Unemployment Insurance and Worker Reallocation

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Big picture

Unemployment Insurance (UI) is a cornerstone of modern labor market policy

- Central challenge: Balancing insurance against moral hazard costs

Large literature on how UI affects *unemployed* workers' search behavior

e.g., Schmieder et al., 2016, Nekoei and Weber, 2017 and Marinescu and Skandalis, 2021

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Does UI also affect how *employed* workers search for new jobs?

- Search models: UI affects incentives to find new jobs
- Empirical findings: Workers anticipate and "avoid" job loss

  (e.g., Burgess and Low 1992, Baghai et al. 2021, Cederlöf et al. 2021, Simmons, 2022, Grindaker, Kostøl and Merkle, 2023)

  $\rightarrow$ Larger pool than unemployed: small behavioral changes matter!

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  → Larger pool than unemployed: small behavioral changes matter!

This paper: How does UI affect employed workers' job mobility and job outcomes?

→ Implications for costs of providing UI and optimal policy?

Setting for analysis

Most countries: UI proportional to wages up to cap

Transition rates around the kink

- Separate effect of UI incentives from sorting
- Isolate micro behavioural responses, holding aggregate economy fixed

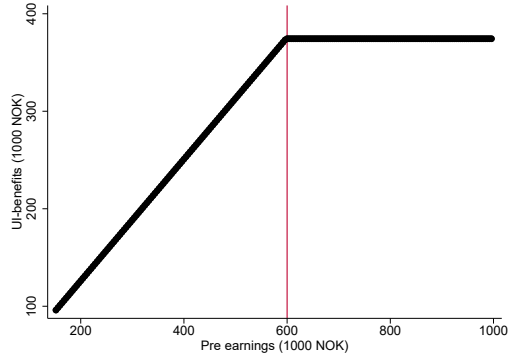

Figure: Kink in Norwegian UI schedule

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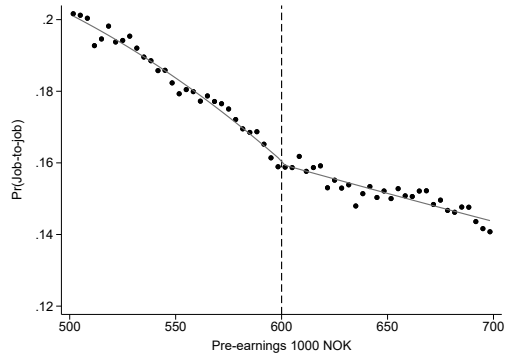

Figure: Kink in JJ probability

Paper in a slide

1. Derive predictions from different classes of on-the-job search models for how UI impacts employee search behaviour
   - Typically $\uparrow$ UI $\longrightarrow \downarrow$ JJ
   - If mobility "precautionary" $\downarrow$ JJ $\longrightarrow \uparrow$ EU
   - U risk in job determines magnitude of JJ response

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   - UI $\uparrow \longrightarrow$ JJ $\downarrow$ & EU $\uparrow$
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2. Test predictions using regression discontinuity design with comprehensive Norwegian register data
   - UI $\uparrow$ $\longrightarrow$ JJ $\downarrow$ & EU $\uparrow$
   - Increasing JJ response with predicted U risk of job

3. Discipline equilibrium search model with reduced form responses
   - Employed contribute to 40% of the fiscal costs of providing UI
   - Strong interaction between employed and unemployed in equilibrium
   - Ignoring the employed would mean a 20% higher optimal UI level at the upper threshold

Literature

On-the-job search:
see, e.g., Burgess and Low 1992, Burdett and Mortensen 1998, Light and Omori 2004, Christensen et al. 2005 Menzio 2010, Lise 2013, Bagger and Lentz 2019, Jarosch 2021, Baghai et al. 2021, Cederlöf et al. 2021 and Simmons 2022.

Optimal Unemployment Insurance:
see, e.g., Baily 1978, Acemoglu and Shimer 1999, Chetty 2006, Card et al. 2007, Chetty 2009, Hendren 2017, Jäger, Schoefer and Zweimüller 2021, Landais et al. 2021 and Hendren, Landais and Spinnewijn 2021

Regression kink design:
see, e.g., Card et al. 2015, Landais 2015, Kolsrud et al. 2018 and Gamba, Jakobsson and Svensson 2022.

1. Models of on-the-job search, U risk and UI

McCall random search model with on-the-job search

Model
- Exogenous distribution of wages, $F(w)$
- Search is endogenous off, s^u and on, s^e, the job
- Reallocation shocks, λ^r, resembling advance notice

where the reservation wage is $w^r(w)$

- Workers lose jobs with certainty at rate $\delta(w)$

$b_w(w) > 0$ below w_k, and $b_w(w) = 0$ above w_k

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$$eu(w) = \delta(w) + \lambda^r F(w^r(w))$$

$$jj(w) = \underbrace{s^e(w)\lambda^e[1 - F(w)]}_{\text{driven by search}} + \underbrace{\lambda^r[1 - F(w^r(w))]}_{\text{advance notice}}$$

Mechanisms

Central determinant of how mobility changes with wages is how values change

1 Gains in benefits create incentives to climb the ladder

$$\frac{dW(w, b(w))}{dw} = \underbrace{\frac{\partial W(w, b(w))}{\partial w}}_{\text{Gains in wages}} + \underbrace{\frac{\partial W(w, b(w))}{\partial b} \frac{db(w)}{dw}}_{\text{Gains in benefits}}$$

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2. Those who receive reallocation shocks more likely to accept a job in lower paying jobs (when benefits are lower)

$$\frac{dU(b(w))}{dw} = \underbrace{\frac{\partial U(b(w))}{\partial b}\frac{db(w)}{dw}}_{\text{Gains in benefits}}$$

Illustration

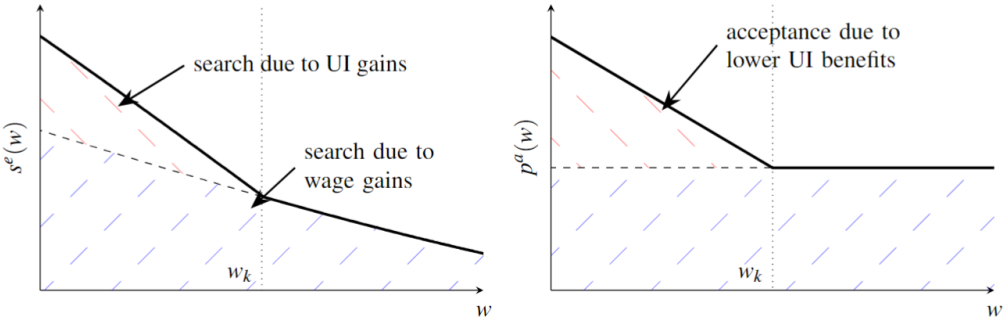

Figure: Illustration of search and acceptance at the kink

Illustration

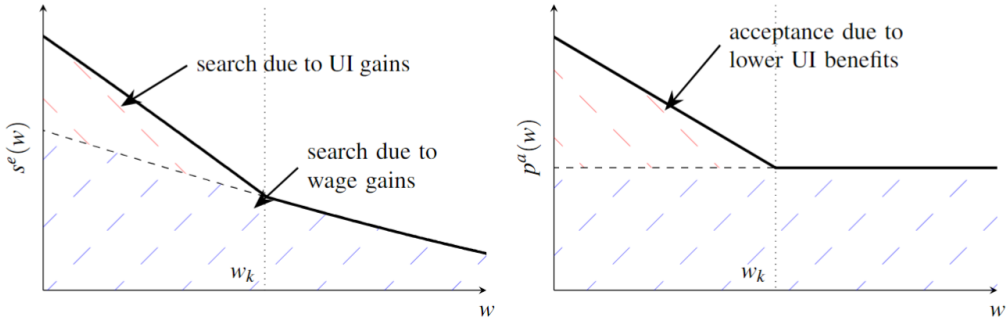

Figure: Illustration of search and acceptance at the kink

Both channels result in an upward kink in job-to-job transitions.
Translates to $\uparrow$ UI $\longrightarrow \downarrow$ JJ

Prediction: The kinked response is increasing in a workers unemployment risk

Employment-to-unemployment rate change with wages

Change in acceptance following λ^r shocks, result in a downward kink in the EU rate.

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Change in acceptance following λ^r shocks, result in a downward kink in the EU rate.

Suppose $\lambda^r = 0$, then $\delta_w(w)$ determines the effect on EU rate.

Show that

$\delta_w(w) < 0$ implies a downward kink in the EU rate
$\delta_w(w) > 0$ implies an upward kink in the EU rate

Alternative models

In a class of random search models, the kink in UI induces a kink in JJ and EU transitions. True in others

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1. Directed search models
   - UI distorts target wage below the kink
2. DMP models of endogenous separations
   - EU transition response works similar to λ^r shock
3. Bivariate offer distribution of w and δ
   - If workers move to sufficiently riskier jobs, downward kink in JJ rate

2. Empirical analysis

Empirical challenges

Three main empirical challenges to test model predictions:

1. Measuring outcomes: job mobility and job outcomes
   → Detailed Norwegian administrative panel data

2. Exogenous variation in *potential* benefits
   → Kink in Norwegian UI schedule

3. Heterogenous responses: unemployment risk
   → Predict unemployment risk using detailed firm-level data similar to Landais et al. 2021

Identification: Regression kink design

Empirical model: $Y = y(b(w), w, u)$

Y: outcome of interest (i.e., probability of job-to-job transition)

b(w): benefits, deterministic continuous function of earnings, kinked at $w = w_k$

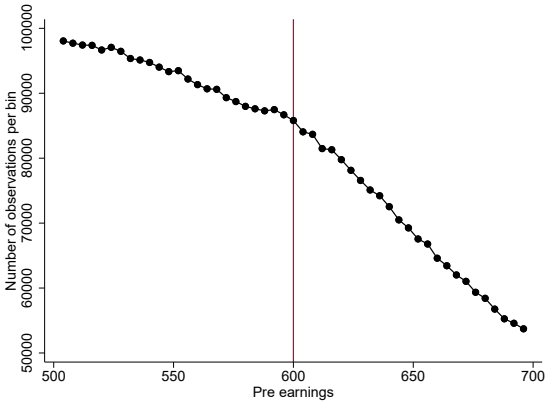
Parameter of interest: Marginal effect of benefits at the kink $\alpha_k = \partial y / \partial b$

Regression kink design (Card et al. 2015):

$$\partial y / \partial b = \frac{\overbrace{lim_{w \to w_k^+} \frac{\partial y}{\partial w} - lim_{\to w_k^-} \frac{\partial y}{\partial w}}^{\text{Slope change outcome variable}}}{\underbrace{lim_{w \to w_k^+} \frac{\partial b}{\partial w} - lim_{w \to w_k^-} \frac{\partial b}{\partial w}}_{\text{Replacement rate}}}$$

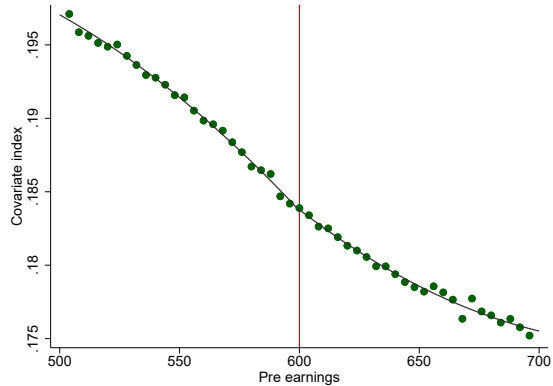
Assessing validity

Test for manipulation



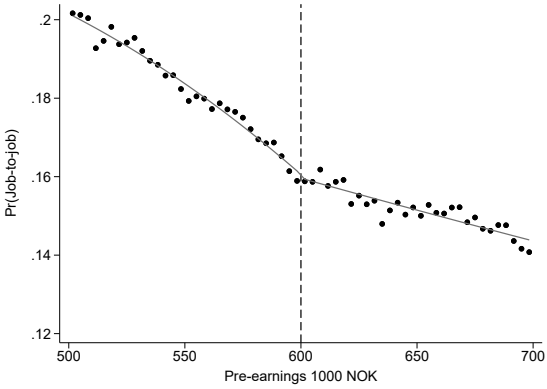
Density of pre earnings

Smoothness of observables

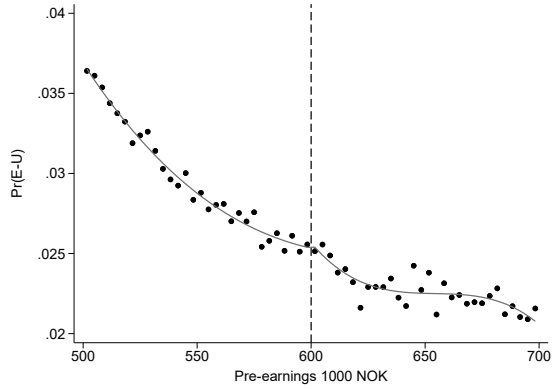


Covariate index

Graphical evidence at the threshold



JJ probability



EU probability

Main estimates

Table: RK Estimates: Mobility, Employment and Earnings Responses

	Pr(J-J)	Pr(Survival)	Pr(E-U)	Wage earnings$_{t+1}$
Slope change: $\hat{\gamma}_k$	0.022	-0.027	-0.007	13.36
	(0.008)	(0.011)	(0.004)	(4.915)
Marginal effect: $\hat{\alpha}_k$	-0.133	0.161	0.045	-0.81
	(0.051)	(0.065)	(0.020)	(0.297)
Number of observations	3,359,767	3,190,625	3,559,013	1,861,909

Standard errors (in parentheses) are clustered at the individual level. Optimal bandwidth as in Calonico et al. 2014

$\longrightarrow$ 1 % change in benefits, 0.13 percentage points reduction in job-to-job transitions

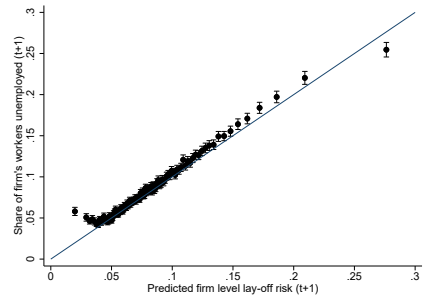
▸ Permutation test ▸ Bandwidth sensitivity ▸ Other measures of job quality

Heterogenous effects: Firm variation in unemployment risk

Search models predict the affect critically depends on unemployment risk in job

Predictive model of future unemployment risk

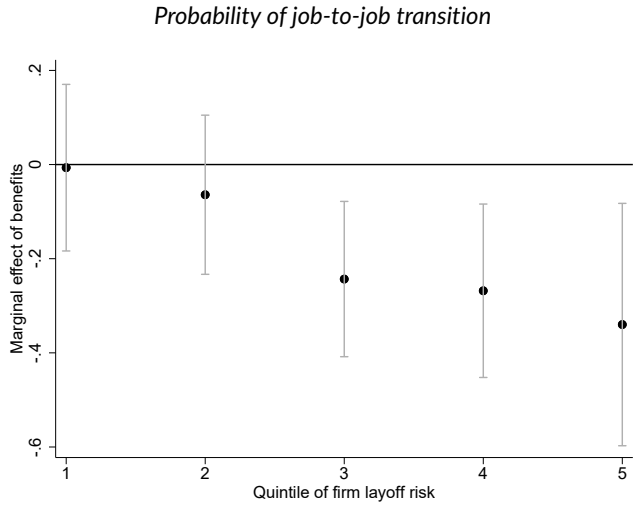
(Layoff-rates, employment change, size, indicator of financial distress)



Mean risk = 0.09

Adjusted R^2=0.16

Effect increasing in predicted unemployment risk



▸ EU heterogeneity

3. Implications for benefit reforms and optimal policies

Quantitative model

- Consider the implications for optimal policy. Use empirical effects to discipline model response to UI

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- Additions to the model from before:
  1. Vacancy creation with free entry (key for policy analysis)
  2. Risk aversion (and savings) (key for welfare analysis)
  3. Wage bargaining as in Elsby et al. (2022) (facilitates equilibrium analysis)

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- Make several parametric assumptions
  - CRRA utility function. Cost of search as in Christensen (2005).
    Beta distributions for productivity. Cobb-Douglas matching function.
    δ depends on productivity following Bagger and Lentz (2019).

Identification

We target the empirical JJ and EU marginal effects. Why?

- Disciplines model response to policy
- Conditional on other model parameters, identify curvature of utility function
- Identifies the role of reallocation vs search
- Allows us to assess whether we concurrently produce a sensible non-targeted UE response (and also non-targeted earnings response)

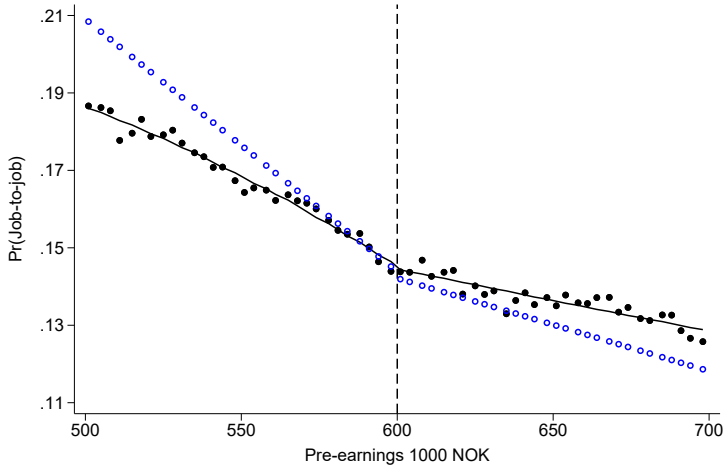
Calibration results

Table: Few estimated parameters and model fit

Structural Parameter	Values	Empirical moments	Model moments
Internally calibrated			
CRRA coefficient	α = 3.1		
		$\alpha_{jj} = -.13$	$\alpha_{jj} = -.10$
		$\alpha_{eu} = .05$	$\alpha_{eu} = .05$
Search efficiency:			
-unemployed	A^u = 0.8	$ue = .36$	$ue = .33$
-employed	A^e = 2.1	$jj = .17$	$jj = .17$
Untargeted moments			
El. unemployment duration w.r.t benefits		1.5	1.9
El. earnings w.r.t benefits		-0.08	-0.09

Empirical and model kink in JJ rate

Figure: Job-to-job transitions: Model prediction versus empirical evidence



Heterogeneous policy response

How does the kink estimate relate to policy. Optimality condition for worker search is:

$$\underbrace{\kappa'(s^e(w,b))}_{\text{marginal cost of search}} = \underbrace{\lambda \int_w^{\bar{w}} \overbrace{W(x,b)}^{\text{future job}} - \overbrace{W(w,b)}^{\text{current job}} dF(x)}_{\text{marginal gain from search}}$$

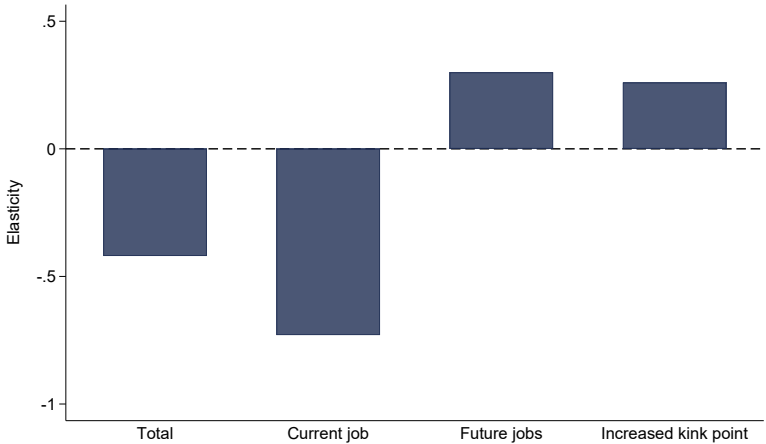
Effect of reform on search effort:

$$\frac{\partial s^e(w_k)}{\partial b} = \underbrace{-\eta^s(w_k)\frac{\partial W(w,b)}{\partial b}}_{\text{Effect from current job}} + \underbrace{\frac{\eta^s(w_k)}{1-F(w_k)} \int_w^{\bar{w}} \frac{\partial W(x,b)}{\partial b} dF(x)}_{\text{Effect from future jobs}}$$

, where $\eta^s(w_k) = \lambda[1-F(w_k)]/\kappa_s''$

Heterogeneous policy response

Figure: Job mobility response (percent) to a 1% increase in unemployment benefits



Implications

Table: Benefit reforms and optimal policy

A. Net fiscal costs	$\epsilon_{\tau,b}$ (1)	$\epsilon_{D,b}$ (2)	$\epsilon_{eu,b}$ (3)	$-\epsilon_{(w),b}$ (4)
1) No equilibrium effects	4.0	1.9	1.1	-.021
2) Full equilibrium effects	7.2	3.6	2.7	-.085
B. Counterfactuals	Baseline	Only U		Only E
1) Productivity, $\epsilon_{p,b}$	-0.28	-0.10		-0.06
2) Welfare, $\epsilon_{c,b}$	-2.8	-1.3		-0.3
C. Optimal policy	Baseline	Only U		Only E
1) Replacement rate v_k	43.06%	46.80%		49.61%
2) Earnings threshold w_k	3.9BA	4.3BA		4.6BA
3) Benefit at the kink, $b(w_k)$	2.4BA	2.9BA		2.9BA

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Conclusion

- Tested search model predictions of JJ and EU responses to UI, and considered the implications for policy
- Strong behavioural response from the employed, significantly reducing the optimal benefit level
- Implications for the nature job mobility $\longrightarrow$ outside option when workers switch jobs is a function of UI

Conclusion

- Tested search model predictions of JJ and EU responses to UI, and considered the implications for policy
- Strong behavioural response from the employed, significantly reducing the optimal benefit level
- Implications for the nature job mobility $\longrightarrow$ outside option when workers switch jobs is a function of UI
- Thank you!

Data

- Population-wide registers from Statistics Norway (2000-2014)
  - Matched employer/employee data and tax registry information
    → Annual transition probabilities, benefits received, and taxes paid
  - Workers' pre-earnings from the Norwegian Welfare Administration
    → Precise measure on workers *potential* UI-benefits
  - Detailed firm information:
    → Incl. income statements, bankruptcy petitions from the Norwegian Court Administration

- Main sample:
  - Employees of working age (18-62)
  - Period of stable UI scheme (2008-2014)

Permutation test

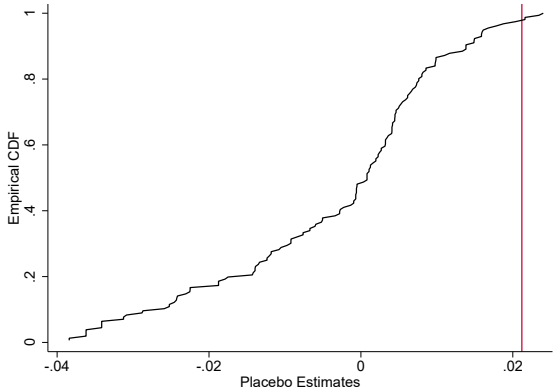

Figure: Permutation test

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Bandwidth sensitivity

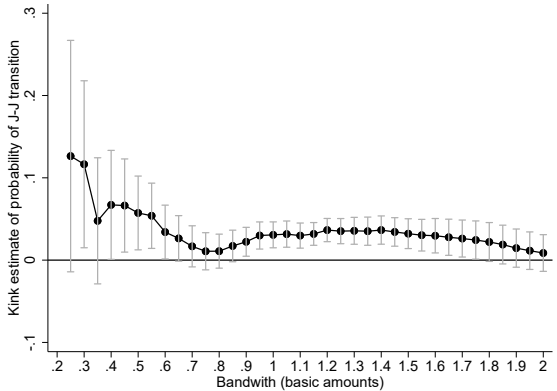

Figure: Bandwidth sensitivity

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Job quality

Table: RK Estimates: Wage earnings and firm "quality"

	Wage earnings$_{t+1}$ (1000 NOK) (1)	Firm rank (Sorkin, 2018) (2)	VA per worker (1000 NOK) (3)	Firm wage premium (AKM) (4)
Slope change: $\hat{\gamma}_k$	13.36 (4.915)	-0.004 (0.009)	0.137 (0.097)	-124.11 (126.56)
Marginal effect: $\hat{\alpha}_k$	-0.81 (0.297)	0.03 (0.055)	-0.01 (0.006)	7.51 (7.655)
N	1,861,909	2,001,579	1,844,011	1,968,013

Standard errors (in parentheses) are clustered at the individual level.

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EU heterogeneity

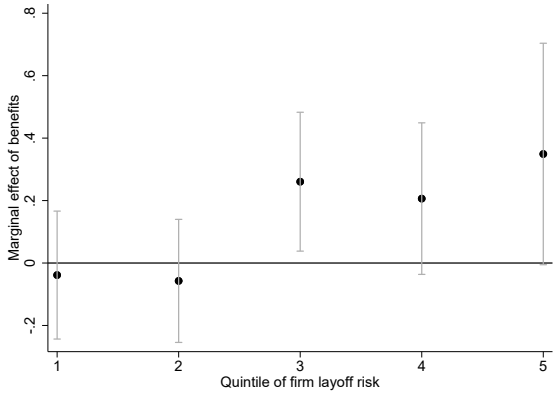

Figure: EU heterogeneity by unemployment risk

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