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Estimating the effects of potential benefit duration without variation in the maximum duration of unemployment benefits

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Abstract

This paper examines the effects of unemployment benefit duration in Finland. To overcome the problem that the maximum duration of benefits is the same for all unemployed we exploit two observations. First, despite the uniform maximum benefit period, potential benefit duration at the beginning of unemployment spells varies across individuals because only those with sufficient work history in the past two years qualify for a new period of benefits whereas others may be entitled to unused benefit days from a previous spell. Second, part of this variation is exogenous due to a reform that reduced the minimum number of employment weeks required for the new benefit period. Using the exogenous part of the variation for identification we estimate that one extra week of benefits increases expected unemployment duration by 0.15 weeks, which corresponds to an elasticity of 0.5. We also find positive effects on the quality of the next job, especially when measured by job stability.

Key words: Unemployment insurance, unemployment duration, eligibility conditions

JEL classes: J64, J65

1 Introduction

One of the key questions in the unemployment insurance (UI) literature is how the length of the benefit period affects the duration of unemployment spells and the quality of subsequent job matches. A major challenge of causal inference is to find exogenous variation in the length of the benefit period. The most convincing studies have relied either on discontinuities in the benefit rule that determines the length of the benefit period as a function of age and/or work history (e.g. Card et al. 2007; Schmieder et al. 2012; Caliendo et al. 2013; Lalive 2007; Le Barbanchon 2016; Lalive 2008) or policy changes that extended or reduced the benefit period for some group of the unemployed but did not affect other groups (e.g. Hunt 1995; van Ours and Vodopivec 2006; Lalive et al. 2006). The regression discontinuity approach can be applied only in the case of certain countries where the length of the entitlement period varies across worker groups (e.g. Germany, Austria, Italy and Portugal).[1] A common problem with the policy reforms is that the benefit periods are often extended in response to recessions (e.g. the federal- and state-level benefit extension programs in the U.S.) or to the relatively poor employment development of a certain worker group, so that the policy changes themselves are endogenous (Card and Levine, 2000; Lalive and Zweimüller, 2004). Large-scale reforms may also have spillover effects on those who are not directly affected through search externalities (Levine 1993; Lalive et al. 2015). In the case of Finland, neither of these approaches can be applied.

In Finland, the maximum duration of UI benefits remained at 100 weeks for all unemployed for several decades up until 2013.[2] As there has been no variation in the maximum benefit duration that one could have exploited for identification in the analysis, no empirical evidence on the effects of potential benefit duration exists for Finland. This is particularly unfortunate at the times when the Finnish UI scheme is being reformed. The reforms implemented so far have involved quite substantial reductions in the length of the entitlement period. In 2014, the maximum benefit duration was reduced by 20 weeks for those with less than three years of work experience. This was followed by a general

[1] The regression discontinuity approach is not immune to confounding factors either. First, the running variable (e.g. work history) that determines eligibility for an extended benefit period may be measured with error which can bias the results unless benefit eligibility is directly observed in the data. Second, workers (and perhaps also their employers) have an incentive to manipulate the timing of unemployment entry in such a way that the benefit claimant qualifies for a longer benefit period. Finally, behavior of the unemployed just below the eligibility threshold provides a poor counterfactual if they can establish eligibility for a longer benefit period by taking up a very short job.

[2] There is an exception for the oldest unemployed as those exceeding a given age threshold before their regular UI benefit expire may qualify for extended benefits until retirement. In practice, this scheme acts as an early retirement scheme for many unemployed workers, some of whom self-select themselves into the program. Kyyrä and Wilke (2007) show that the unemployment risk of private-sector workers at least doubles at the age threshold of this scheme, and Kyyrä and Ollikainen (2008) estimate that approximately one half of unemployed workers eligible for the benefit extension withdraw from job search entirely.

reduction of 20 weeks that came into effect at the beginning of 2017. Together these two changes have shortened the maximum benefit period by 20% for the majority of the people and by 40% for those with less than three years of work experience. Given the long entitlement periods in Finland and the fact that the new rules only affect new UI spells, it will take some time before we will have access to data with a sufficiently long follow-up period to evaluate the effects of these reforms. Meanwhile, we propose and apply a novel approach to estimate the causal effects of potential benefit duration in the absence of variation in the maximum benefit period.

In Finland, an unemployed worker who has worked for a certain minimum number of weeks during the past two years is awarded a new period of UI benefits (500 payment days or 100 calendar weeks prior to 2014). A worker who enters unemployment without satisfying this employment condition may still be entitled to UI benefits if he or she has unused UI days from a previous unemployment spell. Within this group the remaining benefit entitlement can be anything between 0 and 499 days, being 0 for those who exhausted their UI benefits in the past and for those who have not received UI benefits before. Thus, even though the *maximum* entitlement period is the same for all unemployed, there is variation in *potential* benefit duration at the beginning of unemployment spells among workers with somewhat sporadic employment histories. Obviously this variation alone does not permit causal inference because it is completely driven by differences in labor market histories.

To identify the causal effects we take advantage of a change in the employment condition that reduced the minimum number of employment weeks required for renewal of the entitlement period in 2003. As a result of the reform, workers who satisfied the new but not the old employment condition became eligible for UI benefits for different periods of time depending on the date of their unemployment entry, whereas other workers were not affected by the reform. Provided that the change in the employment condition did not affect the unemployment inflow, the resulting variation in the length of benefit entitlement within the affected group is exogenous and thus the causal effects of potential benefit duration can be identified. Since the reform affected only a relatively small fraction of all UI recipients, we are not worried about the confounding spillover effects.

We use comprehensive data that combines information from various administrative registers. A particular feature of the data is that we can keep track of the number of remaining UI days over time. In particular, we observe the number of available benefit days at the beginning of the current unemployment spell (i.e. potential benefit duration) as well as the number of unused benefit days at the end of the previous spell, if any (i.e. counterfactual benefit duration if the employment condition is not satisfied). We classify workers who became unemployed between 2000 and 2004 into groups defined by the number of employment weeks and the number of unused UI days from the previous spell. These groups were affected differently by the 2003 change in the employment condition. The groups where employment weeks exceed the new but not the old threshold of the employment condition are the most likely to experience a notable increase in potential benefit duration after 2003. Moreover, within these groups, the average increase in potential benefit duration is larger for those with fewer UI days from the previous spell. Under the assumption that the expected value of unobserved characteristics in different groups follows the same trend, we can estimate the effects of potential benefit duration by comparing changes in the unemployment outcomes over time across different groups.

Our findings indicate that one additional week of UI benefits increases the expected duration of compensated unemployment by some 0.15 weeks, corresponding to an elasticity of 0.5. This effect appears to be fairly homogeneous, as the absolute effect varies between 0.10 and 0.22 weeks across various subgroups of workers. The effect is quite similar for women and men, for different education groups, and for private- and public-sector employees, as well as for those facing different labor market conditions. However, workers aged 45 and over and those with relatively high UI benefits may be somewhat more responsive to changes in the length of the benefit period.

We find evidence that longer benefit periods improve the quality of the first post-unemployment job: one additional week of benefits is estimated to increase the expected wage and duration of the next job by some 2 Euros a month and 0.15 weeks, respectively. The former effect is very small, corresponding to an elasticity of 0.06, whereas the latter effect is economically significant with an elasticity of 0.19. The effect on quality of next job varies across groups, being close to zero in many cases. Women, low educated and private-sector employees are the most likely to benefit in terms of higher wages or more stable jobs from the longer job search periods that longer benefit periods enable.

Our study makes three contributions. First, we provide first evidence on the effect of potential benefit duration on unemployment duration for Finland. Tatsiramos and van Ours (2014) summarize the findings of the previous studies for other countries by concluding that a one week increase in the potential benefit duration typically prolongs average unemployment duration by approximately 0.2 weeks. Although our approach differs from the previous studies that exploit exogenous variation in the maximum benefit duration, our estimate of 0.15 is of the same magnitude. Second, our study contributes to the literature on the effect of potential benefit duration on quality of subsequent job matches. This literature has produced mixed results, some studies finding small positive effects on subsequent wages or job stability while others report small negative effects or no effects at all. Our results for Finland are rather encouraging as we do find evidence of some positive impacts on match quality.

Finally, we show that it may be possible to estimate the causal effects of potential benefit duration even when there is no variation in the maximum benefit duration. In most countries, benefit eligibility depends on the record of past employment and awarded benefits can be collected over several unemployment spells. In these cases, the approach proposed here can be applied provided that the eligibility rules have changed over time.

The rest of the paper proceeds as follows. The next section discusses the Finnish UI system during the period under investigation and describes the reform in 2003. This is followed by a section describing our data and sample restrictions. Section 4 presents descriptive evidence to support the validity of our research design and likely effects of potential benefit duration. Section 5 describes the econometric model and reports the estimation results along with the results of robustness checks. Section 6 concludes.

2 Institutional setting

2.1 Unemployment insurance in Finland

Earnings-related UI benefits are paid by unemployment funds. Membership in these funds is voluntary, but as many as 90% of employed workers were members in 2015. A worker who lost his or her job qualifies for 100 weeks of UI benefits (500 weekdays) provided that he or she (i) has registered as an unemployed job seeker at the public employment service, (ii) has been a member of an unemployment fund for at least ten months (membership condition), and (iii) has worked for a minimum number of weeks in a certain time interval (employment condition). Workers who are 57 years or older on the day when their regular UI benefits expire are entitled to extended benefits until retirement.

The level of UI benefits has no cap but the replacement rate declines rapidly with the level of past earnings. If the benefit recipient leaves unemployment without exhausting his or her benefits, and then returns to unemployment before satisfying the employment condition again, he or she will be entitled to unused UI benefits from the previous spell (given that he or she did not leave the labor market for a period longer than six months without an acceptable reason). Those who exhaust their UI benefits can claim a means-tested, flat-rate labor market subsidy, which is paid by the Social Security Institution for an indefinite period.[3]

Participants of labor market training programs receive a training subsidy, which equals the unemployment benefit the worker would have otherwise received. Furthermore, an

[3]Those unemployed who do not belong to an unemployment fund but satisfy the employment condition are eligible for a flat-rate basic allowance which is the same amount as the labor market subsidy and which is paid for a period of 500 days without means testing. In practice, this benefit type is of minor importance and their recipients are not covered in our analysis.

unemployed worker who takes up a part-time job or a very short full-time job may be entitled to a reduced amount of benefits, i.e. partial benefits. The entitlement period for a worker on partial UI benefits elapses at a reduced rate proportional to the ratio of the partial benefit to full-time benefit. Thus, the unemployed can collect earnings-related benefits longer than 100 weeks due to part-time unemployment and participation in the labor market training programs.

2.2 The 2003 change in the employment condition

Before 2003, the employment condition was met if the benefit claimant had worked and made contributions to an unemployment fund for at least 43 weeks ("contribution weeks") within the past 24 months ("review period"). During each contribution week the claimant had to have worked for 18 hours or more. For those unemployed who had renewed their UI entitlement last time within two years prior to the current spell, the review period was shorter and defined as the time between the end of the previous UI spell and the end of the job preceding the current spell. On the other hand, the length of the review period could also be extended if the claimant had been outside the labor force for some acceptable reason, such as illness, military service or taking care of a young child at the home.

In 2003, the minimum number of contribution weeks required for *renewal* of the 500-day entitlement period was reduced from 43 to 34. For first-time benefit claimants the minimum number of weeks did not change but remained at 43, yet the review period over which these weeks could be collected was extended by four months to 28 months for this group. For technical reasons, the group of first-time claimants was defined as those who had not received UI benefits after 1996.

The change in the employment condition was part of the renewal of the Unemployment Compensation Act. This new law was officially proposed by the government on September 13, 2002, and it came into effect on January 1, 2003. According to the government's law proposal, the main objective of the reform was to simplify legislation by clarifying certain rules and collecting them into a single law. The motivation for relaxing the employment condition mentioned in the law proposal was to encourage the unemployed to take up short-term jobs and to help those with difficulties in finding stable jobs to renew their benefit eligibility. That is, the 2003 reform was not a response to a change in macroeconomic conditions, which were quite stable at that time yet slightly improving over the later years. The GDP growth rate was around 2% in 2001–2003 but it roughly doubled for the next few years. The unemployment rate was 9.1% in 2001 and 2002, after which it slowly reduced to 7.7% by 2006.

2.3 Other simultaneous changes

In addition to the change in the employment condition, the new law in 2003 involved some other minor changes that affected UI generosity. First, the severance pay system was abolished and replaced by a higher UI benefit that could be paid for the first 150 days of unemployment.[4] Eligibility criteria for the severance pay and higher benefit were slightly different but they were both targeted at older workers who were laid off for economic reasons after a long working career. Due to rather strict eligibility criteria, a relatively small share of all UI recipients qualified for these payments. In the empirical analysis, we focus on workers who became unemployed after a relatively short job spell, usually at the end of a fixed-term contract. As a result, the share of individuals entitled to higher benefits based on a long working career is very small in our data (less than 2%). Second, the benefit level was increased for the oldest unemployed who receive extended benefits after exhausting their regular UI benefits. This age group is excluded from our analysis. Third, the maximum length of a temporary full-time job qualifying for partial benefits was reduced from four to two weeks, which may have increased part-time unemployment somewhat. In the empirical analysis we consider workers who received full-time benefits after a job loss. Some of them moved from full-time benefit into partial benefits at a later point (3.1% in our estimation sample), in which case the period of partial benefits is treated as a part of the overall unemployment spell. Finally, there was also an earlier reform on March 1, 2002, which increased the benefit level of all UI recipients. Since all these other changes affected all UI recipients in the same way, they should not distort our analysis that is based on a difference-in-differences setting.

3 Data

3.1 Data sources

Our data was compiled by merging information from various administrative registers. The register on job seekers, maintained by the Ministry of Employment and the Economy, covers all job seekers at the public employment service. One cannot receive unemployment benefits without being registered as an unemployed job seeker, which means that all benefit recipients should be included in the register. This register contains information on registered job search spells and participation in various active labor market programs,

[4] Also this change was meant to simplify the system (as the severance pay and UI benefits were paid by different institutions) rather than to change benefit generosity. Indeed, the size of the benefit increase (about 15% on average) was chosen in a such way that the amount of the cumulative benefit increase over 150 days roughly equals the abolished severance pay for an average recipient. See Uusitalo and Verho (2010) for an evaluation of the effect of the benefit increase.

as well as demographic characteristics of job seekers. However, it does not contain any information on receipt of unemployment benefits, nor on regular job spells.

While the UI benefits are paid by individual unemployment funds, each fund reports the benefits it paid out to the Insurance Supervisory Authority on a quarterly basis. From the benefit register of this authority we obtain information on unemployment fund membership, UI benefits received and earnings-related training subsidies. Along with daily benefits the records also contain information on the remaining UI entitlement at the end of each quarter. With this information we can keep track of the number of remaining UI days over time. From the Social Security Institution we obtain corresponding information on flat-rate unemployment benefits and training subsidies.

For all unemployed individuals we merge employment and earnings information from the registers of the Finnish Centre for Pensions, which is a statutory co-operation body of all providers of earnings-related pensions in Finland. It keeps comprehensive records on job spells and earnings for the entire Finnish population, which are used to determine pension benefits. We use this information to construct a measure for the number of contribution weeks, to detect exits to employment and to determine the wages and durations of jobs held before and after the unemployment spell.

We define an unemployment spell as the time the worker collects unemployment-related benefits. More precisely, we combine sequential spells of benefit receipt that are no more than four weeks apart by treating such benefit periods as part of the same unemployment spell but ignoring the days without benefits between the benefit periods. The time spent in labor market training courses and on partial benefits is counted as part of the unemployment spell. The resulting unemployment spell may thus include periods on different types of benefits. For example, a worker may first receive UI benefits, then the training subsidy for the duration of a training course, and finally end up on labor market subsidy after exhausting his or her UI benefits.

The unemployment spell may end with a transition to regular work, a job placement program (i.e. subsidized work) or nonparticipation. The register on job seekers contains information on periods of subsidized employment. It also includes information on exits to regular jobs that applicants found themselves or through the referrals of the employment authorities. However, this information on job findings is not complete as the exit reason is often missing for those who found a new job on their own. For these reasons, the exits to regular work are detected by comparing the ending dates of the unemployment spells and the starting dates of job spells. Only exits to jobs with a duration of at least four weeks and monthly wage no less than 500 Euros are classified as job findings.

3.2 Sample

We consider unemployment spells that started in 2001–2004 after a job loss. We require that the duration of the last job was at least four weeks and the job ended within four weeks prior to the benefit claim (this eliminates voluntary quits). We further limit our analysis to individuals between the ages of 25 and 54 who have been a member of an unemployment fund for at least two years, who have received UI benefits after 1996 and who have been in the labor force for at least 90% of the time during the past two years without being self-employed or hired with a wage subsidy. The age restriction eliminates older workers entitled to extended benefits. The UI history condition guarantees that workers with 34–42 contribution weeks were affected by the law change. Other restrictions are imposed to improve the accuracy of our measure of the number of the contribution weeks. This variable is difficult to measure because we do not observe working hours and because the review period may be extended for various reasons, and due to the complexity of the rules regarding how self-employment and subsidized employment are treated. Despite these sample restrictions, the estimated number of contribution weeks remains subject to some measurement error, as we illustrate below.

After the change in the employment condition in 2003, workers with 34–42 contribution weeks became eligible for a new period of UI benefits for 100 weeks. Therefore, we can compare unemployment outcomes within this "treatment group" over time, using some other group whose eligibility status was not affected by the reform as a "comparison group." The most natural candidate for the latter group are workers who are similar to our treatment group members. We consider two such groups: workers with 20–33 contribution weeks and those with 43–60 weeks. Thus, we limit our econometric analysis to workers with 20–60 contribution weeks. Because the law change was proposed on September 13, 2002, we also drop spells that started on that date or later in 2002 as they may have been subject to anticipatory behavior. The final sample consists of 60,295 unemployment spells. In the descriptive analysis we do not necessarily impose these sample restrictions but consider all workers with 4–104 contribution weeks who became unemployed in 2001–2004 provided that they satisfy the age and labor market history conditions listed above.

4 Descriptive evidence

4.1 The 2003 reform and unemployment inflow

One concern in our analysis is that the change in the employment condition may have affected the unemployment inflow, in which case workers with a given number of contribu-

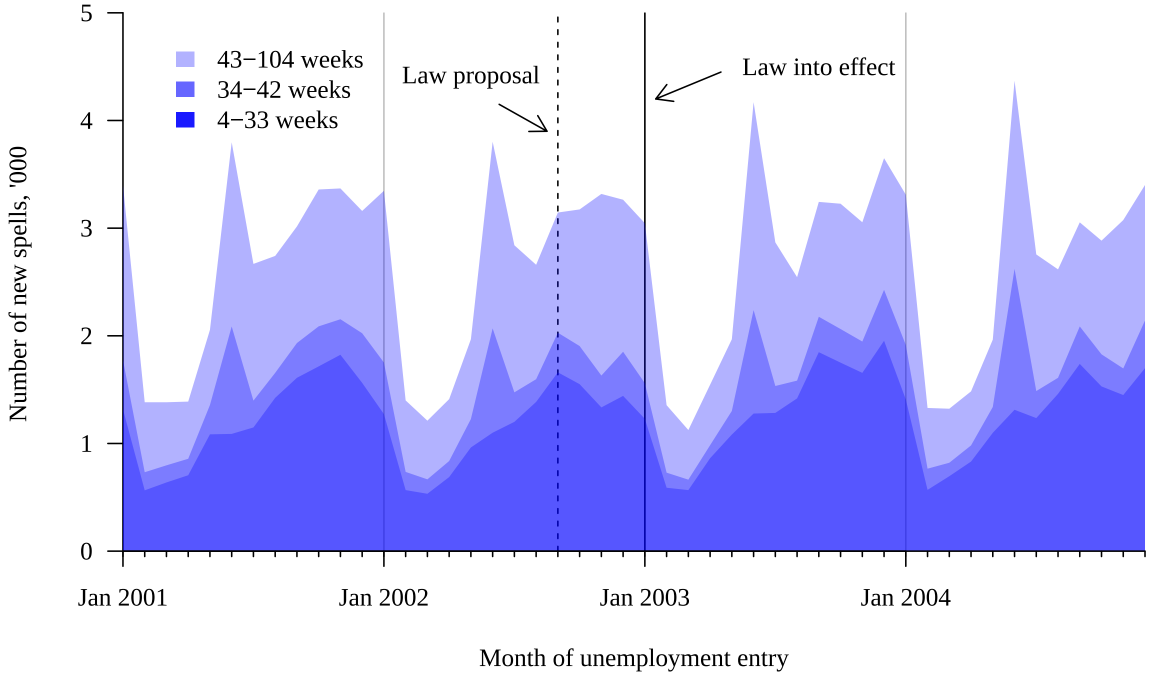

Figure 1: Monthly flow from employment to unemployment by the number of contribution weeks at the beginning of the unemployment spell

tion weeks who entered unemployment before and after the reform may be systematically different. Figure 1 shows the unemployment inflow decomposed into the three groups according to the number of contribution weeks. There is a large degree of seasonal variation in the inflow and the seasonal pattern varies between the groups. In all groups the inflow drops by more than 50% from January to February. The inflow rate of individuals with less than 34 contribution weeks increases smoothly from February onward and stabilizes at a high level for the last quarter. For the other two groups, the inflow rates are also relatively low from February to May but peak at the start of the summer period and remain at higher levels for the second half of the year. Whereas the inflow rate of those with at least 43 contribution weeks roughly doubles in June and July from May, the peak in June is particularly pronounced for those with 34–42 contribution weeks (our treatment group), among whom the inflow rate more than quadruples from May to June having first nearly doubled from April to May. It follows that 26% of all spells of the treatment group started in June compared to 8% in the group with less than 34 contribution weeks and 14% in the group with more than 42 contribution weeks.

Apart from the seasonal variation, the inflow rates were stable around the time of the 2003 reform. This reflects partly the fact that the unemployment rate and economic environment were relatively stable in Finland at that time. Furthermore, given the lack

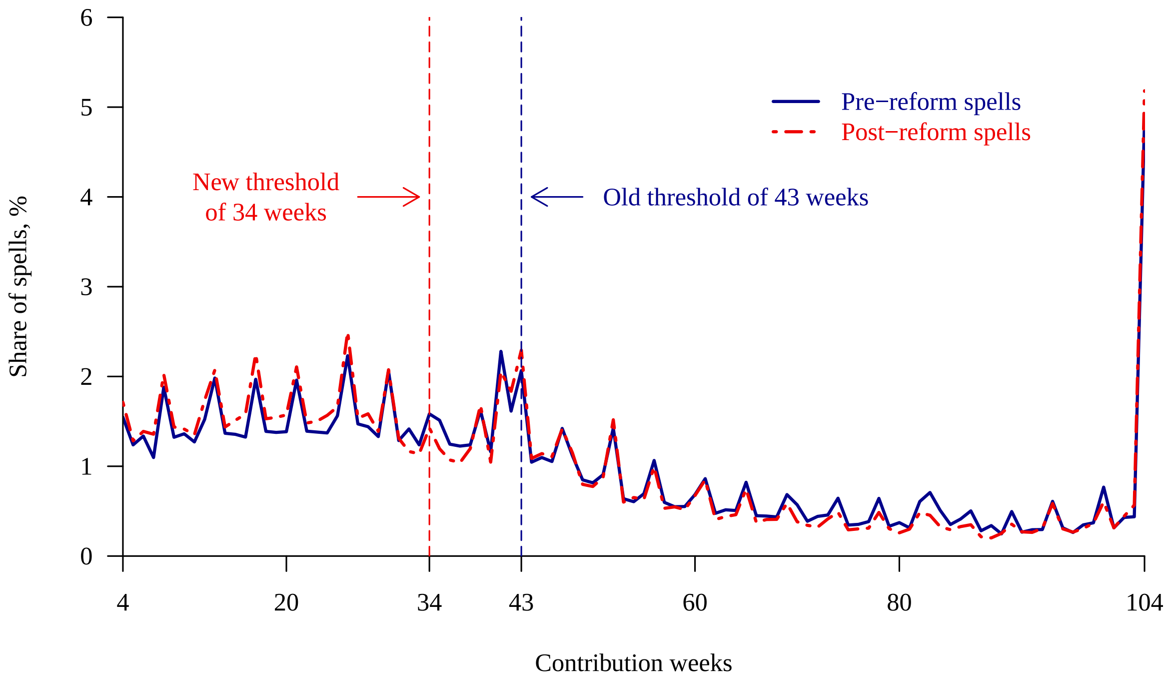

Figure 2: Distribution of contribution weeks by unemployment entry period. Pre-reform spells started in 2001–2002 before September 13, 2002, and post-reform spells in 2003–2004.

of notable changes in the inflow in 2003 between the groups, it is unlikely that the reform had an impact on the unemployment inflow. If satisfying the employment condition increased the exit rate from employment to unemployment, we should see an increase in the unemployment inflow for workers with 34–42 contribution weeks and a decline for those with more than 42 contribution weeks, but we do not see evidence of such an effect in figure 1. To examine this possibility more carefully we compare the distributions of the contribution weeks between those who became unemployed before and after the reform in figure 2. If employed workers time their unemployment entry according to the employment condition rules, we should see a mass point on the right-hand side of the threshold value of 43 weeks in the pre-reform distribution, and this mass point should have moved towards the new threshold value of 34 weeks after the reform. No such evidence is seen in figure 2. Instead, the pre- and post-reform distributions are very similar, suggesting that employed workers or their employers did not change their behavior in response to the law change.

In addition to the spike at 43 contribution weeks, there is bunching of observations on the "wrong" side of the old threshold value. Given that the mass of the observations between 41 and 43 weeks did not vanish in the post-reform period, it is likely to be unrelated to the employment condition. Nor can it be explained by measurement error

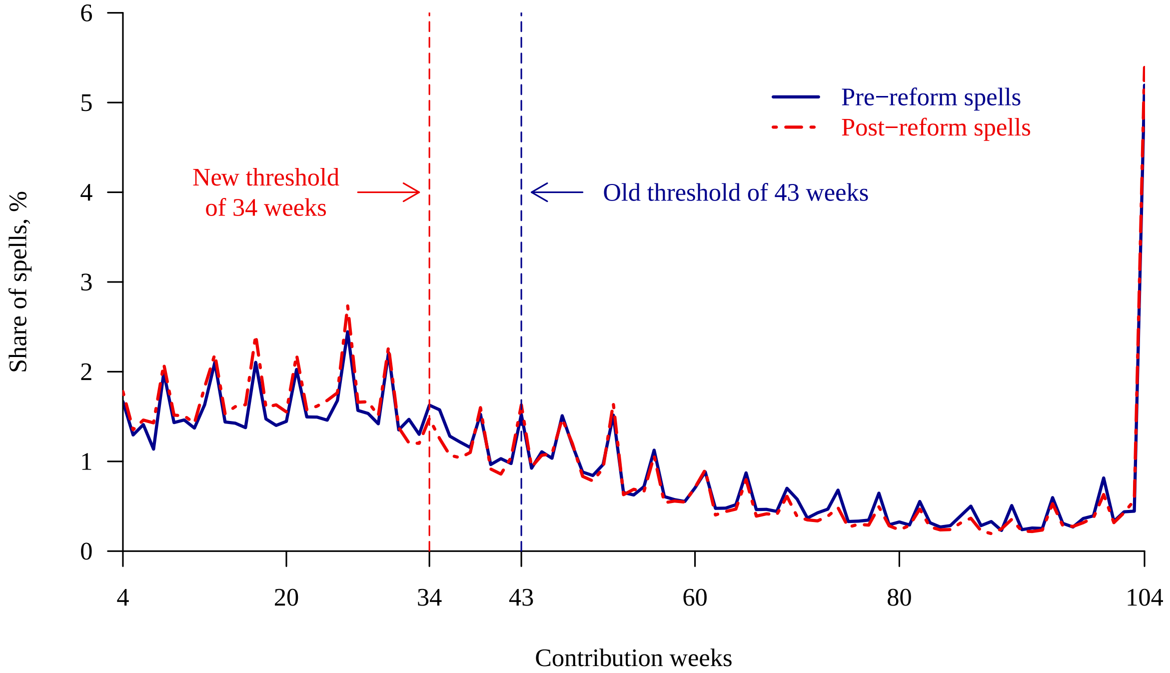

Figure 3: Distribution of contribution weeks by unemployment entry period without spells starting in June. Pre-reform spells started in 2001–2002 before September 13, 2002, and post-reform spells in 2003–2004.

because the vast majority of individuals with 41 or 42 contribution weeks in the pre-reform period did not satisfy the employment condition according to the UI records (this is illustrated in figure 4 below). It turns out that the mass point can be attributed to individuals who entered unemployment in June. The mass point disappears altogether when we drop the individuals who became unemployed in June, as shown in figure 3. About 40% of the unemployment entrants in June with 41 or 42 weeks are female health care or social workers from the public sector. Most of these workers return to their previous employer (typically already in August), even though temporarily laid off workers with a valid employment contract are excluded from the sample.

We have also compared the contribution week distributions separately for workers who were laid off and those whose fixed-term contract ended. As a further robustness check, we have examined the distributions of the duration of the previous job for all unemployed workers as well as for the subgroups who became unemployed for different reasons. None of these analyses indicates that the timing of the unemployment entry from employment would have changed in response to the 2003 reform. As such, it seems evident that workers do not leave employment for unemployment at a higher rate once their contribution weeks exceed the threshold value of the employment condition. Nor do the employers target dismissals at those employees who would be entitled to the maximum duration of UI benefits.

4.2 Benefit entitlement over time by group

We do not directly observe the contribution weeks in our data but calculate them using information on job spells. Despite the sample restrictions discussed earlier, some inconsistencies in the information obtained from the different registers remains. In particular, the number of contribution weeks from the job spell data do not always match the UI records which are supposed to be highly reliable. To illustrate this we depict the fraction of unemployment entrants who qualified for 100 weeks of benefits (500 UI days) according to the benefit records as a function of contribution weeks computed from the employment records for the spells starting before and after the 2003 reform in figure 4a. In the absence of measurement errors, the share of the unemployed who renewed their entitlement period should be 0% until the threshold of 34 or 43 weeks depending on the entry period, and 100% thereafter. As seen in figure 4a, this is not the case and the degree of classification errors is about 15% for the individuals with 34–42 contribution weeks.

Figure 4b shows the renewal rate by the month of unemployment entry for three contribution week groups. The fraction of those qualifying for 100 weeks of UI benefits in our treatment group increases sharply at the time of the reform, ending up close to the level of workers with 43–60 weeks. The renewal rate for workers with 20–33 weeks also increases over time (because those whose latent true contribution weeks are between 34 and 42 renewed their entitlement period in the post-reform period) but to a much lesser extent. The renewal rates of these two groups increased already in late 2002, i.e. before the new law came into effect. This is because the new rules may have been applied to the spells that were ongoing on January 1, 2003.

When measured by the number of UI weeks the individual is entitled to at the start of the unemployment spell, the differences between groups are less drastic, especially around the threshold values of the employment condition (figures 4c). It appears that people typically have many unused UI weeks from the previous unemployment spell (65 weeks on average), suggesting they have experienced short UI spells in the past. As a result, workers are often entitled to long benefit periods even if they do not satisfy the employment condition.

As pointed out above, our data includes a specific subgroup of individuals who typically entered unemployment in June, stayed unemployed for the summer period and then returned to employment in August. Having been unemployed only during the summer weeks of the previous year these workers have 41 or 42 contribution weeks and a large number of unused UI weeks (87 on average). The presence of this group explains the long

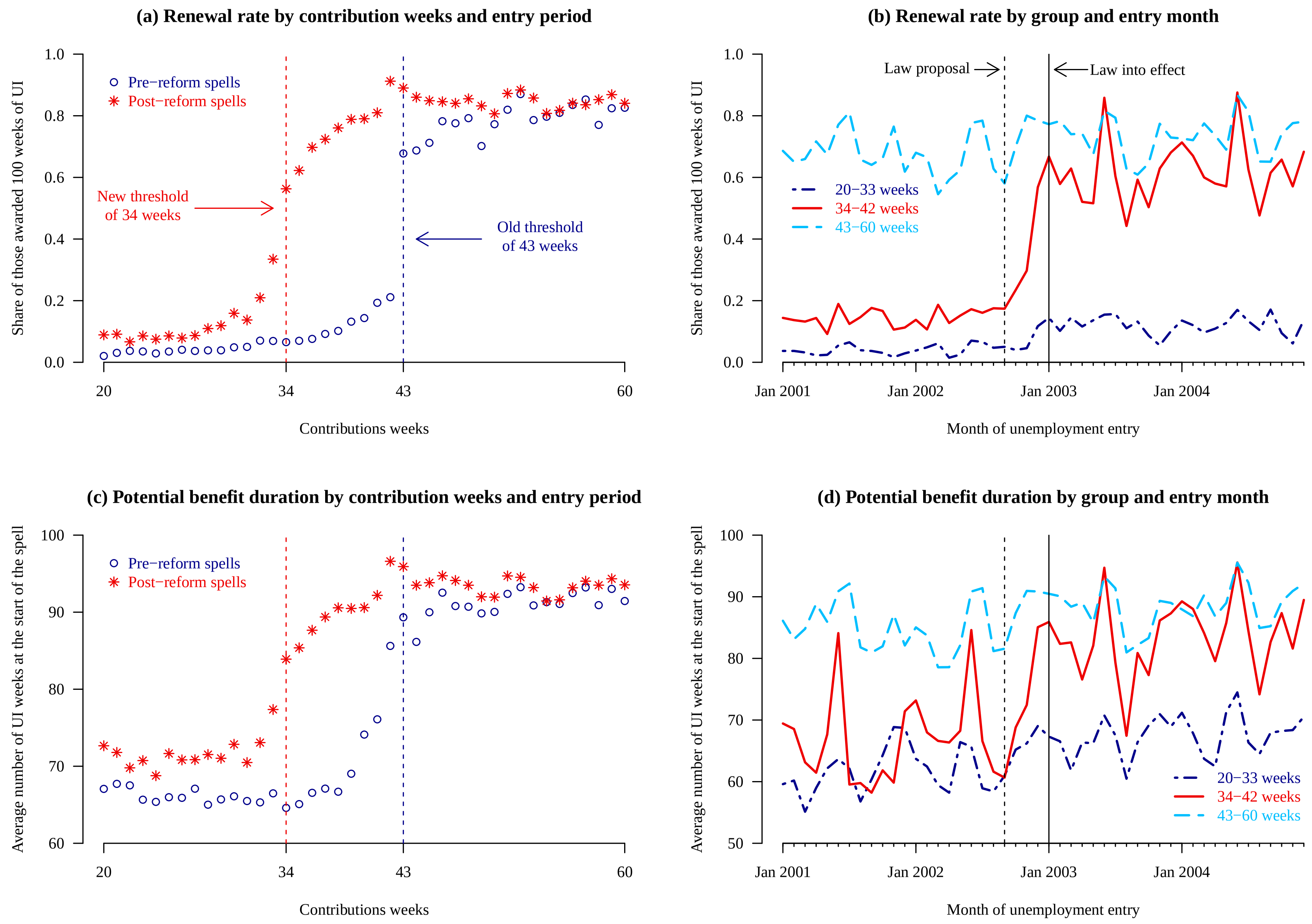

Figure 4: UI entitlement by contribution weeks and time of unemployment entry. Pre-reform spells in panels a and c only include those that begun before September 13, 2002.

potential benefit duration at 42 contribution weeks before the reform period in figure 4c, as well as the spikes in June for the treatment group in figure 4d.

As the macroeconomic environment improved over the years, workers who became unemployed in the later years have experienced shorter UI spells in the past and, therefore, have more unused UI weeks at the beginning of the current spell. The average number of unused UI weeks increased from 2001 to 2004 by 3, 5 and 7 weeks for groups with 20–33, 34–42 and 43–60 contributions weeks respectively. This explains modest increasing trends in the potential benefit duration for those with 20–33 contribution weeks over all years, as well as for the treatment group over the pre-reform period. The improving macroeconomic conditions have less impact on the potential benefit duration of workers with 43–60 weeks who should qualify for 100 weeks of UI benefits in all years, so that all the variation within this group is due to erroneously classifying workers who actually have less than 43 contribution weeks into the group.

The key insight from figure 4 is that despite the measurement error in the contribution week variable, the average potential benefit duration in the treatment group changed markedly at the time of the reform compared to the other groups. This is the variation we exploit for identification in the econometric analysis.

4.3 Labor market outcomes over time by group

Figure 5 shows average outcomes by group and month of unemployment entry.[5] The unemployment spells were shortest for the treatment group up until the summer of 2002. After September 2002, the average length of the benefit period increased in the treatment group compared to the other groups (figures 4b and 4d), which may indicate that the increasing average unemployment duration of the treatment group after the reform was caused by longer benefit periods. The lack of differences in the unemployment duration already in August and September 2002 does not fit the story, but that is likely to be driven by differential seasonal patterns as there were no differences in the same months in 2001 either.[6]

The average unemployment duration of workers with 20–33 weeks increases over time compared to the group with 43–60 weeks. At a glance, this may seem worrisome regarding the parallel trend assumption we need in our analysis, but it may arise from the differential trends in the potential benefit duration between the groups in figure 4d. The

[5] To eliminate a few outliers we censor the unemployment spells at 120 weeks (2.2% of observations), the subsequent job spells at 6.5 years (3.5% of the re-employed) and the post-unemployment wages at the 99th percentile by replacing the higher values with these cutoff values.

[6] When the seasonality-adjusted time series are used, the average unemployment duration is uniformly lowest for the treatment group up until September 2002, after which no systematic differences between the groups exist.

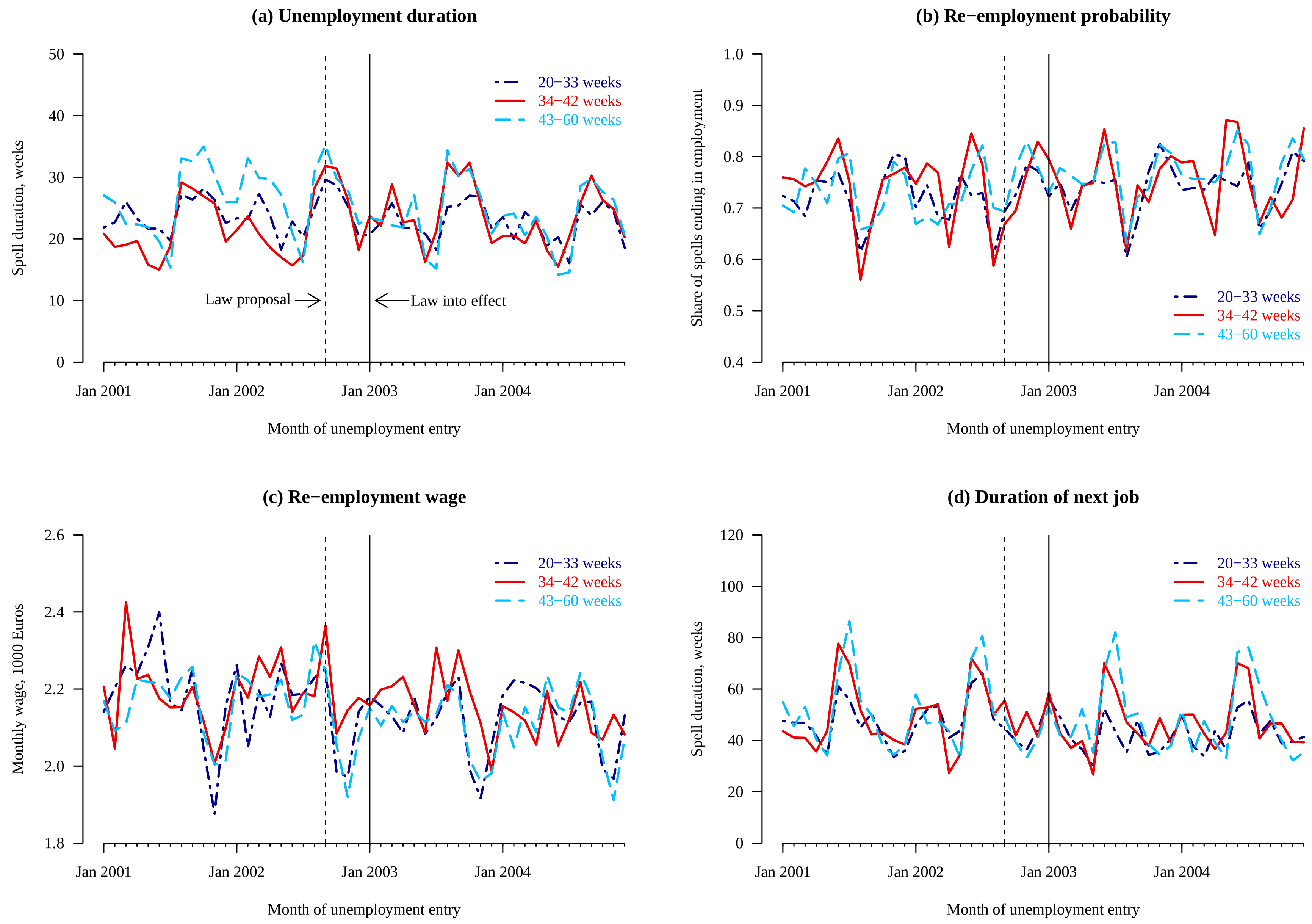

Figure 5: Average outcomes by contribution weeks and month of unemployment entry

average benefit duration of workers with 20–33 weeks increases over time in comparison to those with 43–60 weeks, which should reduce the difference in the average unemployment duration between the groups provided that longer benefit periods lead to longer unemployment spells.

Another measure of successful job search is the probability that the unemployment spell will eventually end with a new job. In figure 5b, we do not see much difference in the fraction of spells ending in employment between the groups, nor any changes after the reform. In each group, roughly three-quarters of the spells are followed by employment. About one half of the re-employed returned to their previous employer, even though temporarily laid off workers with a valid employment contract are excluded from the sample. This does not only apply to the workers selected into the analysis, but also to all unemployed, albeit the share of recalls is somewhat smaller in the whole population. Furthermore, 5% to 7% of exits are to job replacement programs, and roughly 10% to nonparticipation. In the rest of the cases, i.e. for slightly less than 10% of the spells, the exit destination is less clear (e.g. a combination of inactivity and a marginal job that lasted for less than four weeks).

We also consider two measures of match quality: the wage and duration of the first post-unemployment job for those who found a job with a duration of no less than four weeks. These measures are rather similar for all groups and in all periods in figures 5c and 5d. The new jobs are often relatively long lasting as the average duration is close to one year, but the distribution of job duration is very skewed and, therefore, the median job duration is much less, being 23 weeks. The average match quality of subsequent jobs has declined over time despite improving macroeconomic conditions. A closer look at these changes shows that the average wage and duration of the next job increased from 2001 to 2002, and then dropped in 2003. Although the annual changes are small, they suggest the possibility that the more lenient employment condition taking effect in 2003 may have encouraged the unemployed to be less picky about available jobs.

To sum up, the pre-reform trends in figure 5 are highly similar for different groups, and the changes in the average unemployment duration between the groups over time are consistent with the hypothesis that longer benefit periods cause longer spells of unemployment. On the other hand, there is no clear visual evidence implying that the benefit duration would affect other outcomes than the unemployment duration. Yet the average changes between the two periods for different groups show that the match quality of the subsequent jobs declined slightly less in the treatment group than in the other two groups.

4.4 Sample means by group and period

Table 1 reports average background characteristics (panel A) and outcomes (panel B) for various groups by period of unemployment entry. All three groups in the estimation sample are rather similar in terms of most background characteristics, albeit those with 34–42 and 43–60 weeks are closer to each other. Workers with 20–33 weeks are slightly less educated, more often male and their past job was more often in the private sector compared to those in the other two groups. Health care and social work occupations and, consequently, municipal employees are slightly over-represented in the treatment group. There are no notable differences in the past wage, nor in the level of UI benefits between the groups.

Workers with 20–33 contribution weeks have been employed for fewer weeks and have been unemployed for more weeks during the past two years than those in the other two groups. However, there are hardly any differences in employment and unemployment weeks over the past two years between those with 34–42 and 43–60 contribution weeks, even though the latter group has worked more during the review period of the employment condition by construction. As pointed out previously, the treatment group contains a specific group of workers who enter unemployment in June. These workers experience typically only one short unemployment episode in the summer while being employed for the rest of the year. The existence of this group, which is relatively large and has a lot of employment weeks in the past two years, explains the relatively high employment and relatively low unemployment figures for the treatment group.

Around 90% of workers in all groups have at least some unused UI benefits from the previous spell. On average, these benefits would be available for 60–70 weeks if the employment conditions were not met. This explains why almost all workers also in the control group with 20–33 contributions weeks and in the pre-reform treatment group are entitled to UI benefits and for a relatively long time on average.

Within the treatment group, the average duration of unemployment is 1.6 weeks longer for spells that started in 2003–2004 than for spells that started in 2001–2002 before September 13, 2002 (panel B). Over the same period the average unemployment duration decreased by 0.6 weeks for those with 20–33 contribution weeks and by 2.1 weeks for those with 43–60 contribution weeks. The average monthly wage of subsequent jobs is around 2,100 Euros compared to some 2,600 Euros in the previous jobs. However, the average wage decline compared to the previous wage among the re-employed is only about 5% for those with 20–33 contribution weeks and even less for the other two groups. The average re-employment wage dropped by 59 Euros from the pre- to post-reform period in the treatment group and marginally more in the control groups (62 and 69 Euros). The average duration of subsequent jobs declined by 1.9 weeks after the reform in the

Table 1: Sample means by group and unemployment entry period

	Estimation sample by contribution weeks						All	
	20 to 33		34 to 42		43 to 60		spells	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Background characteristics								
Age	41.2	41.2	40.4	40.6	40.4	40.7	40.5	40.6
Female, %	50.2	50.7	55.7	58.5	55.0	54.8	52.2	54.5
Education, %								
Comprehensive	34.1	32.4	28.8	26.9	30.2	28.3	30.6	28.0
Secondary	58.9	60.3	59.8	61.3	58.3	60.4	59.7	61.4
Tertiary	7.0	7.4	11.5	11.8	11.5	11.3	9.7	10.6
Occupation, %								
Engineering	11.0	10.9	16.4	16.7	15.6	15.3	14.1	14.1
Health care/social work	13.4	13.7	19.3	21.3	16.8	15.8	15.6	16.5
Administration	8.5	8.2	7.8	8.1	8.7	7.6	9.5	9.4
Commercial	4.9	5.0	3.9	4.4	4.8	4.8	5.0	5.1
Agricultural	7.8	8.7	4.5	5.3	5.4	7.9	5.0	5.6
Transport	4.2	3.9	3.4	3.1	3.2	2.9	3.8	3.5
Construction	17.0	15.9	14.6	12.6	15.4	16.1	15.8	14.0
Industrial	20.3	20.8	17.8	16.4	18.0	16.7	19.0	18.8
Services	11.1	11.3	10.7	10.7	10.5	11.3	10.7	11.4
Other	1.6	1.6	1.6	1.4	1.6	1.5	1.5	1.5
Weeks within 24 months								
Employed	53.7	54.5	62.9	62.6	62.7	63.8	63.5	63.3
Unemployed	48.9	48.2	39.9	40.2	40.0	38.9	39.3	39.5
Contribution weeks	26.8	26.6	38.6	38.8	50.5	50.3	43.4	41.7
Previous job								
Public sector, %	27.2	27.2	40.9	42.4	36.6	32.8	32.5	33.1
Private sector, %	72.8	72.8	59.1	57.6	63.4	67.2	67.5	66.9
Duration, weeks	17.1	17.3	23.6	24.0	26.2	27.2	25.9	26.0
Monthly wage, Euros	2,638	2,624	2,585	2,541	2,591	2,580	2,615	2,570
Unused UI weeks $>$ 0, %	91.6	92.7	92.3	92.7	89.9	92.0	88.5	90.9
Unused UI weeks	64.6	67.8	67.4	68.5	59.5	63.0	63.3	66.8
UI recipient, %	91.9	93.5	93.6	97.5	97.8	98.8	95.0	96.1
Renew UI entitlement, %	4.2	12.5	15.4	77.5	78.0	85.2	38.4	47.5
Potential UI duration, wks	66.1	71.6	72.9	91.0	90.9	93.7	79.7	83.7
Daily UI benefit, Euros	62.5	63.2	62.0	63.7	63.5	64.3	63.8	64.4
B. Outcomes								
Unemployment duration, wks	22.7	22.1	19.0	20.6	24.0	21.9	23.0	22.9
Re-employed, %	72.6	74.9	76.3	78.6	73.5	78.1	72.2	74.4
Next job for re-employed								
Public sector, %	27.0	25.5	42.5	43.1	37.5	33.1	33.5	32.8
Private sector, %	73.0	74.3	57.5	56.7	62.5	66.6	66.5	67.0
Duration, weeks	46.0	42.3	55.1	53.1	55.1	51.5	53.8	51.0
Monthly wage, Euros	2,156	2,094	2,177	2,119	2,164	2,094	2,174	2,133
100 x (New / old wage)	95.6	94.4	97.2	96.7	97.3	96.6	97.5	97.4
Number of observations	11,160	14,313	6,990	7,951	8,909	10,972	51,849	63,371

Notes: The pre-reform period ("Pre") include unemployment spells that started 2001–2002 before September 13, 2002, and the post-reform period ("Post") include the spells started in 2003–2004.

treatment group, whereas the corresponding decline is close to four weeks for the two control groups (3.5 and 3.7 weeks). These between-group differences are consistent with a small positive effect of potential benefit duration on the wage and job duration of the next job, even though such evidence is not easily seen in the noisy monthly time series in figure 5. Overall it seems that the unemployed found relatively good jobs compared to their previous jobs, which may not be very surprising given that a large share of them returned to the same employer, possibly to perform the same job.

For comparison purposes we report sample means also for a wider sample by dropping the restriction on the number of contribution weeks in columns 7 and 8. It turns out that our estimation sample is very similar in terms of most background characteristics to all unemployed of the same age group who lost their jobs in the same period, albeit the treatment group includes a relatively high share of health care and social work employees from the public sector. These workers are quite a specific group as they often enter unemployment in June and then return to the same employer after the summer. We keep them in the main analysis but show that dropping them (i.e. the spells started in June) has no impact on the results.

5 Econometric analysis

In the previous section, we show that the unemployment inflow was stable at the time of the refrom, the distributions of contribution weeks before and after the reform were almost identical, and the changes in the background characteristics over time were small and similar for all groups. All these findings suggest that the reform did not affect the unemployment inflow. By implication, the reform provides a source of exogenous variation for the length of the benefit entitlement periods.

5.1 A grouping estimator

Consider the model

$$Y_{it} = \alpha + \beta D_{it} + \varepsilon_{it}, \tag{1}$$

where Y_{it} is an outcome (e.g. the duration of the unemployment spell) and D_{it} is the length of the entitlement period in weeks at the start of the unemployment spell for a worker i who becomes unemployed at time t. The potential benefit duration is a deterministic function of the number of unused benefit weeks from the previous unemployment spell R_{it} and the number of contribution weeks H_{it}:

$$D_{it} = R_{it} + 1\left\{H_{it} \geq c_t\right\}\left(100 - R_{it}\right), \tag{2}$$

where c_t is the threshold value for the employment condition which equals 43 before the 2003 reform, and 34 after that. Since both R_{it} and H_{it} reflect past labor market outcomes, they are likely to be correlated with ε_{it}, in which case D_{it} is endogenous in equation (1). If R_{it} and H_{it} were observed without error, we could overcome the endogeneity problem by controlling for their direct effects in the regression of Y_{it} on D_{it} because all the remaining variation in D_{it} would then be driven by the 2003 reform. However, as pointed out previously, we only observe a noisy measure of H_{it}.

Instead we adopt an instrumental variables (IV) approach based on classifying the individuals into groups that were affected differently by the 2003 reform. Suppose that the error term can be decomposed as

$$E\left(\varepsilon_{it}\left|g,t\right.\right) = \lambda_g + \mu_t, \tag{3}$$

where g indexes groups. Under this assumption, the causal effect of β can be consistently estimated from the grouped data equation

$$\overline{Y}_{gt} = \alpha + \beta\overline{D}_{gt} + \lambda_g + \mu_t + u_{gt}, \tag{4}$$

where $\overline{Y}_{gt}$ and $\overline{D}_{gt}$ denote sample means for group g at time t, and the error term u_{gt} is mean-independent of $\overline{D}_{gt}$. The common trend assumption in equation (3) states that differences in average outcomes across groups conditional on the potential benefit duration do not change over time. In addition, the potential benefit duration must change differently across groups over time.

It should be stressed that the weighted least squares (WLS) estimator of β using the group sizes as weights can be interpreted as an IV estimator. To see this note that instead of applying WLS to the grouped data we can obtain numerically *identical* results from individual-level data as follows: first regress by ordinary least squares (OLS) potential benefit durations D_{it} on the group dummies interacted with the time dummies, and then regress the outcomes Y_{it} on the predicted values of D_{it} from the first stage along with the time and group dummies (see e.g. Blundell et al. 1998). Under assumption (3) the group/time interactions have no direct effect on the outcome and thus they can be used as instruments for the potential benefit duration.

We still need to choose the groups. One possibility is to use the three broad contribution week groups we used in the descriptive analysis. In doing so, we would ignore heterogeneity in the effect of the reform on potential benefit duration arising from different UI histories. As an example, a worker in the treatment group with 90 weeks of unused UI benefits from the previous unemployment spell can qualify for 10 extra weeks of benefits due to the reform whereas a worker who exhausted his or her benefits in the past can qualify for 100 extra weeks. For those affected by the reform the counterfactual benefit entitlement equals the number of unused UI weeks from the previous spell, which is observed in our data. By taking into account the counterfactual benefit entitlement, we can increase the statistical power of the analysis. Thus, in addition to the contribution weeks, we group the data also according to the number of unused UI days from the previous spell. One category contains workers who exhausted their benefits in the past. Those with at least some unused UI days are split into twenty roughly equal-sized categories. Based on three categories for contribution weeks and 21 categories for unused UI days we obtain 63 distinct groups.

5.2 Baseline results

We begin by illustrating the IV grouping estimator graphically. For each of the 63 groups we calculate the average potential benefit duration and average outcomes of the unemployment spell before and after the reform. The idea is to compare the changes in the outcomes to the changes in the potential benefit duration across groups. Figure 6 plots within-group changes in the outcome variables against the changes in the potential benefit durations. For the majority of the groups, including the groups of workers with 34–42 contribution weeks who have close to 100 weeks of unused UI benefits, the change in the potential benefit duration is small. These groups are packed around a change of about five weeks in the potential benefit duration. Despite the small increase in the average benefit duration within these groups, the unemployment spells are slightly shorter on average and larger shares of workers found a new job in the post-reform period due to better macroeconomic conditions in the later years. At the same time the average duration and wage of the next job declined pointing to declining match quality.

Changes in the potential benefit duration are by far largest for the groups of workers with 34–42 contribution weeks who have none or only few unused UI weeks. These are located on the right-hand side of the graphs. Unlike in the other groups, unemployment spells became clearly longer in these groups. The change in the re-employment rate does not differ notably from other groups, but the post-unemployment outcomes may have evolved slightly better than in other groups, albeit the differences are rather small.

The slope of the WLS regression line in figure 6a suggests that one additional week of UI benefits increases the expected duration of unemployment by 0.17 weeks, which corresponds to an elasticity of 0.61.[7] The effect on the re-employment probability is very

[7] The elasticity is approximated as $0.17 \times 68/19$ where 0.17 is the slope of the regression line, and 68 is the average potential benefit duration and 19 is the average unemployment duration in the pre-reform period for workers with 34–42 contribution weeks who did not meet the employment condition (i.e. we drop misclassified workers who qualified for 100 weeks of UI benefits according to the UI records). Other elasticities in the text are computed in the same way.

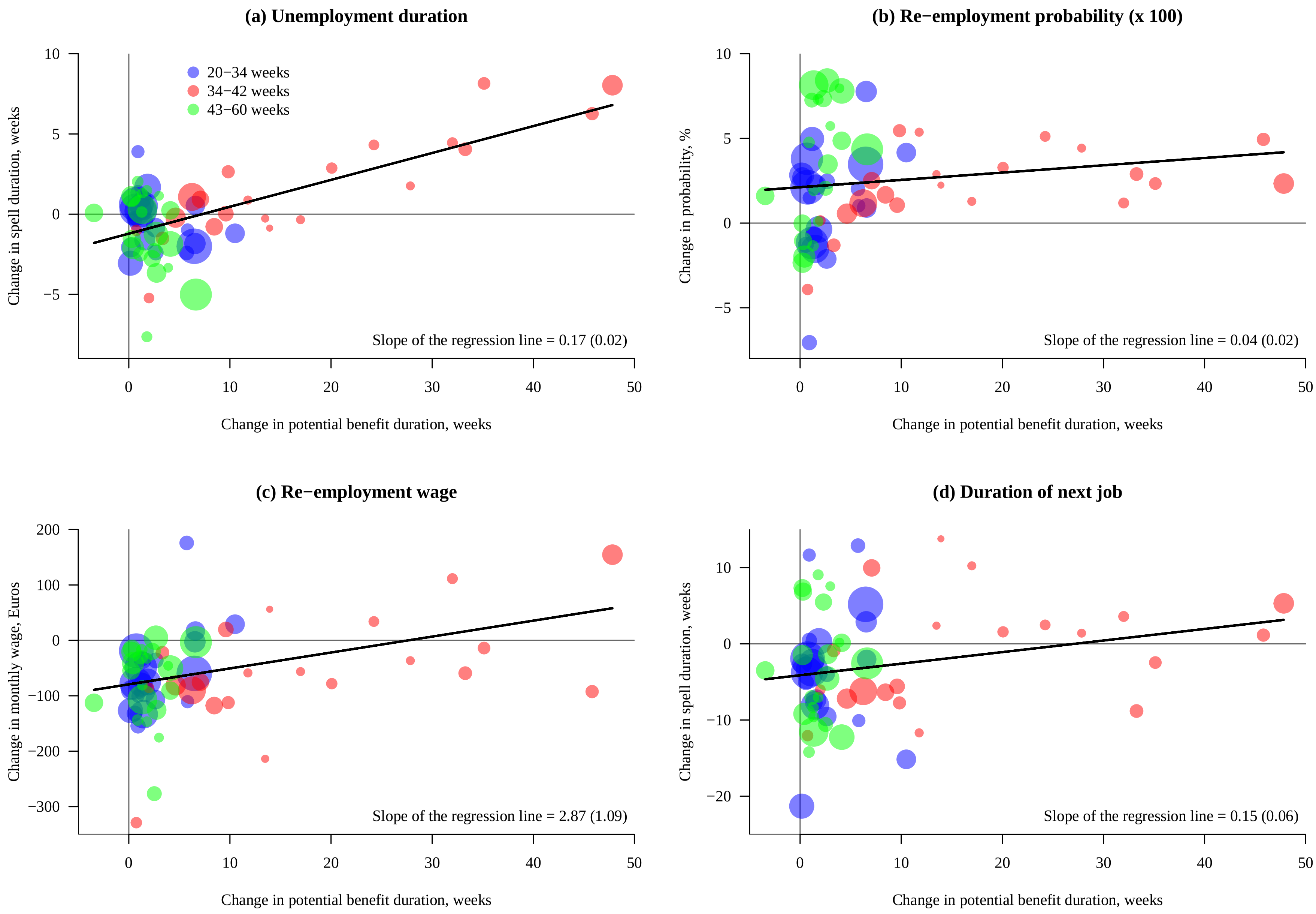

Figure 6: Within-group changes in outcome and benefit entitlement from pre- to post-reform period. Spells started on September 13 or later in 2002 are not included. Size of the balls is proportional to group size. The regression line is obtained by regressing the average outcome on the average benefit entitlement, group dummies and the post-reform dummy using the group sizes as weights.

small and only marginally significant. The longer benefit period may thus improve labor market attachment: an unemployed worker entitled to benefits for a long time may be less likely to leave the labor force and hence more likely to find a job. However, part of this effect on the re-employment probability can be mechanical as we analyze the compensated spells of unemployment. Those individuals who exhaust their UI benefits but do not qualify for means-tested labor market support drop out of the sample regardless of whether or not they continue their job search. For these individuals a longer benefit period lengthens the follow-up period by postponing the day of benefit exhaustion. The implied elasticity is 0.04, which appears to be approximately the same as the regression slope.

There is some evidence of positive impacts on the quality of the next job: one extra week of benefits is estimated to lead to an increase of 2.9 Euros in the expected monthly wage and to an increase of 0.15 weeks in the expected job duration.[8] Both of these effects are statistically significant but much smaller than the effect on the expected unemployment duration. The elasticity of the post-unemployment wage is only 0.09 and that of the job duration is 0.19.

Table 2 reports results from individual-level regressions. For comparison purposes we also report two sets of OLS estimates. In model 1 we simply regress the outcome on the number of remaining UI weeks and year dummies, ignoring the endogeneity problem entirely. The results from this model suggest a very attractive policy option: by providing UI benefits for a longer period, the policy makers could reduce the average time spent in unemployment and increase the share of the re-employed while helping the unemployed to find better jobs in terms of both wage and job duration. Unfortunately these estimates are severely biased. Because workers entitled to longer periods of benefits worked more and collected UI benefits for fewer weeks in the past, they are generally more employable than others and, therefore, more likely to find a good job quickly *despite* their longer benefit periods.

In model 2 we add a large array of control variables, including group dummies that control for the effects of (measured) contribution weeks and unused UI weeks from the previous spell. The inclusion of the group dummies mitigates but does not eliminate the endogeneity problem. The results in this case imply that one additional week of UI benefits increases the expected unemployment duration by 0.07 week. The results for post-unemployment match quality are somewhat mixed: a longer benefit period seems to increase the next wage but reduce the job duration, though the size of the former effect is very small and the latter effect is only marginally significant. Except for the effect on the

[8]When analysing the effects on the post-unemployment outcomes, we use only observations on re-employed workers who could be a selective group. However, this does not seem a significant problem as the effect on the re-employment probability is typically very close to zero.

Table 2: Estimates for the effect of potential UI benefit duration

			OLS estimates		IV estimates	
			Without controls	With controls	Without controls	With controls
	N	Mean	(1)	(2)	(3)	(4)
Unemployment duration	60,295	19.0	-0.047**	0.069***	0.167***	0.155***
			(0.019)	(0.015)	(0.018)	(0.020)
Re-employment probability	60,295	76.3	0.156***	0.010	0.043*	0.050**
			(0.016)	(0.010)	(0.025)	(0.022)
Re-employment wage	45,532	2177	1.729***	0.966***	2.922***	1.958**
			(0.274)	(0.295)	(0.972)	(0.936)
Duration of next job	45,532	55.1	0.193***	-0.037*	0.148***	0.143**
			(0.040)	(0.019)	(0.056)	(0.059)

Notes: Mean is for workers with 34–42 contribution weeks in the pre-reform period. Table reports the coefficient on the number of the UI weeks the worker is entitled to at the beginning of the unemployment spell. Interactions between group dummies and post-reform dummy are used as instruments in models 3 and 4. All models include year dummies. Models 2, 3 and 4 include group dummies. The set of additional controls include gender, age, education, occupation, the calendar month of unemployment entry, the duration and wage of the previous job, the sector of the previous employer, the reason for termination of the previous job, the fraction of time spent in employment in the past 12 months and 12–24 months, and the fraction of time spent on UI benefits in the past 12 months and 12–24 months. The standard errors clustered at the group level are in parentheses. Significance levels: *** 1%, ** 5% and * 10%.

job duration, the OLS estimates are similar to the slope estimates in figure 6 but smaller in absolute value.

Our preferred specifications are models 3 and 4 where the group/post-reform interactions are used as instruments for the potential benefit duration. Apart from including year dummies (and a different way of obtaining standard errors), model 3 corresponds to the grouped data regression shown in figure 6 and therefore the results are almost identical. By comparing the estimates from models 3 and 4 we see that adding a large number of control variables makes little difference. The effect on the post-unemployment wage drops by one-third but that was very small to start with. The effects on match quality should be interpreted with some caution as the potential selectivity of the re-employed group is ignored. However, if we include also those who did not find a new job in the analysis and set their wage and job duration to zero, the results remain similar.

A consensus estimate of Tatsiramos and van Ours (2014) based on a survey of several existing studies is that one extra week of UI benefits prolongs average unemployment duration approximately by 0.2 weeks, which is only marginally above our estimates of 0.16 and 0.17. The estimates of course vary around this value across countries.[9] One extra

[9] Also the definition of the unemployment spell varies across studies: it may refer to the duration of

week of benefits has been estimated to increase the expected unemployment duration by 0.08 weeks in the U.S. (Card and Levine 2000), 0.04 to 0.42 weeks in Austria (Lalive et al. 2006; Card et al. 2007; Lalive 2008), 0.1 to 0.13 weeks in Germany (Schmieder et al. 2012) and 0.18 to 0.58 weeks in Slovenia (van Ours and Vodopivec 2006).

Our estimates imply that longer benefit periods may lead to better job matches after unemployment, at least when measured by the expected duration of the next job. This finding is in line with the studies by Centeno and Novo (2009) and Nekoei and Weber (2017), which find small positive effects on re-employment wages in Portugal and Austria, respectively. On the other hand, most other studies, such as Lalive (2007) and Card et al. (2007) for Austria, Le Barbanchon (2016) for France, and Schmieder et al. (2016) for Germany, find negative or no effects of longer benefit duration on match quality.

5.3 Results for subgroups

In tables 3 and 4 we report IV estimates for various subgroups from the specification without control variables, i.e. the results correspond to model 3 in table 2. The effect of potential benefit duration on the expected duration of unemployment is roughly of the same size for both sexes, but only women benefit from longer benefit periods in terms of better job matches afterward. The effect on the re-employment wage is essentially the same for both sexes but less precisely estimated for men. The longer benefit period increases the probability of job finding only for women.

Older workers seem to more responsive to potential benefit duration, but they are also more likely to benefit from longer search periods in terms of a higher re-employment probability. The effect of potential benefit duration on match quality is very similar across the age groups. The effect on unemployment duration does not vary notably by education or by sector of the previous employer. However, only less educated workers and private-sector workers seem to find better matches due to longer benefit periods. In the public sector the wage distribution is more compressed and the wage rate is mainly determined by formal education and work experience in a given occupation. As such, longer search periods are less likely to lead better job offers in the public sector.

One question of interest is how the effect of potential benefit duration varies over the business cycle. We cannot address this question directly because our data covers a relative short period of time when the macroeconomic conditions were rather stable. There are however large regional differences in labor demand conditions. To study the sensitivity of behavioral responses to local labor market conditions, we use register data from the Ministry of Employment and the Economy on all open vacancies and all unemployed job seekers at the public employment service and compute average vacancy/unemployed (VU)

registered unemployment, the time of UI benefit receipt or the time until the next job.

Table 3: Instrumental variable estimates for the effect of potential UI benefit duration for various subgroups

	Sex		Age			Education			Sector of previous employer	
	Women	Men	25 to 34	35 to 44	45 to 54	Compr.	Secondary	Tertiary	Private	Public
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unemployment duration	0.178***	0.151***	0.137***	0.119***	0.214***	0.149***	0.158***	0.177***	0.153***	0.188***
	(0.032)	(0.033)	(0.036)	(0.022)	(0.037)	(0.035)	(0.018)	(0.062)	(0.020)	(0.038)
Re-employment probability	0.091***	0.000	-0.041	0.057	0.108**	0.010	0.080**	-0.020	0.020	0.062
	(0.030)	(0.040)	(0.067)	(0.044)	(0.052)	(0.047)	(0.039)	(0.110)	(0.032)	(0.061)
Re-employment wage	2.842***	2.475	3.706***	1.252	3.505**	3.112*	3.152***	0.298	4.110***	-0.419
	(1.009)	(1.617)	(1.371)	(1.971)	(1.413)	(1.822)	(1.091)	(1.892)	(0.991)	(1.136)
Duration of next job	0.248***	0.044	0.120	0.141	0.160*	0.135	0.165***	0.026	0.137**	0.076
	(0.078)	(0.076)	(0.129)	(0.097)	(0.090)	(0.171)	(0.057)	(0.264)	(0.055)	(0.160)

Notes: Table reports IV estimates for the effect of the number of the UI weeks the worker is entitled to at the beginning of the unemployment spell. Interactions between group dummies and post-reform dummy are used as instruments. Models do not include control variables, corresponding to the model specification 3 in table 2. The standard errors clustered at the group level are in parentheses. Significance levels: *** 1%, ** 5% and * 10%.

Table 4: Instrumental variable estimates for the effect of potential UI benefit duration for various subgroups

	Labor market tightness			UI benefit level (only UI recipients)			Wage in previous job		
	Low	Mid	High	Low	Mid	High	Low	Mid	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Unemployment duration	0.194***	0.156***	0.147***	0.104**	0.187***	0.218***	0.169***	0.157***	0.145***
	(0.039)	(0.022)	(0.050)	(0.046)	(0.027)	(0.055)	(0.051)	(0.026)	(0.038)
Re-employment probability	0.123**	0.010	0.021	0.103	-0.027	0.090	-0.051	0.074*	0.090
	(0.057)	(0.036)	(0.039)	(0.115)	(0.051)	(0.064)	(0.041)	(0.041)	(0.060)
Re-employment wage	3.750***	2.561**	2.512*	-0.777	-1.913*	-2.209	1.792	0.875	5.032**
	(1.237)	(1.303)	(1.407)	(1.310)	(1.117)	(2.200)	(1.412)	(1.146)	(2.315)
Duration of next job	0.109	0.138	0.172	0.426***	0.026	-0.013	0.158**	0.212**	-0.042
	(0.125)	(0.106)	(0.115)	(0.105)	(0.124)	(0.161)	(0.065)	(0.106)	(0.114)

Notes: Table reports IV estimates for the effect of the number of the UI weeks the worker is entitled to at the beginning of the unemployment spell. Interactions between group dummies and post-reform dummy are used as instruments. Models do not include control variables, corresponding to the model specification 3 in table 2. The low values refer to the first quartile, the mid values to the second and third quartiles, and the high values to the fourth quartile. Labor market tightness is measured by average monthly vacancy/unemployment ratio at municipal level over the period 2001–2004. The UI benefit is based on the average monthly wage over the contribution weeks of the employment condition, which can differ from the wage of the previous job. The standard errors clustered at the group level are in parentheses. Significance levels: *** 1%, ** 5% and * 10%.

ratios over the years 2001–2004 for all municipalities. This ratio serves as a measure of labor market tightness. Then we split our estimation sample into three groups according to labor market tightness in the individual's living region: one-forth of sample members live in municipalities where the VU ratio was 0.055 or less, one half in municipalities where the VU ratio between 0.055 and 0.105, and one forth in municipalities where the VU ratio exceeds 0.105.[10] The results of this exercise are shown in columns 1 to 3 of table 4. The effect of potential benefit duration on unemployment duration does not vary much with labor market tightness. It is marginally stronger for those living in the most depressed regions, but they are also the only group for whom longer benefit periods also increase the likelihood of finding a new job.

Column 4 to 6 of table 4 report the estimates for people who differ in the level of the UI benefits. In this case, we drop from the sample those who were not entitled to UI benefits at the beginning of their unemployment spell (4.6% of all spells). It turns out that UI recipients with the lowest benefit levels (the first quartile) are less responsive to the length of benefit period, although they seem to be the only ones who gain from longer benefits periods in terms of more stable post-unemployment jobs. Thus, from the point of view of the society, an extension of the benefit period would be relatively more costly for workers eligible for higher benefits as they would simply collect unemployed for longer without ending up in better jobs later.

The final set of estimates is for workers who differ in the wage rate of their previous job. The past monthly wage is available also for those who did not qualify for UI benefits at the time of unemployment entry, so that no spells are excluded this time. It also differs from the wage rate on which the UI benefit is based. The latter is the average wage during the contribution weeks for the employment condition. Thus it may be an average of wages in several jobs, and for those who did not satisfy the employment condition at the start of the current unemployment spell, it is not based on the most recent wage at all but on the wages received before some previous unemployment spell. As seen in columns 7 to 9 of table 4, the effect of potential benefit duration on unemployment duration is not sensitive with respect to the wage level. However, longer benefit periods seem to help workers who received a high wage before unemployment to find a new high-paid job. By contrast, those who used to be paid less before tend to find more stable jobs due to longer benefit periods.

In summary, the effect of one extra week of UI benefits on unemployment duration is relatively similar for all considered subgroups, being always statistically significant and varying between 0.10 and 0.22 weeks. Workers aged 45 and over and those with relatively

[10]Surprisingly, the average unemployment duration and the re-employment probability of the sample members do not vary much across these regions whereas the average wage and duration of the next job increase with the VU ratio.

high UI benefits may be somewhat more responsive to changes in the length of the benefit period. The effect on quality of next job varies more across groups. Women, low educated and private-sector employees are the most likely to benefit in terms of higher wages or more stable jobs from the longer job search periods that longer benefit periods enable.

5.4 Robustness checks

Table 5 shows several robustness checks for the IV estimates. The baseline results from model 4 with control variables are reproduced in column 1. Excluding a somewhat specific group of workers who became unemployed in June has very little effect (model 2 vs. model 1). Likewise, if we drop those entering unemployment in 2002, as some of them may have changed their behavior if still unemployed at the time when the reform became public knowledge, the results remain stable (model 3 vs. model 1). Dropping the spells that started with receipt of labor market subsidy kills the effects on the post-unemployment outcomes by cutting their magnitude by half but hardly affects the impact on the unemployment duration and re-employment probability. Note that excluding these spells leads to a somewhat selective sample as a slightly higher share of the pre-reform spells are excluded because it was easier to qualify for UI benefits in the post-reform period.

In models 5 to 8 we relax the common trend assumption by allowing a distinct linear trend for each of the 63 groups. These estimates are noisier but it is reassuring to find that the point estimates do not change much from the baseline results. The effect on the unemployment duration decreases marginally whereas the effects on the post-unemployment outcomes remain similar but lose their statistical significance due to higher standard errors. The only exception is the effect on the re-employment probability which increases to fourfold (model 5 vs. model 1). The point estimate of 0.217 in this case implies an elasticity of 0.19 for the re-employment probability. This estimate is also robust with respect to the sample restrictions (models 6 to 8).

6 Concluding remarks

We found that one additional week of UI benefits increases the expected unemployment duration by some 0.15 weeks, corresponding to an elasticity of 0.5. The estimated effect proved to be fairly similar across different worker groups. Our results also imply a positive effect on the re-employment probability. Our baseline estimate is rather small with an implied elasticity of 0.05, but the size of the effect appears to be sensitive with respect to the common trend assumption. Furhermore, our results indicate that one additional week of UI benefits increases the expected wage and duration of the next job by some 2 Euros per month and 0.15 weeks respectively. The former effect is very small but the latter effect

Table 5: Robustness of the IV estimates for the effect of potential UI benefit duration

	Baseline specification				Group-specific linear trends			
	All spells	Without June spells	Without 2002 spells	Only UI spells	All spells	Without June spells	Without 2002 spells	Only UI spells
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Unemployment duration	0.155***	0.146***	0.159***	0.149***	0.129***	0.142***	0.148***	0.104*
	(0.020)	(0.022)	(0.019)	(0.023)	(0.048)	(0.048)	(0.048)	(0.057)
Re-employment probability	0.050**	0.048**	0.037	0.059**	0.217***	0.250***	0.215**	0.224**
	(0.022)	(0.023)	(0.028)	(0.024)	(0.072)	(0.063)	(0.102)	(0.107)
Re-employment wage	1.958**	1.807**	1.846**	0.890	2.005	2.839	3.006*	-0.319
	(0.936)	(0.873)	(0.923)	(0.964)	(1.933)	(2.043)	(1.774)	(2.024)
Duration of next job	0.143**	0.176***	0.176**	0.100	0.174	0.223	0.399**	0.119
	(0.059)	(0.058)	(0.081)	(0.073)	(0.155)	(0.172)	(0.192)	(0.235)

Notes: Table reports IV estimates for the effect of the number of the UI weeks the worker is entitled to at the beginning of the unemployment spell. Interactions between group dummies and post-reform dummy are used as instruments. All models include year and group dummies as well as controls for gender, age, education, occupation, the calendar month of unemployment entry, the duration and wage of the previous job, the sector of the previous employer, the reason for termination of the previous job, the fraction of time spent in employment in the past 12 months and 12–24 months, and the fraction of time spent on UI benefits in the past 12 months and 12–24 months. Models 5 to 8 allow for group-specific linear trends. Models 4 and 8 are estimated without spells started with receipt of labor market subsidy. The standard errors clustered at the group level are in parentheses. Significance levels: *** 1%, ** 5% and * 10%.

is economically significant. Compared to the evidence from other countries that points to very small (positive or negative) or nonexistent effects on job quality, our findings are broadly similar yet more positive. The main message for the Finnish government is that the recent reductions of 20% and 40% in the maximum benefit duration induce UI recipients to find new jobs more quickly but those jobs are shorter on average and thereby re-employed workers may also return to unemployment more quickly.

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