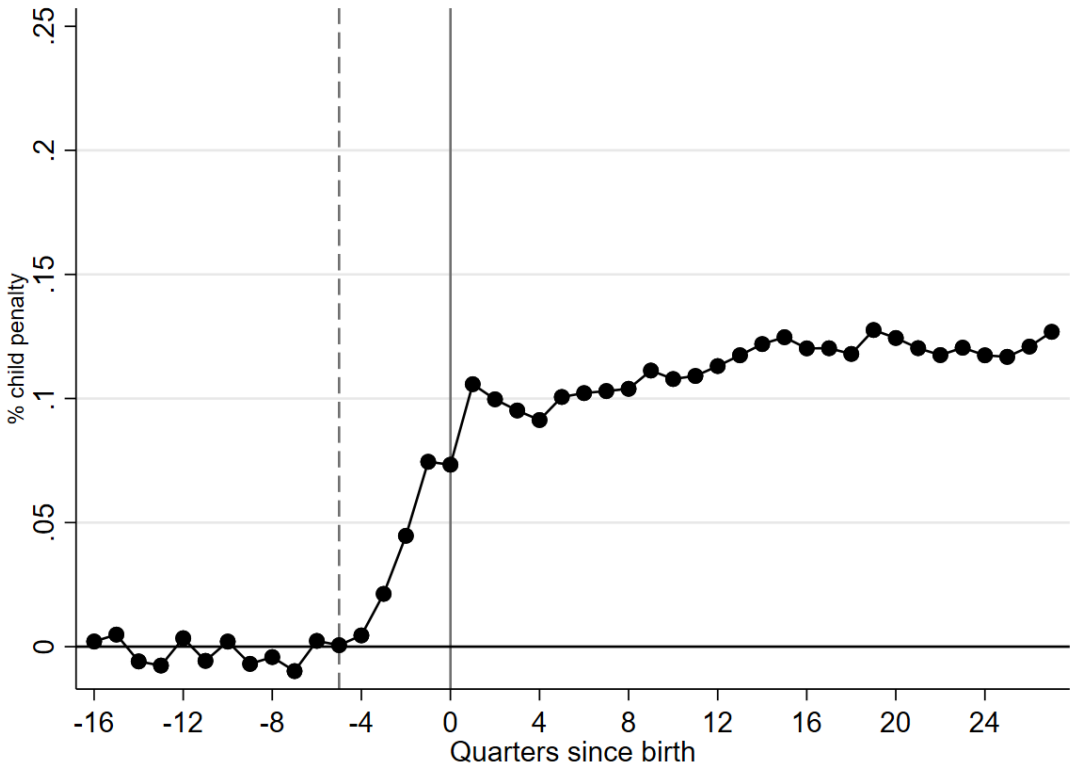
Figure 12: Employment Rate



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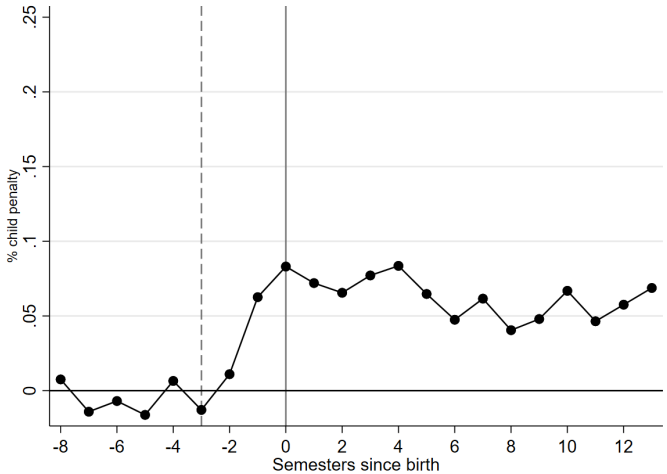
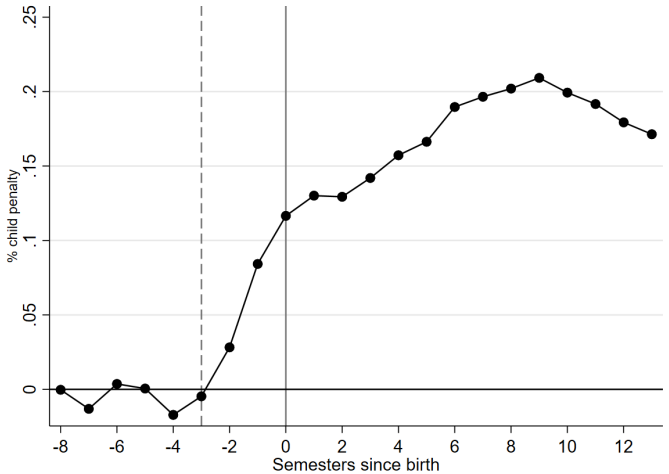
Child Penalty

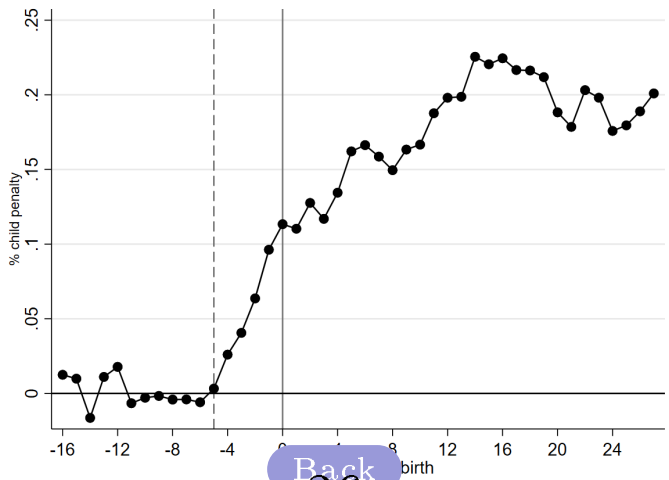
(a) Local employment



(b) Non-local employment



(c) Cross-border employment



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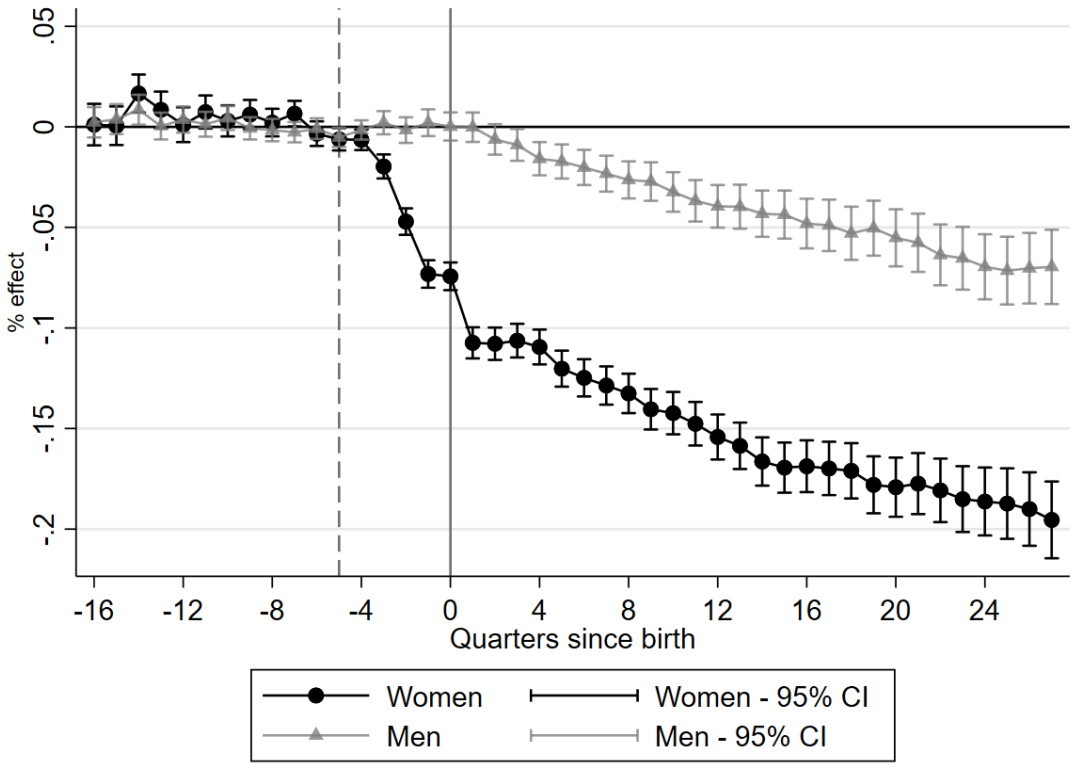
Robustness - Controlling for quadratic age

Figure 14: Employment Rate



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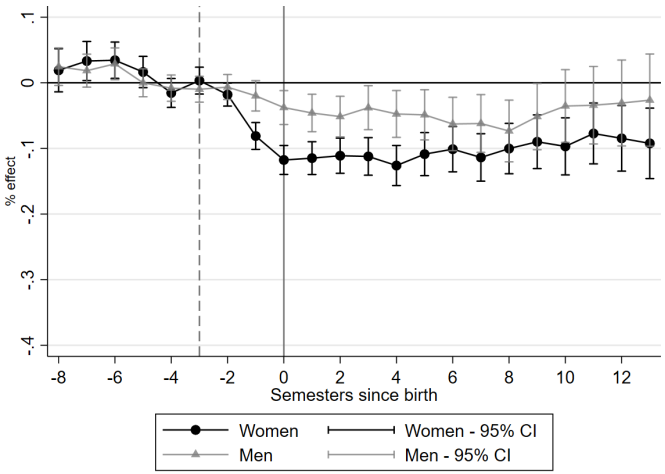
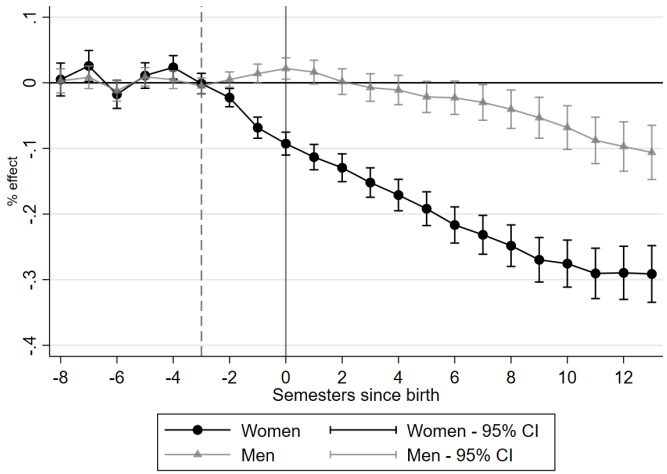
Robustness - Controlling for quadratic age

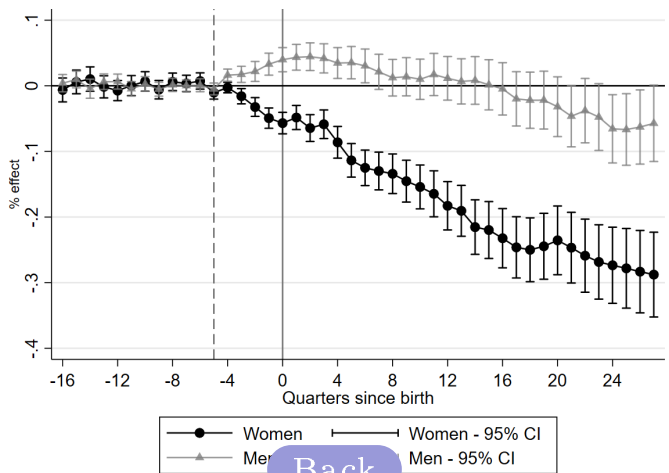
(a) Local employment



(b) Non-local employment



(c) Cross-border employment



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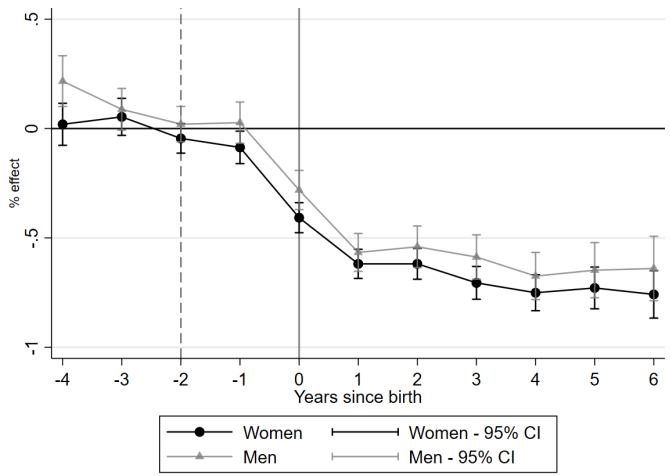
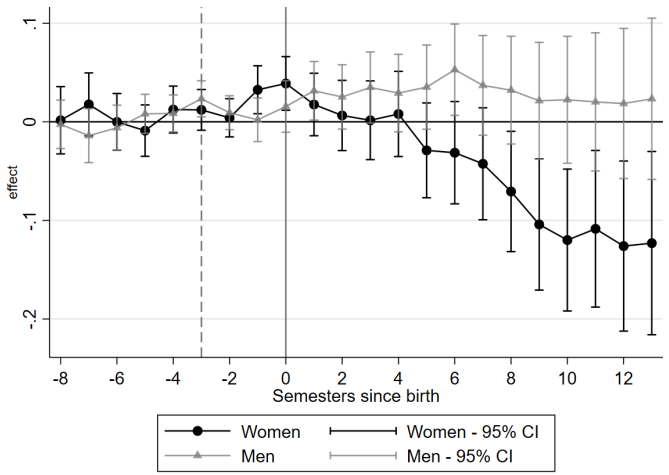
Robustness - Controlling for quadratic age

(a) Changing place of residence (NUTS3)



(b) Log of Commuting time



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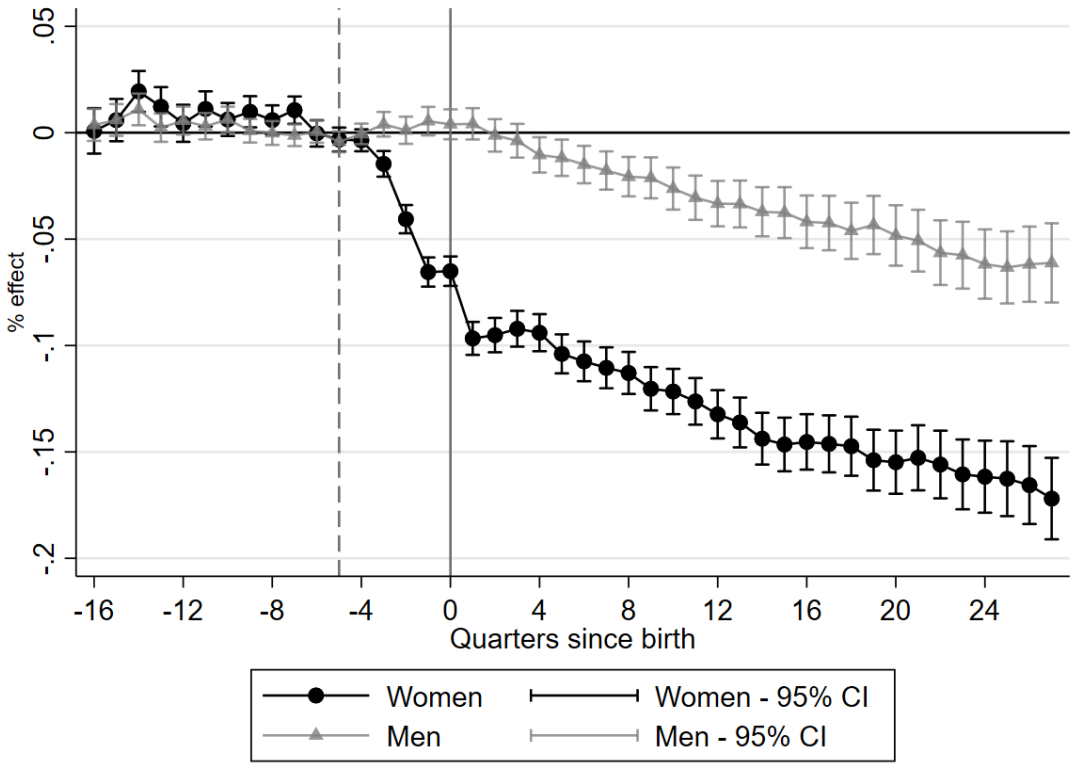
Robustness - Controlling for last job

Figure 17: Employment Rate



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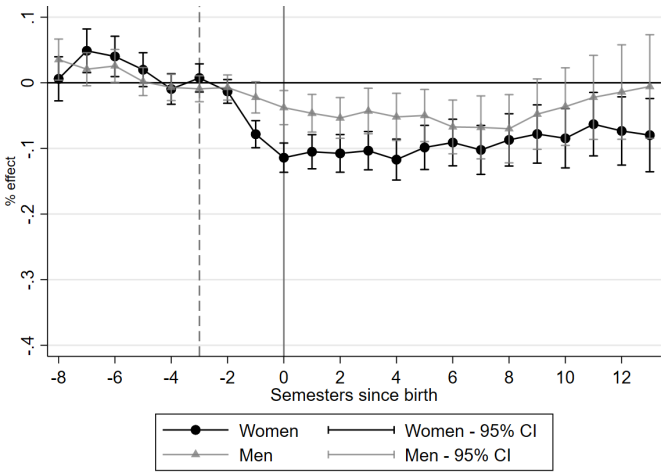
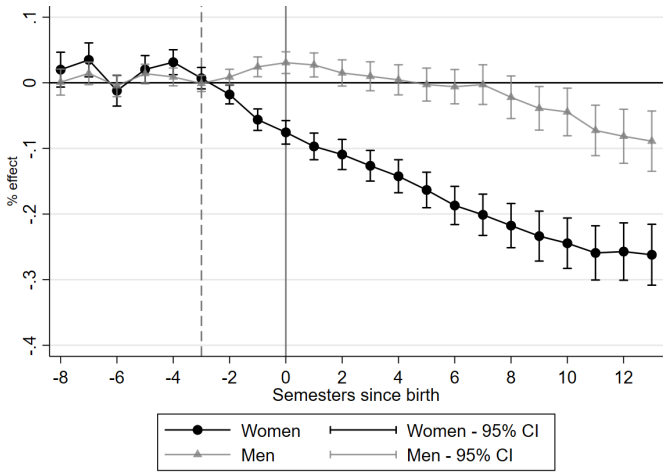
Robustness - Controlling for last job

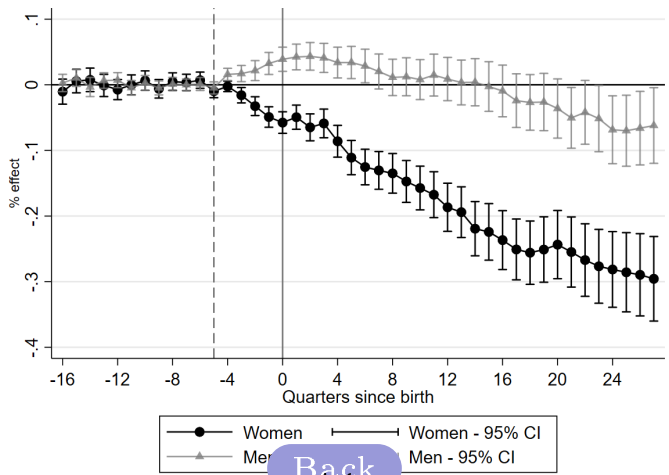
(a) Local employment



(b) Non-local employment



(c) Cross-border employment



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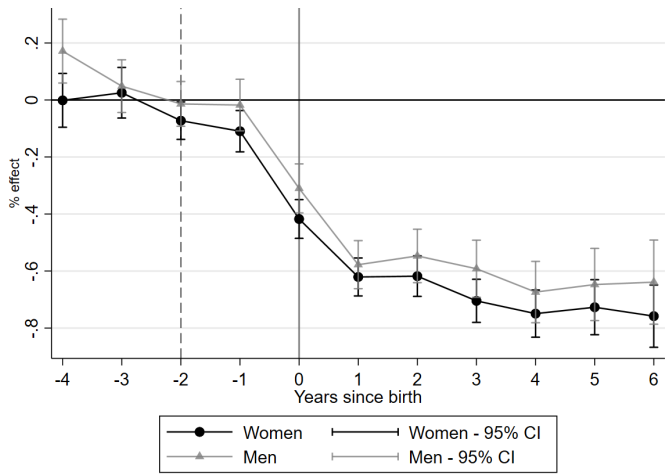
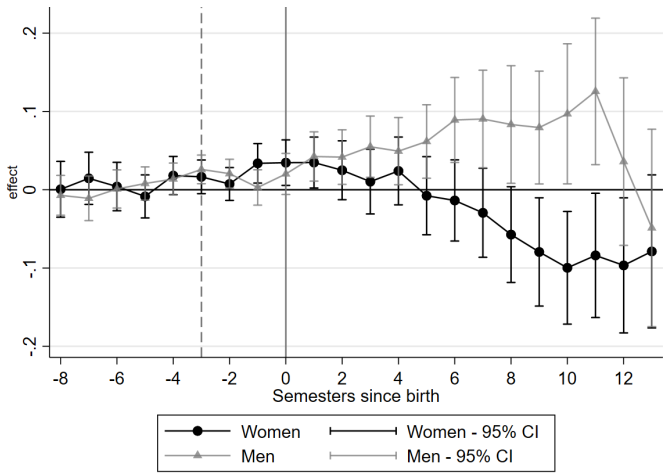
Robustness - Controlling for last job

(a) Changing place of residence (NUTS3)



(b) Log of Commuting time



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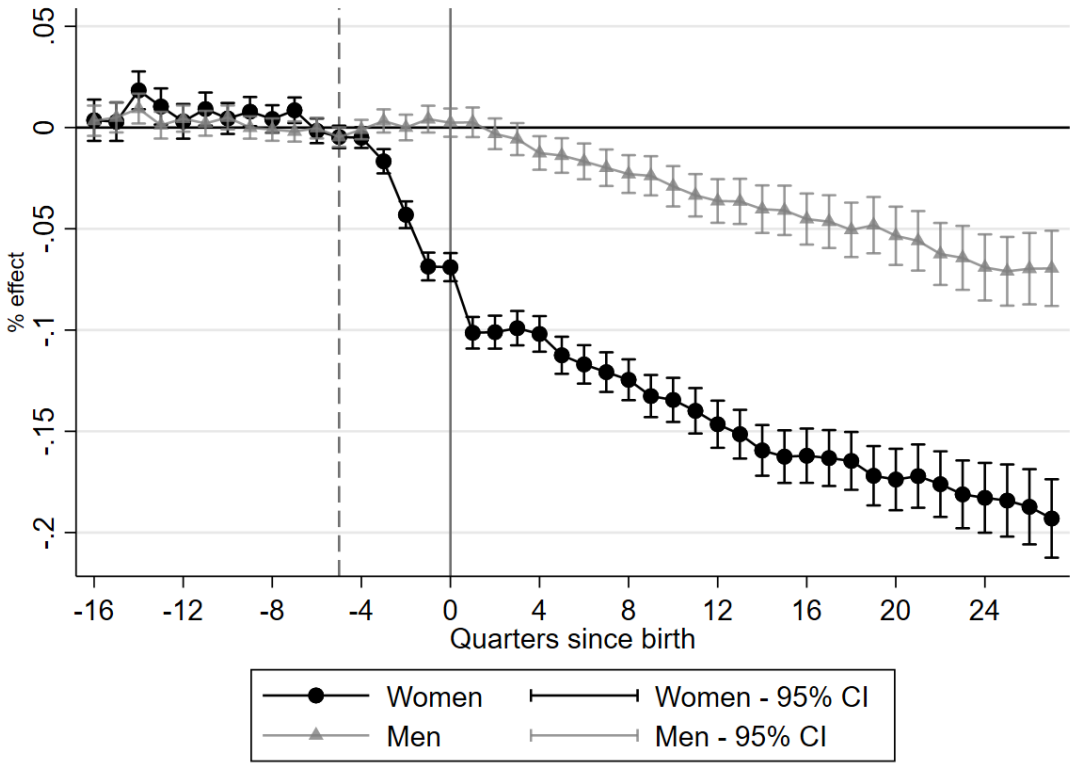
Robustness - Control group: never treated only

Figure 20: Employment Rate



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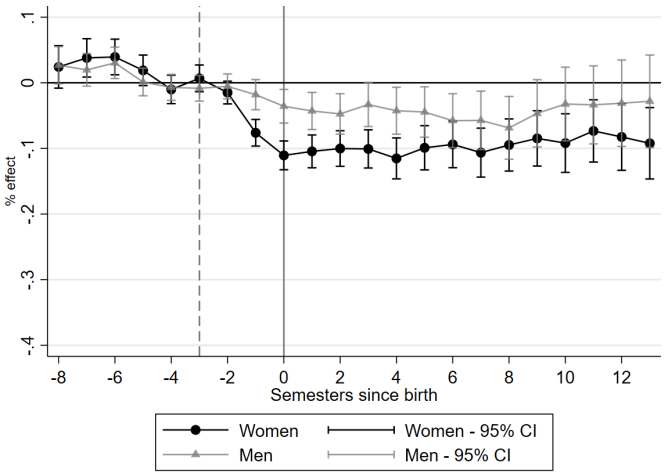
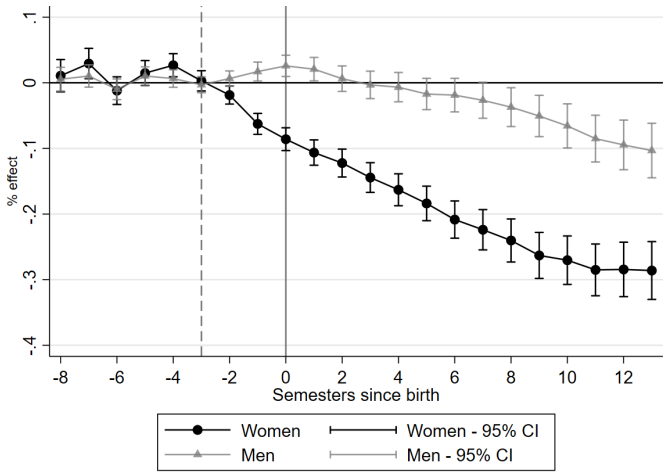
Robustness - Control group: never treated only

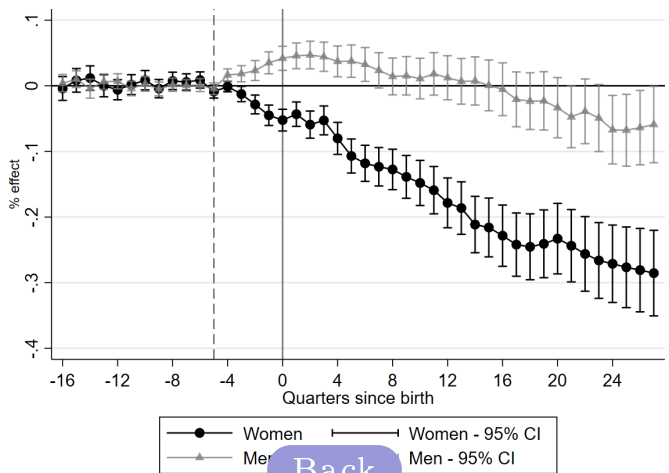
(a) Local employment



(b) Non-local employment



(c) Cross-border employment



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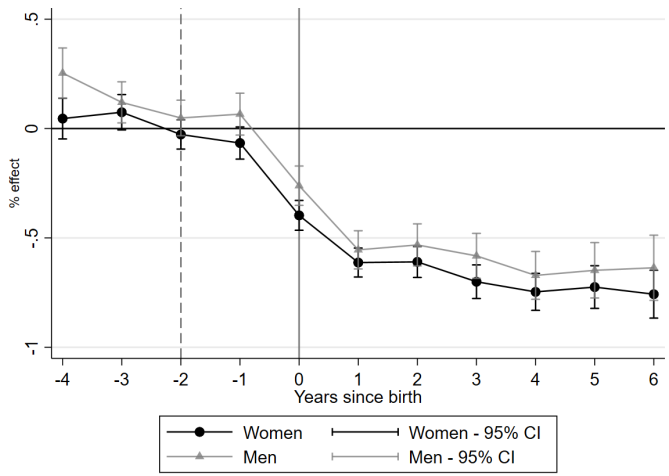
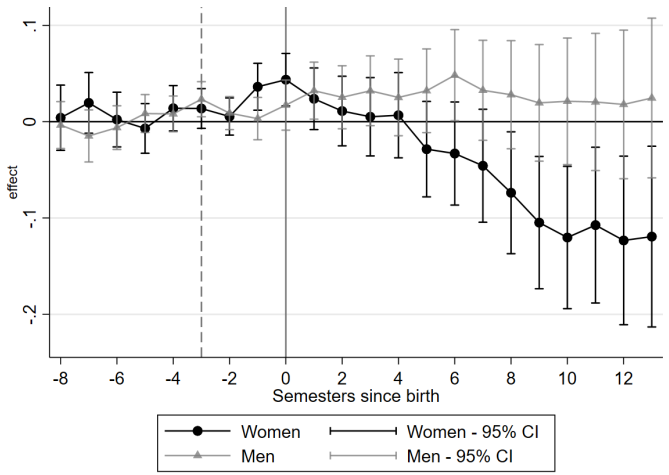
Robustness - Control group: never treated only

(a) Changing place of residence (NUTS3)



(b) Log of Commuting time



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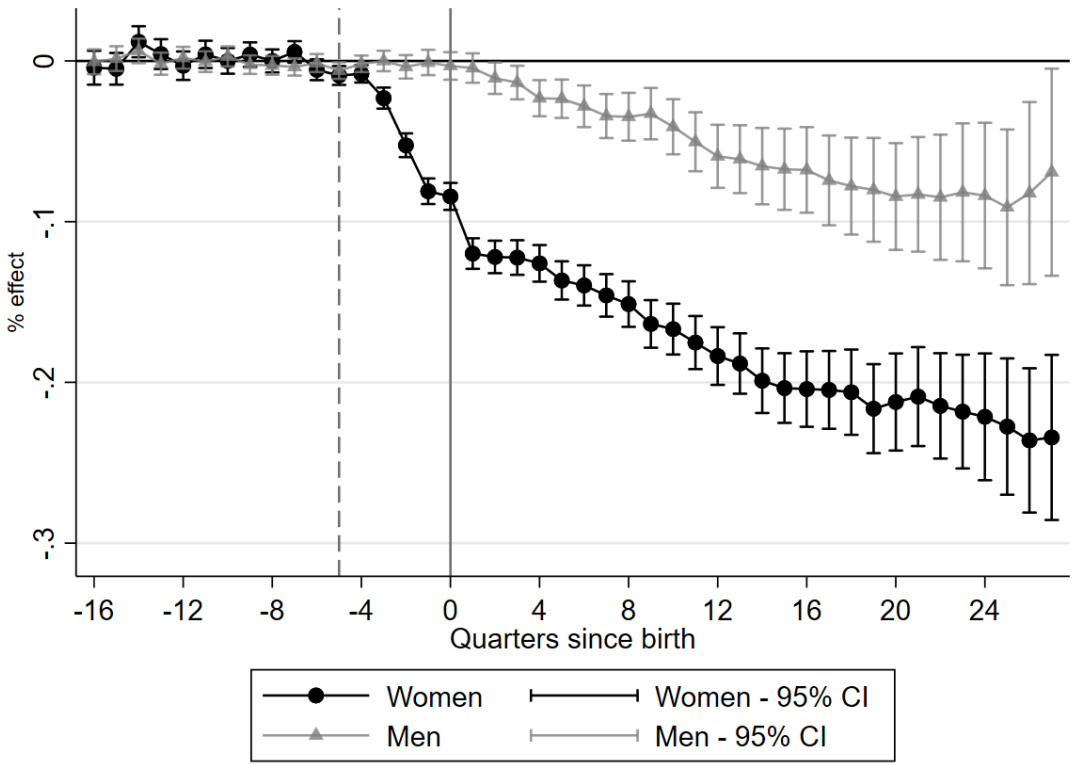
Robustness - Control group: only not-yet treated

Figure 23: Employment Rate



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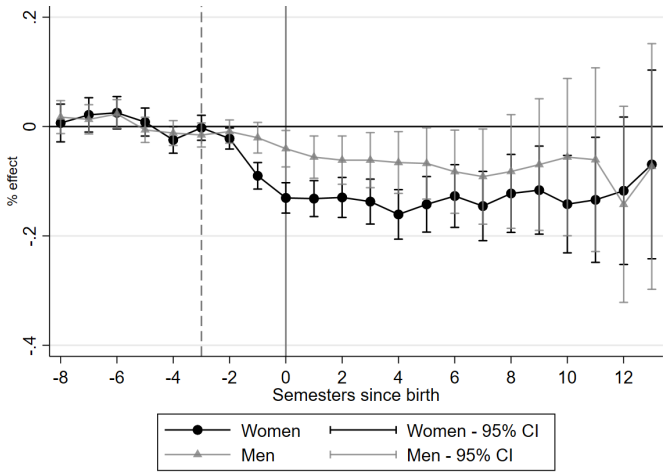
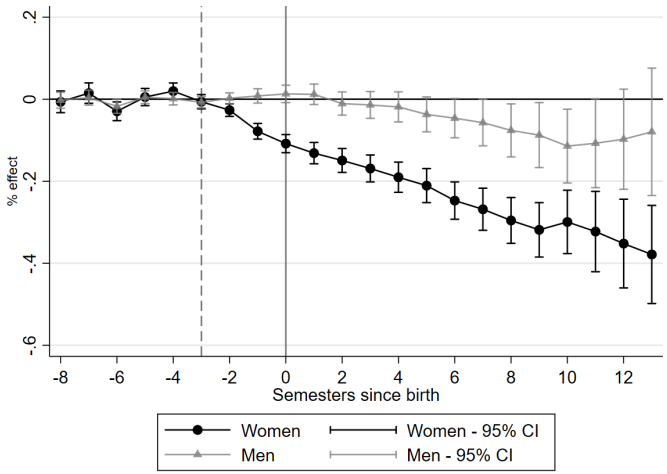
Robustness - Control group: only not-yet treated

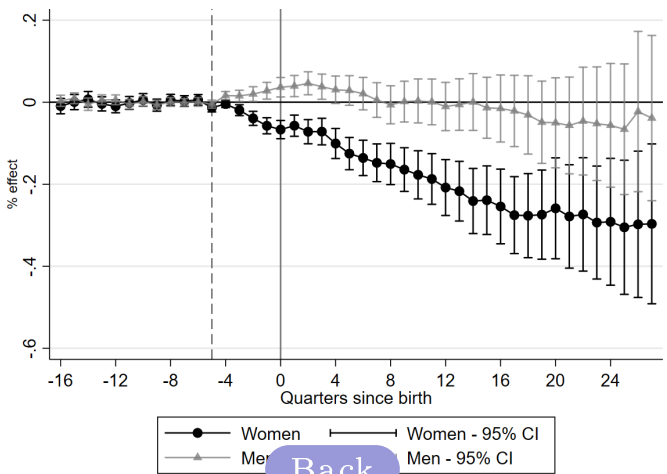
(a) Local employment



(b) Non-local employment



(c) Cross-border employment



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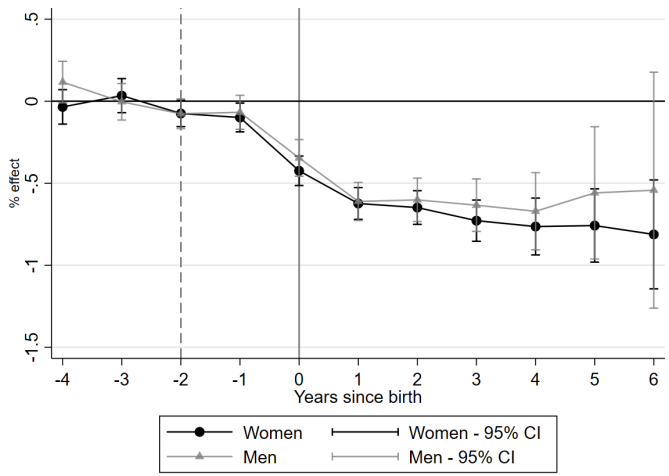
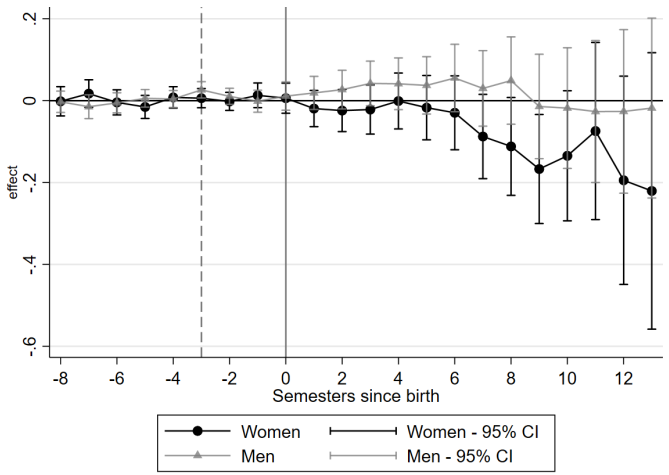
Robustness - Control group: only not-yet treated

(a) Changing place of residence (NUTS3)



(b) Log of Commuting time



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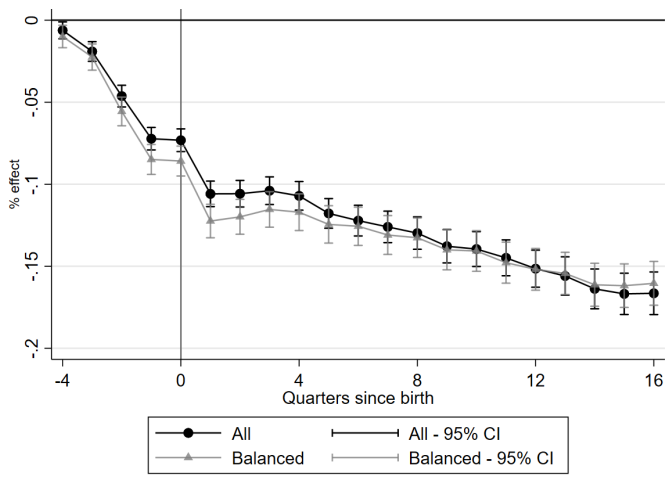
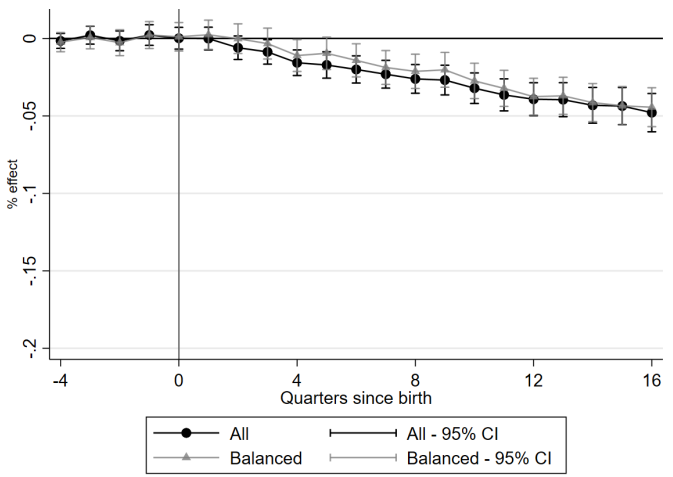
Robustness - Balanced sample vs Unbalanced

(a) Women: Employment Rate



(b) Men: Employment Rate



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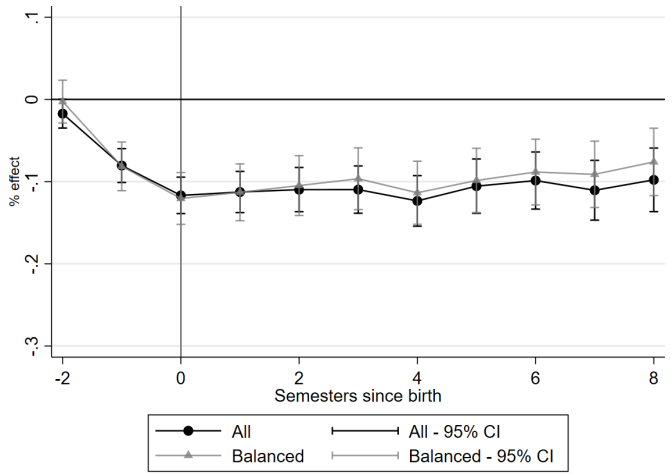
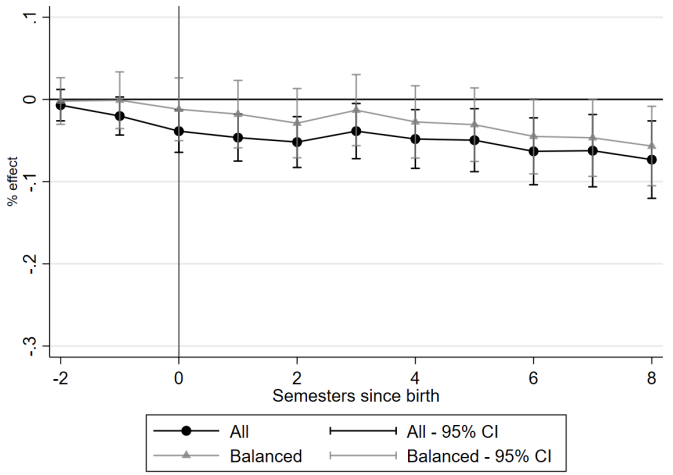
Robustness - Balanced sample vs Unbalanced

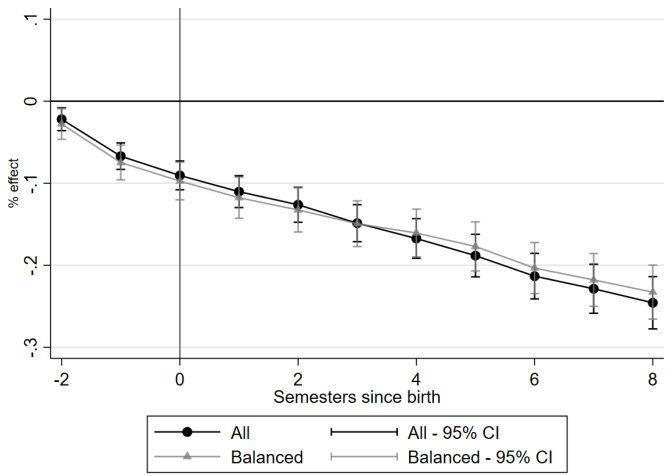
(a) Women: Local emp



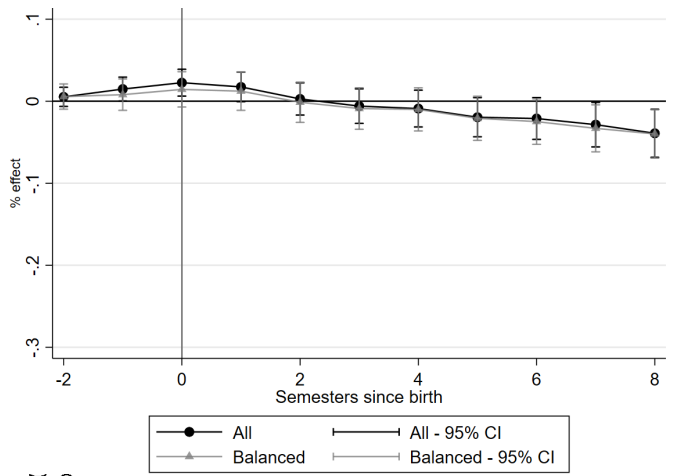
(b) Men: Local emp



(c) Women: Non-local emp



(d) Men: Non-local emp



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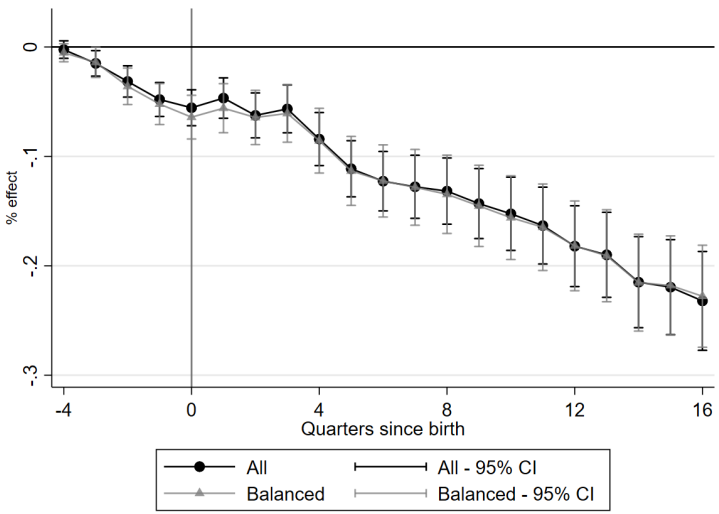
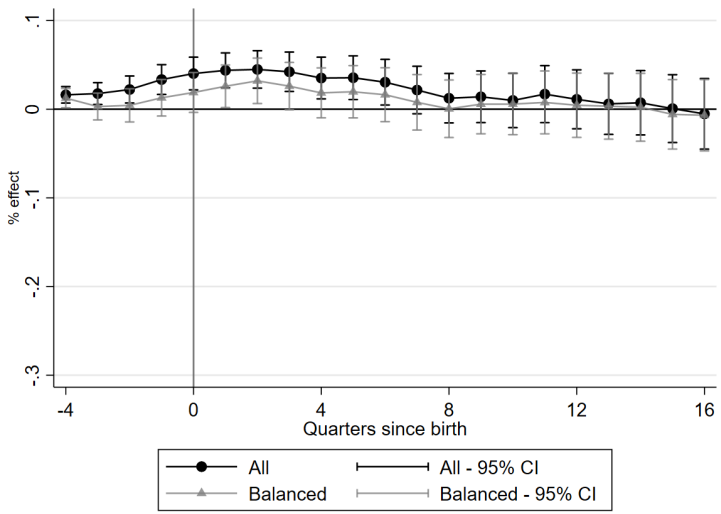
Robustness - Balanced sample vs Unbalanced

(a) Women: Cross-border emp



(b) Men: Cross-border emp



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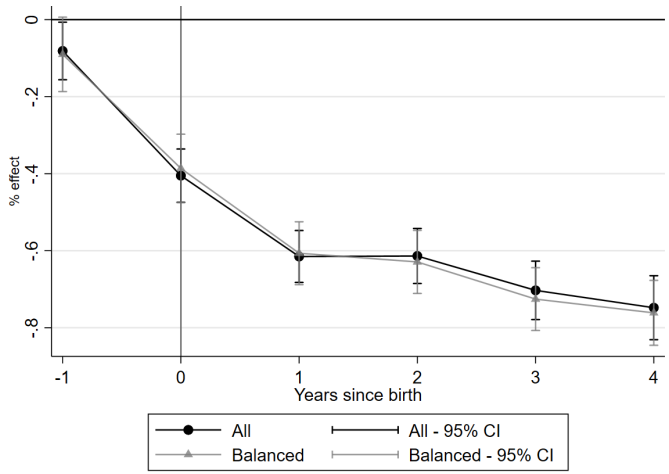
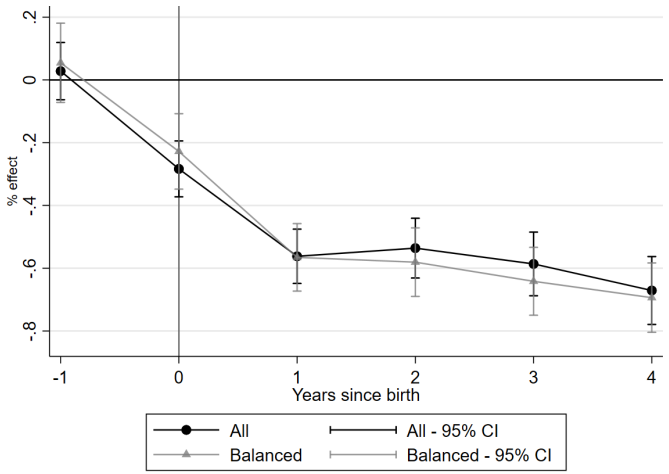
Robustness - Balanced sample vs Unbalanced

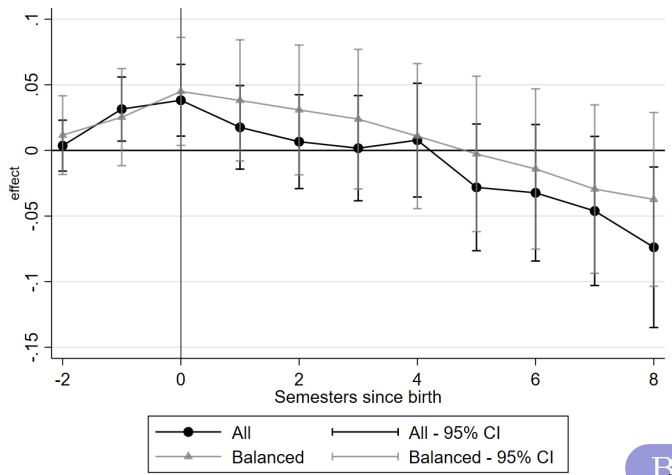
(a) Women: changing residence



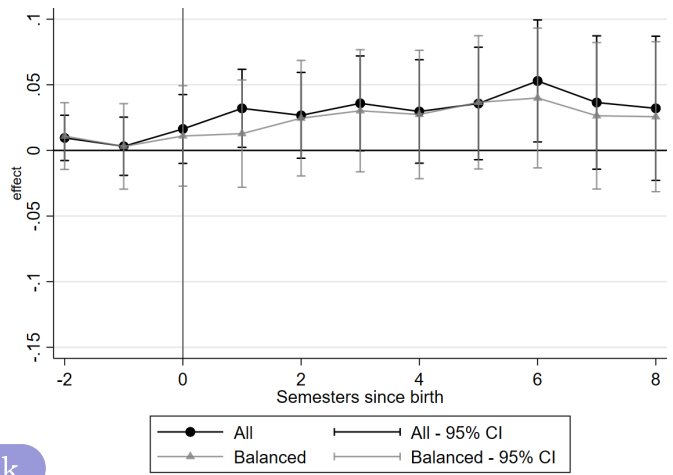
(b) Men: changing residence



(c) Women: log of Commuting



(d) Men: log of Commuting



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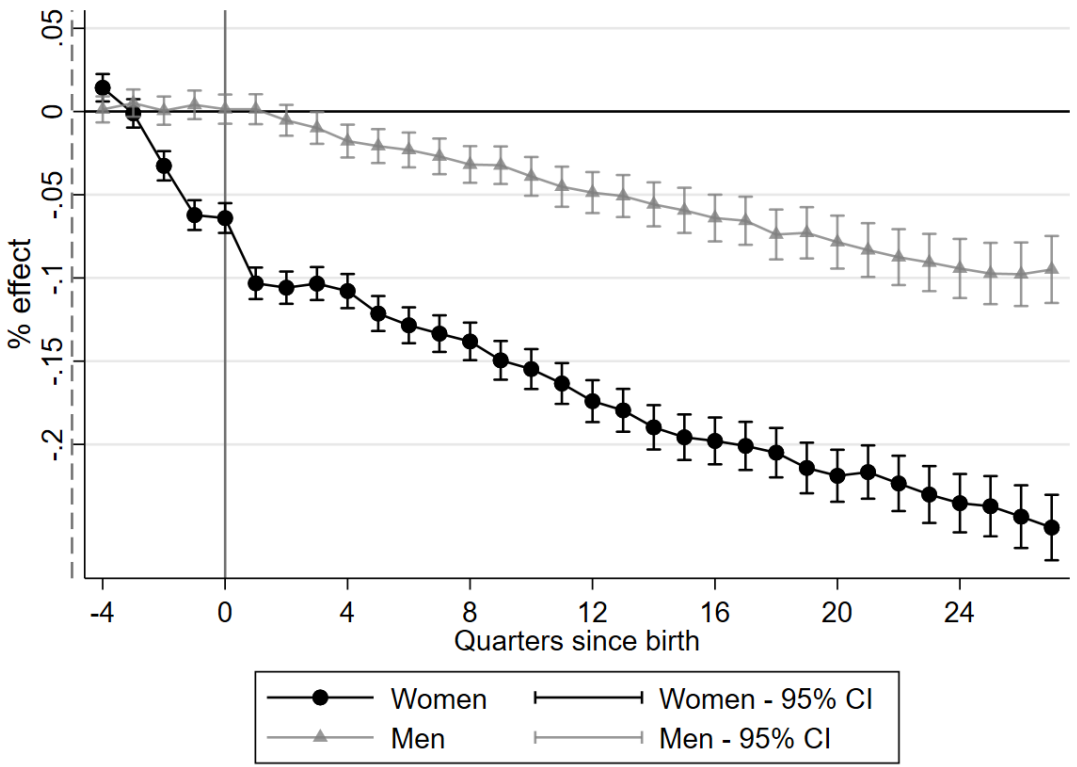
Robustness - Extended Two-Way Fixed-Effect Event Study (Woodridge 2021, all interactions, age quadratic)

Figure 30: Employment Rate



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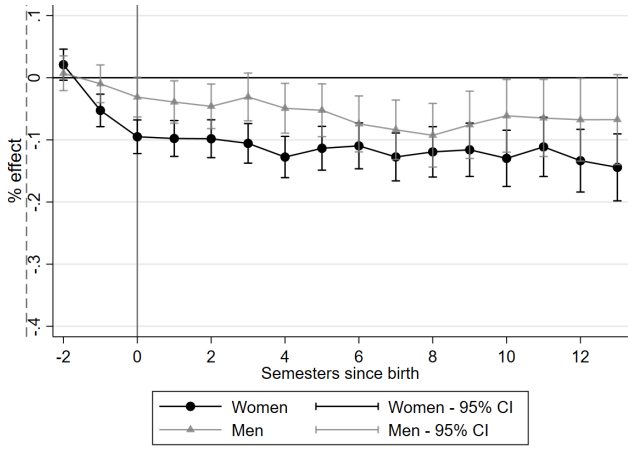
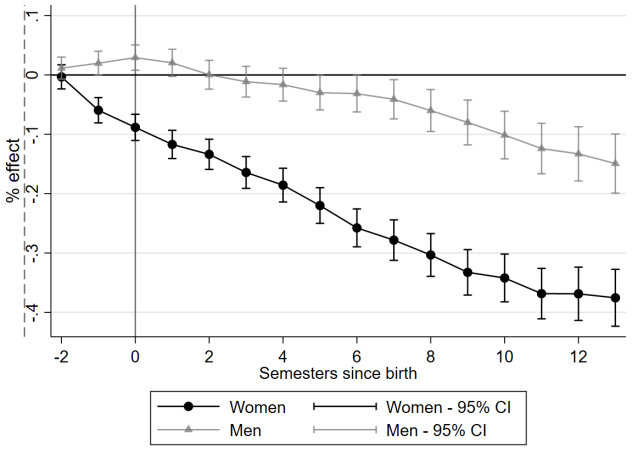
Robustness - Extended Two-Way Fixed-Effect Event Study (Woodridge 2021, all interactions, age quadratic)

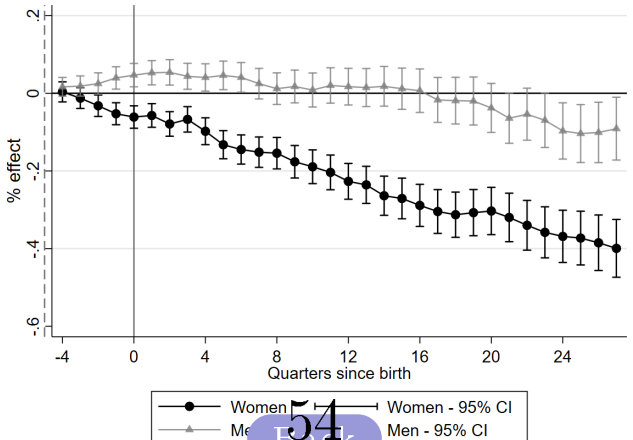
(a) Local employment



(b) Non-local employment

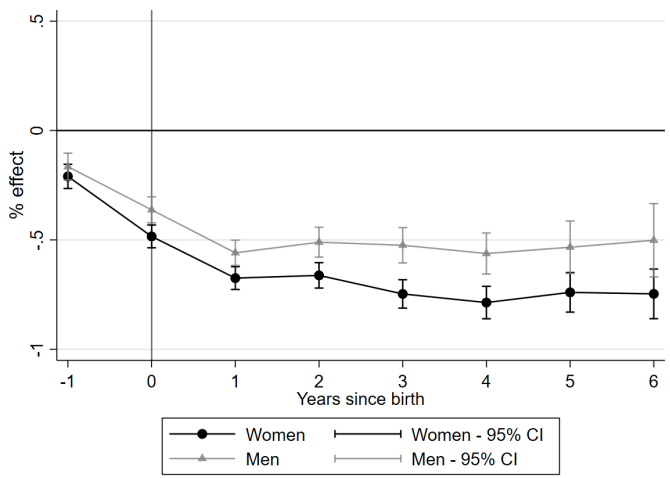


(c) Cross-border employment

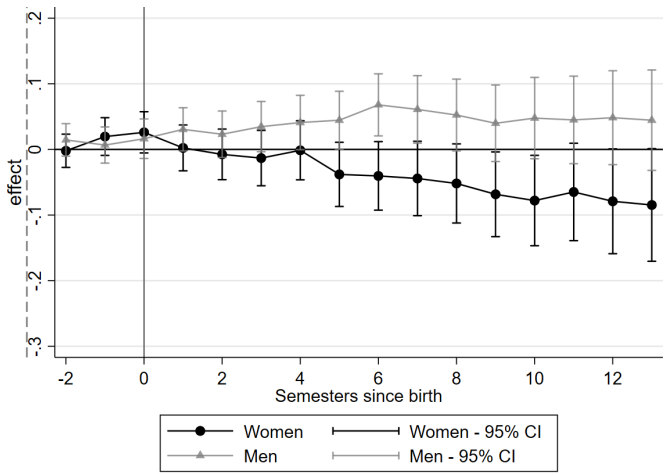


Robustness - Extended Two-Way Fixed-Effect Event Study (Woodridge 2021, all interactions, age quadratic)

(a) Changing place of residence (NUTS3)



(b) Log of Commuting time



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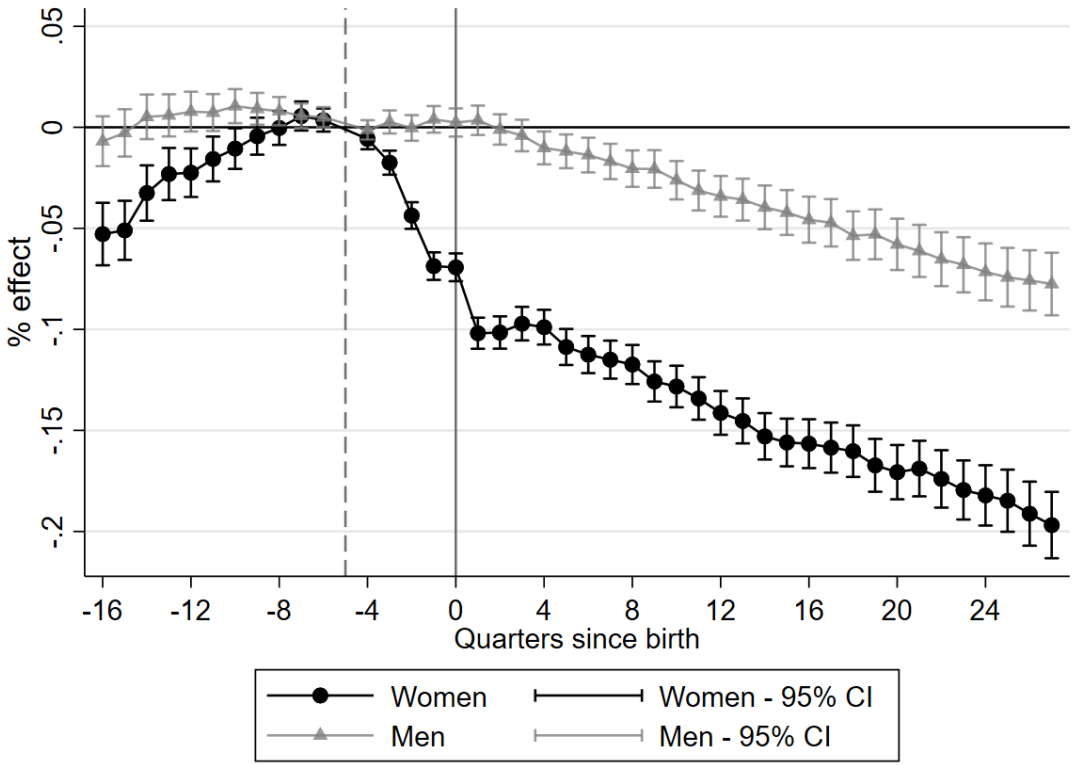
Robustness - Classical Event Study

Figure 33: Employment Rate



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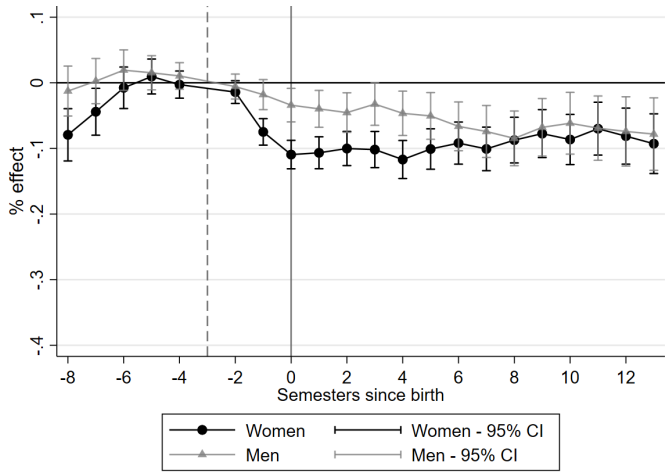
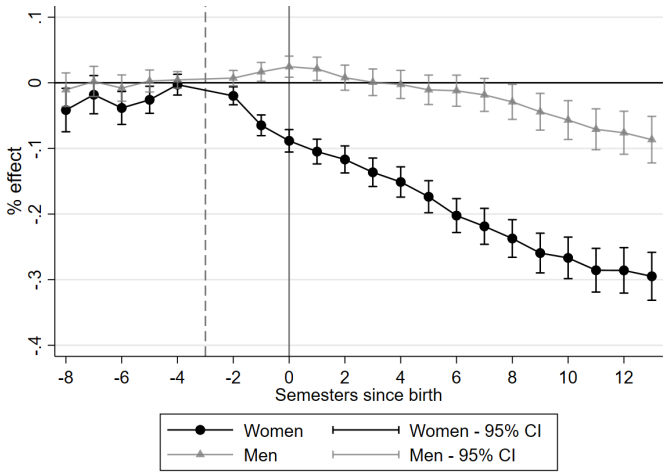
Robustness - Classical Event Study

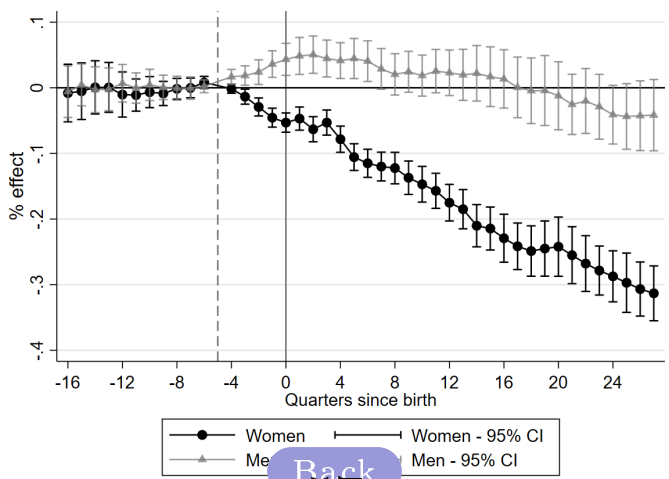
(a) Local employment



(b) Non-local employment

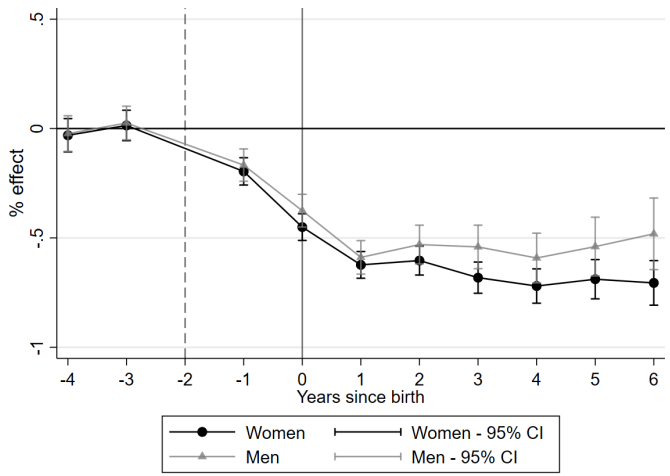


(c) Cross-border employment

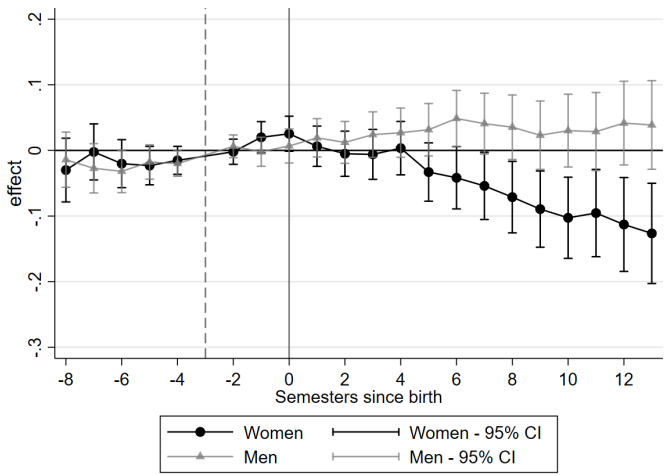


Robustness - Classical Event Study

(a) Changing place of residence (NUTS3)



(b) Log of Commuting time



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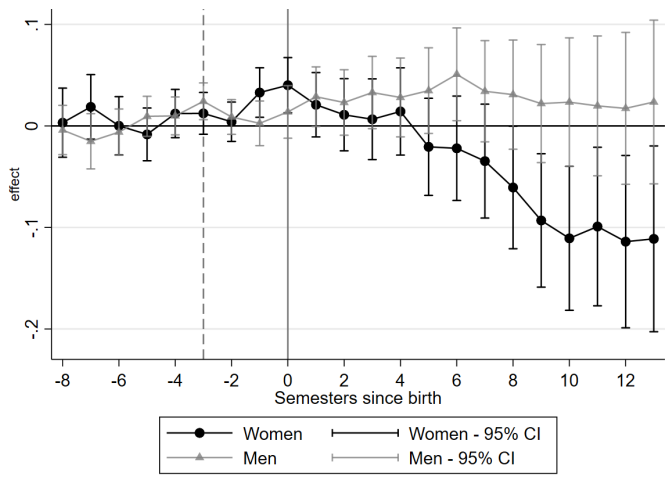
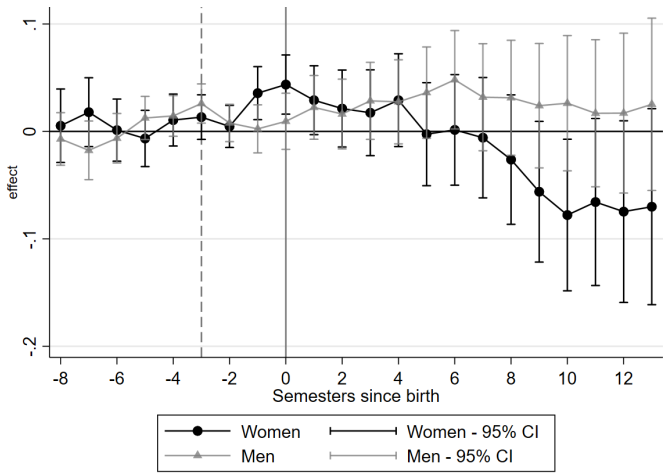
Robustness - Alternative Definition Commuting to Luxembourg

(a) Half between border and Lux. city



(b) Border



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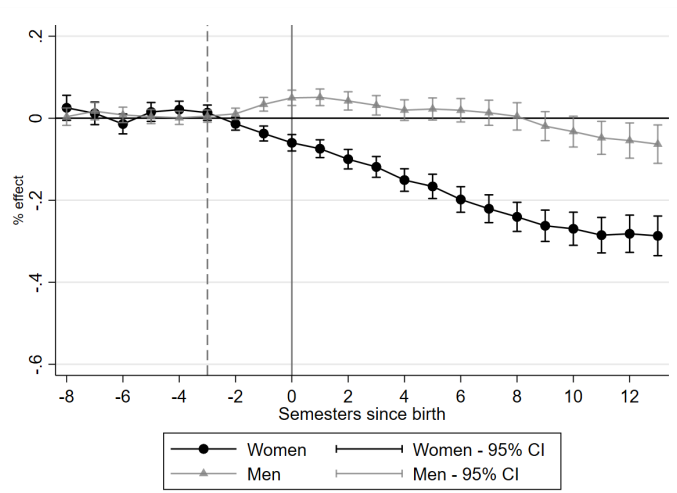
Employment rate by location and daily salary (cross-border = high)

(a) High-Paid Non-Local Jobs



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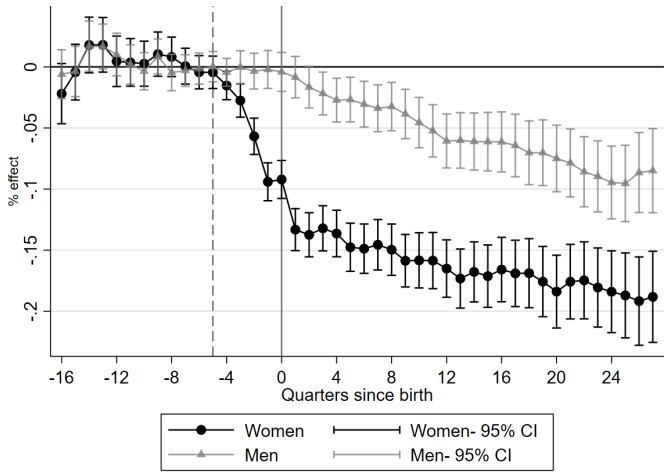
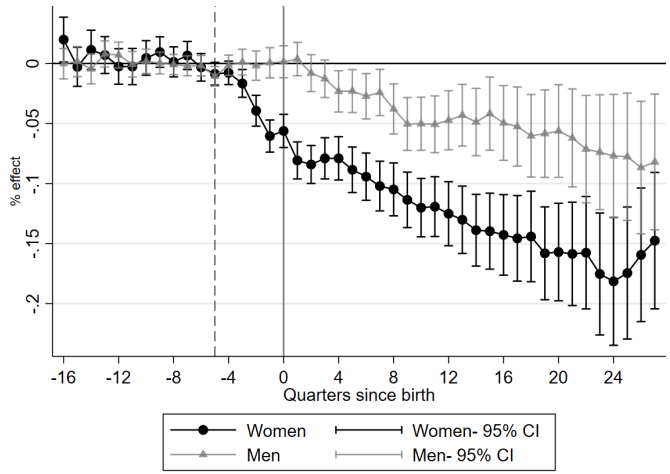
Total employment gap

(a) High unemployment

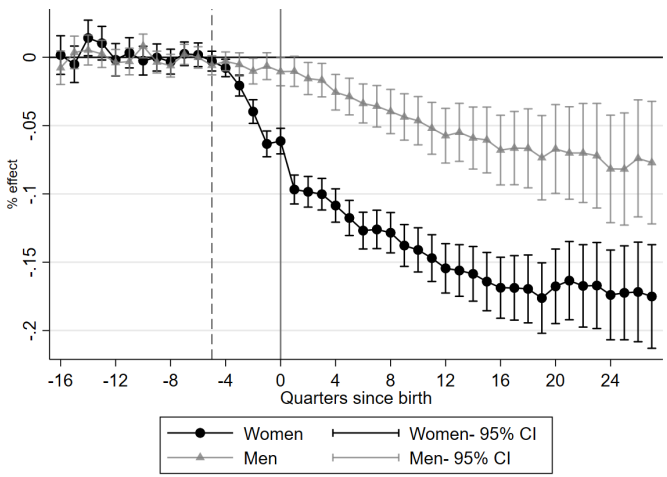
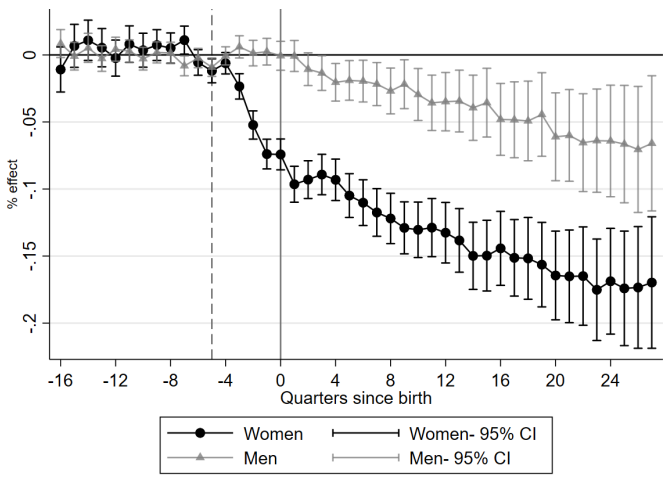


(b) Low unemployment



Back

(c) Active Partner



(d) Inactive Partner