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The Locking-in Effect of Subsidized Jobs

By: Jan C. van Ours

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Jan C. van Ours*

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Abstract

Recent evaluations of active labor market policies are not very optimistic about their effectiveness to bring unemployed back to work. An important reason is that unemployed get locked-in, that is they reduce their effort to find a regular job. This paper uses an administrative dataset from the Slovak Republic on durations of individual unemployment spells. The focus of the analysis is temporary subsidized jobs. By exploiting the variation in the duration of these jobs it is possible to investigate whether or not the locking-in effect is important. It turns out that it is.

Keywords: unemployment, active labor market policy, subsidized jobs, duration models
JEL-codes: J68, C41

*Department of Economics, Tilburg University, CentER, William Davidson Institute, IZA and CEPR; address: P.O. Box 90153, 5000 LE Tilburg, The Netherlands; email: vanours@kub.nl (from September 1, 2002: vanours@uvt.nl). Previous versions of the paper were presented at the May 2000 IZA-WDI conference "Labor markets in transition countries" and the June 2002 CEPR-WDI "Annual international conference on transition economics". The author thanks the participants of these conferences and in particular Randy Filer, the discussant of this paper at both occasions for critical comments. Finally, the author thanks Joost Lebens for data work assistance.

1 Introduction

Active labor market policies (ALMP) aim at bringing unemployed back to work by improving the functioning of the labor market in various ways. ALMP include programs such as public employment services, labor market training and subsidized employment. The 1994 OECD Jobs study recommends governments to "strenghten the emphasis on active labor market policies and reinforce their effectiveness" (OECD, 1994). Recent studies however are not very optimistic about the benefits of many of these programs. Calmfors, Forslund and Hemström (2001) concludes that the evidence on the effectiveness of Swedish ALMP is rather disappointing. Labor market retraining for example has no or negative employment effects. Martin and Grubb (2001) draw similar conclusions in their overview on what works and what does not work among ALMP in OECD countries. They conclude for example that subsidies to employment and direct job creation have been of little success in helping unemployed get permanent jobs. An important drawback of a lot of ALMP is that they stimulate workers to reduce their search efforts in stead of increasing them. This is due to the so-called locking-in effect.

This paper focuses on the locking in effects of temporary subsidized jobs. The analysis is based on information linked to a "natural" experiment that took place in the Slovak labor market in the mid 1990s. At that time there were two types of temporary subsidized jobs known as socially purposeful jobs (SPJ) and publicly useful jobs (PUJ). SPJ were mainly created in the private sector and concerned higher qualified functions while PUJ were low ranking jobs in the public sector best described as "community works" (OECD (1996)). The maximum duration of PUJ changed from 6 months to 9 months in 1994 and from 9 months to 12 months in 1995, while the minimum duration of SPJ remained 24 months over the same time period. This paper uses an administrative dataset from the Slovak Republic on durations of individ-

ual unemployment spells and exploits the change in the duration of PUJ to investigate the locking-in effect. If indeed this effect exists the effectiveness of PUJ to bring unemployed back to regular jobs should have decreased as the duration of the jobs increased.

The paper is set up as follows. Section 2 discusses active labor market policies both from a theoretical and an empirical point of view. Section 3 provides a description of the nature of the Slovak "natural" experiment. This section gives a short overview of labor market developments, the ALMP in Slovakia and previous studies on the effectiveness of these ALMP. Section 4 presents the data and the statistical model and Section 5 presents the parameter estimates. Section 6 concludes.

2 Active labor market policies

2.1 The function of ALMP

Active labor market policies consist of public training programs, job search assistance, subsidies to employment and direct job creation. Calmfors (1995) distinguishes four basic functions of ALMP: i) raise output (and welfare) by putting unemployed to work or have them invest in human capital, ii) maintain the size of the effective labor force by keeping up competition for available jobs, iii) help to reallocate labor between different sub-markets, iv) alleviate the moral-hazard problem of unemployment insurance. ALMP may eliminate mismatch in the labor market, promote more active search behavior on the part of the job seekers and have a screening function because they substitute for regular work experience in reducing employer uncertainty about the employability of job applicants. Placements in labor market programs may provide an alternative work test to the eligibility of unemployment benefits, since some of those who are not genuinely interested in work will prefer to lose registration rather than to participate in a program. An adverse side

effect of ALMP is that workers are locked-in training and job-creation programs: because of their participation they reduce their search intensity. Not only direct effects are important when assessing the effectiveness of ALMP. Calmfors (1994) distinguishes a number of indirect effects. First there are displacement effects since jobs created by one program are at the expense of other jobs. Then there are deadweight effects because labor market programs subsidize hiring that would have occurred anyway in the absence of the program. There are also substitution effects because jobs created for a certain category of workers replace jobs for other categories because relative wage costs have changed. Finally, there are the effects of taxation required to finance the programs on the behavior of everyone in society.

2.2 Empirical studies

In line with the previous distinction between micro and macro effects there are two main types of evaluation studies of ALMP (Martin and Grubb, 2001): The first type uses micro data to measure the impact of program participation on individuals' employment and earnings. The second type uses aggregate data to measure the net effects of programs on aggregate employment and unemployment. Micro studies have the advantage of a very large number of observations. Drawbacks are the selection bias and the fact that they provide only estimates of partial-equilibrium effects. Macro studies are few. Drawbacks of macro studies are that they are based on few observations, they often lump together various types of training and job creation schemes and they have to deal with a simultaneity bias.

There are many evaluation studies. A lot of them are done in Sweden, a country that has used ALMP extensively. In their overview of Swedish studies Calmfors, Forslund and Hemström (2001) concludes that ALMP have probably reduced unemployment but also reduced regular employment. According to Martin and Grubb (2001) the lessons from the evaluation studies in OECD countries are the following. Public training programs are among the most

expensive active measures. Some programs have yielded low or even negative rates of return for participants, some public training programs work. These programs appear to work for some target groups (adult women) but not for others (prime-age men, youth). Four crucial features can increase effectiveness: tight targeting on participants, relative small scale, need to results in a qualification or certificate that is recognized and valued by the market, strong on-the-job component (establishing strong links with local employers). Job search assistance is usually the least costly active labor market program but must be combined with increased monitoring of the job-search behavior of the unemployed and enforcement of work tests. Subsidies to employment involve large dead weight losses and substitution effects. Finally, direct job creation has been of little success in helping unemployed get permanent jobs in the open labor market. Most jobs provided through direct job creation schemes typically have a low marginal product, they should be short in duration and not become a disguised form of heavily subsidized permanent employment.

3 The Slovak natural experiment

3.1 Labor market developments and ALMP

The Slovak labor market is one of the transitional labor markets of Central and Eastern Europe (see Svejnar (1999) for an overview). Like many other countries with a transitional economy, Slovakia experienced a sharp increase of unemployment at the initial stage of the transition. In the course of 1991, within a one-year time span unemployment increased from practically zero to 300,000 persons which corresponded to an unemployment rate of about 12% (OECD 1996). After that unemployment did not change a lot until it started increasing again in 1998. In 2001 the unemployment rate was as high as 18.8% (OECD 2001).

The Slovak Republic has a system of passive and active labor market

policies. The system of unemployment benefits in the Slovak Republic has been discussed elsewhere (for a detailed description of institutions see OECD (1996)). For the current paper I only note that for many unemployed workers replacement rates are quite high. Even for average wage jobs the replacement rate for adults with children and unemployment benefits was no less than about 80%. After transfer to the social assistance benefits their replacement rate was about 50-60% (for more details see Lubyova and Van Ours (1997, 1998)).

ALMP were introduced in 1991 and gradually developed into a comprehensive system of several programs. Important programs were temporary subsidized jobs known as SPJ and PUJ (OECD (1996)). The volume of both SPJ and PUJ was quite large. In 1995 for example in total 47,000 workers started working on a SPJ, while 44,000 started working on a PUJ (Lubyova and Van Ours, 1999).

SPJ were the most important throughout the period, both in terms of number of created jobs and expenditures. The concept of SPJ and the rules of administration have undergone numerous revisions as the authorities learned how to tailor the programs to labor market conditions. In 1991 SPJ were considered to be every job created on the basis of an agreement with the labor office by an employer in production, business or other activities aimed at making profits. In 1992 the profit-seeking requirement was eliminated and the requirement that the job had to be occupied by registered unemployed was introduced. The latter was partially relaxed in 1994 when the school-leavers, persons younger than 18 years and those who would be full-time self-employed under SPJ were allowed to participate without prior registration. The main forms of support introduced in 1991 were subsidies, interest repayments and loans, later reduced to 2-years loans and subsidies. The minimum duration of SPJ was introduced in 1992 and set to 2-years period. In case of lay-off or quit, the job had to be occupied by another registered unemployed within 30 days.

Publicly useful jobs were designed mostly for lower qualified workers for a limited period of time. In 1991 PUJ were introduced as short-term employment opportunities created on the basis of agreements between labor offices and non-profit employers (for example, organs of state administration, municipalities, and local administration). The requirement for non-profit orientation of the employer was canceled in 1992. State budgetary organizations and state contributory (partial budgetary) organizations were excluded from PUJ programs in 1994. The upper limit for financial support was originally set at the wage costs of the participant, later extended to cover also participant's social insurance contributions. The maximum duration of PUJ in 1991 was 6 months. Given that the participation renewed unemployment benefit entitlement, many unemployed workers were shifting between PUJ and open unemployment. Therefore, the maximum duration of PUJ was raised to 9 months January 1 1994 and to 12 months January 1 1995. The stocks were strongly built up after two major inflows of about the same size, which occurred in the financing boom of 1992, and in the first half of 1995. The latter inflow was a result of changed priorities in 1995 - more means were put into PUJ, partly at the expense of other programs.

The implementation of ALMP was in the hands of the Public Employment Service (PES) that had a network of district offices where every district office had a number of local centers. So, the services were never far away (OECD (1996)). Although priority of placement was given to long-term unemployed workers, the target group of the wage subsidies was not limited to the long-term unemployed. Every unemployed person who could not get a normal job was entitled to a subsidized job offered through the PES system. According to the OECD (1996) the incentive to establish a subsidized job usually came from interested employers. Among the subsidized jobs were jobs that required no special training and education, including caretaking, cleaning, kitchen work and unskilled jobs in general. The creation of subsidized jobs was a matter of negotiation between employers and PES. The wage subsidy was

granted to individuals but paid to the employer. The wage was comparable to other workers that had a low skilled industrial job and was usually at the minimum wage or somewhat above. This means that for some workers the replacement rate was quite high. If someone refused a job offered by the PES he or she may have gotten a benefit sanction imposed but the labor offices were usually reluctant to use this instrument.

In 1997 the structure of ALMP programs was substantially reformed. The original SPJ and PUJ were formally unified into one program of subsidized jobs, although some distinction between the two types of jobs was preserved.

3.2 Previous studies

There have been some studies on the impact of ALMP in transition economies, but there is not an abundant number. From an overview of studies on labor-market reforms in transition economics Boeri (1997) concludes that active policies, such as subsidized employment schemes and public work programs have not been very successful. According to Boeri this may have to do with the phenomenon that slots in training courses are often offered to job seekers with rather favorable labor market characteristics who would have found a job anyway. Furthermore, participation in ALMP may have stigmatized the participants, which reduced their chances of finding a regular job. The effectiveness of Slovak labor market policies has been investigated in a number of studies. Burda and Lubyova (1995) use district aggregate data to estimate the effectiveness of Slovak ALMP in a matching function framework. They find that ALMP expenditures increase the outflow from unemployment. Huitfeld (2000) investigates to what extent ALMP created wage pressure and crowded out regular employment in Slovakia. He finds evidence that indeed ALMP have had a positive impact on wages.

In Lubyova and Van Ours (1999) the effects of PUJ, SPJ and training on the transition rate from unemployment to a regular job are investigated. The main conclusions are that PUJ have a positive effect on the job finding rate

while SPJ have a negative effect. In Van Ours (2000) the effects of ALMP are studied more closely, by also investigating whether the separation rate from a new job is related to whether or not the worker previously participated in an ALMP. Here the conclusion is that PUJ reduce the job separation rate. The current paper focuses on the job finding rate. The main issue addressed here is the question why PUJ have a positive effect on the job-finding rate while SPJ have a negative effect. The locking-in effect is the main suspect.

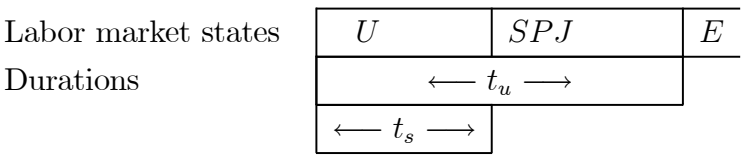
4 Data and statistical model

4.1 Data

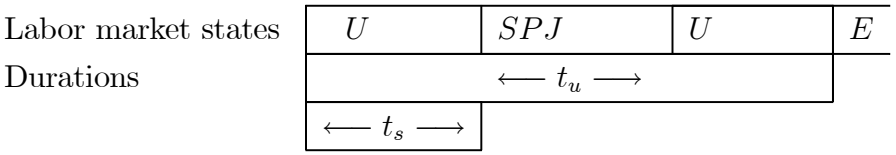
The data used in our analysis come from the unemployment registers of labor offices in 16 Slovak districts. The unemployment rates differ a lot between districts. For example, in the district Bratislava (excluding the capital Bratislava) the December 1993 unemployment rate was 4.1%, while in the Bardejov the unemployment rate at that time was 19.3%.

In the selected districts the data collection was exhaustive, i.e. all the registered unemployed were selected. Several types of information are used in order to reconstruct individual histories. An individual history consists of a sequence of spells representing three possible labor market states: employment, unemployment and out of labor force. In addition to that the spells of participation in SPJ and PUJ programs are identified. From the unemployment register and unemployment archives an inflow sample was selected of all the unemployed that became registered in the course of 1993. The censoring point is April 1998. The use of 1993 inflow is justified by the relative stability in the institutional set-up of the labor market (major reforms occurred at the beginning of 1992 and 1995). Also the time period elapsed before the censoring point is sufficiently large to avoid a lot of censored spells. In the analysis information is used about the length of the first spell of un-

employment that started in 1993. If this spell ended information is used about the labor market status after unemployment. If the spell ended in a transition to a job the unemployment spell was considered to be completed. If the spell ended in a transition to an ALMP-program the unemployment duration was considered to continue until another transition occurred either to a job or back to unemployment. This concept does not coincide with the official statistics but it does coincide with the point of view of a labor economist: a person is unemployed until he or she finds a regular job or leaves the labor market. When a transition to a job occurred the unemployment spell was considered to be complete. When a transition occurred back to unemployment the spell was still considered to be incomplete. In the analysis the duration of unemployment up to a transition to an ALMP-job or to training is also important. This duration is the search period until an ALMP measure is met. If the spell did not end or ended in a transition to out of the labor force the unemployment spell is considered to be right censored. The procedure to deal with duration information can be illustrated in two examples. If an individual first starts in a SPJ and then finds a regular job the situation is as follows:



where U indicates the unemployment state, SPJ the state of being in an SPJ and E indicates the employment state. Furthermore, t_u is the duration until an individual finds a job and t_s is the duration until an individual starts working in a SPJ. If the individual returns to unemployment after having been in a SPJ and then finds a job, the situation is as follows:



After removing missing observations the data from the 16 districts refer to 86,157 individuals of which 49,378 are male and 36,779 are female. Table 1 gives some indication about the transitions in labor market statuses that were used in the analysis. As is shown on average 2.9% of them started in a SPJ, 3.7% started in a PUJ and 47.1% started in a regular job right after their unemployment spell ended. Of those that started in a SPJ 74.4% started in a regular job without or with an intervening spell of unemployment. Of those that started in a PUJ 48.4% started in a regular job within the time period that was observed.

Figure 1 shows the evolution of the exit rates out of unemployment over the duration of the unemployment spell. Figure 1a shows that for males the transition rate to a regular job decreases in the first year and then fluctuates around a sort of constant level of about 3-4% per month. The transition rates to SPJ are almost constant in the first three years of the unemployment spell while the transition rates to PUJ increase strongly. After one year the transition rate to PUJ is higher than the transition rate to SPJ but both are substantially below the transition rates to regular jobs. Figure 1b shows the transition rates for females. The patterns are roughly the same for females but all transition rates are lower than they are for males. Furthermore, the transition rate to a regular job keeps falling after one year of unemployment.

Figure 2 shows the transition rates to a regular job, from a SPJ, a PUJ and from unemployment.[1] For both males and females the transition rates from a SPJ and a PUJ fluctuate substantially over the duration of the stay on these jobs. For the transitions from PUJ there are clear peaks at 6, 9 and 12 months.

[1]Note that the transition rate from unemployment to a regular job is similar for Figures 1 and 2. The PUJ and SPJ lines are calculated on the basis of 1519 males and 1001 females that started on a SPJ, and on the basis of 2348 males and 831 females that started on a PUJ.

4.2 Statistical model

The job finding rate consists of two components: the search intensity and the job offer probability. Going into a subsidized job has two opposite effect with respect to the job finding rate. First, accepting a subsidized job is a signal to the employer of the ambition of the worker to go for a job and not rely on unemployment benefits. This increases the job offer probability and conditional on the search intensity also the job finding rate. The second effect concerns the search intensity. If the subsidized job lasts for a long time the worker may reduce his or her search intensity. Conditional on the job offer probability this has a negative effect on the job finding rate. The net effect of a subsidized job is the balance of the increased job offer probability and the decreased search intensity. Whether the net effect is positive or negative depends on the way the subsidized job is structured. If subsidized jobs last too long the reduced search intensity dominates and the net effect will be negative. If subsidized jobs are limited in time the positive effect of the increased job offer probability dominates and the net effect is positive. Since there is not information about search intensities or job offer probabilities only the net effect on the job finding rate can be established.

In order to establish the effect of a subsidized job on the exit rate to a regular job a model is needed that accounts for possible selectivity in the inflow into a subsidized job. Heckman, LaLonde and Smith (1999) gives an overview of the relevant issues concerning the estimation of treatment effects. Studies that estimate the effects of the treatment in the context of an event history model of labor force dynamics are rare. The current analysis exploits information with respect to the duration of unemployment, the duration of the stay in a subsidized job and the destinations after that. In multivariate duration models the variation in the durations at which treatment is administered to individuals, and data on the corresponding pre- and post-treatment durations can be exploited to identify the treatment effect. The intuition is as follows. Consider the transition rate from unemployment to a regu-

lar job, which is affected by unobserved heterogeneity that has a discrete distribution with two points of support. Consider also the transition rate from unemployment to a subsidized job that is affected by a similar type of unobserved heterogeneity. If the two types of unobserved heterogeneity are correlated this means that conditional on observed characteristics there are four groups of individuals that differ in terms of transition to a job (high/low) and transition to a subsidized job (high/low). Conditional on observed characteristics each of these four groups is homogenous. So, within the groups selectivity of the inflow into a subsidized job cannot be present. Therefore, we are able to estimate the unbiased treatment effect if we can identify the unobserved heterogeneity in both the transition rate to a regular job and the transition rate to subsidized jobs. This means that the data should contain information about all relevant transitions over some period of time, which they do.

A formal proof of the identification of the treatment effect is given in Abbring and Van den Berg (1998). Van den Berg (2000) presents an overview of duration models and has a general discussion on the use of duration models in estimating treatment effects. Examples of the use of multivariate duration models in evaluation studies are Gritz (1993), Bonnal, Fougère and Sérandon (1997), Abbring, Van den Berg and Van Ours (1997), Van den Berg, Van der Klaauw and Van Ours (1998). These and other studies are discussed in more detail in Van Ours (2000). A recent example of a study in which a multivariate duration model is exploited to estimate the effects of ALMP is Lalive, Van Ours and Zweimüller (2000).

Here, the baseline model has for every transition rate a mixed proportional specification with a flexible baseline hazard. Differences between unemployed individuals in the transition rate from unemployment to a job can be characterized by the time invariant observed characteristics x, the elapsed duration of unemployment t , and a variable indicating whether or not the individual started participating in an ALMP. Furthermore, t_j ($j = p, s$, refer-

ring to PUJ or SPJ) is the time at which the individual starts participating in a subsidized job and I_j is the dummy variable indicating whether the individual has already started participating, $I_j = 1$ if $t_j < t$, $I_j = 0$ otherwise. Similar specifications are used for both transition rates to PUJ and SPJ. Each of the transition rates may be influenced by unobserved characteristics, indicated by u for the transition to regular jobs, v for the transition to PUJ and w for the transition to SPJ.

The transition rate from unemployment to a regular job at time t conditional on x, t_p, t_s and v, the transition rates to PUJ or SPJ at time t conditional on x and v or w can be specified as follows:

$$\begin{aligned} \theta_u(t|x, I_p, I_s, u) &= \lambda_u(t) \exp(x'\beta_u + \delta_p I_p + \delta_s I_s + u) \\ \theta_p(t|x, v) &= \lambda_p(t) \exp(x'\beta_p + v) \\ \theta_s(t|x, w) &= \lambda_s(t) \exp(x'\beta_s + w) \end{aligned} \tag{1}$$

where the $\lambda(t)$-functions represent individual duration dependence and the $\delta's$ measure the effect that taking up a temporary subsidized job has on the transition rate from unemployment to a regular job. In both cases the treatment is assumed to be an "incidence effect" (Gritz (1993)) . There could be a lot of aspects of the ALMP that potentially affect the transition rate to a regular job, but only the effect of the participation in an ALMP is taken into account. Flexible duration dependence is modeled by using step functions:

$$\lambda_j(t) = \exp(\Sigma_k(\lambda_{j,k} \cdot I_k(t)) \text{ for } j = u, p, s \tag{2}$$

where k (= 1,..,6) is a subscript for time-interval and $I_k(t)$ are time-varying dummy variables that are one in subsequent time-intervals. Six time intervals are distinguished: 0-3 months, 3-6 months, 6-9 months, 9-12 months, 12-24 months and 24+ months. Because a constant term is also estimated a normalization is needed. Therefore, $\lambda_{u,1} = \lambda_{p,1} = \lambda_{s,1} = 0$.

The conditional density functions of the completed unemployment durations t_u, and the completed durations until entrance of a PUJ or SPJ can be

written as

$$f_u(t_u|x, I_p, I_s, u) = \theta_u(t_u|x, I_p, I_s, u) \exp(-\int_0^{t_u} \theta_u(r|x, I_p, I_s, u)dr) \quad (3)$$

$$f_p(t_p|x, v) = \theta_p(t_p|x, v) \exp(-\int_0^{t_p} \theta_p(q|x, v)dq) \quad (4)$$

$$f_s(t_s|x, w) = \theta_s(t_s|x, w) \exp(-\int_0^{t_s} \theta_s(s|x, w)ds) \quad (5)$$

The basic assumption so far is that the inflow into a subsidized job is a random process in the sense that it is independent of the process by which unemployed find jobs.

The selection into the subsidized jobs is not exogenous or independent of unobserved characteristics that also affect the job finding rate. To account for this selectivity the unobserved heterogeneity terms are allowed to be correlated. $G(u, v, w)$ is defined to be the joint distribution of the unobserved characteristics u, v and w. The joint density function of t_u, t_p and t_s conditional on x equals

$$h(t_u, t_p, t_s|x) = \int_u \int_v \int_w f_u(t_u|x, I_p, I_s, u) f_p(t_p|x, v) f_s(t_s|x, w) dG(u, v, w) \quad (6)$$

Each of the error terms is assumed to follow a discrete distribution with two points of support a and b, and each error term can be correlated to another. Therefore, G is a discrete distribution of unobserved heterogeneity with eight points of support (u_a, v_a, w_a), (u_a, v_a, w_b), (u_a, v_b, w_a), (u_a, v_b, w_b), (u_b, v_a, w_a), (u_b, v_a, w_b), (u_b, v_b, w_a), (u_b, v_b, w_b).

The associated probabilities are denoted as follows:

$$\begin{aligned} \Pr(u_a, v_a, w_a) &= p_1 & \Pr(u_a, v_a, w_b) &= p_2 \\ \Pr(u_a, v_b, w_a) &= p_3 & \Pr(u_a, v_b, w_b) &= p_4 \\ \Pr(u_b, v_a, w_a) &= p_5 & \Pr(u_b, v_a, w_b) &= p_6 \\ \Pr(u_b, v_b, w_a) &= p_7 & \Pr(u_b, v_b, w_b) &= p_8 \end{aligned} \quad (7)$$

where $0 \leq p_i \leq 1$, and $i = 1, .., 8$. So, the assumption is that there are 8 subgroups within the population of unemployed workers that conditional on their observed characteristics and their elapsed duration are homogeneous within the group, but different between. These groups are not observed but the fact that they are homogenous is used to get an unbiased estimate of the treatment effects.

The observations can be divided into three groups. There are individuals that did not go into a PUJ or SPJ, N_1 observations, individuals that go into a PUJ, N_2 observations and individuals that go into an SPJ, N_3 observations. If $c = 1$ when the outcome is a completed unemployment duration and $c = 0$ when the unemployment duration is censored, then the loglikelihood is

$$\begin{aligned}
&\sum_{i=1}^{N_1} \ln[c_i \int_{t_{p_i}}^{\infty} \int_{t_{s_i}}^{\infty} h(t_{u_i}, s, q|x_i) ds dq] + (1 - c_i) \int_{t_{u_i}}^{\infty} \int_{t_{p_i}}^{\infty} \int_{t_{s_i}}^{\infty} h(r, s, q|x_i) ds dq dr] \\
&+ \sum_{i=1}^{N_2} \ln[c_i \int_{t_{s_i}}^{\infty} h(t_{u_i}, s, t_{p_i}|x_i) ds + (1 - c_i) \int_{t_{u_i}}^{\infty} \int_{t_{s_i}}^{\infty} h(r, s, t_{p_i}|x_i) ds dr] \qquad (8) \\
&+ \sum_{i=1}^{N_3} \ln[c_i \int_{t_{pi}}^{\infty} h(t_{u_i}, t_{s_i}, q|x_i) dq] + (1 - c_i) \int_{t_{u_i}}^{\infty} \int_{t_{p_i}}^{\infty} h(r, t_{s_i}, q|x_i) dq dr]
\end{aligned}$$

5 Parameter estimates

The empirical analysis is done separately for males and females. For the empirical analysis a 20% random sample is drawn from the available observations. This sample consists of 9,844 males and 7,327 females. In the appendix in Table A1 the distribution of males and females across the different districts is shown both for the gross sample of 86,157 workers and the net sample of 17,167 workers. The explanatory variables I use in the analysis refer to age, education, marital status, disability status, ethnicity and district unemployment rate. The appendix provides more details about the explanatory variables. As is shown in Table A2 the age distribution of males and females in the sample is approximately the same. Females are

higher educated than males are. Of the females 44% has secondary or higher education, while this is only 30% for males. Of the males 52% is married, of the females this is 64%. Furthermore, the samples of males and females contain about 5% disabled workers, 4% Roma and 6% Hungarians.

5.1 Treatment effects

The parameters of the model are estimated using the method of maximum likelihood.[2] It turns out that is not possible to distinguish more than two points of support in the distribution of unobserved heterogeneity. These two points are modeled by using a logit model, where $p_1 = \frac{\exp(\alpha)}{1+\exp(\alpha)}$ and $p_2 = \frac{1}{1+\exp(\alpha)}$. Parameter estimates with this two point distribution are shown in Table 2.[3] First the results for males are discussed and then the results for females.

As shown in Table 2a the exit rate to a job is lower for males over age 40 than it is for younger males. The level of education does not affect the transition rate to a job, but being married increases this transition rate. Furthermore, disabled workers and workers with a Hungarian nationality or Roma have a lower exit rate to a regular job than their counterparts have. The district unemployment rate has a significant negative effect on

[2]Note that this set-up differs from Lubyova and Van Ours (1999) is two ways. First, training programs are omitted. Durations until training are considered to be right-censored unemployment durations. Second, the transition rates to SPJ and PUJ are now modeled separately in stead of as one exit into ALMPs.

[3]Table A3 in the appendix presents the estimation results if there is no account for unobserved heterogeneity. As will be clear from a comparison of the parameter estimates in this table and the parameter estimates in Table 2 introducing unobserved heterogeneity does not affect the coefficients of the explanatory variables a lot. The pattern of duration dependence of the transition rates changes somewhat. The main difference concerns the treatment effects. Accounting for unobserved heterogeneity increases the effect of PUJ and decreases the effect of SPJ. Without unobserved heterogeneity for both males and females the effect of PUJ would be positive but not significantly different from zero. With unobserved heterogeneity the effect of PUJ is positive and significant.

the outflow to regular jobs. Unobserved heterogeneity is relevant, with a group of 29% that has a low exit rate to a regular job and a group of 71% of which the exit rate to a regular job is substantially higher. Duration dependence is also relevant. Conditional on the observed and unobserved characteristics the transition rate in the second duration interval is higher than the transition rate to a regular job in the first duration interval is. From the third quarter up to two years the exit rate to a regular is smaller than it is in the first quarter. After that it increases again, possible because unemployment benefits expire. A lot of variables that have a positive effect on the transition rate to a regular job have a negative effect on the outflow to PUJ. Age for example has a positive effect, while being married has a negative effect. Furthermore, education has a negative effect on the outflow to a PUJ, while unemployment has a positive effect. These effects are in line with the purpose of PUJ, which were intended for low skilled, young workers. In terms of unobserved heterogeneity regular jobs and PUJ are also negatively correlated. If an individual belongs to a group that has a high exit rate to a regular job he has a low exit rate to a PUJ and vice versa. Since the number of workers going to a PUJ in the first year of their unemployment is very small the first four duration intervals are merged. As shown the exit rate to PUJ has a strong positive duration dependence. Whereas regular jobs and PUJ seems to be complements, regular jobs and SPJ seem to be substitutes. The exit rate to SPJ is lower for older, low educated and unmarried males than it is for their counterparts. Roma men have a lower transition rate to SPJ than other men have. A high district unemployment rate has a negative but not significant effect on the transition rate to SPJ. The unobserved components of the transition to regular jobs are positively correlated with the unobserved components in the transition to SPJ. Those that have a low exit rate to regular jobs have a zero exit rate to SPJ. Apparently, if workers are attractive for employers to hire them on regular jobs they are also attractive for employers to hire them on SPJ. The

treatment effect of PUJ turns out to be positive, while the treatment effect of SPJ is negative.

As shown in Table 2b a lot but not all of the effects of observed and unobserved characteristics and of the duration of unemployment are similar for females. In terms of unobserved heterogeneity there is a group of females of 44% that has a small transition rate to regular jobs, a relatively large transition rate to PUJ and a zero transition rate to SPJ. The complementary group of 56% of the females has a larger transition rates to regular jobs, a positive transition rate to SPJ and a zero transition rate to PUJ. Also for females the treatment effect of PUJ is positive, while the treatment effect of SPJ is negative.

5.2 Locking-in effects?

From the estimation results presented in the previous subsection it is clear that PUJ have a positive effect on the transition rate from unemployment to a regular job, while SPJ have a negative effect. The question is whether this has to do with a locking-in effect that is more severe the longer the potential duration of a temporary subsidized job is. The differences in the potential duration of a SPJ and a PUJ are used to identify the locking-in effect. As discussed before the potential duration of a PUJ changed in the period 1993-95, while the potential duration of a SPJ remained constant over this period. If there is a locking-in effect related to the duration of a temporary job the difference in treatment effects between PUJ and SPJ should have declined over the period 1993-95.

Table 3 shows the estimated treatment effects distinguished by type of program and by year of entrance into the programs. For males the treatment effect of PUJ is indeed lower in 1994 than it is in 1993, while it is again lower in 1995. The treatment effect of SPJ in 1995 is larger than it is in 1993, but the difference is on the border line of significance. So, t the treatment effect of SPJ does not differ a lot across the years, while it becomes smaller

for PUJ. From this convergence in the effect it may be concluded that the duration of the subsidy is important. For females similar results are found.

Table 4 shows how the estimated treatment effects depend on the ex ante duration of the treatment. Here, the calendar year dummies have been replaced by the ex ante duration of a subsidized job, which was 6 months for PUJ that started in 1993, 9 months for PUJ that started in 1994, 12 months for PUJ that started in 1995 onwards, while for SPJ the ex ante (minimum) duration was always 2 years. As shown the effect of the ex ante duration is significantly negative, both for males and females. In both cases the hypothesis that the year dummies may be replaced by the ex ante duration cannot be rejected.[4] Finally, Table 4 shows whether the size of the treatment effects is related to the observed characteristics of the workers in the programs. For males the treatment effect is larger for low educated workers, unmarried workers and Roma. For females none of the coefficients differs significantly from zero.[5]

6 Conclusions

This paper focuses on the relationship between the duration of subsidized jobs and the regular job finding rate. The main hypothesis is that long duration of subsidized jobs generate locking-in effects for the participants in these programs. The analysis is based on data from the "natural" experiment

[4]For males the Likelihood-Ratio test statistic comparing the first column of Table 3 with the first column of Table 4 is equal to 9.0. Since the critical $\chi^2 - value$ (95%) for 4 degrees of freedom is equal to 9.5 I cannot reject the restriction. For females the equivalent LR-test is equal to 7.4, while the critical $\chi^2 - value$ (95%) for 3 degrees of freedom is equal to 7.8.

[5]For males the LR-test statistic equals 34.0 which is significant, since the critical $\chi^2 - value$ for 9 degrees of freedom is 16.9. For males the LR-test statistic equals 16.4, which indicates that the hypothesis that the treatment effect is not affected by observed characteristics of the women cannot be rejected.

in the Slovak labor market of the mid 1990s, where the maximum length of a so called Publicly Useful Job was extended first from 6 to 9 months and then from 9 to 12 months. The empirical analysis shows that short term subsidized jobs had a positive effect on the regular job finding rate. However, as the ex ante duration of a subsidized job increased this positive effect became smaller. Locking-in effects seem to have been a relevant phenomenon. This phenomenon also explains the negative treatment effect of so called Socially Purposeful Jobs, which were intended to last at least two years. SPJ had clear negative treatment effects and were more suitable to bring open unemployment down than they stimulated workers to find regular jobs. Also, in hindsight, it may not have been a wise decision to lengthen the duration of the PUJ. All in all, it is clear that subsidized jobs can reduce unemployment durations provided that the subsidy does not last too long.

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Table 1 Labor market transitions

Stage 1		Stage 2		Stage 3
86,157 Unemployed	⟹	To SPJ 2,520 (2.9%)	⟹	To regular job 1,868 (74,4%)
	⟹	To PUJ 3,179 (3.7%)	⟹	To regular job 1,522 (48,4%)
	⟹	To regular job 40,218 (47.1%)		
	⟹	Others[a)] 40,240 (46.4%)		

[a)] Including censored observations

Table 2 Estimation results baseline model[a)]

a. males

	To job	To PUJ	To SPJ
Age30-40	-0.03 (0.7)	0.62 (4.1)	-0.05 (0.3)
Age40+	-0.20 (4.7)	0.79 (5.3)	-0.40 (2.4)
Incompl sec. education	0.05 (1.2)	-0.19 (1.4)	0.72 (4.6)
Sec. and higher education	-0.01 (0.3)	-1.14 (5.7)	0.53 (3.4)
Married	0.34 (9.3)	-0.60 (4.7)	0.42 (2.9)
Disabled	-0.34 (4.6)	-0.19 (0.9)	-0.32 (1.1)
Roma	-0.75 (8.8)	0.12 (0.6)	-1.30 (3.6)
Hungarian	-0.17 (2.6)	0.19 (1.1)	0.05 (0.2)
Urate/10	-0.18 (4.3)	0.74 (5.0)	-0.15 (1.2)
Mass points			
u^a	-3.66 (15.2)	-7.03 (26.1)	$-\infty$
$u^b - u^a$	1.19 (5.6)	-2.17 (2.8)	-5.54 (21.1)
Duration dependence			
3-6 months	0.08 (1.9)	-	-0.04 (0.2)
6-9 months	-0.10 (1.9)	-	-0.38 (2.0)
9-12 months	-0.23 (3.8)	-	-0.38 (2.0)
12-24 months	-0.21 (3.8)	1.66 (10.2)	0.26 (1.4)
$>$ 24 months	0.10 (1.2)	2.38 (14.5)	0.89 (3.5)
Heterogeneity			
α		-0.88 (2.6)	
Treatment effect (δ)	-	0.67 (3.3)	-0.93 (7.7)
-Loglikelihood		26,448.1	

[a)] t-values in parentheses

b. females

	To job	To PUJ	To SPJ
Age30-40	-0.31 (5.4)	0.42 (1.6)	-0.21 (0.8)
Age40+	-0.19 (3.4)	0.31 (1.2)	-0.01 (0.0)
Incompl sec. education	0.02 (0.4)	-0.44 (1.4)	0.73 (3.3)
Sec. and higher education	-0.10 (2.1)	0.45 (2.4)	-0.33 (1.6)
Married	-0.07 (1.4)	0.08 (0.4)	-0.39 (1.8)
Disabled	-0.15 (1.7)	-0.25 (0.8)	-0.94 (2.1)
Roma	-0.67 (6.7)	-0.36 (1.1)	-1.43 (2.9)
Hungarian	-0.15 (1.7)	-0.46 (1.4)	-0.35 (1.1)
Urate/10	-0.16 (2.9)	0.67 (3.2)	0.65 (3.6)
Mass points			
u^a	-3.49 (11.1)	-8.74 (18.0)	$-\infty$
$u^b - u^a$	1.41 (5.5)	$-\infty$	-5.93 (14.5)
Duration dependence			
3-6 months	-0.07 (1.4)	-	-0.04 (0.2)
6-9 months	-0.24 (3.7)	-	-0.10 (0.4)
9-12 months	-0.29 (3.8)	-	-0.10 (0.4)
12-24 months	-0.28 (3.6)	2.01 (6.6)	0.26 (0.9)
$>$ 24 months	-0.15 (1.2)	2.95 (9.6)	1.25 (3.0)
Heterogeneity			
		-0.25 (0.6)	
Treatment effect (δ)	-	0.64 (2.0)	-0.95 (5.0)
-Loglikelihood		16350.4	

[a)] t-values in parentheses

Table 3 Separate treatment effects - model with unobserved heterogeneity[a)]

	Males		Females[b)]
δ_{puj}^{1993}	1.52 (4.7)		
$\delta_{puj}^{1994} - \delta_{puj}^{1993}$	-0.52 (1.8)	δ_{puj}^{1994}	1.00 (2.6)
$\delta_{puj}^{1995} - \delta_{puj}^{1993}$	-1.07 (3.7)	$\delta_{puj}^{1995} - \delta_{puj}^{1994}$	-0.50 (1.7)
δ_{spj}^{1993}	-1.08 (6.7)	δ_{spj}^{1993}	-1.18 (4.1)
$\delta_{spj}^{1994} - \delta_{spj}^{1993}$	0.23 (1.1)	$\delta_{spj}^{1994} - \delta_{spj}^{1993}$	0.37 (1.1)
$\delta_{spj}^{1995} - \delta_{spj}^{1993}$	0.48 (2.0)	$\delta_{spj}^{1995} - \delta_{spj}^{1993}$	0.60 (1.6)
-Loglikelihood	26435.6	-Loglikelihood	16344.9

[a)] t-values in parentheses

[b)] In 1993 there was only 1 female starting on a PUJ. Therefore, there is no separate estimate for 1993

Table 4 Combining treatment effects[a)]

	Males		Females	
Constant	1.37 (5.4)	1.80 (5.5)	1.33 (3.2)	1.05 (1.6)
Ex ante duration - 6	-0.13 (8.3)	-0.13 (8.5)	-0.13 (5.4)	-0.12 (5.2)
Age 30-40	-	-0.24 (1.5)	-	0.50 (1.6)
Age 40+	-	-0.03 (0.2)	-	0.20 (0.6)
Incompl sec. education	-	-0.44 (2.8)	-	-0.43 (1.3)
Sec. and higher education	-	-0.37 (2.0)	-	-0.32 (1.2)
Married	-	-0.30 (2.5)	-	-0.03 (0.1)
Disabled	-	0.24 (1.0)	-	0.19 (0.4)
Roma	-	0.42 (1.9)	-	0.46 (0.9)
Hungarian	-	0.18 (1.0)	-	-0.14 (0.3)
Urate/10	-	-0.07 (0.5)	-	0.17 (0.7)
-Loglikelihood	26440.1	26423.1	16348.6	16340.4

[a)] t-values in parentheses

7 Appendix

7.1 Data used in the analysis

Definition of variables used in the analysis:

- Age 30-40: Age of the individual in 1998 is between 30 and 40 years
- Age 40+: Age of the individual in 1998 is over 40 years. In combination with the previous variable this means that individuals of age below 30 years are the reference group
- Incomplete secondary education: Dummy variable with the value 1 if the individual has incomplete secondary education (without leaving examination)
- Secondary and higher education: Dummy variable with the value 1 if the individual has one of the following educational levels: complete secondary - apprentice, complete secondary - grammar, complete secondary vocational, higher secondary, university, scientific (graduate, etc.). In combination with the previous variable this means that individuals without education and individuals with basic education or apprentices are the reference group
- Married: Dummy variable with the value 1 if the individual is married. The reference group consists of individuals that are single, divorced, widow(er) or cohabitating
- Disabled: Dummy variable with the value 1 if the individual has small restrictions to work, is disabled, heavily disabled or very heavily disabled. The reference group consists of individuals with no degree of disability
- Roma: Dummy variable with the value 1 if the individual has the nationality indicator Roma

- Hungarian: Dummy variable with the value 1 if the individual has a Hungarian nationality. In combination with the previous variable this means that Slovaks and other nationalities are the reference group
- Unemployment rate/10: district unemployment rate in December 1992 divided by 10.

Table A1 presents the number of observations by district of the gross sample and the net sample. Table A2 shows for each of the variables the mean, minimum and maximum.

Table A1 Number of observations by district

District	Gross sample		Net sample	
	Males	Females	Males	Females
Banská Bystica	3932	3458	750	662
Bardejov	1898	903	375	168
Bratislava 1	947	952	184	195
Bratislava 5	1494	716	326	156
Dolný Kubín	1652	1135	324	230
Martin	3144	2677	674	528
Michalovce	4242	3443	846	680
Nitra	6930	5284	1380	528
Pezinok	2145	1722	441	370
Rimavská Sobota	4117	2705	833	554
Rožňava	2825	2365	550	465
Spišská Nová	2086	1250	422	252
Trenčin	3530	2427	695	505
Vranov nad Topl'ou	2489	1531	483	303
Žiar nad Hronom	1653	1298	332	237
Žilina	6294	1298	1229	932
Total	49378	36779	9844	7323

Table A2 Mean minimum and maximum of variables (net sample)

	Males (N=9844)			Females (N=7323)		
	Mean	Min	Max	Mean	Min	Max
Age 30-40	0.28	0	1	0.30	0	1
Age 40+	0.35	0	1	0.37	0	1
Incompl sec. education	0.23	0	1	0.17	0	1
Sec. and higher education	0.30	0	1	0.44	0	1
Married	0.52	0	1	0.64	0	1
Disabled	0.05	0	1	0.05	0	1
Roma	0.04	0	1	0.04	0	1
Hungarian	0.06	0	1	0.06	0	1
Urate	12.5	5.6	17.2	12.4	5.6	17.2

7.2 Additional parameter estimates

Table A3 Estimation results without unobserved heterogeneity[a)]

a. males

	To job	To PUJ	To SPJ
Age30-40	-0.04 (1.1)	0.66 (4.9)	-0.07 (0.5)
Age40+	-0.19 (5.1)	0.75 (5.9)	-0.38 (2.4)
Incompl sec. education	0.04 (1.1)	-0.14 (1.1)	0.69 (4.6)
Sec. and higher education	-0.03 (0.8)	-1.07 (5.6)	0.48 (3.2)
Married	0.29 (9.1)	-0.42 (4.1)	0.30 (2.2)
Disabled	-0.29 (4.4)	-0.34 (1.9)	-0.20 (0.7)
Roma	-0.62 (8.3)	-0.20 (1.2)	-1.02 (2.9)
Hungarian	-0.14 (2.3)	0.07 (0.5)	0.13 (0.6)
Urate/10	-0.15 (4.1)	0.63 (4.6)	-0.07 (0.6)
Mass points			
u[a]	-2.73 (47.6)	-7.78 (33.9)	-5.93 (25.3)
Duration dependence			
3-6 months	0.04 (1.0)	-	-0.11 (0.6)
6-9 months	-0.18 (3.7)	-	-0.54 (2.9)
9-12 months	-0.34 (6.1)	-	-0.54 (2.9)
12-24 months	-0.38 (9.0)	1.87 (12.2)	-0.05 (0.3)
$>$ 24 months	-0.17 (3.4)	2.69 (17.8)	0.30 (1.5)
Treatment effect	-	0.09 (1.2)	-0.46 (4.7)
-Loglikelihood		26,458.8	

[a)] t-values in parentheses

b. females

	To job	To PUJ	To SPJ
Age30-40	-0.27 (5.4)	0.32 (1.3)	-0.03 (0.1)
Age40+	-0.18 (3.8)	0.25 (0.9)	0.09 (0.4)
Incompl sec. education	-0.01 (0.3)	-0.39 (1.2)	0.66 (3.2)
Sec. and higher education	-0.08 (2.0)	0.42 (2.3)	-0.28 (1.4)
Married	-0.06 (1.4)	0.07 (0.3)	-0.42 (2.2)
Disabled	-0.14 (1.8)	-0.26 (0.8)	-0.90 (2.1)
Roma	-0.58 (6.4)	-0.54 (1.8)	-1.14 (2.5)
Hungarian	-0.12 (1.6)	-0.52 (1.6)	-0.30 (1.0)
Urate/10	-0.15 (3.1)	0.63 (3.0)	0.76 (4.3)
Mass points			
u[a]	-2.56 (33.1)	-9.28 (20.3)	-6.75 (20.5)
Duration dependence			
3-6 months	-0.14 (2.6)	-	-0.15 (0.6)
6-9 months	-0.35 (5.7)	-	-0.33 (1.3)
9-12 months	-0.45 (6.5)	-	-0.33 (1.3)
12-24 months	-0.54 (10.3)	2.25 (7.5)	-0.20 (0.8)
$>$ 24 months	-0.60 (9.3)	3.38 (11.5)	0.27 (1.0)
Treatment effect	-	0.05 (0.4)	-0.16 (1.1)
-Loglikelihood		16,358.4	

[a)] t-values in parentheses

Figure 1a Exit rates out of unemployment
males

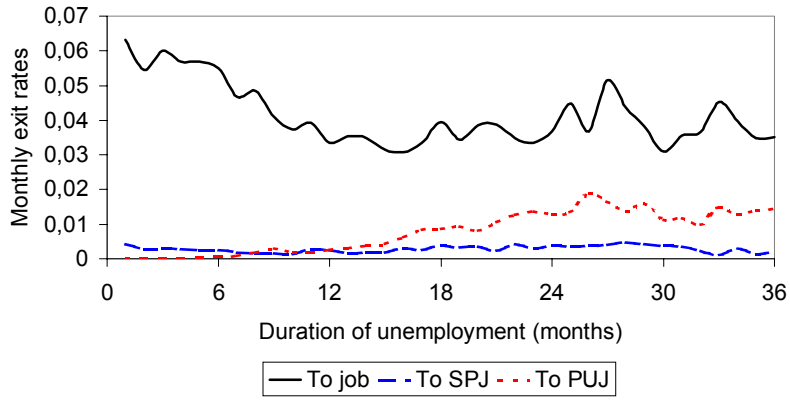
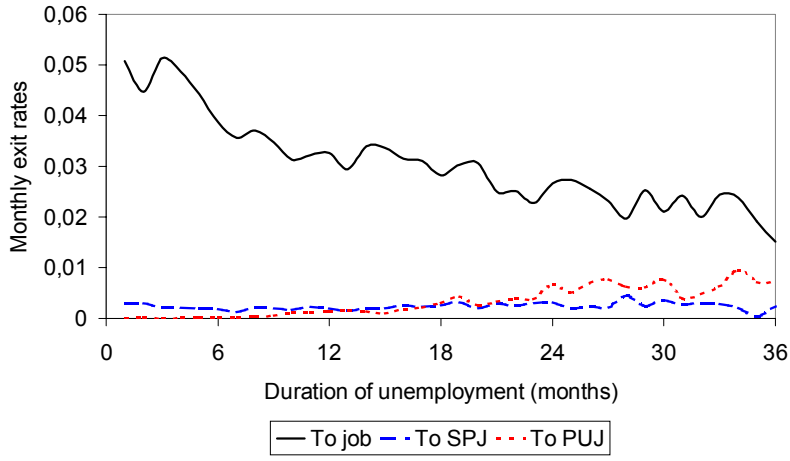


Figure 1b Exit rates out of unemployment
females



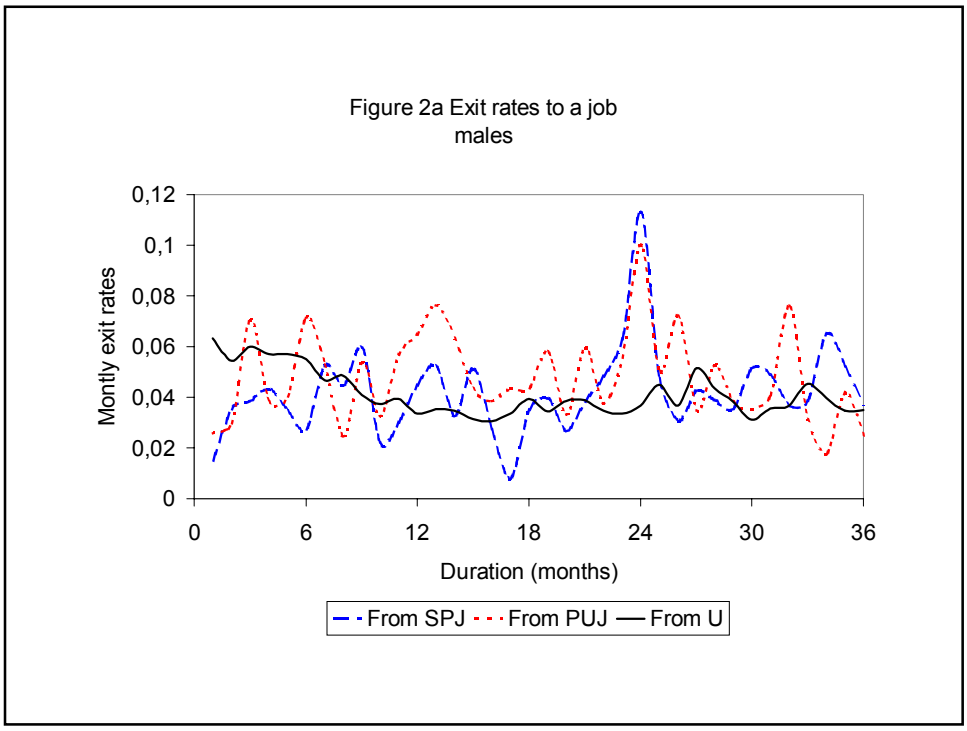


Figure 2a Exit rates to a job
males
Montly exit rates
0,12
0,1
0,08
0,06
0,04
0,02
0
0
6
12
18
24
30
36
Duration (months)
From SPJ
From PUJ
From U

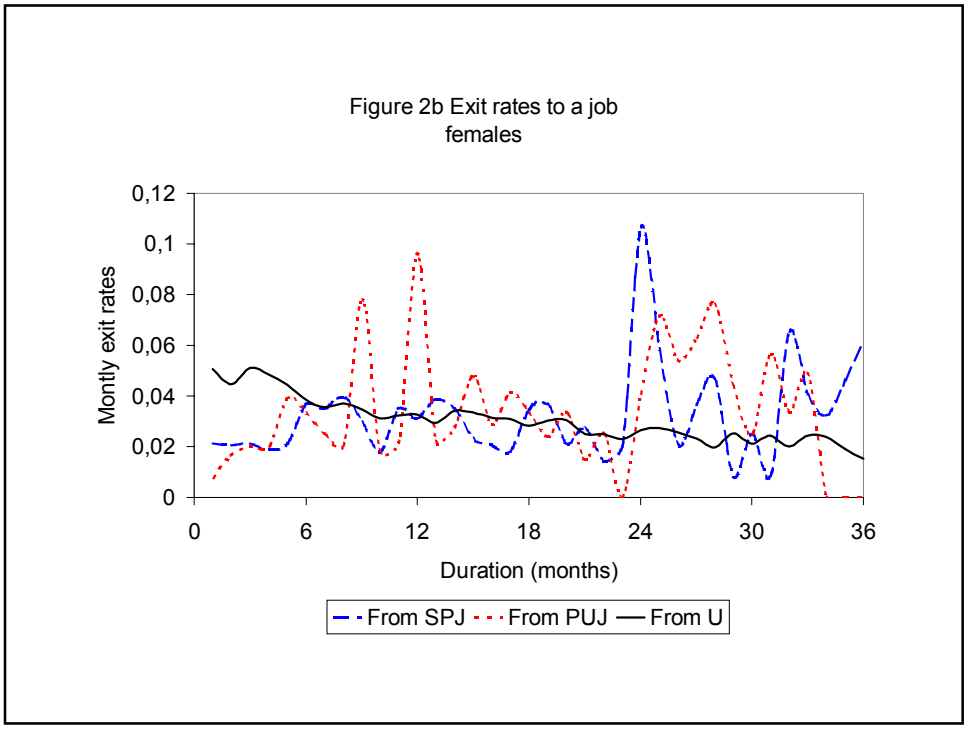


Figure 2b Exit rates to a job
females
Montly exit rates
0,12
0,1
0,08
0,06
0,04
0,02
0
0
6
12
18
24
30
36
Duration (months)
From SPJ
From PUJ
From U

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