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Entitlement Affect Job-Finding:
Lessons from the Slovenian "Experiment"**

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ABSTRACT

How Changes in Benefits Entitlement Affect Job-Finding: Lessons from the Slovenian "Experiment"[*]

In 1998 the Slovenian UI system was drastically reformed. The reform reduced the potential duration of unemployment benefits substantially and simultaneously improved employment services offered to, and monitoring of, the recipients. We find that the reduction in potential benefit duration had a positive effect on the exit rate out of unemployment – both to employment and to other destinations – at various durations of unemployment spells and for many categories of unemployed workers. We also identify a clear spike in the exit rate out of unemployment in the month unemployment benefits expire (and a smaller spike in the month thereafter), and for males an increase of job-finding rate in the third month of unemployment, a likely consequence of a reduction of the level of benefit that occurs at that point. Interestingly, post-unemployment wages of recipients were not affected after the change of the law, suggesting that higher job-finding rates following the reduction of benefits were not produced by reduced reservation wages (higher acceptance probability) but rather more effective job-search activity.

JEL Classification: C41, H55, J64, J65

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1. INTRODUCTION

Transition and developing countries are exceedingly relying on public unemployment insurance (UI) systems to provide income support to the unemployed. Anticipating the emergence of widespread unemployment, all European transition countries introduced UI systems at the very beginning of transition. An increased interest in this type of income support is noticeable also among middle-income developing countries: Algeria, Argentina, Brazil, China, Korea, Thailand and Turkey, among others, introduced UI in a recent decades; Sri Lanka, a low-income country, is amidst preparations to launch it; and studies analyzing the desirability of UI have been prepared by some other countries (Philippines being among them).

For developed economies, numerous studies have analyzed various aspects of the functioning of the UI system. Their findings show that thanks to its economy-wide risk-pooling, UI enables a high degree of consumption smoothing for all categories of workers, performs well under idiosyncratic, sectoral, and regional shocks, and acts as an automatic macroeconomic stabilizer. But studies on developed economies (and the emerging literature on transition countries) also find that UI creates reemployment disincentives and contributes to higher equilibrium unemployment. Even for developed economies, however, the magnitude of disincentive effects is not a firmly established parameter, and the literature is inconclusive and rather thin on important aspects such as the characteristics of post-unemployment jobs (for a review of the performance of UI and other income support systems, see Vodopivec, 2004).

The above evaluation of UI applies primarily to OECD countries. Much less is known about transition and developing countries – yet there are compelling reasons to study the experience in these countries, too. Not only is there a growing experience with different support programs from which a great deal can be learned, but also labor market conditions and other relevant circumstances differ profoundly from those in developed economies. Crucial differences include worse administrative capacity, the presence of a larger informal sector, and greater importance of informal risk-sharing arrangements. These features have importance implications for the performance and thus the possibility of replicating the OECD-style income support programs in transition and developing countries.

The purpose of this paper is to provide evidence about incentive effects of UI on job-finding rate and shed light on desirable design features of UI in the context of a transition country. For that purpose, Slovenia offers especially interesting case. Before its

1998 reform, the Slovenia's UI system was the most generous among the transition countries. The reform drastically reduced the potential duration of unemployment benefits and simultaneously improved employment services offered to, and monitoring of, the recipients. Dramatic changes in the UI system allow us to investigate how the change in UI rules affected system's performance, in particular, the job-finding rate and the wage in the new job.

We find that the reduction in potential benefit duration had a positive effect on the exit rate out of unemployment, both to employment and to other destinations. This conclusions applies at various durations of unemployment spells and for many categories of unemployed workers. Interestingly, post-unemployment wages of recipients were not affected after the change of the law, suggesting that higher job-finding rates following the reduction of benefits were not produced by reduced reservation wages (higher acceptance probability) but rather by more effective job-search activity. We also identify a clear spike in the exit rate out of unemployment in the month when unemployment benefits expire (and a smaller spike in the month thereafter), and for males an increase of job-finding rate in the third month of unemployment, a likely consequence of a reduction of the level of benefit that occurs pointing the following month.

In continuation we first formulate the research questions to be investigated by the study (Section2) and describe the reform of the unemployment benefit system in Slovenia (Section 3). We then describe the methodology and data sources (Section 4) and present the results (Section 5). Section 6 concludes.

2. RESEARCH QUESTIONS

A stylized prediction from simple theoretical models is that an increase in the unemployment benefit reduces the recipient's probability of transition from unemployment to employment, that is, it increases the expected duration of unemployment. This follows from simple job-search models (the reservation wage is assumed to rise with the benefit level), as well as from simple labor supply models (because the presence of unemployment insurance modifies the budget constraint – less income is forgone by staying unemployed, and a utility maximizing individual chooses a longer duration of unemployment). Search

theory also implies that the reservation wage declines and the exit rate increases as one nears the date of expiration of the benefits.[1]

However, once more complexity is introduced in the models (for example, recognizing that unemployment benefits are paid only for a finite period and that by taking employment, one re-qualifies for unemployment benefits), it can be shown that the increase of the benefit rate makes the transition to employment more attractive, not less (see Atkinson and Micklewright, 1991). Or one can argue that unemployment benefit increases resources devoted to search and hence increases the probability of finding a job (in such a case, a job offer effect prevails over the reservation wage effect).[2] In other words, the theoretical predictions about the effects of longer duration and higher replacement rate on the probability of transition from unemployment to employment are ambiguous.

In the light of these theoretical ambiguities, empirical studies are of particular relevance. There has been a wealth of empirical studies, many of them based on microeconomic data, on developed economies, and studies on transition countries are also emerging. By and large, these studies show that unemployment benefits reduce the probability of leaving unemployment to take a job, but there are also studies that did not find such effects (for a review of the evidence, see Vodopivec, 2004).

The paper seeks to shed additional light on the effects of unemployment benefits on job-finding rate in the context of a transition economy. We take advantage of the reform of the Slovenia's unemployment benefit law to investigate how the changes of the law affected employment and wage outcomes of the benefit recipients. In particular, we focus on the following two sets of questions:

- How did the reduction of entitlement period, the increased intensity of monitoring and employment services, as well as easier access to active labor market programs affected job-finding rates, exits to active labor market programs, and overall

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[1] There are three types of effects implied by Mortensen's seminal paper (1977): (i) For the qualified unemployed worker, the exit rate increases as he (she) approaches benefit expiration. (ii) A rise in benefits reduces the exit rate for an insured worker who has recently become unemployed, and increases the exit rate for the insured worker who is close to benefit expiration. This follows from the fact that a higher benefit level increases both the value of continued search as unemployed and the value of accepting an offer. The immediate value of higher benefits is small for workers close to benefit exhaustion, because they are in similar situation as workers not qualified for the benefit. (iii) A rise in benefits increases the exit rate for an unemployed worker who is not qualified (the entitlement effect).

[2] According to Klassen and Woolard (2001), the absence of unemployment benefits in South Africa affects household formation and residential choices in ways that are detrimental to job-finding. The system forces the unemployed to base their location decisions on the availability of economic support – generally available in rural areas, often in parental households – rather than on the availability of job openings. Klassen and Woolard thus conclude that the absence of unemployment benefits may not only lower welfare of the unemployed and their dependents, but it may also not reduce unemployment duration – and may actually increase it.

duration of unemployment of benefit recipients? Did such effects differ across groups of unemployed according to the change of the length of entitlement or across the duration of the unemployment spell?

- How did the changes in benefit entitlements and employment support to the recipients affect the post-unemployment wage? Did such effect differ across different groups of unemployed?

The questions about the effects of the change of the law on the job-finding probabilities are obviously relevant for policymakers, shedding light on the extent of the moral hazard created by unemployment insurance, and pointing out how effective were the changes in employment services and monitoring. Also very interesting are questions about the effects of changes of the law on post-employment wages. They are aimed at exploring the behavior underlying the decision to take a job, in particular, whether changes in job-finding rate were influenced by the changes in reservation wages.

3. THE 1998 CHANGE OF THE SLOVENIAN UI SYSTEM

The 1998 amendments of the UI law introduced several measures to encourage and help the unemployed, especially the benefit recipients, to leave unemployment. In particular, the amendments shortened the maximum duration of the UI (earnings-related) benefit; improved the employment services offered to the unemployed and monitoring of the recipients of the benefit; and stimulated participation of the unemployed in active labor market programs. Even after the 1998 reform, Slovenia's unemployment benefit system remained one of the most generous ones compared to other transition countries.

Similar to OECD countries, Slovenia provides income support to the unemployed via a social insurance program consisting of a combination of unemployment insurance and unemployment assistance (UA). The program covers the majority of employed persons, irrespective of industry or occupation (the most notable exception are the self-employed). Under employment insurance, the benefits have been earnings related and the duration of entitlement is contingent on the length of work experience, with predetermined maximum and minimum levels. Benefits under UA are means-tested and offered to those who exhausted their eligibility to UI, and selected groups of other workers who do not qualify to unemployment insurance benefits. Benefits are mostly financed by the budget, with token contributions paid by employers and workers.

Faced by an increasing trend in the number of unemployed, including UI recipients and long-term unemployed, Slovenia in October 1998 reformed its unemployment benefit

system. Arguably the most significant change was the reduction of the potential duration of benefits. Under the new system, the length of the UI entitlement period was shortened roughly by half for most groups of recipients (Table 1). Before the reform, for example, workers with 5-10 years of work experience were eligible to 9 months, and workers with 10 –15 years of experience to 12 months of benefits; in contrast, after the amendments, both groups of workers have been eligible only to 6 months of benefits. But a notable feature of the reform was the different treatment of different groups of beneficiaries – a trait we take advantage of in testing the effects of the reform.

The amendments also called for improvements in employment services offered to benefit recipients and introduced other measures aimed at speeding their reemployment. They introduced obligatory preparation of a re-employment plan for benefit recipients and more frequent contacts between counselors and recipients. The amendments also broadened the definition of the suitable job (after 4 months, unemployed may be offered worse-paying jobs or jobs requiring substantial commute) and introduced stiffer sanctions for refusal of job offers. Moreover, the amendments called for stricter monitoring of continuing eligibility. Benefit recipients had to make themselves accessible for contacts by employment office counselors several hours per day and a new inspection – a special arm of employment offices – was introduced. The task of inspectors is to check whether benefit recipients are in fact unemployed (among others, by paying home visits to UB recipients), and whether they actively search for a job.

Simultaneously with restricting access to UI benefits, the amendments made participation in active labor market programs more accessible and attractive. Public works participants were given a status of regular workers, thus enabling them to access many fringe benefits (such as vacation and pension coverage). A hiring program reimbursing employers for the payment of social security contributions was strengthened by broadening the target groups (to include long-term unemployed, first-time job-seekers, older workers, and recipients of unemployment benefits) and increasing the amount of reimbursement. And in the wake of the introduction of amendments, the government spent more on active labor market policies: the expenditures on these policies as a share of GDP increased from 0.40 percent in 1998 to 0.52 percent in 1999.

Even after the 1998 changes, Slovenian unemployment benefit system remains among the most generous in transition countries. The legally stipulated benefit replacement rate remained among the highest (Figure 1) and with the average unemployment benefit amounting to 37 percent of the average wage, Slovenia in 1999 exceeded the average ratio

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of 19 percent in other transition countries (Vodopivec et al, 2003). True, the post-1998 maximum potential duration of eligibility is substantially reduced and became comparable to the one in other countries (Figure 2). Still, judged by the index of the generosity of unemployment benefits (defined as the product of the replacement rate and the share of compensated unemployed among all unemployed), Slovenia (which together with Hungary offered the most generous protection throughout the 1990s) retained the first place in 1999, although the index decreased strongly from its 1998 value (Vodopivec et al, 2003).

4. METHODOLOGY AND DATA

Below we describe the approach we undertook to investigate the questions raised by the paper, taking advantage of the rich possibilities to address them provided by the Slovenian unemployment benefit system, above all, the 1998 change of the UI law. We start with explaining the formation of the "twin" groups of benefits recipients – groups that consist of otherwise comparable individuals but some faced shorter potential benefit durations because of the change of the law. We then describe econometric methods used to analyze the job-finding rate. We conclude with the description of variables and data sources used in the empirical analysis.

4.1 Formation of "twin" groups

One feature worth exploiting in setting up the empirical analysis is the fact that the change in the Slovenian benefit law introduced different rules for different groups of unemployed. We therefore form nine "twin" groups of benefit recipients. In each group, some unemployed started to collect benefits before the change of the law and some after the change, but the groups were formed so that – in the absence of the change of the law – all members of a group would be entitled to same potential benefit durations. Because some of the recipients in a group registered after the change of the law, they in fact faced much reduced duration of entitlement. For all such groups, 'old' and 'new' benefit entitlements are presented in Table 1. The nine groups are different in terms of previous work experience, age, or both. The first group has limited work experience (up to 18 months) and it is also the only group of which the potential benefit duration has not changed – it was kept at 3 months. For the second group, which has a work experience of 1.5-5 years, the maximum benefit duration has been reduced from 6 to 3 months. All the other groups except group 9 are also confronted with a reduction of the maximum benefit duration. Group 7, for example, which consists of worker with more than 25 years of work experience were entitled to a maximum benefit duration of 24 months under the old law, but

under the new law this period has been reduced to 12 months. For groups 8 and 9 there is in addition to the working experience requirement also an age requirement. Implicitly, as indicated in Table 1, the formation of groups is also strongly correlated with age. The older workers are, the more work experience they have and the longer their potential benefit duration when they loose their job.

The introduction of amendments to the UI law in 1998 not only affected the behavior of the unemployed workers but also had an influence on the inflow from employment to unemployment. The reduction in the potential duration of UI made it less attractive for workers to be unemployed. As is discussed in more detail in Appendix 1 this caused a higher than 'usual' inflow into unemployment just before the new UI law was introduced, and a lower than 'usual' inflow into unemployment right after the new UI law was introduced. Apparently for some workers it was possible to influence the time at which they entered unemployment. To avoid biased estimates in our empirical analysis we took two periods of inflow that were not affected by this behavior. More specifically we used an inflow sample over the period August 1, 1997 – July 31, 1998 and an inflow sample over the period January 1, 1998 – December 31, 1999. Because both inflow samples cover a year of inflow we do not have to worry about seasonal differences in the composition of the inflow.

From an empirical point of view it is not easy to establish how potential benefit duration affects the job-finding rate due to correlation between several personal characteristics. Individuals that are entitled to longer potential benefit durations have more work experience and are therefore usually older. So, the fact that individuals with longer potential benefit durations find jobs at a slower rate can be attributed not only to the longer duration of their benefit entitlement, but also to their higher age or the length of work experience. To disentangle these two effects we need variation in potential benefit duration across individuals uncorrelated with work experience or age. The Slovenian change in unemployment law provides such variation because potential benefit duration was reduced conditional on particular requirements concerning work experience (and age). If the reduction had been uniform we would still have a problem, because over time labor market conditions might change (as a consequence of business cycle, for example). It would be difficult if not impossible to disentangle the effect of the reduction in potential benefit durations from the effect of the change in labor market conditions. Here, too, the change in Slovenian benefit law is helpful because for some workers the potential benefit durations did not change. Information about these workers can be used as reference point because

changes in their job-finding rate can be attributed to changes in labor market conditions only. The identifying assumption, which allows us to isolate the effect of the reduction in potential benefit duration, is that the relative effect of changes in labor market conditions on the job-finding rate is the same for all categories of workers.

By way of illustration Table 2 presents job-finding probabilities – after 6 months and 12 months of unemployment – distinguished by group of unemployed. As shown for the first group of which the benefit entitlements has not changed, 50 percent of the group finds a job within 6 months, both before and after the change of the law. This could mean that there is no effect of the cycle. Or, it could mean that the effect of the business cycle is compensated by a change in the composition of the group of unemployed. In other words: a deterioration of the labor market may have been compensated by an increase in the average quality of the unemployed workers. In the empirical analysis below we will account for possible changes in quality of unemployed workers by using individual data. For the sake of argument we assume that the fact that the average job-finding probability after 6 months did not change means that there is no effect of the cycle.

For the second group of which the potential benefit duration has been reduced from 6 months to 3 months there is an increase of job-finding rate after 6 months from 49 to 51 percent. Since there is no effect of the cycle this must be due to the reduction of the potential benefit duration. Table 2 shows that the average 6 months job-finding probability decreases as the potential benefit duration increases. And the table also shows that there are clear effects of the reduction in potential benefit duration brought by the change of the benefit law. For group 7 for which the potential benefit duration has been reduced from 2 years to 1 year the 6 months job-finding probability has gone up from 9 to 26 percent.

The second column of Table 2 shows similar patterns for the 12 months job-finding probability. For the categories of workers with short potential benefit duration the main effect seems to occur in the first 6 months of unemployment. For the categories of workers with longer potential benefit duration the positive effect on the job-finding rate remains. Finally, Table 2 shows that for groups 9 and 10 the job-finding rate is very low. These groups concern 50+ workers and 55+ workers who apparently do not have a big incentive to find a job. Therefore, we omit them from the econometric analysis and focus on workers aged 21-50.

Figure 3 shows the outflow from unemployment for the various groups in our sample. Presented are the survival probabilities as a function of the unemployment duration (in months). For each of the nine groups there is a separate graph representing the survival

probabilities before and after the change in the UI law. For all groups the survival probabilities after the change in the UI law are smaller than before indicating that after the change in the UI law unemployed leave unemployment more quickly. Figure 3a illustrates the effect of the change in labor market conditions since for this group the potential benefit duration has not changed. Here the two lines are not very far apart indicating that there is only a small effect of changing labor market conditions. For all the other groups there is a substantial difference between the two lines indicating that the reduction in potential benefit period stimulated the outflow from unemployment. Another obvious pattern comparing the different groups is the positive relationship between potential benefit duration and survival probability. Groups with very long potential benefit durations have a high survival probability. Finally, for many groups there is a substantial drop in the survival probability in the month when benefits expire.

Figure 4 presents monthly exit rates out of unemployment before and after the change of the UI law for all nine groups. For the first group there is a clear spike in the exit rate out of unemployment after three months, the time when benefits expire. For the second group there are two spikes in the exit rate out of unemployment; one spike at 3 months which has to do with the drop of the unemployment benefit replacement rate from 70% to 60% and one spike at 6 months which has to do with the expiration of the unemployment benefits. Also for the other groups there are clear spikes at 3 months and the time of benefit exhaustion. For the last two groups, with very long potential benefit durations there are spikes at the time of benefit exhaustion but also spikes after 1 year of unemployment. In Figure 5 where the job finding rates before and after the change of the UI law are presented there are no such spikes for these groups at 12 months of unemployment duration. Apparently after 1 year of unemployment elderly workers leave unemployment for other reasons than finding a new job. For the groups with very long benefit entitlement periods the job finding rates are very small, which is again a reason to exclude them from the empirical analysis. For the other groups the obvious conclusion from Figure 5 is that the expiration of benefits creates clear spikes in the job finding rates.

4.2 Econometric set-up

In the empirical part we estimate hazard rate models that are used very often in the analysis of unemployment durations (see for a recent overview Van den Berg, 2001). In the

proportional hazard rate model the job-finding rate at time (unemployment duration) t conditional on observed characteristics x can be specified as:[3]

$$\theta(t|x) = \lambda(t).\exp(x'\beta) \tag{1}$$

where β is a vector of parameters and the $\lambda(t)$-functions represent individual duration dependence. Individual duration dependence is modeled in a flexible way by using step functions:

$$\lambda(t) = \exp(\Sigma_k(\lambda_k) I_k(t) + \delta_j I_j(t)) \tag{2}$$

where k (= 1,..,26) is a subscript for time-intervals, and $I_k(t)$ are time-varying dummy variables that are one in N subsequent time-intervals. In the analysis the time-intervals refer to the first 25 months of unemployment, and the 26th time-interval concerns durations longer than 25 months. The parameters λ_k measures the pattern of duration dependence. Previous studies find the effect of benefit exhaustion to be non-linear. Therefore, we investigate whether in the month before, the month of, and the month after the expiration of the benefit the job-finding rate is different. The $I_j(t)$ refer to the months at the time unemployment benefits expire, where j refers to the month before the benefit expiration (j = c), the month of benefit expiration (j = b) and the month after expiration of the unemployment benefits (j = a). The related parameters δ_j represent potential spikes related to the exhaustion of the unemployment benefits.

The conditional density function of the completed unemployment duration t can be written as

$$f(t|x) = \theta(t|x) \exp(- {}_0\!\int^t \theta(s|x) \, ds) \tag{3}$$

Since we have an inflow sample the log-likelihood L of the model is rather straightforward, consisting of two components

$$L = d_L.\Sigma \log(f) + (1-d_L).\Sigma \log(1-F) \tag{4}$$

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[3] Here the x refers to personal characteristics that are discussed in more detail in the next section. For simplification a subscript referring to individual is omitted.

where d_L is a dummy variable with a value of 1 when the observation refers to a job being found and a value 0 otherwise (the individual is still unemployed or the unemployment spell terminated because of other reasons) and F is the distribution function of f. The parameters of the job-finding rate can be estimated using the method of maximum likelihood.

By way of sensitivity analysis we also introduce unobserved heterogeneity in the exit rate out of unemployment. Then, the job-finding rate at time t conditional on observed characteristics x and unobserved characteristics u can be specified as:

$$\theta(t|x,u) = \lambda(t).\exp(x'\beta + u) \tag{5}$$

where the unobserved components are assumed to follow a discrete distribution with two points of support p and 1-p

$$\Pr(u=u^a) = p \qquad \Pr(u=u^b) = 1 - p \tag{6}$$

in which p has a logit specification with $p = \exp(\alpha)/(1+\exp(\alpha))$. So, there is a probability p that $\theta(t|x,u) = \theta^a(t|x)$ and a probability $1 - p$ that $\theta(t|x,u) = \theta^b(t|x)$. The conditional density function of the completed unemployment durations t can be written in the same way as before

$$f(t|x,u) = \theta(t|x,u) \exp(- {_0\!\int}^t \theta(s|x,u)\, ds) \tag{7}$$

and we remove the unobserved components by integration:

$$f(t|x) = p.\theta^a(t|x) \exp(- {_0\!\int}^t \theta^a(s|x)ds + (1-p).\theta^b(t|x) \exp(- {_0\!\int}^t \theta^b(s|x)ds \tag{8}$$

The set-up of the likelihood is the same as before.

4.3 Definition of variables

The focus in the analysis is on the job-finding rate. The destination "to job" is defined as by administrative records as exit to private or public employment with or without the mediation of employment offices, including self-employment. The analysis is done separately for males and females to account for possible differences in labor market

behavior. In addition to this distinction by gender the effect of the following personal characteristics are taken into account:

- Age: continuous variable, age range 21 to 50 years
- Education: dummy variables

    Education2 = elementary school

    Education3 = vocational school

    Education4 = high school or more

    Reference group = unfinished elementary school

- Family situation: dummy variables

    Family1 = 1 dependent family member

    Family2 = more than 1 dependent family member

    Reference group = no dependent family members

- Ill health: Dummy variable derived from information obtained by employment office councilors from interviews with benefit recipients
- Previous working experience; represented by eligibility groups dummy variables:

    1.5 – 5 years

    5 –10 years

    10 –15 years

    15 –20 years

    20 –25 years

    more than 25 years

    Reference group = less than 1.5 years

These personal characteristics are expected to affect the job-finding rate in various ways, which will be discussed in more detail below. Furthermore, we investigate to what extent there is an effect of a change in business cycle/labor market conditions. For this we use a dummy variable related to the year of inflow into unemployment; i.e. dummy variables for 1999 where the reference group refers to individuals becoming unemployed in the period July 1, 1997 – June 30, 1998. Because labor market conditions after the change of the law may have been different from the labor market conditions before the change the job-finding rate may have changed because of this. We want to disentangle the effect of the labor market conditions from the effect of the change in the law on benefit entitlement. Note that our identifying assumption is that the effect of the labor market conditions is the same for every worker, in particular for every entitlement group. Since the reference entitlement

group did not face a change in entitlement period the 1999 dummy variable captures the effect of the business cycle.

Of course we are also interested whether there is a shift of the job-finding rate because of the reduction in potential benefit duration. From Table 2 we derive that this shift is duration dependent, i.e. it may be different in the first unemployment period from the effect later on. Therefore, we investigate the effect of benefit reduction on the job-finding rate averaged over the first 12 months of unemployment. For this we use dummy variables:

From 6 to 3 months

From 9 to 6 months

From 12 to 6 months

From 18 to 9 months

From 24 to 9 months

From 24 to 12 months

Reference group: Staying at 3 months

4.4 Data sources

The analysis is based on administrative records of unemployment spells for the recipients of unemployment benefits, as well as of their post-unemployment employment spells, for all unemployment spells that started during August 1, 1997 – July 31, 1998 and during the period January 1, 1998 – December 31, 1999 (with censoring on December 31, 2001). The following data sets were used:

- *Data set on registered unemployed* (source: National Employment Office of Slovenia). For each spell, it contains starting and ending date of registered unemployment spell, destination of exit, and the information on the receipt of unemployment insurance benefits (starting and ending date of the eligibility and actual ending date of the receipt). Personal and family characteristics of recipients are also included.

- *Work history data set* (source: Statistical Office of Slovenia). For all formal sector workers, the data includes information about their employment spells which started or were in progress on January 1, 1994. The data are obtained from social insurance records and contain information on the starting and ending date, the type of appointment, occupation, and personal characteristics (gender, age, education).

- *Workers' earnings data set* (source: Pension and Disability Fund*).* The set contains information on earnings associated with each employment spell of workers employed in

the formal sector. For each year (or part of the employment spell within a year) the information collected includes the amount of earnings, the number of hours worked in regular time and overtime, and the starting and ending date of the earnings period.

The data sources provide exceptionally rich and high quality information. First, they provide a complete coverage – all registered unemployed in the selected period were included. For the analysis, we selected a random sample of about 6 percent of spells. Second, being of administrative nature, the information is free of problems typically faced by the survey data (such as non-response and interviewer bias). Third, by combining information about unemployment and subsequent employment spells, the information at our disposal not only covers the whole, not just the covered part of the unemployment spell, but it also contains accurate information about the timing of transitions from unemployment to employment. In contrast to many studies using administrative data on unemployment spells where information about the job-finding date is based on unreliable reporting of unemployed workers themselves (as they have little incentive to do so), we have independent information about the start of post-unemployment job reported by employers. And fourth, we have the information about wages the unemployed earn in their post-unemployment jobs.

5. RESULTS OF EMPIRICAL ANALYSIS

Below we present the results of the estimation of a basic job-finding duration model, as well as provide he sensitivity analysis. To shed more light on the job-finding behavior, we also present post-unemployment wage regressions.

5.1 Estimating job-finding probability

Econometric results of job-finding probabilities, estimated separately for males and females, show the presence of strong disincentive effects of unemployment insurance. The probability of exit to employment strongly increases when the benefits expire and shortly thereafter, and it increases also after three months, coinciding with the reduction of the level of benefits (Table 3). Moreover and perhaps even more persuasively, our analysis confirms that the reduction of benefits under the changed law had a strong positive effect on job-finding rate during the first 12 months of their unemployment spell for most categories of unemployed workers.

The parameter estimates show a clear spike in the month unemployment benefits expire, and a smaller spike in the month thereafter, both for males and females. In the months of benefit expiration the job-finding rate doubles compared to the month before

benefit expiration. Also in the month after benefits expire there is a higher job-finding rate. The reduction of the length of benefit entitlement under the changed law also clearly affected the job-finding rate of the unemployed during their first 12 months of the benefit receipt. Controlling for their other characteristics, the probability of finding a job for males in the "18 months to 9 months" group increases by 40 percent averaged over the first year of unemployment (in this group are those with 15 to 20 years of work experience, who qualified for 18 months of potential benefit duration before the law changed, and to 9 months duration after the change).[4] Except for the first two groups, there is a significant increase of the job-finding rate for all other groups, both for males and females. Generally, the bigger is the reduction of entitlement duration, the bigger is the increase of the job-finding rate. Interestingly, deviating slightly from this pattern and recording the largest increase in the job-finding rate is the group comprising the oldest workers (who also have the most work experience), again for males and females. Note that neither for males nor for females there seems to be an effect of changing labor market conditions on the job-finding rate (insignificant year effects), so the difference in job-finding rate after the change of the benefit law can indeed be attributed to the change of behavior, not to the impact of environment.

How does the job-finding rate of recipients depend on the time spent in unemployment, that is, what is their duration dependence pattern? As found by many other studies, the probability of finding a job declines the longer the unemployment spell. This can be seen in Figure 6, depicting duration dependence parameters of Table 3. Except for the first couple of months, the declining pattern is very similar for males and females.

Figure 6 also suggests that the reduction of benefit level has a positive effect on the job-finding rate. As described above, the level of benefits is 70 percent of individual's past wages during the first 3 months, dropping to 60 percent in the fourth month. As can be seen from the figure, there is a clear spike at 3 months, especially pronounced for males. For males, the job-finding rate is about 20 percent higher in the third month than in the second or the fourth month of unemployment. Taking into account that the benefits dropped by 15 percent this suggests an elasticity of unemployment benefits with respect to unemployment duration of about 1.4.

Other results are also interesting. Age has a negative effect on the job-finding rate. Education does not affect the job-finding rate of males while for females the highest

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[4] Computed as $\exp(0.34) - 1$.

educational category has a significantly higher job-finding rate than other educational categories. The effect of family conditions is different for males and females. Males with dependent family members have a higher job-finding rate than males without dependent family members. Females with more than one dependent family member have a lower job-finding rate than other females. Apparently dependent family members are a stimulus for males to find a job more quickly while for females having dependent family members is a handicap. Bad health is reducing the job-finding rate substantially. Concerning work experience there is no clear effect on the job-finding rate. Apparently, many effects have been picked up by the age variable. Only for males with a short work experience there is a negative effect on the job-finding rate. For females there is also such a negative effect, and there is a negative effect for the category with the most experience.

5.2 Sensitivity analysis – job-finding rates and exit rates to other destinations

To investigate the sensitivity of our parameter estimates we performed a number of additional analyses: we studied how job-finding rate is affected within and outside the 12 month period of unemployment spell; how exits to other destinations were affected in the period after the change of the law; and whether there were unobservable characteristics of the unemployed which affected job-finding rate.

Possible shifts of the job-finding rate in different duration intervals are studied by two alternatives. First, we investigated shifts in months 1-6 separate from shifts in months 7-12 (the relevant parameter estimates are shown in the upper part of Table A1, appendix 2).[5] There are differences in the effect in the first 6 months from the effect in the second 6 months. For both males and females the Likelihood Ratio test statistics comparing the loglikelihoods in Tables A1 and Table 3 are significant.[6] However, the general pattern does not change much. The lower part of Table A1 shows the relevant parameter estimates if we also allow a shift to occur after 1 year. In this case, for males the LR-test shows that we cannot reject the hypothesis that there is no effect of the reduction in potential benefits on the job-finding rate after 12 months of unemployment. For females we cannot reject this hypothesis.[7] Nevertheless, again the pattern of the shifts is very similar as before.

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[5] The other parameter estimates are not reported since they did not differ much from the ones presented in Table 3.

[6] For males the LR-statistic equals 38.4, for females the LR-statistic equals 17.4. In both cases this is significant at a 5%-level (the critical χ^2-value for 6 degrees of freedom equals 12.6).

[7] For males the LR-statistic equals 10.4, for females the LR-statistic equals 19.8.

We also investigated to what extent exits to other destinations are affected by potential benefit durations and changes in these durations.[8] The parameter estimates are shown in Table A2. The set-up of the table is similar to Table 3. As with the job-finding rate age has a negative effect on the exit rate for other reasons. With respect to education there is a clear difference between males and females. Whereas higher educated males are less likely to leave unemployment for other reasons higher educated females are more likely to do so. Having one or more dependent family members has no significant effect on the exit rate for males, but has a negative effect on the exit rate for females. Bad health not only reduces the job-finding rate but also the exit rate for other reasons. By and large there is not a lot of difference in the determinants of the job-finding rate or the exit rate for other reasons. This makes sense if in the exits for other reasons labor market programs are important. Then, personal characteristics that are helpful in finding a regular job quickly are also helpful in entering a labor market program. Concerning labor market experience there is a negative effect on the exit rate for other reasons. Apparently the exits for other reasons are especially important for workers with little working experience.

Interestingly, there are also clear end-of-benefit entitlement spikes in the exit rates for other reasons. Again, the exit rate in the month of benefit expiration is about twice as high as in the preceding month. And also in the month after benefit expiration the exit rate for other reasons is higher than before. Furthermore, the reduction in benefit duration has had quite large effects on the exit rates for other reasons in the first 12 months of unemployment. Finally, the pattern of duration dependence is different from the pattern in the job-finding rate (Figure 7). Contrary to the job-finding rate where there is a decline over the duration of unemployment the exit rate for other reasons increases over the duration of unemployment.

Furthermore, we investigated whether the change in UI law affected the spikes in the job finding rates at the time of expiration of the benefits. We re-estimated the models allowing the three dummy variables concerning the months around benefit exhaustion to have a different value before and after the change in UI law. The relevant parameters are presented in Table A3. As shown the spikes after the change in UI law are less pronounced. Nevertheless, although the Likelihood Ratio test shows that we cannot reject the hypothesis that the spike effects are different their pattern is very similar. One month before benefit expiration there is no effect, then in the month of benefit expiration there is a big effect, and

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[8] These exits are to all other destinations other than to a job including exits to labor market programs.

in the month after benefit expiration there is a smaller effect. As Table A3 shows this concerns both the job finding rates and the exit rates to other destinations.

Moreover, we examined whether age has a non-linear effect on the job-finding rate. We replaced age as a continuous variable by dummy variables representing age categories of 5 years. This did not change the parameter estimates much and had no effect on the relevant benefit duration variables. We also studied whether unobserved heterogeneity affected the job-finding rate and found no evidence for this.[9]

5.3 Sensitivity analysis – simulations

To give an idea about the size of the effects of the change of the law, we calculated the difference in job-finding rate before and after the change of the law for selected groups of unemployed workers. These calculations are based on the parameter estimates presented in Tables 3 and A2. The reference group is male individuals, 30 years old, with no education, no dependent family members, of good health, and having a 12-month benefit entitlement before and a 6-month benefit entitlement after the change of the law. The effects are dramatic (Table 4). Before the change of the law, 49 percent of individuals in the reference group found a job within 6 months of the start of their unemployment spell, and 7 percent left unemployment for other reasons. The corresponding percentages after 12 months are 65 (exit to employment) and 14 (exit for other reasons). After the change of the unemployment benefit law the exit rates out of unemployment strongly increased: 59 percent of individuals in the reference group found a job within 6 months of the start of their unemployment spell (10 percentage points increase in comparison to the before-the-change period), and 16 percent left unemployment for other reasons (9 percentage points increase in comparison to the before-the-change period). The overall probability for this group to have left unemployment after 6 months thus increased from 57 percent in the period before the law changed to 75 percent after the change. Using these exit probabilities one can calculate the expected duration of unemployment to be 21.2 months before the change in UI law and 16.0 months after the change of the law. Taking into account that this reduction is caused by a reduction in potential benefit period of 6 months we find that on average a one month reduction is potential benefit period would lead to a reduction in the unemployment duration of 0.86 months .

Faster exit from unemployment after the change of the law is shown also by comparing job-finding rates 12 months into unemployment spells (after 12 months about 69

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[9] Results available upon request.

percent has found a job and 23 percent has left unemployment for other reason), but the increases in comparison to the before-the-change period are less dramatic.

Table 4 also shows simulation results for 40 years old individuals, with other characteristics being the same as the reference group. In comparison to the younger group, fob-finding probabilities for this group decrease, but a substantial increase of this probability due to the change in the unemployment law remains. Similarly, Table 4 shows simulation results for individuals of bad health but otherwise possessing the same characteristics as the reference group. In this case, the exit probabilities are substantially lower, and the effect of the change in unemployment benefit law much smaller. Furthermore, Table 4 shows the outflow probabilities is an individual with the reference characteristics had a change in potential benefit duration from 18 to 9 months. As shown despite the longer benefit entitlement the job finding rates are not much smaller. Finally, Table 4 shows the simulation results if the reference person is a female instead of a male. Then, both the job finding rates and the exit rates to other destinations are substantially smaller. Whereas of the male reference persons after the change in the UI law 75 percent has left unemployment for the female reference persons this is only 63 percent.

How do the above estimates of sensitivity of unemployment with respect to changes in potential duration and level of benefits compare with those obtained by other researchers? In general, our estimates seem to be on the high end both with respect the duration of benefit entitlement and benefit replacement rate. As for duration sensitivity, Katz and Meyer (1990) estimate for the U.S. that one week increase in potential duration increased the average duration of the unemployment spells of UI recipients by 0.16 to 0.20 weeks. Similar estimates are obtained by Moffitt (1985), who finds that a 1 week increase in the benefit duration is associated with a 0.15 week increase in the duration of unemployment, and Ham and Rea (1987), who find that a 1 week increase in the benefit duration is associated with 0.26-0.33 weeks increase in the duration of unemployment in Canada. For transition countries, Ham et al (1998) estimate that a 1 week increase in benefit duration is associated with a 0.30 and 0.93 week increase in the duration of unemployment in the Czech and Slovak Republics, respectively. Our estimate of the impact of change of potential duration for Slovenia is thus similar to the estimate for Slovakia, both being several times higher than the ones in the US, Canada and the Czech Republic.

Also our estimate of benefit elasticity of 1.4 (see section 5.1) is at internationally high level. A similarly large estimate is obtained by Carling et al. (2001), whose study of the effects of a reduction in the replacement rate from 80 to 75 percent in Sweden in 1995

finds an elasticity of around 1.7. Benefit elasticities found by many other studies are smaller. Bennmarker et al. (2004) that evaluates changes in the Swedish UB system in the early 1990s and finds an elasticity of around 0.6. Similarly, in their study of Norway, Roed and Zhang (2003) find elasticities of around 0.95 for males and around 0.35 for females. Ham et al (1998) estimate benefit elasticities quite low, at 0.34 percent for the Czech Republic (the parameter estimate for Slovakia was insignificant). According to Layard et al (1991), the benefit elasticity ranges from 0.2 to 0.9, depending on the time elapsed from the start of benefit receipt.

5.4 Post-unemployment wage regressions

Although the paper focuses on the effects of the reduction in potential benefit duration on job-finding rate, we also analyze the effects this reduction has on the accepted wages of benefit recipients. In fact, information about the accepted wages in post-unemployment jobs allows us to study the behavior underlying the job-finding rates. Recall that there are two determinants of the job-finding rate, the job offer arrival rate and the job offer acceptance probability. The acceptance of a job offer depends on individual's reservation wage. When benefit exhaustion approaches, the reservation wage decreases and the acceptance probability increases. If the reduction of benefit duration unduly reduced the period necessary to find a job, one should observe that the level of accepted wage would be lower in the period after the law compared to the wage level before the change, particularly when transitions to employment occur close to benefit exhaustion.

We investigate the above hypotheses with wage regressions.[10] The explanatory variables in the analysis are very similar to those used before. In addition to these variables we include Mill's ratio to account for possible selectivity in the wage acceptance process.

Our findings show that the overall effects of the reduction in potential benefit durations on post-unemployment wages of benefit recipients are insignificant.[11] There is no

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[10] One of the problems with the analysis of the wages is that for a large part of the unemployed that found a job no new wage (or previous wage) is available. The reduction of the sample size is as follows:

	Males	Females
Original sample	12,752	17,585
Exit to job	8,735	9,166
New earnings > 0	5,682	5,716
Old earnings > 0	4,970	4,971
20,000<wage<150.000	3,813	3,821

As shown in the sample used in the analysis of the job-finding rates, there are about 9000 males and females that have found a job. However, for only about 5500 males and females that have found a job information is available about earning in the new job. The sample is reduced to less than 5000 if old earnings are included in the analysis. We calculate the wage rate taking into account that overtime working hours pay 20% more. To reduce the effects of errors in earnings and hours of work we limit the wage range from 20,000 to 150,000. This further reduces the sample to about 3800 males and females.

clear pattern of duration dependence (Table 5). Moreover, our parameter estimates show that for males, there was no wage reduction related to benefit exhaustion. However, for females we find that wages in the month of benefit exhaustion are 4.6 percent lower than wages in adjacent months. Apparently for males the spike in the job-finding rate is unrelated to the acceptance probability, i.e. the reservation wage. In contrast, for females at least part of the spike in the month of benefit exhaustion can be attributed to a downward adjustment of the reservation wage leading to a substantial drop in the acceptance wage.[12]

Other interesting wage regression results are as follows. Education has a positive effect on the wage. Males with the highest education earn a wage that is about 12% higher than males with no education, for females the difference is even 19.1%. A surprising result is that age has a negative effect on the wage. This is due to the inclusion of working experience as an explanatory variable. For males the experience dummies are highly significant. For females the experience dummies are insignificant. If we omit the experience dummies for both males and females we find significant positive effect of age. Table 5 also shows that conditional on all observed characteristics the previous wage has a positive effect on the new wage. This effect is due to unobserved characteristics of the workers that are captured by the previous wage. The elasticity is about 0.2. If conditional on the observed characteristics the previous wage was 1 percent higher the current wage is 0.2 percent higher. The effect of wage increases and inflation is shown in the year (1999) dummy. For males in the inflow sample after the change in law the wage is 5.1 percent higher than for males in the inflow sample before the change in unemployment benefit law. The coefficients of the Mill's ratios are insignificantly different from zero.[13]

6. CONCLUSIONS AND POLICY IMPLICATIONS

The above analysis identified important and sizeable disincentive effects of the Slovenian unemployment insurance system. First, we identified clear spikes at the point of benefit exhaustion and the month following it, although the spikes were less intense after the change of the law. Second, there is a positive effect on the job-finding rate in the third month of unemployment, which is likely the consequence of a reduction of the level of benefit that occurs in the fourth month of benefit receipt. And third and perhaps most

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[11] Note that this is consistent with the finding of Meyer (1995) that speeding the return to work does not decrease earnings following an unemployment spell.

[12] The lower part of Table A3 shows that there is not a lot of difference in this pattern if we allow the effects of the months around benefit exhaustion to differ before and after the change in the UI law.

[13] Note that no selectivity is consistent with the parameter estimates of the job finding rate where we did not find evidence of the presence of unobserved heterogeneity.

persuasively, the job-finding probability of most groups of recipients whose benefit entitlement was reduced by the change of the law strongly increased while remaining virtually unchanged for recipients whose entitlement period did not change. Interestingly, post-unemployment wages of recipients were not affected by the change of the law, suggesting that higher job-finding rate following the reduction of benefits was not produced by reduced reservation wages (higher acceptance probability) but rather higher job-offer probability, suggesting more effective job-search activity. The paper also found that the reduction in potential benefit duration has had a positive effect on the exit rate out of unemployment to other destinations, including active labor market programs, confirming the ability of policymakers to attract benefit recipients to active labor market programs. Increased intensity employment services and monitoring also might have contributed to this development.

Can we attribute more effective job-search activity to increased job-search efforts of recipients, facing shorter duration of benefit entitlement? Conceivably, the same effects could had been achieved by more intense employment services provided to the unemployed and stricter monitoring in the period after the change of the law (recall from section 3 that there are some indication that employment services and monitoring has indeed improved).[14] The fact that job-finding rate has not changed for the group of recipients whose entitlement period did not change, however, speaks in favor of the interpretation that the reduction of the job-finding rate was produced primarily by increasing job-search efforts of recipients themselves. If, however, the efforts of employment offices after the change of the law have been targeted on recipients with longer durations, employment offices, too, could be credited with helping to increase the job-finding rate.

What lessons, then, can be learned from the Slovenian change of the unemployment benefit law? The law was certainly effective encouraging the benefit recipients to leave unemployment, contributing, most likely, to shortening of their unemployment episodes, thus reducing the severity of the moral hazard induced by the unemployment benefit system. The fact that their accepted wages in new jobs were not reduced following the reduction of the duration of benefit entitlement – a likely consequence of increased job-

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[14] The 1998 amendments of the Slovenian UI law introduced obligatory preparation of a re-employment plan for benefit recipients, called for more frequent contacts between counselors and recipients, broadened the definition of the suitable job, introduced stiffer sanctions for refusal of job offers, and introduced stricter monitoring of continuing eligibility (home visits of inspectors, mandatory daily accessibility of benefit recipients by counselors).

search intensity by benefit recipients and improved employment services and monitoring by employment offices – is also suggestive that the change of the law did not affect much disposable income of beneficiaries. These positive developments have to be weighted against possible additional hardship created by the curtailment of benefit entitlement, as well as worse quality of post-unemployment jobs in terms of their stability, type of appointment, and precariousness. A thorough assessment of the legislative changes would have to probe into these issues as well – an important area for future research.

Our findings about large disincentives created by UI system also suggest that UI design parameters importantly affect incentives to exit from insured unemployment. For developing countries where monitoring capacity is weak, enforcement is costly, and a large informal sector provides abundant possibilities for undeclared work, this finding underscores the need to provide modest benefits that will not to jeopardize employment incentives and the fiscal balance of the system. A flat-rate as opposed to earnings-related benefit seems particularly pertinent, because it is administratively less demanding and it increases the progressivity of the redistribution implied by the system.

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TABLES AND GRAPHS

Table 1 Requirements for and potential duration of UI benefits before and after the 1998 change of law

| Entitlement Group | Requirements for benefit | | Max benefit duration (months) | | Age group [a] |
	Work experience (years)	Additional age requirement	Before	After	
1	0-1.5	none	3	3	19-29
2	1.5-5	none	6	3	21-30
3	5-10	none	9	6	23-35
4	10-15	none	12	6	27-39
5	15-20	none	18	9	32-43
6	20-25	none	24	9	37-49
7	>25	none	24	12	41-49
8	>25	50+	24	18	50-54
9	>25	55+	24	24	55-58

[a] The age boundaries are determined by the presence of at least 100 observations for a particular year of age

Table 2 Probability to find a job within 6 and 12 months (males and females); by entitlement group (%)

Group	Potential benefit Duration (months)	Found a job after 6 months	12 months
1.	Before – 3	50	66
	After – 3	50	63
	Effect	**0**	**-3**
2.	Before – 6	49	66
	After – 3	51	63
	Effect	**2**	**-3**
3.	Before – 9	41	61
	After – 6	46	58
	Effect	**5**	**-3**
4.	Before – 12	36	55
	After – 6	45	57
	Effect	**9**	**2**
5.	Before – 18	34	45
	After – 9	38	55
	Effect	**4**	**10**
6.	Before – 24	24	33
	After – 9	32	49
	Effect	**8**	**15**
7.	Before –24	9	12
	After – 12	26	38
	Effect	**17**	**25**
8.	Before – 24	4	5
	After – 18	12	15
	Effect	**8**	**10**
9.	Before – 24	1	1
	After – 24	4	6
	Effect	**3**	**5**

Table 3 Parameter estimates – outflow to a job

	Males	**Females**
Characteristics		
Age/10	-0.38 (11.3)*	-0.49 (15.1)*
Education2	0.06 (1.3)	0.05 (0.9)
Education3	0.06 (1.4)	-0.00 (0.0)
Education4	-0.07 (1.4)	0.19 (3.3)*
Family1	0.07 (2.4)*	-0.02 (0.9)
Family2	0.10 (3.5)*	-0.05 (2.0)*
Ill health	-1.66 (32.9)*	-1.63 (29.5)*
Constant	-4.42 (45.2)*	-4.40 (42.0)*
Experience (years)		
1.5 - 5	-0.30 (4.9)*	-0.13 (2.6)*
5 - 10	-0.11 (2.1)*	-0.04 (0.9)
10 - 15	-0.07 (1.3)	0.05 (0.9)
15 - 20	-0.03 (0.4)	0.23 (3.5)*
20 - 25	-0.03 (0.4)	0.08 (1.1)
More than 25	-0.14 (1.4)	-1.27 (12.5)*
Year effect		
1999	-0.07 (1.7)	0.02 (0.5)
Spikes – end of benefit		
1 month before	-0.01 (0.2)	0.06 (0.1)
Month end of benefit	0.78 (16.4)*	0.87 (19.9)*
1 month after	0.44 (6.5)*	0.29 (4.4)*
Effect of benefit reduction		
(first 12 months)		
6 months to 3 months	0.21 (2.8)*	-0.01 (0.1)
9 months to 6 months	0.10 (1.4)	0.08 (1.3)
12 months to 6 months	0.23 (3.4)*	0.17 (2.7)*
18 months to 9 months	0.34 (4.9)*	0.27 (4.2)*
24 months to 9 months	0.35 (5.1)*	0.59 (8.2)*
24 months to 12 months	0.71 (4.9)*	1.85 (11.2)*
Duration dependence		
Month2	0.04 (0.9)	-0.14 (3.2)*
Month3	0.23 (5.7)*	-0.06 (1.4)
Month4	0.04 (0.9)	-0.26 (5.3)*
Month5	-0.02 (0.4)	-0.22 (4.2)*
Month6	-0.20 (3.8)*	-0.39 (7.4)*
Month7	-0.42 (6.7)*	-0.43 (7.3)*
Month8	-0.38 (5.7)*	-0.40 (6.5)*
Month9	-0.36 (5.8)*	-0.45 (7.7)*
Month10	-0.48 (6.7)*	-0.44 (6.6)*
Month11	-0.56 (7.0)*	-0.64 (8.7)*
Month12	-0.51 (6.8)*	-0.41 (6.4)*
Month13	-0.56 (6.4)*	-0.60 (7.4)*
Month14	-0.47 (5.2)*	-0.63 (7.5)*
Month15	-0.45 (5.0)*	-0.52 (6.4)*
Month16	-0.70 (6.6)*	-0.73 (7.9)*

Month17	-0.34 (3.6)*	-0.82 (8.3)*
Month18	-0.53 (5.4)*	-0.56 (6.6)*
Month19	-0.68 (5.8)*	-0.76 (6.4)*
Month20	-0.85 (6.4)*	-0.78 (7.3)*
Month21	-0.71 (5.4)*	-0.77 (6.9)*
Month22	-0.94 (6.3)*	-0.81 (7.0)*
Month23	-1.14 (6.6)*	-0.88 (7.0)*
Month24	-0.38 (3.6)*	-0.32 (3.6)*
Month25	-0.84 (5.5)*	-1.13 (7.8)*
Month25+	-1.56 (21.6)*	-1.63 (26.6)*
-Loglikelihood	60,116.9	66,461.9
N	12,752	17,585

Table 4 Simulation results

Reference individual: male, 30 years, no education, no dependent family members, good health, max. 12 months of benefit duration before the change of the law, max. 6 months of benefit duration after the change of the law.

Before the change of the law

%	After 6 months			After 12 months		
	To job	To other	Total exit	To job	To other	Total exit
Reference	49.4	7.2	56.6	64.8	14.4	79.2
If age = 40	37.7	6.5	44.2	52.5	14.7	67.2
If ill health	12.7	2.6	15.3	20.1	7.3	27.4
If max. 18 months	51.3	5.3	56.6	65.7	9.9	75.6
If female	36.1	3.6	39.7	56.3	7.4	63.7

After the change of the law

%	After 6 months			After 12 months		
	To job	To other	Total exit	To job	To other	Total exit
Reference	58.6	16.2	74.8	67.9	23.2	91.1
If age = 40	46.7	15.7	62.5	57.3	25.2	82.5
If ill health	17.4	7.1	24.5	24.9	14.9	39.8
If max. 9 months	60.2	12.9	73.1	72.3	20.6	92.9
If female	40.5	22.4	62.9	51.4	35.8	87.2

Table 5 Log-wage regressions

	Males	**Females**
Characteristics		
Age/10	-0.024 (1.9)*	-0.042 (3.4)*
Education2	0.016 (1.2)	0.032 (2.1)*
Education3	0.061 (4.9)*	0.091 (5.9)*
Education4	0.118 (7.8)*	0.191 (11.8)*
Constant	8.913 (52.0)*	8.691 (52.7)*
Previous wage		
Log(wage)	0.224 (14.9)*	0.223 (15.0)*
Experience (years)		
1.5-5	0.068 (2.8)*	0.024 (1.3)
5-10	0.043 (2.4)*	0.005 (0.3)
10-15	0.078 (4.0)*	-0.006 (0.3)
15-20	0.124 (5.2)*	-0.043 (1.9)
20-25	0.131 (4.6)*	-0.026 (1.0)
More than 25	0.199 (6.2)*	0.012 (0.4)
Year effect		
1999	0.051 (2.5)*	0.035 (1.9)
Spikes – end of benefit		
1 month before	-0.021 (0.9)	-0.001 (0.1)
Month end of benefit	-0.019 (1.1)	-0.046 (2.6)*
1 month after	-0.031 (1.2)	0.002 (0.1)
Effect benefit reduction (first 12 months)		
6 months to 3 months	-0.027 (0.9)	0.006 (0.2)
9 months to 6 months	0.016 (0.6)	0.040 (1.6)
12 months to 6 months	-0.014 (0.5)	0.033 (1.4)
18 months to 9 months	0.001 (0.1)	0.076 (3.2)*
24 months to 9 months	0.018 (0.7)	0.025 (1.0)
24 months to 12 months	-0.149 (2.7)*	-0.051 (1.1)
Duration dependence		
Month2	-0.021 (1.7)	-0.012 (1.1)
Month3	-0.086 (7.3)*	-0.008 (0.6)
Month4	-0.032 (2.3)*	0.035 (2.3)*
Month5	-0.057 (3.6)*	0.020 (1.3)
Month6	-0.043 (2.5)*	0.032 (1.9)
Month7	-0.058 (3.1)*	0.022 (1.2)
Month8	-0.019 (1.0)	0.010 (0.6)
Month9	-0.048 (2.3)*	-0.014 (0.7)
Month10	-0.057 (2.2)*	-0.018 (0.7)
Month11	-0.059 (2.0)*	-0.002 (0.1)
Month12	-0.061 (2.0)*	0.044 (2.1)*
Month13	-0.019 (2.7)*	0.020 (0.8)
Month14	-0.047 (1.6)	0.058 (2.4)*
Month15	-0.031 (0.9)	0.048 (1.7)
Month16	-0.036 (1.2)	0.002 (0.1)
Month17	-0.030 (1.0)	0.045 (1.3)

Month18	0.029 (0.8)	0.036 (1.2)
Month19	0.042 (1.0)	-0.001 (0.1)
Month20	-0.017 (0.3)	0.040 (1.4)
Month21	-0.067 (1.7)	0.041 (1.1)
Month22	-0.004 (0.1)	0.125 (3.4)*
Month23	-0.045 (0.7)	0.064 (0.9)
Month24	-0.011 (0.3)	0.114 (2.6)*
Month25	-0.017 (0.3)	0.005 (0.1)
Month25+	-0.052 (1.6)	0.092 (4.0)*
Mill's ratio [a]	-0.006 (0.3)	-0.043 (1.8)
N	3813	3821
R^2	0.178	0.232

[a] Mill's ratio based on a probit analysis of having found a job with positive earnings. In the probit analysis explanatory variables are age, education, family situation, health conditions, experience (eligibility group) and type of benefit reduction.

APPENDIX 1 Effects on inflow into unemployment and choice of sample period

This appendix explains the selection of the two observation periods used to form the twin groups. Recall that to isolate the effects of the change of the law, each twin group consisted of two subgroups, one starting to collect benefits in a selected period before and one after the change of the law, so that members of both subgroups – in the absence of the change of the law – would be entitled to same potential benefit duration.

The choice of the two sample periods was based on the following considerations. First, to keep the macroeconomic and other conditions influencing the inflow to and outflow from unemployment as similar as possible, the "before" period was selected so that it closely preceded, and the "after" period closely followed the change of the law. Second, to ensure that the twin groups were as homogeneous as possible, the length of the observation period was chosen to be one year, thereby avoiding the bias caused by the seasonality of inflow into unemployment. In addition, we also took into account a possible "self-selection" bias arising from the ability of workers to influence the timing of their inflow into unemployment so as to take advantage of the old, more generous benefit rules.

As shown in Figure A1, in the two months preceding the change of the law, the inflow into recipiency was abnormally large, and in the two months following the change of the law, the inflow was abnormally small (the amendments were discussed in the Slovenian Parliament starting October 2, 1998, and the law passed on October 24, 1998). To avoid the possible bias arising from the ability of workers to affect the timing of their entry into unemployment, we chose August 1, 1997 – July 31, 1998 for the "before" period, and January 1, 1998 – December 31, 1999 for the "after" period.

APPENDIX 2 Sensitivity analyses – various estimates

Table A1 Effects benefit reduction – several duration intervals [a]

|	Males	Females
A. Two duration intervals		
Months 1-6		
6 months to 3 months	0.13 (1.6)	-0.10 (1.3)
9 months to 6 months	0.08 (1.1)	0.00 (0.0)
12 months to 6 months	0.19 (2.7)*	0.16 (2.2)*
18 months to 9 months	0.29 (3.9)*	0.26 (3.6)*
24 months to 9 months	0.26 (3.3)*	0.59 (7.3)*
24 months to 12 months	0.91 (6.2)*	1.77 (8.5)*
Months 7-12		
6 months to 3 months	0.63 (5.1)*	0.27 (2.6)*
9 months to 6 months	0.15 (1.2)	0.27 (2.9)*
12 months to 6 months	0.34 (3.1)*	0.17 (1.7)
18 months to 9 months	0.46 (4.6)*	0.28 (3.0)*
24 months to 9 months	0.57 (6.0)*	0.58 (5.8)*
24 months to 12 months	-0.19 (0.6)*	1.97 (7.7)*
-Loglikelihood	60,097.7	66,453.2
B. Three duration intervals		
Months 1-6		
6 months to 3 months	0.03 (0.3)	-0.10 (1.2)
9 months to 6 months	0.01 (0.1)	-0.02 (0.3)
12 months to 6 months	0.13 (1.6)	0.16 (2.0)*
18 months to 9 months	0.23 (2.8)*	0.25 (3.0)*
24 months to 9 months	0.16 (1.8)	0.59 (6.8)*
24 months to 12 months	0.85 (5.7)*	1.78 (8.5)*
Months 7-12		
6 months to 3 months	0.53 (3.9)*	0.26 (2.3)*
9 months to 6 months	0.08 (0.6)	0.25 (2.4)*
12 months to 6 months	0.27 (2.4)*	0.17 (1.6)
18 months to 9 months	0.40 (3.8)*	0.26 (2.6)*
24 months to 9 months	0.48 (4.6)*	0.58 (5.6)*
24 months to 12 months	-0.26 (0.7)	1.98 (7.7)*
Months 12+		
6 months to 3 months	-0.36 (2.0)*	-0.01 (0.1)
9 months to 6 months	-0.07 (0.5)	-0.21 (1.6)
12 months to 6 months	-0.04 (0.3)	0.17 (2.7)*
18 months to 9 months	0.00 (0.0)	0.06 (0.5)
24 months to 9 months	-0.39 (2.7)*	-0.11 (0.9)
24 months to 12 months	-0.15 (0.5)	1.44 (4.7)*
-Loglikelihood	60,092.0	66,443.3

[a] The other parameter estimates are not reported since they did not differ much from the ones presented in Table 3.

Table A2 Parameter estimates – outflow to other destinations

	Males	Females
Characteristics		
Age/10	-0.23 (4.0)*	-0.10 (2.0)*
Education2	-0.24 (3.5)*	0.19 (3.0)*
Education3	-0.39 (5.7)*	0.05 (0.9)
Education4	-0.46 (6.2)*	0.33 (5.2)*
Family1	-0.01 (0.1)	-0.10 (2.7)*
Family2	-0.08 (1.6)	-0.12 (3.2)*
Ill health	-1.39 (21.0)*	-0.79 (18.7)*
Constant	-7.04 (37.0)*	-7.97 (48.6)*
Experience (years)		
1.5-5	-0.41 (4.0)*	-0.27 (3.1)*
5-10	-0.56 (6.7)*	-0.41 (5.1)*
10-15	-0.35 (3.4)*	-0.47 (5.5)*
15-20	-0.64 (5.0)*	-0.75 (7.3)*
20-25	-0.62 (4.3)*	-0.91 (7.8)*
More than 25	-0.57 (3.4)*	-1.28 (10.0)*
Year effect		
1999	0.01 (0.2)	0.11 (2.2)*
Spikes – end of benefit		
1 month before	0.03 (0.2)	-0.17 (1.6)
Month end of benefit	0.79 (9.5)*	0.75 (9.8)*
1 month after	0.25 (2.4)*	0.32 (3.4)*
Effect benefit reduction (first 12 months)		
6 months to 3 months	0.76 (5.6)*	0.85 (7.6)*
9 months to 6 months	1.14 (9.7)*	1.05 (10.4)*
12 months to 6 months	0.85 (7.3)*	1.09 (11.0)*
18 months to 9 months	1.11 (8.7)*	1.21 (11.2)*
24 months to 9 months	1.02 (8.3)*	1.19 (10.3)*
24 months to 12 months	0.94 (3.6)*	1.16 (3.7)*
Duration dependence		
Month2	0.12 (0.8)	0.19 (1.6)
Month3	0.64 (4.9)*	0.51 (4.6)*
Month4	1.15 (9.1)*	0.64 (5.7)*
Month5	0.86 (6.2)*	0.76 (6.5)*
Month6	0.92 (6.7)*	0.65 (5.6)*
Month7	1.00 (7.1)*	0.75 (6.2)*
Month8	1.10 (7.6)*	0.70 (5.5)*
Month9	1.10 (7.7)*	0.84 (7.0)*
Month10	1.35 (9.3)*	0.85 (6.6)*
Month11	1.19 (7.8)*	0.80 (6.1)*
Month12	1.52 (11.1)*	0.97 (7.9)*
Month13	1.84 (12.4)*	1.42 (10.9)*
Month14	1.62 (10.0)*	1.28 (9.2)*
Month15	1.88 (12.3)*	1.35 (9.9)*
Month16	1.73 (10.6)*	1.54 (11.6)*
Month17	1.91 (11.9)*	1.49 (10.9)*

Month18	2.15 (14.5)*	1.56 (11.7)*
Month19	1.97 (11.8)*	1.62 (12.0)*
Month20	1.99 (11.8)*	1.63 (11.9)*
Month21	2.01 (11.6)*	1.66 (11.9)*
Month22	1.92 (11.7)*	1.75 (12.8)*
Month23	1.91 (10.1)*	1.47 (9.0)*
Month24	2.20 (13.4)*	1.68 (11.7)*
Month25	2.03 (10.8)*	1.49 (9.2)*
Month25+	1.43 (11.6)*	1.69 (17.3)*
-Loglikelihood	22349.1	39,684.3
N	12,752	17,585

Table A3 End of benefit spikes in the exit rates and log wage regressions – before and after the change of the law[a]

a. Job finding rates

	Males		Females	
	Before	**After**	**Before**	**After**
1 month before	0.09 (0.9)	-0.09 (1.2)	0.10 (1.1)	0.02 (0.2)
Month end of benefit	0.96 (14.0)*	0.66 (11.0)*	1.11 (19.0)*	0.68 (11.6)*
1 month after	0.55 (5.4)*	0.34 (4.0)*	0.25 (2.5)*	0.28 (3.5)*
-loglikelihood	60,109.9		66,447.8	
LR-test Before=After	14.0*		28.2*	

b. Exit rates to other destinations

	Males		Females	
	Before	**After**	**Before**	**After**
1 month before	-0.06 (0.4)	0.04 (0.3)	-0.12 (0.7)	-0.23 (1.8)
Month end of benefit	1.22 (11.4)*	0.38 (3.4)*	1.13 (9.9)*	0.44 (4.6)*
1 month after	0.42 (2.7)*	0.08 (0.6)	0.55 (3.8)*	0.11 (1.0)
-loglikelihood	22,332.6		39,669.7	
LR-test Before=After	33.0*		29.2*	

c. Log wage

	Males		Females	
	Before	**After**	**Before**	**After**
1 month before	-0.085 (2.1)*	0.018 (0.6)	0.009 (0.3)	-0.008 (0.4)
Month end of benefit	-0.022 (0.8)	-0.012 (0.6)	-0.038 (1.7)	-0.054 (2.2)*
1 month after	-0.064 (1.6)	0.004 (0.1)	-0.017 (0.4)	0.013 (0.5)
F-test Before=After	8.4*		1.0	

[a] The other parameter estimates are not reported since they did not differ much from the ones presented in Table 3 (for job finding rates), Table 5 (log wage regressions), and Table A2 (for exit rates to other destinations).

Figure A1: Actual and predicted monthly inflow into UI recipiency, July 1998 – February 1999 (in thousands)*
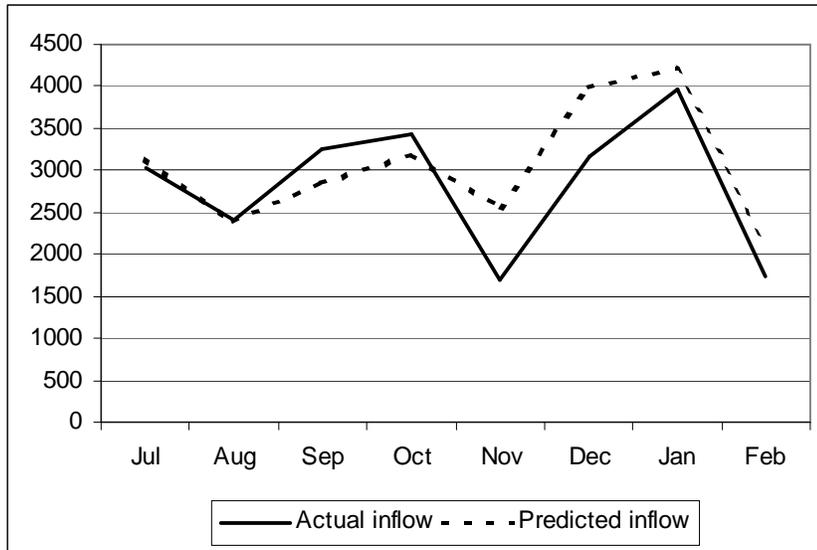
Note: Inflow is predicted by a regression of the actual inflow on yearly and monthly dummies, estimated over January 1997 – December 2001 period.

Figure 1: Replacement rate of unemployment insurance payments, transition economies, early and late 1990s*
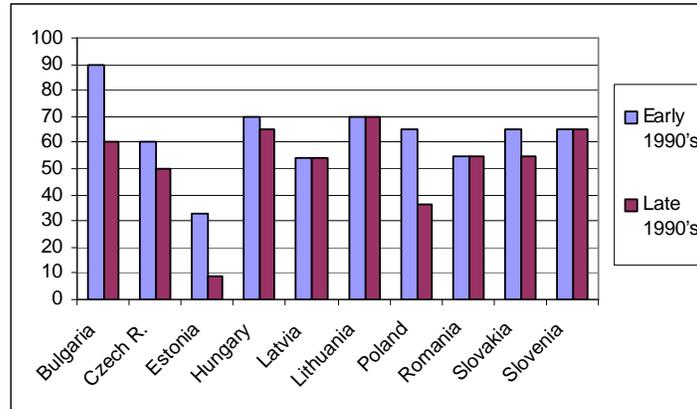
Source: Vodopivec, Wörgötter and Raju (2003).

*Average replacement rate in the first six months of benefit eligibility. For Estonia, the benefit is flat, so the rate is calculated as the level of the benefit divided by the average wage

Figure 2: Maximum potential duration of unemployment insurance payments, transition economies, early and late 1990s
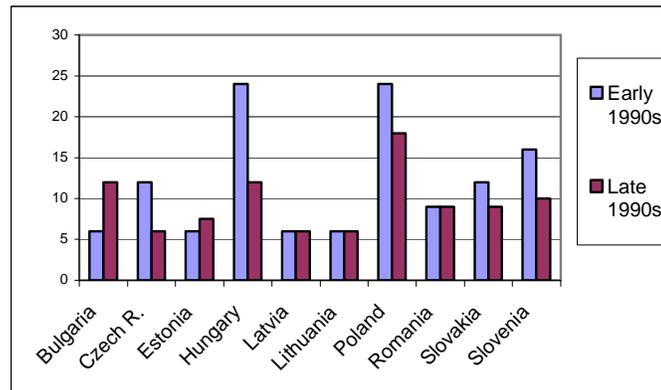
Source: Vodopivec, Wörgötter and Raju (2003); own calculations for Slovenia.

Note: For Slovenia, simple average of potential duration for groups presented in Table 1.

Figure 3: Survival in unemployment; before and after the change of law
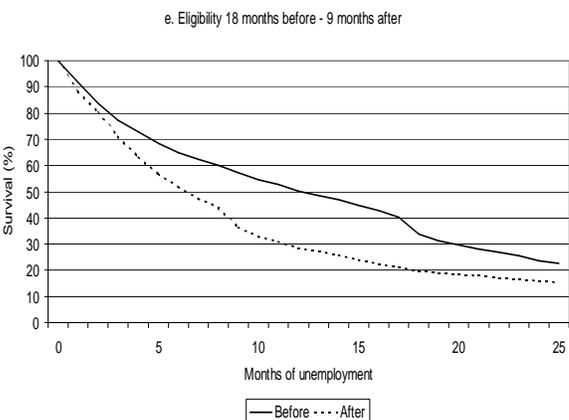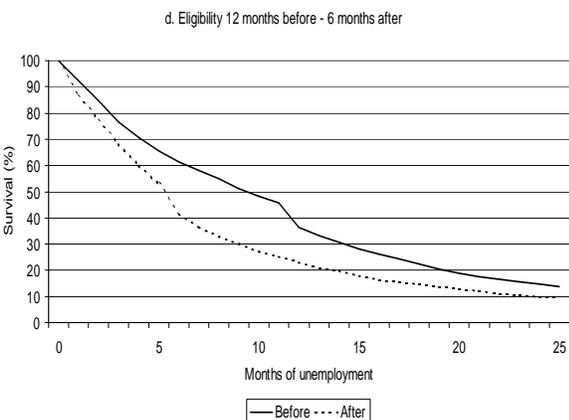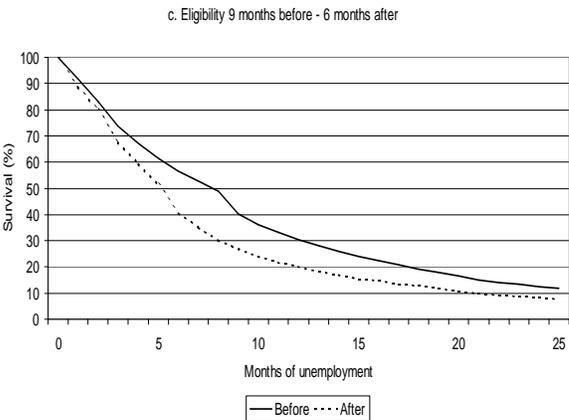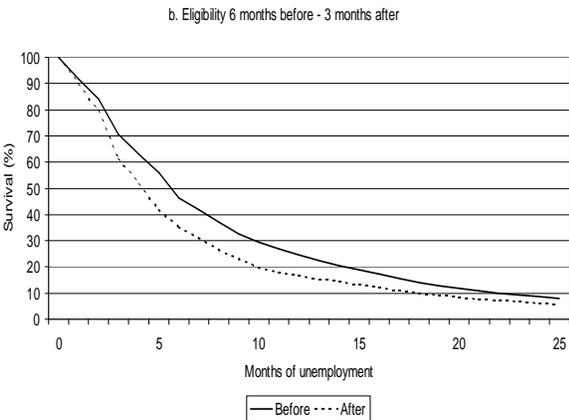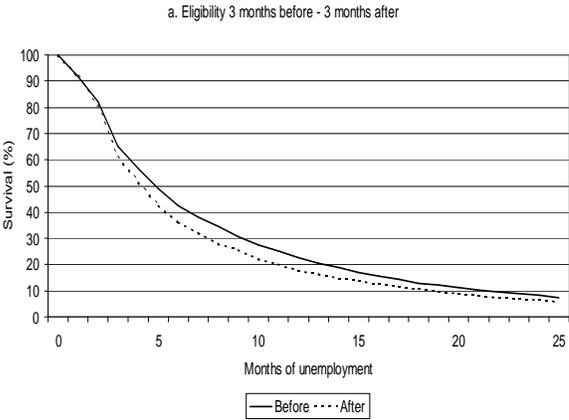
distinguished by entitlement group

a. Eligibility 3 months before - 3 months after

b. Eligibility 6 months before - 3 months after

c. Eligibility 9 months before - 6 months after

d. Eligibility 12 months before - 6 months after

e. Eligibility 18 months before - 9 months after

1

f. Eligibility 24 months before - 9 months after

g. Eligibility 24 months before - 12 months after

h. Eligibility 24 months before - 18 months after

i. Eligibility 24 months before - 24 months after

2
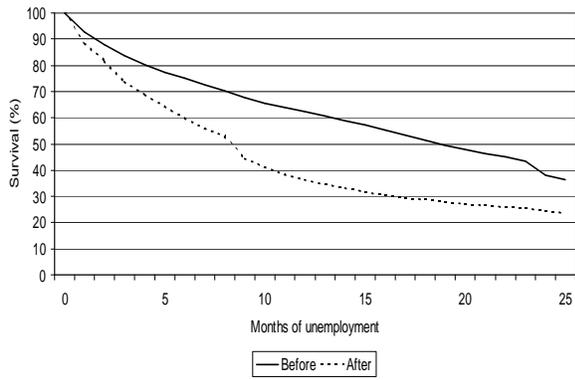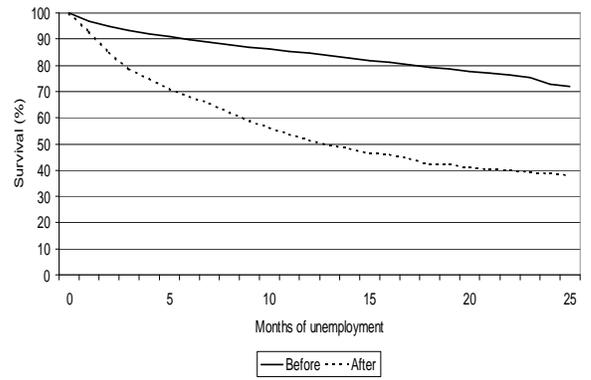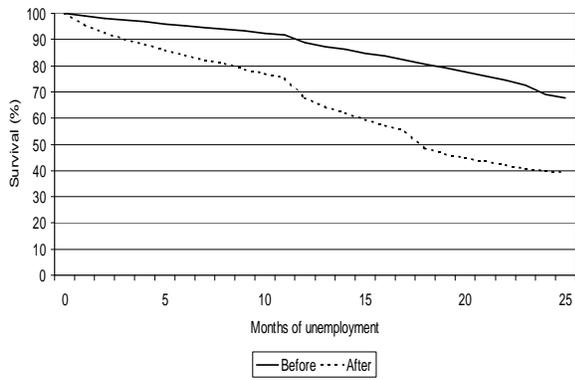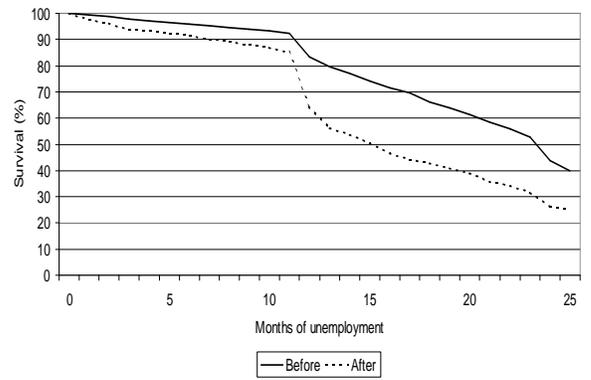
Figure 4: Monthly exit rates from unemployment; before and after the change of law
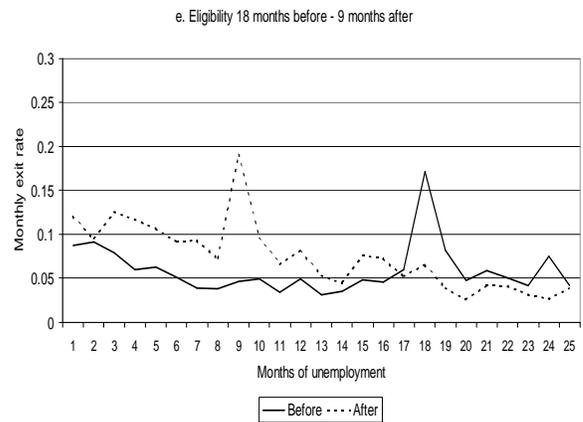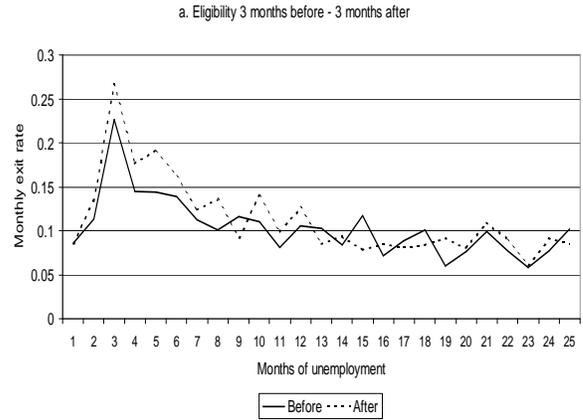
distinguished by entitlement group

a. Eligibility 3 months before - 3 months after

b. Eligibility 6 months before - 3 months after

c. Eligibility 9 months before - 6 months after

d. Eligibility 12 months before - 6 months after

e. Eligibility 18 months before - 9 months after

3

f. Eligibility 24 months before - 9 months after

g. Eligibility 24 months before - 12 months after

h. Eligibility 24 months before - 18 months after

i. Eligibility 24 months before - 24 months after

4
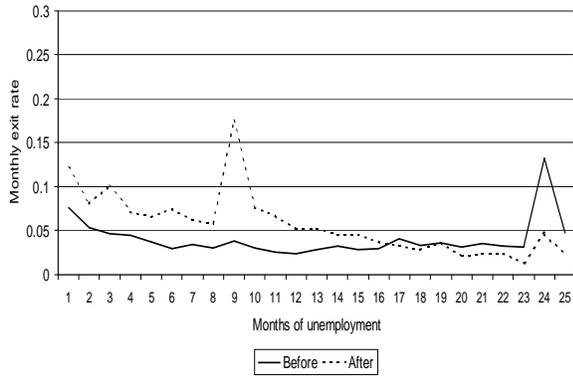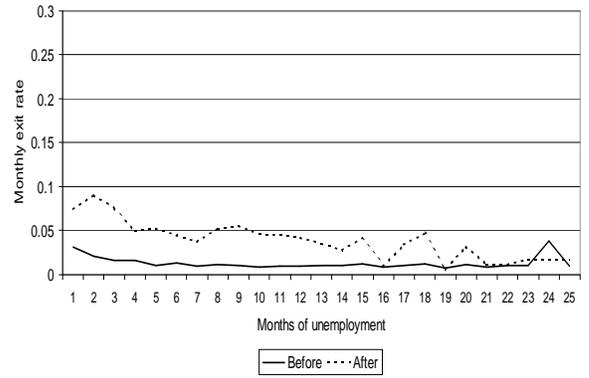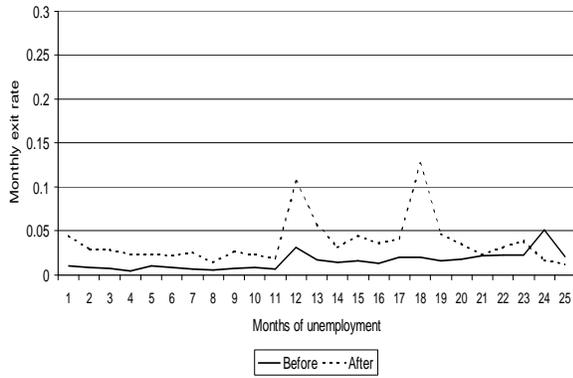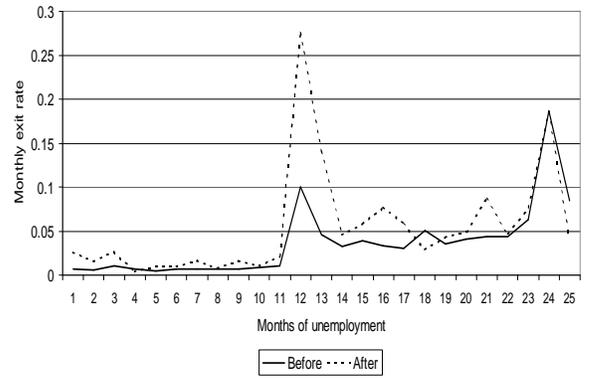
Figure 5: Monthly job finding rates; before and after the change of law
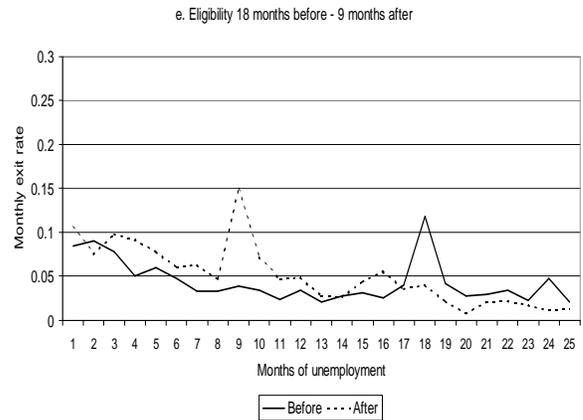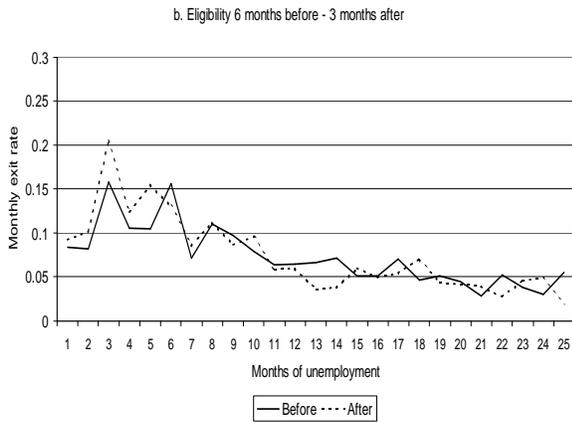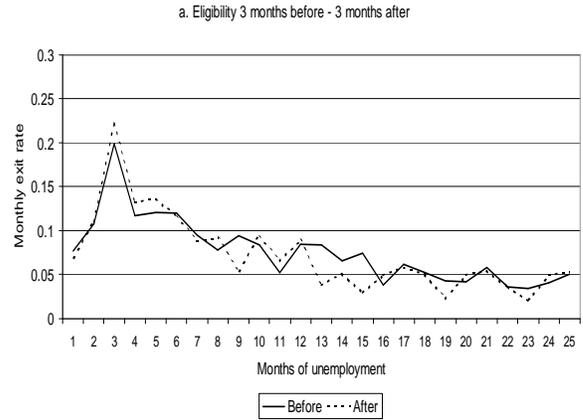
distinguished by entitlement group

a. Eligibility 3 months before - 3 months after

b. Eligibility 6 months before - 3 months after

c. Eligibility 9 months before - 6 months after

d. Eligibility 12 months before - 6 months after

e. Eligibility 18 months before - 9 months after

5

f. Eligibility 24 months before - 9 months after

g. Eligibility 24 months before - 12 months after

h. Eligibility 24 months before - 18 months after


i. Eligibility 24 months before - 24 months after

6
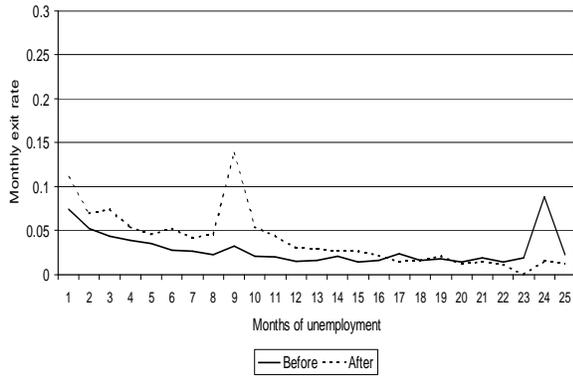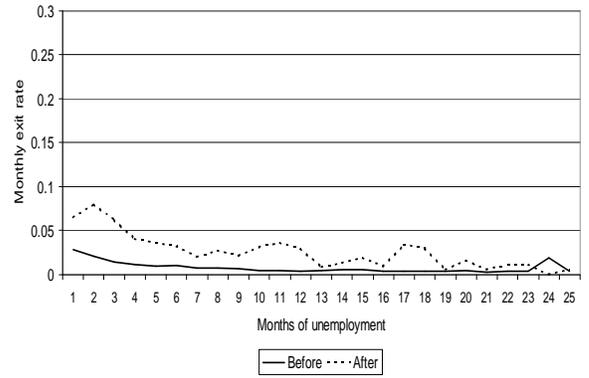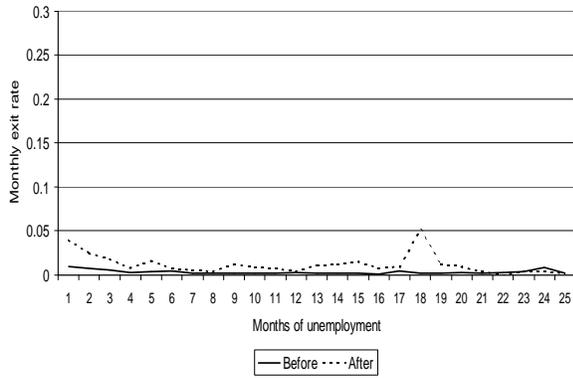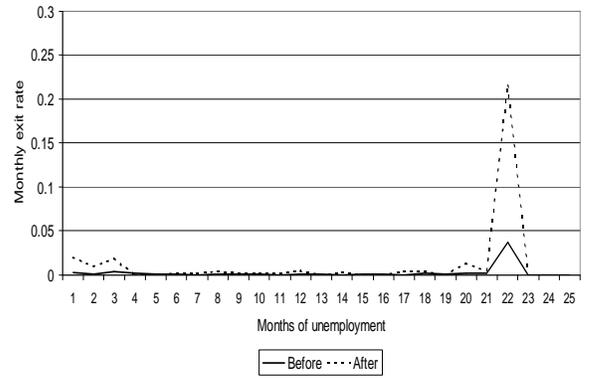
Figure 6 Pattern of duration dependence
job finding rate

parameter estimates Table 3
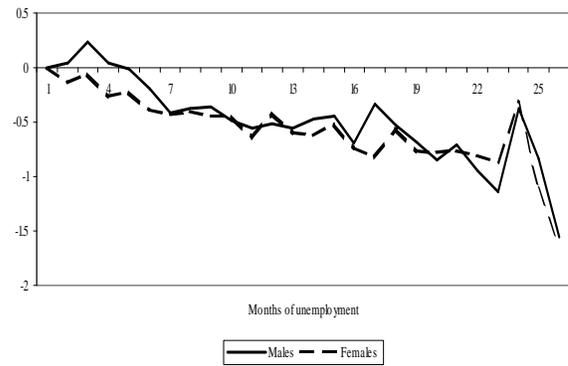
Figure 7 Pattern of duration dependence
other destinations

parameter estimates Table A2