Potential benefit duration in multi-spell unemployment

PRELIMINARY AND INCOMPLETE VERSION

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Abstract

This paper studies how a reduction in potential benefit duration affects the job finding rate of unemployed workers in The Netherlands. Until August 2003, workers that exhausted their unemployment benefits would receive extended benefit instead of having to apply for welfare benefits. A sudden legislation change removed the right to extended benefits for workers becoming unemployed directly after this legislation change. We use duration models to estimate the effect of the abolishment of extended benefits on the benefit outflow rates. Furthermore, we exploit the fact that workers with multiple unemployment spells have rights to extended benefits if the start of their first unemployment spell was before the legislation change, making the legislation change a natural experiment for the multi-spell unemployed. For both men and women, there seems to be an increase in the job finding rate after August 2003. For the youngest group we consider the reduction has the largest positive effects on the job finding rate.

1 Introduction

Part of the enormous differences in unemployment duration in the United States and Europe have been attributed to the generous unemployment insurance system in Europe. While the replacement rate in the US is much lower than in Europe, there are also large differences in benefit duration. The potential benefits duration (PBD) in the US are typically around 26 weeks, while e.g. in The Netherlands the maximum duration was 5 years. This is ten times as long as in the United States.

After exhausting regular unemployment benefits, unemployed workers in The Netherlands were eligible for *extended benefits*. These benefits were a more attractive alternative to welfare benefits, since extended benefits were not means-tested.

The focus of this paper is a reduction of the potential benefits duration in 2003 in The Netherlands. In August 2003, the Dutch government announced that the extended benefits would be abolished. In this paper we investigate the effects of this reduction on the job finding rate of unemployed workers.

2 Previous literature

Card and Levine (2008) researched a benefit extension in New Jersey of 13 weeks for a short period in 1996.[1] On a maximum duration of 26 weeks this extension doubles the potential benefits duration. They estimate that the percentage of benefit receivers that exhausted their regular benefits rose by 1 to 3 percentage points. Since the program was only in place for a short time, some of the benefit receivers their unemployment span were not influenced by the extension program for the whole unemployment spell. Card and Levine (2008) estimate that the percentage of exhaustees would

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[1] This extension was funded by a state charity program, after it became the subject of a political debate. After 6 months, the program was terminated.

have risen to 7 percentage points if the program were in place for their entire unemployment spell.

Winter-Ebmer (2001) investigates the effect of a benefit extension for older workers in several parts of Austria. This is interesting because of the fact that the extension only applied to some parts of Austria it is possible to do a difference-in-differences analysis. While unemployment duration has been found to be longer after the extension, it also shows an increase in layoffs by firms, meaning that the unemployment level rose because of the benefit extension. However, since this extension only applied to older workers, there were also other effects playing a role in this process. For the elderly workers, this extension could mean an early (state-paid) retirement. This means that these results may not apply to all age groups.

Lalive (2008) takes a regression discontinuity approach to investigate the same extension. He shows that there the employment duration significantly increases after the age of 50 is reached. This is the age that workers could retire by exhausting their unemployment benefits. While Lalive finds great differences in the duration of unemployment spells of workers aged 49 and 50 for both men and women, the differences are the largest for women.

Most of the current research on potential benefits duration has been done by assessing extensions of the potential duration. An exception is Van Ours and Vodopivec (2006), where the authors take a look at a reduction in benefit duration in Slovenia in 1998 by estimation duration models. They find that there are significant decreases in the duration of unemployment spells.

The 2003 extended benefit reduction was also regarded in Van Ours and Tuit (2010), where the focus lies on the inflow side of the reduction in potential benefit duration. However, inflow effects seem to be mostly for older workers that could bridge the period until they reached the legal retirement age by receiving unemployment benefits.

The evidence provided in the papers mentioned above shows a clear

relationship between the duration of unemployment spells and the PBD.

3   Unemployment system changes

In The Netherlands all workers are covered by a compulsory unemployment insurance system. Workers are eligible to receive unemployment benefits when they have been working (and thus contributing to the insurance system) in at least 4 of the last 5 years. Furthermore, they should have worked in at least 26 of the last 39 weeks. The last requirement is that their dismissal was involuntary.

The duration of the unemployment benefits was in the period we are looking at solely determined by the age of the worker. The so-called *fictional employment history* determined the potential unemployment benefit duration. This employment history was made up by subtracting 18 from the age when becoming unemployed. The height of the unemployment benefits depends on the last earned wage and has a replacement rate of 70%.

The extended unemployment benefits were an alternative for welfare benefits. When a worker would run out of unemployment benefits he would not immediately have to depend on welfare benefits because of the extended benefits. While in theory these extended benefits can be equal to welfare benefits, the rules for eligibility are much less strict. Both amount to 70% of the minimum wage, but welfare benefits are means tested, while the extended benefits were available to everyone running out of unemployment benefits.

The differences between welfare benefits and extended benefits are different across groups. For instance, if a worker is married, the spouse's income is deducted from the amount of welfare benefits one can receive. Homeowners might be forced to sell their house before becoming eligible for welfare payments.

After the regular benefits where exhausted, the extended benefits had a

potential duration of 2 years. The only exception being workers that became unemployed after reaching the age of 57.5, who were eligible for extended benefits until reaching the legal retirement age of 65. However, for (yong) workers that are only eligible for regular benefits for 6 months, this is of course an enormous extension. In Table 1 the potential benefit durations of three age groups are shown. This table also shows what happened to the potential benefit duration after August 2003, when the extended benefits were abolished.

The interesting feature of the abolishment of the extended benefits is that there is a strict difference between the potential benefit duration of workers that became unemployed before the 11th of August 2003 and the potential benefit duration of workers that became unemployed just after. Although there were talks of these extended benefits being abolished in a couple of months, there was no announcement before the actual decision was announced. The measure was announced late on the 8th of August, which is a Friday. The abolishment was complete on the 11th of August, which is a Monday. This means that there was no possible way to fire workers in this time span, especially since firms would need permission from a judge to be able to fire a worker. This permission would be impossible to get in the weekend. For our analysis, this means that there will be virtually no anticipation effect.

Clearly, the effect that the abolishment of the extended has on unemployment duration will differ between the groups shown in Table 1 due to the difference in relative duration reduction, but also because the groups will most likely differ in terms of marital status and previously earned income.

4   Data

The dataset used in this paper is provided by Statistics Netherlands (CBS). The CBS gathers information from three different administration sources.

Tab. 1: Potential benefit duration

Age	23-28	28-33	33-38
Regular benefits	9	12	18
Extended benefits	24	24	24
Reduction after Aug 2003	72.7%	66.7%	57.14%

Administration data is mostly considered to be superior to survey data (e.g. from labor surveys). However, the CBS has cleaned the data by removing inconsistencies in the data. The three sources that provided the data to the CBS are the municipalities, the organization that pays out unemployment benefits (UWV) and the organization that helps with the reintegration process of unemployed workers (CWI).

The CBS provides the data sets separately, but adds an unique key to every individual, which facilitates the merger of the data sets. All individuals that are found in the data from the UWV are also found in the municipalities data. When merging this combined data set with the CWI data, there is a matching percentage of 98%. This means that for at least 2% of the individuals in the dataset there is no information on education level.

The data ranges from January 2001 until December 2005. This means however, that we can follow workers that became unemployed in 2004 for two years at most. Therefore, we decided to drop all spells for workers that became unemployed after December 2004. Since the effects for workers that are entitled to a longer benefit duration may not be followed through their entire unemployment span, we choose to pick three groups of unemployed workers based on their age that we can follow for a significant part of their unemployment span. The age groups are 23-28, 28-33 and 33-38. Because their potential benefit duration is for the largest part determined by their

age, we can group these workers by their (expected) potential benefit duration.

In Figures 1-3 we can find the monthly job finding rate for the three age groups we are interested in. It seems that the youngest group, the workers ranging in age between 23 and 27 are most affected by the reduction in benefit duration.

Fig. 1: Job finding rates (23-27)
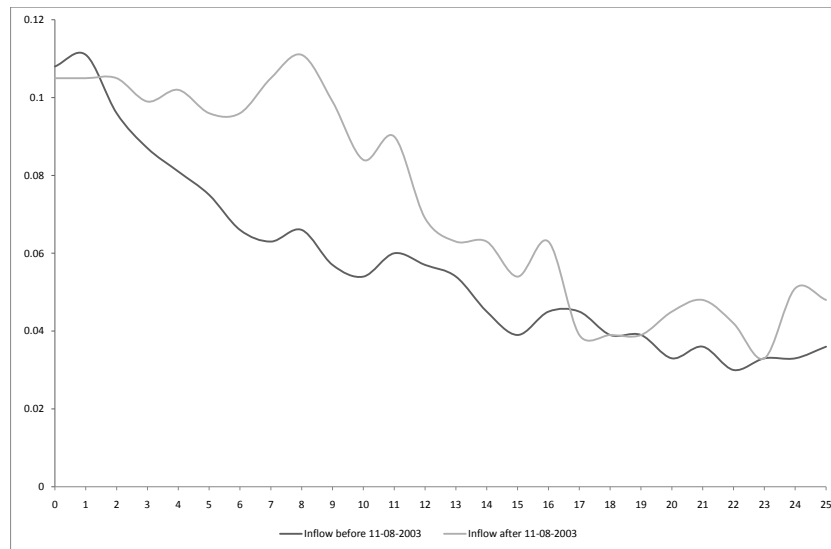
Although there seem to be apparent effects of the abolishment of the extended benefits, these might not be significant in a formal analysis or might be due to difference in economic climate. However, if take a look at Table 2, we see that the unemployment rate was rather high in the period after August 2003. This makes it more unlikely that the effects we observe are due to economic cycles.

Tab. 2: Unemployment percentage for males 25-64

	2001	2002	2003	2004	2005
January	2.4	1.8	2.7	4.0	4.2
February	2.3	1.9	3.1	4.1	4.2
March	2.0	1.9	3.1	4.1	4.1
April	1.8	1.9	3.1	4.0	3.9
May	1.6	2.0	3.1	4.0	3.8
June	1.6	1.9	3.2	4.0	3.7
July	1.5	2.0	3.3	4.0	3.7
August	1.6	2.1	3.3	4.0	3.7
September	1.5	2.1	3.3	3.9	3.7
October	1.6	2.2	3.5	4.0	3.7
November	1.5	2.2	3.6	4.1	3.6
December	1.7	2.5	3.9	4.2	3.7

Fig. 2: Job finding rates (28-32)
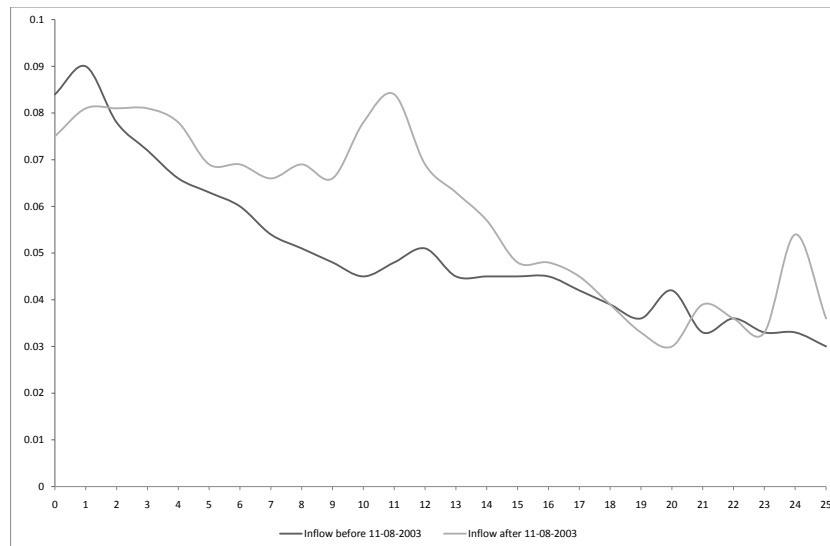
5   Exploratory analysis

Since the effect of the potential benefit duration reduction was immediate, there is a sharp difference in potential duration for workers that became unemployed just before August 2003 and those that lost their job just after August 2003. Therefore, will be interesting to do different estimations of a duration model for workers that enter unemployment before and after August 2003.

This will allow us to identify the variables that contribute most to the duration of an unemployment spell. We will include a dummy variable 'after' that is valued 1 if the unemployment spell started after August 11 2003 and valued 0 if the unemployment spell started before August 11. This dummy variable will show the effect that abolishing the extended benefits has on the duration of unemployment.

Fig. 3: Job finding rates (33-37)
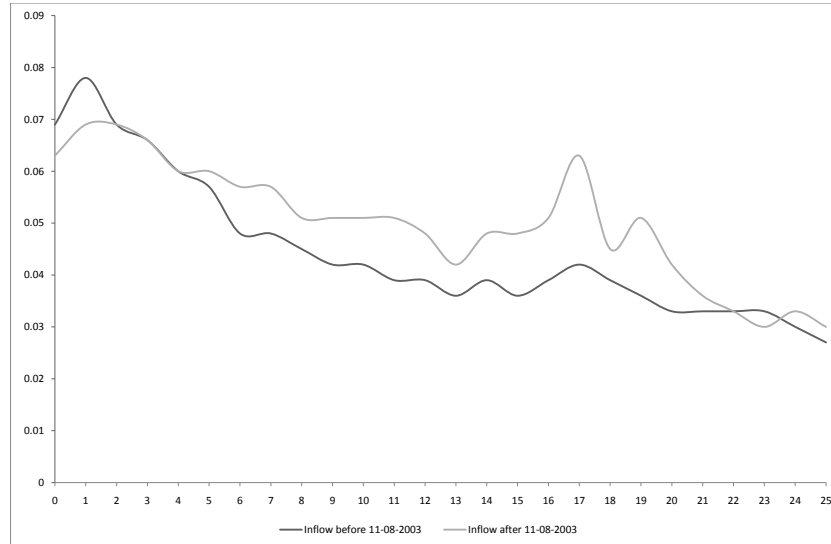
For this analysis we will use two types of duration models. The first type of duration models we will estimate is an *exponential model*:

$$S(z) = \exp(a + b1 \cdot z1 + b2 \cdot z2 + ... + bm \cdot zm) \tag{1}$$

Where a is a constant, z_i are explanatory variables and b_i are the estimated coefficients. Finally, $S(z)$ is the survival time.

The second type is a *Cox proportional hazard model*:

$$h(t) = g(z_i)h_0(t) \tag{2}$$

Where z_i with $i = 0, 1, 2, ...$ is a vector that contains explanatory variables that are expected to influence the duration of unemployment, $g(z) = e^{bz}$ and b will be the vector of coefficients. h_0 is called the hazard function. The actual hazard function we will use is based on the shape of the survival curves we will plot. Finally, the estimated conditional hazard is given by

Tab. 3: Characteristics of the different age groups

variable	Age 23-27			Age 28-32			Age 33-37		
	before	after	t	before	after	t	before	after	t
dutch	0.780	0.790	5.689	0.793	0.797	1.676	0.807	0.816	3.866
wage	4336	4061	13.043	5536	5276	7.980	6223	5971	8.240
married	0.100	0.050	29.251	0.245	0.171	31.683	0.427	0.366	21.644
educ1	0.001	0.001	3.596	0.002	0.001	5.069	0.001	0.033	3.278
educ2	0.214	0.017	5.501	0.028	0.025	3.502	0.037	0.337	3.676
educ3	0.275	0.288	4.638	0.256	0.289	13.217	0.266	0.101	27.178
educ4	0.040	0.045	4.333	0.066	0.082	10.469	0.079	0.528	13.473
educmis	0.663	0.651	4.392	0.649	0.605	16.240	0.617	0.298	31.301
man	0.514	0.510	1.332	0.519	0.514	1.677	0.541	0.528	4.773
foreign	0.327	0.308	6.627	0.320	0.314	2.341	0.315	0.298	6.407
athome	0.264	0.315	18.608	0.080	0.089	5.910	0.036	0.039	2.606
single	0.242	0.228	5.224	0.262	0.259	1.114	0.220	0.214	2.425
kids	0.161	0.126	16.334	0.341	0.325	6.049	0.525	0.524	0.358
oberv.	62207	47757		81019	51188		74799	50901	

$h(t)$. An interesting feature of the Cox way of modeling is that it makes no distributional assumptions.

First we will check whether the characteristics of the workers that enter unemployment before the legislation change and workers that enter unemployment after are similar. In Table3 we find the average values for a number of variables that are of interest for this paper. Because the education levels are missing for a large part of the workers, we have included a variable *educmis* for missing values for the education level. For the oldest age group, with workers aged 33-37, there are big differences in the eduction levels. It seems that this is not due to differences in characteristics but due to missing values in the dataset.

5.1   Results

In Table 4 we can find the coefficients we have obtained by estimating the exponential and Cox proportional hazard model. Both models show very similar results. The signs of the coefficients are in line with expectation. Negative coefficients mean a lower expected hazard rate, while positive coefficients mean a higher expected hazard rate.

Compared to the baseline group, the group with workers aged 23-27 has the highest probability of leaving unemployment for a job. The older the workers are (and the longer their potential benefit duration is), the lower their expected hazard rate. Furthermore, we find that workers with the dutch nationality have a higher expected hazard rate, while single men and men that live with their parents have a lower probability of finding work. For women, the exact opposite is true. Single women and women that live at home have a higher probability of find a job. However, having children seems to increase the job finding rate for men slightly, but decreases the job finding rate quite a bit.

When we take a look at the *after* coefficients, which are the coefficients of interaction terms of the age group dummies and *after*. The coefficients show the magnitude of impact of the abolishment of the extended benefits. While all coefficients are still highly significant, the effect seems to be smallest on female workers. However, the effect of the abolishment seems to be positive everywhere, in the sense that the expected outflow probability is higher after August 2003. The age group with workers aged 28-32 has for men the smallest effect, while for women the oldest age group has the smallest effect.

5.2   Multiple spells

In our data set we find many workers that have multiple unemployment spells. The benefit rules state that when a workers gets unemployed within 26 weeks of finding a new job, his benefits are continued. The second spell

Tab. 4: Regression results for exploratory analysis

	Exponential model				Proportional hazard			
	men	$|z|$	women	$|z|$	men	$|z|$	women	$|z|$
group28	-0.070	7.30	-0.084	7.57	-0.063	6.52	-0.068	6.11
group33	-0.193	19.18	-0.113	9.63	-0.179	17.66	-0.083	7.03
wage	-0.132	120.98	-0.121	112.53	-0.129	117.68	-0.117	107.56
wage^2	0.002	65.02	0.000	59.56	0.003	64.07	0.000	56.93
educ2	-0.608	5.97	-0.829	5.56	-0.592	5.28	-0.760	5.10
educ3	-0.509	5.12	-0.921	6.30	-0.489	4.93	-0.931	5.68
educ4	-0.412	4.12	-0.531	3.62	-0.393	3.93	-0.454	3.10
educmis	0.489	4.93	0.204	1.40	0.475	4.79	0.233	1.59
dutch	0.440	53.19	0.224	21.69	0.436	52.69	0.234	22.62
single	-0.178	22.74	0.207	22.08	-0.176	22.42	0.197	21.02
athome	-0.114	12.53	0.167	12.58	-0.112	12.25	0.159	11.92
kids	0.017	2.14	-0.487	54.99	0.019	2.33	-0.470	52.90
after23	0.178	16.15	0.189	15.23	0.148	13.30	0.124	9.96
after28	0.146	14.42	0.170	14.18	0.114	11.23	0.104	8.61
after33	0.186	18.38	0.163	12.99	0.155	15.15	0.098	7.73
observ.	192000		175871		192000		175871	

is then a *relived* benefit spell. For some workers, benefits can even be continued if there has been a gap larger than 26 weeks. For us, the *reliving* of benefits gives us a control group. In Figure 5.2 we show several possible unemployment types, given that the worker becomes at unemployed at least twice within the period 2001-2005. The first unemployment period is α_{i1} and the second period is α_{i2}.

This leaves us with three groups of workers that have at least two unemployment spells. The 'before' group (a) has both spells starting before our legislation change. The control group which is depicted in (b) and (c) has α_{i1} starting before the legislation change, but α_{i2} after. This means that the pre-legislation change conditions apply to the second unemployment spell as well. However, for workers in the treatment group, which are workers that have both their spells starting after August 2003, the new conditions apply. This means that they are not able to receive extended benefits should they exhaust their regular benefits. In our data set, approximately 12% of unemployed workers have multiple unemployment spells.

In Table 5 we find the results of the duration analysis on workers with multiple unemployment spells. Again, we find that workers that have their second unemployment spell after August 2003 have a higher hazard rate of leaving unemployment. The effect seems to be similar for both men and women.

6   Formal analysis

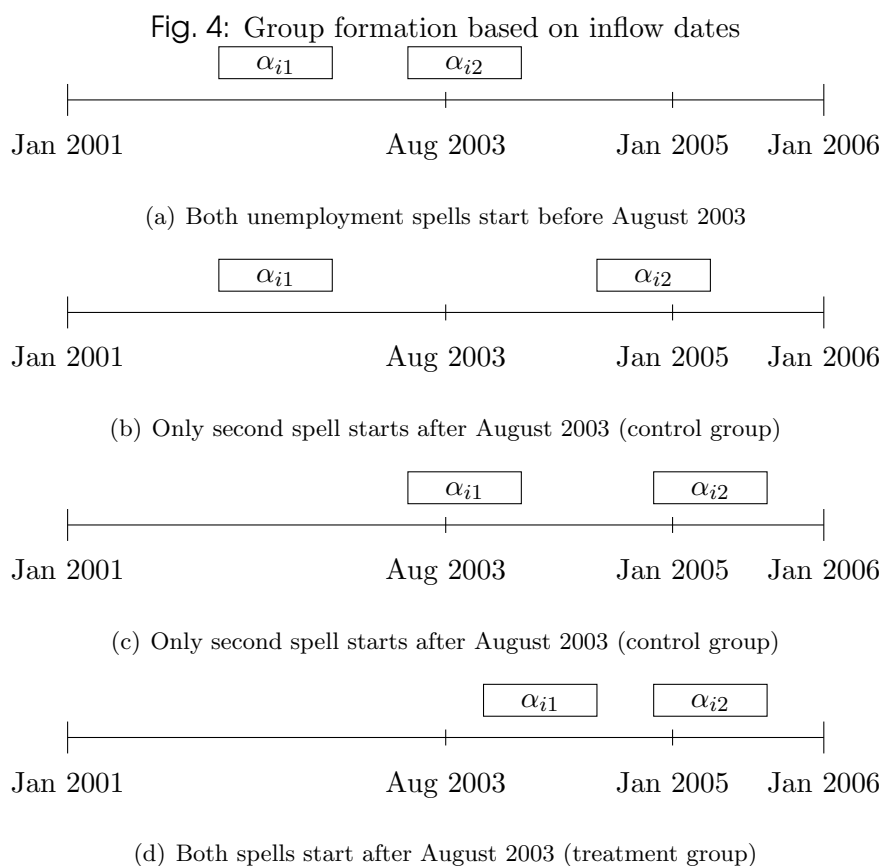For the formal analysis we use the following hazard rate model.

$$\theta(t|x) = \lambda(t)\exp(x'\beta) \tag{3}$$

With β being a vector of parameters and λ begin the individual duration dependence. λ is modeled using step functions:

Tab. 5: Regression results multiple spells

	Exponential model				Proportional hazard			
	men	$|z|$	women	$|z|$	men	$|z|$	women	$|z|$
age	0.093	9.52	0.131	9.81	0.093	9.58	0.128	9.63
age^2	-0.001	12.63	-0.002	10.94	-0.001	13.12	-0.002	11.00
wage	-0.088	25.21	-0.152	28.55	-0.095	27.25	-0.160	30.43
wage^2	-1.345	11.93	0.003	18.85	0.001	12.48	0.003	19.94
educ2	0.001	5.09	-1.080	2.60	-1.435	5.43	-1.115	2.68
educ3	-1.084	4.18	-1.201	2.93	-1.177	4.54	-1.263	3.07
educ4	-1.147	4.37	-0.833	2.02	-1.251	4.76	-0.887	2.15
educmis	-0.156	0.60	0.026	0.06	-0.116	0.45	0.070	0.17
dutch	0.372	12.17	0.273	6.79	0.384	12.58	0.269	6.68
single	0.841	0.47	1.459	6.79	0.069	0.38	1.620	7.54
athome	0.796	3.94	1.801	6.42	0.941	4.66	1.846	6.59
kids	0.041	1.76	-0.264	8.68	0.038	1.65	-0.280	9.24
after	0.311	13.01	0.321	10.91	0.389	16.36	0.387	13.28
observ.	6402		9255		6402		9255	

Fig. 4: Group formation based on inflow dates

α_{i1} α_{i2}

Jan 2001   Aug 2003   Jan 2005   Jan 2006

(a) Both unemployment spells start before August 2003

α_{i1} α_{i2}

Jan 2001   Aug 2003   Jan 2005   Jan 2006

(b) Only second spell starts after August 2003 (control group)

α_{i1} α_{i2}

Jan 2001   Aug 2003   Jan 2005   Jan 2006

(c) Only second spell starts after August 2003 (control group)

α_{i1} α_{i2}

Jan 2001   Aug 2003   Jan 2005   Jan 2006

(d) Both spells start after August 2003 (treatment group)

$$\lambda(t) = \exp(\Sigma_k \mu_k I_k(t)) \tag{4}$$

With $k = 1, ..., 26$ being a subscript for the duration interval. With this function, we are able to estimate the effects of the reduction in potential benefit duration while taking into account the duration dependence of the job finding rate.

6.1   Results

We find the estimation results in Table 6. We see that indeed that the effects of the reduction in potential benefit duration seem to be positive for the job finding rate. We can also see that the job finding rate is affected most for

Tab. 6: Duration analysis estimates single spells

	Model I				Model II			
	men	$|z|$	women	$|z|$	men	$|z|$	women	$|z|$
age	-0.156	4.01	-0.17	3.78	-0.156	4.01	-0.171	3.77
agesquare	0.002	3.26	0.002	4.24	0.002	3.26	0.002	3.24
group28	0.025	0.61	0.068	1.47	-0.020	0.55	0.005	0.12
group33	0.080	1.49	0.068	1.12	-0.054	1.06	-0.083	1.45
log(wage)	-0.355	36.69	-0.349	38.16	-0.356	36.62	-0.35	37.83
dutch	0.125	7.04	-0.018	0.87	0.126	7.08	-0.2	0.93
single	-0.040	2.18	0.034	1.53	-0.038	2.11	0.033	1.49
athome	-0.054	2.36	0.070	0.33	-0.049	2.13	0.071	2.15
kids	0.002	0.11	-0.283	14.09	0.002	0.13	-0.286	14.19
after23	0.918	31.03	0.900	27.27				
after28	0.834	35.84	0.790	30.33				
after33	0.688	33.85	0.657	27.51				
after					0.805	58.41	0.782	48.76
observ.	192000		175871		192000		175871	

the youngest group of workers. Furthermore, we see that the effects on the job finding rate are higher for women than they are for men.

When we look at the workers with multiple spells, we expect to capture a large part of the effects on the job finding rate due to economic cycles. In Table 7 we find the estimations for workers with multiple spells. Interesting to see is that here the job finding rates are more affected for women. Furthermore, we see that again the job finding rates for both men and women are higher after the legislation change.

Tab. 7: Duration analysis estimates multiple spells

	Model I					Model II			
	men	$|z|$	women	$|z|$		men	$|z|$	women	$|z|$
age	-0.112	0.71	0.107	0.75	age	-0.111	0.7	0.109	0.76
agesquare	0.001	0.45	-0.002	0.9	agesquare	0.001	0.45	-0.002	0.91
group28	0.166	1.06	0.043	0.33	group28	0.146	1.00	-0.048	0.38
group33	0.219	1.09	0.179	1.00	group33	0.210	1.08	0.033	0.19
log(wage)	-0.556	15.49	-0.573	19.10	log(wage)	-0.555	15.50	-0.575	19.13
dutch	0.478	8.30	0.407	6.46	dutch	0.477	8.29	0.405	6.44
single	-0.860	2.13	0.912	2.00	single	-0.860	2.13	0.927	2.02
athome	0.173	0.43	-1.025	0.79	athome	1.662	0.42	-1.047	0.81
kids	-0.094	1.77	-0.683	13.38	kids	-0.095	1.76	-0.692	13.61
after23	0.564	4.15	0.980	8.28	after23				
after28	0.504	5.41	0.715	8.48	after28				
after33	0.548	7.13	0.522	6.76	after33				
after					after	0.536	9.88	0.693	13.46
observ.	6402		9255			6402		9255	

7   Conclusion

Even though the extended benefits had a lower replacement rate (except for workers earning the minimal wage) than the regular benefits, it was still an interesting alternative to welfare benefits. From our analysis it seems that the job finding rate has indeed gone up after August 2003. These effects differ between the age groups. This might be due to the fact that the degree of substitution that welfare benefits offer differs between groups. The effects of the reduction in potential benefit duration seem to be the largest on the youngest age group we consider, that of age 23-27. Finally, it seems that women are more affected than men by the reduction in potential benefit duration.

Our results are incomplete; we want to investigate the effects of the change in potential benefit duration by introducing unobserved heterogeneity in the job finding rate and model the rate by which job finders return to unemployment thus taking potential selectivity in the repeated unemployment spells into account.

References

Card, D. and Levine, P. B.: 2008, Extended benefits and the duration of ui spells: evidence from the new jersey extended benefit program, *Journal of Public Economics* **78**, 107–138.

Lalive, R.: 2008, How do extended benefits affect unemployment duration? A regression discontinuity approach, *Journal of Econometrics* **124**, 785–806.

Van Ours, J. C. and Tuit, S.: 2010, How changes in unemployment benefit duration affect the inflow into unemployment, *CentER Discussion Paper Series* (7).

Van Ours, J. C. and Vodopivec, M.: 2006, How shortening the potential duration of unemployment benefits affects the duration of unemployment: Evidence from a natural experiment, *Journal of Labor Economics* **24**(2), 351–378.

Winter-Ebmer, R.: 2001, Potential unemployment benefit duration and spell length: Lessons from a quasi-experiment in austria, *Oxford Bulletin of Economics and Statistics* **60**, 33,45.