

# The Effects of Reducing the Entitlement Period to Unemployment Insurance Benefits

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## Abstract

This paper exploits a substantial reform of the Dutch UI law to study the effect of the entitlement period on job finding and subsequent labor market outcomes. Using detailed administrative data covering the full population we find that reducing the entitlement period increases the job finding rate, but decreases the job quality. Unemployed workers accept more often temporary jobs with lower wages and fewer working hours. Therefore, they also change jobs more frequently. The reform did not affect total post-unemployment earnings indicating that the positive effects on job finding and job turnover cancel out the negative effects on job quality. We also observe a spike in job finding around benefits exhaustion even, although more modest, for individuals who do not experience a drop in benefits level when moving to welfare.

Keywords: unemployment benefits entitlement, job finding, job quality, difference-in-differences, duration model

JEL-code: J64, J65, C21, C41

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# 1 Introduction

In most continental European countries the welfare state has been expanding until the early 1990s. Since then the generosity of benefit schemes has been reduced gradually. But compared to other OECD countries, continental European countries still provide generous benefits (e.g Immervoll and Richardson (2011)). The Netherlands is no exception. Until 2006, the entitlement period to unemployment insurance (UI) benefits could be up to five years and most workers would receive 70% of their last earned gross wage during this period.

Providing benefits for inactivity causes moral hazard problems. Unemployed workers may exert too little effort to find work or become more selective in which job offer to accept. Being selective is not always bad. For example, unemployment benefits act as a search subsidy, i.e. individuals can financially survive without work and are not forced to immediately start working in the first available job, which might be ill-suited for them. In a system with generous benefits, the quality of the match between worker and job may, therefore, be better.

In this paper we study the effects of the length of entitlement to UI benefits on the exit rate from unemployment and subsequent labor market outcomes. We exploit a substantial reform in the Dutch UI law in October 2006. Both before and after the reform the entitlement period depended on age and employment history. The reform reduced the shortest entitlement period from six to three months, and the longest entitlement period from 60 to 38 months. However, for some workers the entitlement period did not change or even slightly increased. This allows us to separate calendar time effects from the effects of the changed UI entitlement period.

Moffitt (1985), Katz and Meyer (1990) and Meyer (1990) show that exit rates from unemployment rise sharply just before the end of benefits entitlement. Boone and Van Ours (2012) find that spikes are more prominent in exit rates to permanent jobs rather than to temporary jobs from which they conclude that spikes occur because unemployed workers delay the start of their new job until the moment of exhausting benefits. However, focusing on such spikes does not answer the policy relevant question how the length of benefits entitlement affects exit rates from unemployment. Answering this question requires exogenous variation in the entitlement period.

Job search theory predicts that the duration of unemployment increases when the benefits entitlement period is extended. Empirical evidence confirms this prediction. Van Ours and Vodopivec (2006) exploit changes in the Slovenian UI system and show that reducing the entitlement period increases the exit rate to work and to other destinations. Lalive (2008) finds that for Austria extending the entitlement to benefits for 50 years old from 30 to 209 weeks reduced the job finding rate.

Card and Levine (2000) find mixed evidence of an extended benefits program. A state level comparison shows that exit rates from the UI benefits scheme remain largely unaffected, but individual data show a significant reduction in these exit rates. Schmieder et al. (2012a) use a discontinuity at age 42 in UI entitlement to show that the effect of the entitlement period on the unemployment duration does not vary over the business cycle.

Reduced job finding rates due to longer benefit entitlement are not necessarily bad, if the overall quality of worker-job matches increases.<sup>1</sup> However, empirical studies do not find much evidence for improved worker-job matches. Card et al. (2007) and Lalive (2007) do not find any effect on post-unemployment wages. Centeno and Novo (2009) and Cockx and Picchio (2009) find a positive but small effect of extending UI benefits on post-unemployment wages. Also Schmieder et al. (2012b) do not find effects on job quality, measured by length of employment spells, both in the short and the long run (five years after unemployment). Schmieder et al. (2013) find that increasing the UI entitlement period decreases post-unemployment wages. They show that this effect is caused by changes in wage offers and not by a decrease of the reservation wage. The key problem with many of these studies is that either the data are not informative on many post-unemployment outcomes or that the design lacks sufficient power to study effects on these outcomes.

The Dutch UI reform in October 2006 was quite substantial causing changes in the entitlement period ranging from an increase of two months to a decrease of 22 months. Since many unemployed workers were affected, it allows us to study effects almost along the full distribution of workers. This contributes to the literature, which often only considers a specific margin, for example, Lalive (2008) studies unemployed workers at the 50-year old threshold, and Schmieder et al. (2012a), Schmieder et al. (2012b) and Schmieder et al. (2013) study unemployed workers at the 42-year threshold. Furthermore, Card et al. (2007) consider both extended severance payments for lay-offed workers who have worked at least three years at their previous employer and the discontinuity in the entitlement period around the threshold of 36 months of employment in the previous five years.

In the empirical analysis, we use administrative data on all UI benefits spells which started between July 2004 and December 2008 in the Netherlands. This includes in total over 800,000 spells. We combine these data with other administrative datasets provided by Statistics Netherlands to observe demographic and socioeconomic characteristics as well as post-unemployment labor market outcomes. For the period until 2010 we observe earnings, working hours and type of contract in all jobs after unemployment. We observe eligibility and receipt of other types of

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<sup>1</sup>Tatsiramos (2009) compares different countries and finds that more generous UI benefits are associated with longer employment spells after unemployment.

benefits. This allows us to identify the group of unemployed workers for whom the UI benefits level is equal to the welfare benefits they would receive after exhausting UI benefits. Since these people do not face a drop in benefits level after exhausting UI entitlement, we can investigate to which extent also non-monetary factors are important.

Our empirical results support the earlier literature that reducing the entitlement period to UI benefits increases job finding rates. However, we also find significant reductions in earnings and working hours. In particular, workers leave unemployment more often because of finding a temporary job, which are often lower paid part time jobs. Those results suggest that unemployed workers lower their reservation wages and job demands when faced with a shorter UI entitlement period. Furthermore, we find a spike in the job finding rate around the moment of exhaustion of UI benefits, also for workers who do not face a drop in benefits level when entering welfare after exhausting UI benefits. This indicates that not only the benefits level matters, but also other aspects of the UI scheme. Or that facing a deadline changes behavior, even if the consequences of the deadline are very limited.

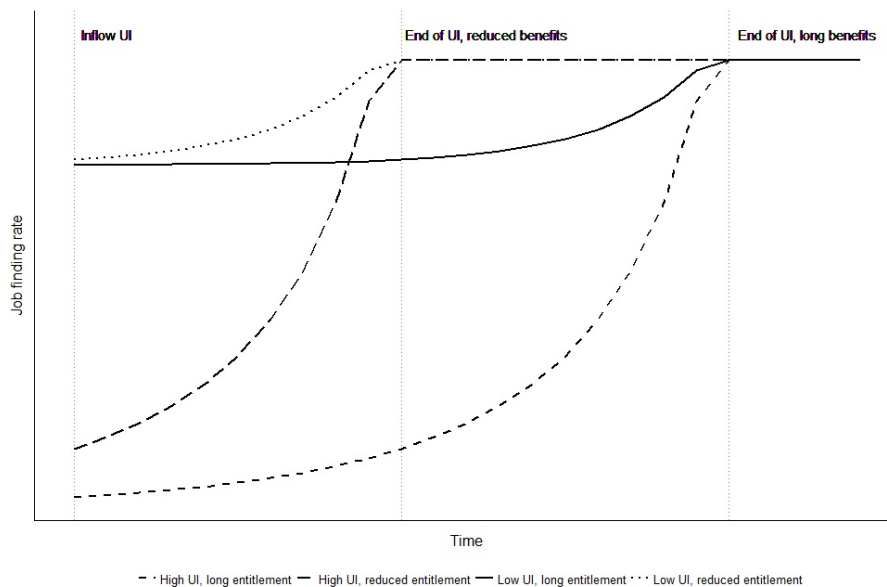
This paper proceeds as follows. In the next section we provide some theoretical background. In section 3 we describe the Dutch UI system and the reform of October 2006. In section 4 we present our data. We discuss the effects of reducing the entitlement period on job finding and other labor market outcomes in section 5 and explore the underlying job-finding mechanism in section 6. In section 7 we repeat the estimations for individuals who do not face an income drop after unemployment. We present our conclusions in section 8.

## 2 Theory

Job search models describe the behavior of unemployed workers (e.g. Mortensen (1986), Van den Berg (1990)). Each period the unemployed worker decides to which vacancies to send a job application. Each job application can result in a job offer. Whether or not such a job offer is acceptable for the unemployed worker depends on the characteristics of the job and the worker's labor market prospects. For ease of exposition theoretical models often impose that jobs are characterized by the wage. In our empirical analysis we also consider other job characteristics as measure for the quality of a job.

Job search theory assumes that unemployed workers maximize the present value of their lifetime utility, where utility is a function of income and leisure. When all jobs are full-time, the job offer acceptance decision is based on a reservation wage strategy. Each period the unemployed worker chooses a reservation wage and

Figure 1: Theoretical job finding rates in different benefits schemes.



accepts a job offer if the associated wage exceeds the reservation wage in that period. Furthermore, in each period the unemployed worker determines the number of job applications such that the marginal costs of a job application equal the marginal returns.

The generosity of unemployment benefits plays a key role in job search decisions. If benefits are generous, either in level or length of the entitlement period, theory predicts that unemployed workers increase their reservation wage. Unemployed workers are thus more selective in which job offers to accept. If a worker accepts a job offer in a particular period, the wage or more general job quality will be higher if the job was found in a generous benefits system.

Increasing the reservation wage reduces the marginal benefits of search, which implies that the optimal number of job applications is lower. Therefore, a more generous unemployment benefits scheme reduces the job finding rate both because unemployed workers become more selective and because they search less intensively. These behavioral responses are referred to as moral hazard. Whereas being more selective on job offers has the positive effect that the match between the worker and job improves which may have long-term consequences, the reduction in job applications only causes unemployment durations to become longer.

Van den Berg (1990) discusses a job search model taking account of limited entitlement to UI benefits. In the model the present value of being unemployed decreases with the unemployment duration since the remaining entitlement period to UI benefits decreases. Therefore, the reservation wage declines and unemployed workers increase their search effort. Figure 1 shows the predicted effects of shortening

the UI entitlement period on the job finding rate within an otherwise stationary environment. Since individuals are considered to be forward looking, shortening the UI entitlement period already increases job finding rates at the moment of entering unemployment. However, the effects are larger for unemployed workers receiving a high level of benefits than for those collecting lower benefits.

We can interpret low benefits as UI benefits close to the level of welfare benefits, so there is only a small drop in benefits at the moment of exhausting UI. Theory predicts that the length of the UI entitlement period has a smaller impact for those individuals who experience a smaller drop in benefits upon UI benefits exhaustion. Alternatively, one may argue that the drop in benefits upon exhausting UI is highest for those not entitled to welfare. In theory for these individuals the effects of shortening the UI entitlement period is highest. But the reason for not becoming entitled to welfare benefits is often that the partner has a sufficiently high income. If there are diminishing returns to additional household income, then it is not clear beforehand that those who are not entitled to welfare benefits respond most to changes in the UI entitlement period. We will test this empirically.

The figure shows a smooth increase in job finding rates until UI benefits exhaustion. Several empirical studies have shown the existence of spikes in exit rates towards UI benefits exhaustion (e.g. Moffitt (1985), Katz and Meyer (1990) and Meyer (1990)). Most studies also find that exit rates drop again after exhausting UI benefits. The standard job search models cannot explain this latter finding. Although, Mortensen (1977) explains the spike from an additional assumption that income and leisure are substitutes. Various other explanations have been provided in the literature. Katz and Meyer (1990) find that a large part of the spike is caused by former employers reemploying laid-off workers at the moment of UI benefits exhaustion. Moffitt and Nicholson (1982) and Meyer (1990) assume that unemployed workers can find a job with a fixed wage at any moment. Individuals will only take this job just before UI benefits exhaustion. Boone and Van Ours (2012) describe a situation where employers and unemployed workers agree to delay the starting date of a new job until UI benefits exhaustion. And Decreuse and Kazbakova (2008) argue that UI benefits exhaustion is associated with a negative signal about the worker's skill level. This predicts a spike in job finding rates also for individuals whose UI benefits level is close to the welfare benefits they would receive after UI benefits exhaustion.

In this paper we study if the spikes exist for the Dutch UI scheme and how the reduction of the entitlement period affects unemployment duration and subsequent labor market outcomes. We repeat the analyses for individuals who do not face a large income drop after exhausting UI benefits, to check if spikes also occur for these individuals. If such spikes are present, also other than monetary incentives

are important.

### 3 Institutional setting

The Dutch UI law insures all employees against the risk of unemployment.<sup>2</sup> If a worker becomes unemployed, she is entitled to UI benefits when she has a sufficiently long employment history. Entitlement requires that the worker lost at least 50 percent of her working hours with a minimum of five working hours. Before October 2006, entitlement required that the worker worked at least 26 of the previous 39 weeks. The reform of October 2006 changed this *weeks condition* to at least 26 of the previous 36 weeks.

The maximum duration of collecting UI benefits depends on the worker's employment history. A calendar year counts as employed if the worker worked at least 52 days in that year. Because the UI administration does not have records of employment histories before 1998, the number of employed years before 1998 is equal to the age of the worker on January 1, 1998 minus 18. Before the reform workers who did not satisfy the *years condition* (worked at least four of the past five years), were entitled to short-period UI benefits for six months. The level of these benefits was 70 percent of the minimum wage or 70 percent of the last wage, whichever was lower. Workers satisfying the years condition were entitled to wage-related benefits equal to 70 percent of the last wage (capped at a maximum) for at least six months. If the worker had worked between five and ten years, the maximum length was nine months. And this maximum entitlement period increased with each interval of five additional years of employment.

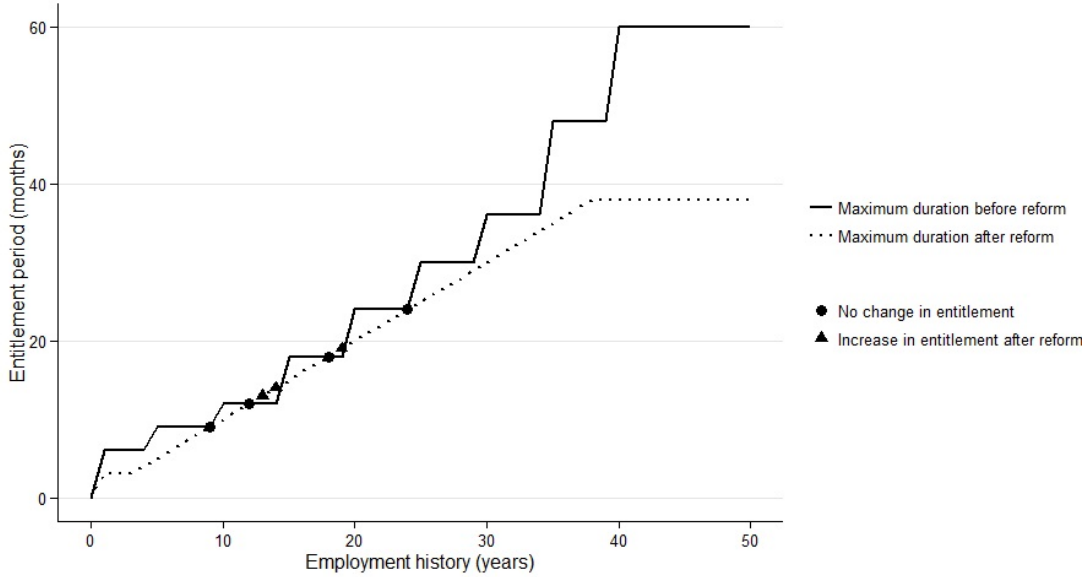
After the reform in October 2006 all workers received UI benefits for at least three months. Workers satisfying the years condition are entitled to UI benefits for one additional month for each employed year. During the first two months of UI a worker receives 75 percent of the past wage and afterwards 70 percent (again capped at the maximum). The reform reduced the maximum entitlement to UI benefits from 60 to 38 months. Figure 2 shows the entitlement to UI benefits before and after October 2006. The reform reduced the entitlement period most for individuals with long employment histories. For workers with an employment history of nine, 12, 18 and 24 years the entitlement period was unaffected by the reform, while workers with an employment history of 13, 14 or 19 years were after the reform entitled to UI benefits for a longer period.

When a UI benefits recipient accepts a job but enters unemployment again within six months, the old UI spell is continued. This rule was not affected by the reform,

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<sup>2</sup>The law excludes self-employed workers and some civil servants who have special arrangements.

Figure 2: Entitlement to UI benefits before and after October 2006.



and we take account of it in the empirical analysis. In the empirical analysis we only consider individuals satisfying the years condition, because prior to the reform workers not satisfying this condition received much lower benefits. Furthermore, we only consider worker satisfying the more strict weeks condition after the reform. Finally, we exclude individuals with an employment history of ten, 11 and 12 years. Prior to the reforms, the entitlement period of these individuals exceeded 12 months, and, therefore, these individuals were exposed to a regime with more extensive active labor market policies. After the reform these individuals were no longer exposed to this regime because their entitlement period was shortened.<sup>3</sup>

Workers, who are either not or no longer entitled to UI benefits, can apply for welfare benefits. Welfare is means tested and complements the household income to 50 percent of the minimum wage for a unlimited time period. Couples and single parents receive some additional benefits. Whereas UI is managed by the national social insurance institute, welfare is managed by the municipalities. Welfare benefits are paid from general taxation while UI benefits are paid from premiums contributed by all employed workers. Job search requirements are similar, all benefits recipients have to make a job application at least once every week. However, during the first year, UI benefits recipients only have to select suitable job offers, while welfare benefits recipients have to accept all job offers.<sup>4</sup>

<sup>3</sup>Our empirical results are not sensitive to excluding these individuals.

<sup>4</sup>During the first six months of UI only jobs with a similar wage and skill level are suitable. Between six months and one year, jobs that require an educational level one degree below the workers level are also suitable. After one year of UI all jobs are considered suitable jobs.



## 4 Description of the data

We use data provided by Statistics Netherlands covering the period from 1999 to 2010. Statistics Netherlands combines information from various administrations using social security numbers. We use registrations at municipalities and the UI administration. The latter includes all payments of various types of benefits, but also information on jobs such as wages, working hours, type of work (flexible or permanent), sector, etc. The data cover the total Dutch population.

We observe 1,538,776 individuals who started collecting UI benefits at least once between 1999 and 2010 and they experienced over 2.3 million spells. Figure 3 shows for each quarter the number of individuals entering UI. The upper left graph shows that the inflow follows the business cycle closely and that there is no substantial change in the inflow around the moment of the reform. From the end of 2008 onwards the inflow into UI increased substantially. Therefore, in the empirical analysis we only consider individuals entering UI between July 1, 2004 and December 31, 2008. This provides an interval of 27 months both before and after the reform. Next, we distinguish different age groups. The inflow of younger workers fluctuates more strongly over the business cycle than the inflow of older workers. For workers older than 45 years the inflow increases substantially from the beginning of 2009. This coincided with the introduction of part-time UI for firms who faced a substantial drop in their turnover due to the financial crisis (e.g. De Groot et al. (2012)). But as stated above in the empirical analysis we only consider inflow into UI until December 31, 2008, so before the introduction of part-time UI.

For each UI spell we observe daily information about the start and end of collecting benefits, and the level of benefits. We use the age of each worker and the exact employment history since 1999 to construct the maximum entitlement period before and after October 2006.<sup>5</sup> We correct for re-entering UI using the institutional rules. If a person returns to UI within a period of six months, the maximum entitlement period is equal to the entitlement period of the previous UI period corrected for the length of the previous UI spell.

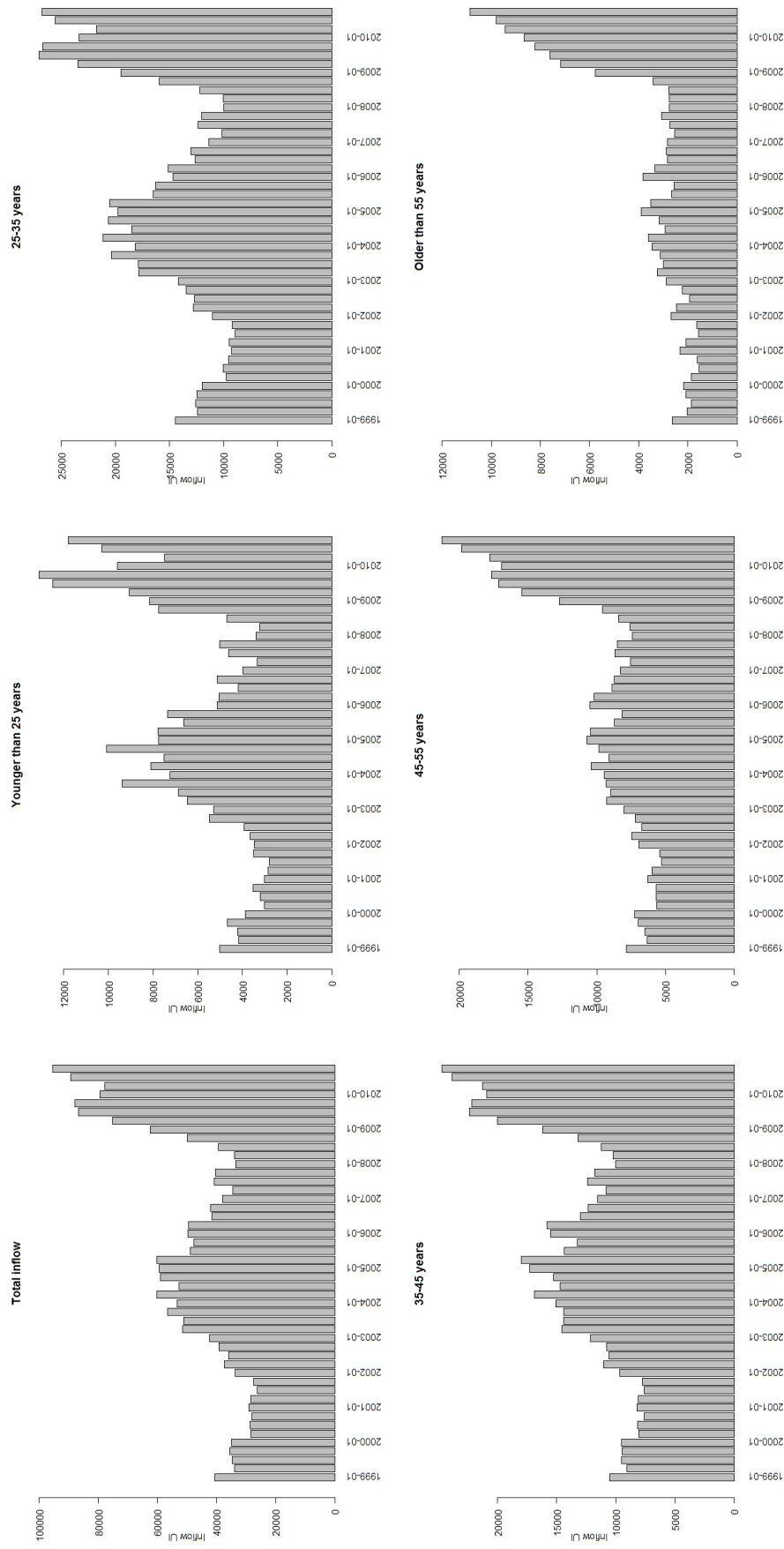
Once an individual stops collecting UI benefits, we know if this was due to reaching the end of the entitlement period. In that case we observe whether or not the individual starts collecting welfare benefits. Otherwise we observe subsequent labor market outcomes, e.g. earnings, working hours and type of contract. We observe this information for each job after leaving unemployment.

From the registration of municipalities we obtain demographic variables, which

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<sup>5</sup>We do not observe employment in 1998 while the national social insurance institute does observe actual employment for this year. We count 1998 as an employed year if the worker was at least 18 years old in 1998 and employed in 1999.

Figure 3: Quarterly inflow into UI between 1999 and 2010 for different age groups.



we merge with the labor market information. The demographic variables contain, for example, date of birth, gender, household composition, etc. This allows us to identify the partner for which we observe labor market outcomes as well. Recall that the partners' earnings determine whether someone will become eligible for welfare after UI (see section 3). We construct a variable indicating eligibility for welfare benefits.

Table 1 shows descriptive statistics. We distinguish between UI spells that started before and after the reform. Both before and after the reform individuals had, on average, an employment history of almost 18 years. If the institutional rules from before the reform would apply the entitlement to UI benefits would, on average, be 18.7 months for individuals who entered unemployment both before the reform and after the reform. The reform reduced the average UI entitlement period with more than three months to 15.6 months.

The descriptive statistics show a decrease in the median UI duration of about three months and a decrease of roughly one month in the median duration until finding work. The percentage of unemployed workers who found work within one year and three years after entering unemployment increased with five and one percentage points, respectively. The average earnings after unemployment decreased, both in the first job and within three years becoming unemployed. After the reform the percentage of first jobs which had a temporary contract was about half a percentage point lower, the number of jobs within three years after inflow was also slightly lower after the reform and reemployed individuals work in their first job roughly one hour less than before the reform.

There are no substantial differences in the composition of workers entering UI before and after the reform. Around 47 percent are women and the average age is about 36 years. About 67 percent have a partner and 35 percent a partner with an income such that after UI the individual will not be entitled to welfare. Around 36 percent of the individuals have children and about 19 percent are immigrants. The annual earnings before entering UI are more than €1500 lower for individuals who entered UI after the reform. The sectors generating most inflow into UI are the business and financial sector, trade and industry.

Figure 4 shows Kaplan-Meier estimates for exit to work. We distinguish between four groups that (would) have a different benefit entitlement period prior to the reform. We observe the largest outflow to work for individuals with a short entitlement period of six months. For this group after six months almost half of the unemployed workers found work, while for workers with an entitlement period of 12 and 24 months this is 38 percent and 36 percent, respectively. After the reform, the entitlement period to UI benefits was shortened and the Kaplan-Meier estimates shift downwards. For those with an entitlement period of six months prior to the re-

Table 1: Descriptive statistics of UI spells starting before and after the reform (July 2004-December 2008).

	Before reform (July 2004-Sept 2006)	After reform (Oct 2006-Dec 2008)
Employment history (years)	17.5	17.9
Potential UI entitlement before reform (months)	18.7	18.7
Actual UI entitlement (months)	18.7	15.6
Median UI duration (days)	183	94
Median duration until work (days)	199	172
Found work within one year (%)	54.7	60.2
Found work within three years (%)	75.2	76.3
Annual earnings first job (€)	29,920	25,583
Total earnings in three years after inflow (€)	44,318	43,041
Temporary contract in first job (%)	45.4%	44.9%
Working hours in first job (per week)	28.5	27.4
Number of jobs within three years	3.6	3.4
Female (%)	46.2	46.7
Age at start unemployment (years)	36.4	37.5
Couple (%)	69.4	65.8
Partner with income (%)	35.1	34.5
Single parent (%)	9.0	10.0
Children (%)	37.8	37.0
Immigrant (%)	18.4	21.0
Annual earnings before UI (€)	33,697	31,932
Sector last job before UI (%)		
Business and financial	18.9	22.2
Trade	13.5	12.8
Industrial	12.4	10.5
Health care	6.8	7.1
Food	7.5	8.3
Transport	4.9	4.3
Construction	3.0	2.5
Agriculture	2.0	2.3
Government	2.1	2.7
Number of spells	382,727	285,661

form we observe a lower survival probability for the group that started after October 2006 up until approximately 450 days. After about 500 days the survival probability is lower for the group that started before October 2006. For groups with longer entitlement periods prior to the reform the moment of convergence of the Kaplan-Meier estimates is later. For the group with a maximum entitlement period of five years, the survival probability for those who entered after the reform remains lower for the entire period of three years. The figures suggest that potential effects of reducing the entitlement period on outflow to work exist during the original entitlement period, but vanishes afterwards.

Figure 5 shows annual earnings in the first job stratified by the unemployment duration. Individuals with a longer UI entitlement period have higher accepted earnings. This is not necessarily due to entitlement period, but can also reflect the employment history. For individuals with long entitlement periods, we observe a declining pattern in the accepted earnings. This may be due to a decreasing reservation wage, but could also be caused by heterogeneity among workers or non-stationarities in the job search process. However, for individuals with a short UI entitlement period and those with low UI benefits, there is no clear decline of earnings in the first accepted job. A simple linear regression confirms that for both groups there is no significant trend. This can suggest that the reservation wage of these individuals is not above the minimum wage and, therefore, all jobs are acceptable.

## 5 Estimated effects of the reform

Job search theory predicts that after reducing the generosity of a benefits scheme unemployed workers lower their reservation wage and increase their search effort. This implies that a reduction in the entitlement period to UI benefits reduces the expected length of an unemployment spell and decreases the subsequent job quality. In this section, we test these hypotheses empirically.

### 5.1 The model

We specify a regression model to estimate the effects of reducing the UI entitlement period on various labor market outcomes  $Y_{it}$  of individual  $i$  who started collecting UI benefits at calendar time  $t$

$$Y_{it} = \alpha + \delta D_{it} + \sum_h \gamma_h \mathbb{1}\{H_i = h\} + X_i \beta + \mu_t + \epsilon_{it} \quad (1)$$

The variable  $D$  describes the change (in months) in the UI entitlement period due to the reform. So prior to October 2006, the variable  $D$  always equals 0. We construct

Figure 4: Kaplan-Meier estimates for the survival in unemployment for different groups of UI benefits entitlement periods prior to the reform.

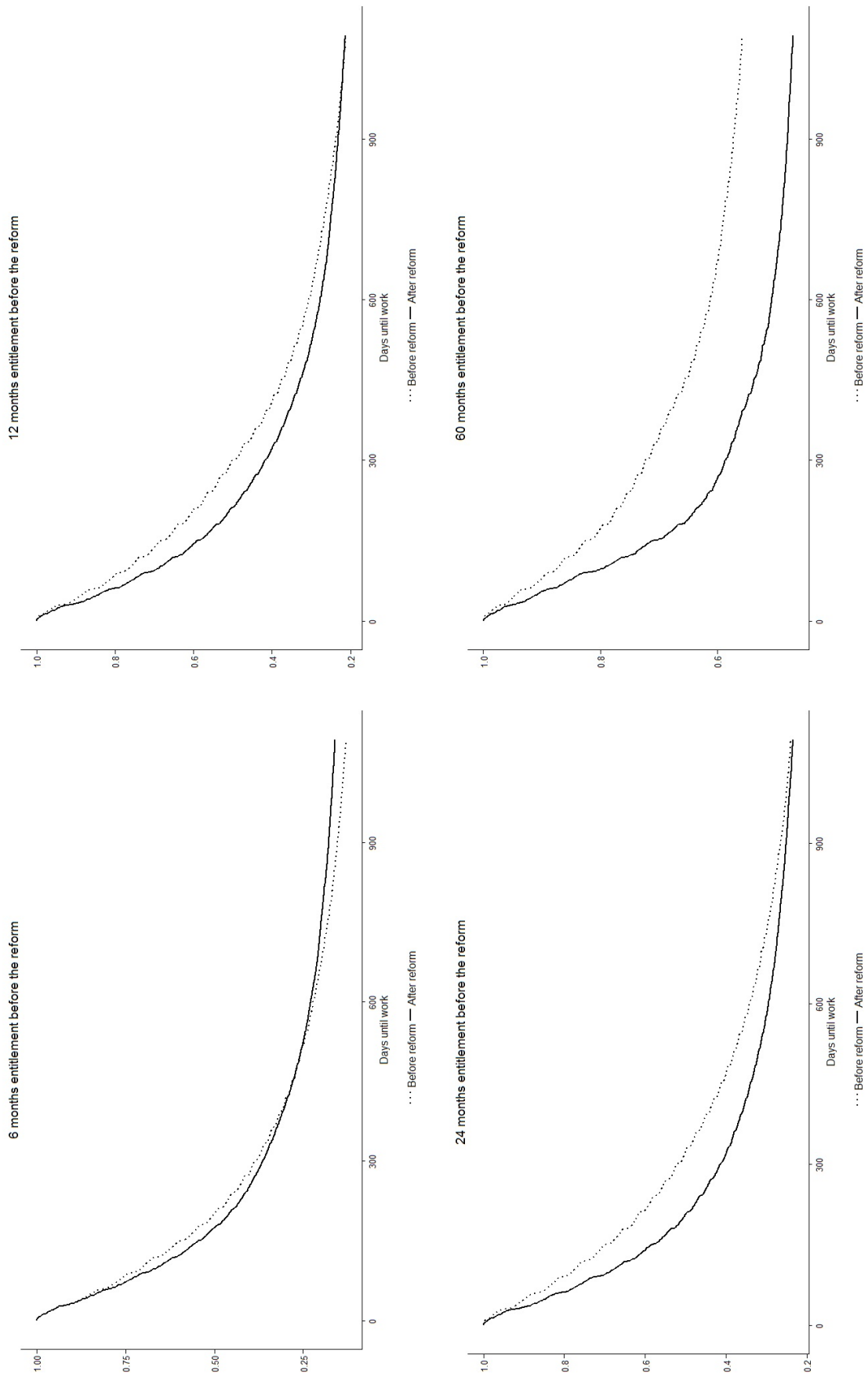
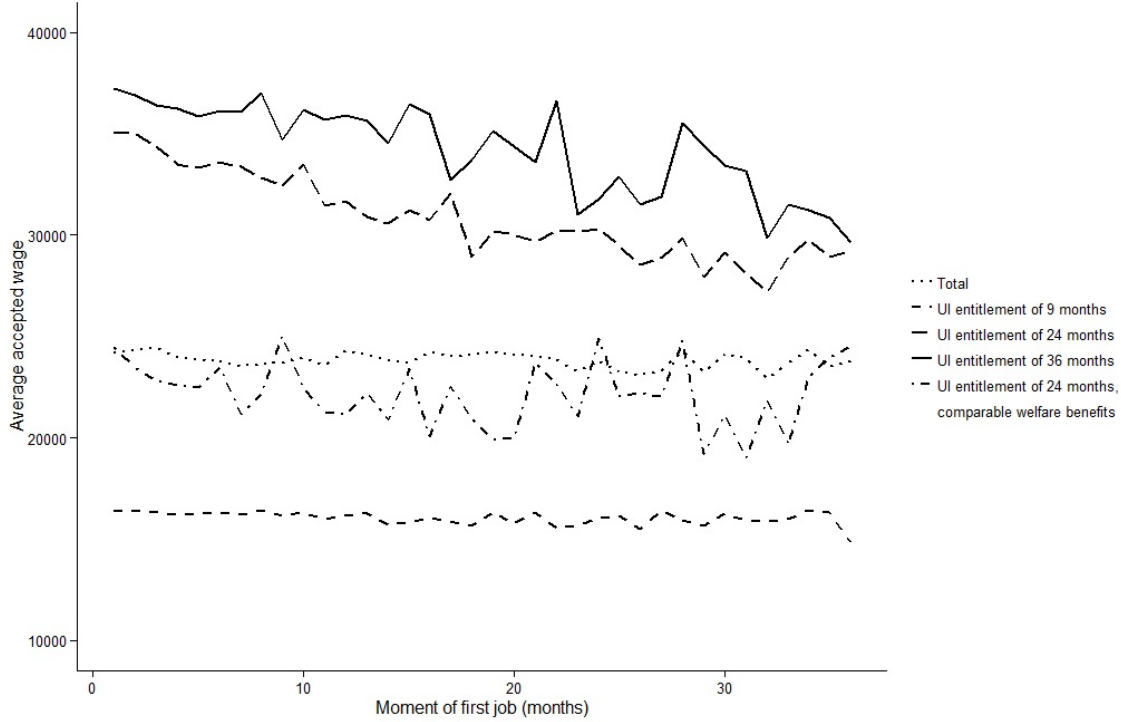


Figure 5: Annual earnings in the first job for individuals with different UI entitlement periods.

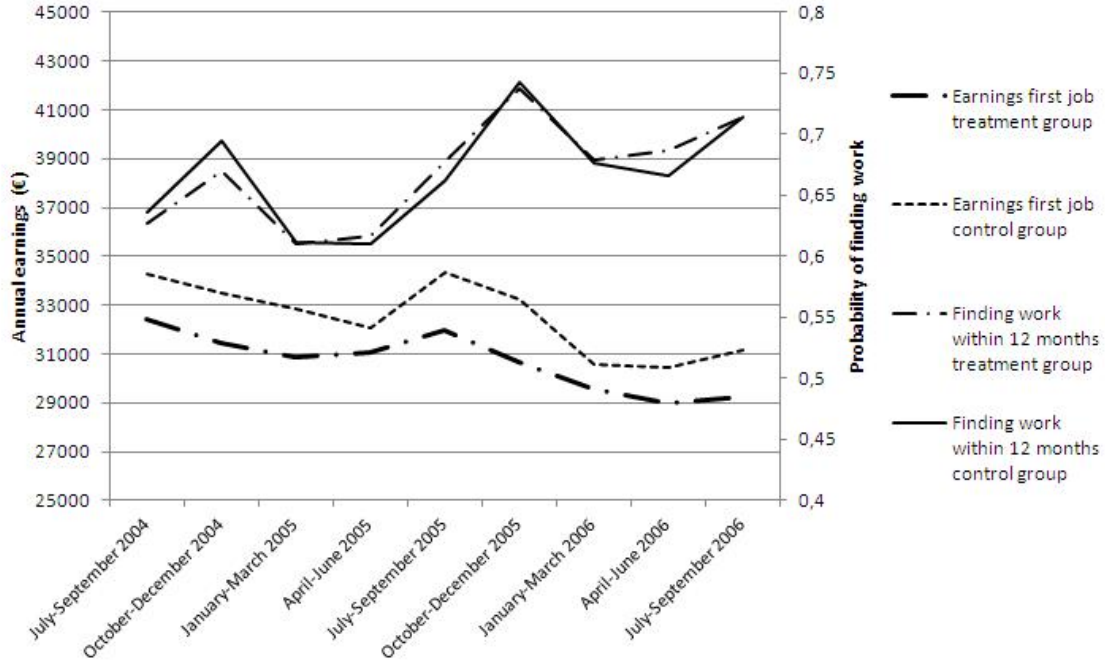


$D$  such that if the reform reduced UI entitlement with six months,  $D$  takes value six. For about 88 percent of the entrants in UI after October 2006, the UI entitlement period is shorter than it would have been before the reform. The parameter of interest  $\delta$  should be interpreted as, for example, the increase in exit probability or earnings due to reducing the entitlement period with one month.

The entitlement period to UI benefits is determined by the employment history. We included fixed effect  $\gamma$  for all possible values of the employment history  $H$ . Including these fixed effects controls for the endogeneity of  $D$ . The vector  $X$  contains a variable indicating if the worker returns to UI within six months and resumes the previous UI spell. If that case,  $X$  also contains a variable describing the already used UI duration. The time trend  $\mu$  is specified using dummy variables for each quarter of inflow in UI. This controls for calendar time variation in job finding probabilities, for example, due to business cycle variation or seasonality. We also provide estimation results where this baseline specification is extended with additional covariates. In that specification, we include in  $X$  gender, household composition, ethnicity, whether or not someone collected UI before, earnings before entering UI, and sector.

Our empirical model is a difference-in-difference model. Recall from section 3 that for some employment histories the reform did not affect the maximum entitle-

Figure 6: Trends in outcomes prior to the reform.



ment period to UI benefits. This is the control group which identifies the time trend  $\mu$ . The fixed effects for the employment histories control for differences in exit rates between individuals with different employment histories. So the identification of the effect of a change in the entitlement period  $D$  hinges on a common trend between individuals with different employment histories.

We have tested the common trend assumption in two different ways. First, we graphically explored the trend in labor market outcomes  $Y_t$  before the reform, where we distinguished between the control group and treatment group. Figure 6 shows these trends for finding work within 12 months, and earnings in the first job. These trends prior to the reform look quite similar, which is also the case for other outcome measures. Next, we test this more formally by estimating the regression model specified in equation (1) for all labor market outcomes, but only using the subsample of individuals who entered UI before the reform. We include a placebo treatment variable, i.e. we suppose that the reform occurred in October 2005 instead of October 2006 and substitute  $D_{it}$  by one if the individual is affected by the placebo reform. The estimated placebo effects are shown in Table 2. Out of the many outcomes variables, we only find a significant placebo treatment effect for finding work within six months. Also we consider other moments for the placebo treatment variable, we do not find significant effects. Therefore, we conclude that there has been a common trend in the treatment and control group prior to the reform, which we take as evidence in favor of the common trend assumption.



Table 2: Estimated placebo effects before the actual reform to test for common trends.

	Placebo effects	
Finding work within 3 months	0.004	(0.004)
Finding work within 6 months	-0.010*	(0.005)
Finding work within 12 months	-0.005	(0.005)
Finding work within 18 months	-0.002	(0.005)
Earnings first job	-22.2	(446.6)
Earnings after 2 years	266.8	(624.4)
Earnings after 3 years	1.9	(564.8)
Working hours first job	-0.016	(0.088)
Total working hours within 2 years	-0.058	(0.094)
Total working hours within 3 years	-0.093	(0.093)
Temporary contract first job	0.003	(0.006)
Temporary contract after 2 years	-0.006	(0.010)
Temporary contract after 3 years	-0.012	(0.011)
Number of jobs first year	-0.005	(0.012)
Number of jobs 2 years	0.011	(0.019)
Number of jobs 3 years	0.005	(0.024)

Standard errors in parentheses.

\* significant at a level of 5%, \*\* significant at a level of 1%.

## 5.2 Effects of reducing UI entitlement

We use various measures for finding work, benefits receipt, earnings, working hours, number of jobs and type of contract as outcome variables. Table 3 presents the estimated effects of reducing the UI entitlement period on these outcome variables. The table shows the effects both with and without controlling for individual characteristics. Each estimate represents a separate estimation.

The first panel of the table considers finding work. The outcome variables take value one if someone found work within three, six, 12 or 18 months, respectively. Before the reform in October 2006, 22 percent of the unemployed workers found work within three months. After October 2006, this increased to 28 percent. For six, 12 and 18 months job finding percentages increased from 38 to 45 percent, 55 to 60 percent and 64 to 68 percent respectively. The estimates show that reducing the UI entitlement period does not significantly affect the probability of finding work within three months.<sup>6</sup> However, for longer periods the effects of reducing the UI entitlement period are significant and the effects increase when we consider a longer period.

The reform reduced the UI entitlement period with, on average, three months. Therefore, due to the reform the probability of finding work within six months after entering UI increased with about 0.0048. Since prior to the reform about 38 percent of the UI inflow found work within six months, the reform increased the number of people finding work within six months with about 1.3 percent. Our estimated effects are relatively small compared to, for example, the effects found by Van Ours and Vodopivec (2006). The reduced UI entitlement period can also only explain a small fraction of the increased job finding rates observed after the reform. The remainder is due to improved labor market conditions.

In the baseline model we impose that the effect of the reduction in the UI entitlement period increased linearly with the number months. In Table 4 we show results where we estimate a separate effect for each possible change in the UI entitlement period. The estimated effects are small for small changes in the UI entitlement period and increase if the reduction in the UI entitlement period becomes larger. When the UI entitlement period is reduced by five months or more, the effects become significant. The pattern that the effect increases with the reduction is in agreement

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<sup>6</sup>Recall that in October 2006 the level of benefits in the first two months of UI increased from 70 to 75 percent of the last wage. This could affect the exit to work as well. To test for this we performed estimations using individuals who entered UI just before and after the reform with an employment history such that the UI entitlement period remained the same. We do not find significant effects on the probability of finding work within two, three or six months, suggesting that the change in benefits level did not affect job finding probabilities (see appendix A for the results).

Table 3: Estimated effects of reducing the UI entitlement period.

	(1)		(2)	
Finding work within 3 months	-0.0001	(0.0003)	-0.0002	(0.0003)
Finding work within 6 months	0.0019**	(0.0003)	0.0016**	(0.0003)
Finding work within 12 months	0.0029**	(0.0003)	0.0025**	(0.0003)
Finding work within 18 months	0.0030**	(0.0003)	0.0027**	(0.0003)
Total UI benefits within 2 years	-61.43**	(7.06)	-74.99**	(6.81)
Total UI benefits within 3 years	-98.33**	(10.52)	-107.63**	(10.24)
Earnings first job or benefits	-324.45**	(23.91)	-372.30**	(23.19)
Income after 2 years	-219.93**	(42.64)	-278.90**	(42.02)
Income after 3 years	-351.40**	(30.56)	-384.35**	(29.69)
Earnings first job	-161.52**	(28.09)	-218.77**	(27.05)
Earnings after 2 years	-126.15**	(48.49)	-210.46**	(46.76)
Earnings after 3 years	-108.51	(58.02)	-187.68**	(55.85)
Total earnings within 2 years	53.88**	(19.61)	-5.60	(18.16)
Total earnings within 3 years	48.90	(36.87)	-14.87	(33.86)
Working hours first job	-0.125**	(0.008)	-0.137**	(0.008)
Total working hours within 2 years	0.021*	(0.009)	0.009	(0.008)
Total working hours within 3 years	0.019	(0.012)	0.009	(0.010)
Temporary contract first job	0.0029**	(0.0005)	0.0030**	(0.0005)
Temporary contract after 2 years	-0.0014	(0.0009)	-0.0009	(0.0009)
Temporary contract after 3 years	-0.0088	(0.0056)	-0.0022	(0.0012)
Number of jobs first year	0.0030**	(0.0008)	0.0034**	(0.0008)
Number of jobs 2 years	0.0057**	(0.0012)	0.0067**	(0.0012)
Number of jobs 3 years	0.0004	(0.0026)	-0.0006	(0.0026)
Calendar time fixed effects	yes		yes	
Employment history fixed effects	yes		yes	
Other individual characteristics	no		yes	

\* significant at a level of 5%, \*\* significant at a level of 1%.

with our linear baseline specification.

The second panel of Table 3 presents the effects of the UI entitlement period on the total amount of UI benefits received within two and three years after entering UI. Shortening the UI entitlement period with one month reduces on average the total UI benefits payment within two years after inflow with about 75 euros and within three years after inflow with about 108 euros. Both effects are significant. Expressed as a percentage of the average UI benefits payment within two and three years after inflow these savings are 0.7% and 1.0% respectively, which is in agreement with the earlier finding that the job finding probability increased modestly.

Next, we focus on job quality. We first consider various measures for earnings after UI and total income including earnings and various sources of benefits. In the third panel we focus on annual earnings in the first job, and the jobs individuals have two years and three years after entering UI. If the worker did not find work, we take the benefits level. The estimation results show that these income measures are significantly lower after reducing the UI entitlement period. In particular, the annual income level two years after inflow is 280 euros lower for each month of reducing UI benefits entitlement, and this is about 380 months after three years. Since the reform reduced UI benefits entitlement, on average, by about three months. This implies that average income levels after three years are about 1080 euros lower, which is 2.8 percent of the average annual income after three years of the inflow before the reform.

There can be two reasons why we observe these effects on income levels. First, unemployed workers may have lowered their reservation wages. And second, due to the reduced entitlement period more unemployed workers may have exhausted UI benefits. Therefore, we focus in the fourth panel on earnings for individuals who found work. At any moment earnings levels are significantly lower after reducing the UI entitlement period. For those who found work, average earnings in the first job are about 220 euros lower for reducing the UI entitlement period with one month. Because average earnings in the first job were about 33,300 euros, a reduction of three months would decrease the average earnings by roughly two percent. The effects decline only modestly over the time elapsed since entering UI. Two and three years after entering UI the effects are slightly smaller than in the first job, which suggests some degree of persistence. Because job finding rates are only marginally affected by the reform, this suggests that unemployed workers have lowered their reservation wages due to the reform. However, total earnings after two and three years are unaffected by reducing the UI entitlement period. Obviously, the reduction in earnings is offset by the increased job finding. Most previous studies found at most a small negative effect on earnings, Centeno and Novo (2009), Schmieder et al. (2013) and Cockx and Picchio (2009) found a small positive effect of an extension

Table 4: Estimated effects for finding work with heterogeneous effects for each possible change in entitlement period

	3 months	6 months	12 months	18 months
Extra 2 months	-0.0471 (0.0394)	-0.0693 (0.0447)	-0.0269 (0.0437)	-0.0210 (0.0412)
Extra 1 month	0.0103 (0.0073)	0.0075 (0.0080)	0.0134 (0.0079)	-0.0022 (0.0074)
Reduction 1 month	-0.0093* (0.0047)	-0.0056 (0.0052)	-0.0065 (0.0050)	-0.0085 (0.0047)
Reduction 2 months	-0.0124** (0.0024)	-0.0124* (0.0048)	-0.0067 (0.0047)	-0.0060 (0.0044)
Reduction 3 months	-0.0076 (0.0045)	-0.0072 (0.0050)	-0.0050 (0.0048)	-0.0051 (0.0045)
Reduction 4 months	-0.0193** (0.0050)	-0.0145** (0.0054)	-0.0097 (0.0053)	-0.0088 (0.0049)
Reduction 5 months	0.0060 (0.0064)	0.0116 (0.0071)	0.0158* (0.0070)	0.0134* (0.0066)
Reduction 6 months	0.0155 (0.0088)	0.0328** (0.0098)	0.0309** (0.0097)	0.0167 (0.0092)
Reduction 10 months	-0.0051 (0.0084)	0.0135 (0.0096)	0.0342** (0.0099)	0.0337** (0.0097)
Reduction 11 months	-0.0011 (0.0104)	0.0257* (0.0120)	0.0459** (0.0123)	0.0336** (0.0120)
Reduction 12 months	0.0013 (0.0101)	0.0190 (0.0115)	0.0279* (0.0117)	0.0317** (0.0113)
Reduction 13 months	0.0102 (0.0099)	0.0247* (0.0111)	0.0350** (0.0113)	0.0245* (0.0110)
Reduction 22 months	-0.0198** (0.0072)	0.0624** (0.0037)	0.0423** (0.0087)	0.0489** (0.0088)
Calendar time fixed effects	yes	yes	yes	yes
Employment history fixed effects	yes	yes	yes	yes
Other individual characteristics	yes	yes	yes	yes

\* significant at a level of 5%, \*\* significant at a level of 1%

of the entitlement period while Lalive (2007) and Card et al. (2007) do not find an effect.

We also consider other measures for job quality. The bottom three panels present the effects on the weekly working hours, type of contract (permanent or temporary) and job-to-job mobility measured by the number of jobs after leaving UI. For the first two outcome variables we only consider the sample of individuals who actually found work. We find a significant negative effect of the reduction of the entitlement period on the number of working hours in the first job. A reduction of the UI entitlement period of three months would reduce the number of working hours of the first job with 0.4 hours a week (about 1.3% of the average number of working hours). However, if we consider total working hours within two and three years, we do not find any effects. Obviously, the fewer working hours in the first job due to shortening the UI entitlement period is compensated by the increased job finding.

Another indicator of job quality is whether or not an employee has a temporary contract. We find a positive effect of the reduction of the UI entitlement period on the probability of first accepting a temporary job. The reform, on average, increased the probability of accepting a temporary job after unemployment with one percentage point. We do not observe significant effects for the jobs two and three years after entering UI. People may thus move to a permanent job relatively quickly after the first initial temporary job. This is consistent with the results on job-to-job mobility reported in the final panel. After reducing the UI entitlement period, workers tend to find more jobs within two and three years after entering UI. To our knowledge only Boone and Van Ours (2012) analyzed the relationship between UI entitlement and exit to temporary work. They find that the spikes around exhaustion of UI benefits are larger for permanent jobs than for temporary jobs and regard this as evidence that spikes occur because unemployed workers delay their starting date of a new job until the moment of exhaustion of UI benefits. This seems to contradict our findings. But it is not necessarily inconsistent if the exit rate to temporary work is increased by a reduction of the UI entitlement period early during the period of UI entitlement rather than close to exhaustion. Our findings on the effects on the number of jobs is consistent with the literature, that focuses on employment or job durations. Belzil (2000), Cockx and Picchio (2009) and Tatsiramos (2009) do find a positive effect of an increase of the entitlement period on the duration of the first job. Caliendo et al. (2009) find that individuals quit their first job after unemployment more frequently when the entitlement period is shortened. Addison and Blackburn (2000) and Le Barbanchon (2012) do not find an effect on the employment duration of the first job after unemployment.

We have estimated the model for different subgroups to explore heterogeneous effects of reducing the UI entitlement period. These results are presented in Table 5,

in which each estimate comes from a separate regression. We focus on job finding, the first job and the total number of jobs within two years, since most other outcome measures are in agreement with these and show similar results (a complete table can be found in the appendix). The differences in effects between subgroups are never very substantial, although we find that most effects are slightly larger for men, those who have a relatively short UI entitlement period and individuals with higher earnings prior to entering UI. For immigrants we observe a larger effect of reducing the UI entitlement period on finding a temporary job, but a smaller effect on hours worked and earnings.

## 6 Modeling job finding

In the previous section we showed that reducing the maximum UI entitlement period increases the probability of finding work. In this section we explore the underlying dynamics of job finding during the unemployment spell using a hazard rate model. This model describes exit to work after  $\tau$  periods of unemployment for an individual who entered UI at calendar time  $t$  with an observed UI entitlement  $\max UI$ , labor market history  $H$  and other observed characteristics  $X$ ,

$$\theta(\tau|t, H, X) = \lambda(\tau)\phi(\max UI - \tau)\varphi(\max UI, t, H, X) \quad (2)$$

where  $\lambda(\tau)$  denotes duration dependence in job finding. Our function of interest,  $\phi(\max UI - \tau)$ , describes how the job finding rate is affected by the remaining entitlement period after  $\tau$  days of unemployment. We specify  $\phi(\max UI - \tau)$  as a piecewise constant function. In the function  $\varphi(\max UI, t, H, X)$ , we allow the length of UI entitlement to have a constant effect on job finding from the start of unemployment. To account for endogeneity of the UI entitlement period we include calendar time indicators, and fixed effects for the employment history  $H$ . Finally, we include the same covariates  $X$  as in the empirical analysis described in the previous sections. We use Cox partial likelihood method to estimate the hazard rate, thereby leaving  $\lambda(\tau)$  unspecified.

The identification of the causal effects of the UI entitlement is similar as in the difference-in-difference model specified in the previous sections. The control group of individuals who were not affected by the reform identify the calendar time effects. The employment histories  $H$  control for differences between individuals, and the effects of the UI entitlement period are identified from interactions between calendar time and employment histories. So this identification hinges on a common trend in exit rates to work between individuals with different employment histories.<sup>7</sup>

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<sup>7</sup>We artificially censor all unemployment spells after three years. This avoids that for the pre-

Table 5: Heterogeneous effects on reducing the UI entitlement

	Finds work within 12 months	Earnings first job	Hours first job	Temporary job	Number of jobs 2 years
Total population	0.0025** (0.0003)	-218.77** (27.05)	-0.1369** (0.0078)	0.0030** (0.0005)	0.0067** (0.0012)
Women	0.0012* (0.0005)	-154.66** (45.05)	-0.1205** (0.0141)	0.0021* (0.0008)	0.0062** (0.0019)
Men	0.0035** (0.0004)	-209.99** (34.31)	-0.1236** (0.0090)	0.0030** (0.0006)	0.0083** (0.0015)
Immigrant	0.0026** (0.0009)	-191.52** (57.15)	-0.1030** (0.0221)	0.0056** (0.0012)	0.0104** (0.0034)
No immigrant	0.0026** (0.0003)	-225.27** (30.22)	-0.1468** (0.0083)	0.0025** (0.0005)	0.0062** (0.0012)
Had low income before UI	0.0017* (0.0007)	61.47 (36.98)	-0.1035** (0.0181)	0.0019 (0.0011)	0.0079** (0.0027)
Had no low income before UI	0.0025** (0.0004)	-235.63** (35.43)	-0.1262** (0.0085)	0.0036** (0.0005)	0.0079** (0.0013)
Entitlement period 6-9 months	0.0019 (0.0019)	321.88** (95.01)	0.0409 (0.0419)	0.0046 (0.0024)	0.0070 (0.0080)
Entitlement period 18 months or more	0.0009* (0.0003)	-190.45** (31.66)	-0.1284** (0.0081)	0.0030** (0.0005)	0.0061** (0.0012)

Every cell in the table represents a separate regression. All regressions include the same controls as in the earlier specifications  
\* significant at a level of 5%, \*\* significant at a level of 1%



Table 6 shows the estimated effects of the UI benefits entitlement period on the job finding rate.<sup>8</sup> We have estimated models with and without additional covariates  $X$  (all estimated coefficients are in Table 11 in the appendix). The results are very similar and all estimated coefficients have the expected sign. The estimation results show that increasing the UI entitlement period significantly reduces the job finding rate. Each additional month of UI entitlement reduces the job finding rate from the start of the spell by about 0.8 percent. There is a clear peak in the exit rate to work around the moment of exhaustion. The job finding rate is highest in the month before and the month after exhausting UI benefits. The exit rate starts increasing three months before exhaustion and declines again in the six months after exhaustion to the reference level before exhaustion.<sup>9</sup>

The increase of the job finding rate until the moment of UI benefits exhaustion is in agreement with a standard job search model. However, such a model predicts that after UI benefits exhaustion reservation wages remain low and job search effort high. While we observe that after UI benefits exhaustion the job finding rate drops again to the same level as between three to 12 months before exhaustion. This pattern has often been found in the literature (e.g. Moffitt (1985), Katz and Meyer (1990) and Meyer (1990)).

In Figure 7 we show how the job finding rate changes when varying the UI entitlement period. In the figure we consider a representative individual (male, with a partner, 18 years of employment history in the business sector and an annual income between €20.000 and 27.500, living in Zuid-Holland). For this individual we show the job finding rate of the entitlement period to UI benefits is six, nine and 12 months respectively. In the first three months after entering UI the job finding rate is only slightly higher if the UI entitlement is only six months. After three months, the difference in the job finding rates increases because the moment of exhaustion of UI benefits approaches for the six months entitlement period. We observe the same effect for an entitlement period of nine and 12 months, just before the moments of exhaustion. Since the baseline hazard decreases over time, the spike around the moment of exhaustion for the longer entitlement periods looks much smaller than for the entitlement of six months.

The hazard rate model above imposes a common proportional effect of the UI entitlement period on the job finding rate for all unemployed workers. Next, we reform data we have a longer observation period and also reduces the impact of the financial crisis which started to affect the Dutch labor market late 2011.

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<sup>8</sup>We take the time interval 3-6 months before exhaustion as the reference category since the minimum entitlement period is four months so for every possible entitlement period there are individuals observed in the reference category.

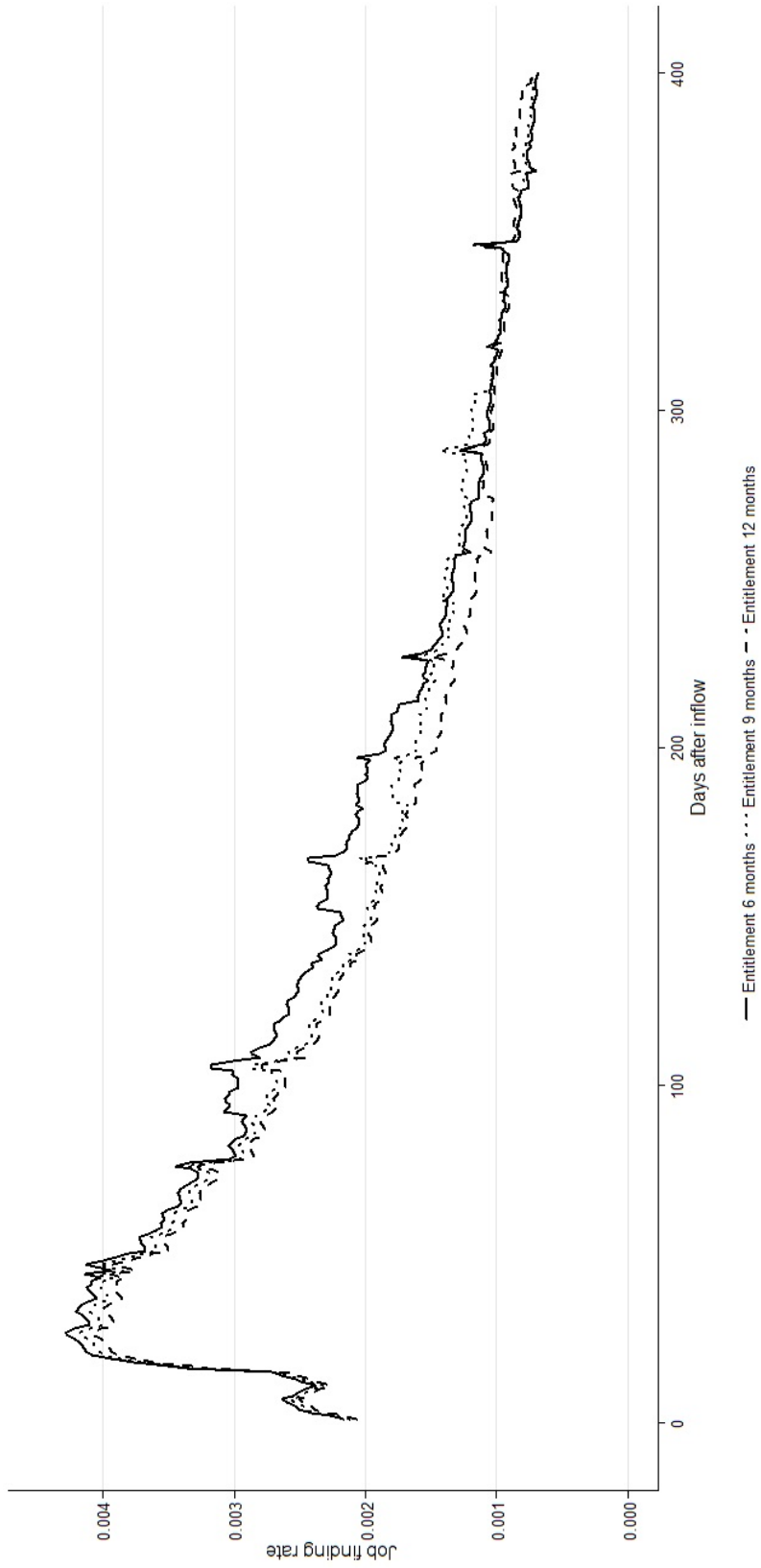
<sup>9</sup>We return later to the positive significant effects observed for the time periods more than 12 months prior to exhaustion.

Table 6: Estimated effects of the UI entitlement period from a hazard rate model for finding work.

Effects entitlement period	(1)	(2)
UI entitlement (months)	-0.008** (0.001)	-0.008** (0.001)
More than 6 months after exhaustion	0.021 (0.018)	0.023 (0.018)
3-6 months after exhaustion	0.059** (0.017)	0.060** (0.017)
1-3 months after exhaustion	0.093** (0.017)	0.093** (0.017)
First month after exhaustion	0.191** (0.019)	0.191** (0.019)
Last month until exhaustion	0.151** (0.017)	0.152** (0.017)
1-3 months until exhaustion	0.079** (0.013)	0.080** (0.013)
3-6 months until exhaustion, (reference category)	0	0
6-12 months until exhaustion	0.007 (0.010)	0.005 (0.010)
12-24 months until exhaustion	0.074** (0.014)	0.071** (0.014)
More than 24 exhaustion until exhaustion	0.096** (0.022)	0.095** (0.022)
Duration dependence	yes	yes
Calendar time effects	yes	yes
Employment history fixed effects	yes	yes
Other individual characteristics	no	yes

\* significant at a level of 5%, \*\* significant at a level of 1%.

Figure 7: Estimated job finding rates for an average individual with a UI entitlement period of 6, 9 or 12 months.



estimate separate models for workers with different characteristics. The estimation results are presented in Table 7. We observe the significant spike in job finding rates around exhausting UI benefits both for men and women. Although for men the spike is more pronounced and after UI benefits exhaustion their job finding rate does not fully decline to the reference level before exhaustion. The literature on the differences between women and men are mixed. Lalive (2007) finds that the effects of a reduction of the entitlement period are larger for women than for men, while Roed and Zhang (2003) also find that the effects are larger for men.

Next, we stratify groups by the entitlement period at the moment of entering UI. We consider two groups, those with a UI entitlement period of six to nine months and those with an entitlement period exceeding 18 months. Recall that for an entitlement period between ten and 17 months we do not have a proper control group. For both groups we see an increasing job finding rate toward the moment of UI benefits exhaustion. However, for the group with the longer initial entitlement period, the job finding rate remains high after exhaustion, while it declines again for the other group. For the group with the longer UI entitlement period, we also do not observe the higher job finding rate more than 12 months before benefits exhaustion displayed when considering the full sample. This suggests that the proportional hazard structure may be too restrictive for a model considering all unemployed workers.

## 7 Effects for individuals without a potential income drop after UI

In the previous sections we found that there are behavioral responses to reducing the UI entitlement period affecting labor market outcomes. In particular, reducing the UI entitlement period increases job finding, but reduces the subsequent job quality. These results are consistent with standard job search theory, but we also found evidence for a spike in job finding at the moment of benefits exhaustion which is more difficult to explain with standard job search theory. This could indicate that there are also other important factors associated to UI entitlement than the benefits level. Therefore, in this section we consider individuals who receive UI benefits close to the welfare benefits level and who would become entitled to welfare benefits after exhausting UI benefits.<sup>10</sup> These individuals do not face an income drop when exhausting their UI benefits.

In Table 8 we show the effects of reducing the entitlement period for those indi-

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<sup>10</sup>Recall that welfare is means tested, so individuals can only become eligible for collecting welfare if they do not have a working partner.

Table 7: Estimation output of PH model of time until work for different subgroups

	Women	Men	Entitlement period of 6-9 months	Entitlement period of at least 18 months
UI entitlement (months)	-0.008** (0.002)	-0.010** (0.001)	0.020** (0.005)	-0.020** (0.001)
More than 6 months after exhaustion	-0.048 (0.021)	0.087** (0.019)	0.144** (0.053)	0.195** (0.021)
3-6 months after exhaustion	0.012 (0.019)	0.076** (0.019)	0.210** (0.040)	0.171** (0.021)
1-3 months after exhaustion	0.061** (0.019)	0.122** (0.019)	0.252** (0.015)	0.141** (0.021)
First month after exhaustion	0.136** (0.022)	0.213** (0.022)	0.325** (0.027)	0.168** (0.026)
Last month until exhaustion	0.121** (0.019)	0.172** (0.019)	0.272** (0.022)	0.175** (0.023)
1-3 months until exhaustion	0.061** (0.015)	0.101** (0.015)	0.174** (0.015)	0.079** (0.018)
3-6 months until exhaustion, reference category	-	-	-	-
6-12 months until exhaustion	0.012 (0.012)	0.005 (0.012)	-0.116** (0.015)	0.003 (0.012)
12-24 months until exhaustion	0.052** (0.016)	0.102** (0.015)	-	0.027 (0.014)
More than 24 months until exhaustion	0.105** (0.026)	0.116** (0.023)	-	0.003 (0.019)
Duration dependence	yes	yes	yes	yes
Calendar time effects	yes	yes	yes	yes
Employment history	yes	yes	yes	yes
fixed effects				
Other individual char- acteristics	yes	yes	yes	yes

\* significant at a level of 5%, \*\* significant at a level of 1%

viduals who do not experience a benefits drop at the moment of exhausting UI. We compare these findings to individuals who have the same level of UI benefits, but will due to a working partner not become eligible for welfare benefits. These latter individuals experience a benefits drop at the moment of exhausting UI. Finally, we show results separately for individuals with an without a working partner to illustrate how having a working partner interacts with the length of the UI entitlement period.

For the group of individuals who become eligible for welfare and have a low level of UI benefits, we do not find significant effects of reducing the UI entitlement period on job finding and also not on post-unemployment outcomes. There is an exception for the effect on the number of working hours in the first job, but the effect is very small. This is consistent with the standard job search theory. The lack of effects for this group is not due to the low level of UI benefits, because individuals with low UI benefits and a working partner respond to the reducing in the UI entitlement period. We might conclude from this that the size of the effect of reducing the UI entitlement period is associated to the magnitude of the drop in benefits when exhausting UI entitlement.

Next, we consider again the full population and distinguish between whether or not the individual has a working partner. There are no differences in job finding rates between both groups, but individuals with a working partner accept a first job with, on average, a lower wage. As already mentioned above, having a working partner increases the benefits drop at the moment of exhausting UI entitlement, which explains a lower reservation wage and thus lower accepted wages. Obviously, this dominates a possible income effect, arising from sharing the income of partners within the household.

We also estimate the hazard rate model separately for the different groups. Table 9 presents the results of these estimations. We again observe spikes in job finding rates around UI benefits exhaustion for all groups. The spikes are more pronounced for individuals who do not have a working partner. If we distinguish this group by those with a high and a low wage, we find that the spike is much larger for those with relatively high UI benefits. These are indeed the individuals for whom the drop in benefits is highest when moving from UI to welfare. Given that there is a spike, it is indeed most likely that it is most pronounced for this group.

The results also show a spike for those individuals without a partner and with low benefits, so the group of individuals who experience at most a modest drop in benefits when exhausting UI. Even though the spike is smaller than for other groups, it is significant in the month of exhausting UI benefits. Since job finding rates fall afterwards again, this suggests that not only the level of benefits is important in explaining the transition rate from unemployment to employment. Some possible

Table 8: Estimated effect of reducing UI entitlement for different groups

	Finds work within 12 months	Earnings first job	Hours first job	Temporary job	Number of jobs 2 years
Entitled to welfare, low benefits	0.0006 (0.0016)	53.14 (44.31)	-0.0548* (0.0262)	0.0002 (0.0015)	0.0040 (0.0037)
Not entitled to welfare, low benefits	0.0026** (0.0003)	-250.38** (29.97)	-0.1442** (0.0081)	0.0035** (0.0005)	0.0080** (0.0012)
Has partner with wage	0.0025** (0.0006)	-334.71** (54.47)	-0.1511** (0.0137)	0.0026** (0.0009)	0.0038* (0.0019)
Has no partner with wage	0.0026** (0.0004)	-162.18** (30.14)	-0.1278** (0.0094)	0.0032** (0.0006)	0.0080** (0.0015)

Every cell in the table represents a separate regression. All regressions include the same controls as in the earlier specifications

\* significant at a level of 5%, \*\* significant at a level of 1%

explanations are already provided in section 2, for example there may more negative stigma associated with collecting welfare benefits. Moffitt (1983) finds that the existence of welfare stigma causes individuals not to apply for welfare, even though they are entitled to welfare benefits. However, it may also be that there is uncertainty about the welfare regime or whether or not the individual really qualifies for collecting welfare benefits.<sup>11</sup> Another explanation is that the exhaustion of UI benefits imposes an implicit deadline on unemployed workers.

Our results are in contrast with Pellizzari (2006), who finds that people who are likely to collect welfare benefits after exhaustion of UI benefits do not have a higher probability of finding a job in the last months of unemployment. However, his study is based on cross-country and self-reported data, which implies that he is required to make stronger assumptions for identifying effects. We have repeated the analysis of Pellizzari (2006) with our data in appendix C, and the results are similar to the ones presented here.

## 8 Conclusion

In this paper we have exploited a substantial reform in the Dutch UI system in October 2006 to study the effect of the entitlement period to UI benefits on the exit rate to work and post-unemployment job quality. Due to the reform the average

<sup>11</sup>For the application of disability insurance benefits Halpern and Hausman (1986) find that the number of applications depends on the uncertainty concerning the acceptance of a disability claim. The more uncertainty of acceptance, the lower the number of applications.

Table 9: Estimation effects of PH model of time until work for different subgroups

	Total	Partner with wage	No partner with wage	No partner and low UI benefits	No partner and high UI benefits
More than 6 months after exhaustion	0.023 (0.018)	-0.003 (0.024)	0.044* (0.017)	0.012 (0.059)	0.040 (0.029)
3-6 months after exhaustion	0.060** (0.017)	0.016 (0.023)	0.065** (0.016)	0.056 (0.052)	0.097** (0.027)
1-3 months after exhaustion	0.093** (0.017)	0.073* (0.023)	0.110** (0.016)	0.030 (0.051)	0.140** (0.026)
First month after exhaustion	0.191** (0.019)	0.153** (0.027)	0.192** (0.019)	0.107 (0.058)	0.191** (0.031)
Last month until exhaustion	0.152** (0.017)	0.125** (0.023)	0.164** (0.016)	0.123* (0.050)	0.216** (0.026)
1-3 months until exhaustion	0.080** (0.013)	0.093** (0.018)	0.079** (0.013)	0.070 (0.040)	0.097** (0.021)
3-6 months until exhaustion, reference category	-	-	-	-	-
6-12 months until exhaustion	0.005 (0.010)	0.024 (0.014)	-0.003 (0.010)	-0.068 (0.036)	0.0044** (0.016)
12-24 months until exhaustion	0.071** (0.014)	0.108** (0.019)	0.057** (0.014)	0.038 (0.048)	0.057** (0.022)
More than 24 months until exhaustion	0.093** (0.022)	0.133** (0.029)	0.089** (0.021)	0.109 (0.077)	0.058 (0.035)

Every cell in the table represents a separate regression. All regressions include the same controls as in the earlier specifications

\* significant at a level of 5%, \*\* significant at a level of 1%



entitlement period was reduced by about three months, but there were groups of workers for whom the entitlement period did not change or even increased. This allows us to use a difference-in-difference model. To estimate the model we have used administrative data covering the full Dutch population. These data contain daily information on benefits receipt and job spells, as well as earnings and working hours.

Our findings are in agreement with earlier literature. Reducing the UI entitlement period increases the job finding rate, which indicates the presence of moral hazard. However, the size of the effects is relatively small. The Dutch reform occurred during a period of low unemployment and substantial GDP growth. Schmieder et al. (2012a) and Kroft and Notowidigdo (2011) show that moral hazard associated to UI are larger during recessions than in economic booms. Moral hazard in unemployment benefits programs is not necessarily bad if the benefits act as search subsidy improving the post-unemployment job quality. Our results show significant effects of the UI entitlement period on earnings. This indicates that unemployed workers lower their reservation wage when faced with a reduced UI entitlement period. These results are in agreement with standard job search theory.

We have used a hazard rate model to estimate the underlying dynamics in job finding. These models show that job finding rates increase just before the moment of exhausting UI benefits and afterwards they decline again. The latter is not consistent with standard job search theory, but is found often in the literature. We also find such a spike, although less pronounced, for unemployed workers who do not face a drop in benefits level when exhausting UI. This indicates that the level of benefits is not the only element of the benefits program which is important for job finding. The moment of exhausting UI benefits may be considered as an implicit deadline to unemployed workers, for example because there is a larger negative stigma associated to collecting welfare benefits than UI benefits. Alternatively, the transition for UI to welfare may be associated with uncertainty, which unemployed workers may dislike.

We have used our empirical results to quantify the expenditures associated to the reform. For the cohort of workers entering UI the year before the reform, the total expenditures on UI benefits with three years after entering unemployment equaled 3,296 million euros. Our empirical results show that the reform would have reduced this by 56 million euros. But only 15 percent of this difference is caused by unemployed workers leaving the UI scheme earlier because they found work, the rest is due to the earlier expiration of UI benefits. Therefore, expenditures on welfare benefits within three years for these individuals increased from 152 to 161 million euros. Since there is no effect on the total earnings, the total income within three years due to the reform reduced with 47 million euros, which is 0.6 percent of total

income for these individuals within this period.

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Table 10: Estimation effects of increasing the benefits level during the first two month of UI.

Reduction in months, by subgroup	Total	9 months	18 months	24 months
Finds job within 2 months	0.0142 (0.0129)	0.0015 (0.0221)	0.0355 (0.0217)	0.0002 (0.0232)
Finds job within 3 months	-0.0323** (0.0151)	-0.0342 (0.026)	-0.0195 (0.0254)	-0.0484* (0.0276)
Finds job within 6 months	-0.0006 (0.0172)	-0.0406 (0.0288)	0.0201 (0.0292)	0.0210 (0.0320)
Finds job within 12 months	-0.0368 (0.0168)	-0.0323 (0.0278)	0.0177 (0.0289)	0.0071 (0.032)
Finds job within 18 months	0.0038 (0.0157)	-0.0177 (0.0257)	0.0082 (0.0271)	0.0019 (0.0296)

\* significant at a level of 5%, \*\* significant at a level of 1%

## A The effects of increasing of UI benefits level

The Dutch UI reform in October 2006 did not only change the length of the entitlement period, but also the level of UI benefits. Before October 2006 an unemployed worker would receive 70% of the last earned wage. After October 2006 the unemployed worker, during the first two months UI the benefits level was increased to 75% of the last earned wage. Roed and Zhang (2003), Moffitt (1985), and Meyer (1990) show that the level of benefits affects job search behavior. We test this hypothesis by considering workers who entered just before and just after the reform and for whom the UI entitlement period was unaffected. These are the individuals with an employment history of either nine, 18 or 24 months. This has similarities with a regression discontinuity design and we estimate the effects of finding work within two, three, six, 12 and 18 months.

Table 10 shows the estimated coefficients for receiving high benefits during the first two months rather than 70% of the last wage. Because benefits are higher, job search theory would predict a negative effect on job finding. However, we do not find many significant effects. For finding work within two months the estimated effect is even slightly positive. From this we conclude that there is no strong evidence that the increase in benefits level during the first two months of UI affects job search behavior.

## B Estimation results of proportional hazard rate model for finding work

Table 11: Parameter estimates of the proportional hazard rate model for finding work.

Variable	(1)	(2)	(3)	(4)
Effects entitlement period				
After exhaustion UI	0.093** (0.013)	0.093** (0.013)	-	-
More than 6 months after exhaustion	-	-	0.021 (0.018)	0.023 (0.018)
3-6 months after exhaustion	-	-	0.059** (0.017)	0.060** (0.017)
1-3 months after exhaustion	-	-	0.093** (0.017)	0.093** (0.017)
First month after exhaustion	-	-	0.191** (0.019)	0.191** (0.019)
Last month until exhaustion	0.159** (0.017)	0.160** (0.017)	0.151** (0.017)	0.152** (0.017)
1-3 months until exhaustion	0.084** (0.013)	0.085** (0.013)	0.079** (0.013)	0.080** (0.013)
3-6 months until exhaustion, (reference category)	-	-	-	-
6-12 months until exhaustion	-0.003 (0.010)	-0.005 (0.010)	0.007 (0.010)	0.005 (0.010)
12-24 months until exhaustion	0.043** (0.013)	0.040** (0.013)	0.074** (0.014)	0.071** (0.014)
More than 24 exhaustion until exhaustion	0.039* (0.020)	0.037 (0.020)	0.096** (0.022)	0.093** (0.022)
Maximum duration of UI benefits (months)	-0.008** (0.001)	-0.007** (0.001)	-0.008** (0.001)	-0.008** (0.001)
Seasonal effects				
Quarter 3, 2004	-0.173** (0.016)	-0.186** (0.016)	-0.176** (0.016)	-0.188** (0.016)
Quarter 4, 2004	-0.070** (0.016)	-0.084** (0.016)	-0.073** (0.016)	-0.086** (0.016)
Quarter 1, 2005	-0.104** (0.015)	-0.123** (0.015)	-0.106** (0.015)	-0.125** (0.015)
Quarter 2, 2005	-0.170** (0.015)	-0.182** (0.015)	-0.172 (0.015)	-0.184** (0.015)
Quarter 3, 2005	-0.050** (0.016)	-0.058** (0.016)	-0.053** (0.016)	-0.060** (0.016)
Quarter 4, 2005	0.050**	0.043**	0.048**	0.041*

Variable	(1)	(2)	(3)	(4)
	(0.016)	(0.016)	(0.016)	(0.016)
Quarter 1, 2006	0.026	0.016	0.024	0.014
	(0.016)	(0.016)	(0.016)	(0.016)
Quarter 2, 2006	-0.042**	-0.041*	-0.044**	-0.043**
	(0.016)	(0.016)	(0.016)	(0.016)
Quarter 3, 2006	0.021	0.018	0.018	0.016
	(0.017)	(0.017)	(0.017)	(0.017)
Quarter 4, 2006	-0.011	-0.006	-0.012	0.007
	(0.017)	(0.017)	(0.017)	(0.017)
Quarter 1, 2007	0.095**	0.100**	0.095**	0.100**
	(0.017)	(0.017)	(0.017)	(0.017)
Quarter 2, 2007	0.054**	0.058**	0.054**	0.058**
	(0.017)	(0.017)	(0.017)	(0.017)
Quarter 3, 2007	0.052**	0.057**	0.052**	0.057**
	(0.017)	(0.017)	(0.017)	(0.017)
Quarter 4, 2007	0.096**	0.095**	0.095**	0.094**
	(0.018)	(0.018)	(0.018)	(0.018)
Quarter 1, 2008	0.062**	0.076**	0.062**	0.076**
	(0.018)	(0.018)	(0.018)	(0.018)
Quarter 2, 2008	0.017	0.029	0.017	0.028
	(0.018)	(0.018)	(0.018)	(0.018)
Quarter 3, 2008	0.066**	0.072**	0.066**	0.072**
	(0.017)	(0.017)	(0.017)	(0.017)
Personal characteristics				
Entered UI scheme in previous 2 years	-	0.114**	-	0.114**
		(0.007)		(0.007)
Renewal of old UI right	0.071**	-0.002	0.072**	-0.001
	(0.010)	(0.012)	(0.010)	(0.012)
Length previous UI spell in case of renewal	-0.026**	-0.025**	-0.025**	-0.024**
	(0.003)	(0.003)	(0.003)	(0.003)
Men	-	0.152**	-	0.152**
		(0.005)		(0.005)
Length of employment history				
5 years	0.001	-0.006	-0.005	-0.008
	(0.017)	(0.017)	(0.017)	(0.017)
6 years	-0.009	-0.027	-0.013	-0.030
	(0.017)	(0.017)	(0.017)	(0.017)
7 years	0.012	-0.012	0.008	-0.017
	(0.016)	(0.016)	(0.016)	(0.016)
8 years	-0.031	-0.066**	-0.036*	-0.071**
	(0.017)	(0.017)	(0.017)	(0.017)
9 years	-0.042*	-0.083**	-0.048**	-0.089**
	(0.017)	(0.018)	(0.017)	(0.018)
10 years	-0.185**	-0.219**	-0.191**	-0.225**
	(0.060)	(0.060)	(0.060)	(0.060)
11 years	-0.197**	-0.244**	-0.205**	-0.252**

Variable	(1)	(2)	(3)	(4)
	(0.070)	(0.070)	(0.069)	(0.070)
12 years	-0.230**	-0.284**	-0.239**	-0.292**
	(0.070)	(0.071)	(0.070)	(0.070)
13 years	-0.154*	-0.197**	-0.164*	-0.207**
	(0.064)	(0.064)	(0.064)	(0.064)
14 years	-0.162*	-0.217**	-0.171*	-0.226**
	(0.072)	(0.072)	(0.072)	(0.072)
15 years	-0.092**	-0.161**	-0.112	-0.181**
	(0.024)	(0.024)	(0.024)	(0.025)
16 years	-0.063**	-0.137**	-0.084**	-0.158**
	(0.024)	(0.024)	(0.024)	(0.025)
17 years	-0.088**	-0.164**	-0.110**	-0.186**
	(0.024)	(0.025)	(0.024)	(0.025)
18 years	-0.114**	-0.195**	-0.136**	-0.217**
	(0.024)	(0.025)	(0.025)	(0.025)
19 years	-0.088**	-0.163**	-0.103**	0-0.186**
	(0.024)	(0.025)	(0.025)	(0.026)
20 years	-0.042	-0.125**	-0.067*	-0.150**
	(0.029)	(0.030)	(0.030)	(0.030)
21 years	-0.008	-0.091**	-0.034	-0.116**
	(0.030)	(0.030)	(0.030)	(0.030)
22 years	-0.025	-0.105**	-0.050	-0.131**
	(0.030)	(0.031)	(0.030)	(0.031)
23 years	-0.032	-0.119**	-0.058	-0.145**
	(0.030)	(0.031)	(0.031)	(0.031)
24 years	-0.030	-0.109**	-0.056	-0.135**
	(0.031)	(0.031)	(0.031)	(0.032)
25 years	-0.005	-0.089*	-0.040	-0.124**
	(0.036)	(0.036)	(0.036)	(0.036)
26 years	-0.032	-0.121**	-0.069	-0.158**
	(0.036)	(0.037)	(0.037)	(0.037)
27 years	-0.046	-0.134**	-0.084*	-0.172**
	(0.037)	(0.037)	(0.037)	(0.038)
28 years	-0.040	-0.132**	-0.079*	-0.171**
	(0.037)	(0.038)	(0.038)	(0.038)
29 years	-0.060	-0.160**	-0.100**	-0.200**
	(0.038)	(0.038)	(0.039)	(0.039)
30 years	-0.051	-0.148**	-0.093*	-0.190**
	(0.042)	(0.043)	(0.043)	(0.043)
31 years	-0.100*	-0.206**	-0.142**	-0.248**
	(0.043)	(0.044)	(0.044)	(0.044)
32 years	-0.087*	-0.197**	-0.130**	-0.239**
	(0.044)	(0.044)	(0.044)	(0.044)
33 years	-0.142**	-0.258**	-0.185**	-0.301**
	(0.044)	(0.045)	(0.045)	(0.045)
34 years	-0.123**	0-0.241**	-0.166**	-0.284**



Variable	(1)	(2)	(3)	(4)
	(0.045)	(0.046)	(0.046)	(0.046)
35 years	-0.137*	-0.267**	-0.180**	-0.310**
	(0.054)	(0.054)	(0.54)	(0.055)
36 years	-0.172**	-0.300**	-0.214**	-0.342**
	(0.055)	(0.055)	(0.055)	(0.055)
37 years	-0.217**	-0.355**	-0.260**	-0.398**
	(0.056)	(0.056)	(0.056)	(0.057)
38 years	-0.259**	-0.405**	-0.302**	-0.448**
	(0.057)	(0.057)	(0.057)	(0.057)
39 years	-0.281**	-0.438**	-0.324**	-0.481**
	(0.058)	(0.058)	(0.059)	(0.059)
40 years	-0.355**	-0.511**	-0.395**	-0.551**
	(0.067)	(0.067)	(0.067)	(0.067)
41 years	-0.669**	-0.825**	-0.711**	-0.866**
	(0.070)	(0.070)	(0.071)	(0.071)
42 years	-0.644**	-0.819**	-0.686**	-0.861**
	(0.075)	(0.075)	(0.075)	(0.075)
43 years	-0.826**	-0.998**	-0.869**	-1.041**
	(0.085)	(0.084)	(0.085)	(0.085)
44 years	-0.846**	-1.022**	-0.888**	-1.064**
	(0.099)	(0.099)	(0.099)	(0.099)
45 or more years	-1.259**	-1.423**	-1.302**	-1.466**
	(0.091)	(0.091)	(0.092)	(0.092)
Has children	-	-0.054**	-	-0.054**
		(0.006)		(0.006)
Immigrant	-	-0.211**	-	-0.211**
		(0.007)		(0.007)
Yearly wage before UI less than €12500	-	-0.085**	-	-0.085**
		(0.011)		(0.011)
Yearly wage before UI €12500-20000	-	-0.062**	-	-0.062**
		(0.009)		(0.009)
Yearly wage before UI €20000-27500	-	-0.012	-	-0.012
		(0.008)		(0.008)
Yearly wage before UI €27500-45000	-	0.044**	-	0.045**
		(0.008)		(0.008)
Has partner with wage above SA threshold	-	0.035**	-	0.035**
		(0.005)		(0.005)
Has partner	-	0.057**	-	0.057**
		(0.007)		(0.007)
Single parent	-	0.026*	-	0.026*
		(0.010)		(0.010)
Sector: Agriculture	-	0.088**	-	0.088**
		(0.016)		(0.016)
Sector: Industry	-	0.105**	-	0.105**
		(0.008)		(0.008)
Sector: Construction	-	-0.006	-	-0.006

Variable	(1)	(2)	(3)	(4)
		(0.016)		(0.016)
Sector: Trade	-	0.087**	-	0.087**
		(0.008)		(0.008)
Sector: Transport	-	0.077**	-	0.077**
		(0.012)		(0.012)
Sector: Food	-	0.044**	-	0.044**
		(0.009)		(0.009)
Sector: Health care	-	-0.091**	-	-0.091**
		(0.011)		(0.011)
Sector: Government	-	-0.062**	-	-0.062**
		(0.019)		(0.019)
Sector: Financial	-	0.075**	-	0.075**
		(0.018)		(0.018)
Sector: Business	-	0.110**	-	0.110**
		(0.009)		(0.009)
Province: Groningen	-	0.004	-	0.004
		(0.014)		(0.014)
Province: Friesland	-	-0.020	-	-0.019
		(0.014)		(0.014)
Province: Drenthe	-	0.001	-	0.001
		(0.015)		(0.015)
Province: Overijssel	-	0.043**	-	0.043**
		(0.012)		(0.012)
Province: Gelderland	-	0.044**	-	0.044**
		(0.011)		(0.011)
Province: Flevoland	-	0.078**	-	0.078**
		(0.017)		(0.017)
Province: Utrecht	-	0.087**	-	0.087**
		(0.013)		(0.013)
Province: Noord-Holland	-	0.078**	-	0.078**
		(0.011)		(0.011)
Province: Zuid-Holland	-	0.070**	-	0.070**
		(0.010)		(0.010)
Province: Zeeland	-	0.098**	-	0.098**
		(0.019)		(0.019)
Province: Noord-Brabant	-	0.072**	-	0.072**
		(0.010)		(0.010)

\* significant at a level of 5%, \*\* significant at a level of 1%

## C Alternative specification for individuals without an income drop after UI

We find a spike in the job finding rate around UI benefits exhaustion for individuals who do not face drop in benefits after UI. To further explore this, we repeat the

analysis performed by Pellizzari (2006), who finds that individuals who also receive welfare benefits during the period of receiving UI benefits are less sensitive to changes in the UI replacement rate and UI entitlement period. Pellizzari (2006) does not find a spike in the exit rate during the final month of UI for these individuals who either receive welfare benefits or become eligible for welfare benefits. Pellizzari uses self-reported data and exploits differences between European countries.

In our analysis we include interaction terms for the time until exhaustion for individuals who are entitled to welfare benefits after exhausting UI benefits. Since we are able to distinguish between individuals who do or do not face a large income drop, we also include interactions for individuals with UI benefits equal to welfare benefits. The analysis thus mimics the specification used by Pellizzari (2006) and the estimation results are presented in table 12.

Like in our earlier estimations we find an increase in the job finding rate towards the moment of UI benefits exhaustion, and after exhaustion the job finding rate declines. This confirms our earlier findings that entitlement to welfare benefits does not remove the spike in the job finding rate. We do find a negative effect on the job finding rate of being entitled to welfare benefits, but this effect is not related to time until exhaustion and does not reduce the spike. So, in contrast to Pellizzari (2006) we find a spike in the hazard rate to work for individuals without a large income drop after UI.

Table 12: Estimation output of Cox Proportional Hazard model with interaction terms

Variable	Effects total	Effects entitled to welfare	Effects low income	Effects entitled to welfare and low income
More than 6 months after exhaustion	-0.103* (0.044)	0.079 (0.047)	0.442** (0.071)	-0.220* (0.087)
3-6 months after exhaustion	-0.005 (0.051)	0.051 (0.059)	0.178 (0.093)	-0.036 (0.114)
1-3 months after exhaustion	0.033 (0.051)	-0.001 (0.060)	0.209* (0.095)	0.006 (0.167)
First month after exhaustion	0.154* (0.061)	-0.001 (0.072)	0.270* (0.110)	-0.063 (0.138)
Last month until exhaustion	0.186** (0.051)	-0.056 (0.062)	0.005 (0.101)	0.082 (0.126)
1-3 months until exhaustion	0.058 (0.040)	0.013 (0.049)	0.176* (0.078)	-0.154 (0.098)
3-6 months until exhaustion, reference category	-	-	-	-

Period	Effects total	Effects entitled to welfare	Effects low income	Effects entitled to welfare and low income
6-12 months until exhaustion	-0.021 (0.030)	0.028 (0.036)	0.084 (0.062)	-0.139 (0.079)
12-24 months until exhaustion	0.055 (0.031)	0.000 (0.032)	0.070 (0.055)	-0.111 (0.069)
More than 24 months until exhaustion	0.048 (0.041)	0.011 (0.034)	-0.019 (0.057)	-0.065 (0.076)
Entitled to welfare	-0.073** (0.028)	-	-	-
Entitled to welfare and has low income	0.094 (0.060)			
Has low income	-0.375** (0.048)			

\* significant at a level of 5%, \*\* significant at a level of 1%