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POLICY RESEARCH WORKING PAPER

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# Unemployment Insurance and Duration of Unemployment

## Evidence from Slovenia's Transition

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Would shortening the duration of unemployment benefits shorten the period of unemployment? In Slovenia, and probably in other transition economies with generous benefits, the answer is yes. Why not consider converting unemployment benefits into hiring subsidies?



## Summary findings

Between 1990 and 1992 in Slovenia, recipients of unemployment insurance (UI) benefits tended to remain (formally) unemployed until their benefits expired, before taking a job. Institutional set-up suggests, and labor surveys show, that many of the recipients were actually working while collecting UI benefits. In the spirit, if not in the letter of the law, the UI system was abused.

Vodopivec shows that the escape rate of the recipients of unemployment compensation to employment increased dramatically just before the potential exhaustion of unemployment benefits — and decreased equally dramatically after benefits were exhausted. When grouped by the potential duration of benefits, unemployment length varies significantly. The unemployed with longer potential benefits stay unemployed longer. Because these groups differ in their characteristics (for example, in age), this does not prove the “waiting behavior” of the recipients. However, exits to employment dramatically increase just before exhaustion — and that does prove waiting behavior. The pattern of an increased escape rate just before benefits are exhausted and its dramatic fall thereafter is more rigorously demonstrated using hazard model estimation.

Possibilities for informal employment are abundant in Slovenia, and the environment of transition economies generally seems conducive to misuse of the UI system. Legislative loopholes and failure to enforce the labor code allowed the unemployed to work and to collect benefits. And the monitoring of job searches was lax.

Vodopivec’s calculations suggest that reducing the duration of benefits would reduce the incidence of

unemployment, its duration, the amount spent on UI benefits, and the inefficiencies generated by raising taxes to finance unemployment insurance. At the same time, reducing the duration of benefits would not impair job matches or crowd out jobs for nonrecipients.

True, despite increased efficiency generally, the workers with the least job mobility might suffer hardships — and might need social assistance. The tradeoff between increased hardships for the least mobile group and greater efficiency generally would have to be resolved in the political sphere. Redesigning the system for better targeting would be less controversial. One way to reduce UI spending without seriously curtailing incentives to work would be to reduce the benefits in proportion to earnings from irregular work. Another possibility is stricter monitoring of the job searches of the unemployed. To reduce spending and make “double dipping” less attractive, old-age insurance could be removed from the package of benefits the UI system offers. And counselors who help the unemployed find jobs (and who may thus develop a close relationship with them) should perhaps not be expected to be able to make impartial decisions about disqualification for benefits; someone else should do that.

In addition to better targeting, a “benefit transfer program” — a voluntary program that converts UI benefits (through vouchers) into hiring subsidies — seems particularly attractive for Slovenia and other transition economies. In a way, such a program would legalize the “double-dipping” that has been taking place in Slovenia and possibly elsewhere. It would legalize practices that have undermined the system’s credibility. But it might improve fiscal savings while sustaining the incentive to find jobs.

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**UNEMPLOYMENT INSURANCE AND DURATION OF UNEMPLOYMENT:  
EVIDENCE FROM SLOVENIA'S TRANSITION**

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**The World Bank**

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Adequate social safety nets are often cited as an important factor in ensuring sustainability of reforms in transition economies. Both inexperience and budgetary restraints imposed by falling production make the designing of a safety net compatible with a market economy an especially challenging task. Unemployment insurance (UI) is one part of this safety net. Regarding UI systems, one may argue that their protection has been too generous in some economies and too meager in others. For example, Poland's 1989 UI law granted benefits to anyone, regardless of previous work history, who registered with an employment office. In Hungary (during 1989-92) and Slovenia, the maximum potential benefit duration has been two years, with possible extensions for workers of pensionable age. This is comparable to the maximum duration in Western Europe but much longer than in the U.S. On the other hand, in many of the successor states of the Soviet Union, the UI benefit has been minimal with potential duration of six months and the level of benefit at, or even below, subsistence.

Especially when unemployment insurance is generous, there is a danger that it may create perverse incentives to take a job. The purpose of this paper is to demonstrate that during 1990-92, the Slovenian UI system created such perverse incentives: many UI recipients waited until their benefits were about to expire before taking a job. This paper shows that the escape rate of the recipients of UI to employment dramatically increased just before the potential exhaustion of unemployment benefits, and equally dramatically decreased after benefits were exhausted. This pattern may be observed from plotting survival in unemployment as a function of time. When grouped by their potential duration of benefits, unemployment varies significantly among groups. Unemployed with longer potential duration of benefits stay unemployed longer. Because the groups differ in their characteristics, this does not prove the "waiting behavior" of the recipients. However, exits to employment dramatically increase just before exhaustion -- which proves waiting behavior. The pattern of increased escape rate just before benefits exhaustion is more rigorously demonstrated using hazard model estimation.

Section 1 provides an overview of labor market trends during the Slovenian transition.

Section 2 discusses the working of the unemployment insurance system and addresses the factors that may

contribute to discouraging exits to employment. After discussing data sources in Section 3, the paper analyzes -- both non-parametrically and parametrically -- the effects of unemployment duration in Section 4. Policy implications are discussed in Section 5.

## **1. RECENT LABOR MARKET TRENDS**

Slovenia's reforms during transition shattered job security, replaced the previous rigid system of wage determination by collective bargaining, and strengthened financial discipline that squeezed subsidies for ailing enterprises (for a description of labor market policies during the transition, see Vodopivec and Hribar-Milic, 1993). All that has produced dramatic changes in the working of the labor market. Not only the level of employment and unemployment, but also the transition rates among different labor market states and wages have been severely affected. Employment has been drastically reduced, disproportionately affecting both young and old workers, as well as the less educated. Unemployment has soared, rising from its virtual absence in the mid-1980s to double digits in the 1990s. The probability of an employed worker becoming unemployed has sharply increased, while the probability of changing jobs has declined considerably. The probability of finding a job after being unemployed has declined. To put the analysis of exits from unemployment to employment in a broader context, these developments are summarized below.

Transition drastically reduced both real wages and employment. With the exception of extraordinary 1989 (when hyperinflation artificially decreased costs and increased profitability and wages), real wages fell considerably. They fell by a quarter in 1990 alone, and then further in both 1991 and 1992 (Table 1, panel A). And despite the reduction in real wages, differences in wage distribution have substantially widened (Orazem and Vodopivec, 1995). After remaining relatively stable from 1987 through 1990, employment in the formal sector of Slovenia fell by 7 percent during 1990 and a further 9 percent during 1991, for a cumulative decline over the 1990-1991 period of 15 percent (Table 1, panel



B). Both young workers and older workers have been particularly affected: young workers have been frozen out of jobs, and more workers have retired than usual, many under the government-sponsored early retirement program (see Abraham and Vodopivec, 1993).

The destinations of exits from employment have also changed profoundly. Prior to 1990, it was rare for any employed person to leave his or her job for unemployment. The yearly job-to-unemployment exit rate -- the share of employed persons who, over a 12 month period, exited from employment directly into unemployment -- was only 0.4 percent in 1987 and had risen only to 0.8 percent by 1989 (Table 1, panel C). Other job exits, to retirement and out-of-the-labor-force, were remarkably steady. During the transition, exit rates to unemployment and out-of-the-labor-force, including to retirement, increased sharply.<sup>1</sup> Most strikingly, the exit rate to unemployment increased to 4 percent by 1991. The tightening of the market is reflected also in a decline in the job changing rate. In 1987, 7.2 percent of those employed at the start of the calendar year changed jobs during the year; by 1991, this rate had fallen to 4.9 percent, a decline of about a third.

Another dramatic development has been a surge of unemployment. Both because of the large increase in inflows into unemployment and the substantial decrease in the probability that a typical unemployed person will find a job, the number increased from 14,068 unemployed persons at the start of calendar year 1987, to 93,036 at the start of 1992 (Table 1, panel D, and figure 1). Data on unemployment inflows shed additional light (Table 1, panel E). The number of persons entering unemployment because their enterprise had declared bankruptcy grew from 1,472 in 1989 to 8,674 in 1990 and 18,852 in 1991. In mid-1991, however, the government had suspended the initiation of new bankruptcies, and the number of persons entering unemployment due to employer bankruptcy had

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<sup>1</sup> Changes to Slovenian law introduced in 1989 made it easier for firms to declare bankruptcy and for the first time allowed enterprises to lay off workers. Under the 1989 law, laid-off workers were in effect entitled to 24 months advance notice; changes introduced in February of 1991 reduced the amount of required notice to six months. The government also introduced early retirement subsidies in 1989.

declined substantially. Unemployment inflows due to layoffs emerged only in October 1991 (the February 1991 law shortened the notification period to six months) and dramatically increased in 1992.

Given the large declines in employment and the large growth in unemployment during this period, it is hardly surprising that the job opportunities for most individuals have been sharply curtailed (Table 1, panel F). Among those who entered employment in 1987, 61.9 percent found employment in the formal sector within 12 months; among those who entered unemployment in 1990, only 40.8 percent found a formal sector job within the same period of time, a decline of about a third. The data for 1991 show a slight increase, an early sign of a light at the end of the tunnel.<sup>2</sup>

## **2. HOW THE UNEMPLOYMENT INSURANCE SYSTEM WORKS**

This section describes the types of benefits and eligibility rules for unemployment insurance in Slovenia. It proceeds with the arguments that lead one to believe that the Slovenian system during 1990-1992 encouraged unemployed to wait until their unemployment insurance benefits lapsed before taking a job.

### **Description of the system**

Unlike other socialist economies, Yugoslavia allowed the existence of open unemployment, and set up a system of unemployment insurance to cope with it, in the early 1970s. During the period covered in our analysis (1990-1992) and since then, unemployed workers have had the right to:

- a) Unemployment compensation;
- b) Unemployment assistance;
- c) Training;

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<sup>2</sup> Slovenia's production has been on the rise since the last quarter of 1993, reaching a remarkable 5 percent in 1994. Unemployment peaked at the end of 1993 and has been declining since then.

- d) Reimbursement for moving expenses connected with employment; and
- e) Health and old age insurance.

Those who leave their jobs and those dismissed for disciplinary reasons are not covered by the insurance. The level of the benefit depends on the individuals' previous earnings, and the potential length of the benefit on the duration of previous employment. At least nine-months of uninterrupted employment has been required, yielding three months of potential duration of the benefit. The maximum potential duration has been two years, with extensions up to five years for workers near pensionable age.

After their right to unemployment compensation expires, unemployed workers are eligible for income-tested unemployment assistance. The same amount is paid to all (80 percent of the minimum wage), and the benefit is payable for up to three years from the date the person first receives unemployment compensation. Similarly, income-tested assistance is extended to those who become unemployed after successfully finishing an internship.<sup>3</sup> There is also an income-tested program of social assistance, the assistance of the last resort.

The unemployed lose the benefit if they obtain a job, refuse a job offer or training, fail to visit employment office if invited, or retire. The job that eliminates the benefits, however, has to be a "regular" job -- a job that offers a rich bundle of fringe benefits (above all, pension and health insurance, and regular leave) and worker rights, although it need not be for indefinite period. The unemployed could collect UI benefits and also legally work, even full time, under the so-called contract employment. This type of employment not only allowed the unemployed to "double-dip," but also enabled employers to avoid a good portion of taxes and contributions on wages. To be sure, the labor code very rigidly defines under what circumstances one could be employed under the

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<sup>3</sup> While on the job for less than 6 to 12 months, graduates of high schools and universities are called "interns." Their pay is reduced, and they have to pass an internal exam in order to retain a job -- which is not a guarantee that they do.

contract (for example, if demand for labor is seasonal). But its enforcement has been minimal, and so breaches were widespread.

Aware of deficiencies of the UI system and under pressure from the public, Slovenian legislators in 1993 and 1994 enacted several laws aimed at preventing double-dipping of the above sort. First, in December 1993 they introduced a law which barred the receipt of unemployment benefits for those months when monthly pay from irregular work exceeded twice the minimum monthly level of unemployment compensation (amounting to just under the average wage of the economy). For irregular pay below that amount, there is no reduction of benefits. Second, to discourage contract employment, taxes imposed on it were raised to match the tax and contribution rate of regular employment. Third, taxes and contributions on wages of previously unemployed workers were waived for the length of the unutilized entitlement to unemployment compensation, a kind of benefit transfer program (see below).

In February 1991, in the middle of the period of this study, there was also a change in the unemployment insurance law. Though broadly similar in concept, the February 1991 law does deviate in certain respects from the statute previously on the books. It is in some ways less generous to displaced individuals than the earlier law: (1) workers who have become unemployed due to bankruptcy have had both the level and the duration of their benefits reduced (previously, their replacement rate was 80 percent, and the duration of their eligibility for unemployment compensation was double that provided in the current statute); and (2) it reduces the length of unemployment compensation for workers with 15 to 20 years of work experience to 18 months (previously 24 months). In some other respects, the new law is more generous: (1) the replacement rate for the first three months of unemployment is increased to 70 percent (up from 60 percent); and (2) the maximum duration of unemployment assistance is increased to three years (up from two years). Table 2 presents the details of the system before and after the February 1991 change of the law.

Reflecting the increased number of workers with previous work history among those entering unemployment, the share of unemployed workers covered by unemployment insurance increased during the transition. For example, the share of unemployed receiving unemployment compensation has increased from 20.2 percent at the beginning of 1990 to 40.9 percent by September 1992. During the same period, the percentage of those receiving unemployment compensation increased from 9.4 to 12.3, and those receiving unemployment compensation after internship from 3.8 to 6.8. Micklewright and Nagy (1994a) observed a decreasing trend of the share of recipients of UI in Hungary, but in a later period (from July 1992 to April 1994).

Qualification rules for benefits produce a large variance in the length of the potential eligibility for benefits -- a feature most welcome in analysis of the incentive effects of compensation. They range from 3 months to 24 months, and even beyond 24 months for unemployment assistance. Unemployment compensation entitlements are fairly equally distributed over the potential length of entitlements, with a distinct peak at the longest, 24-month duration (nearly one third of entitlements over 1990-92 were of that length).

Once assessed, the level of UI entitlements was periodically adjusted to account for changes in inflation. Figure 1 depicts the possible range of unemployment compensation as a percent of the average wage of the economy. Because adjustments were done in an ad-hoc way, they produced an irregular pattern of periodic increases at the time of adjustment and gradual erosion of the benefits by wage growth.

### **Does the Slovenian system discourage exits to employment?**

In principle, the effects of unemployment insurance on probability of exit from unemployment are ambiguous. In the model of Moffit and Nicholson (1982), for example, higher unemployment benefits increase the value of leisure. This, in turn, increases reservation wage and reduces job search intensity, and hence reduces job-taking propensity and prolongs the duration of unemployment.

Moreover, the kink in the budget constraint at the point when benefits lapse in the model suggests that one should observe a much larger job-finding rate just before the benefits lapse. On the other hand, it is conceivable that higher unemployment benefits increase the job-finding rate. Increased benefits may decrease the worker's costs of future layoffs if actuarial return exceeds the costs (when the state also contributes to the unemployment fund, for example), and may also provide resources for a more effective job search.

Although the evidence pointing to disincentive effects is mounting, Atkinson and Micklewright (1991) insist that it is institutional aspects that are critical to the economic impact of the benefits.<sup>4</sup> They show that when unrealistic assumptions underlying a standard job search model are relaxed, the theoretical predictions about the disincentive effects of unemployment insurance may be reversed. It is institutional details that matter, and so it is the matter of empirical analysis to find out how the system works in a particular economy.

Following this institutional approach, I argue -- and show empirically below -- that the Slovenian UI system is particularly likely to negatively affect the rate of jobtaking. Similar forces are at work in other transition economies. In these economies, the trade-off between income from (formal) employment and insured unemployment that underlies predictions of Moffit and Nicholson is particularly skewed in favor of the insured, "formal" unemployment. In fact, many of the unemployed workers in transition economies are engaged in a kind of "double dipping:" they collect unemployment compensation or assistance **and** work at the same time under informal employment (employment paid in cash and without a formal contract, thus avoiding taxes and contributions levied on the payroll), or even under formal employment, as described above for Slovenia. By doing that, the unemployed may even not violate a law. Through such an arrangement, both the worker and the employer are better off: the unemployed receives double payments, and the employer avoids paying

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<sup>4</sup> The same reference provides a recent survey of disincentive effects of UI systems.

payroll taxes (and possibly pays lower wages). In terms of the model of Moffit and Nicholson, the slope of the budget constraint in the income–unemployment space is nearly flat, and so the utility of maximizing the duration of unemployment is very large.

To start with, in transition economies there are many possibilities for informal employment. Although the official sanctioning of private ownership removed the principal rationale for the existence of the informal sector under communism, evidence suggests that the informal sector is thriving. New types of informal activities have emerged due to possibilities of windfall gains under the still underdeveloped and inefficient formal sector. Moreover, labor laws are violated and taxes are avoided and underreported, because the law enforcement capacity of these economies is weak.

There is also a more subtle point about who makes the decision to engage in informal employment. Having the upper hand in negotiating the terms of appointment, employers often force the unemployed to take informal employment until their benefits expire and only then are willing to grant formal employment which brings a range of fringe benefits.<sup>5</sup>

Another reason for the prevalence of "double dipping" are loopholes and deficiencies of labor and unemployment insurance laws. As discussed above, recipients of unemployment compensation in Slovenia can receive unemployment insurance payments and legally work. (Since December 1993, the benefit is taken away if irregular earnings exceed a certain threshold.) And very suggestive is the fact that double-dipping in the above sense was not only perfectly legal, it was also perceived as legitimate by the unemployed, as discussions with employment counselors in Slovenia led me to believe. Also, if the decision to cancel benefits has been challenged at the court, the burden of the proof rests with employment offices, instead of leaving to the unemployed to prove that he or she has not violated the law.

Last but not least, in Slovenia the costs of being detected of abusing unemployment insurance

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<sup>5</sup> Heads of regional employment offices in Slovenia have told me of such behavior.

are low. The worker has to repay the received unjustified benefits, but there are no violation fines. Also, the "shoe-leather" costs of keeping the status of insured unemployment imposed in the form of search requirements have been small because employment offices have been overloaded with work. Since the beginning of transition in 1989 till 1994, employment offices have not increased their staff, although the number of unemployed increased many times, and the scope of their work also increased.

Because "double-dipping" has been legally allowed and because costs of remaining in "formal" unemployment are low, the Slovenian system of unemployment insurance seemed to encourage the unemployed to stay in insured, "formal" unemployment until benefits lapsed. This prediction is examined below.

### **3. DATA SOURCES**

The Employment Office of Slovenia's records on registered unemployed are the main source of data for this study. For each unemployment spell, information was provided on the following issues:

- a) starting and ending dates,
- b) destination of exit (job vs. exit from labor force),
- c) date and reason of termination of last employment, if applicable, and
- d) personal characteristics of the worker.

We have information on all unemployment spells that were in progress as of December 31, 1986 or began between December 31, 1986 and mid-April 1993, altogether about 325,000 records.

For a subsample of registrations between January 1990 and October 1992, we also have the receipt of unemployment insurance benefits, consisting of the type of benefit (unemployment compensation, unemployment assistance, or unemployment assistance after internship) and starting



and ending date of eligibility. This data set was provided separately and was merged with unemployment spell records by personal identifiers and date of registration at the employment office.

The accuracy of information on exits from unemployment -- a particular problem for the administrative data obtained from employment offices -- is ensured by a requirement that, when they find a job, unemployed workers have to retrieve the "work booklet" from employment offices and bring it to their new employer, thus signaling employment offices information on exit. Moreover, the coverage of the data is reasonably good since unemployed workers in Slovenia have had strong incentives to register at employment offices.<sup>6</sup> According to the Slovenian labor force survey, in 1989 and 1990, 77 percent of those unemployed according to the International Labor Organization (ILO) definition were also registered with employment offices, and in 1991 this proportion increased to 83 percent. Missing from the registers are probably school-leavers early in their job hunt.

Two features of the data recorded in the unemployment register should be noted. First, exits from unemployment to employment include only exits to formal jobs, though these may be jobs either within the social or private sector. Exits for persons who find work under "contract employment" (see above) or in the gray economy are not recorded. For example, according to the Slovenian labor force survey, 42 percent of registered unemployed were performing paid work of at least one hour in the reference week in 1990. Second, the 1992 data on unemployment spells for young persons are not entirely comparable to those for earlier years. In cases where a young person registers as unemployed, leaves unemployment to take a fixed-term internship, and then re-registers as unemployed, the second unemployment registration date is overwritten on that individual's original

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<sup>6</sup> For those who have lost a job, incentives are the most powerful, since even a previous nine-month employment makes them eligible for unemployment compensation (see above). Other incentives include employment office services (counseling, training, employment subsidies); lower likelihood that a spouse will be laid off, since having an unemployed member of the family influence redundancy decisions; ability to enroll in evening post-elementary education (only day-time enrollment is permitted otherwise); subsidies for child care; priority in queues for renting or buying apartments; eligibility for child allowances; and eligibility for voluntary old-age insurance.

unemployment record. Fixed-term internships typically last nine months. Thus, in order to assure strict comparability, in pre-1992 data but not in post-1992 data pre-internship unemployment spells experienced by young people who re-register as unemployed following completion of their internship generally should have been erased. Although this means that the 1992 unemployment inflow data are not wholly comparable to those for earlier years, this is not a serious problem.

The Slovenian data compare favorably with data used in other studies of the effects of unemployment insurance. First, both recipients and non-recipients of unemployment insurance are included. Second, it covers a complete duration of a spell, not only the portion in insured unemployment, and it distinguishes between exits to employment and non-employment. Third, it covers the period both before and after the change of the UI law. The change provides exogenous variation in benefits and thus helps identify the effects of potential duration on job exit rate.

#### **4. EMPIRICAL ANALYSIS**

##### **Non-parametric analysis**

One way to explore a possible association between unemployment insurance and duration of unemployment is by comparing survival function for different groups of unemployed, that is, using non-parametric analysis. I use Kaplan-Meier survival functions, showing the probability of still being unemployed at a given duration of unemployment spell (see, for example, Kalbfleisch and Prentice, 1980). I focus on escapes from unemployment to employment, and thus treat escapes to out of labor force as censored observations (together with true censored observations).

Let us first examine possible differences in surviving in unemployment among recipients and non-recipients of unemployment compensation (Figure 2). The two survival functions differ from each other with statistical significance. The function for non-recipients is below the one for the recipients, indicating higher cumulative exit to employment. But for durations of more than 24

months, the difference becomes smaller, and it virtually disappears at 36 months. Note that for a majority of unemployed, 36 months is the longest potential duration of UI (if unemployment compensation is followed by unemployment assistance).

Further insights may be obtained by comparing survival in unemployment among the unemployment compensation recipients grouped by potential length of the entitlement. Figure 3 plots a survival function for six groups of workers: those with three, six, nine, twelve, eighteen, and twenty four-months of potential duration of unemployment compensation, respectively. Workers who continued receiving unemployment assistance after exhausting unemployment compensation were excluded. The figure discerns a remarkable pattern: the longer the potential duration, the longer the survival in unemployment. Such a pattern persists throughout the time period studied (three years). Not only that, survival function of all groups of workers exhibits substantial decline just before and at the point of exhaustion of eligibility (for example, at three months for the group with three-month potential eligibility).

To pursue the behavior near the point of exhaustion of the benefits further, I follow Meyer (1990). He constructed an empirical estimator analogous to the Kaplan-Meier estimator but having on the time axis time before benefits lapse instead of time since a spell began. This hazard computed for Slovenian recipients for 1990-92 is presented in Figure 4. The most striking feature of the figure is a dramatic increase of the empirical hazard at the month when benefits lapse and particularly one month before -- the finding similar to the one of Meyer for the U.S. The irregular shape of the hazard in months before the exhaustion reflects differences in hazards among the new cohorts that enter at certain points (at three, six, twelve, fifteen and eighteen) as opposed the ones that already survived in unemployment for some time.

What do the above observations suggest? The fact that more non-recipients exit unemployment to employment early in their unemployment spell does not prove a "waiting" behavior

on their part -- although it is not inconsistent with it. Recipients and non-recipients differ in observable and non-observable characteristics. Chief among those is probably age, with recipients, on average, being much older than non-recipients, many of whom are school-leavers. The difference in the escape rate may well reflect those characteristics and not the effect of UI. Similarly, systematic differences in survivor function among groups with different potential duration of entitlements do not necessarily reflect disincentive effects. These groups again differ in their characteristics -- after all, workers are classified into different groups because of differences in their work histories. But the particular pattern of the exit just before the exhaustion, namely its sharp increase, does demonstrate waiting behavior.

As mentioned, the law of February 1991 reduced the amount of unemployment insurance for some groups of workers (above all, for those becoming unemployed due to bankruptcy). For these groups, the change in the law provides a natural experiment. It is tempting to compare survival functions of affected workers, divided into two groups by date of registration as unemployed to detect incentive effects of the UI system. Workers of affected groups who registered as unemployed under the new law stayed unemployed for a shorter time than their counterparts who registered under the old law.

Difference in the pattern of survival in unemployment for the affected groups before and after the change of the law, however, cannot be taken as a proof of disincentive effects. This conclusion follows only if other things remained equal -- but they did not. For one thing, in the latter part of the period under consideration, the exit rate from unemployment to employment increased also for groups of workers not affected by the change in the law (Figure 5). For another thing, it seems plausible that before February 1991 -- but not after that -- bankruptcy was often used to get rid of redundant workers. Hence, a firm laying off a worker was subject to extremely high costs in terms of severance pay (see above). On the other hand, firms declaring bankruptcy had no obligations to

departing workers and so had strong incentives to use the bankruptcy route to lay off workers. Some firms later reemployed some laid off workers, presumably younger, more productive ones. The February 1991 law reduced the costs of layoffs to be borne by firms, and thus their incentives to use bankruptcy as a method of workforce reduction. The main change was that prior notice of redundancy was cut from 24 to 6 months.

A comparison of survival in unemployment by groups differentiated by the date of becoming unemployed cannot account for all possible differences in the circumstances and composition of groups. We turn to a more sophisticated, parametric analysis.

### Parametric analysis

We are interested in estimating the probability that an individual moves from unemployment to employment. If we know that the individual has already been in state  $i$  for  $t$  periods, the probability that he or she leaves that state at time  $t$ ,  $\lambda(t)$ , can be specified as:

$$\lambda(t) = f(t)/S(t) \tag{1}$$

where  $\lambda(t)$  is the hazard function,  $S(t) = [1 - F(t)]$  is the survivor function,  $F(t) = \Pr(T < t)$  specifies the probability distribution that random variable  $T$  is less than some value  $t$ , and  $f(t)$  is the corresponding density function.

The hazard depends on how long the individual has been in state  $i$ , on the characteristics of individuals in that state, and on environment (state of the economy, for example). Given the advantages of semi-parametric hazard models, the Cox proportional hazard model is used, with the functional form of the hazard specified as follows:<sup>7</sup>

$$\lambda(t, X) = \lambda_0(t) \exp[X(t)\beta], \tag{2}$$

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<sup>7</sup> Meyer (1990) cites several advantages of semi-parametric models, among others, the reduction of the bias in the parameter estimates of covariates in the case of unobserved heterogeneity.

where  $\lambda_0$  is the "baseline" hazard, and  $X(t)$  is a set of explanatory variables -- covariates. The latter may include time-varying factors -- a feature especially important when exploring time effects of unemployment insurance.

To account for the effects of entitlements arising from the approaching exhaustion of unemployment benefits, we again follow Meyer (1990) and introduce a series of "spline" dummy variables. The coefficients of these variables are marginal effects of moving one period (in this case, one month) closer to the exhaustion of the benefit or further beyond the exhaustion. To save on the number of variables introduced, we focus on the effect of the main type of unemployment insurance benefit -- unemployment compensation. The spline dummies are defined as follows:

SPLN-2 = 1 if a recipient of unemployment compensation is unemployed during the month starting one month after the exhaustion of the benefit, or in any month after that; 0 otherwise. (The coefficient of this dummy reflects the cumulative effect of remaining in unemployment beyond one month after the exhaustion.)

SPL-1 = 1 if a recipient of unemployment compensation is unemployed during the month after the exhaustion of the benefit, or in any month after that; 0 otherwise.

SPL0 = 1 if a recipient of unemployment compensation is unemployed during a month before the exhaustion of the benefit, or in any month after that; 0 otherwise.

SPL1 = 1 if a recipient of unemployment compensation is unemployed during a month ending one month before the exhaustion of the benefit, or in any month after that; 0 otherwise.

Variables SPL2 to SPL24 are defined in the same fashion.

The results of the hazard estimation are presented in Tables 3 and 4. For estimation, I have randomly selected a 15-percent sample from the universe of all unemployed who registered between January 1990 and October 1992, a total of 23,242 individuals. Let us first examine the estimates for control variables, those representing human capital and personal characteristics. Their performance

makes good intuitive sense and is consistent with findings about the returns to skills and gender during the transition (see Orazem and Vodopivec, 1995). More skilled and younger workers have significant advantages in finding a job. Similar results are found for Hungary by Micklewright and Nagy (1994b). The differences among the groups are systematic, with increases in education and experience, and reductions of age, consistently yielding higher success rates in job finding. The only exception are the unemployed with less than three years of experience, whose hazard is larger than the hazard for those with three to four years of experience. The least experienced have been helped by targeted job-subsidy programs. The effects of experience and age work against each other, with the effects of age prevailing. Surprisingly, the results show that women have been equally likely to find a job. Non-Slovenians, however, have had significantly lower escape rates than Slovenians. In the climate of growing ethnic tensions that tore the country apart, ethnic discrimination is not unexpected. The hazard of jobfinding is also strongly influenced by the source of unemployment. Among the groups with a much larger success rate are labor market entrants, helped by government-sponsored internship program, and the unemployed whose previous employer went bankrupt.

The unemployment insurance variables, the focus of our analysis, tell a clear and consistent story. The probability finding a job is significantly lower for recipients than for non-recipients. The coefficients of the three variables indicating the receipt of different types of benefit (one for unemployment compensation, one for unemployment assistance following the expiration of unemployment compensation, and one for unemployment assistance for former interns) are all negative and strongly significant. Moreover and of utmost importance, the spline dummies, which capture the effects of the remaining potential duration of unemployment compensation, show that the hazard dramatically increases just before the exhaustion and equally dramatically falls immediately after the exhaustion of benefits.

More precisely, holding other variables constant, the effects of approaching and moving

beyond the exhaustion of benefits on the hazard are as follows: at segments far away from the exhaustion, the hazard is virtually unaffected by time effects (most of the coefficients of SPL24 to SPL3 are insignificant -- see Table 4, model 1). But the coefficients of spline dummies dramatically increase two months before and particularly one month before the exhaustion, with yet an additional increase at the month when benefits are exhausted. During the month following the exhaustion, the increase of the hazard rate of the preceding three months is almost completely wiped out. The further effects of moving away from the exhaustion beyond one month are insignificant.

Note that the increases in empirical hazard between 24 and 21 months before the exhaustion and other increases at points of entry of new cohorts with lower potential duration observed in Figure 4 are not matched by a similar increase in the coefficients of the spline dummies. The spline variables reflect pure effects of time distance from the exhaustion, and the increases of the empirical hazard at points of entry of new cohorts are captured by other explanatory variables.

To allow for differences in hazard rates among the cohorts that enter unemployment at different points relative to the exhaustion of benefits (depending on maximum duration of entitlements), I introduced additional dummy variables, interactions of the spline dummies with dummies identifying the cohorts of different maximum duration of unemployment compensation. In interactions, I exclude the potential duration of 24 months, so the coefficients of interactive dummies show deviations from the hazard for that group. To reduce the number of dummies, spline dummies for remaining unemployed at segments more distant than three months from the exhaustion are combined by quarters. The interactive dummies are of the form

$$\begin{aligned}
 \text{MiSPLj}, \quad & i = 3, 6, 9, 12, 18; \\
 & j = -2, -1, 0, 1, \dots, 18, i < j+1
 \end{aligned}$$

The results for this model are presented in Tables 3 and 4, model 2. The basic story about the effects of the remaining entitlement duration on the hazard as told by coefficient of the spline



dummies (SPL-2 to SPL24) remains unchanged. The hazard increases strongly during the month before the exhaustion of benefits and falls sharply thereafter. Interactive dummies add to this picture in two aspects. First, groups with a shorter potential duration wait "to the last minute" before taking a job. For these groups, the hazard within a month of the exhaustion is significantly larger than the hazard for the groups with the longest duration, the 24- and 18-months groups. Second and of lesser statistical significance, at the segments where new groups with shorter entitlement enter unemployment, the hazard of these groups tend to be lower than the one of groups that have already survived through more distant segments of unemployment.

What can we say about the effects of the change in the law? Does a cut in potential benefit length reduce the duration of unemployment? The results confirm such effects. The above parametrization of the effects of the distance from the exhaustion of the benefits isolates pure waiting effects, and there is no reason to believe that the groups affected by changes behave differently. Nonetheless I also estimated a model that tries to identify the effects of the change of the law on the affected groups directly. I followed the "differences in differences" approach and added to the basic model three dummies: one indicating the period when the benefits were granted (1 if after, 0 otherwise); one for the treatment group (1 if affected by the change of the law, 0 otherwise), and one for the interaction between the period and the treatment group. It is the coefficient of the interactive dummy that tells us about the effects of the change of the law (see Hunt, 1992).

I applied this approach to two groups. One is unemployed due to bankruptcy, for which both level and length of unemployment was cut under the new law. Because there are reasons to believe that different experience groups were treated differently before the change of the law (see above), I formed separate treatment groups by experience categories. The law did not affect the group with experience above 20 years, so it is not included among the treatment groups. The second group is the recipients of the unemployment benefit in their third month of unemployment who were granted

benefits after the change of the law. Recall that under the new law, the replacement rate falls after three months from 70 to 60 percent; there was no such a gradation before the change of the law.

The results show that the difference in the hazard for the unemployed due to bankruptcy who registered after the change in the law is indeed positive, significantly so for the two high-end experience groups.<sup>8</sup> Changes in the replacement rate, however, are found not to influence the job-taking rate. The drop of replacement rate from 70 percent to 60 percent after the third month has no effect on the hazard; in fact, the coefficient on the interaction between the dummy for receiving unemployment compensation in the third month and the period dummy is negative, even significantly so.

How should we interpret these results? Of course, one can make a case that it is not the disincentive effects, but rather heterogeneity -- because we control for observed heterogeneity, it would be the unobserved heterogeneity this time -- that is responsible for a lower overall hazard of exit of the recipients of insurance benefit. But the identified effects of duration by spline dummies conclusively confirm the waiting pattern detected by empirical hazard.

## 5. POLICY IMPLICATIONS

The paper has shown that during 1990-92 there was a tendency among the recipients of unemployment compensation in Slovenia to stay (formally) unemployed until their benefits expired before taking a job. Institutional set-up suggests -- and labor surveys show -- that many of the recipients were actually working while collecting UI benefits. In spirit, if not in the letter of the law, the UI system was abused.

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<sup>8</sup> A better specification of the test would compare differences in the hazard rate throughout time distance from the exhaustion, readjusting the potential eligibility for the treatment group that registered after the change of the law so as to ignore the changes in the law. Such specification, however, would be computationally much more demanding.

The tendency to wait was produced by the design of the UI system. Legislative loopholes and non-enforcement of the labor code allowed the unemployed to work and to collect UI benefits. Monitoring of job search of the recipients of UI was lax. And the environment of transition economies in general seems to be conducive to misuse of the UI system because there are abundant possibilities for informal employment.

To be sure, that Slovenian "unemployed" have been working means that resources were not wasted, an obvious welfare improvement. But the "rent" these unemployed have been receiving in the form of UI benefits is unjustified. Indeed, for a significant number of unemployed, the reduction of duration of benefits would reduce both the length of insured unemployment and of unemployment. This would reduce UI expenditure and the inefficiencies generated by raising taxes to finance it without impairing job matches or crowding out jobs for non-recipients. For those who could not ensure employment under the shortened entitlements, however, their incomes and hence welfare would be reduced, possibly to the level where they would have to resort to social assistance. Across-the-board cutting of the potential duration of UI benefits thus faces a trade-off between improved efficiency and increased hardship for the least mobile groups -- a trade-off that can only be solved in the political sphere.

Redesigning the system by better targeting would be less controversial. For example, one way to reduce UI expenditures without seriously hurting incentives to work is to reduce the benefits in proportion to earnings from irregular work.<sup>9</sup> Another possibility is stricter monitoring of the job search by the unemployed. Moreover, to reduce expenditures and in particular, to make "double dipping" less attractive, it would make sense to take away old-age insurance from the package of benefits offered by the UI system. Furthermore, to be able to make impartial decisions about

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<sup>9</sup> It is doubtful that the December 1993 change of the Slovenian UI law has teeth: the threshold it sets is relatively high, and the ability to monitor earnings -- the task of already overburdened employment offices - is weak.

disqualification for benefits, this function should be taken away from counselors who help the unemployed finding a job and may thus develop too close a relationship with the unemployed.

Radical changes in value systems during the transition -- the changes not yet matched by creating appropriate institutions to deal with them -- contribute to further erosion of law and order in these societies.<sup>10</sup> Such an environment is particularly conducive to rent-seeking. Therefore, in addition to better targeting, a "benefit transfer program" -- a voluntary program which converts UI benefits, via vouchers, into hiring subsidies -- seems particularly attractive for Slovenia and transition economies in general.<sup>11</sup> Such a program would, in a way, legalize "double-dipping" that has been taking place in Slovenia and possibly in other economies as well. It would legalize practices that have undermined the credibility of the system, and it may even offer fiscal savings over the present system leaving incentives to take a job intact.

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<sup>10</sup> Above all, individuals have become much more materialistically oriented (see Musek, 1994).

<sup>11</sup> The program has recently gained popularity in many countries, including U.K. and Australia (for a description and strong endorsement of the program, see Snower, 1995).

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TABLE 1: LABOR MARKET TRENDS, SLOVENIA, 1987-1992

|  | 1987    | 1988    | 1989    | 1990    | 1991    | 1992    |
|--|---------|---------|---------|---------|---------|---------|
| A. Real wage rate (yearly average, 1987=100)   |         |         |         |         |         |         |
| Total  | 100     | 89.3    | 103.2   | 76.5    | 68.1    | 62.1    |
| B. Estimated formal sector employment as of the start of the calendar year <sup>a</sup>  |         |         |         |         |         |         |
| Total  | 826,495 | 835,722 | 831,347 | 823,224 | 767,710 | 700,825 |
| C. Probability of exit from employment during calendar year among persons employed as of the start of the calendar year <sup>a</sup> |         |         |         |         |         |         |
| Job-to-job   | 7.2     | 6.6     | 6.6     | 5.0     | 4.8     | n.a.    |
| Job-to-unemployment  | 0.4     | 0.6     | 0.8     | 2.3     | 4.0     | n.a.    |
| Job-to-retirement  | 1.8     | 2.0     | 2.0     | 4.0     | 2.8     | n.a.    |
| Job-to-other   | 2.8     | 2.8     | 3.3     | 4.7     | 5.3     | n.a.    |
| Total  | 12.1    | 12.0    | 12.7    | 16.0    | 16.9    | n.a.    |
| D. Stock of unemployment as of the start of the calendar year  |         |         |         |         |         |         |
| Total  | 14,068  | 18,195  | 26,788  | 34,699  | 55,060  | 93,036  |
| E. Inflows into unemployment during calendar year  |         |         |         |         |         |         |
| New entrant  | 6,613   | 7,555   | 8,483   | 10,016  | 13,964  | 21,915  |
| Reentrant  | 3,053   | 3,700   | 4,026   | 4,525   | 6,121   | 6,632   |
| Dismissed from previous job  | 1,034   | 1,379   | 2,451   | 2,544   | 1,341   | 1,151   |
| Laid off from previous job   | —       | —       | —       | —       | 4,052   | 21,283  |
| Previous employer bankrupt   | 606     | 485     | 1,472   | 8,674   | 18,852  | 5,016   |
| Internship ended   | 553     | 871     | 930     | 3,058   | 7,718   | 8,236   |
| Fixed term job ended   | 4,728   | 6,242   | 5,953   | 9,774   | 10,647  | 10,163  |
| Quit previous job  | 3,930   | 3,885   | 4,331   | 5,301   | 5,248   | 6,353   |
| Other  | 1,735   | 2,318   | 1,852   | 2,639   | 5,676   | 3,871   |
| Total  | 22,252  | 26,435  | 29,498  | 46,531  | 73,619  | 84,620  |
| F. Probability of exit from unemployment to employment within 12 months among persons entering unemployment during the calendar year |         |         |         |         |         |         |
| Total  | 61.9    | 54.9    | 48.0    | 40.8    | 41.4    | n.a.    |

<sup>a</sup> Data sources: Statistical Yearbook of Slovenia, 1993 (wages); Abraham and Vodopivec (1993), data on employment and probability of exit from employment; data source on unemployed is described in the text.

Table 2: Unemployment Insurance Legislation, 1990-92

|  | Before February 1991  | After February 1991  |
|--|---|--|
| Unemployment compensation                | <p><u>Eligibility:</u> Quitters and those dismissed for disciplinary reasons ineligible.</p> <p><u>Duration:</u></p> <ul style="list-style-type: none"> <li>-- 3 months for at least nine months of uninterrupted employment, or for at least 12 months of employment with interruptions during the last 18 months;</li> <li>-- 6 months for at least 30 months of uninterrupted employment, or for 50 months of employment with interruptions during the last five years;</li> <li>-- 9 months for employment above five years, but less than ten years;</li> <li>-- 12 months for employment above ten years, but less than 15 years;</li> <li>-- 24 months, for employment above 15 years.</li> </ul> <p>Longer durations for those unemployed due to a bankruptcy:</p> <ul style="list-style-type: none"> <li>-- 6 months for at least nine months of uninterrupted employment, or for at least 12 months of employment in the last 18 months;</li> <li>-- 12 months for 30 months of uninterrupted employment, or for 50 months in the last five years;</li> <li>-- 18 months for employment above five years, but less than ten years;</li> <li>-- 24 months for employment above ten years.</li> </ul> <p><u>Replacement ratio:</u> 60 percent, except 80 percent for those unemployed due to bankruptcy.</p> <p>No reduction in benefits for persons with irregular earnings.</p> | <p><u>Eligibility:</u> Quitters and those dismissed for disciplinary reasons ineligible.</p> <p><u>Duration:</u></p> <ul style="list-style-type: none"> <li>-- 3 months for at least nine months of uninterrupted employment, or for at least 12 months of employment with interruptions during the last 18 months;</li> <li>-- 6 months for at least 30 months of uninterrupted employment, or for 50 months of employment with interruptions during the last five years;</li> <li>-- 9 months for employment above five years, but less than ten years;</li> <li>-- 12 months for employment above ten years, but less than 15 years;</li> <li>-- 18 months for employment above 15 years, but less than 20 years; and</li> <li>-- 24 months for employment above 20 years.</li> </ul> <p><u>Replacement ratio:</u> 70 percent for the first three months, 60 percent thereafter, with a ceiling of 400 percent of the minimum wage and a floor of 80 percent of the minimum wage.</p> <p>Special provisions governing those unemployed due to bankruptcy eliminated.</p> <p>No reduction in benefits for persons with irregular earnings.</p> |
| Unemployment assistance                  | Eligibility means-tested. Benefits equal to minimum wage (plus allowance for dependents). Maximum duration 2 years (together with unemployment compensation).   | Eligibility means-tested. Benefits equal to 80 percent of minimum wage (plus allowance for dependents). Maximum duration 3 years (together with unemployment compensation).  |
| Unemployment assistance after internship | Eligibility means-tested. Benefits equal to minimum wage (plus allowance for dependents). Maximum duration 2 years.   | Eligibility means-tested. Benefits equal to 80 percent of minimum wage (plus allowance for dependents). Maximum duration 12 months.  |

Table 3: Determinants of the Hazard of Exit from Unemployment to Employment

|   | Model 1 <sup>(a)</sup> | Model 2 <sup>(b)</sup> | Mean<br>(Standard<br>deviation) |
|---|------------------------|------------------------|---------------------------------|
| <b>Education</b>                        |                        |                        |                                 |
| Unfinished elementary                   | -0.445<br>(0.056)      | -0.451<br>(0.056)      | 0.077<br>(0.266)                |
| Elementary                              | -0.307<br>(0.035)      | -0.309<br>(0.035)      | 0.253<br>(0.435)                |
| High school                             | 0.094<br>(0.030)       | 0.092<br>(0.030)       | 0.243<br>(0.429)                |
| University                              | 0.448<br>(0.043)       | 0.448<br>(0.043)       | 0.089<br>(0.284)                |
| <b>Experience</b>                       |                        |                        |                                 |
| Less than 3 years                       | 0.089<br>(0.045)       | 0.092<br>(0.046)       | 0.444<br>(0.497)                |
| 5 to 10 years                           | 0.102<br>(0.050)       | 0.102<br>(0.050)       | 0.141<br>(0.348)                |
| 10 to 15 years                          | 0.278<br>(0.063)       | 0.252<br>(0.063)       | 0.107<br>(0.309)                |
| 15 to 20 years                          | 0.430<br>(0.073)       | 0.447<br>(0.073)       | 0.093<br>(0.291)                |
| More than 20 years                      | 0.434<br>(0.087)       | 0.481<br>(0.087)       | 0.145<br>(0.351)                |
| <b>Age</b>                              |                        |                        |                                 |
| Under 20                                | 0.226<br>(0.044)       | 0.222<br>(0.043)       | 0.178<br>(0.383)                |
| 20 to 25                                | 0.083<br>(0.036)       | 0.087<br>(0.036)       | 0.237<br>(0.425)                |
| 30 to 35                                | -0.111<br>(0.045)      | -0.116<br>(0.045)      | 0.117<br>(0.321)                |
| 35 to 40                                | -0.275<br>(0.058)      | -0.263<br>(0.058)      | 0.100<br>(0.299)                |
| 40 to 45                                | -0.452<br>(0.070)      | -0.442<br>(0.070)      | 0.077<br>(0.266)                |
| 45 to 50                                | -0.657<br>(0.088)      | -0.650<br>(0.088)      | 0.061<br>(0.239)                |
| 50 plus                                 | -1.071<br>(0.103)      | -1.068<br>(0.103)      | 0.064<br>(0.245)                |
| <b>Other individual characteristics</b> |                        |                        |                                 |
| Female                                  | -0.023<br>(0.023)      | -0.025<br>(0.023)      | 0.457<br>(0.498)                |
| Having dependents                       | -0.005<br>(0.025)      | -0.008<br>(0.025)      | 0.359<br>(0.480)                |
| Non-Slovenian                           | -0.294<br>(0.034)      | -0.299<br>(0.034)      | 0.153<br>(0.360)                |



|  |                   |                   |                  |
|--|-------------------|-------------------|------------------|
| In ill health                                      | -0.974<br>(0.100) | -0.965<br>(0.100) | 0.029<br>(0.169) |
| <b>Source of unemployment</b>                      |                   |                   |                  |
| Labor market entrant                               | 1.041<br>(0.050)  | 1.058<br>(0.050)  | 0.066<br>(0.248) |
| Labor market reentrant                             | -0.066<br>(0.049) | -0.063<br>(0.049) | 0.098<br>(0.297) |
| Firm bankruptcy                                    | 0.611<br>(0.046)  | 0.625<br>(0.046)  | 0.190<br>(0.392) |
| Laid off   | -0.166<br>(0.058) | -0.187<br>(0.058) | 0.157<br>(0.364) |
| Disciplinary dismissal                             | 0.014<br>(0.071)  | 0.011<br>(0.071)  | 0.025<br>(0.156) |
| Expiration of fixed-term contract                  | 0.227<br>(0.042)  | 0.229<br>(0.042)  | 0.185<br>(0.388) |
| Conclusion of internship                           | 0.240<br>(0.050)  | 0.241<br>(0.050)  | 0.116<br>(0.320) |
| Other source                                       | 0.206<br>(0.054)  | 0.202<br>(0.054)  | 0.060<br>(0.237) |
| <b>Effects of unemployment insurance</b>           |                   |                   |                  |
| Receiving unemployment compensation                | -0.865<br>(0.057) | -0.641<br>(0.210) | 0.359<br>(0.480) |
| Receiving unemployment assistance                  | -0.357<br>(0.076) | -0.302<br>(0.080) | 0.074<br>(0.262) |
| Receiving unemployment assistance after internship | -0.772<br>(0.076) | -0.716<br>(0.050) | 0.064<br>(0.245) |
| -2 [logL <sub>R</sub> - LogL <sub>U</sub> ]        | 5030.0            | 5083.1            | n.a.             |
| d.f.   | 88                | 114               | n.a.             |
| Sample size  | 23242             | 23242             | n.a.             |
| Completed spells                                   | 10258             | 10258             | n.a.             |
| Censored spells                                    | 12984             | 12984             | n.a.             |

Notes: Standard errors in parentheses. Excluded categories among dummy variables are vocational education, experience of 3 to 4 years, age of 25 to 30, males, no dependents, Slovenians, of good health, workers who quit the previous job, hold regular appointment, and are not receiving unemployment compensation or assistance. Included in the estimation but not reported are 10 regional and 7 occupational dummies as well as dummies equal to 1 if individual found a job in a particular quarter between 1990/I and 1992/III, and 0 otherwise.

(a) Included in the model are also spline dummies discussed in the text; they are presented in Table 4.

(b) Included in the model are also spline dummies and their interactions with cohorts that enter at different time distance from the exhaustion of benefits; they are presented in Table 4.

Table 4: Determinants of the Hazard of Exit from Unemployment to Employment: Effects of the Distance from the Exhaustion of Unemployment Compensation<sup>(a)</sup> (standard errors in parentheses)

|                     | Model (1)                     |                               | Model (2)  |  |  |   |   |
|---------------------|-------------------------------|-------------------------------|--|--|--|---|---|
|                     | Coefficient of spline dummies | Coefficient of spline dummies | Coefficient of interaction of the spline with 3-month entitlement cohort | Coefficient of interaction of the spline with 6-month entitlement cohort | Coefficient of interaction of the spline with 9-month entitlement cohort | Coefficient of interaction of the spline with 12-month entitlement cohort | Coefficient of interaction of the spline with 18-month entitlement cohort |
| SPL-2 <sup>ab</sup> | -0.129<br>(0.097)             | 1.187<br>(0.758)              | -1.346<br>(0.773)  | -1.598<br>(0.814)  | -1.418<br>(0.795)  | -1.837<br>(0.808)   | -0.534<br>(0.976)   |
| SPL-1               | -1.121<br>(0.123)             | -1.868<br>(0.801)             | 1.276<br>(0.790)   | 0.626<br>(0.833)   | 0.711<br>(0.812)   | 0.895<br>(0.822)  | -0.363<br>(0.990)   |
| SPL0                | 0.155<br>(0.080)              | -0.767<br>(0.341)             | 1.005<br>(0.368)   | 0.838<br>(0.404)   | 0.978<br>(0.391)   | 1.057<br>(0.410)  | 0.681<br>(0.450)  |
| SPL1                | 0.694<br>(0.088)              | 1.358<br>(0.392)              | -0.793<br>(0.414)  | -0.685<br>(0.458)  | -0.427<br>(0.464)  | -0.535<br>(0.493)   | -0.685<br>(0.502)   |
| SPL2                | 0.324<br>(0.132)              | 0.647<br>(0.552)              | --   | -0.031<br>(0.625)  | -0.353<br>(0.633)  | -0.050<br>(0.683)   | 0.209<br>(0.716)  |
| SPL3                | -0.140<br>(0.125)             | -0.573<br>(0.494)             | -0.228<br>(0.458)  | 0.731<br>(0.557)   | 0.474<br>(0.555)   | 0.151<br>(0.603)  | 0.468<br>(0.649)  |
| SPL4                | 0.038<br>(0.104)              | --                            | --   | --   | --   | --  | --  |
| SPL5                | 0.237<br>(0.134)              | --                            | --   | --   | --   | --  | --  |
| SPL6                | -0.082<br>(0.121)             | 0.551<br>(0.279)              | --   | -0.748<br>(0.370)  | -0.425<br>(0.311)  | -0.577<br>(0.326)   | -0.154<br>(0.378)   |
| SPL7                | 0.093<br>(0.104)              | --                            | --   | --   | --   | --  | --  |
| SPL8                | 0.080<br>(0.138)              | --                            | --   | --   | --   | --  | --  |
| SPL9                | -0.098<br>(0.124)             | -0.047<br>(0.276)             | --   | --   | -0.151<br>(0.358)  | 0.200<br>(0.308)  | -0.278<br>(0.359)   |
| SPL10               | 0.267<br>(0.103)              | --                            | --   | --   | --   | --  | --  |
| SPL11               | -0.188<br>(0.180)             | --                            | --   | --   | --   | --  | --  |
| SPL12               | -0.122<br>(0.170)             | -0.125<br>(0.233)             | --   | --   | --   | -0.039<br>(0.327)   | 0.249<br>(0.296)  |
| SPL13               | 0.032<br>(0.158)              | --                            | --   | --   | --   | --  | --  |
| SPL14               | 0.183<br>(0.210)              | --                            | --   | --   | --   | --  | --  |
| SPL15               | -0.551<br>(0.172)             | -0.226<br>(0.190)             | --   | --   | --   | --  | -0.128<br>(0.240)   |

|       |                   |                   |    |    |    |    |                   |
|-------|-------------------|-------------------|----|----|----|----|-------------------|
| SPL16 | 0.311<br>(0.135)  | --                | -- | -- | -- | -- | --                |
| SPL17 | 0.318<br>(0.211)  | --                | -- | -- | -- | -- | --                |
| SPL18 | -0.317<br>(0.197) | 0.018<br>(0.152)  | -- | -- | -- | -- | -0.072<br>(0.273) |
| SPL19 | 0.527<br>(0.192)  | --                | -- | -- | -- | -- | --                |
| SPL20 | -0.478<br>(0.217) | --                | -- | -- | -- | -- | --                |
| SPL21 | -0.051<br>(0.162) | -0.200<br>(0.119) | -- | -- | -- | -- | --                |
| SPL22 | 0.076<br>(0.132)  | --                | -- | -- | -- | -- | --                |
| SPL23 | -0.132<br>(0.315) | --                | -- | -- | -- | -- | --                |
| SPL24 | 0.040<br>(0.308)  | -0.243<br>(0.223) | -- | -- | -- | -- | --                |

<sup>(a)</sup> These are coefficients from the estimation of the hazard model; the coefficients of other variables included in the model are presented in Table 3.

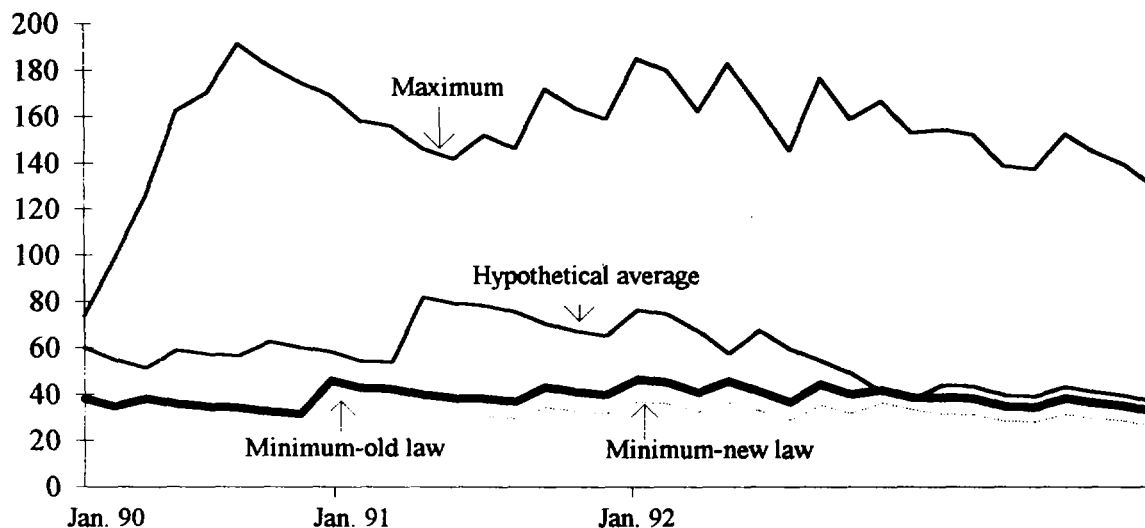
<sup>(b)</sup> See text for the definition of variables.

Table 5: Effects of the Change of the Law on the Hazard of Exit from Unemployment to Employment for Unemployed due to Bankruptcy and for Recipients of Unemployment Compensation in their Third Month (standard errors in parentheses)

|   | Unemployed due to<br>Bankruptcy | Recipients of<br>Unemployment<br>Compensation in Their<br>Third Month |
|---|---------------------------------|---|
| Period dummy = 1 if the benefit granted after the change of the law   | 0.023<br>(0.065)                | 0.157<br>(0.056)  |
| Experience treatment group 1  | -0.198<br>(0.167)               | --  |
| Interaction between the experience treatment group 1 and the period dummy                                     | 0.286<br>(0.212)                | --  |
| Experience treatment group 2  | -0.418<br>(0.165)               | --  |
| Interaction between the experience treatment group 2 and the period dummy                                     | 0.277<br>(0.203)                | --  |
| Experience treatment group 3  | -0.441<br>(0.128)               | --  |
| Interaction between the experience treatment group 3 and the period dummy                                     | 0.230<br>(0.150)                | --  |
| Experience treatment group 4  | -0.327<br>(0.130)               | --  |
| Interaction between the experience treatment group 4 and the period dummy                                     | 0.319<br>(0.146)                | --  |
| Experience treatment group 5  | -0.375<br>(0.132)               | --  |
| Interaction between the experience treatment group 5 and the period dummy                                     | 0.311<br>(0.145)                | --  |
| Dummy = 1 if unemployment compensation received in the third months   | --                              | 0.001<br>(0.149)  |
| Interaction between the dummy for receiving unemployment compensation in the third month and the period dummy | --                              | -0.327<br>(0.159)   |

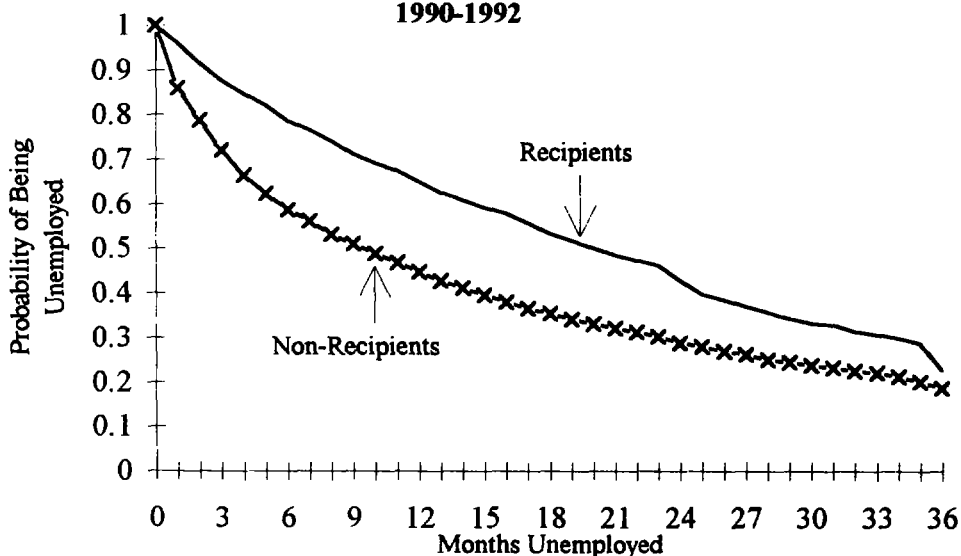
Note: Included in the estimation are all covariates of the model 1 as specified in Tables 3 (for the recipients of unemployment compensation in their third months, also those in Table 4). Their coefficients are similar to the ones reported in those tables, so they are omitted here.

**Figure 1: Range of Unemployment Compensation, 1990-1992  
(percent of the average wage of the economy)**



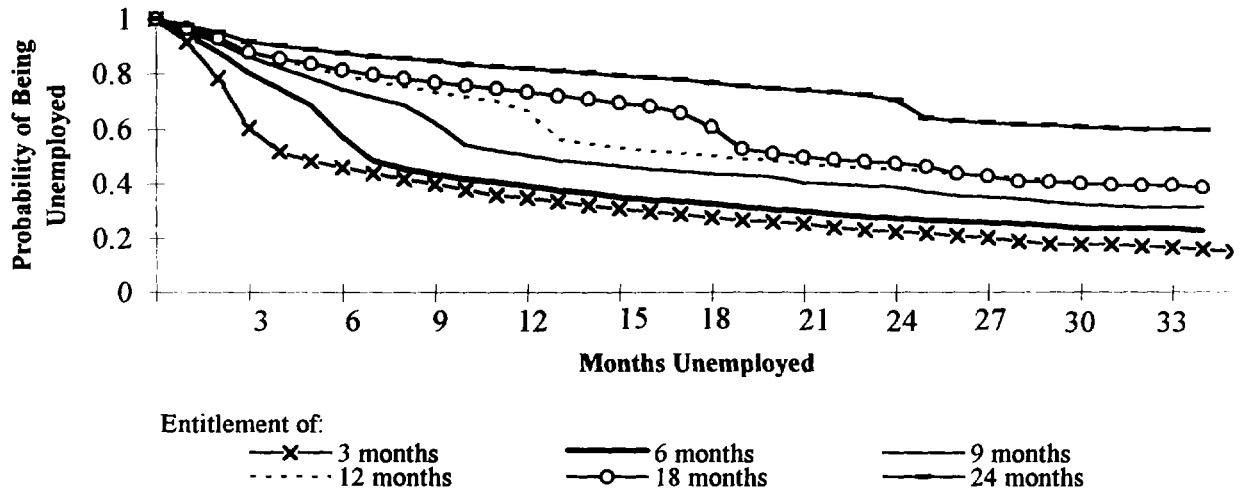
Note: Hypothetical average of unemployment compensation is received by an unemployed worker who, prior to unemployment, earned an average wage and who started receiving the benefit in January 1990 (at 60% replacement rate).

**Figure 2: Survival in Unemployment, Recipients of Unemployment Compensation, and Non-Recipients of Unemployment Insurance, 1990-1992**



(a) Sample size: 21,731 (18,344-recipients, 13,387-non-recipients).

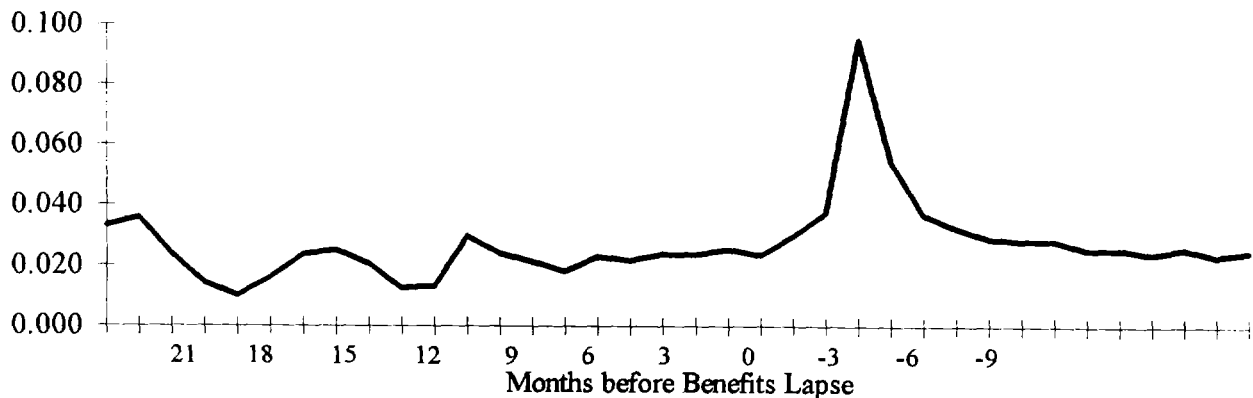
**Figure 3: Survival in Unemployment by Duration of Entitlement, 1990-92<sup>(a)</sup>**



<sup>(a)</sup> Included are 48,151 recipients of unemployment compensation during 1990-92. (Excluded are those who upon the exhaustion of unemployment compensation transferred to unemployment assistance, as well as recipients of unemployment assistance after internship.)

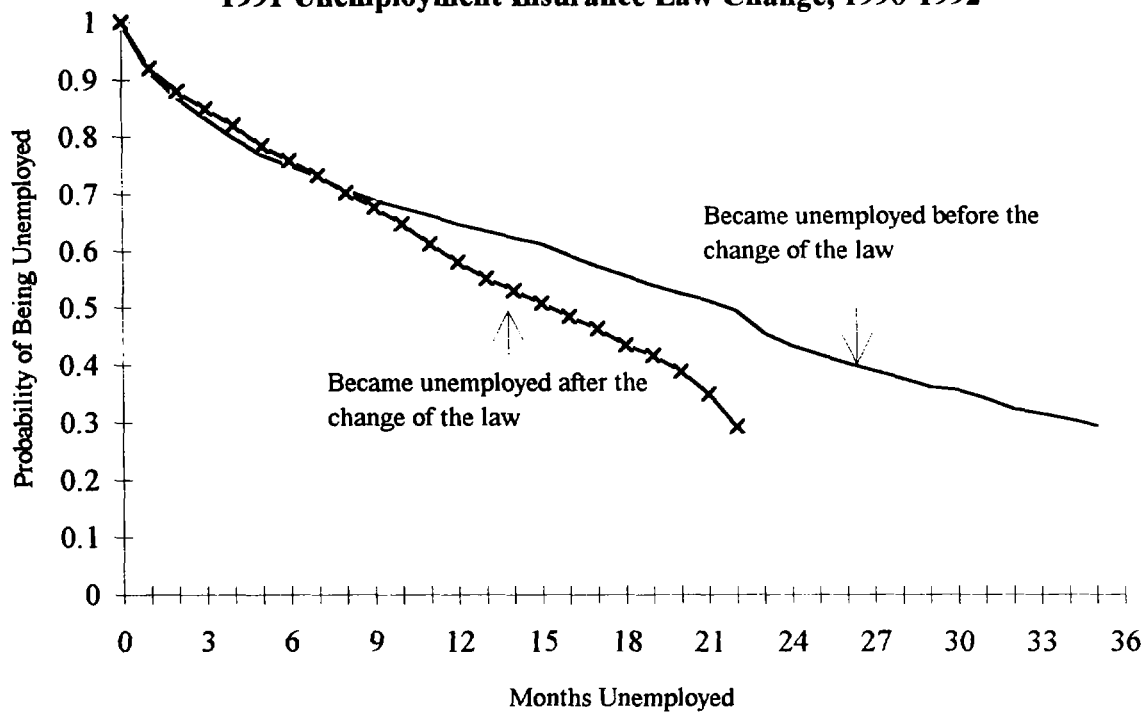
| Sample size: | 48,151 | Total                   |
|--------------|--------|-------------------------|
|              | 4,494  | -3 -months eligibility  |
|              | 2,587  | -6 -months eligibility  |
|              | 6,600  | -9 -months eligibility  |
|              | 7,098  | -12 -months eligibility |
|              | 7,680  | -18 -months eligibility |
|              | 19,687 | -24 -months eligibility |

**Figure 4: Empirical Hazard of Exit to Employment, Months before Benefits Lapse on the Time Axis <sup>(a)</sup>**



<sup>(a)</sup> Negative values for the period after the lapse of benefits.

**Figure 5: Survival in Unemployment of Workers Not Affected by the 1991 Unemployment Insurance Law Change, 1990-1992**



Sample size: 61,834 (15,370-before the change of the law, 46,464-after the change of the law).









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