Benefit Duration, Unemployment Duration and Employment Stability: A Regression Discontinuity Approach

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Introduction I

- The generosity of the UI system plays a central role for the job search behavior of unemployed individuals
- A comparison of benefit schemes in different countries shows a correlation between unemployment and potential duration of unemployment benefits (Nickell and Layard, 1999)
- The disincentive effect of UI is conventional wisdom in modern labor economics
- Fails to take into account the potential benefical effects of UI on post-employment outcomes
- By allowing more time and more resources for search, UI may improve job matching

Introduction II

- Also within countries we observe differences in the generosity of UI for different groups
- In this paper we make use of sharp discontinuities in the maximum duration of benefits in Germany at different ages to evaluate the effect of UI on:
  - unemployment duration
  - subsequent employment duration - as a measure of employment stability

Theoretical Arguments and Evidence I

- Standard search theory predicts that an increase in UI benefit generosity has a negative impact on job search activities and leads to increased unemployment duration
  - unemployed exert lower search effort as the utility of being unemployed is higher and they choose higher reservation wages
  - closer to the time of benefit exhaustion the value of unemployment drops:
    - marginal benefit of search increases and reservation wage falls
    - higher exit rate out of unemployment (Mortensen, 1977; Burdett, 1979; van den Berg, 1990)
- Many empirical studies show positive relationship between benefit duration and unemployment duration
  - Meyer 1990; Katz and Meyer 1990; Hunt 1995; Lalive 2008; Lalive and Zweimueller 2004; Lalive, van Ours and Zweimueller 2006; van Ours and Vodopivec 2006

Theoretical Arguments and Evidence II

- Despite the disincentive effect, UI benefit generosity may allow individuals - by providing more time and more resources - to wait for job offers which are better either in terms of re-employment wages or employment stability
  - the overall effect on unemployment is ambiguous
- The Macro literature has pointed to the positive effects of UI:
  - Burdett (1979): "search subsidy"
  - Marimon and Zilibotti (1999); Acemoglou and Shimer (1999): "job matching"
  - Hansen and Imrohoroglou (1992); Gruber (1997): "consumption smoothing"

Theoretical Arguments and Evidence III

The empirical literature has considered two outcomes:

- Wages
  - Ehrenberg and Oaxaca (1976), Classen (1977); Addison and Blackburn (2000)
- Employment duration
  - Belzil (1992, 1995, 2001) using Canadian data
  - Centeno (2004) using US data
  - van Ours and Vodopivec (2008) using Slovenian data
  - Tatsiramos (2008) focusing on eight European countries

Main Contribution

- We use sharp discontinuities in the maximum duration of benefit entitlement with respect to age to study both the search behavior during unemployment and the effect on job match quality
- First study based on an age-based RD design that looks at the job match quality question

Institutional Background I

- The amount of unemployment benefits depends on family status and previous average wages: 67% with and 60% without children
- Maximum duration of unemployment benefits depends on previous employment duration and age
- After entitlement period has expired: principally unlimited and means-tested unemployment assistance
- We make use of the variation between age groups in our observation period (inflow sample of 2001–2003)

Institutional Background II

Table: Benefit Entitlement

Length of Benefit Entitlement (in months)	Age (in years)	Months worked in last 7 years
6	-	12
8	-	16
10	-	20
12	-	24
14	45	28
16	45	32
18	45	36
20	47	40
22	47	44
24	52	48
26	52	52
28	57	56
30	57	60
32	57	64

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24	52	48
26	52	52
28	57	56
30	57	60
32	57	64

Sample I

- Inflow sample into unemployment 2001-2003, Integrated Labor Market Biographies (IEB)
- Information on employment history, unemployment, participation in ALMP, occupational information, socio-demographic variables (age, marital status, number of children, education etc.)
- Two states: Unemployment and Employment
- Single spells
- Unemployment includes participation in ALMP like training and wage subsidies
- Employment: regular employment (subject to social security contributions), no self-employment
- Men from West Germany aged between 44-46

Sample II

Table: Number of Observations - Below and Above the Thresholds

	Version A		Version B	
	Below	Above	Below	Above
Age Threshold				
45 years	1763	1639	1622	1475
47 years	1428	1409	1311	1267
52 years	1198	1139	1108	1026
57 years	816	1153	761	1030

Note: These are the observations conditional on having been employed for 36/44/52/64 months in the last seven years. In version A groups are defined directly around the threshold, in version B around the threshold minus 0.1 years.

Sample III

Table: Number of Transitions

	Exits	Censored
From UE to Employment		
N	2,546	856
%	74.8	25.2
From E to Unemployment		
N	1,011	1,535
%	39.7	60.3

Econometric Approach I

- Assignment to treatment (extended benefit duration) is completely determined by age: sharp regression discontinuity design.
- Identification Assumption: no selection into treatment / smoothness of conditional regression function around threshold
- Any discontinuity of the conditional distribution of the outcome variable as a function of age at the threshold is interpreted as the causal effect of the treatment.
- Average causal effect of the treatment at the discontinuity point:

$$ATT = E[Y_i(D = 1) - Y_i(D = 0)|Age = c]$$

Econometric Approach II

(1) Linear regression:

$$Y_i = \alpha_0 + \alpha_1 X_i + \mu_1 D_i + \beta_0(1 - D_i)(Age_i - Age_0) + \beta_1 D_i(Age_i - Age_0) + \varepsilon_i$$

Y_i: Number of months in unemployment

Caveats of this approach:

- Many right censored observations
- Dynamic selection not taking into account

(2) Bivariate duration model:

$$\lambda_{ue}(t) = \lambda_{u0}(t)\exp(\alpha_{u0} + \alpha_{u1} X_i + \mu_u D_i + \beta_{u0}(1 - D_i)(Age_i - Age_0) + ... + \gamma_{iu}) \quad (1)$$

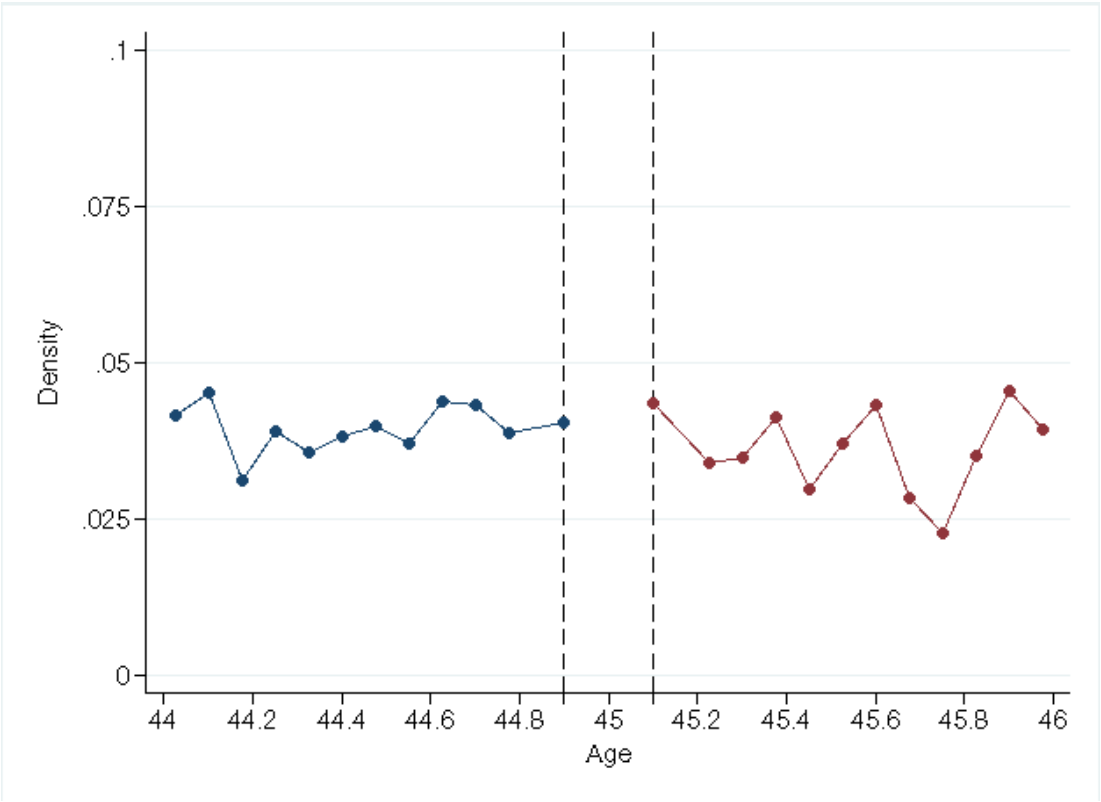
$$\lambda_{eu}(t) = \lambda_{e0}(t)\exp(\alpha_{e0} + \alpha_{e1} X_i + \mu_e D_i + \beta_{e0}(1 - D_i)(Age_i - Age_0) + ... + \gamma_{ie}) \quad (2)$$

Identification Issues

- Firms and workers may alter the timing of layoffs leading to non-random selection around the threshold
- We compare the inflow at different age groups around the threshold
- We examine the characteristics of job losers below and above the threshold

Inflow into Unemployment around Threshold

Figure: Density of Forcing Variable



Descriptives Around Threshold

Table: Selected Descriptives and *t*-Test of Mean Equality

Age Group	45 years		
	Below	Above	*p*-value
N	1763	1639	
Age (in years)	44.49	45.50	0.00
Married	0.63	0.65	0.23
Non-German	0.10	0.09	0.80
Migration background	0.04	0.03	0.15
Children $\leq$ 10 years	0.17	0.15	0.10
School Degree			
No degree	0.08	0.09	0.51
Low	0.60	0.60	0.96
Medium	0.15	0.14	0.25
High	0.16	0.17	0.59
Apprenticeship (yes)	0.81	0.79	0.22
University Degree (yes)	0.12	0.13	0.70

Note: *p*-value for t-test of mean equality between above/below age groups.

Descriptives Around Threshold

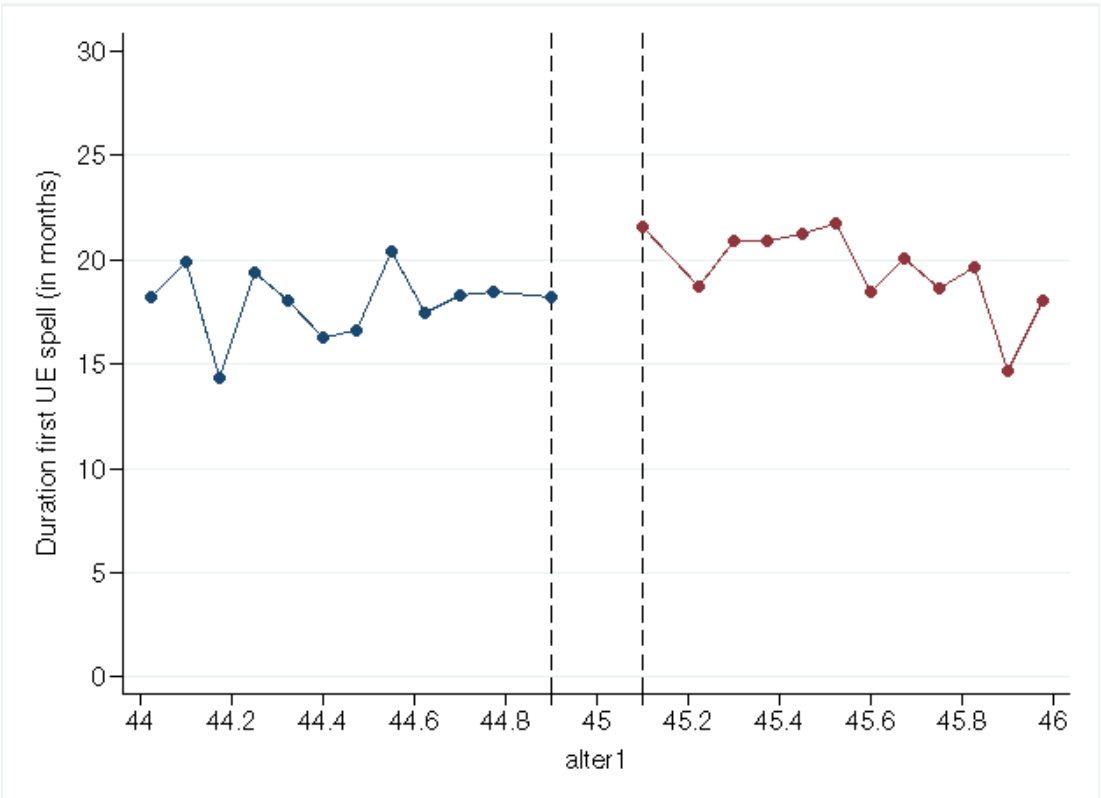
Table: Selected Descriptives and *t*-Test of Mean Equality (contd.)

Age Group	45 years		
	Below	Above	*p*-value
N	1763	1639	
Occupational Group			
Agriculture, Other	0.03	0.03	0.38
Manufacturing	0.48	0.49	0.57
Technical Occupations	0.06	0.06	0.75
Services	0.43	0.41	0.47
Labor Market History			
Last daily income (in Euro)	76.24	76.79	0.67
Employment last 3 years (in months)	30.64	30.75	0.67
Employment last 4-7 years (in months)	38.92	39.29	0.36
Unemployed last 7 years (in months)	5.35	5.32	0.92
Year cohort			
2001	0.28	0.28	0.69
2002	0.35	0.34	0.39
2003	0.37	0.38	0.63

Note: *p*-value for t-test of mean equality between above/below age groups.

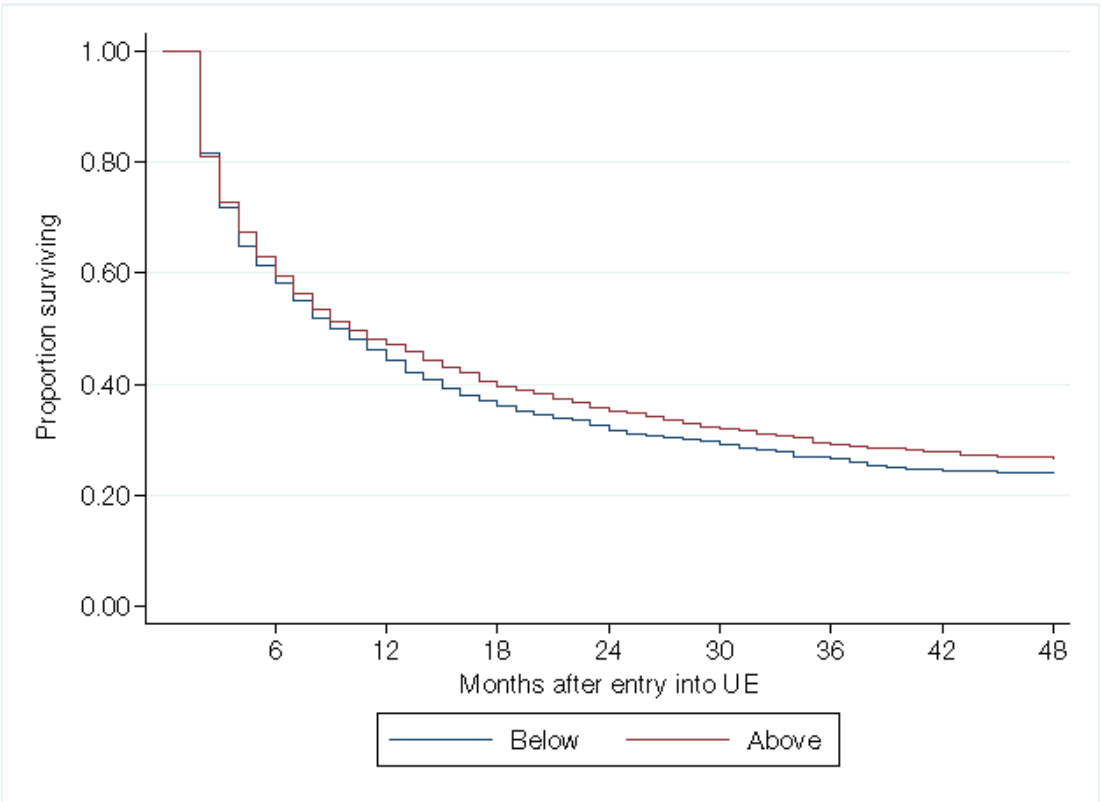
Unemployment Duration by Age

Figure: Duration of First UE Spell (in months)



Survival Functions

Figure: Survival Functions - Below/Above 45 years Threshold



Linear Regression Results I

Table: Linear Regression Results - Unemployment

	Coef.	s.e.	Coef.	s.e.
Treatment Effect	2.497	1.150 **	2.099	1.129 *
Education				
Lower Secondary School			-2.343	0.924 **
Middle Secondary School			0.669	1.102
Upper Secondary School			0.480	1.343
Apprenticeship			-2.229	0.744 ***
University			-0.679	1.150
Demographics				
Married			-2.576	0.534 ***
Children under 10 years			-0.053	0.697
Non National			1.475	0.862 *
Migrant			-1.568	1.346
Labor Market History				
Last daily income			-0.025	0.008 ***
etc. ...				

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Linear Regression Results II

Table: Linear Regression Results - Employment

	Coef.	s.e.	Coef.	s.e.	
Treated	0.427	1.123	0.028	1.194	
Treated * (PUD 4-6)			0.718	1.245	
Treated * (PUD 7-9)			0.411	1.519	
Treated * (PUD 10-12)			6.563	1.953	***
Treated * (PUD 13-15)			0.714	1.970	
Treated * (PUD 16-18)			2.161	2.129	
Treated * (PUD 19-21)			0.579	2.827	
etc. ...					
(PUD 4-6)			-3.286	0.846	***
(PUD 7-9)			-4.481	1.061	***
(PUD 10-12)			-7.048	1.268	***
(PUD 13-15)			-4.480	1.255	***
(PUD 16-18)			-8.603	1.537	***
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Discrete-Time Logistic Hazard Estimates I

Table: Discrete-Time Logistic Hazard Estimates - Unemployment Transition

	Without UH				With UH	
	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.
Treated	-0.178	0.10*				
Treated * t(1-3)			-0.165	0.117	-0.223	0.152
Treated * t(4-6)			-0.184	0.138	-0.277	0.170
Treated * t(7-9)			-0.060	0.161	-0.151	0.192
Treated * t(10-12)			-0.378	0.198 *	-0.481	0.227 **
Treated * t(13-15)			-0.503	0.202 **	-0.656	0.233 ***
Treated * t(16-18)			-0.036	0.217	-0.198	0.249
etc. ...						
Duration Dependence						
t(4-6)	-0.414	0.062 ***	-0.406	0.085 **	-0.207	0.099 **
t(7-9)	-0.769	0.075 ***	-0.819	0.104 ***	-0.489	0.135 ***
t(10-12)	-1.224	0.093 ***	-1.129	0.123 ***	-0.698	0.167 ***
t(13-15)	-1.135	0.095 ***	-0.986	0.123 ***	-0.431	0.188 **
t(16-18)	-1.238	0.105 ***	-1.304	0.150 ***	-0.629	0.222 ***
etc. ...						

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Discrete-Time Logistic Hazard Estimates II

Table: Discrete-Time Logistic Hazard Estimates - Employment Transition

	Without UH				With UH	
	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.
Treated	-0.122	0.151	-0.094	0.168	-0.132	0.185
Treated * (PUD 4-6)			-0.001	0.166	0.003	0.181
Treated * (PUD 7-9)			0.040	0.218	-0.010	0.236
Treated * (PUD 10-12)			-0.809	0.315 ***	-0.931	0.343 ***
Treated * (PUD 13-15)			-0.123	0.325	-0.212	0.345
etc. ...						
Previous Unemp. Duration						
(PUD 4-6)	0.258	0.083 ***	0.257	0.111 **	0.354	0.133 ***
(PUD 7-9)	0.237	0.110 **	0.215	0.157	0.378	0.190 **
etc. ...						
Duration Dependence						
t(4-6)	0.461	0.113 ***	0.464	0.113 ***	0.486	0.115***
t(7-9)	0.948	0.109 ***	0.953	0.109 ***	1.007	0.114 ***
etc. ...						

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Conclusions

- We find evidence of a significant positive effect of extended benefit duration on employment stability
- The effect is highest for those who have spent less than 1 year in unemployment
- Job accepted within 10-12 months since unemployment last longer for those unemployed who have still 6 remaining insured months
- Next steps:
  - Consider job duration / Distinguish between job-to-job vs. job-to-unemployment
  - Consider effects on wages