Wages and the Value of Nonemployment

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April 2020

- **Prominent view of wage setting:** bargaining, e.g. Nash:

$$\text{Wage} = \phi \cdot [\text{Inside Value of Job}] + (1-\phi) \cdot [\text{Value of Outside Option}]$$

Common specification: workers' outside option is (brief) nonemployment

$\Rightarrow$ Nonemployment outside option is a key determinant of wages

- **Theory:** e.g., canonical DMP model & Nash bargaining

  Pissarides (2000); Shimer (2005); Hagedorn & Manovskii (2008); Ljungqvist and Sargent (2017); Christiano, Eichenbaum & Trabandt (2017),...

- **Policy:** wage pressure channel of UI

  Krusell, Mukoyama & Sahin (2010); Hagedorn, Karahan, Manovskii and Mitman (2015); Chodorow-Reich, Coglianese and Karabarbounis (2017)

- **Evidence:** wages comove with aggregate LM conditions

  Pissarides (2009); Phillips curve; Beaudry & DiNardo (1991), Blanchflower Oswald (1994); Hagedorn & Manovoskii (2013); Chodorow-Reich & Karabarbounis (2015),...

The Paper: Estimate Wage Sensitivity to NE Value

Variation is quasi-experimental shifts in UI benefit levels b_i.

$$\frac{dw_i}{db_i} = \widehat{\sigma}_{w,b}$$

Empirical Strategy

Four UIB reforms in Austria from 1976 to 2001

Sharp, large and quasi-experimental variation in benefit levels

- Treatment groups $db > 0$ and control groups $db = 0$
- Treatment $\frac{db}{w}$ often multiple percentage points

Main focus: existing employment relationships and wages

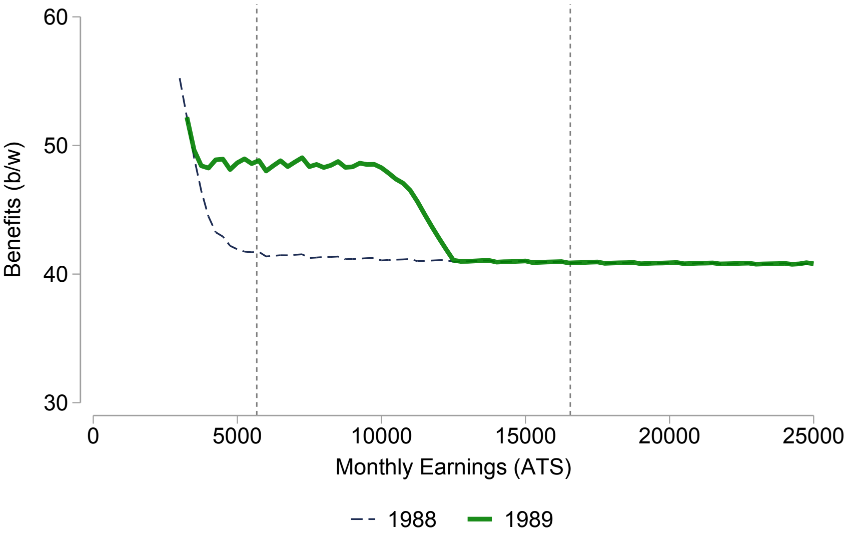
$\Rightarrow$ Isolate bargaining channel

Rather than McCall channel and search behavior of unemployed

Schmieder, von Wachter and Bender (2016), Nekoei and Weber (2017),...

Extension: we also study wages in new jobs

Example: 1989 Reform of Benefit Levels



The Paper: Estimate Wage Sensitivity to NE Value

Variation is quasi-experimental shifts in UI benefit levels b_i.

$$\frac{dw_i}{db_i} = \widehat{\sigma}_{w,b}$$

Derive theoretical benchmark from calibrated Nash bargain model:

$$\sigma_{w,b}^{\text{Nash}} \approx 0.48$$

Our estimate reveals empirical insensitivity of wages to UIBs:

$$0.00 \leq \widehat{\sigma}_{w,b} \leq 0.03$$

Little heterogeneity, e.g. local unemp. rate, time on UI...
Small effect extends to new hires

$\Rightarrow$ **Micro evidence for models insulating wages from NE value**

- Alternating offer bargaining (Hall and Milgrom 2008)
- Employer competition models (e.g. Cahuc et al. 2006)
- Non-bargaining models of wage determination

Outline

1. Theoretical Prediction for Wage–UI Benefit Sensitivity from Calibrated Bargaining Model
2. Institutional Setting and Data
3. Empirical Estimate of Wage–UI Benefit Sensitivity
4. Discussion & Alternative Interpretations

Nash Bargaining: Background

$$w = \phi \cdot p + (1 - \phi) \cdot \Omega$$

p: Inside value (e.g. productivity, amenities,...)

Ω: Worker outside option (e.g. retirement, another job,...)

ϕ: Worker bargaining power

Wage-inside value sensitivity:

$$\Rightarrow dw = \phi \cdot dp$$

Wage-outside option sensitivity:

$$\Rightarrow dw = (1 - \phi) \cdot d\Omega$$

Wage-benefit sensitivity:

$$\frac{dw}{db} = (1 - \phi) \cdot \frac{d\Omega}{db}$$

Model: Roadmap

Nash wage:

$$w = \phi \cdot p + (1 - \phi) \cdot \Omega$$

Wage-benefit sensitivity:

$$\frac{dw}{db} = (1 - \phi) \cdot \frac{d\Omega}{db}$$

Roadmap:

1. Calibrate ϕ
2. Specify Ω and derive $\frac{d\Omega}{db}$
3. Derive theoretical benchmark for $\frac{dw}{db}$
4. Show robustness to market adjustment and micro reoptimization

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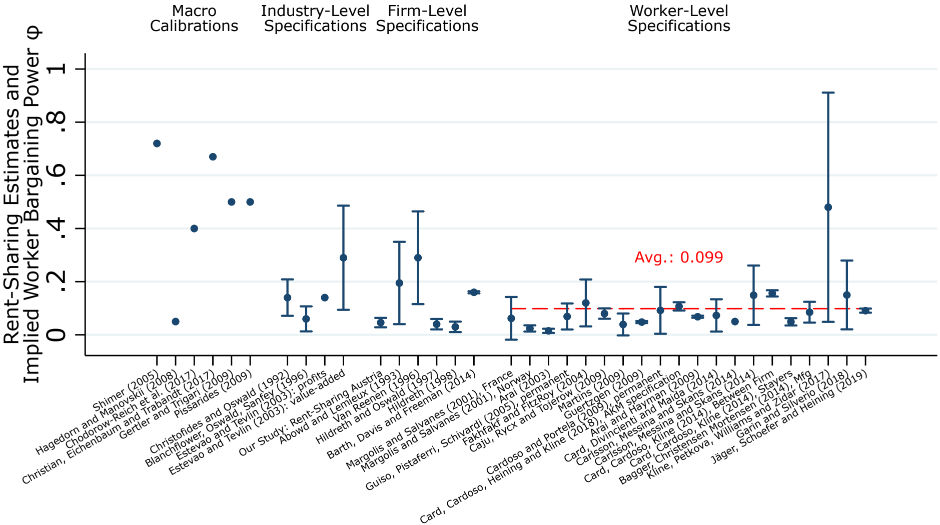
ϕ: **Macro Calib's & Micro Evidence** (Rent Sharing)



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Ω and b

Outside option:

$$\Omega \equiv \rho N = b + f \cdot (E(w') - N)$$

Re-employment value

$$\rho E(w') = w' + \delta(N - E(w'))$$

Solved for outside option:

$$\Rightarrow \rho N = \underbrace{\frac{\rho + \delta}{\rho + f + \delta}}_{\equiv \tau} b + \underbrace{\frac{f}{\rho + f + \delta}}_{\equiv 1 - \tau} w'$$

Post-Separation Time in Nonemployment

Post-Separation Time in Re-Employment

$$= \tau \cdot b + (1 - \tau) \cdot w'$$

The Sensitivity of w to b

Nash wage:

$$w = \phi \cdot p + (1-\phi) \cdot \overbrace{\left(\tau \cdot b + (1-\tau) \cdot w'\right)}^{\Omega}$$

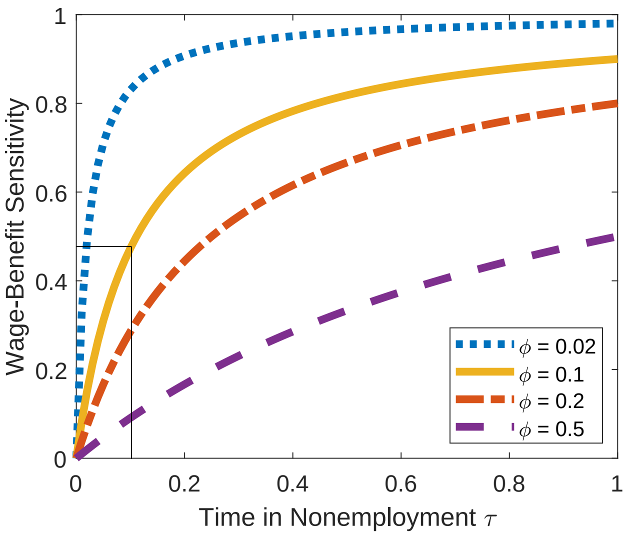
$$\Rightarrow \frac{dw}{db} = (1-\phi) \cdot \left(\underbrace{\tau}_{\text{"Direct effect"}} + \underbrace{(1-\tau)\frac{dw'}{db}}_{\text{"Feedback"}} \right)$$

Nash bargaining in next job implies that $\frac{dw}{db} = \frac{dw'}{db}$, and thus:

$$\boxed{\frac{dw}{db} = (1-\phi) \cdot \frac{\tau}{1-(1-\phi)(1-\tau)}} = (1-\phi) \cdot \frac{1}{1+\phi\left(\tau^{-1}-1\right)} \approx 0.48$$

- $\phi = .10$ – rent sharing estimates
- $\tau = .10$ – post-separation time in on UI when $\rho = 0$ (conservative)

$\frac{dw}{db}$ as Function of τ given ϕ



The Sensitivity of w to b

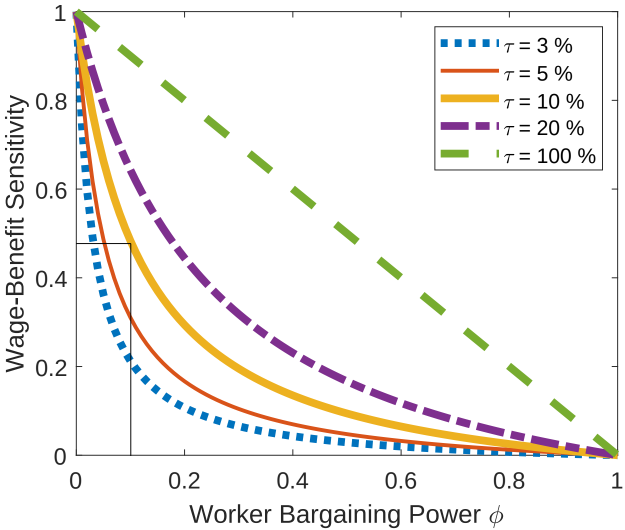
Wage-benefit sensitivity:

$$\frac{dw}{db} = (1-\phi) \cdot \frac{1}{1+\phi\left(\tau^{-1}-1\right)}$$

$\Leftrightarrow$ Worker bargaining power implied by given estimate of dw/db:

$$\Leftrightarrow \phi = \frac{1-\frac{dw}{db}}{1+\frac{dw}{db}\cdot\left(\tau^{-1}-1\right)}$$

The Sensitivity of w to b as Function of ϕ given τ



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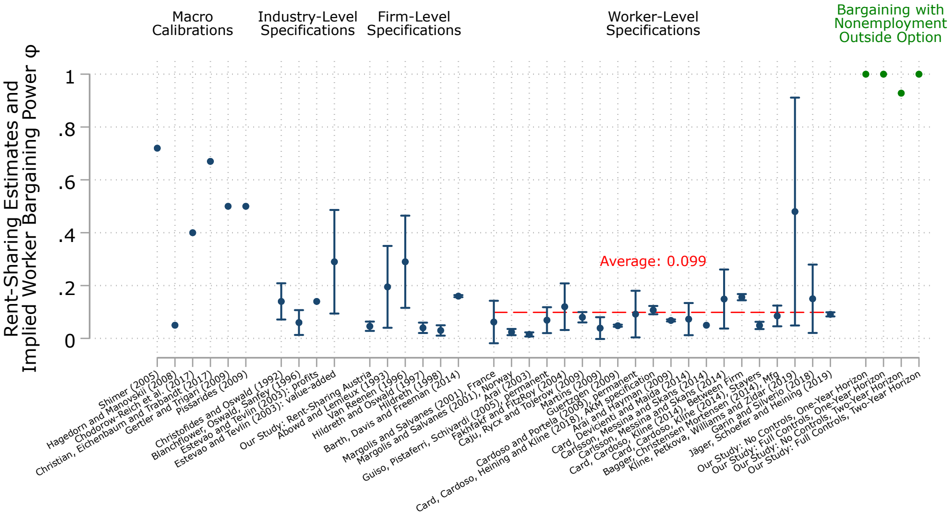

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Roadmap:

1. Calibrate ϕ
2. Define Ω and $\frac{d\Omega}{db}$
3. Derive theoretical benchmark for $\frac{dw}{db}$
4. Robustness: market adjustment and micro reoptimization

Robustness

$$\rho N \quad = \quad [\quad b \quad + f \quad [E(w' \quad) - N \quad]]$$

$$\Rightarrow \boxed{\frac{\cdot dN}{db} = \overbrace{\underbrace{\frac{\partial N}{\partial b}}_{\text{Mechanical effect}} + \underbrace{\frac{\partial N}{\partial w'}\frac{dw'}{db}}_{\text{Feedback of wage response}}}^{\text{Benchmark calibration ``holding } \tau \text{ fixed''}}}$$

Richer Instantaneous Payoff from Nonemployment

$$\rho N \quad = \quad [z(b, ., .) + f \quad [E(w' \quad) - N \quad]]$$

$$\Rightarrow \boxed{\frac{\cdot dN}{db} = \overbrace{\underbrace{\frac{\partial N}{\partial b}}_{\text{Mechanical effect}} + \underbrace{\frac{\partial N}{\partial w'}\frac{dw'}{db}}_{\text{Feedback of wage response}}}^{\text{Benchmark calibration ``holding } \tau \text{ fixed''}}}$$

$z(b)$: inst. payoff while nonemployed $z = b + [\text{other}]$

Richer Instantaneous Payoff from Nonemployment

$$z(b, \mathbf{c}^*, \mathbf{x}) = b_i + \frac{v_i(h > 0) - v_i(h = 0)}{\lambda_i} - c(e) - \gamma_i + y_i + \ldots$$

b_i: Unemployment benefits

$v(h)$: Disutility of labor

λ_i: Budget constraint Lagrange multiplier

$c(e)$: Job search effort costs

γ_i: Stigma from unemployment

y_i: Other nonemployment-conditional income sources or transfers

- **Strategy:**

  Directly quantifiable variation in the level of UIBs b_i.

  Derive and estimate in levels: dollar-for-dollar sensitivity $\frac{dw}{db}$

  $\Rightarrow$ No need to know *share* of b among other components

Micro Choice Variables $\mathbf{c}$

$$\rho N(\mathbf{c} \quad) = \quad [z(b, \mathbf{c}, \quad) + f(\mathbf{c} \quad)[E(w', \mathbf{c} \quad) - N(\mathbf{c} \quad)]]$$

$$\Rightarrow \boxed{\frac{\cdot dN}{db} = \overbrace{\underbrace{\frac{\partial N}{\partial b}}_{\text{Mechanical effect}} + \underbrace{\frac{\partial N}{\partial w'}\frac{dw'}{db}}_{\text{Feedback of wage response}}}^{\text{Benchmark calibration "holding } \tau \text{ fixed"}}}$$

$z(b)$: inst. payoff while nonemployed $z = b + [\text{other}]$

$\mathbf{c}$: choice variables

Envelope Theorem

$$\rho N(\mathbf{c}) = \max_{\mathbf{c}} [z(b, \mathbf{c}) + f(\mathbf{c})[E(w', \mathbf{c}) - N(\mathbf{c})]]$$

$$\Rightarrow \nabla_{\mathbf{c}} N(\mathbf{c}^*) = \mathbf{0}$$

$$\Rightarrow \boxed{\frac{\cdot dN}{db} = \overbrace{\underbrace{\frac{\partial N}{\partial b}}_{\text{Mechanical effect}} + \underbrace{\frac{\partial N}{\partial w'} \frac{dw'}{db}}_{\text{Feedback of wage response}}}^{\text{Benchmark calibration ``holding } \tau \text{ fixed''}}}$$

$z(b)$: inst. payoff while nonemployed $z = b + [\text{other}]$

c: choice variables

Micro-Reoptimization $\Rightarrow$ Envelope Theorem

$$\rho N(\mathbf{c} \quad) = \max_{\mathbf{c}} [z(b, \mathbf{c} \quad) + f(\mathbf{c} \quad)[E(w', \mathbf{c} \quad) - N(\mathbf{c} \quad)]]$$

$$\Rightarrow \nabla_{\mathbf{c}} N(\mathbf{c}^* \quad) = \mathbf{0}$$

$$\Rightarrow \boxed{\frac{\cdot dN}{db} = \overbrace{\underbrace{\frac{\partial N}{\partial b}}_{\text{Mechanical effect}} + \underbrace{\frac{\partial N}{\partial w'}\frac{dw'}{db}}_{\text{Feedback of wage response}}}^{\text{Benchmark calibration “holding } \tau \text{ fixed”}}}$$

$$+ \overbrace{\underbrace{\nabla_{\mathbf{c}} N(b, \mathbf{c}^*, \mathbf{x}) \cdot \nabla_b \mathbf{c}^*}_{\text{Micro re-optimization}}}^{=0 \text{ by envelope theorem}}$$

$z(b)$: inst. payoff while nonemployed $z = b + [\text{other}]$

$\mathbf{c}$: choice variables

Net Out Market-Level Effects w/ Control Group

$$\rho N(\mathbf{c},\mathbf{x})) = \max_{\mathbf{c}} [z(b,\mathbf{c},\mathbf{x}) + f(\mathbf{c},\mathbf{x})[E(w',\mathbf{c},\mathbf{x}) - N(\mathbf{c},\mathbf{x})]]$$

$$\Rightarrow \nabla_{\mathbf{c}} N(\mathbf{c}^*,\mathbf{x}) = \mathbf{0}$$

$$\Rightarrow \boxed{\frac{\cdot dN}{db} = \overbrace{\underbrace{\frac{\partial N}{\partial b}}_{\text{Mechanical effect}} + \underbrace{\frac{\partial N}{\partial w'}\frac{dw'}{db}}_{\text{Feedback of wage response}}}^{\text{Benchmark calibration "holding } \tau \text{ fixed"}}}$$

$$+ \overbrace{\underbrace{\nabla_{\mathbf{x}} N \cdot \nabla_b \mathbf{x}}_{\text{Market Adjustment}}}^{\text{Net out with control group}} + \overbrace{\underbrace{\nabla_{\mathbf{c}} N(b,\mathbf{c}^*,\mathbf{x}) \cdot \nabla_b \mathbf{c}^*}_{\text{Micro re-optimization}}}^{=0 \text{ by envelope theorem}}$$

$z(b)$: inst. payoff while nonemployed $z = b + [\text{other}]$

$\mathbf{c}$: choice variables

Theoretical Robustness — In Paper

- Multiple components of nonemployment payoff z (ex. value of leisure, stigma, job search effort cost,...)
  - No need to take stand on share $\frac{b}{z}$
- Equilibrium market-level adjustment
  - Net out with *control group* in same market
  - Provide calibrated equilibrium model for segmented markets (DMP)
- Micro re-optimization (search effort, spousal labor supply, endogenous UI take-up, ...)
  - Envelope theorem
- Myopia/liquidity constraints
- Finite benefit duration
- Incomplete take-up/eligibility
- Multi-worker firms,...

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Features of Austrian UI For Mapping into Model

A No experience rating

- Funded through fixed linear payroll tax

B Voluntary quitters eligible for UI

- US, Portugal: Quitters entirely ineligible
- Germany, Sweden: longer wait periods
- Austria: 28-day wait period for quitters

C Substantial and clean variation in UIB schedules, multiple reforms

- Vs. more common potential benefit duration variation (constant benefits)

D High take-up

- Fraction w/ UIB receipt conditional on E–N transition $> 70\%$

E Post-UI benefits ("Notstandshilfe") are indexed to worker's UIBs

Data

1. Austrian Social Security Register (ASSD)
   - Matched employer-employee data
   - Universe of dependently employed, private-sector workers and firms (1972 onwards)
   - Detailed information on (annual) earnings, employment status, industry, and occupation (blue/white collar)

- Sample Restrictions:
  - Age 25-54
  - Full-year employment in pre-reform year t
  - Robustness: stayers/movers; longer-tenured workers;...

2. Austrian Unemployment Register (AMS)
   - Universe of unemployment spells (1987 onwards)

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Roadmap: Difference-in-Differences Analyses

We estimate σ: *dollar-for-dollar sensitivity* of wages to UI:

$$dw_{i,t} = \sigma \cdot db_{i,t}$$

$$\Leftrightarrow \frac{dw_{i,t}}{w_{i,t-1}} = \sigma \cdot \frac{db_{i,t}}{w_{i,t-1}}$$

Our theoretical benchmark:

$$\sigma^{\text{Nash},\phi=0.1} = .48$$

A Visualize evidence in raw data

B Regression approach with controls & placebo checks

C Theory-driven heterogeneity cuts

Variation: Reform-Induced UI Benefit Changes

Benefit schedule:

$b_t(w_{i,t-1})$: for worker with pre-determined (pre-separation) wage $w_{i,t-1}$

We isolate reform-induced benefit changes:

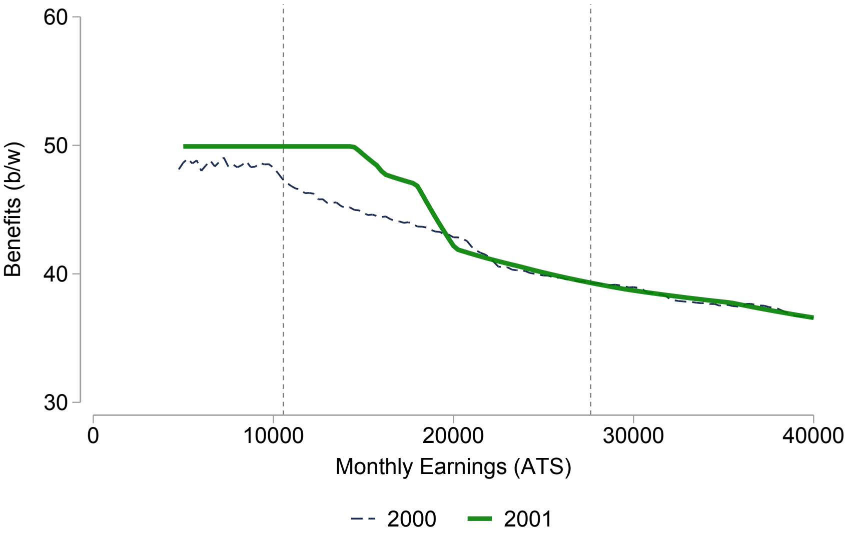
$$db_{i,t} = b_t(w_{i,t-1}) - b_{t-1}(w_{i,t-1})$$

⇒ Difference: benefits in regime t minus *counterfactual benefits absent the reform* (i.e. $t-1$) holding fixed reference wage

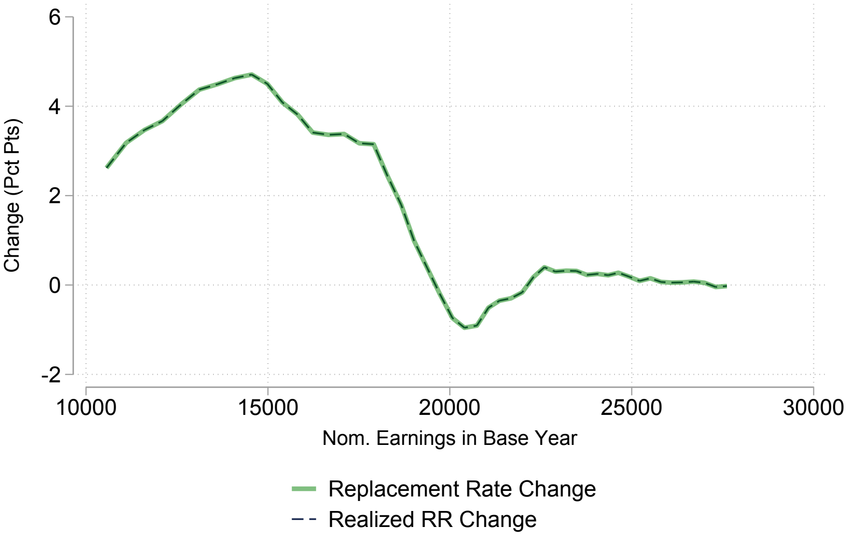
Example 2001 reform: $\tilde{w}_{i,2001} = w_{i,2000}$:

$$db_{i,2001} = b_{2001}(w_{i,2000}) - b_{2000}(w_{i,2000})$$

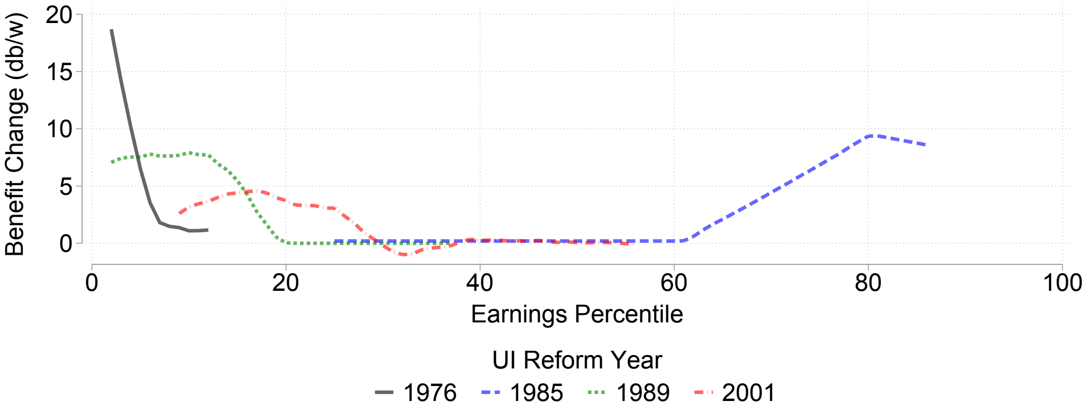
2001 Reform: Benefit Schedules



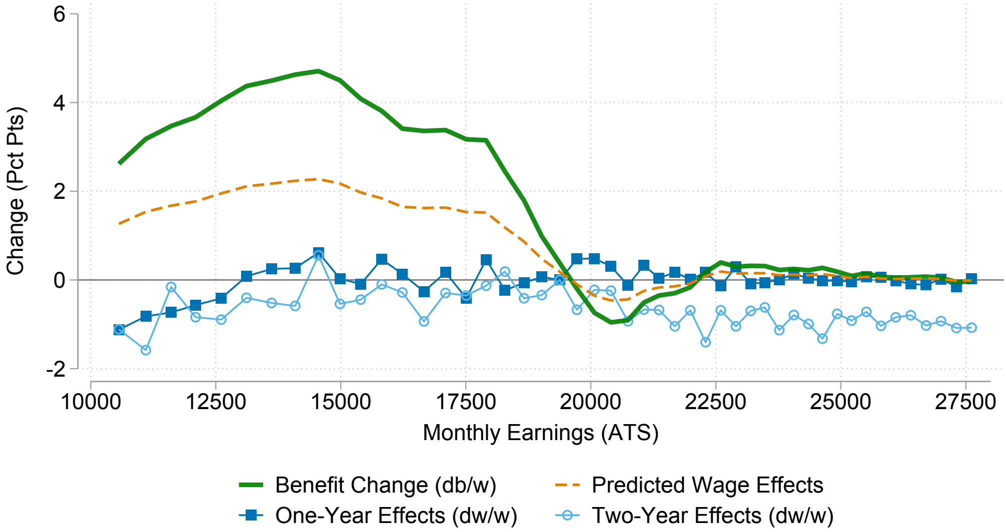
2001 Reform: Benefit Changes



The Reforms Across the Earnings Distribution

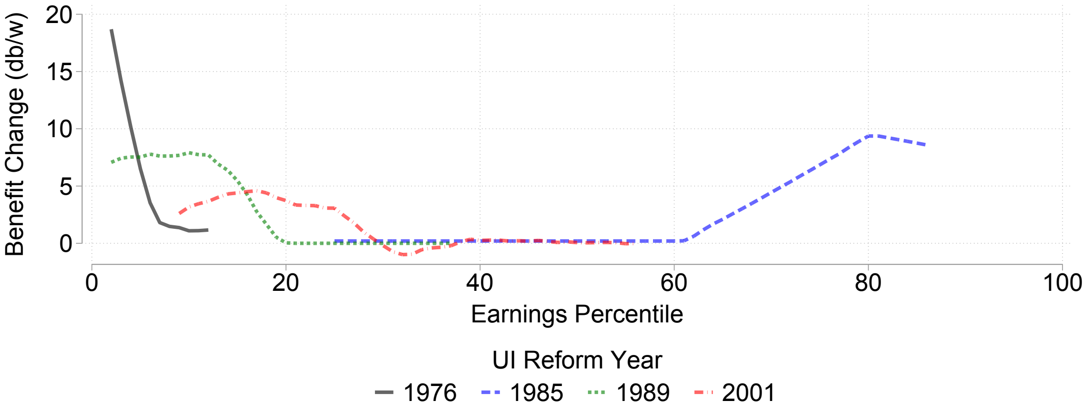


2001 Reform

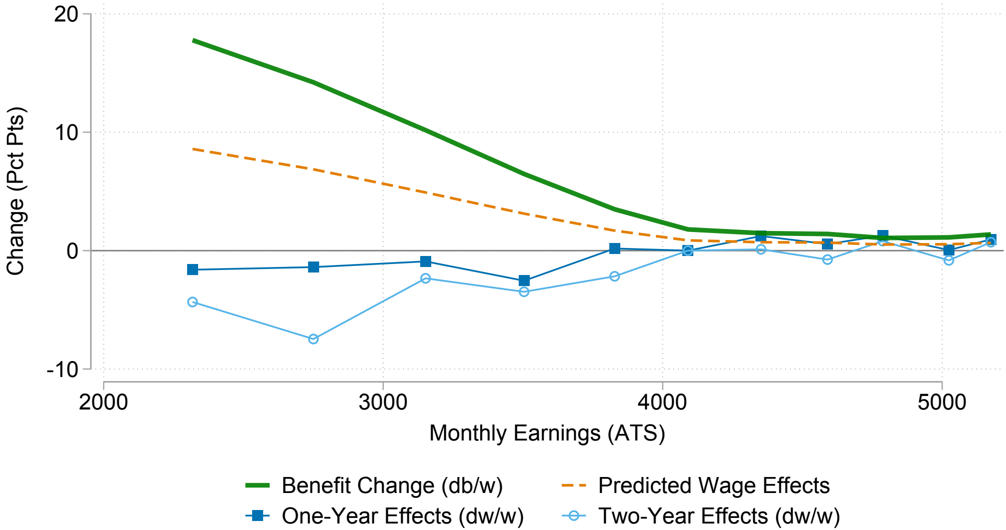


Change (Pct Pts)
6
4
2
0
-2
10000
12500
15000
17500
20000
22500
25000
27500
Monthly Earnings (ATS)
Benefit Change (db/w)
Predicted Wage Effects
One-Year Effects (dw/w)
Two-Year Effects (dw/w)

The Reforms Across the Earnings Distribution

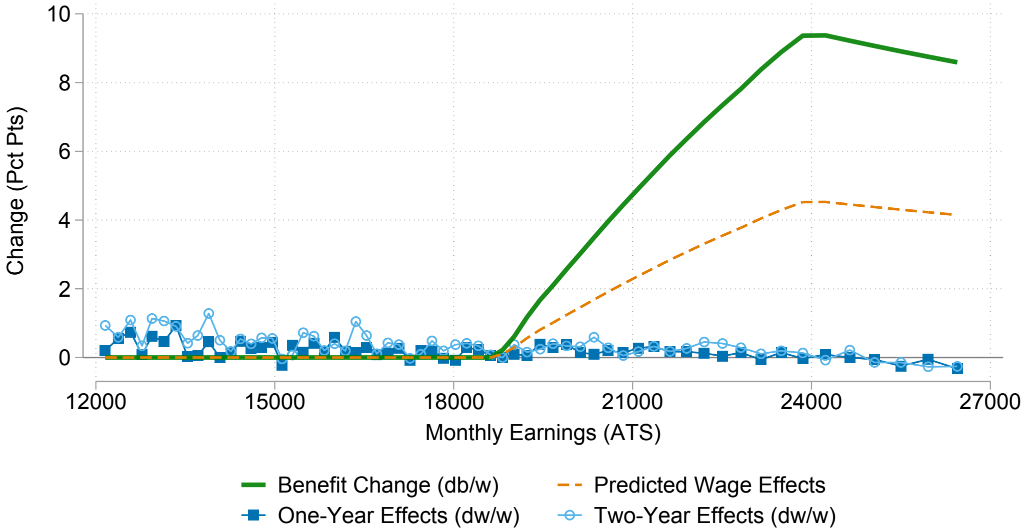


1976 Reform



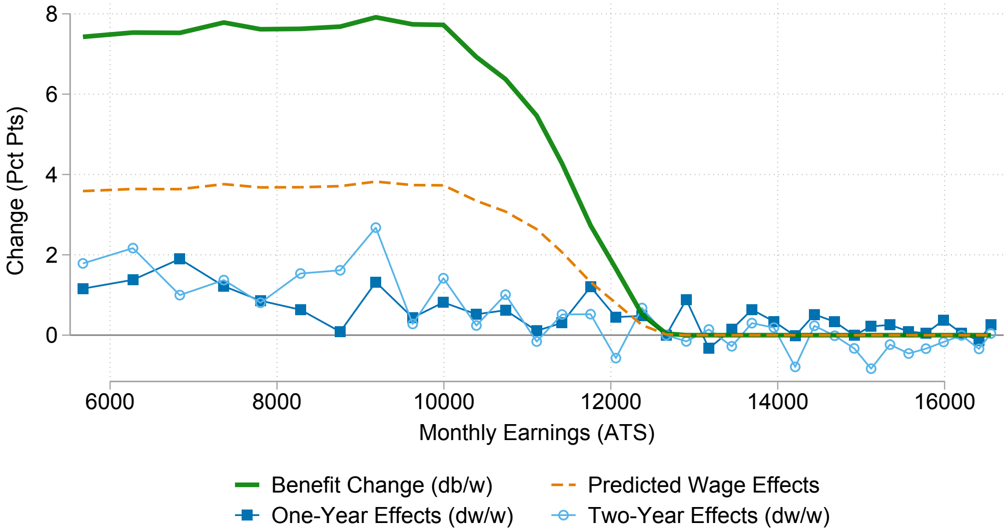
20
10
0
-10
Change (Pct Pts)
2000
3000
4000
5000
Monthly Earnings (ATS)
Benefit Change (db/w)
Predicted Wage Effects
One-Year Effects (dw/w)
Two-Year Effects (dw/w)

1985 Reform



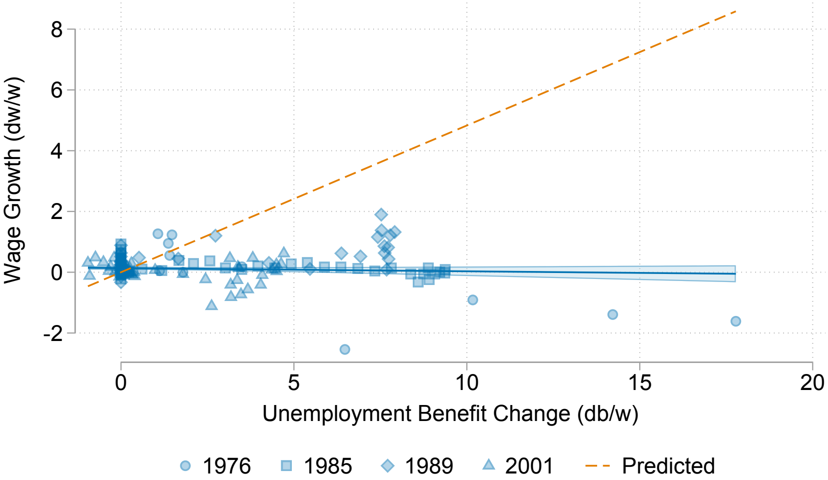
10
8
6
4
2
0
Change (Pct Pts)
12000
15000
18000
21000
24000
27000
Monthly Earnings (ATS)
Benefit Change (db/w)
Predicted Wage Effects
One-Year Effects (dw/w)
Two-Year Effects (dw/w)

1989 Reform



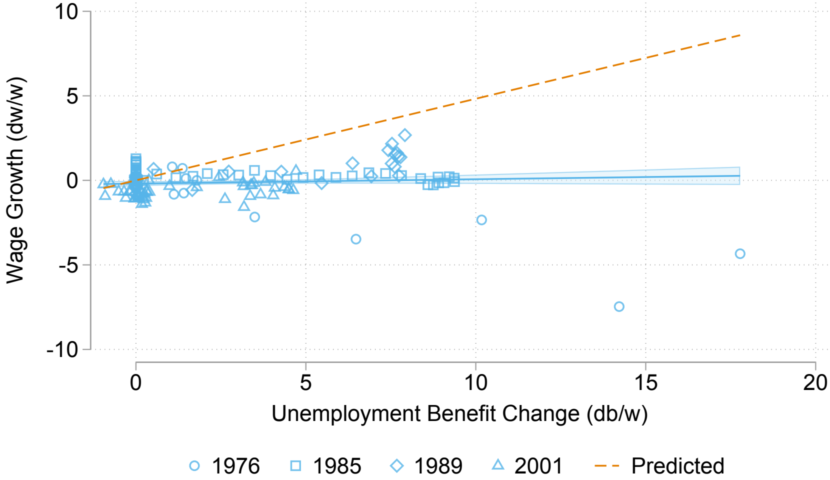
8
6
4
2
0
Change (Pct Pts)
6000
8000
10000
12000
14000
16000
Monthly Earnings (ATS)
Benefit Change (db/w)
Predicted Wage Effects
One-Year Effects (dw/w)
Two-Year Effects (dw/w)

Wage vs. Benefit Changes: One-Year Effects



Estimated Wage Sensitivity σ: -.01 (SE: .0083)
Predicted Semi-Elasticity: .483

Wage vs. Benefit Changes: Two-Year Effects



Estimated Wage Sensitivity σ: .026 (SE: .0181)
Predicted Semi-Elasticity: .483

Roadmap: Difference-in-Differences Analyses

We estimate σ: *dollar-for-dollar sensitivity* of wages to UI:

$$dw_{i,t} = \sigma \cdot db_{i,t}$$

$$\Leftrightarrow \frac{dw_{i,t}}{w_{i,t-1}} = \sigma \cdot \frac{db_{i,t}}{w_{i,t-1}}$$

Our theoretical benchmark:

$$\sigma^{\text{Nash},\phi=0.1} = .48$$

A Visualize evidence in raw data

B Regression approach with controls & placebo checks

C Theory-driven heterogeneity cuts

Regression Model

$$\frac{dw_{i,r,t}}{w_{i,r,t-1}} = \boxed{\sigma_0 \times \mathbb{1}_{(t=r)} \times \frac{db_{i,r,t}(w_{i,r,t-1})}{w_{i,r,t-1}}}$$

$$+ \overbrace{\sum_{e=-L}^{-1} \widetilde{\sigma_e} \times \mathbb{1}_{(t-r=e)} \times \left(\frac{db_{i,r,t}(w_{i,r,t-1})}{w_{i,r,t-1}} \right)}^{\text{Placebo}}$$

$$+ \tau_{r,P_t} + \theta_{r,t} + f_t(w_{i,r,t-1}) + X'_{i,r,t}\phi_{r,t} + \epsilon_{i,r,t}$$

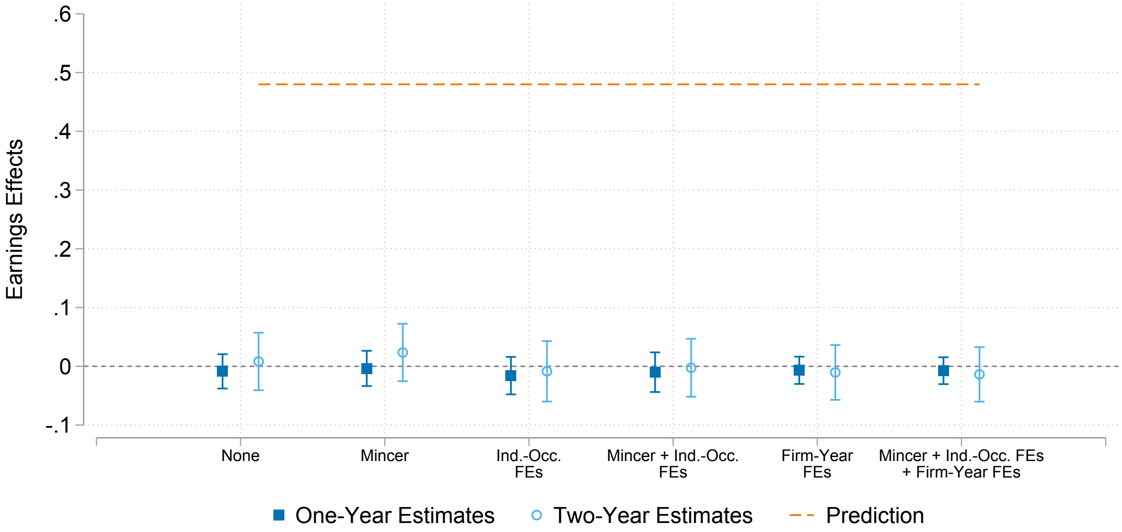
σ_0: treatment effect

σ_e: placebo treatment effect $\Rightarrow$ test for parallel pretrends

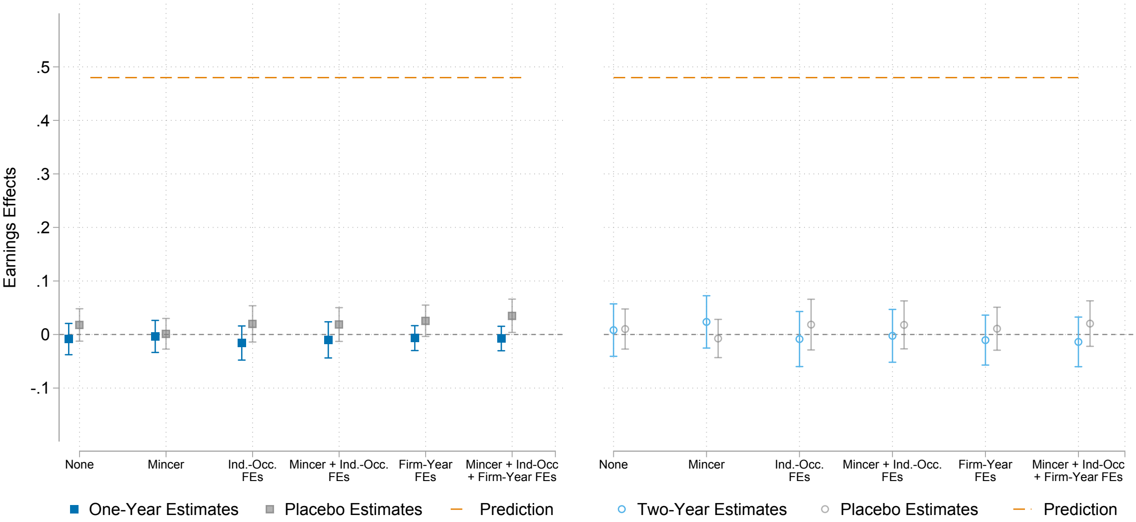
$\phi_{r,t}$: controls with year-specific slopes

$f_t(.)$: parametric earnings control (e.g. $\ln w$)

Wage Sensitivity: Regression Outcomes



Wage Sensitivity: $t-3$ Placebos



Robustness Checks

Selection concerns: No effect on separation rates or J2J mobility.

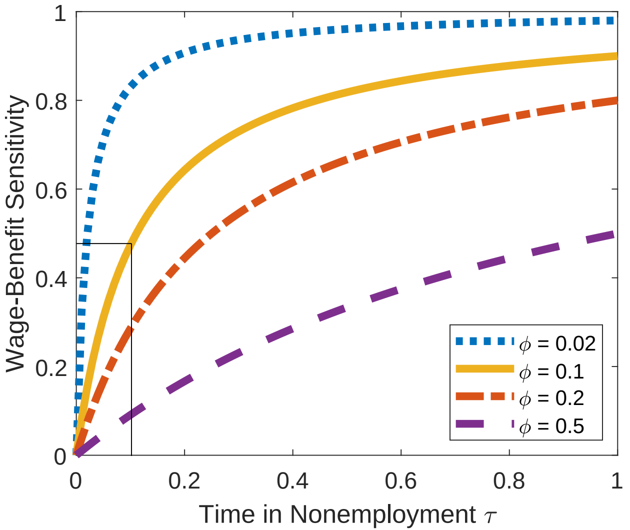
Efficiency wage concerns: No effect on sick leave (shirking proxy)

Specification choices

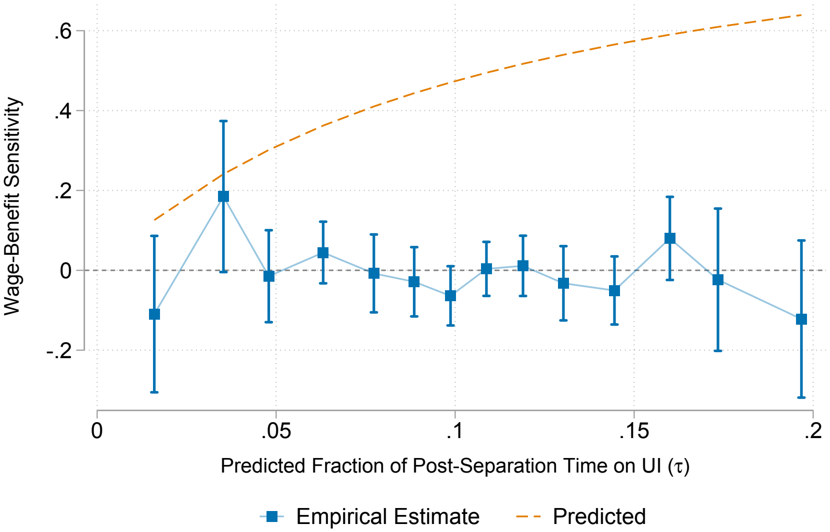
- Level of SE clustering.
- Parametric earnings controls.
- Winsorization.

Potential benefit duration vs. UIB level: No wage effect from 1989 PBD reform.

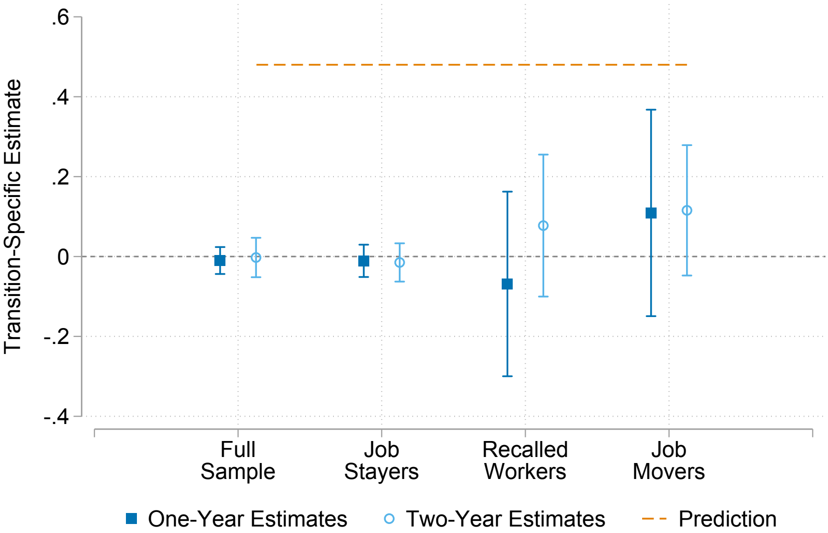
The Sensitivity of w to b as Function of τ given ϕ



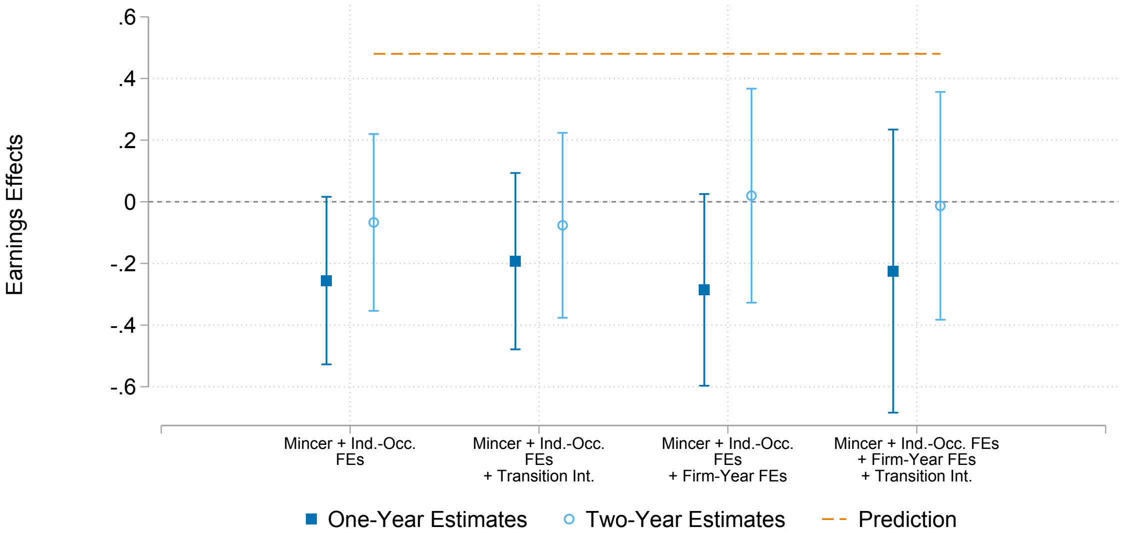
Heterogeneity by τ: Predicted Time on UI



Wage Sensitivity by Transition Type

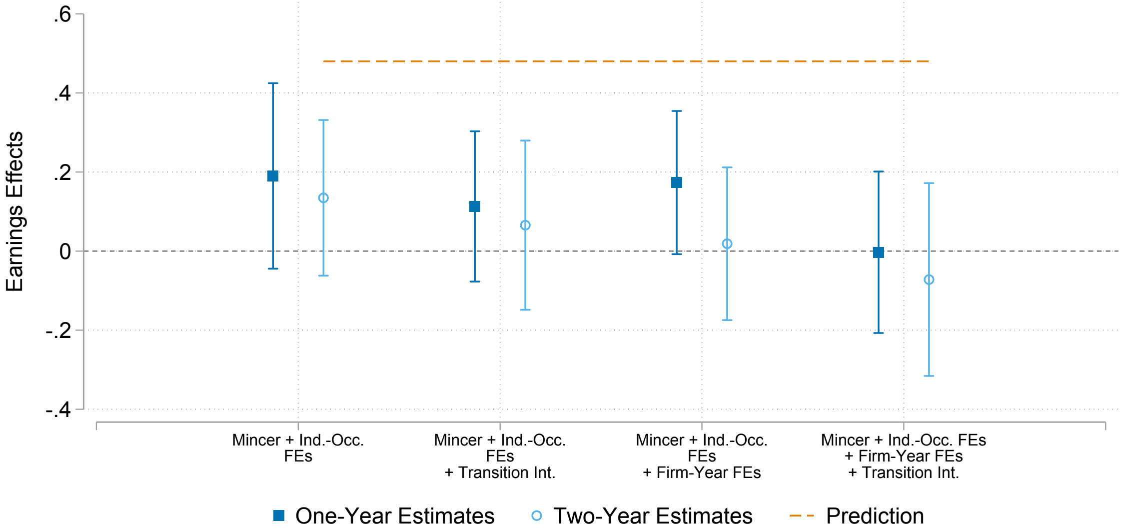


EUE Movers



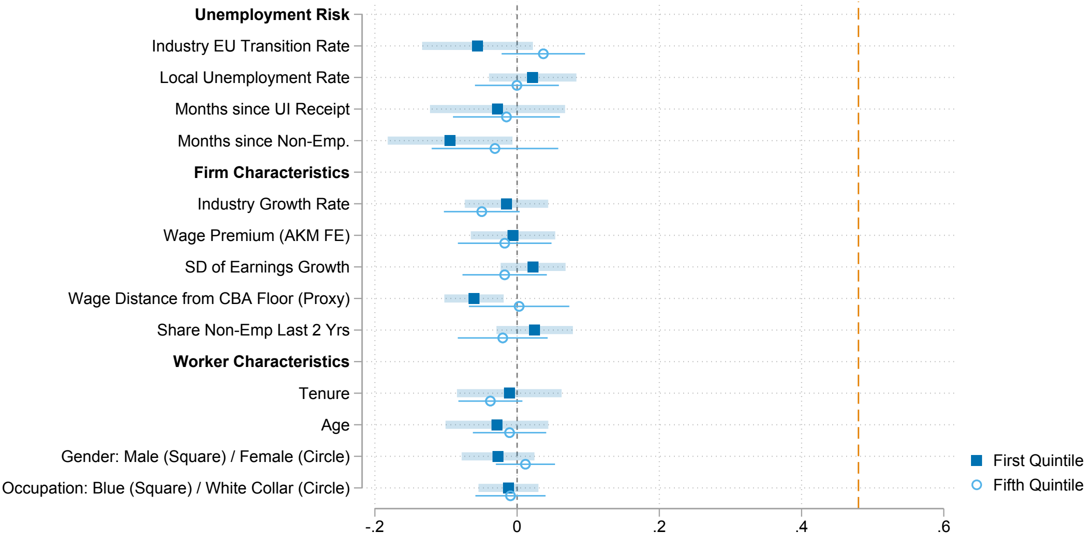
Earnings Effects
.6
.4
.2
0
-.2
-.4
-.6
Mincer + Ind.-Occ. FEs
Mincer + Ind.-Occ. FEs + Transition Int.
Mincer + Ind.-Occ. FEs + Firm-Year FEs
Mincer + Ind.-Occ. FEs + Firm-Year FEs + Transition Int.
One-Year Estimates
Two-Year Estimates
Prediction

EE Movers

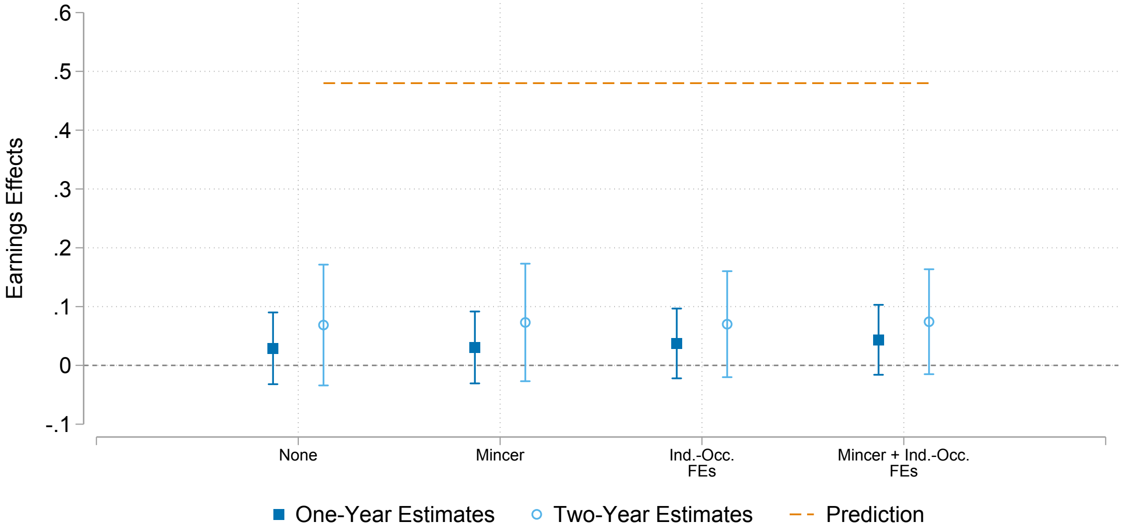


.6
.4
.2
0
-.2
-.4
Earnings Effects
Mincer + Ind.-Occ. FEs
Mincer + Ind.-Occ. FEs + Transition Int.
Mincer + Ind.-Occ. FEs + Firm-Year FEs
Mincer + Ind.-Occ. FEs + Firm-Year FEs + Transition Int.
One-Year Estimates
Two-Year Estimates
Prediction

Heterogeneity Analyses



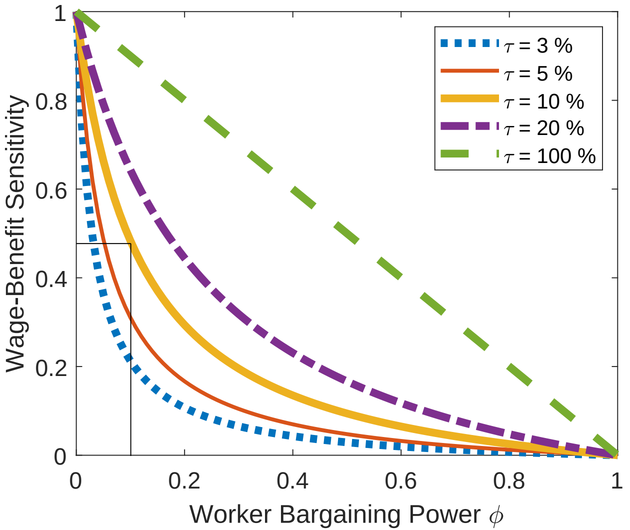
Sensitivity Estimates with Firm-Level Treatment



Outline

1. Theoretical Prediction for Wage–UI Benefit Sensitivity from Calibrated Bargaining Model
2. Institutional Setting and Data
3. Empirical Estimate of Wage–UI Benefit Sensitivity
4. Discussion & Alternative Interpretations

The Sensitivity of w to b as Function of ϕ given τ



The Sensitivity of w to b

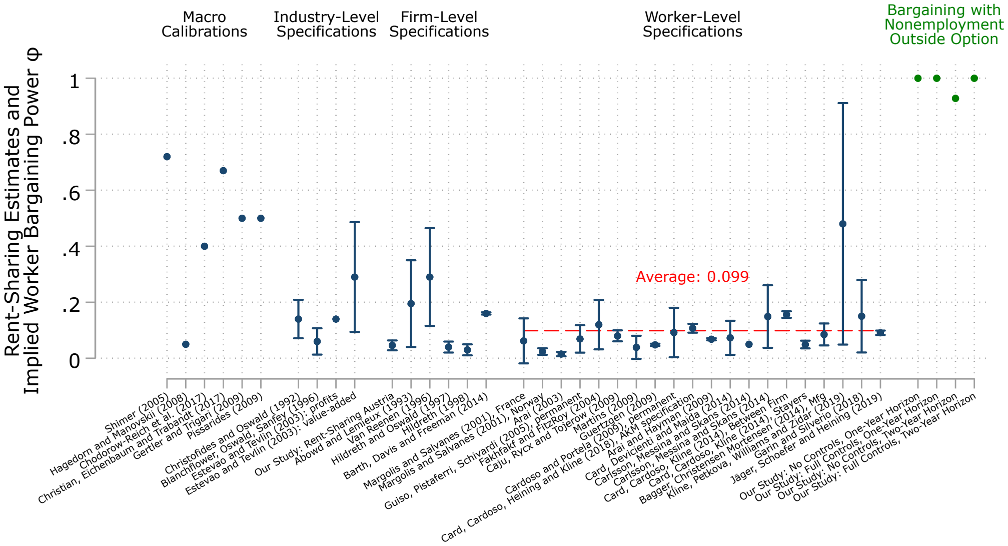
Wage-benefit sensitivity:

$$\frac{dw}{db} = (1-\phi) \cdot \frac{1}{1+\phi\left(\tau^{-1}-1\right)}$$

$\Leftrightarrow$ Worker bargaining power implied by given estimate of dw/db:

$$\Leftrightarrow \phi = \frac{1-\frac{dw}{db}}{1+\frac{dw}{db}\cdot\left(\tau^{-1}-1\right)}$$

Possible Interpretation: $\phi \approx 1$?



The Insensitivity of Wages to the Nonemployment Value

$\Rightarrow$ **Micro-evidence for insensitivity of wages to nonemployment value (here: UI)**

Hard to square with in Nash framework w/ NE as outside option for plausible ϕ values

Promising alternative models that insulate wages from NE value:

- Credible bargaining (Hall and Milgrom (2008))
- Employer competition (e.g. Cahuc, Postel-Vinay and Robin (2006))
- Non-bargaining models of wage determination

Aggregate empirical comovement between wages and labor market conditions – e.g. wage Phillips curve; wage procyclicality – perhaps not driven by outside option channel in bargaining.

APPENDIX SLIDES

Treatment and Control Groups

Diff-in-diff value:

$$\frac{d(\rho N^T)}{db^T} - \frac{d(\rho N^C)}{db^T} = \frac{\partial(\rho N)}{\partial b} + \frac{\partial(\rho N)}{\partial w'} \cdot \left[\frac{dw'^T}{db^T} - \frac{dw'^C}{db^T}\right]$$
$$= \tau + (1-\tau) \cdot \left[\frac{dw'^T}{db^T} - \frac{dw'^C}{db^T}\right]$$

Diff-in-diff Nash wage:

$$\frac{dw^T}{db^T} - \frac{dw^C}{db^T} = (1-\phi)\left[\frac{d(\rho N^T)}{db^T} - \frac{d(\rho N^C)}{db^T}\right]$$
$$= (1-\phi)\left(\tau + (1-\tau)\left[\frac{dw'^T}{db^T} - \frac{dw'^C}{db^T}\right]\right)$$

Using Nash bargaining of reemployment wage:

$$\Rightarrow \boxed{\frac{dw^T}{db^T} - \frac{dw^C}{db^T} = (1-\phi)\frac{\tau}{1-(1-\phi)(1-\tau)}}$$

Heterogeneity Analyses: Strategy

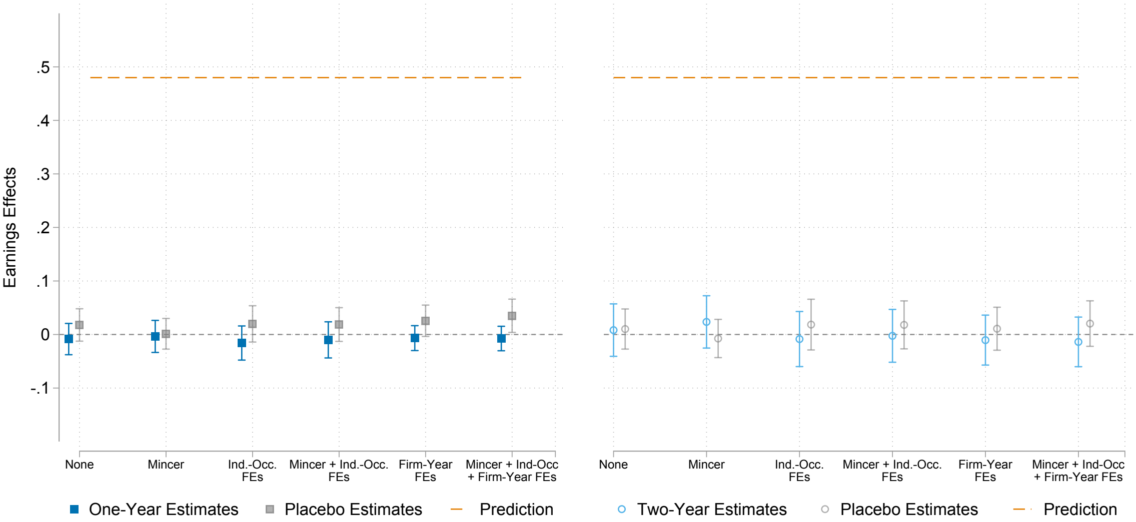
1. Split up the worker sample into subgroups g (gender, firm size,...)
2. Allow for group-specific wage sensitivities

$$\frac{dw_{i,r,t}}{w_{i,r,t-1}} = \sum_{g \in G} \sigma_0^g \times \mathbb{1}_{(i \in g)} \times \mathbb{1}_{(t=r)} \times \frac{db_{i,r,t}(w_{i,r,t-1})}{w_{i,r,t-1}}$$

$$+ \sum_{g \in G} \sum_{e=-L}^{-1} \widetilde{\sigma_e^g} \times \mathbb{1}_{(i \in g)} \times \mathbb{1}_{(t-r=e)} \times \left(\frac{\widetilde{db_{i,r,t}(w_{i,r,t-1})}}{w_{i,r,t-1}} \right)_{\text{Placebo}}$$

$$+ \tau_{r,P_t} + \theta_{r,t} + f_t(w_{i,r,t-1}) + X'_{i,r,t}\phi_{r,t} + \epsilon_{i,r,t}$$

Wage Sensitivity: $t-3$ Placebos



Features of Austrian UI For Mapping into Model

A. No experience rating
   - Funded through fixed linear payroll tax

B. Voluntary quitters eligible for UI
   - US, Portugal: Quitters entirely ineligible
   - Germany, Sweden: longer wait periods
   - Austria: 28-day wait period for quitters

C. Substantial and clean variation in UIB schedules, multiple reforms
   - Vs. more common potential benefit duration variation (constant benefits)

D. High take-up
   - Fraction w/ UIB receipt conditional on E–N transition $> 70\%$

E. Post-UI benefits ("Notstandshilfe") are indexed to worker's UIBs

F. Population-level matched employer-employee data

DMP Equilibrium Adjustment

$$dw^{\mathsf{DMP}} = (1-\phi)db + \phi k d\theta \tag{1}$$

Next we solve the free entry condition $\frac{k}{q(\theta)} = J = \frac{p-w'}{\rho+\delta}$ for $kd\theta = -dw' \cdot \frac{1}{\eta}\frac{f(\theta)}{\rho+\delta}$ to move into the wage equation:

$$dw^{\mathsf{DMP}} = (1-\phi)db + \phi\left[-dw'^{\mathsf{DMP}} \cdot \frac{1}{\eta}\frac{f(\theta)}{\rho+\delta}\right] \tag{2}$$

$$\Leftrightarrow \frac{dw^{\mathsf{DMP}}}{db} = \frac{1-\phi}{1+\phi\frac{1}{\eta}\frac{f(\theta)}{\rho+\delta}} \tag{3}$$

$$\approx \frac{1-\phi}{1+\phi\cdot\frac{1}{\eta}\cdot(u^{-1}-1)} \approx_{(?)} \frac{1-\phi}{1+\phi\cdot(\tau^{-1}-1)} \tag{4}$$

since $\frac{f}{\rho+\delta} \approx \frac{f}{\delta} \approx \frac{1-u}{u} = u^{-1}-1$

Wage Setting in the Austrian Labor Market

- High degree of flexibility even in presence of central bargaining
  Hofer et al. (2001)

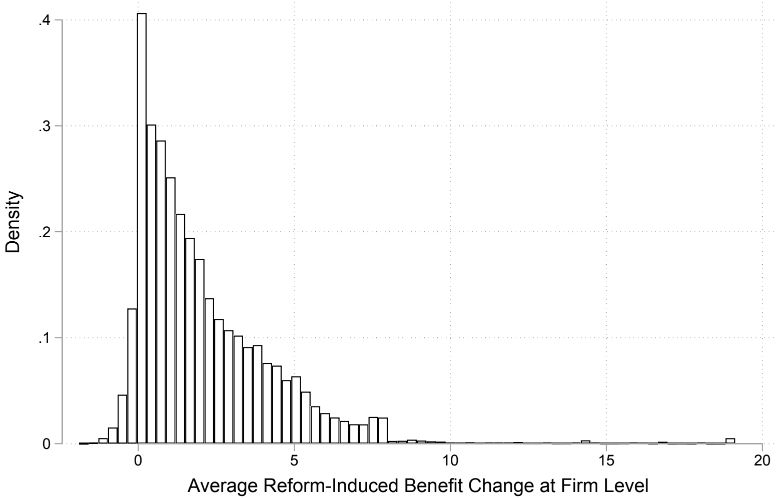
- 95% of workers covered by central bargaining agreements (CBAs)
  - Negotiated by unions and employer associations, primarily at industry level
  - Regulate working conditions, hours, and wage **floors**

- Substantial scope for wage negotiations at firm and worker level
  - Traxler (1994): "in practice local works councils often negotiate supplementary wage increases"
  - Opening clauses allow for paying below-CBA wages
  - Actually paid wages, on average, 34% higher than wage floors
    Leoni and Pollan (2011)
  - Lower wage rigidity than Germany or United States
    Dickens et al. (2007)
  - Borovickova and Shimer (2017) find large wage dispersion between firms even within industry

Wage Setting in the Austrian Labor Market

- In our data: substantial wage and wage growth dispersion among full-time workers
  - Average deviation from industry$\times$occupation$\times$experience cell average: 18.5%
  - Standard deviation of within-firm, within-worker earnings growth: 4.4%

Standard Deviation of Within-Firm Earnings Growth

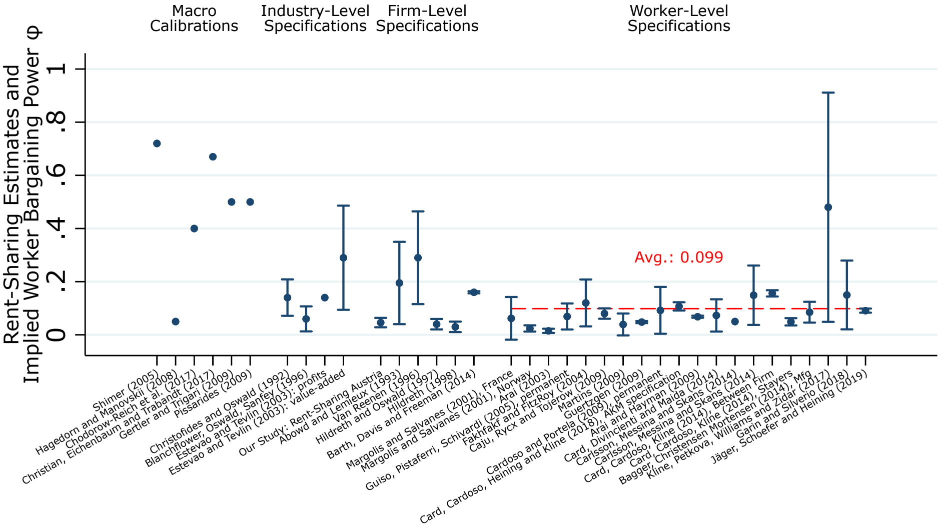


Rent-Sharing in Austria

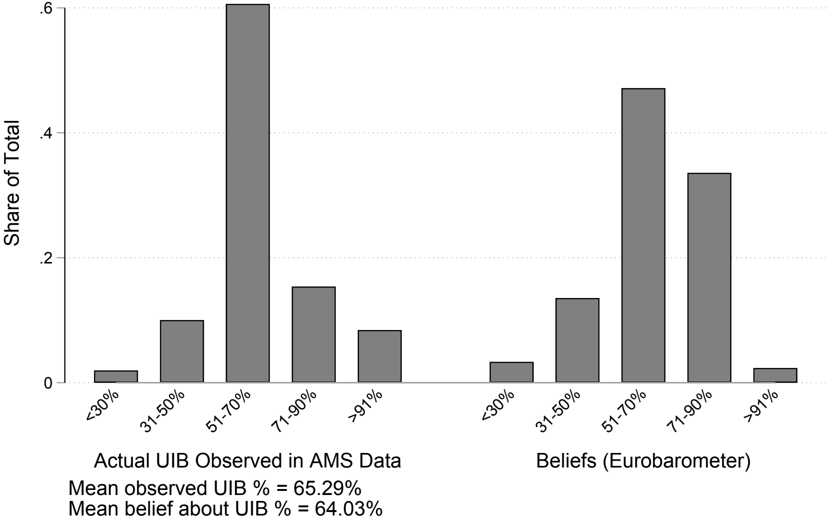
Rent-sharing coefficients
Level-on-level specification: 0.046 (se 0.009)
Log-log specification: 0.36 (se 0.017)

Note: Own calculations based on BvD data. Specifications include firm, year, and industry-by-year effects. Standard errors clustered at the firm level.

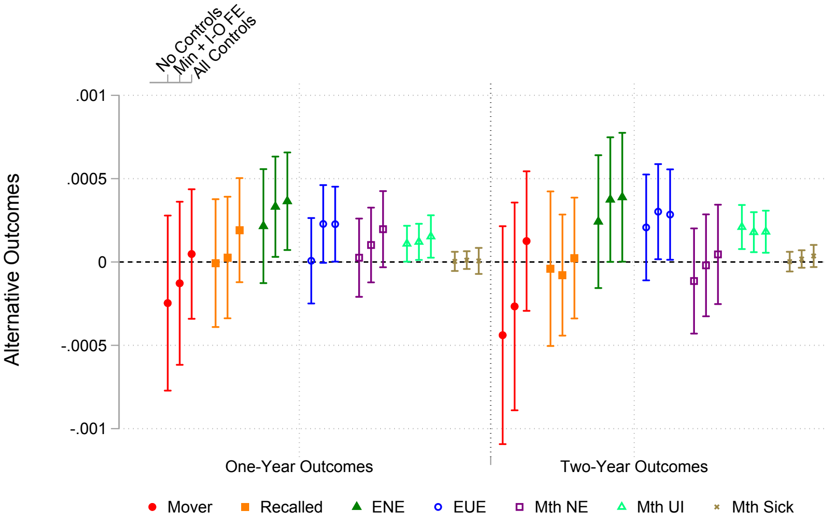
Rent-Sharing in Austria in Comparison



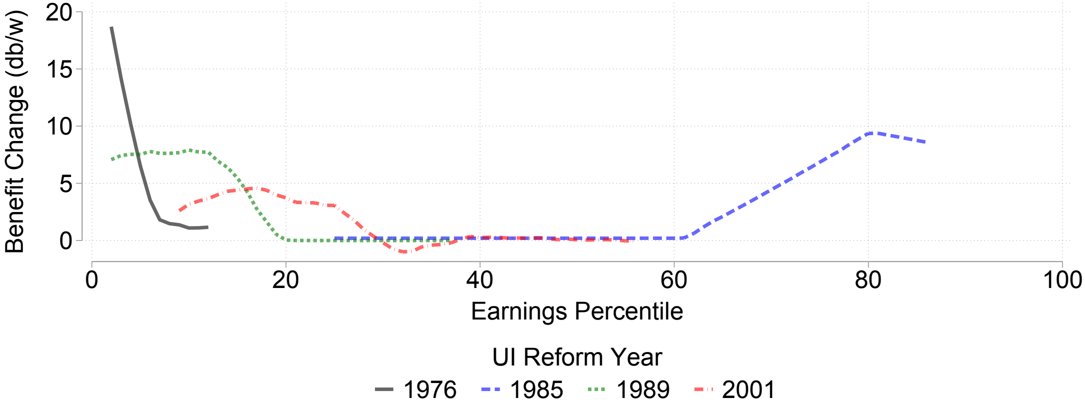
Salience and Knowledge of UIBs: 2006 Survey



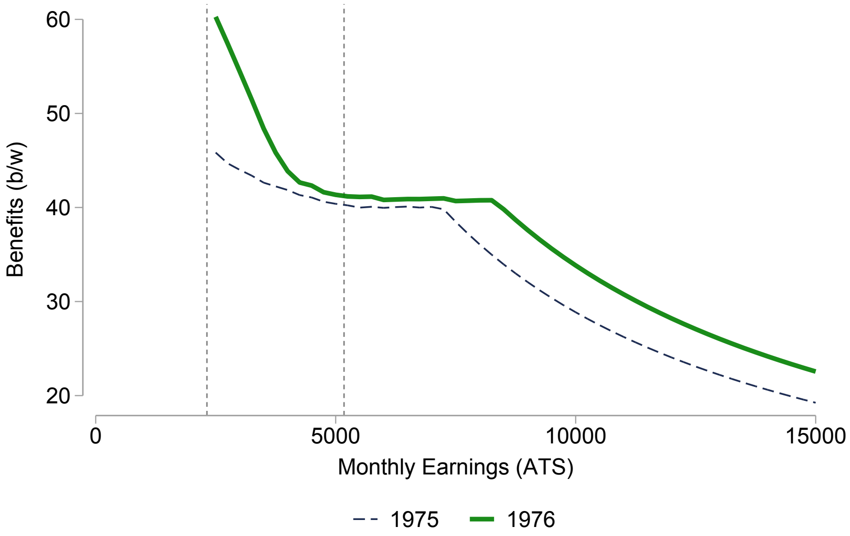
Non-Wage Outcomes: Mobility, UE Duration, Sickness



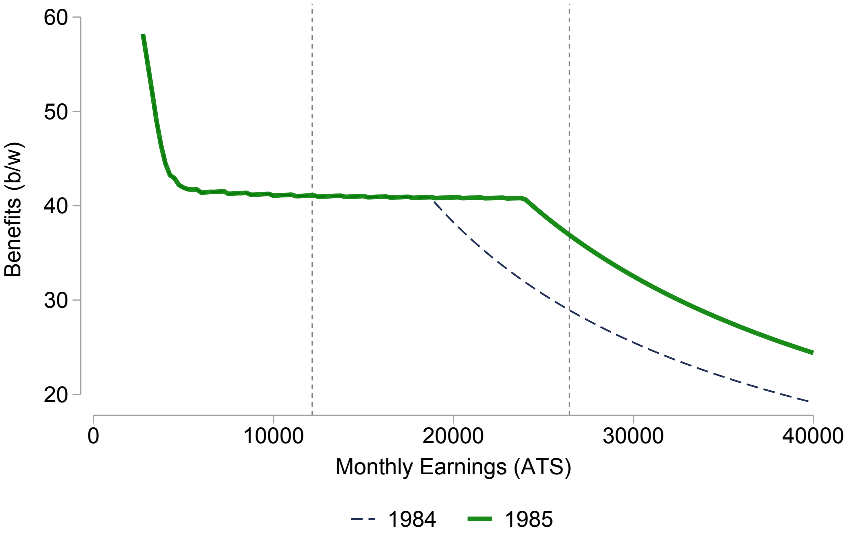
The Reforms Across the Earnings Distribution



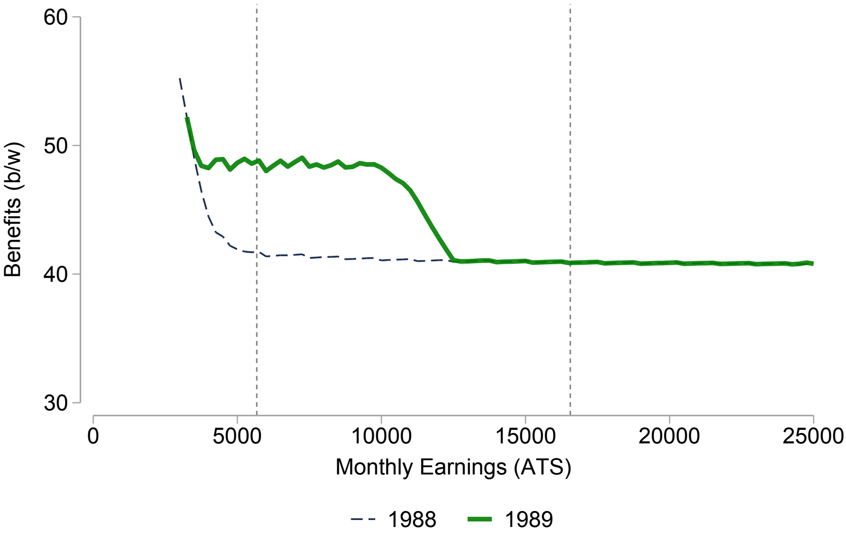
1976 Reform: Benefit Schedules



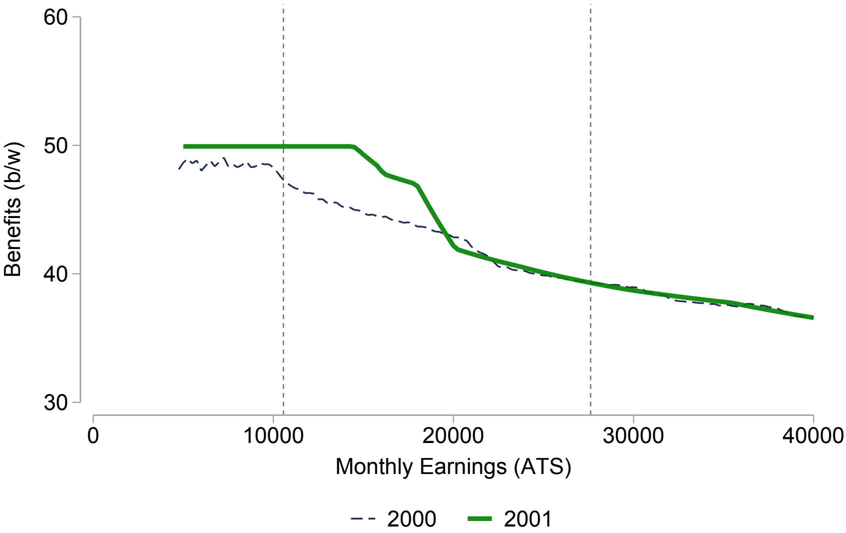
1985 Reform: Benefit Schedules



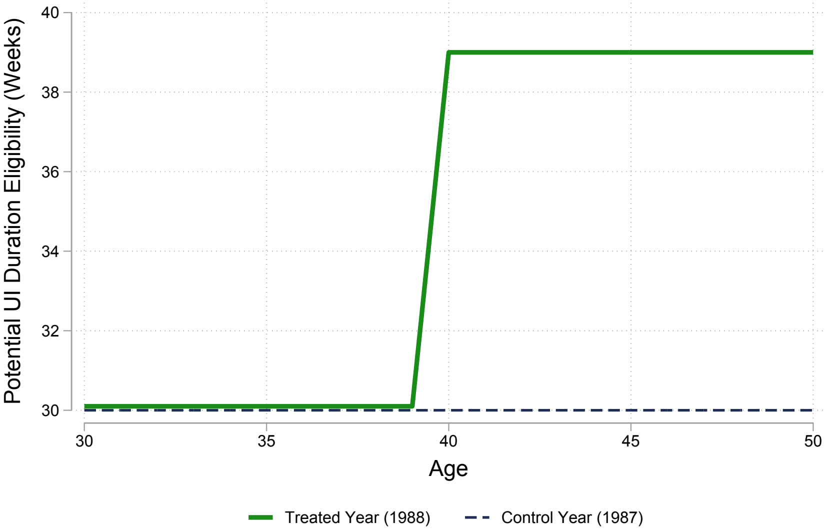
1989 Reform: Benefit Schedules



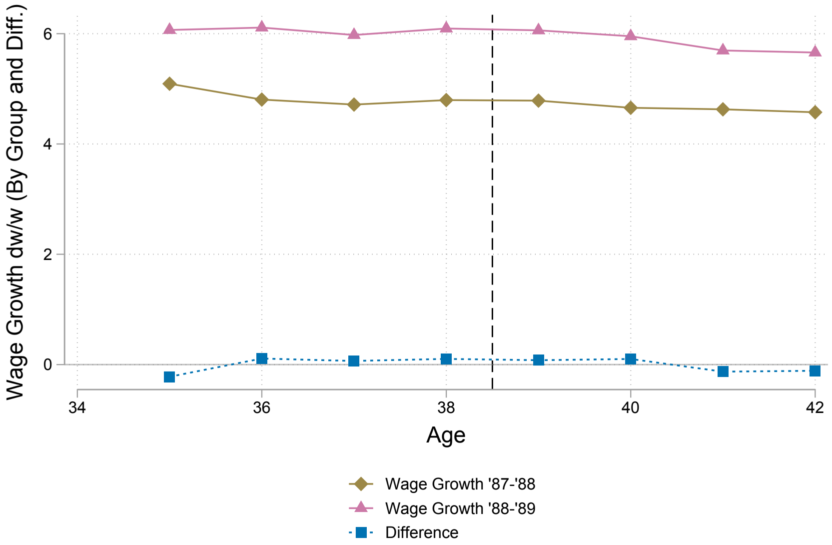
2001 Reform: Benefit Schedules



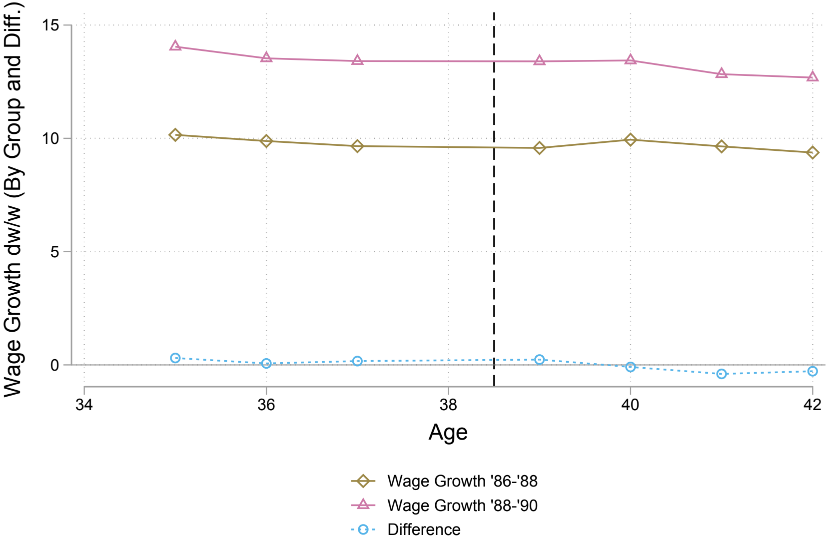
1989 PBD Increase for workers 40-49



One-Year Earnings Growth: Age Gradients

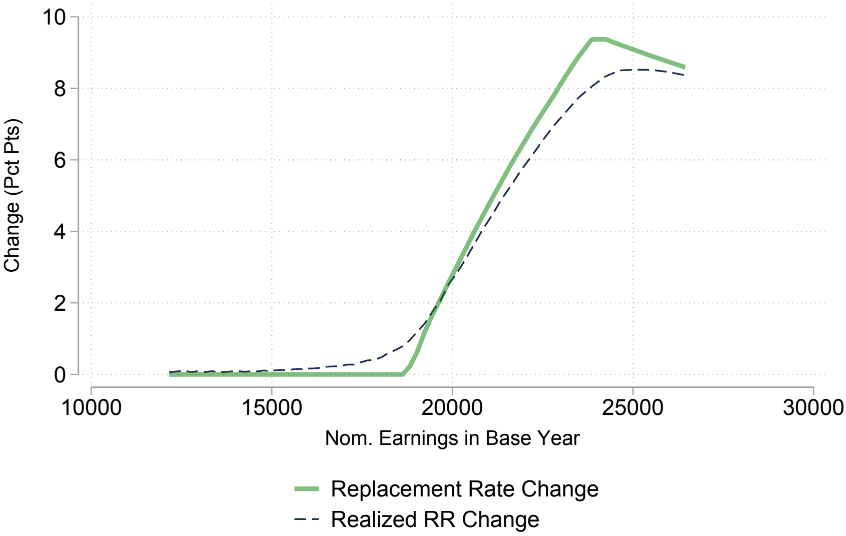


Two-Year Earnings Growth: Age Gradients

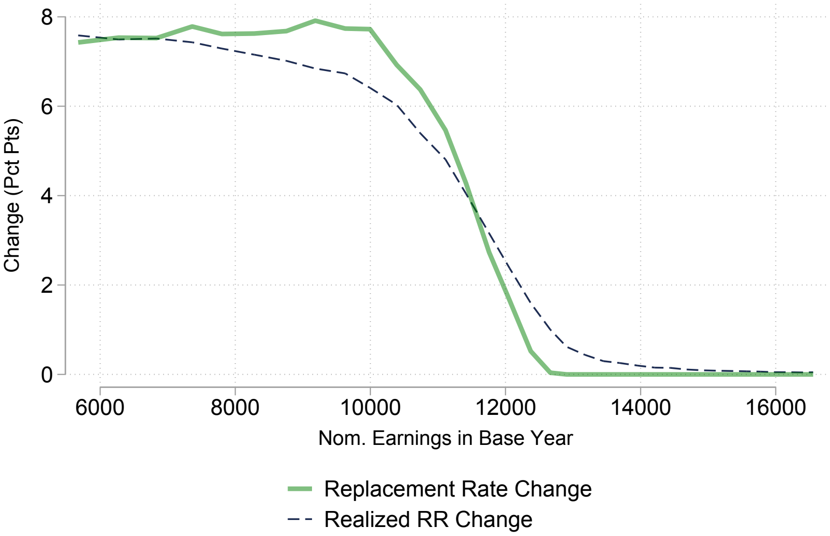


1976: Reform-Induced vs. Actual Benefit Changes

1985: Reform-Induced vs. Actual Benefit Changes



1989: Reform-Induced vs. Actual Benefit Changes

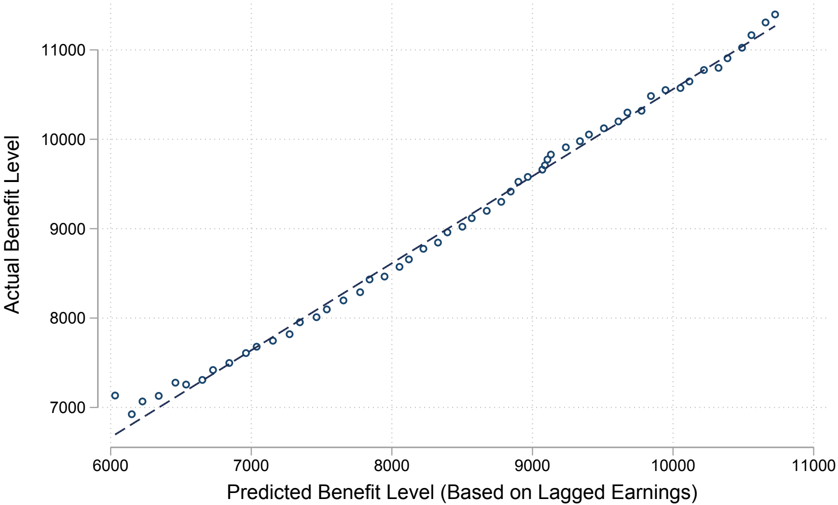


Variation: UI Benefit Levels and Replacement Rates

- Replacement rate $= \frac{\text{Benefit(Previous Earnings)}}{\text{Previous Earnings}}$
- Earnings base for "previous earnings":
  - Until 1987: last month's earnings
  - 1987 - 1996: average of last six months' earnings
  - 1996 - 1999: average earnings in previous calendar year (or year before)

    2000 - today: no RR reforms
- Series of reforms shifting replacement rates and maximum benefits
  - We identify **all** reforms to the RR schedule from 1972 to 1999

Validation: Actual Benefit Receipts vs. Predicted Receipts from Measured Lagged Average Earnings



Note: β=0.974 (se=0.003), R^2=0.451.