Moral Hazard Among the Employed

Work in progress. Preliminary.

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Introduction And Motivation

Motivation

- large body of work on how unemployment insurance (UI) affects job-search effort of the unemployed
- yet, presence of UI may even affect those that are not currently unemployed
  - e.g., increase employeds' risk of entering unemployment (moral hazard; MH)
    - possibly through shirking, reduced effort of avoiding job-loss
- aggregate effect of moral hazard on employment and output may be larger than what is measured by examining the unemployed alone
- hard to analyze when everybody is covered by UI (no control group)
- Denmark: UI without mandate and without exclusion

  $\rightarrow$workers voluntarily sign up for UI;
- need to disentangle MH from selection

Our Contributions

- within the MH literature (Literature), we leverage a system-wide early retirement (ER) policy reform inducing workers to enroll in UI early along **age thresholds**
  - pre reform: be enrolled in UI by 50 to qualify (for ER option @60+)
  - post reform: be enrolled by 40
  - at reform: a number of cohorts needed to enroll immediately

- system open to any worker: use population register data and study the dynamic behavioral effects on unemployment; we closely follow comparable treated and not-yet-treated over time (Callaway and Sant'Anna, 2021 and Goodman-Bacon, 2021)

- first paper to document existence of clear, and sometimes strong **spillover effects** (e.g. coworkers, spouses, siblings)

Institutions & Data

UI Institutions

- framework: UI in Denmark until 1999
- similar to Swedish system (Kolsrud et al., 2018; Landais et al., 2021)
- 35 private, industry/occupation-specific UI funds
- individual participation **voluntary** and unobserved by employer
- no direct selection, pooling, uniform pricing
- benefit replacement rate 90%, with high floor and low ceiling
- benefit duration finite (4-7 yrs) but long in int'l comparison
- enrolment varies by age/y-o-b, Fig. 6

ER Institutions

- ER as special provision in UI system, separate from old-age pensions (age: 67)
- ER accessible to UI fund members under qualification restrictions:
  - full benefit eligibility: min 10 yrs of UI fund membership
  - ER option available to qualified members at (initially) zero marginal cost

- **1992: ER reform**, requiring 20 yrs of contributions, differential horizons for birth cohorts 1942-1952; see ▸ Fig. 7

Danish Register Data

- Combined set of tax & transfer, population, income, wealth, labor market, and health registers
  - administered by Statistics Denmark
- Data base and core data:
  - Denmark residents 1980–1998, b. 1931-1958, aged 25-59
- Main outcome variables:
  - unemployment insurance membership (binary $\{0; 1\}$)
  - unemployment incidence (binary $\{0; 1\}$)
  - employment, earnings, wage rate

Descriptives

Correlation Risk and Insurance

- data show:
  - 80% of all workers will be insured at some stage; 20% uninsured
  - most workers transition once into UI without ever leaving again
- under canonical cases of asymmetric information expect positive correlation between being insured and being unemployed (Chiappori, 2000; Cohen and Spiegelman, 2010)
- strong evidence: both for males and females, across all ages and education groups: ▸ Fig. 8

Descriptive Patterns

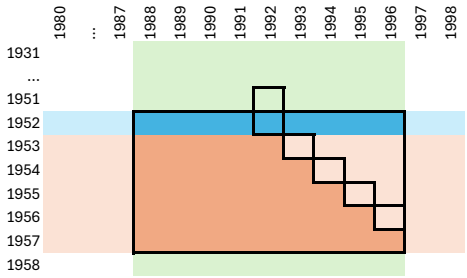
- Age, cohort and calendar year effects in UI enrollment:
  - for any given cohort, there are strong age and year patterns in UI membership Fig. 9
- around 1992 ER-reform Fig. 10
  - strong effect of age threshold on UI membership
  - strong cohort differences in levels for both UI and UE outcome
- **complier profile**: Tbl. 1
  - better educated, higher earnings, more entrepreneurial
  - small group (7.5%) compared to always takers (71%) or never takers (17%)
  - (almost) no defiers ($< 1\%$), and some on/off (3.5%)

Estimation and Results

Design & Identification

- event study setup centered around 1992 reform
- not in education, not retired, Danish citizens

  - window ±4 years (1988-1996)
  - "treated": b. 1952 (40 in 1992), "control" (not-yet treated): b. 1953-57 (35-39 in 1992, removed from analytic sample before age 40)
    - rules out anticipation effects
    - T and C very comparable (small age difference)
    - no differential time effects/macro shocks



- event graphs for
  1. insurance status ▸ Fig. 10
  2. un/employment and financial outcomes

→ like 1st stage and reduced form (compare IV—RF:1st)

Estimation

$$Y_{it} = \alpha_i + \gamma_t + \underbrace{\sum_{s=1988}^{1990} \delta_s D_i \times \mathbf{1}(t=s)}_{\text{pre-trends}} + \underbrace{\sum_{s=1992}^{1996} \beta_s D_i \times \mathbf{1}(t=s)}_{\text{dyn. reform effects}} + X_{it}\zeta + \varepsilon_{it}. \quad (1)$$

- Y insurance or labor market outcome
- α time-invariant, individual-specific effect
- γ macro time effects
- D treatment (1952-cohort)
- X additional regressors

today: raw data exercise, not conditioning on add. regressors

Index Page Estimation Results

Unemployment Insurance (UI) & Incidence (UE)

Sample	UI	UE
base	Fig. 1	Fig. 2
Placebo		
never insured	—	Fig. 11
Heterogeneity		
by gender	—	Fig. 12
by gender × edu	—	Fig. 13

all: T 1952, C $1953 - 57| < 40$

Base Sample, Alternative Outcomes

Employment degree	Fig. 19
Earnings	Fig. 20
by gender × edu	Fig. 22
Hourly wage rate	Fig. 21

all: T 1952, C $1953 - 57| < 40$

Spillovers

UE of main|alw.ins.	sp affected v no spouse	Fig. 14
UE of spouse|alw./nvr.ins.	T/C of main	Fig. 4
UE of oldest sib|alw./nvr.ins.	T/C of main	Fig. 16
UE by workplace exposure	T/C of main	Fig. 17
UE of 1991 coworkers	T/C of main	Fig. 18

Conclusions and Outlook

Conclusions

- use Danish register data, leveraging voluntary UI with policy shock
  $\rightarrow$ strong first stage in the face of salient age, year and cohort effects
- study extensive margin of entry-to-unemployment among the employed, aim to detect MH
- identification: narrow cohort/year selection mitigates age effects and removes time effects
- find sizeable MH effects on unemployment incidence, with expected 1-year lag, but also effect on hourly wages
- heterogeneity esp. between sexes (and across education)
- pronounced spillover effects, especially between spouses, but not siblings, and with coworkers
  - joint leisure
  - workplace norms and culture

Future Work and Extensions

- extend beyond current narrow T/C selection
- revisit alternative identification strategies and approaches
- more comprehensive assessment of behavioral effects among the employed
  - more targeted coworker selection as peers, possibly matching
  - increased attention to health and productivity outcomes, including long-run (up to 2012)
  - more on geographical, occupational, and career mobility

Figures and Tables

Difference-in-Difference: Unemployment Insurance

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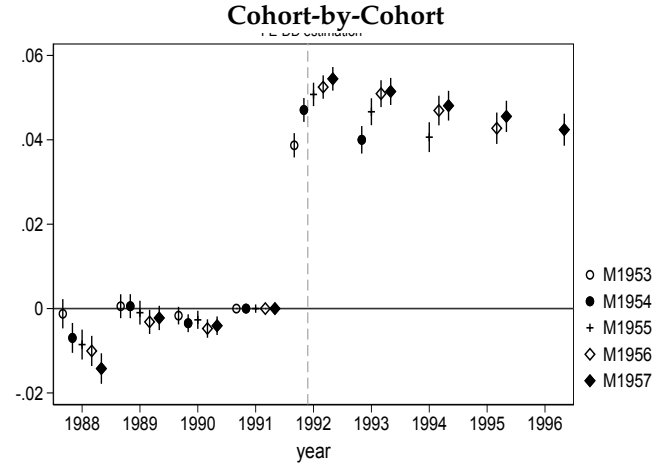

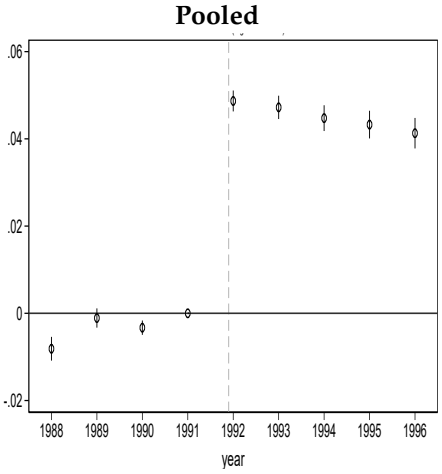

Figure: Event Study UI

Difference-in-Difference: Unemployment Incidence

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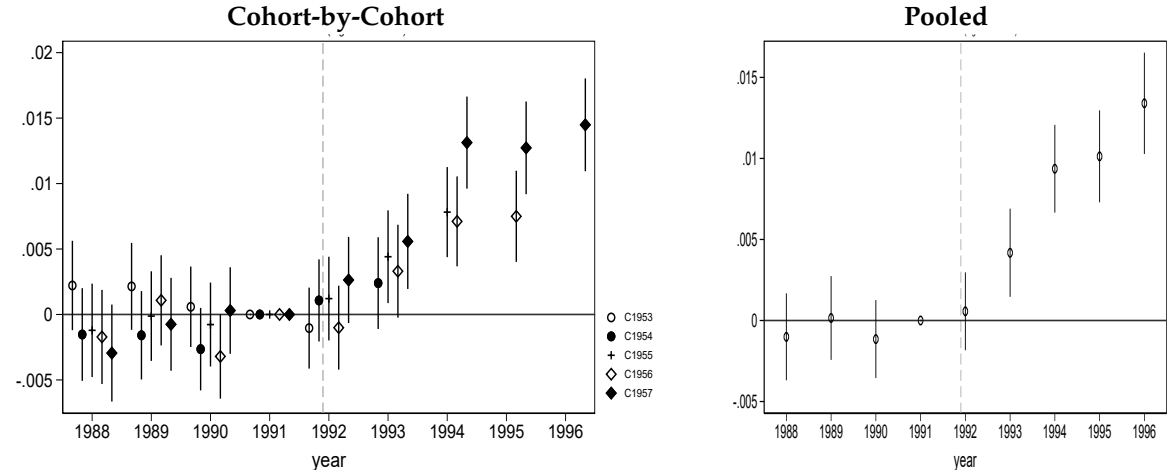

Figure: Event Study Unemployment

Spillover effects

- we investigate if there are spillover effects to spouses, siblings and co-workers
- we investigating the effect on spouses when the main person is treated
- to isolate the spillover effect we look at spouses who are either always insured or never insured
- sibling is defined as the older sibling
- co-worker is defined as the ”closest” co-worker at the same workplace in 1991 in terms of age, gender, and occupation at the workplace

Spillovers from Reform: Unemployment Insurance of Spouse

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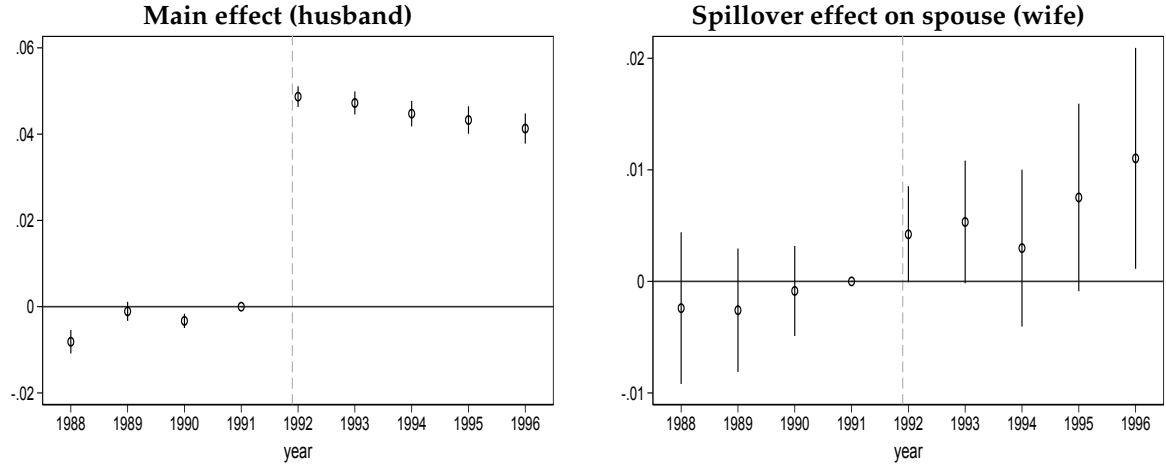

Figure: Spillover on Spouse (spouse at least two years younger obs drop if wife > 40 years old)

Spillovers from Reform: Unemployment Incidence of Spouse

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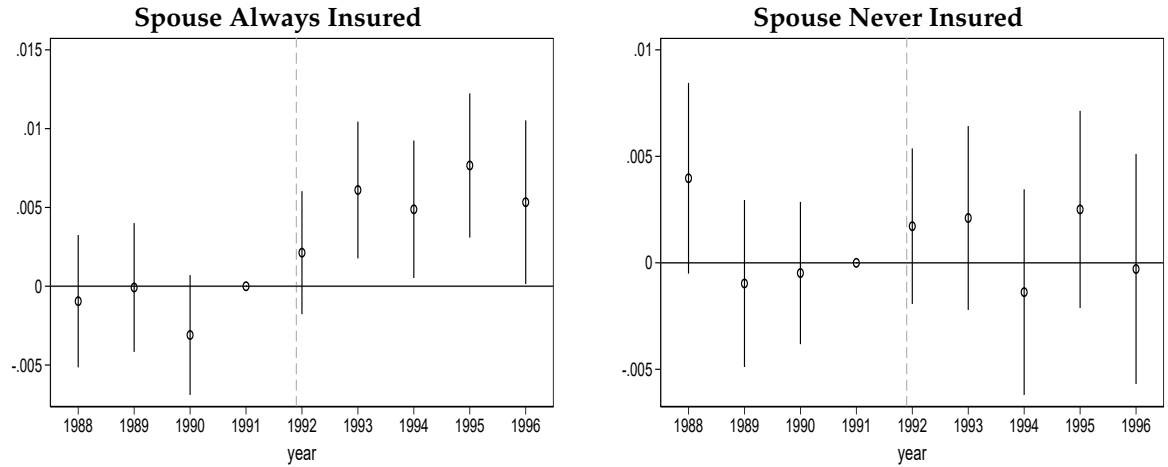

Figure: Spillover on Spouse

Spillovers fr. Reform: Main effect and spillover on coworker

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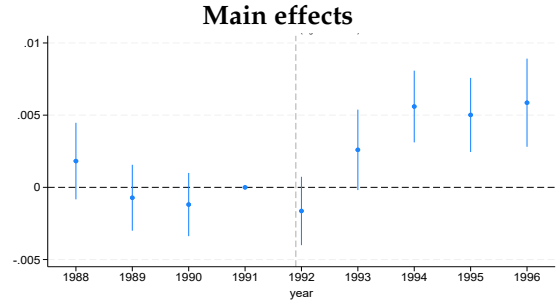

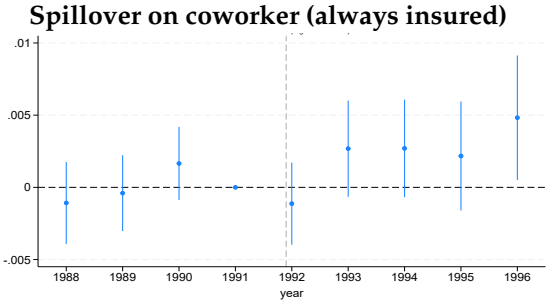

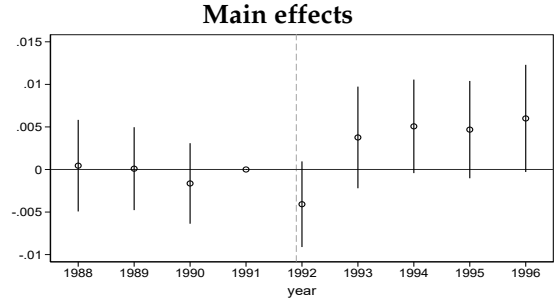

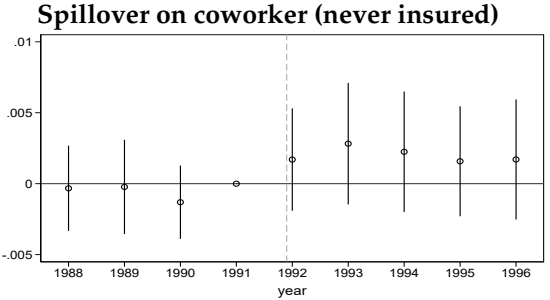

Figure: Within Workplace Spillover on closest coworker

Previous Literature; I back

- social insurance systems may encourage workers to take productive risk, in particular when private insurance markets fail (Sinn, 1996; Acemoglu & Shimer, 1999, 2000; Bird, 2001; De Mooij, 2006; Chetty and Finkelstein, 2013)
- flip side: MH, e.g. in UI
- large literature concerned with job search and job finding success affected by UI parameters **among the unemployed**— occurring **after** job loss
  - longer PBD → +UE duration (Katz & Meyer, 1990; Card et al., 2007; Card et al., 2015; Nekoei & Weber, 2017)
  - higher benefit level → +UE duration (Meyer, 1990; Krueger & Meyer, 2002; Lalive et al., 2006)
  - benefit schedule & benefit extensions (Kroft & Notowidigo, 2016; Landais, 2011; Schmieder et al., 2016)

Previous Literature;II

back

- much smaller literature on effects on non-unemployed (e.g., employed workers) occurring **before** job loss
  - main parameter: qualification period to draw UIB or eligibility requirements
    → length of employment spell / employment hazard / employment↦unemployment transition

- spikes in layoff upon becoming UI eligible (Green & Riddell (1997), Baker & Rea (1998), Christofides and McKenna (1996), Brebion et al (2022), Van Doornik et al. (2023))
  - → UI eligibility rules (earnings and employment requirements)
- unemployment incidence employees (Winter-Ebmer (2003), Kyyra & Wilke (2007), Tuit & Van Ours (2010), Hartung et al. (2022), Birinci & See (2023), Gudgeon et al. (2024))
  - → mostly for very specific groups (e.g. delayed qualification for early retirement)
- moral hazard effect among self-employed (Ejrnæs and Hochguertel (2013))
- effect of UI on wages (outside option effect) (Jäger et al. (2020), Dahl & Knepper (2022))
- shirking and productivity effects of workers (Burda et al. (2020), Lusher et al. (2022), Ahammer et al. (2023))

Heatmaps

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P(Join UI)

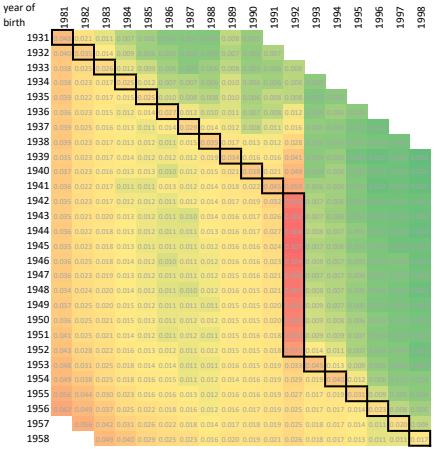

Table shows mean of UIentry by yob and year (ttl: 15566678 obs)
Sample restrictions:
if UIentry<. & Ncell>=5
Sample: everyone (estimation base sample);; ; min. effective cell size: 18432 obs. (mean: 35234 obs.)

Unemployment Intensity for Joiners

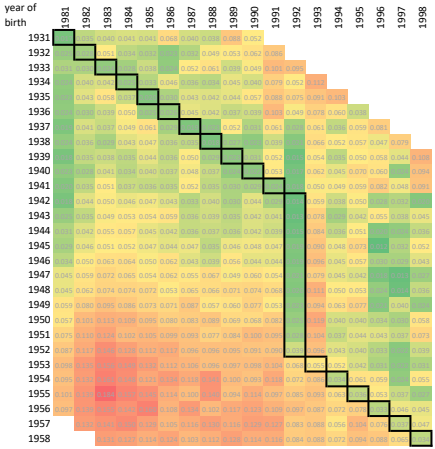

Table shows mean of UEdeg1 by yob and year (ttl: 273512 obs)
Sample restrictions:
if UEdeg1<. & Ncell>=5 & UIentry==1

Sample: everyone (estimation base sample);; unempl. degree t+1 [0,1]; conditional on changing UIfund from t-1 (0) to t (1); min. effective cell size: 22 obs. (mean: 1334 obs.)

Rules and Reform

YEAR / YOB	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
1930	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
1931	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67
1932	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
1933	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
1934	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
1935	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
1936	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62
1937	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61
1938	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
1939	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
1940	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
1941	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
1942	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
1943	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
1944	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
1945	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
1946	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
1947	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
1948	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
1949	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
1950	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
1951	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
1952	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
1953	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
1954	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
1955	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
1956	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
1957	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
1958	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

LEGEND
sample exclusions
likely not yet participating in the labor market or potentially eligible for early retirement
eligible for old-age pension
minimum required insurance ages to qualify for early retirement at the earliest age
initial situation, valid from 1980
those affected by the 1992 reform

Incentive

YEAR / YOB	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
1930	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
1931	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67
1932	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
1933	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
1934	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
1935	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
1936	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62
1937	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61
1938	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
1939	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
1940	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
1941	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
1942	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
1943	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
1944	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
1945	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
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1947	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
1948	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
1949	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
1950	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
1951	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
1952	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
1953	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
1954	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
1955	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
1956	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
1957	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
1958	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

LEGEND
Non retirement group
Retirement group

Correlation Unemployment Intensity and UI Membership

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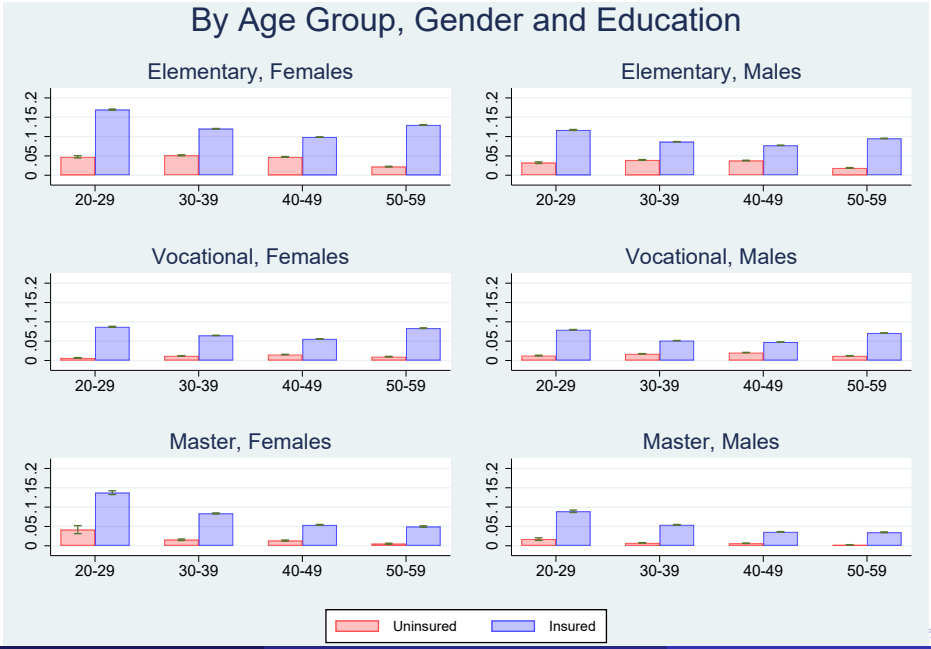

P(Insured) Over Year or Age

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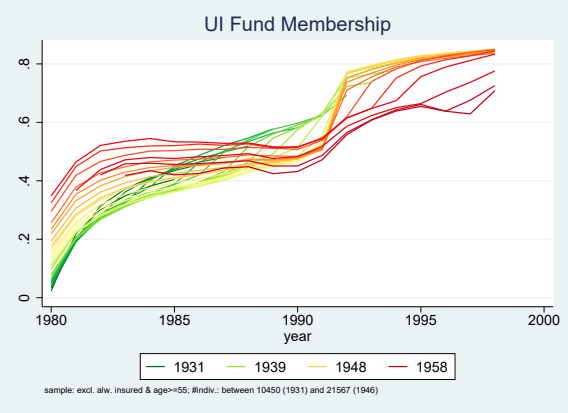

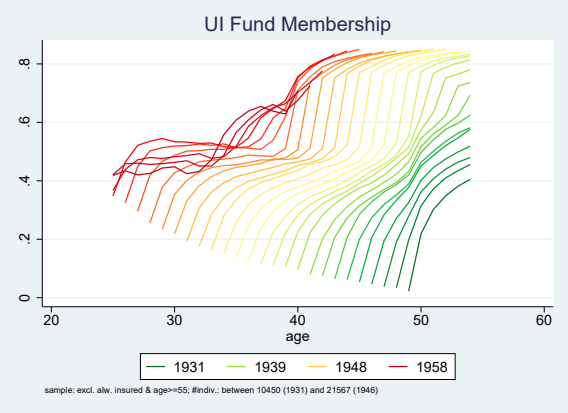

Figure: P(Insured) Over Year or Age

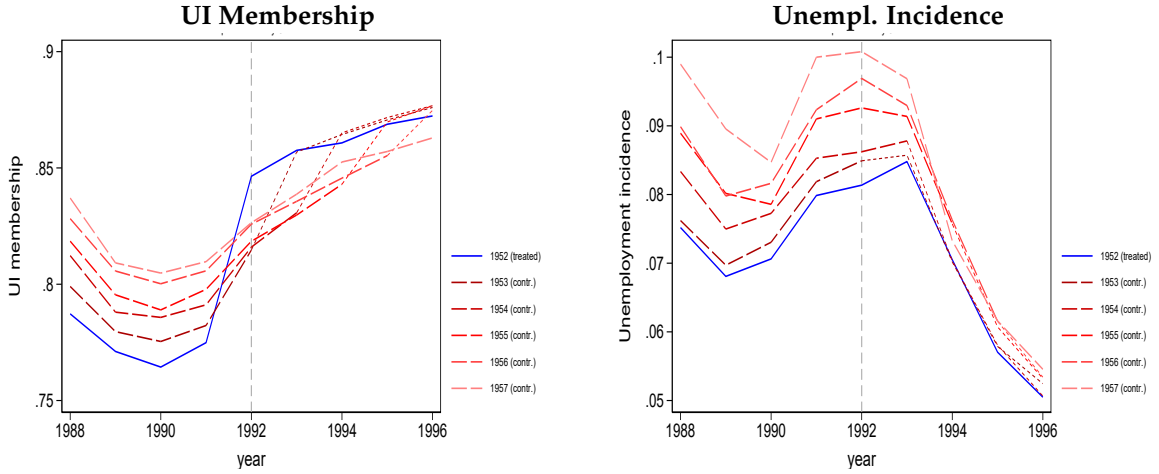

Figure: Cohort Graphs

Placebo Test: Unemployment Incidence of on Never-Insured

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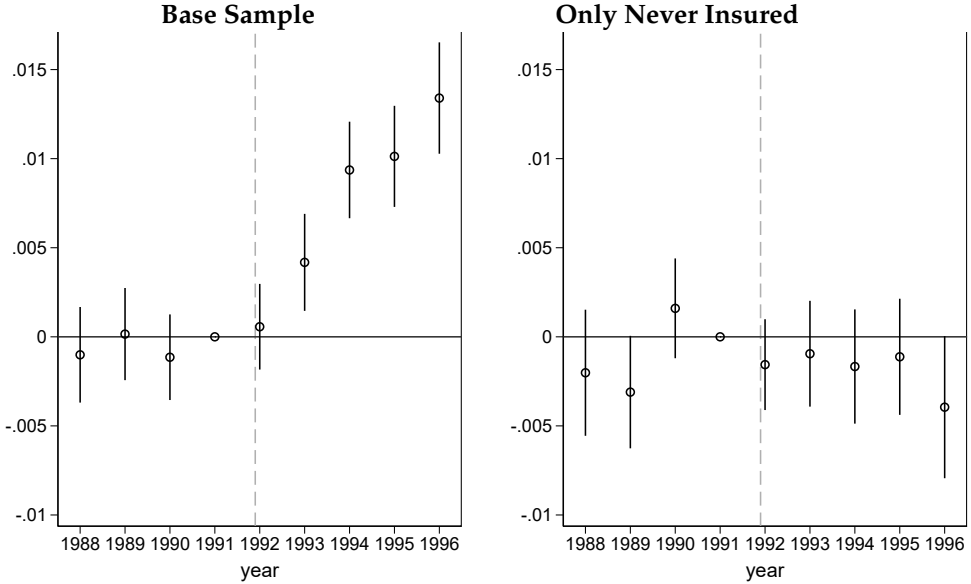

Figure: Placebo: Never Insured

Heterogeneity: Unemployment Incidence by Gender

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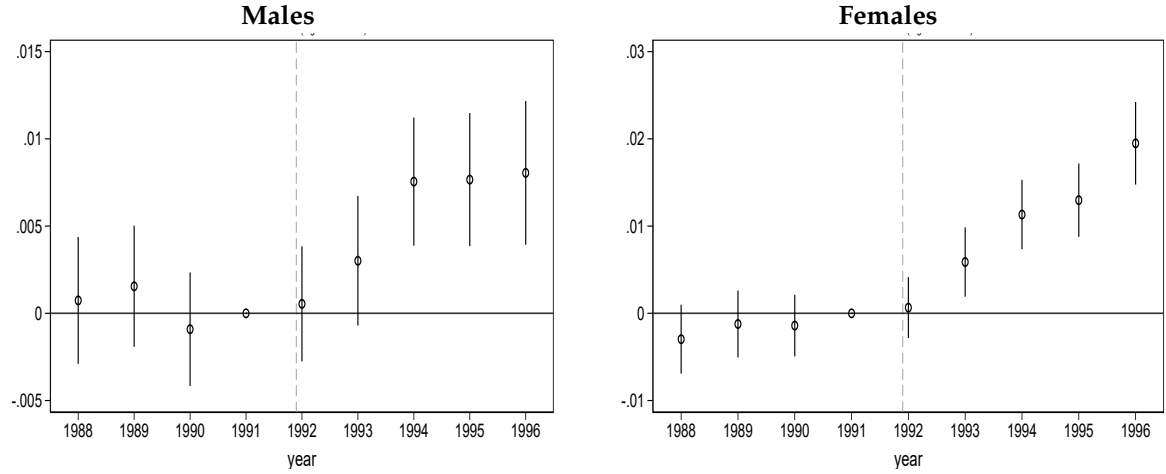

Figure: Heterogeneity by Gender

Heterogeneity: Unemployment Incidence by Gender × Educ.

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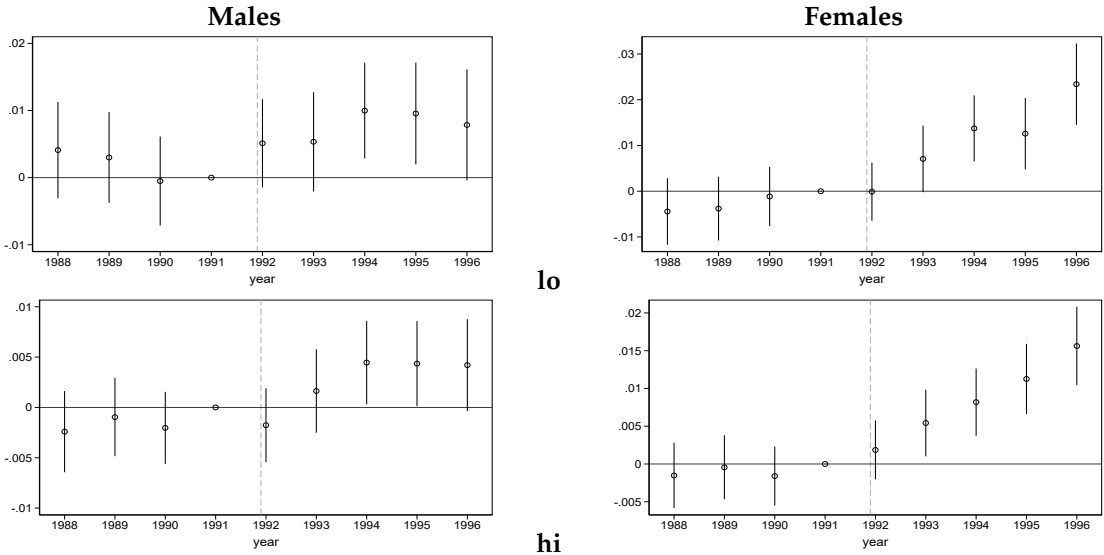

Figure: Heterogeneity by Gender and Education

Spillovers from Reform: Marital Spillovers from Reform

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Figure: Marital Spillovers for Always Insured

Spillovers from Reform: Unemployment Insurance of Spouses

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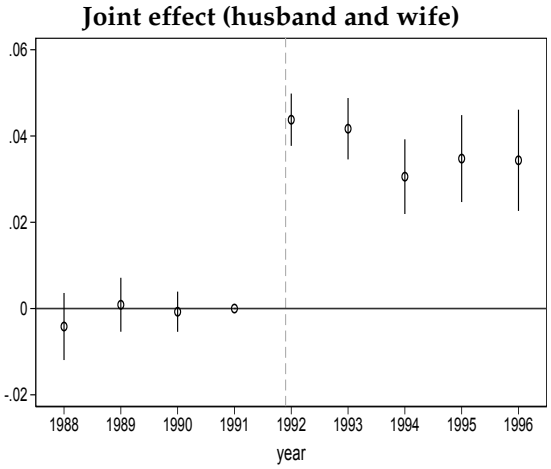

Figure: Joint decision (spouse two years younger obs drop if wife¿ 40 years old)

Spillovers from Reform: Unemployment Incidence of Siblings

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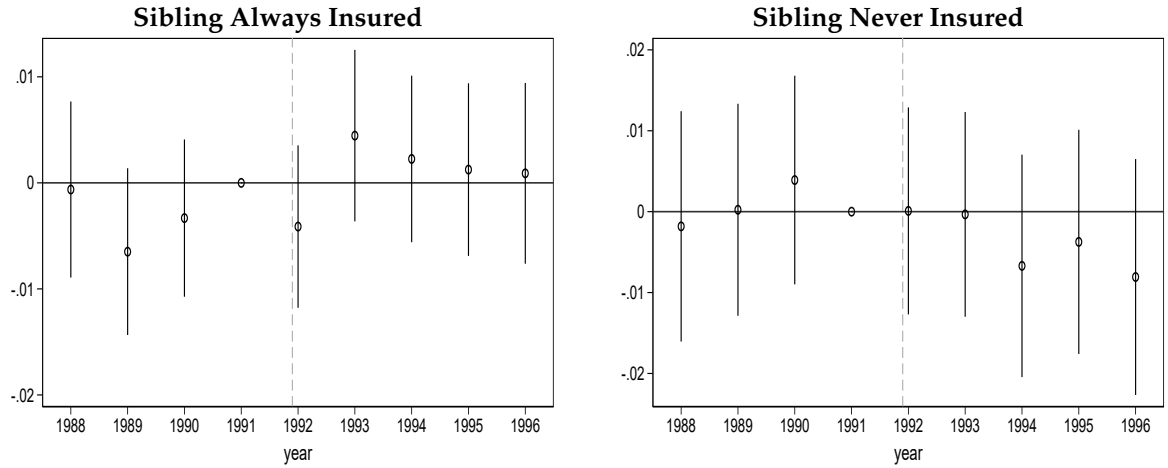

Figure: Spillover on Oldest Sibling

Spillovers fr. Reform: Ins. Rate & UE Incid. by Workplace

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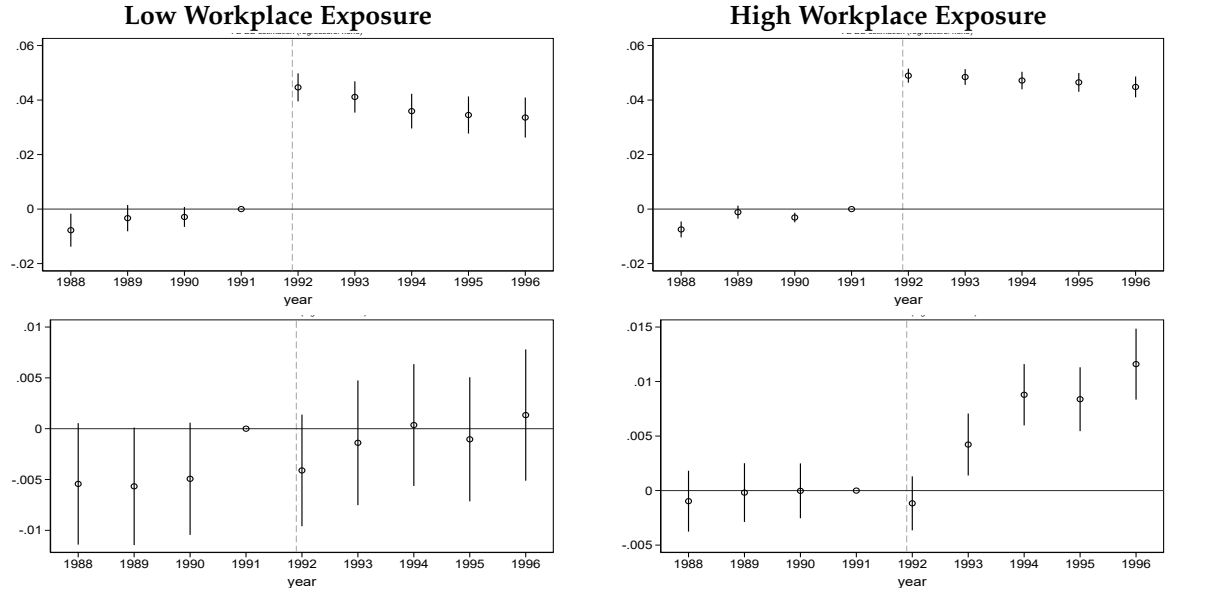

Figure: Within Workplace Spillover

Spillovers fr. Reform: unempl among 1991-co-workers

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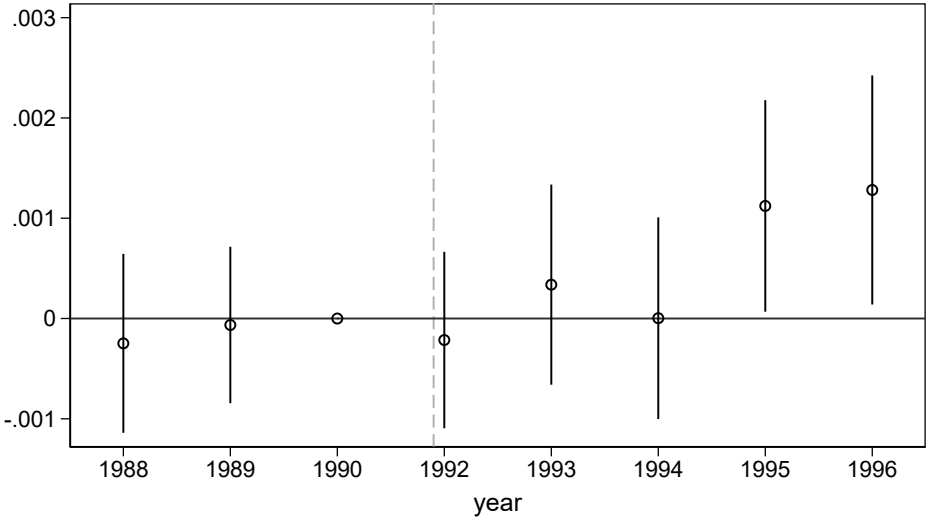

Figure: 1991 Coworkers

Alternative Outcome: Employment Degree

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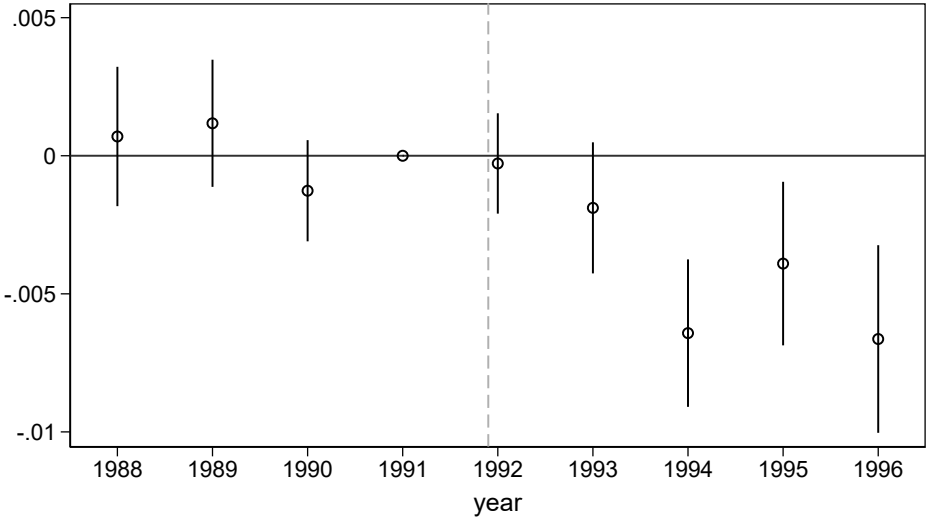

Figure: Employment Degree

Alternative Outcome: Earnings

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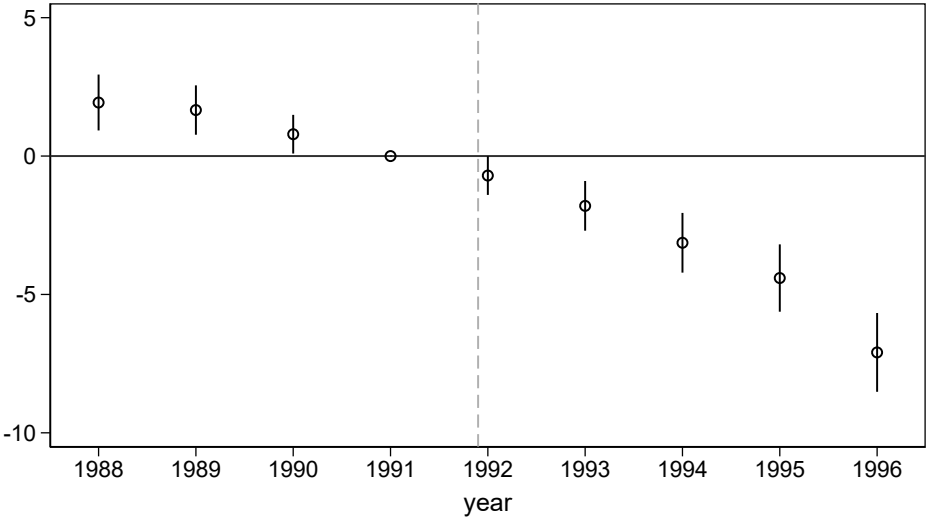

Figure: Earnings

Alternative Outcome: Hourly Wage Rate

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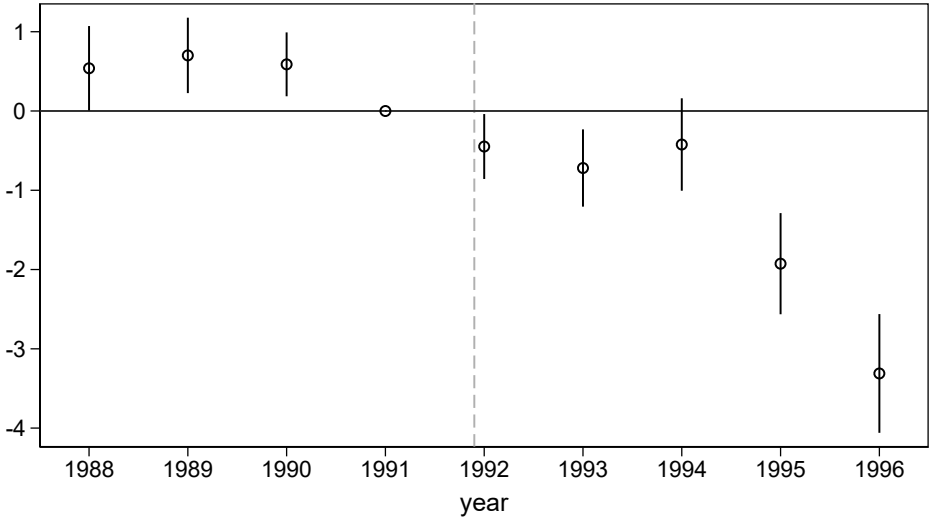

Figure: Hourly Wage Rate

Heterogeneity: Earnings by Gender × Educ. back

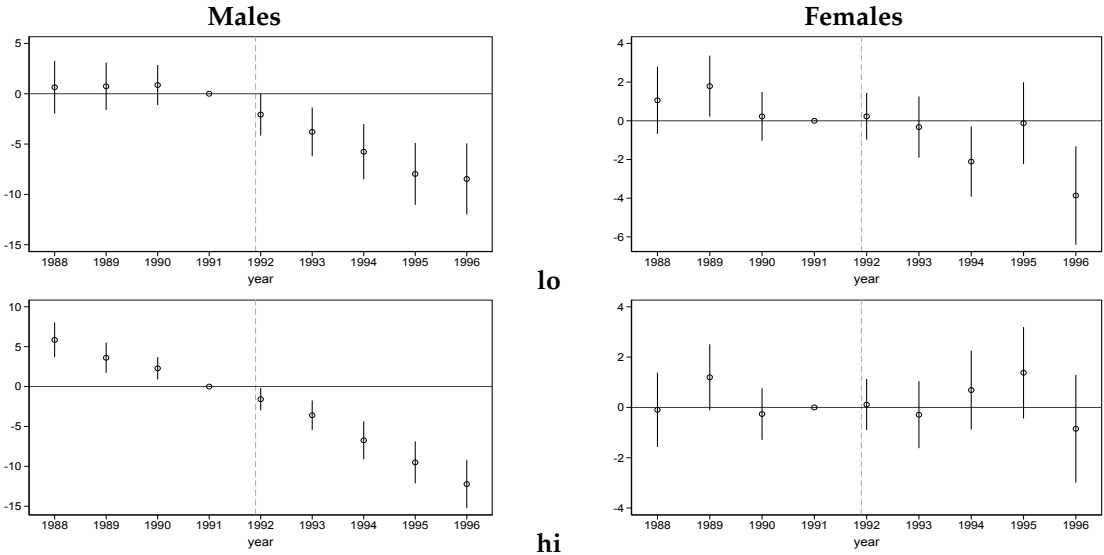

Figure: Heterogeneity by Gender and Education

Complier Analysis

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	(1) Always takers	(2) Compliers	(3) Never takers	(4) Defiers	(5) All
Unempl. incidence	0.09	0.02	0.06	0.11	0.08
	(0.28)	(0.15)	(0.25)	(0.32)	(0.27)
Gender: male	0.50	0.51	0.56	0.54	0.51
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)
Years of educ.	12.24	12.84	12.19	11.63	12.26
	(2.80)	(2.68)	(3.16)	(3.03)	(2.87)
Danish	0.97	0.97	0.92	0.95	0.96
	(0.16)	(0.17)	(0.27)	(0.22)	(0.19)
Experience (years)	14.19	13.43	10.44	11.61	13.36
	(4.88)	(6.22)	(6.77)	(5.30)	(5.61)
Earnings	88.02	89.64	67.07	64.64	83.52
(1,000kr$_{1979}$)	(49.36)	(65.86)	(78.70)	(54.62)	(58.57)
Intermediate and	0.60	0.67	0.56	0.51	0.60
high edu.	(0.49)	(0.47)	(0.50)	(0.50)	(0.49)
Self-employed	0.05	0.17	0.15	0.08	0.08
	(0.21)	(0.37)	(0.36)	(0.28)	(0.26)
Out of LF	0.01	0.05	0.22	0.09	0.06
	(0.10)	(0.21)	(0.42)	(0.29)	(0.23)
No obs	50191	5214	11979	533	69359

Note: means; standard deviations in parentheses.

Table: Complier analysis for 1952 Cohort