technische universität
dortmund

Lecture 4b: Endogenous effort and empirics of search and matching

Michael J. Böhm

Empirical Economics

Wintersemester 2025/26

Agenda

I. Extensions to the standard job search model
   - Job search effort as a choice variable

II. Empirical evidence on the job search model
   - Schmieder et al. (2012): *The Effects of Extended Unemployment Insurance over the Business Cycle: Evidence from RD Estimates over 20 years*, QJE.

III. Active labour market policies (ALMP) in job search
   - The importance and effects of ALMPs
   - Case Study: The Role of Caseworkers

IV. Job Search Process

Job search theory with endogenous effort

Job offer arrival rate depends on **choice of effort** e: $\lambda = \alpha e$

- $\alpha > 0$ as indicator of labour market conditions or person traits

Effort induce **cost** $\psi(e)$, with $\psi'(e) > 0$ and $\psi''(e) > 0$ (convex costs)

$\rightarrow$ Apart from ϕ, job seeker to determine **optimal search effort** e^*

Endogenous search effort does not change the fundamental structure of the stopping rule. For a *given level of e*, optimal ϕ is given by:

$$\phi = b - \psi(e) + \frac{\alpha e}{r + q} \int_{\phi}^{\infty} (w - \phi) dF(w)$$

Job search theory with endogenous effort

How do job seekers choose e^*? Since $V^u = \frac{\phi}{r}$, FOC of utility maxization is e for which $d\phi/de = 0$.

Properties (without derivations):

$$\frac{d\phi(\alpha, b)}{d\alpha} > 0, \quad \frac{de^*(\alpha, b)}{d\alpha} > 0$$

$$\frac{d\phi(\alpha, b)}{db} > 0, \quad \frac{de^*(\alpha, b)}{db} < 0$$

$\rightarrow$ Improvements of the labour market situation increases e and ϕ.
$\rightarrow$ Conversely, longterm unemployed (low α) may be less demanding but also discouraged and search little.
$\rightarrow$ Increase in benefits increases ϕ and lowers e

Job search - Empirical evidence

UI schemes present in all OECD countries

- UI as an insurance (usually) covering all dependent workers
- Eligibility (generally) dependent on workers' employment history prior to an unemployment spell
- Benefit duration s.t. contribution period & (sometimes) the worker's age
- Benefit level subject to previous earnings (capped at some threshold)
- Benefit receipt linked to some obligations (such as active job search)

Job search - Empirical evidence

Net replacement rates (benefits as percentage of previous net earnings)

- Germany: 60% (66% for those with children) over entire eligibility period
- USA: 54% over entire eligibility period
- Hungary: 49%; decreasing over eligibility period

Job search - Empirical evidence on the effect of UI benefits

(Non-stationary) job search model predicts

- Increase in benefit level to raise ϕ & prolong spells of unemployment
- Increase in benefit duration to raise ϕ & prolong spells of unemployment

If confirmed by empirics, UI design entails a tradeoff:

- Unemployment insurance (UI) generate welfare gains by offering insurance and consumption smoothing unlikely provided by private markets
- Yet, benefits may come at costs of distorting incentives to look for a job
- Threat of moral hazard effects

Job search - Empirical evidence on the effect of UI benefits

In recent years, renewed interest in effects of UI schemes on job seekers

- How does UI affect the duration of non-employment?
- How does UI affect post-employment wages/the duration of the new job?
- Should the potential benefit duration (PBD) vary over the business cycle?

$\rightarrow$ We focus on effects of the PBD

Job search - Empirical evidence

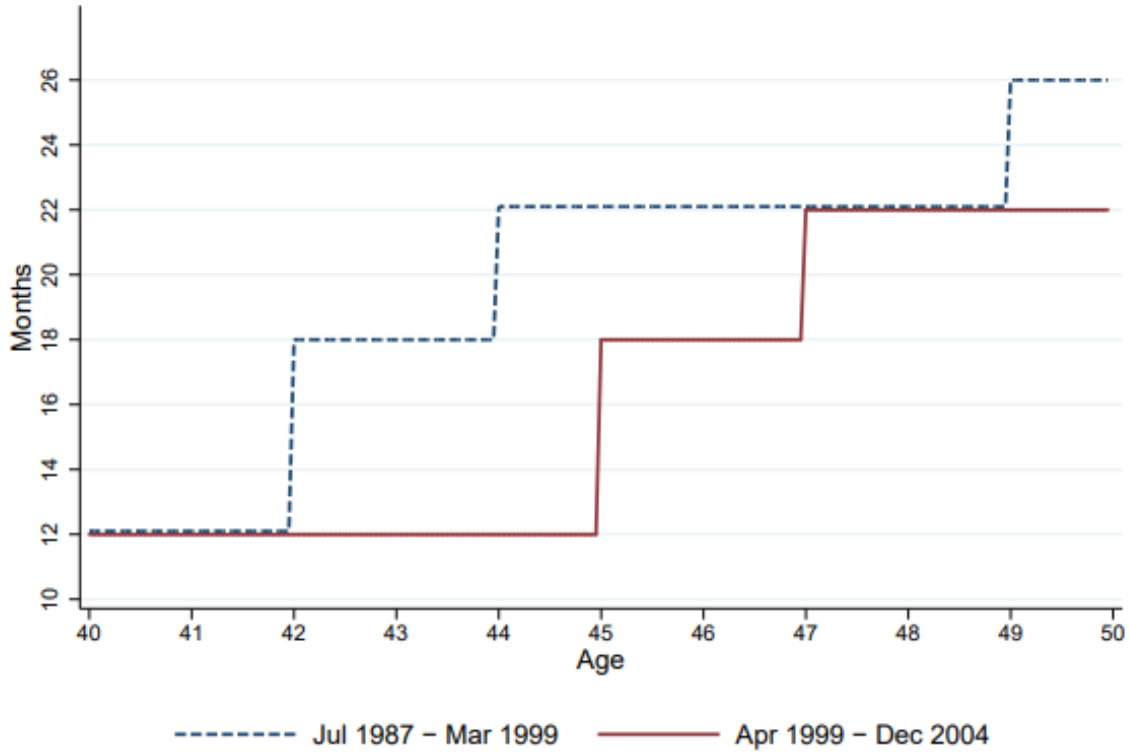
Schmieder et al. (2012): Effects of extended UI over the business cycle

a. Investigate effects of PBD on benefit receipt & non-employment
b. Test whether responses vary over business cycle

Approach: RDD using universe of GER unemployed (1987-2004)

- GER UI scheme generate large differences in PBD by exact age
- PBD for unemployed aged 41(42): 12(18) months

Job search - Empirical evidence



Notes: The figure shows how potential unemployment insurance (UI) durations vary with age and over time for unemployed individuals workers who had worked for at least 52 months in the last 7 years without intermittent UI spell.

Job search - Empirical evidence

Institutional setting and data allow estimation of RDD

$$y_{ia} = \beta_0 + \beta_1 D_{a \geq a^*} + f(a) + e_{ia}$$

- y_{ia}**:** outcome variable of individual i aged a (measured in months)
- $D_{a \geq a^*}$**:** dummy variable indicating that an individual is above the age threshold a^*
- $f(a)$**:** linear function of age (allowing different slope on both sides of the threshold)

Identifying assumption of RDD:

- All variables other than the treatment vary continuously at age threshold
- If true, β_1 yields causal estimate as $f(a)$ captures the effect of other factors

Job search - Empirical evidence

Testing the identifying assumption

	(1) Years of Education	(2) Female	(3) Foreign Citizen	(4) Tenure Last Job	(5) Occupation Tenure Last Job	(6) Industry Tenure Last Job	(7) Wage Last Job
D(age>=42)	0.027	0.0056	0.0023	-0.010	-0.038	-0.017	0.28
	[0.014]	[0.0028]*	[0.0021]	[0.028]	[0.036]	[0.016]	[0.21]
Observations	452749	452749	452749	452749	452749	452749	418667
D(age>=44)	-0.0092	0.00016	-0.00088	-0.045	-0.052	-0.023	0.078
	[0.013]	[0.0028]	[0.0024]	[0.029]	[0.037]	[0.017]	[0.20]
Observations	450280	450280	450280	450280	450280	450280	413874
D(age>=49)	0.026	0.010	-0.000038	-0.0072	-0.070	-0.011	-0.12
	[0.014]	[0.0036]**	[0.0034]	[0.034]	[0.045]	[0.021]	[0.26]
Observations	329680	329680	329680	329680	329680	329680	292706

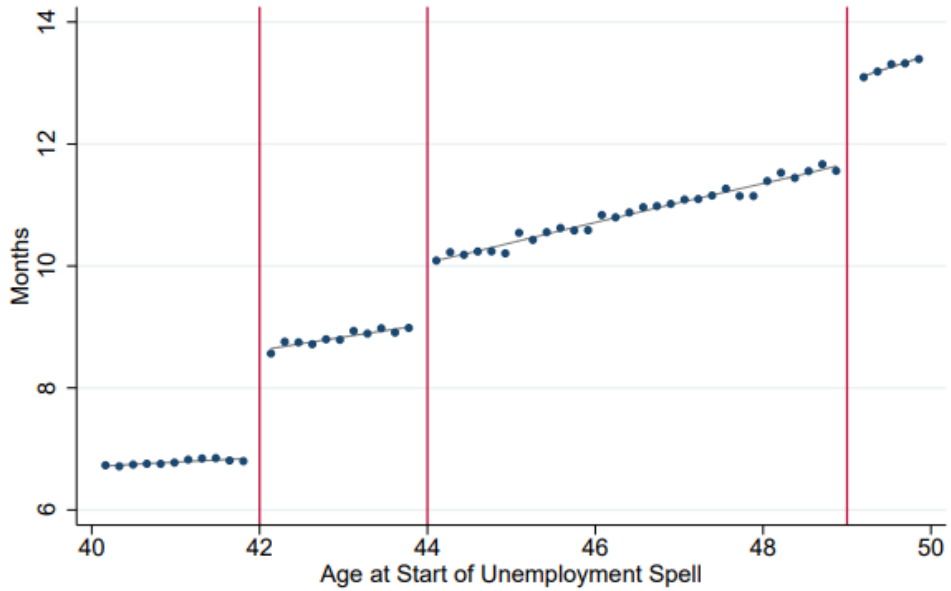
Notes: The coefficients estimate the magnitude of the change in the dependent variable at each age threshold. Each coefficient is estimated in a separate RD regression that controls linearly for age using different slopes on each side of the cutoff and bandwidth of two age years. Standard errors (in parentheses) are clustered at the day level (* P<.05, ** P<.01).
The sample consists of individuals starting unemployment spells between July 1987 and March 1999, who had worked for at least 52 months in the last 7 years without intermittent UI spell. Last job refers to the last job prior to starting the unemployment insurance spell. Means are shown in Appendix Table A-1.

Little evidence for discontinuities in observables at cutoff values

- 2 out 21 coefficients significant (yet of small size)

Job search - Empirical evidence

Baseline results - Effects of UI benefits on unemployment receipt



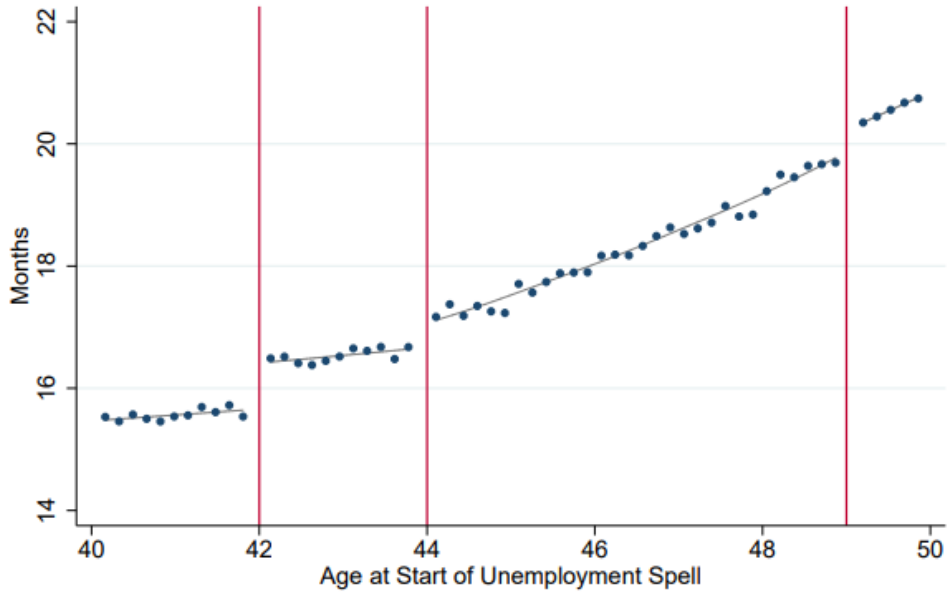
(a) Actual UI Duration

Key message: Length of UI receipt increases substantially at thresholds

- Avg. duration on benefits for unemployed below 42: 6.8 months
- Avg. duration on benefits for unemployed aged 42: 8.5 months

Job search - Empirical evidence

Baseline results - Effects of UI benefits on non-employment duration



(b) Nonemployment Duration

Length of PBD also increases the duration of non-employment

- Avg. non-employment duration for workers aged 41(42): 15.6(16.4) months

Job search - Empirical evidence

Rescaling results, effects stronger for duration of UI receipt

- For one additional month of PBD, UI receipt ↑ by 9-12 days
- For one additional month of PBD, non-employment duration ↑ by 3 days (clean incentive effect)

→ Significant fraction of workers remains non-employed after benefit exhaustion

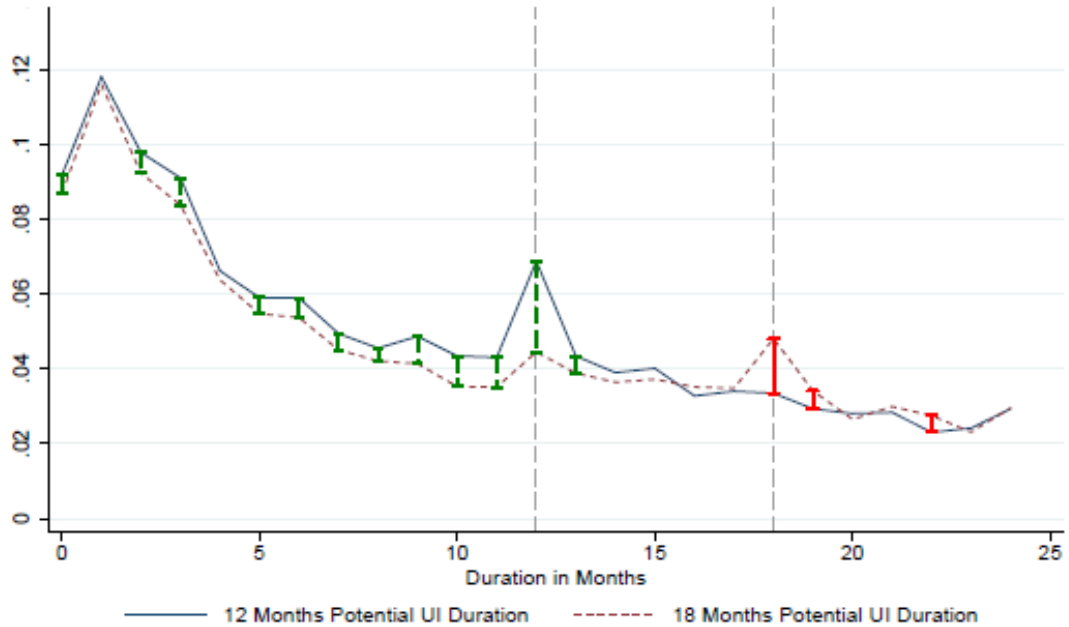
→ These unemployed directly benefit from a benefit extension

For example, 28% of unemployed left of 42 cutoff exhaust their benefits.

Among the exhaustees, only 8% enter employment, majority non-employment.

Job search - Empirical evidence

However, non-employment effect (decline in hazard rate) not limited to shift at exhaustion point



→ When eligible for longer PBD, unemployed adjust search behavior

→ Reduced search to lower hazard rates at any point in time

Job search - Empirical evidence

Results suggest a trade-off for policy makers:

- Increase in PBD has disincentive effects ($\downarrow$ exit from non-employment)
- Provides additional welfare to those who would otherwise exhaust benefits

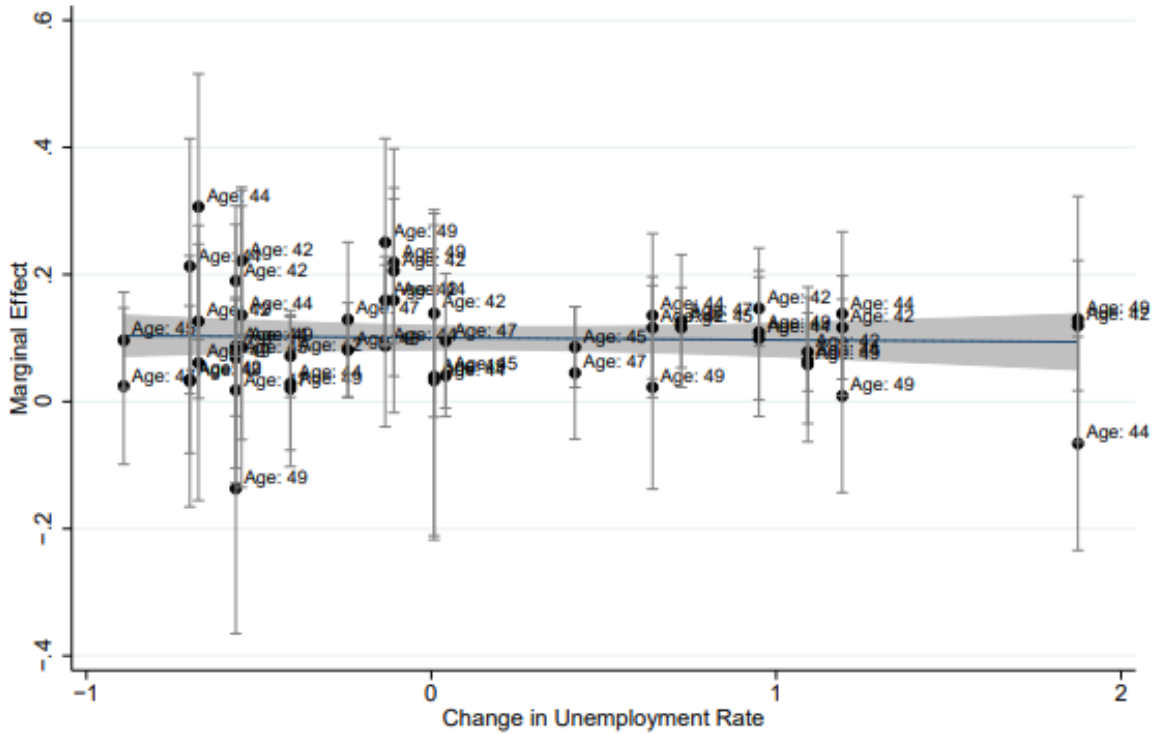
Should UI generosity thus vary over the business cycle?

- Threat of benefit exhaustion higher during recessions
- Threat of moral hazard behavior potentially lower

Authors estimate baseline effects for each year & correlate effects with measures of the business cycle (changes in the unemployment rate)

Job search - Empirical evidence

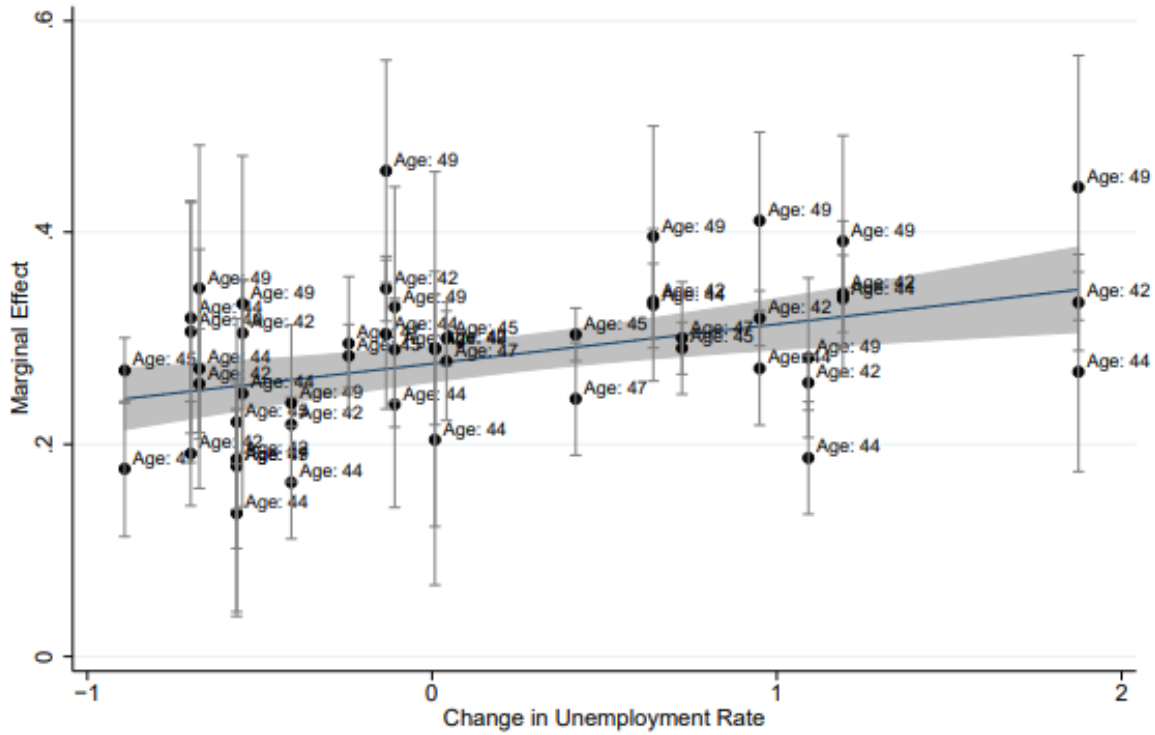
Effects of PBD on non-employment duration stable over business cycle



(a) Effect of Pot. UI Durations on Nonemployment Durations $\frac{dD}{dP}$ vs. Change in Unemployment Rate

Job search - Empirical evidence

Effects of PBD on duration of UI receipt increasing with unemployment



(b) Effect of Pot. UI Durations on Actual UI Durations $\frac{dB}{dP}$ vs. Change in Unemployment Rate

Mostly driven by unemployed individuals who would have exhausted PBD

Job search - Empirical evidence

Welfare inverse to "disincentive effect":

$$\frac{\text{effect on nonempl duration}}{\text{effect on UI receipt duration}} \hat{=} \frac{\text{behavioral response, moral hazard}}{\text{insurance, consumption smooting}}$$

Ratio of two effects is counter-cyclical

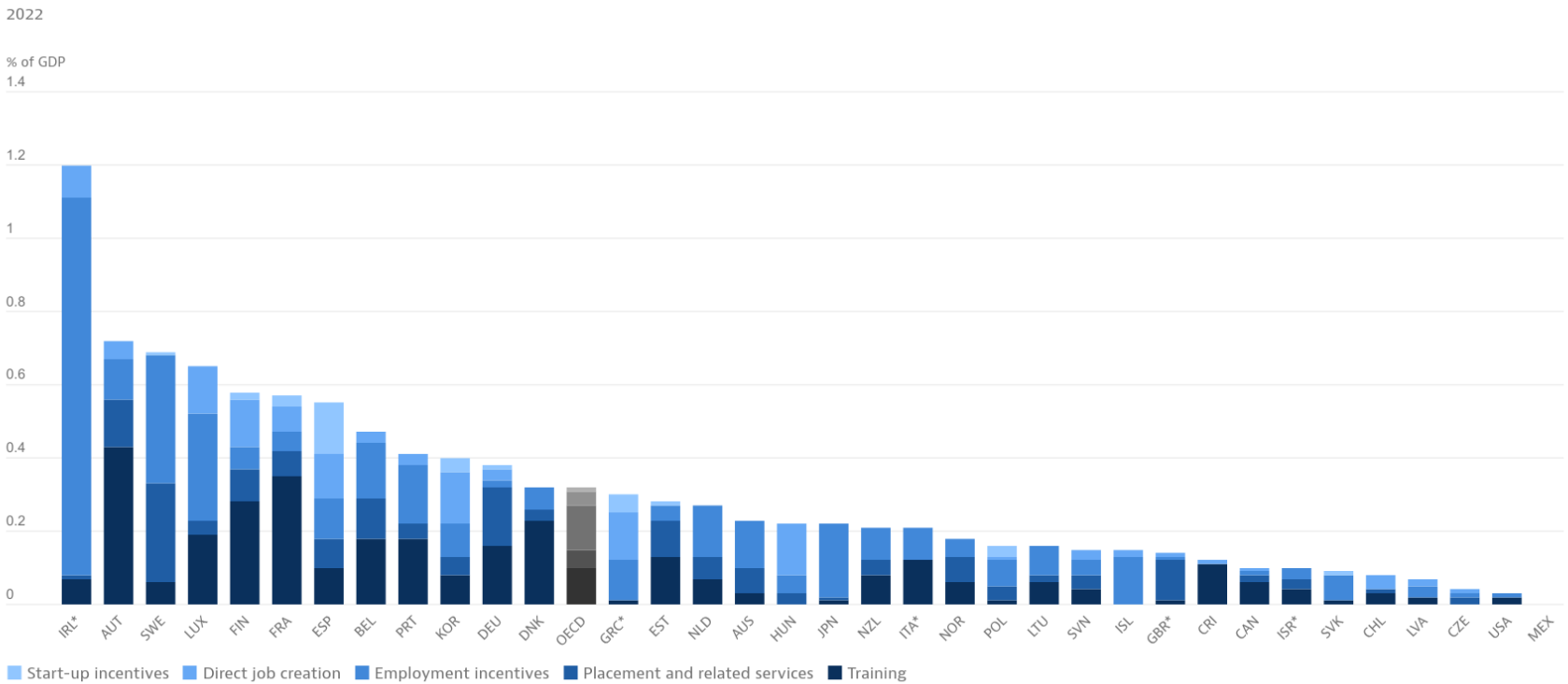
- Indicates that optimal UI should be more generous in recessions
- In recessions, welfare gains from additional coverage for those at risk of exhausting benefits exceed costs due to moral hazard behavior

Job search - Empirical evidence

Level and duration of benefits as *passive* labour market instruments
***Active* labour market policies as additional measures to help find work**
Examples of ALMPs:

- Counseling
- Training/Further education
- Re-employment subsidies
- Moving subsidies
- Job search requirements
- Sanctions

Job search - Empirical evidence



* Relates to a less-recent year.

Source: The OECD Going Digital Toolkit, based on the OECD Labour Market Programmes Database.
The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

OECD Going Digital Toolkit

Job search - Empirical evidence

Do ALMPs work? - A meta-regression analysis (Card et al., 2018)

- Systematic evaluation of around 200 studies analyzing effects of ALMP

Key findings of meta-analysis:

- Average impact of an ALMP close to zero in the short run
- However, positive effects 2–3 years after completion of program
- ALMPs emphasizing human capital accumulation larger effects
- Effects of ALMPs larger for females and long-term unemployed

Job search - Empirical evidence

Schiprowski (2020): The Role of Caseworkers in Unemployment Insurance: Evidence from Unplanned Absences, *Journal of labor Economics*.

Job search - The Role of Caseworkers

Research Questions:

(1) How do meetings with the caseworker affect unemployment duration?

(2) What is the importance of caseworker quality?

Data:

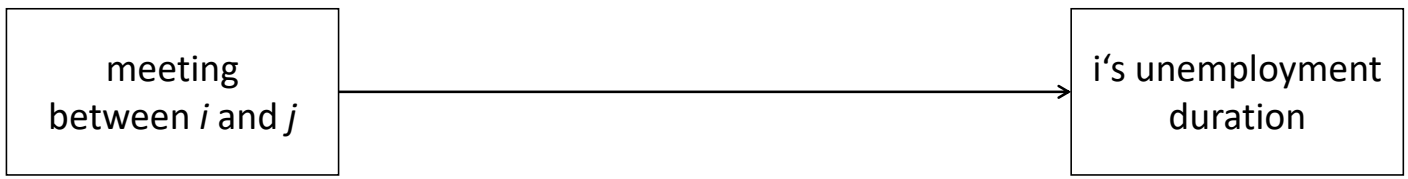
Full-population registers from Swiss unemployment insurance, 2010-2012
N=379,358.

Research Design:

Quasi-experiment: incidence of unplanned caseworker absence

Empirical Design: Intuition

Consider job seeker *i* assigned to caseworker *j*:

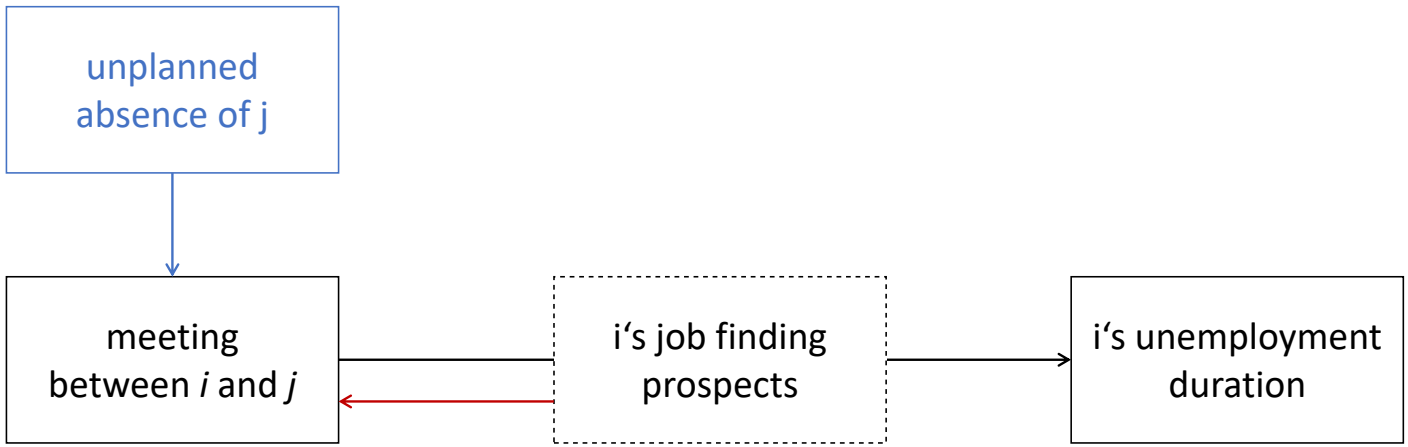


Empirical Design: Intuition

Consider job seeker *i* assigned to caseworker *j*:

Empirical Design: Intuition

Consider job seeker *i* assigned to caseworker *j*:

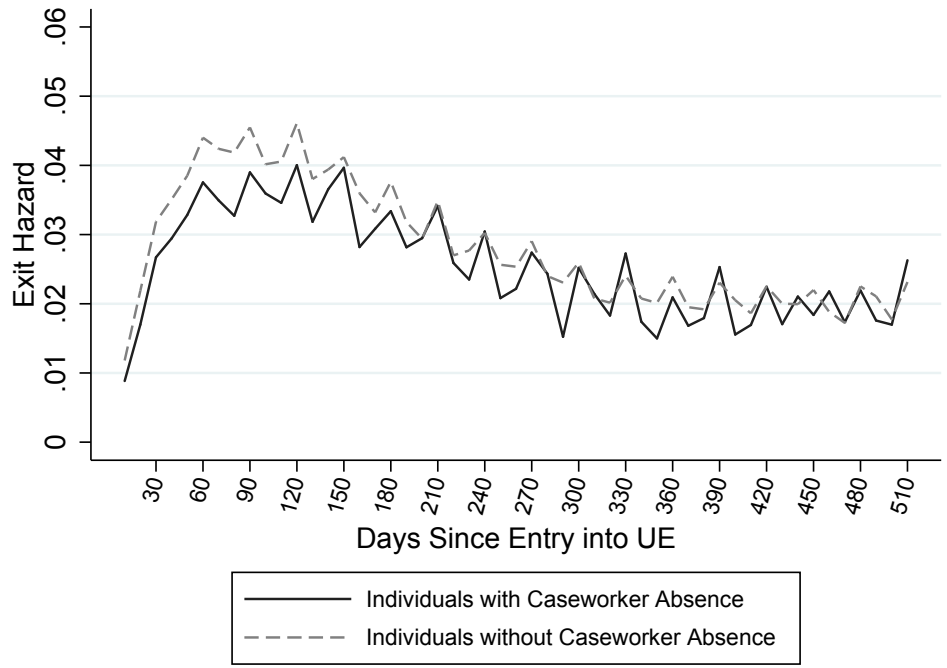


Identification relies on **within-caseworker variation** in absences

Estimated effect: Local average treatment effect (LATE)

Caseworker Absence and Unemployment Exit: Raw Data

Figure 1: **Unemployment Exit Hazard**



Solid line: job seekers whose caseworker is absent $>$1 week in first 6 months after UE.

Econometric Model

Instrumental Variables Framework:

$$Meet_{i(j)} = \theta Absence_{j(i)} + \rho_j + \lambda_t + X_i'\beta + u_i$$

$$y_i = \delta Meet_{i(j)} + \pi_j + \eta_t + X_i'\gamma + v_i$$

- $Meet_{i(j)}$: No. of meetings between individual i and her caseworker j

  (during first 6 months)
- $Absence_{j(i)}$: Caseworker j is absent $>$ 1 week (during first 6 months)
- ρ_j/π_j: Caseworker fixed effects
- λ_t/η_t: Month fixed effects
- X_i: Job seeker covariates

Econometric Model

$\hat{\delta}$: effect of one more meeting with caseworker j, due to j's presence

- Informs on effect of the meeting on compliers
- Relative effect, due to partial replacement

Identification

Identifying variation: within-caseworker variation in absences

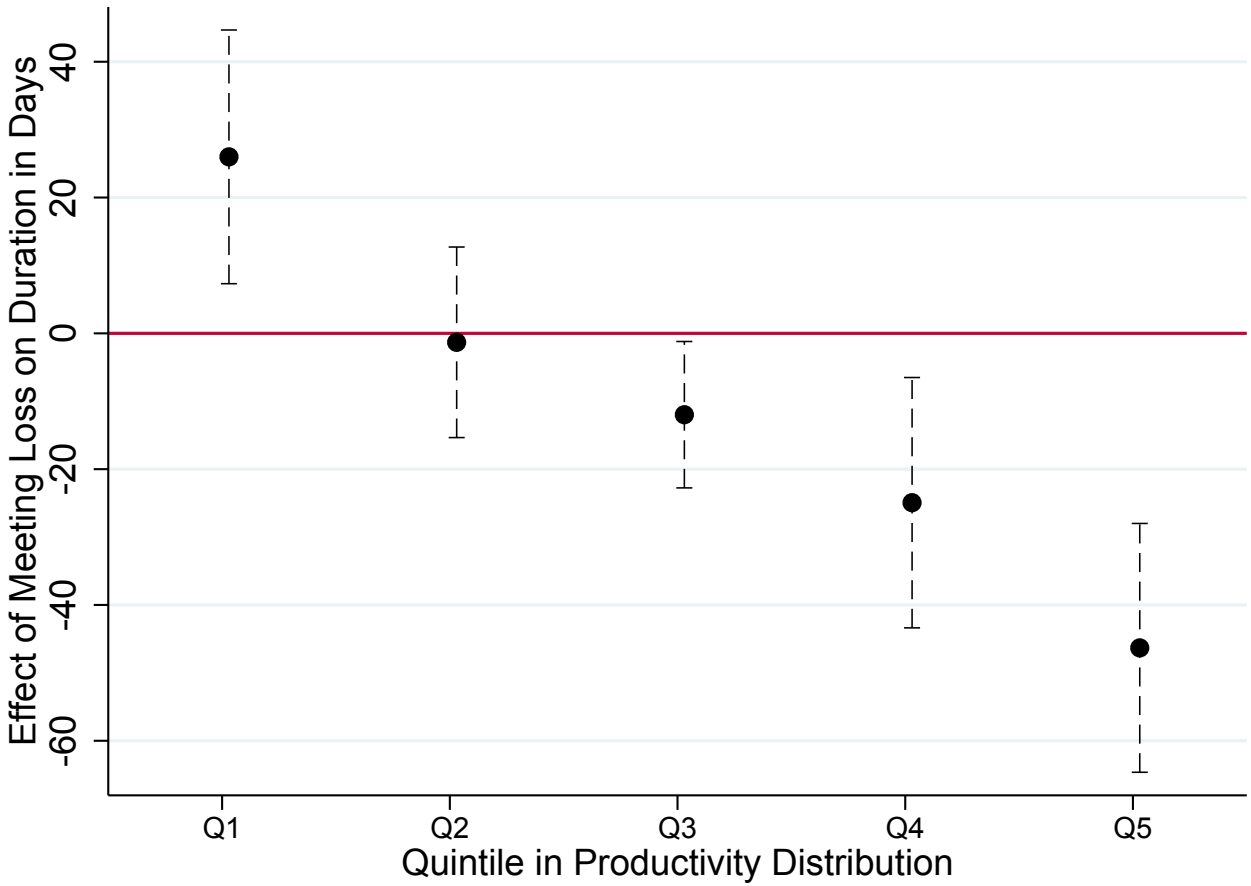
- **Intuition:** compare two job seekers assigned to the same caseworker at different points in time
- **Assumption:** from a given job seeker's perspective, timing of caseworker absence is quasi-random
- **Checks:**
  - Do absences respond to observable job seeker characteristics?
  - Placebo: Do current outcomes respond to future absences?

Baseline Effects

	Meetings with Assigned CW	Duration of UE in Days	
	First Stage	Reduced Form	2SLS
Absence	-0.473***	5.484***	
	(0.039)	(1.957)	
Meetings with Assigned CW			-11.604***
			(4.167)
F-Stat (Weak ID)			144.66
Outcome Mean	2.86	218.02	218.02
N	379358	379358	379358

*$p < 0.10$,** $p < 0.05$,*** $p < 0.01$. Standard errors are clustered at the caseworker level (N=2250).

Quality Matters



Conclusions

Unemployment as an economic and social problem

- E.g., reduces income; affects physical and mental health of the affected

Sources of unemployment manifold

- Seasonal/Frictional/Cyclical/Structural unemployment

Beveridge curve illustrates flexibility of labour markets

- By relating vacancy and unemployment rates

Job search theory: Individuals' behavior absent perfect information

- Job seeker chooses ϕ that maximizes intertemporal utility
- Unemployment duration as an increasing function of ϕ
- Reservation wage & unemployment duration to increase with benefit level

Conclusions (ii)

Theoretical insights on job search behavior and UI benefits:

- Size and length of unemployment benefits affect job seekers' reservation wage and the duration of non-employment

Empirical insights:

- Evidence of moral hazard behavior of job seekers
  $\rightarrow$ Longer benefit duration to increase duration of non-employment
- Moral hazard effects vs. welfare benefits from more generous UI
  $\rightarrow$ For those at risk of exhausting benefits
- Optimal UI may vary with business cycle conditions
- (Some) ALMPs as suitable instruments to fasten re-integration into work
- Caseworker are important intermediaries

Further readings

- Schmieder et al. (2012): The Effects of Extended Unemployment Insurance over the Business Cycle: Evidence from RD Estimates over 20 Years, QJE.
- Card et al. (2018): What Works? A Meta Analysis of Recent Active Labor Market Program Evaluations, JEEA.
- Schiprowski, A. (2020). The role of caseworkers in unemployment insurance: Evidence from unplanned absences. Journal of Labor Economics.