Earnings losses of displaced workers

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Outline

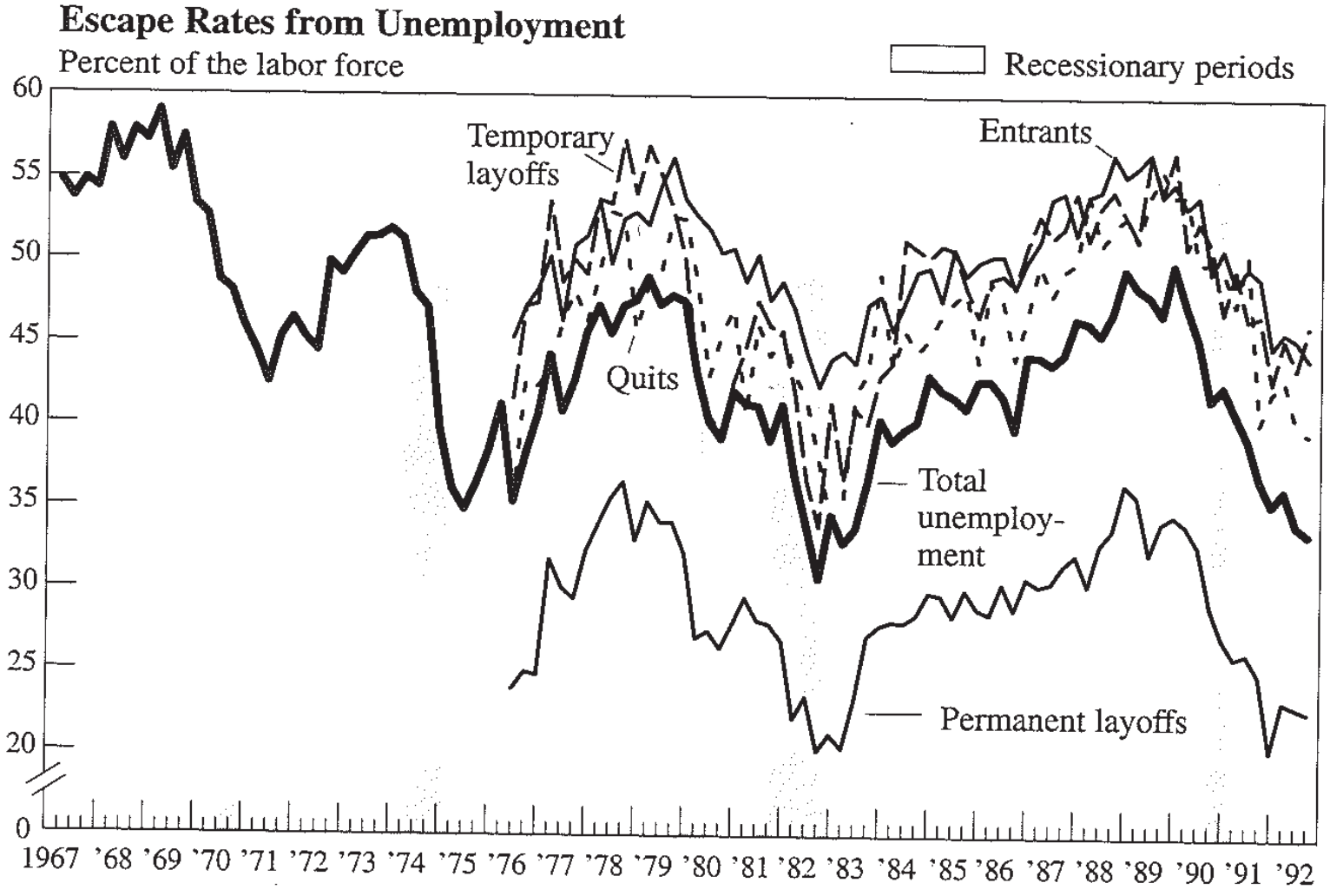
1. Quit-layoff distinction
2. Davis, von Wachter (2011)
3. Jarosch (2014, JMP)
4. Huckfeldt (2016, JMP)

Quit-layoff distinction

Quit-layoff distinction

- layoffs involve greater unemployment incidence and longer unemployment spells than quits
- Mincer (1986)
  - 2/3 of layoffs result in unemployment compared to 1/3 for quits
  - mean unemployment duration is twice as long for layoffs
- Davis, Haltiwanger, Schuh (1998)
  - CPS data
  - escape rate from unemployment 10-15 percentage points lower for layoffs

Escape rate from unemployment



source: Davis, Haltiwanger, Schuh(1998), Figure 6.8

Quit-layoff distinction

- laid-off workers experience large and persistent earning losses
- this is true especially for prime-age workers who lose high-tenure jobs
- job losers experience large, persistent declines
  - relative to their previous income
  - relative to observationally similar workers who did not lose a job

Quit-layoff distinction

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- job losers experience large, persistent declines
  - relative to their previous income
  - relative to observationally similar workers who did not lose a job
- in search models, separations are mutually agreeable, no meaningful distinction between quits and layoffs

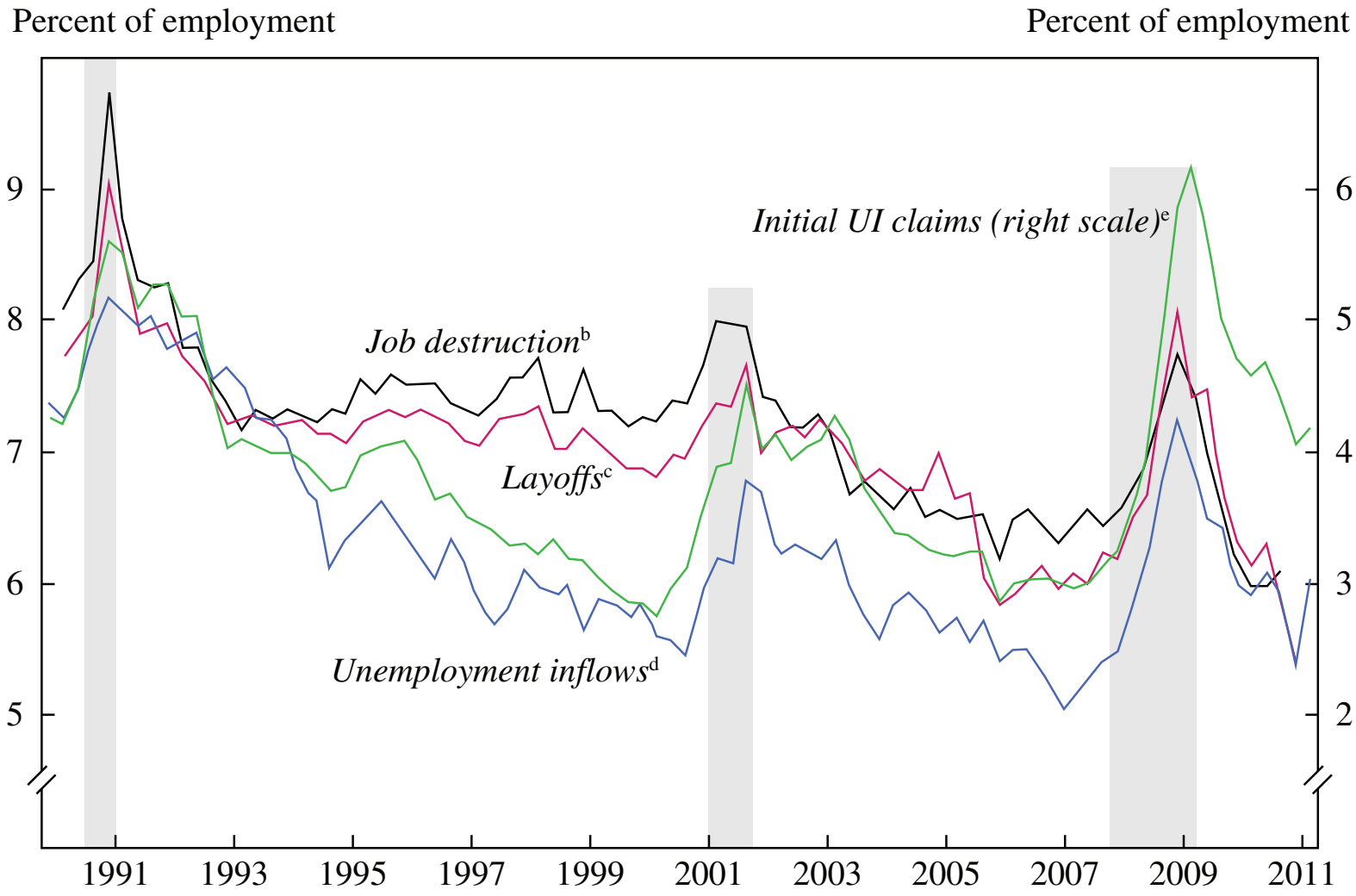
Davis, von Wachter (2011)

Outline

- incidence of job loss and job displacement
- earnings losses associated with displacement
  - magnitude of the present value losses
  - sensitivity to conditions at time of displacement
- response of worker anxieties and perceptions to contemporaneous conditions
- earning losses in search models

Different measures of job loss

Figure 1. Four Measures of Job Loss, 1990–2011Q2[a]



Different measures of job loss

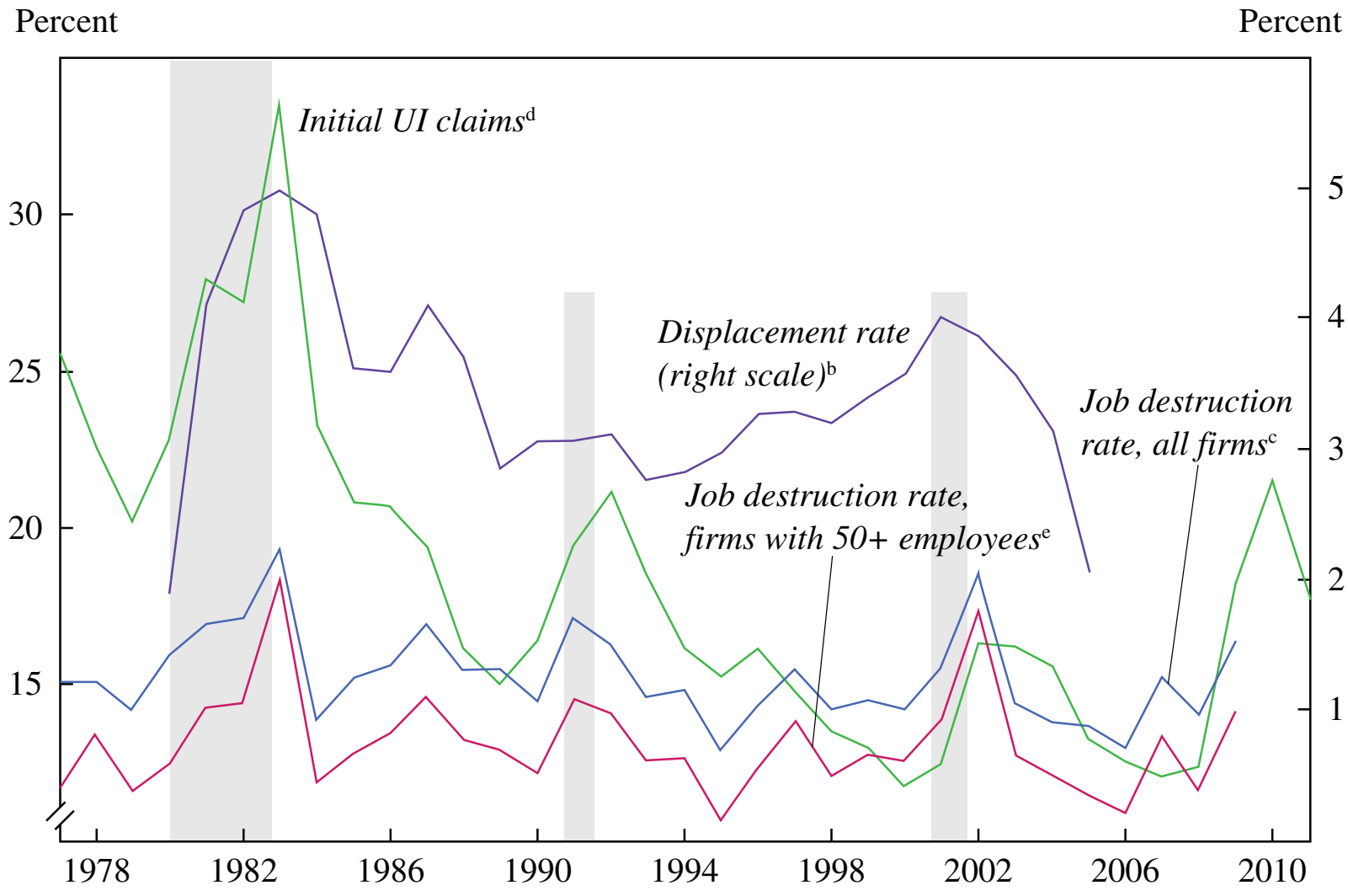
- large volume of job losses, both in good and bad times
  - JOLTS: 7 percent per quarter = 9 million layoffs per quarter
  - UI claims: 5 million per quarter
- impressive ability of the economy to reallocate workers
- most of these job losses have a little financial impact on families
- all series are strongly countercyclical

Job displacement events

- focus on job loss events involving serious consequences (financial and other)
- focus on long-tenure male who lose jobs in large-scale layoff events
- data: annual earnings records from Social Security Administration (SSA)

Job displacement in SSA

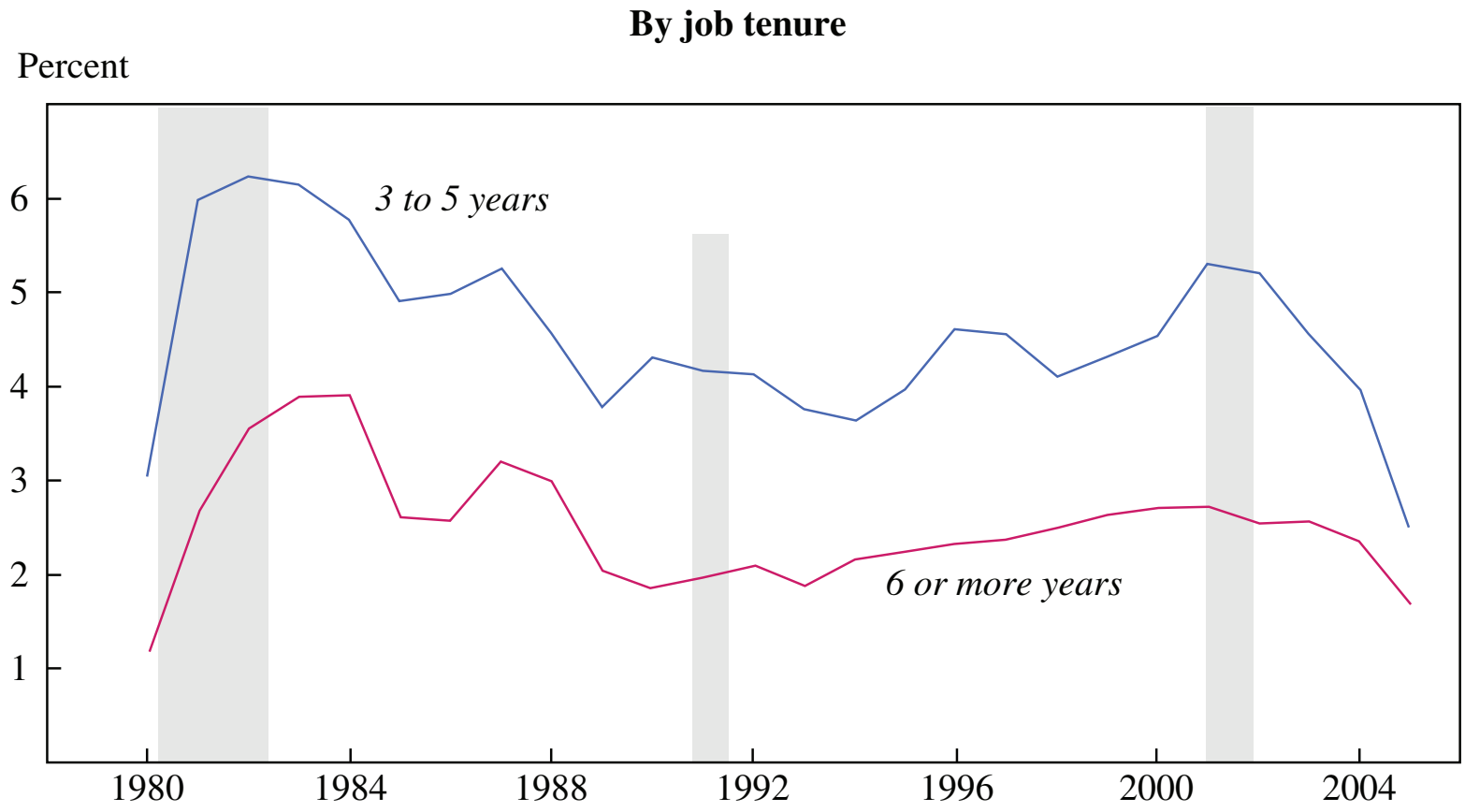
Figure 2. Job Displacement, Job Destruction, and Initial Claims for Unemployment Insurance Benefits, 1977 to 2011[a]



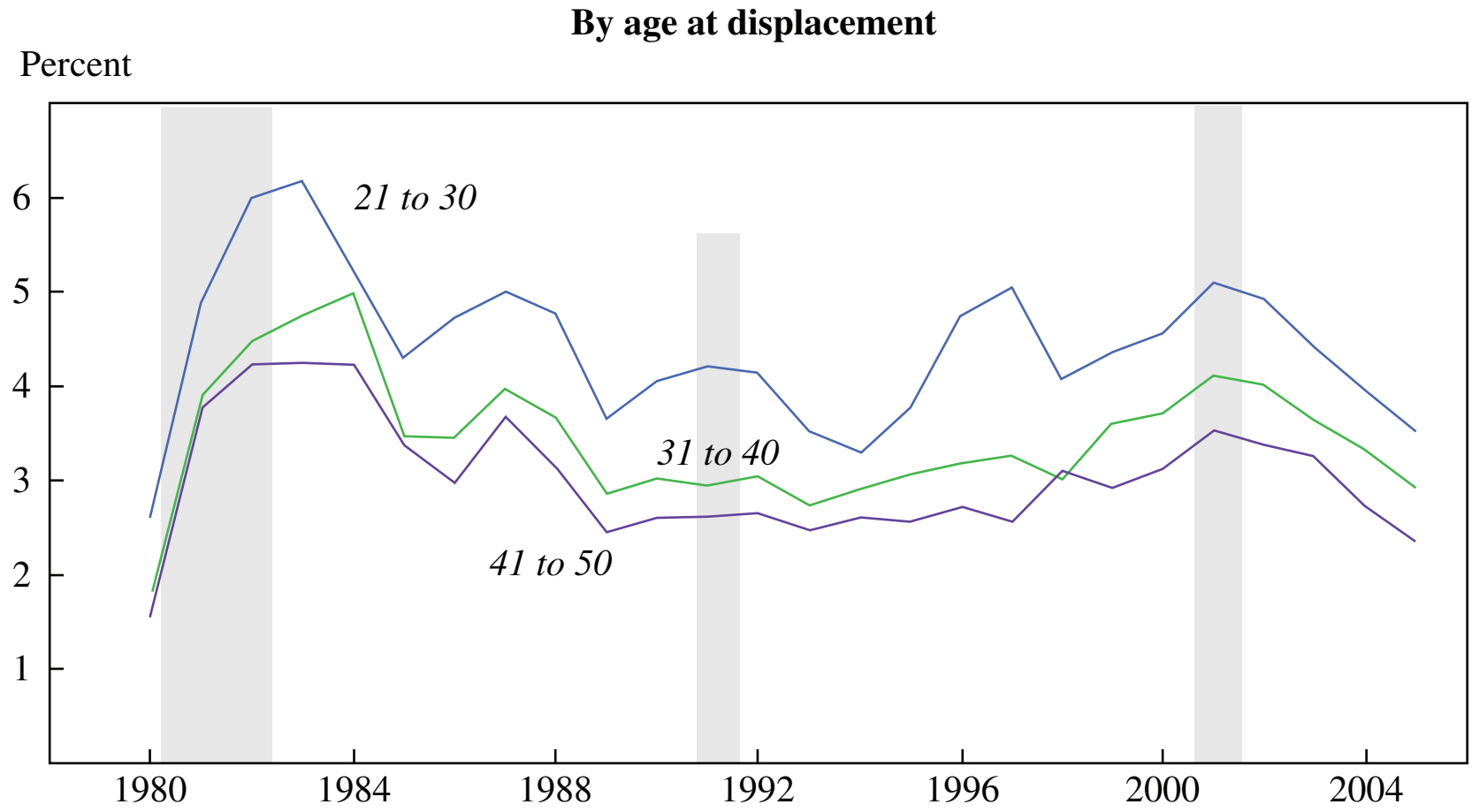
Definition of job displacement in SSA

- a worker is **displaced** in year y if he
  - separates from his (main) employer in y
  - has 3+ years of job tenure with the employer
  - employer experiences a mass layoff event in y
- a worker **separates** in year y if he has earnings with the employer in $y-1$ but not in y
- employer criteria for a **mass-layoff** event in year y
  - 50+ employees in $y-2$
  - employment contracts by 30–99% from $y-2$ to y
  - employment in $y-2 < 130\%$ of employment in $y-3$
  - employment in $y+1 < 90\%$ of employment in $y-2$

Displacement rates for men by job tenure



Displacement rates for men by age at displacement



Estimating the earnings losses

- statistical model

$$e_{it}^{y} = \alpha_i^{y} + \gamma_t^{y} + \bar{e}_i^{y}\lambda_t^{y} + \beta^{y} X_{it} + \sum_{k=-6}^{20} \delta_k^{y} D_{it}^{k} + u_{it}^{y}$$

- where

$\alpha_i^{y}, \gamma_t^{y}$	fixed effects
X_{it}	quartic polynomial in the age of worker i at time t
$\bar{e}_i^{y}$	pre-displacement average earnings from $y-5$ to $y-1$
D_{it}^{y}	$=1$ in worker's k^{th} year before/after displacement

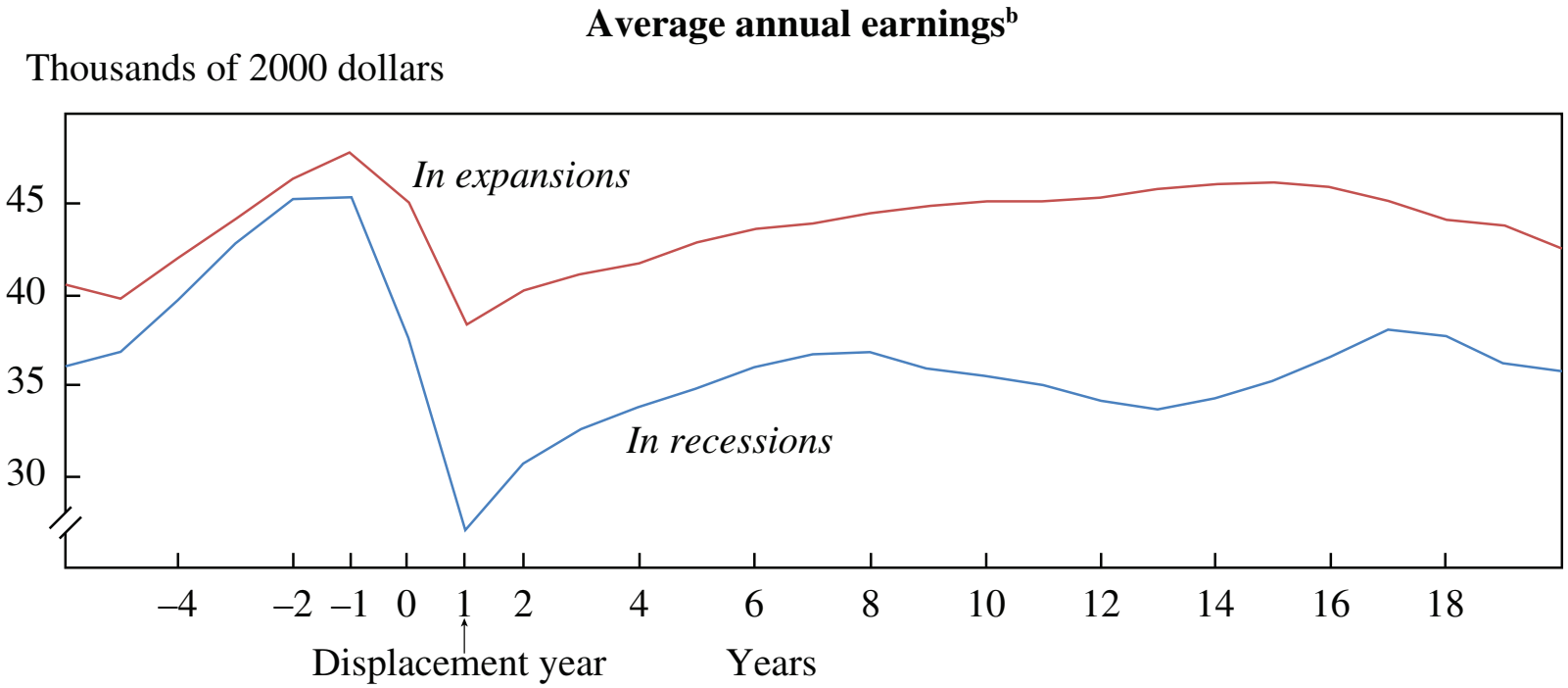
- $\bar{e}_i^{y}$ – different profiles for workers with different initial earnings

event	job displacement in $y, y+1, y+2$
control group	workers not separating from employers in $y, y+1, y+2$ (same tenure and 50+ requirement)
identifying assumption	evolution of control group earnings is a valid counterfactual of displaced workers in the absence of job displacement, conditional on controls

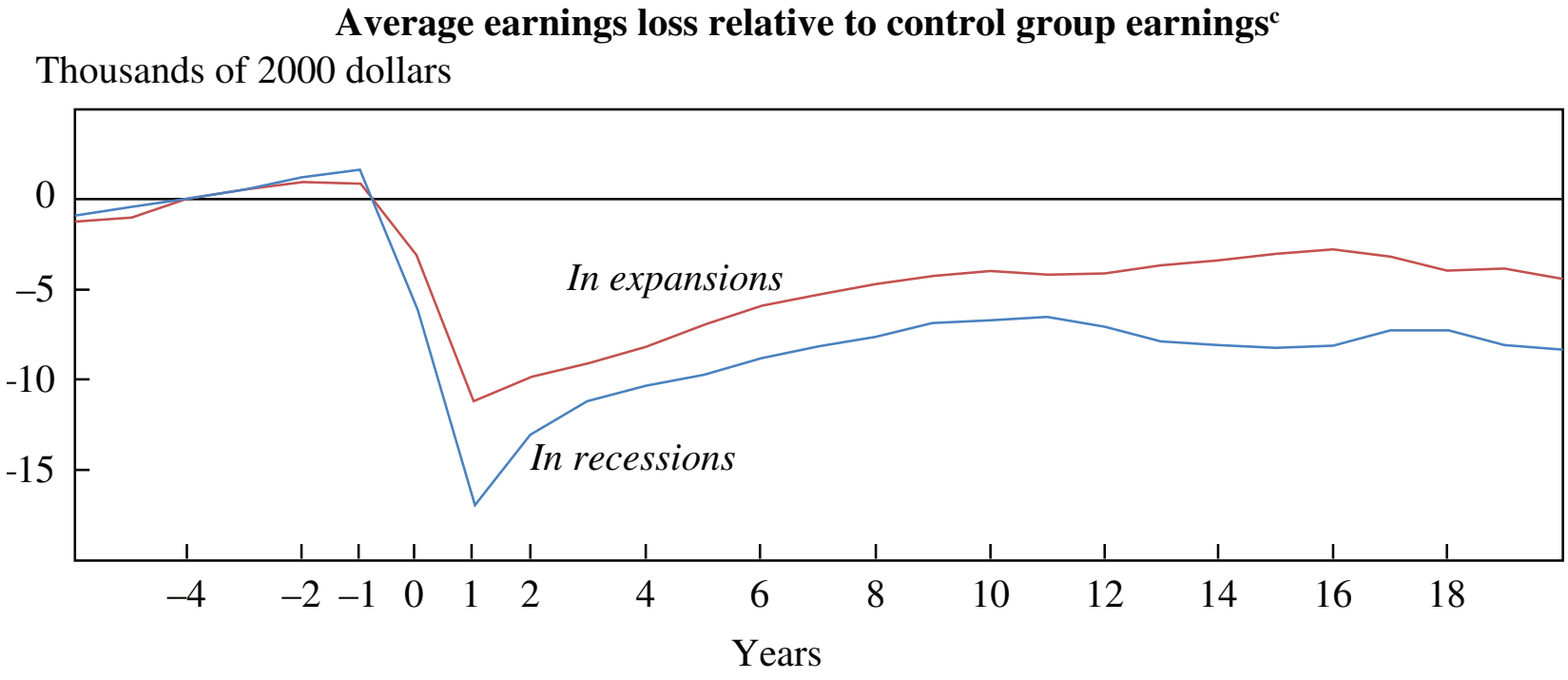
Estimating the earnings losses

- estimate equation separately for each y
- δ_k^y – coefficients of interests
- regression for year y includes workers displaced in $y, y+1, y+2$
  - increase the sample size
  - be consistent with the control group
- control group – "non-separators" in $y, y+1, y+2$
  - so called non-mass-layoff separators are excluded
- separate recession and expansion
  - weight δ_k^y according to how many months of year y were in a recession/expansion

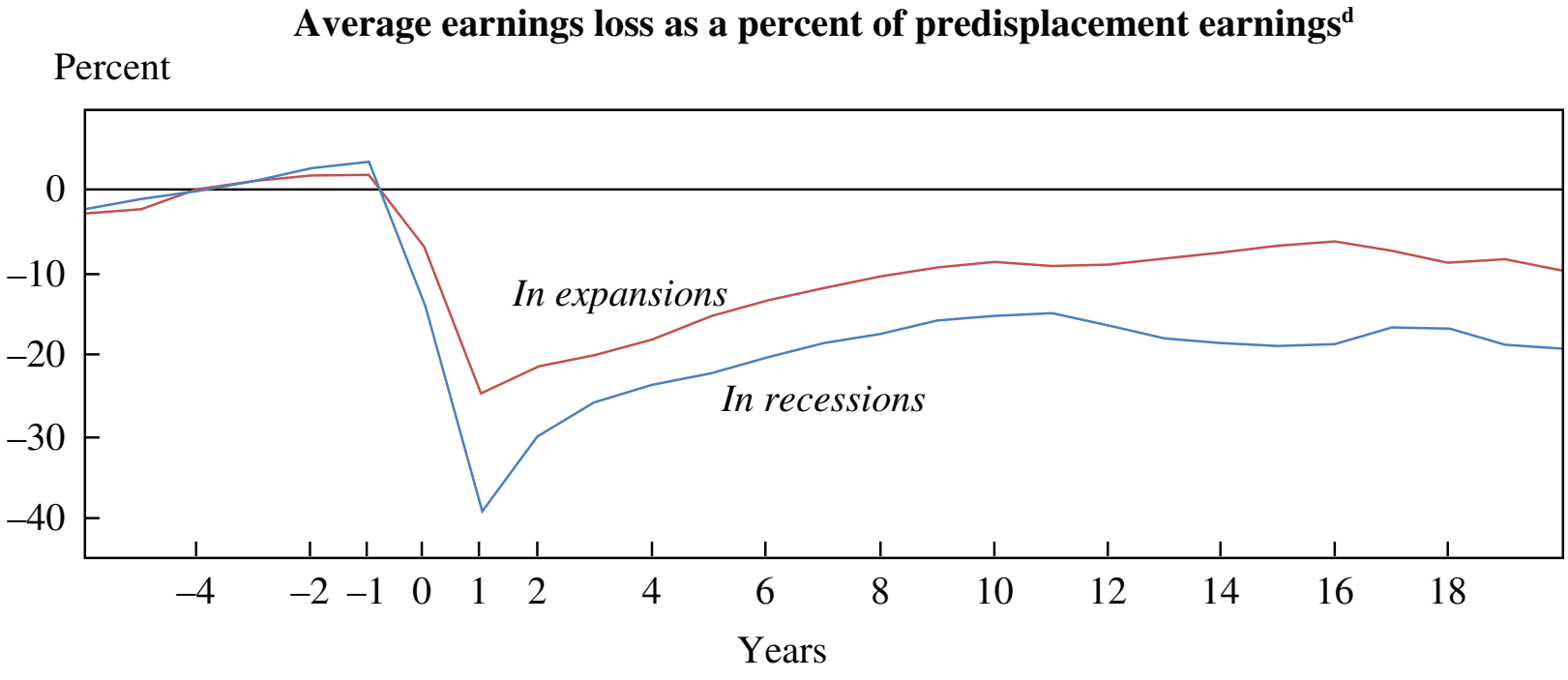
Earnings: raw mean earnings



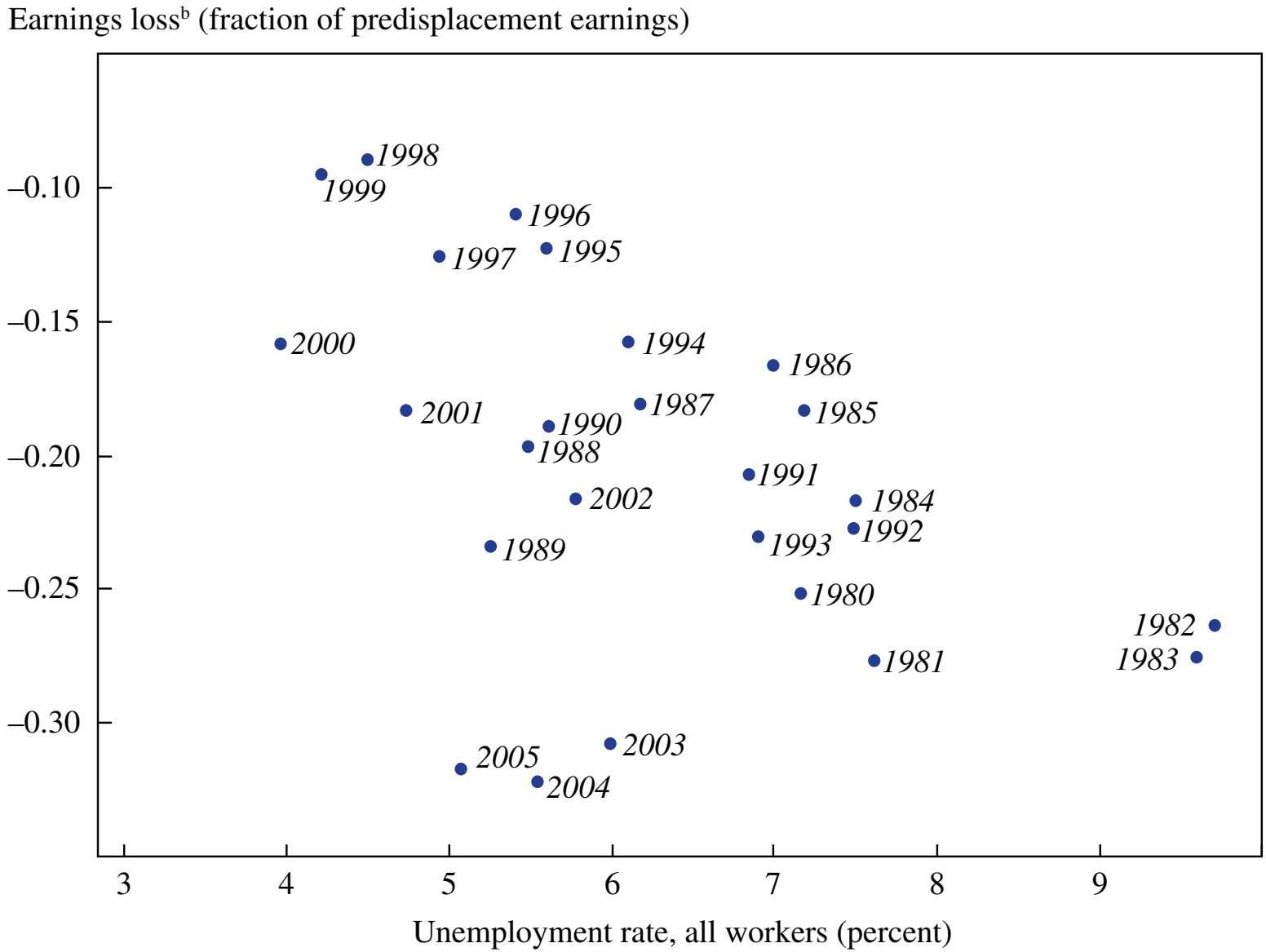
Earnings losses relative to the control group



Earnings losses as a fraction of pre-displacement earnings



Earnings losses of men in the 3rd year after displacement and unemployment rate in year 1



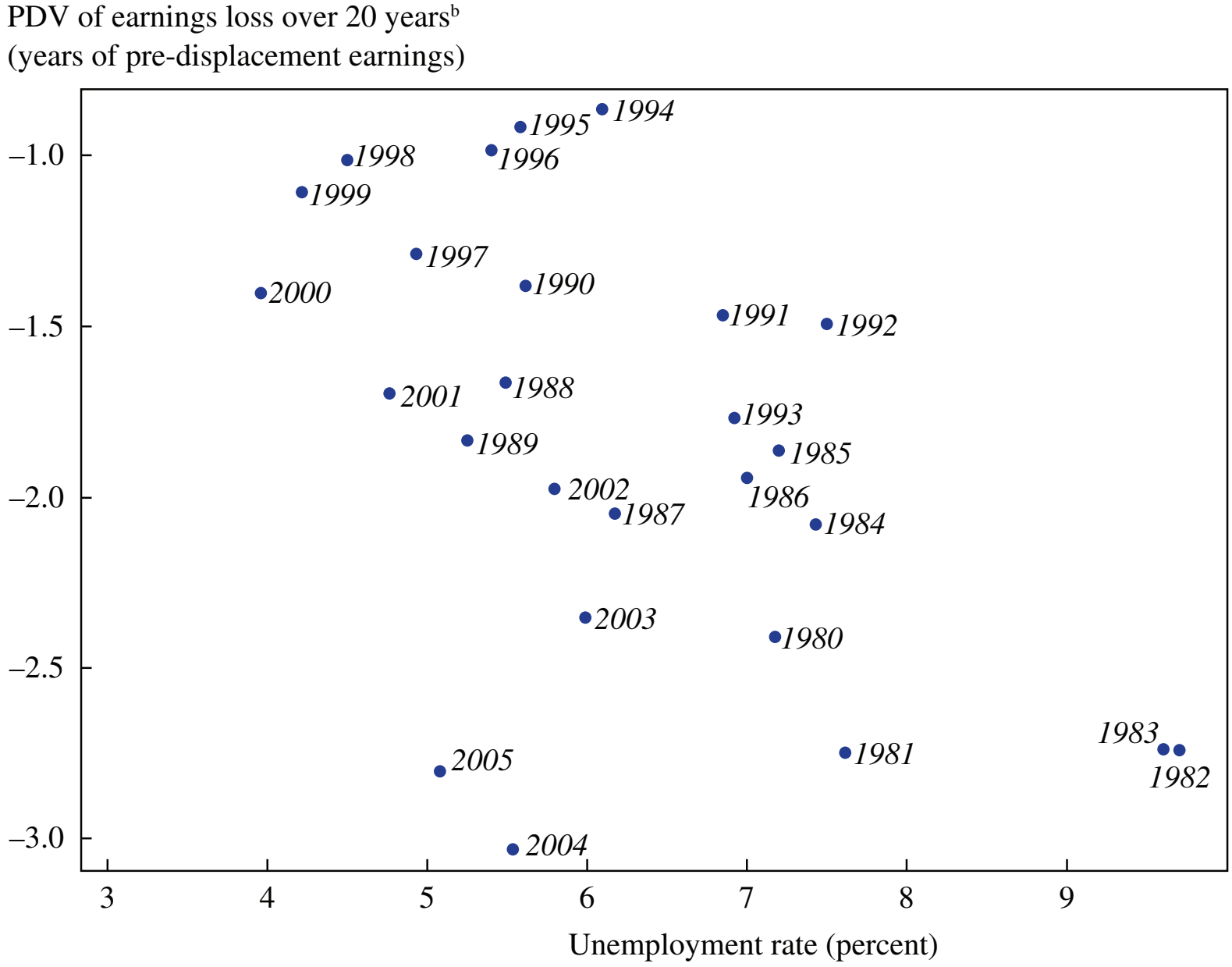
Present discounted value of earnings losses

- present discounted value of earnings losses using interest rate R

$$PDV_{loss}^{R} = \sum_{s=1}^{10} \bar{\delta}_{s}^{R} \frac{1}{(1+r)^{s-1}} + \sum_{s=11}^{20} \bar{\delta}_{10}^{R} \frac{(1-\bar{\lambda})^{s-10}}{(1+r)^{s-1}}$$

- where
  - $\bar{\delta}_{s}^{R}$ is the average estimated loss s years after displacement
  - $\bar{\delta}_{10}^{R}(1-\bar{\lambda})^{s-10}$ extrapolated earnings losses with decay rate $\bar{\lambda}$

Cumulative earnings losses after displacement and unemployment rate



Cumulative earnings losses after displacement and unemployment rate

Table 1. Present-Value Earnings Losses after Mass-Layoff Events, Men 50 or Younger with at Least 3 Years Prior Job Tenure, 1980–2005[a]

		PDV of average loss at displacement		
Subgroup[b]	*% of all years from 1980 to 2005*	*Dollars*	*As a multiple of predisplacement annual earnings*	*As % of PDV of counterfactual earnings*[c]
All	100	77,557	1.71	11.9
Displaced in expansion year	88	72,487	1.59	11.0
Displaced in recession year	12	109,567	2.50	18.6
Displaced in year with unemployment rate:				
<5.0%	23	50,953	1.06	9.9
5.0–5.9%	35	71,460	1.56	10.9
6.0–6.9%	13	71,006	1.58	10.7
7.0–7.9%	21	89,792	2.07	14.4
≥ 8.0%	8	121,982	2.82	19.8

Non-financial consequences of a job loss

- effect on consumption
  - sizeable near-term decline in consumption expenditures
  - no long-term consumption responses
- some evidence on decline in health, higher incidence of stress, higher mortality
- negative effect on children – worse at school, worse prospects of getting a job
- reduction in happiness and life satisfaction

Worker anxieties and perceptions

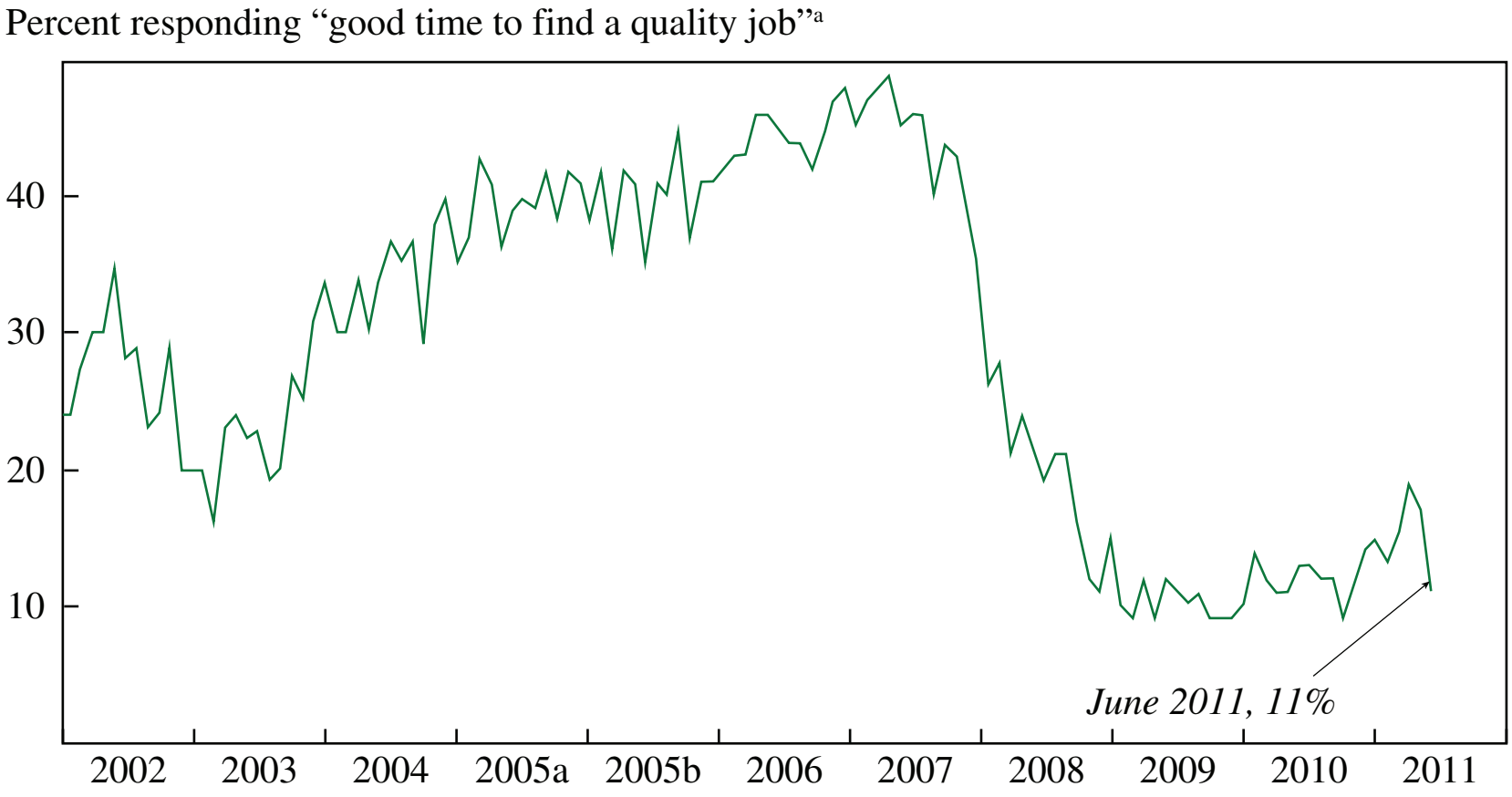
- perception about job loss and the difficulty of job finding track actual unemployment rates
- worker anxieties about job loss, hours cuts, wage and benefit cuts rose sharply after 2008 financial crises and remain high
- these high anxiety levels likely produce important stresses and psychological costs for a large segment of the population

Perceived likelihood of job loss vs unemployment rate

Perceived likelihood of finding a job vs unemployment rate

Perceived availability of good jobs

Figure 8. Perceived Availability of Good Jobs, March 2002 to June 2011



- coincides with a sharp decline in quits

Job loss in search models

Table 4. Present Value Income and Earnings Losses Associated with Job Loss in the Basic Mortensen-Pissarides Model[a]

Percent

	Basic MP model version		
	Nash version, standard calibration[b]	*Nash version, Hagedorn and Manovskii (2008) calibration*	*Credible bargaining version, Hall and Milgrom (2008) calibration*[c]
Range of mean PDV income losses over five aggregate states[d]	0.20 to 0.22	0.044 to 0.047	0.20 to 0.23
Simulation outcomes[e]			
All aggregate paths			
Mean unemployment rate	6.6	6.7	6.7
Monthly job finding rate[f]	43	43	43
Mean PDV income loss[g]	0.23	0.05	0.23
10th–90th percentile range, income	–0.55 to 1.07	–0.29 to 0.40	–0.51 to 1.04

Summary

- job displacement involves large earnings losses

unemployment rate	mean PV losses as a multiple of pre-displacement earnings
less than 6%	1.4 years
more than 8%	2.8 years
full sample, 1980-2005	1.7 years

- incidence of a job loss in recessions increases dramatically
- job loss has many negative consequences, also non-financial
- job loss is inconsequential in search models

Explanations

- earnings loss – hours worked drop or wage drops
- Davis, von Wachter cannot do that
- two JM papers: Jarosch (UoC, 2015), Huckfeldt (NYU, market 2014)
- Jarosch (2015)
  - German data, recovery in hours is slow
  - mechanism: serially correlated separations shocks lead to repeated job loss
  - wage decomposition; no aggregate shocks
- Huckfeldt (2016)
  - U.S. data, rapid recovery in hours
  - mechanism: (stable) reemployment in lower paying occupations
  - aggregate shocks, explains "graduating in recessions" effect

Jarosch (2014)

Introduction

- observations
  - hazard rate of separation decreasing in tenure
- model
- positive analysis
  - role of unemployment benefits
- quantitative application
  - large and persistent reduction in earnings after separation
  - decomposition of earnings losses into wage loss and employment probability
  - decomposition of wage losses into 3 sources: human capital, negotiation rents, match quality

Model

- heterogenous firms: $\theta = [\theta_y, \theta_\delta]$
  - observable
  - output of a match: θ_y
  - exogenous separation probability: θ_δ
- homogenous workers, infinitely lived, linear preferences
- employed workers – wage, unemployed workers – benefits z
- random search
  - prob. of meeting a firm for E and U: λ_0, λ_1
  - sampling distribution $F(\theta)$

Wage setting

- fixed wage contracts, re-bargained only with a credible threat
- value functions: $W(\theta, \hat{\theta}), U, J(\theta, \hat{\theta})$
  - $\hat{\theta}$ – last outside offer, used in negotiation, worker builds *negotiation capital*
  - $w(\theta, \hat{\theta})$ – wage
- joint surplus $S(\theta) = W(\cdot) - U(\cdot) + J(\cdot)$ depends only on θ
- wage implements surplus split with worker share α
- worker hired out of unemployment: $W(\theta_1, u) - U = \alpha S(\theta_1)$
- worker with an outside offer from $\hat{\theta}$
  1. poacher wins: $W(\theta_2, \theta_1) - U = S(\theta_1) + \alpha(S(\theta_2) - S(\theta_1))$
  2. incumbent wins: $W(\theta_1, \theta_2) - U = S(\theta_2) + \alpha(S(\theta_1) - S(\theta_2))$
  3. incumbent wins but the wage does not change if $S(\theta_2) < S(\hat{\theta})$
- large frictional wage dispersion
- unemployed worker does not have any negotiation capital

Value functions

- value of being employed

$$\begin{aligned} W(\theta,\hat{\theta}) &= w(\theta,\hat{\theta}) + \beta\theta_\delta U \\ &+ \beta(1-\theta_\delta)\lambda_1\left(\int_{x\in M_1(\theta)} W(x,\theta)\,dF(x) + \int_{x\in M_2\left(\theta,\hat{\theta}\right)} W(\theta,x)\,dF(x)\right) \\ &+ \beta(1-\theta_\delta)\left(1-\lambda_1\int_{x\in M_1(\theta)\cup M_2\left(\theta,\hat{\theta}\right)} dF(x)\right) W\left(\theta,\hat{\theta}\right) \end{aligned}$$

- value of being unemployed

$$\begin{aligned} U &= z + \beta\lambda_0\int_{x\in M_1(\theta)} W(x,u)\,dF(x) \\ &\quad +\beta\left(1-\lambda_0\int_{x\in M_1(\theta)} W(x,u)\,dF(x)\right) U \end{aligned}$$

Value functions

- value of a job

$$\begin{aligned} J\left(\theta,\hat{\theta}\right) &= \theta_y - w\left(\theta,\hat{\theta}\right) \\ &\quad +\beta\lambda_1\left(1-\theta_\delta\right)\int_{x\in M_2\left(\theta,\hat{\theta}\right)} W\left(\theta,x\right)dF\left(x\right) \\ &\quad +\beta\left(1-\theta_\delta\right)\left(1-\lambda_1\int_{x\in M_1(\theta)\cup M_2\left(\theta,\hat{\theta}\right)} dF\left(x\right)\right)J\left(\theta,\hat{\theta}\right) \end{aligned}$$

- joint surplus

$$\begin{aligned} S\left(\theta\right) &= \max\left\{0,S^*\left(\theta\right)\right\} \\ S^*\left(\theta\right) &= \theta_y - z + \\ &\quad +\beta\left(1-\theta_\delta\right)\left(S\left(\theta\right)+\alpha\lambda_1\int_{x\in M_1(\theta)}\left(S\left(x\right)-S\left(\theta\right)\right)dF\left(x\right)\right) \\ &\quad -\alpha\lambda_0\int_{x\in M_1(u)} S\left(x\right)dF\left(x\right) \end{aligned}$$

- $\partial S/\partial\theta_y > 0$, $\partial S/\partial\theta_\delta < 0$

Correlated unemployment spells

- Assumption: $E[\theta_\delta|\theta_y]$ is nonincreasing in θ_y, and $E[\theta_y|\theta_\delta]$ is non-increasing in the sampling distribution $F(\theta)$.
- Proposition: In expectation, worker's job security $1-\theta_\delta$ and job productivity θ_y are strictly increasing in her employment and job tenure.
- Corollary: The hazard from employment to unemployment is strictly decreasing in job and employment tenure.
- "Bottom rungs of the career ladder are slippery."

Efficiency

- planner maximizes PDV output
- assume $\lambda_1 < \lambda_0$ and $\alpha \in [0, 1)$
- workers overvalue job security: $\frac{\partial \theta_y}{\partial \theta_\delta} > \frac{\partial \theta_y^P}{\partial \theta_\delta}$
- reservation productivities are inefficiently low: $\theta_y^{0,P}(\theta_\delta) > \theta_y^0(\theta_\delta)$

Efficiency

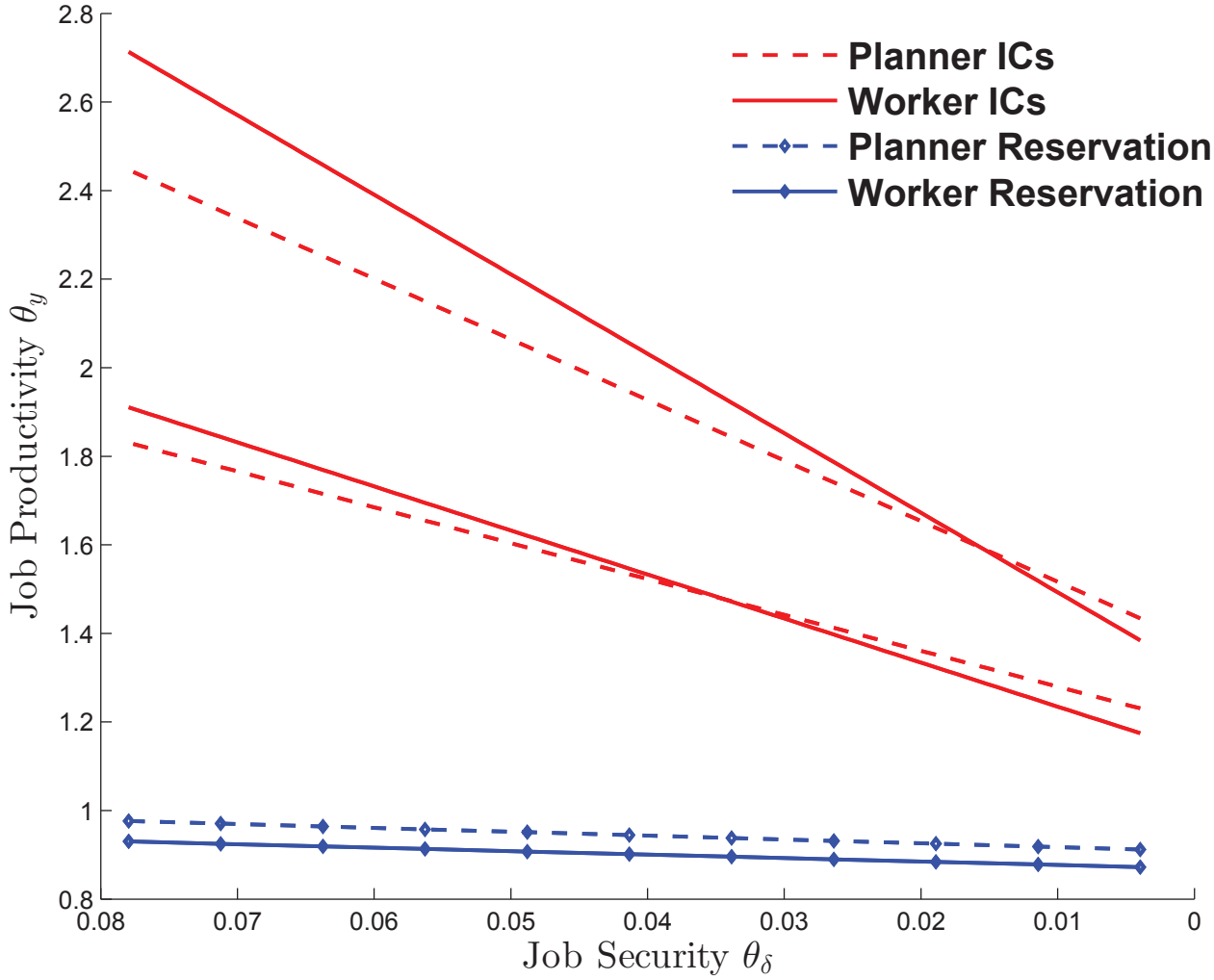


Figure 1: The tradeoff between θ_δ and θ_y

Reasons for inefficiency

- social planner

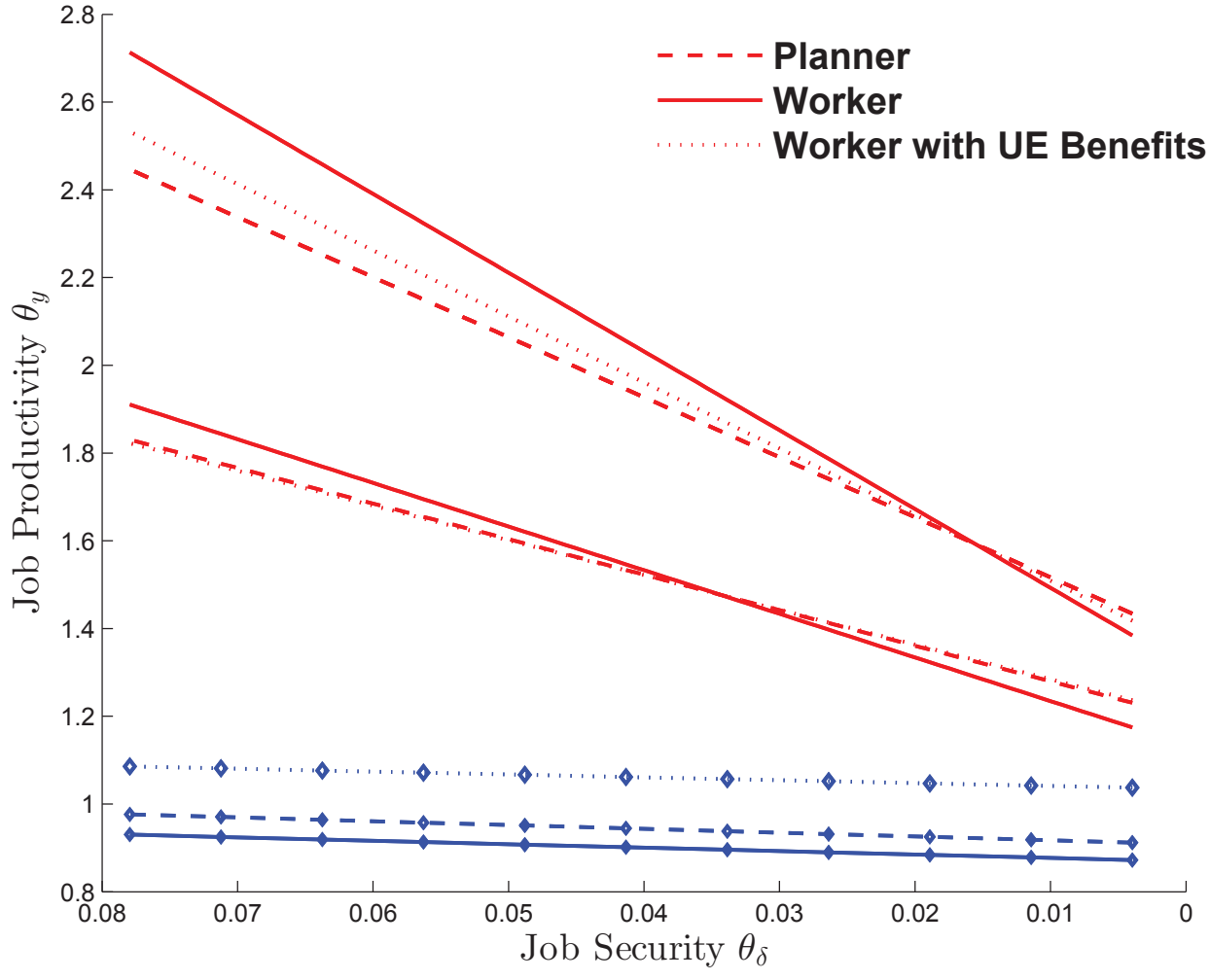
$$
\begin{aligned}
S^{P}(\theta) &= \theta_y - z + \beta(1-\theta_\delta)\left(S(\theta) + \lambda_1 \int_{x \in M_1(\theta)} (S(x) - S(\theta))\, dF(x)\right) \\
&\quad -\lambda_0 \int_{x \in M_1(u)} S(x)\, dF(x) \\
S(\theta) &= \theta_y - z + \beta(1-\theta_\delta)\left(S(\theta) + \alpha\lambda_1 \int_{x \in M_1(\theta)} (S(x) - S(\theta))\, dF(x)\right) \\
&\quad -\alpha\lambda_0 \int_{x \in M_1(u)} S(x)\, dF(x)
\end{aligned}
$$

- this is a partial equilibrium framework, no congestion externality from creating vacancies

- only surplus splitting channel

Unemployment benefits

- there exists a moderate level of unemployment benefits $b^* > 0$ that strictly increases welfare relative to the laissez-faire economy.



Estimation

- data: German social security records (1974–2010)
  - wages, employment status, gender, education, age, geography, employer
  - matched components: basic establishment features
- simulated methods of moments

Estimation

- data: German social security records (1974–2010)
  - wages, employment status, gender, education, age, geography, employer
  - matched components: basic establishment features
- simulated methods of moments
- extension for qualitative evaluation of the model: human capital accumulation
  - heterogenous workers with skill $s \in \{\underline{u}, \ldots, \bar{u}\}$
  - transition

$$
\begin{aligned}
s' &= \min\{s+1, \bar{s}\} && \text{with prob.} \psi_e \text{ during employment} \\
s' &= \max\{s-1, \underline{s}\} && \text{with prob.} \psi_e \text{ during employment} \\
s' &= s && \text{otherwise}
\end{aligned}
$$

Parametric assumptions

- $\theta_y \sim beta(\eta_y, \mu_y)$
- $\theta_\delta \sim beta(\eta_\delta, \mu_\delta)$
- bivariate distribution $F(\theta)$ generate by copula C_ϕ governing correlation
- s has support of 7 uniformly distributed grid points $[1, 2]$
- match output: $p(\theta, s) = s + \theta_y$

Parameters

Parameters	Description
λ_0	Offer Arrival Rate during Unemployment
λ_1	Offer Arrival Rate during Employment
α	Worker Bargaining Power
ψ_e	Skill Appreciation during Employment
ψ_u	Skill Depreciation during Unemployment
η_y, μ_y	Job Productivity Marginal Distribution
η_δ, μ_δ	Job Security Marginal Distribution
φ	Copula $\rightarrow \rho\left(\theta_y, \theta_\delta\right)$

Table 1: Parameters

Moments

Moments	Target	Model	Estimates
Unemp. Rate	.09	.09	$\lambda_0 = .091$
EE-Rate	.007	.007	$\lambda_1 = .067$ (.01)
$\bar{\theta}_\delta^{lt}$	.029	.031	$\eta_\delta = 1.77$ (.13)
$\bar{\theta}_\delta$	.009	.009	$\mu_\delta = 48.7$ (2.3)
$\bar{\theta}_\delta^{ht}$	.004	.006	
$Var\left(log\left(w\right)\right)$	.019	.036	$\eta_y = 11.95$ (1.2)
$Skew\left(log\left(w\right)\right)$	$-.8$	$-.3$	$\mu_y = 11.05$ (.7)
$\Delta^{JJ} w$	.09	.123	
$\Delta^{E} w$	.007	.011	
$\Delta^{J} w$	.004	.003	
$\hat{\gamma}_1$ in (20)	$-.002$	$-.002$	$\psi_u = .131$ (.038) $\psi_e = .014$ (.004)
$\hat{\gamma}_2$ in (21)	$-.00005$	$-.00004$	$\varphi = -14.95$ (1.05)
$\bar{w}^0/\bar{w}$	.78	.75	$\alpha = .68$ (.11)

- regression (20): $\log(w_{it}^0) = \alpha_i^1 + \xi_t + \gamma_1 d_{it} + \varepsilon_{1,it}$
- regression (21): $I_{it}^\delta = \alpha_i^2 + \gamma_2 \log(w_{it}) + \varepsilon_{2,it}$

Results

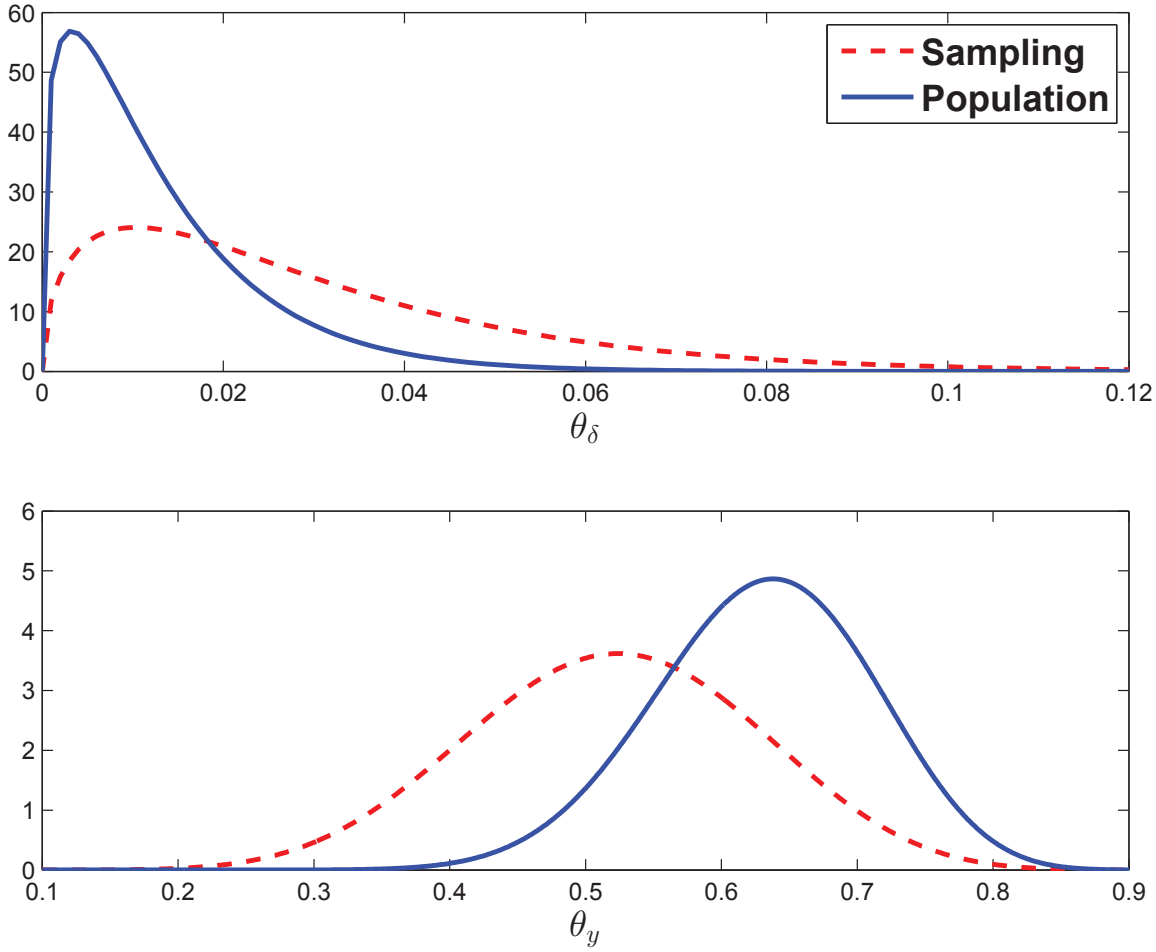


Figure 3: Sampling and Population Distributions for θ_δ and θ_y

Distribution of θ_δ in the model and data

- for each firm-year, compute separation rate; average over all years in the dataset

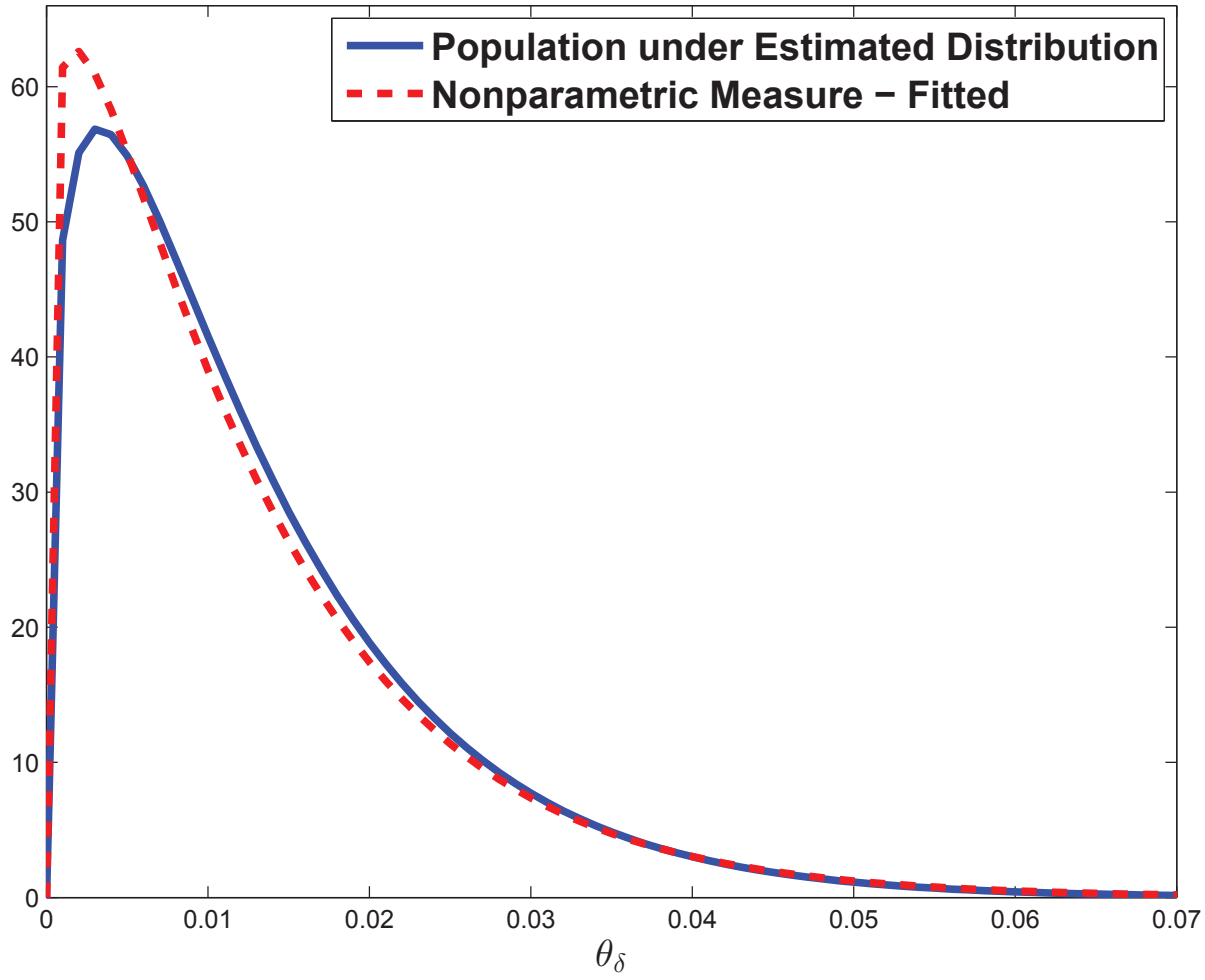
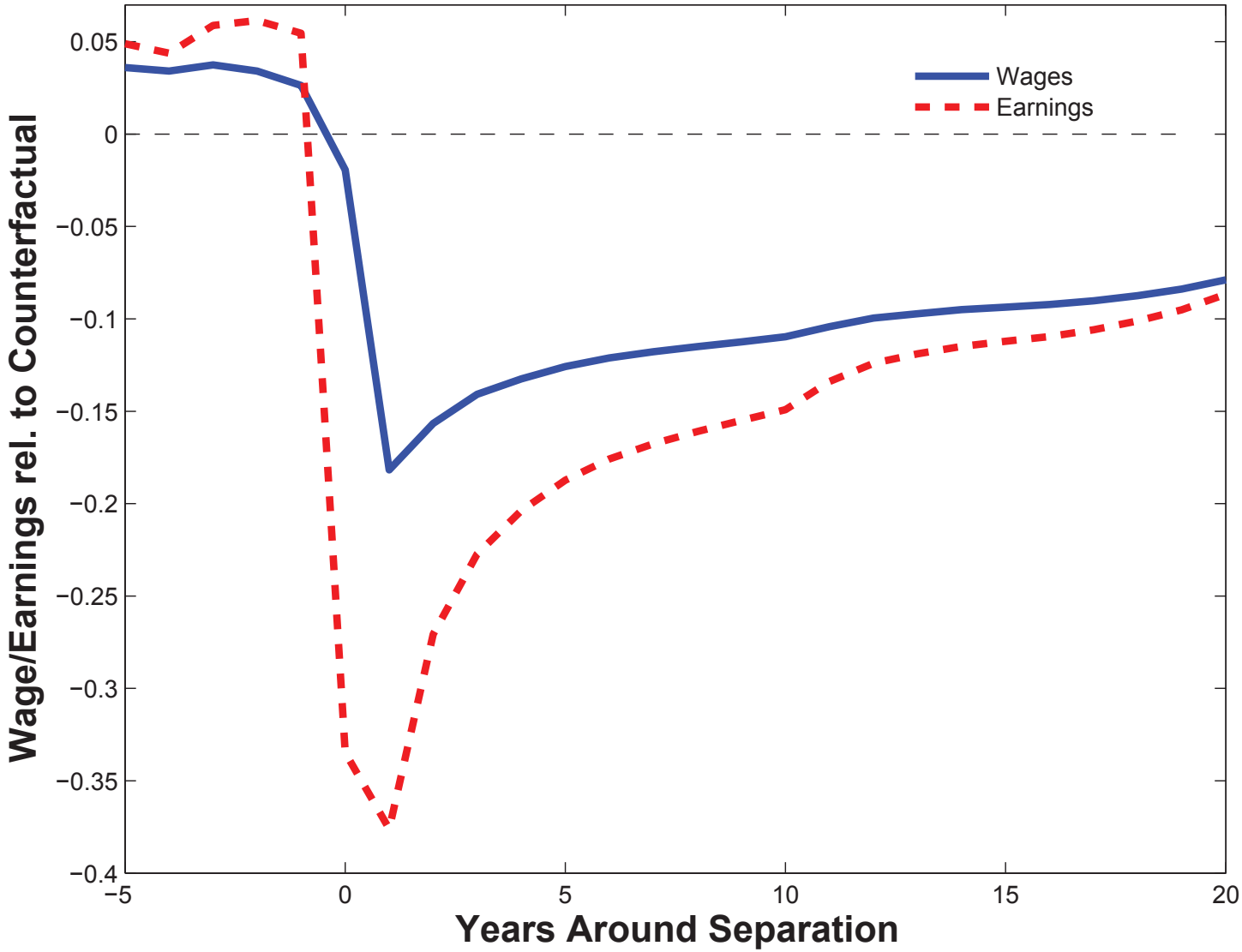
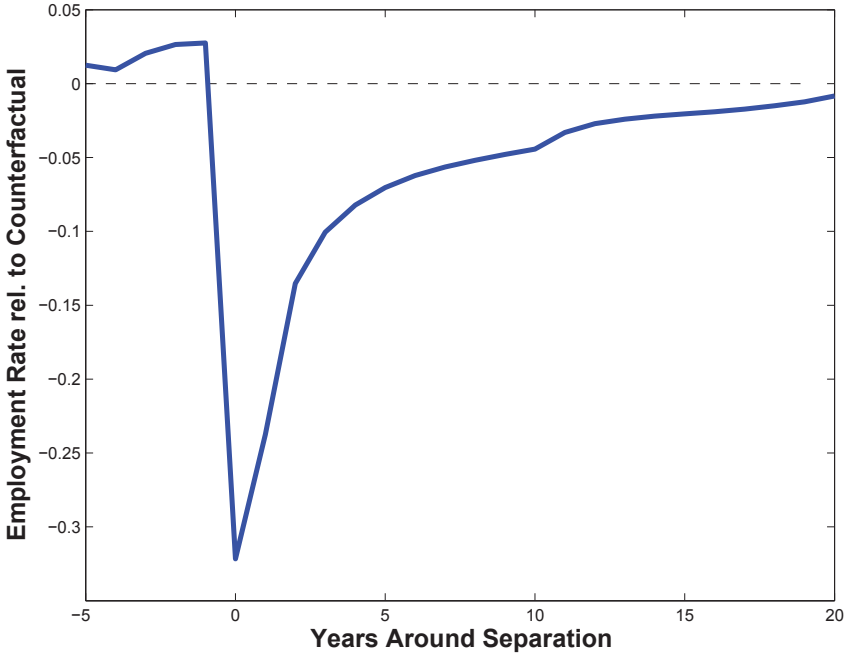


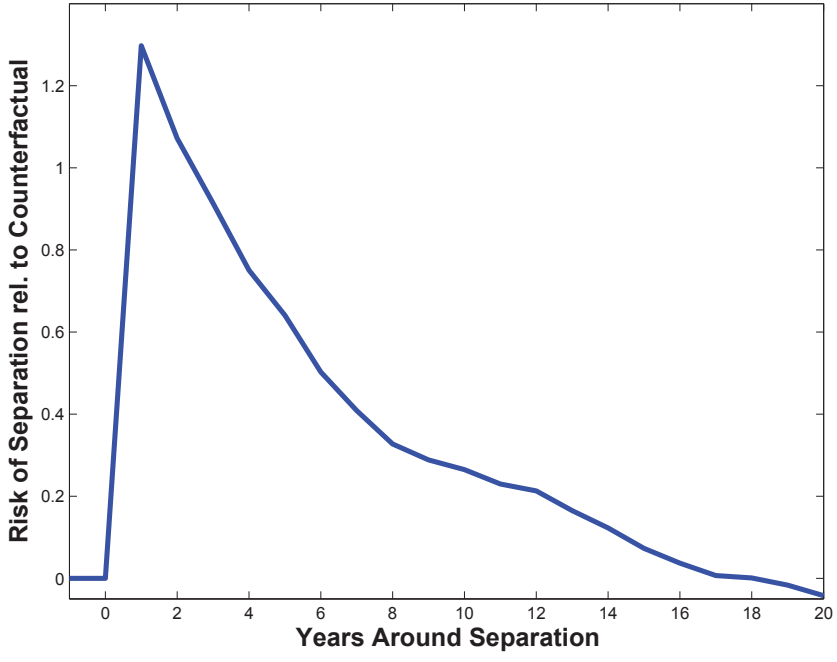
Figure 4: Direct Evidence on Heterogeneity in θ_δ

Empirical decomposition of earnings losses

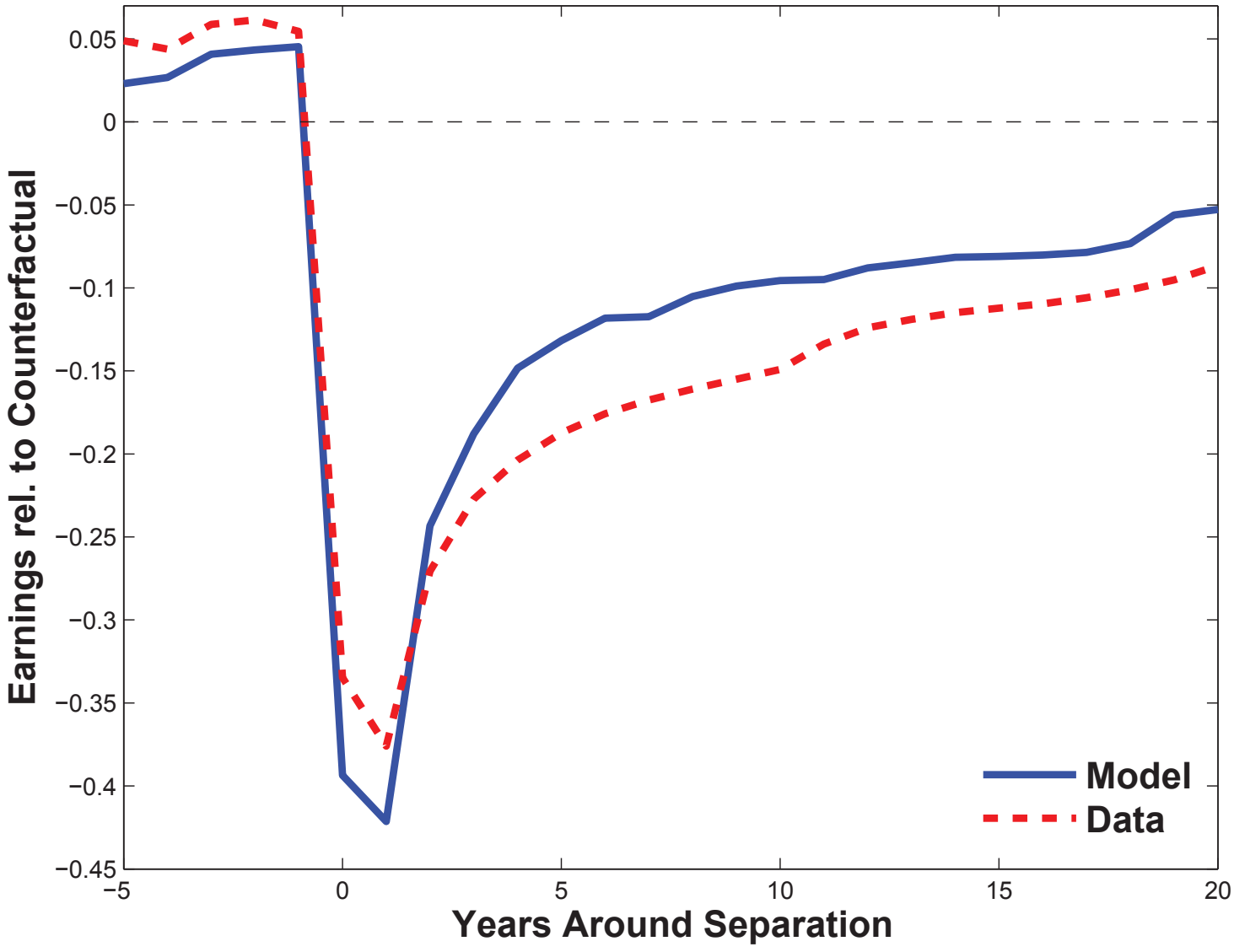


Decomposition of wage losses

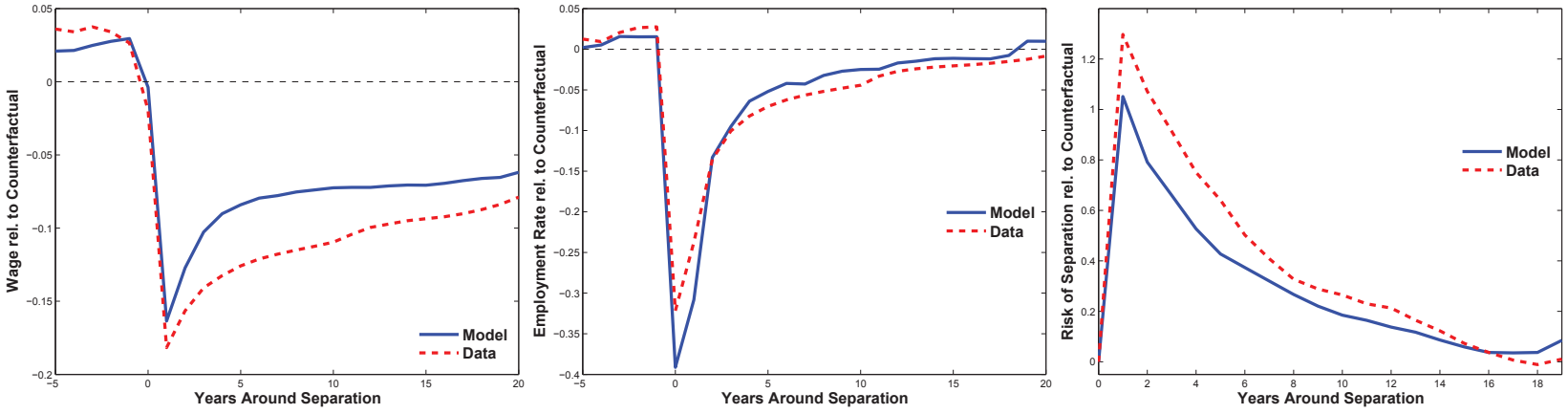




Earnings losses in the model



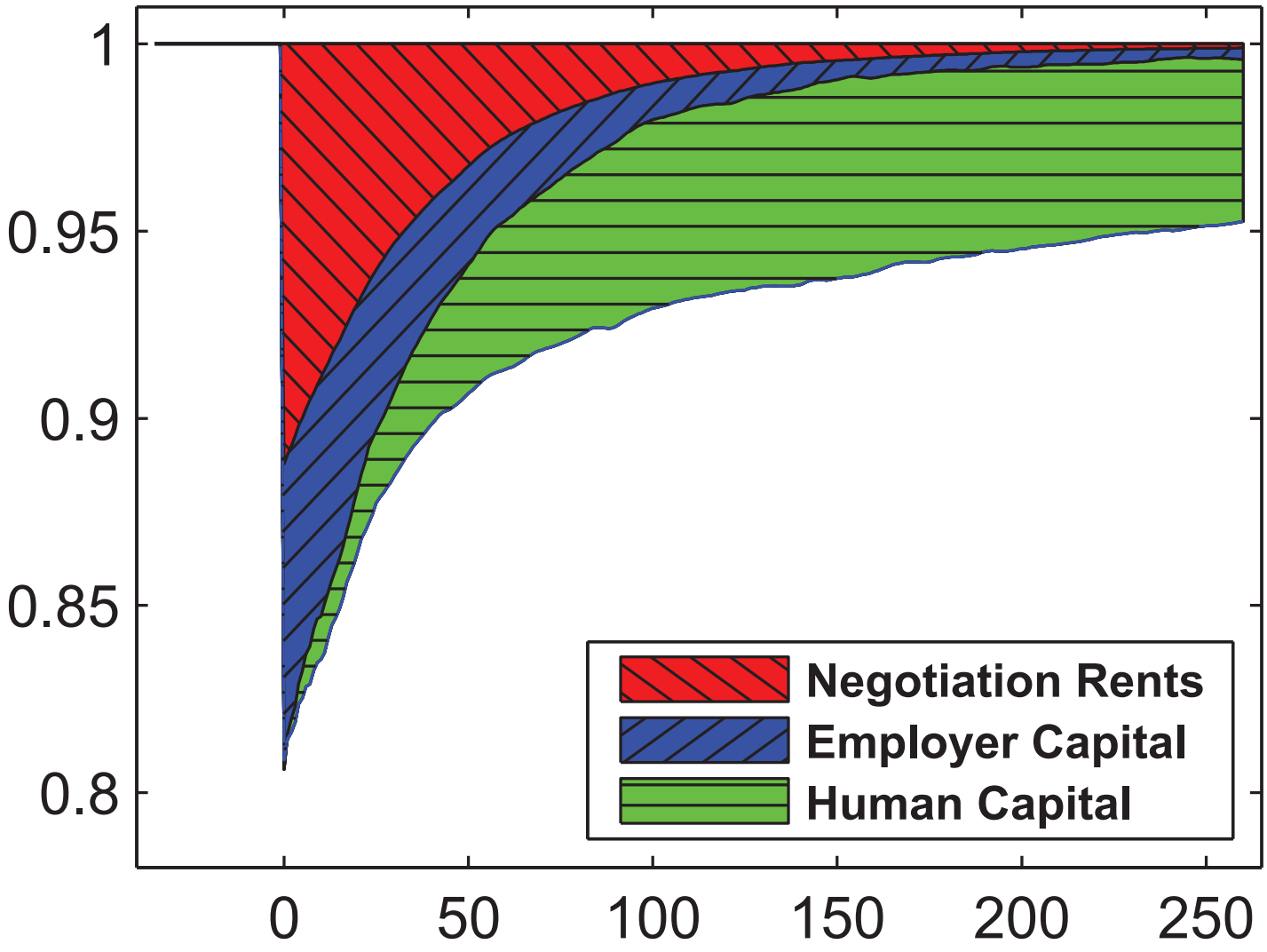
Earnings losses in the model – decomposition



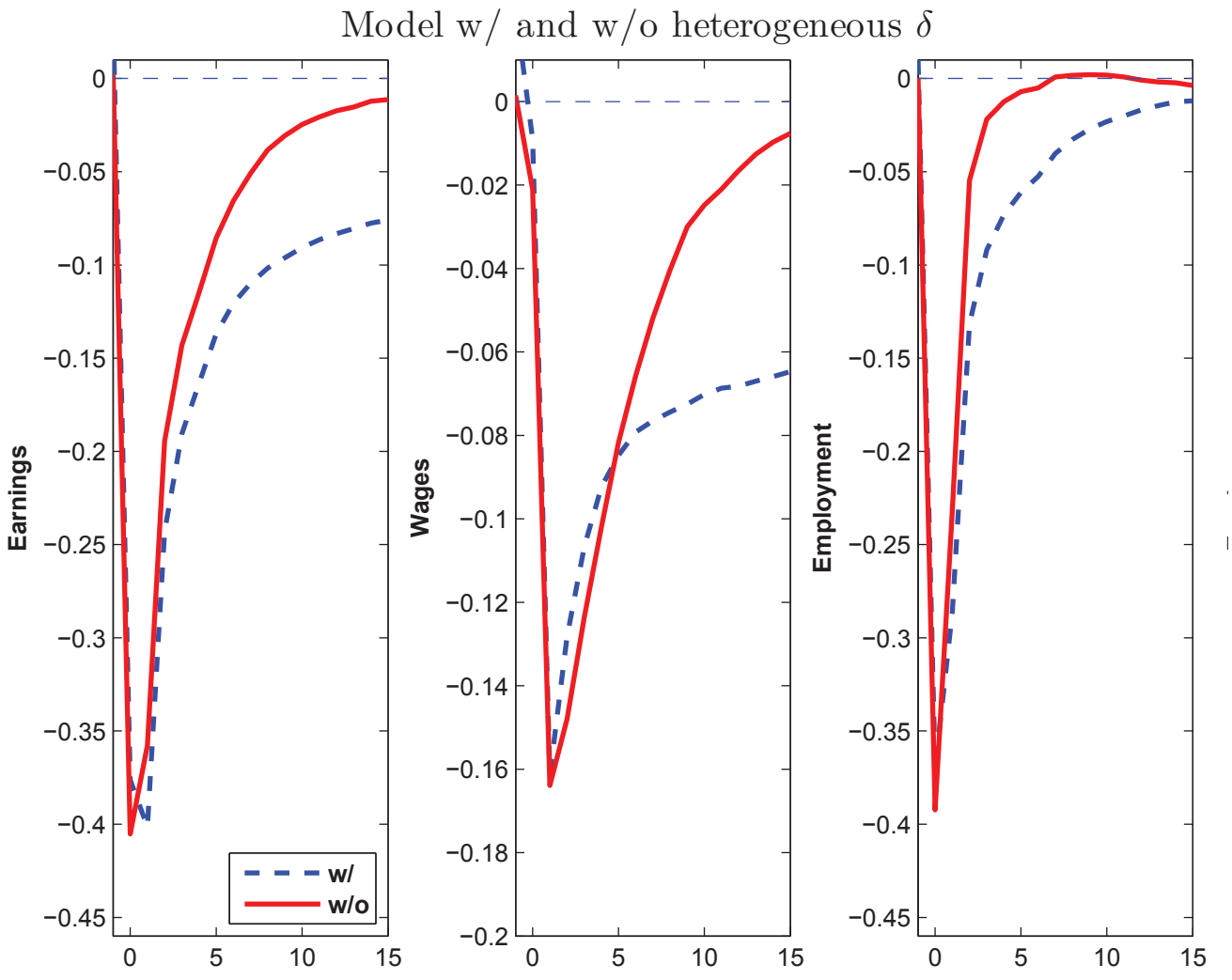
Decomposition of wage losses

- channels
  - loss of negotiation rents
  - loss of an employer
  - human capital
- "turn off" each component separately
- control group: workers who do not separate
- treatment group: workers who lose a job
- remove negotiation component by setting negotiation benchmark to unemployment
- remove human capital loss by setting the path of HK to counterfactual
- 52% of PDV of losses due to HK, 24% loss of employer, 22% negotiation capital

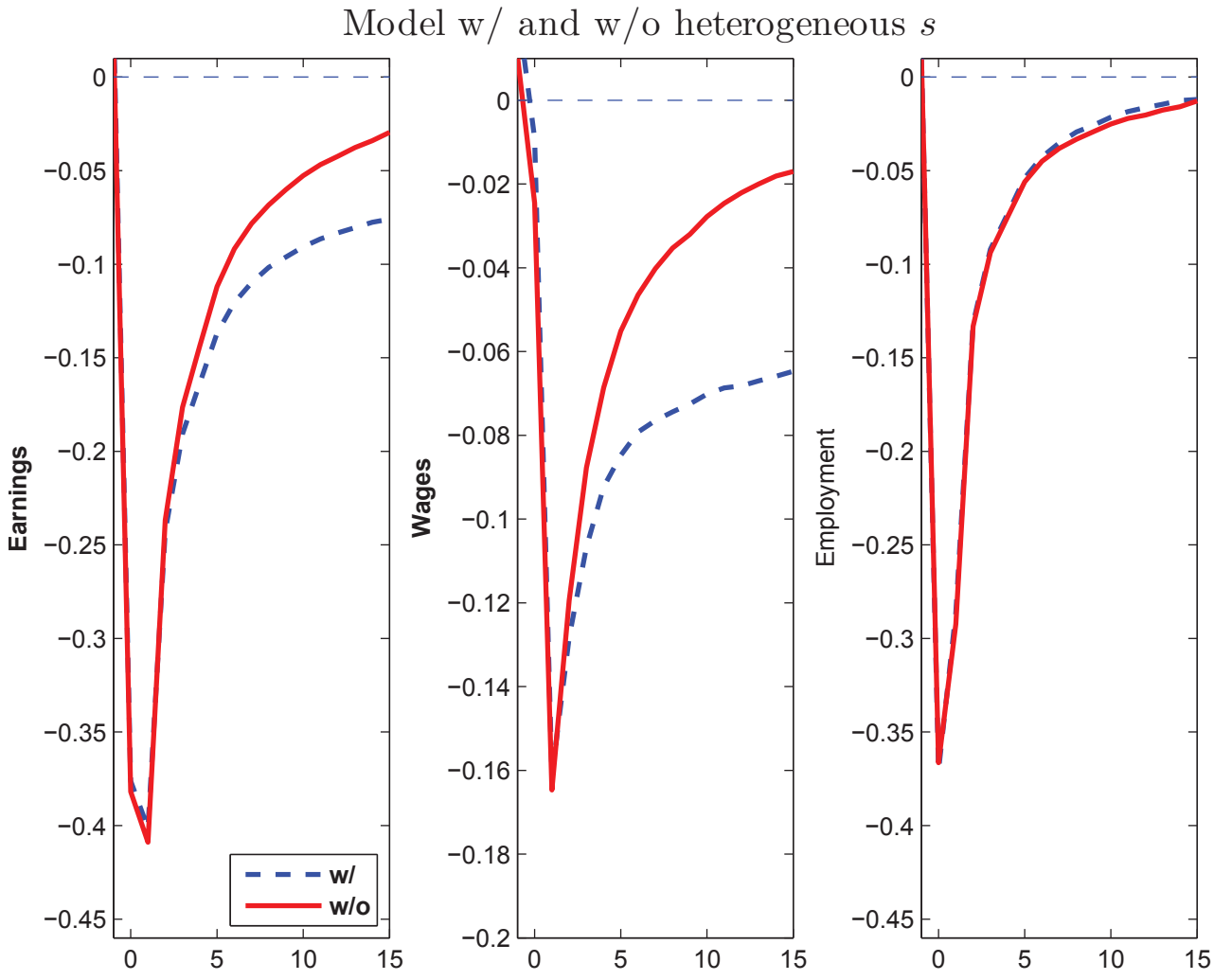
Decomposition of wage losses



Role of heterogeneity in job security

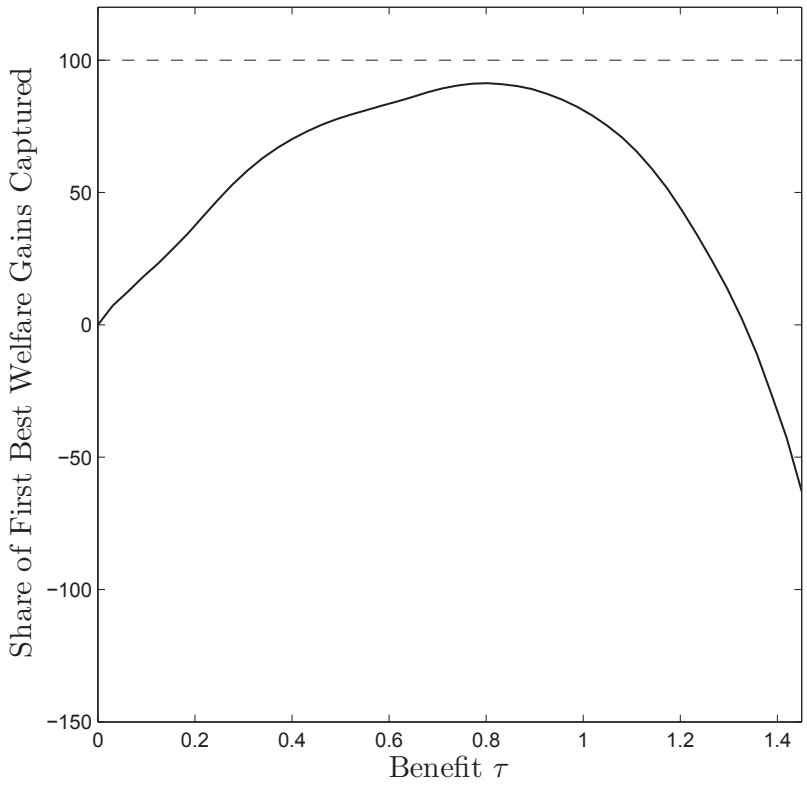


Role of heterogeneity in human capital



Policy

- introduce constant unemployment benefits τ



Optimal policy

- search for $\tau(\theta, s)$ that equates social planner solution to the laissez-faire
- higher benefits to higher-value matches