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## Flows to and from Insured Unemployment in Hungary

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ECONOMICS DEPARTMENT

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# FLOWS TO AND FROM INSURED UNEMPLOYMENT IN HUNGARY

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Abstract

Registered unemployment has represented over 10% of the labour force in Hungary since mid-1992 but little is known about the inflows and outflows that result in an unemployment stock of this size. The paper investigates these flows using a sample of nearly 40,000 spells of unemployment insurance (UI) receipt drawn from administrative records of the UI system. We emphasise the modest level of inflows (although higher than previously thought) and show the variation in inflow rates by sex, age, education, and region. Outflows are remarkably low with UI exhaustion being the most common form of exit from the UI register for the individuals in our sample despite their often long entitlement periods to benefit. Following non-parametric analysis of the spell data we estimate a parametric competing risks model that summarises variation in exit probabilities with individual characteristics and region to six states - employment, subsidised employment, subsidised self-employment, training, public works, and disqualification. We draw conclusions for labour market policy in Hungary and for further research.

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## 1. INTRODUCTION

The available evidence on unemployment dynamics in the economies in transition of Central Europe indicates that the turnover in the unemployed pool is typically low (Boeri, 1994, 1994a). Unemployment has emerged rapidly since 1990 in most countries in the region but it seems that this has often been associated with only modest flows into unemployment. The growth in unemployment has been more the result of very low outflows. This has implications for both how the transition process should be viewed in the countries concerned and for labour market and income support policy. For example, a low outflow rate implies that expected duration of unemployment will be long for any entrant, with resulting threat of loss of human capital and labour market attachment and a need for income support that may last long after expiry of entitlement to unemployment insurance benefit of limited duration.[1]

In this paper we investigate the dynamics of unemployment in Hungary. Although Hungary appears to fit the picture of a labour market with low turnover in the unemployed pool, there has been little investigation of this phenomenon to date. Regular analyses of the registered unemployed stock (and of the stock defined on a search basis in the new Labour Force Survey) show clearly the uneven incidence of unemployment across different population groups. But whether this is the result of differences in inflow rates or outflow rates or both is not specifically addressed by these analyses. Whether, for example, labour-shedding by enterprises is concentrated on the old and the unskilled is unclear. In the case of the outflow there has been the suggestion that individual characteristics matter relatively little (Boeri, 1994). If true, this weakens the argument for re-training for the unemployed to be targeted on particular groups. Which groups of workers have a greater risk of entering unemployment? Which groups escape unemployment more quickly? To where do the unemployed go after leaving the register? The purpose of this paper is to use large samples of individual level microdata to analyse the dynamics of unemployment in Hungary and so to shed light on these sorts of issues.

The data we use are drawn from administrative registers of the unemployment insurance (UI) scheme so our analysis is restricted to flows to and from *insured unemployment*. (This source is described in detail in the Appendix.) Figure 1 shows that at the end of 1992 just under 70 percent of the registered unemployed stock in Hungary received UI, but lengthening durations on account of the low outflow rate together with cuts in entitlement periods for UI have sharply reduced the coverage by UI of the stock to less than 40 percent

[1] It is possible that the low outflow rate is in part the result of disincentives in the benefit system, which would have rather different implications for income support policy. We do not consider disincentive effects in this paper.

by April 1994. The nature of our data source also means that (i) we are unable to say anything about flows to and from unemployment defined on a criterion of behaviour rather than registration, and (ii) that the information we have about each individual in the data is limited. However, administrative registers have the great advantage of providing large samples of spells. Our analysis is of the complete inflow into UI receipt in March 1992, which provides nearly 40,000 spells. This allows us to detect differences in inflow and outflow rates across different groups with a high degree of precision.

In Section 2 we calculate monthly inflow rates by sex, age, education, occupation and region (county). We also describe why the official measure of inflow appears to be an underestimate of the true value. Section 3 traces the March 1992 inflow through the UI registers to February 1994, describing the duration of spells and exit rates to various labour market states using non-parametric techniques. Despite the long entitlement periods to benefit of most of our sample, the most common exit state from the UI register is exhaustion of entitlement, and not employment, which reflects the low outflow rate. Treating exhaustion as censoring, we estimate the median duration of insured unemployment to be over a year. The empirical hazard of exit to employment displays a somewhat surprising time pattern. Section 4 estimates a parametric model of the exit probabilities that allows for exit to different labour market states. Section 5 summarises our findings and draws out conclusions for labour market policy in Hungary and for future research.

## 2. INFLOW INTO UI RECEIPT

In this section we present calculations of the monthly rates of flow into receipt of UI in the Spring of 1992. At this time the registered unemployment rate was just under 10 percent. By Spring 1993 it had risen to 14 percent and has since fallen to 11 percent by June 1994 - see Figure 1. We observe the inflow into UI receipt for the period 21 February-20 March 1992.

Our first finding is a simple but important one. The number of new spells of payment in this period recorded in the National Labour Centre's UI database from which we draw our data is substantially higher than the official figure for the inflow into UI for the same period that the Centre publishes, which is based on the same source. (The monthly figures for inflows published by the NLC always refer to the 21st of one month to the 20th of the next.) The flow data published monthly by the NLC are preliminary figures and do not include entries to the register within the relevant period that are reported by the local employment offices after this period has finished. The published inflow figure for March 1992 (i.e. 21 February-20 March) is 25,739 persons but using the updated database to calculated the inflow we get a total of 39,417 persons - 50

percent higher. Figure 2 shows the official inflow figures for each month in 1992 and that for March does not seem to be an outlier. We must be careful in drawing general conclusions based on data for a single month and we do not know whether late reporting was a particular problem during the period in question. With these provisos the results suggest that inflow into registered unemployment in Hungary is substantially higher than recorded in official published figures.[2]

Although Figure 2 suggests that the level of inflow into UI in March 1992 was not abnormal, recorded inflow throughout the first half of 1992 should have been affected by a severance pay scheme introduced at the end of 1991. This pays 1-6 months wages to workers dismissed for other than disciplinary reasons, the period depending on length of service with the last employer (3-4 years of service leads to one month of wages and 25 years or more to 6 months). UI does not begin until after the period of wages is completed, implying that UI inflow will have been depressed for the first half of 1992 (and in a way that will presumably have varied with age and education.) (The restriction to service with the same employer limits the problem somewhat since job-to-job changes were relatively common pre-reform.) As this emphasises, our definition of inflow is not the date of claim to UI but *the date that payment started* (something that is forced on us by the data).[3]

We relate the inflow to the average stock of employment in the first quarter of 1992 so as to estimate inflow into "insured unemployment" (unemployment covered by UI) *from employment*. We therefore exclude from the inflow those persons who have not worked within the preceding 6 months. This is 7,203 out of the 39,419 new spells of UI receipt - some 18 percent.[4] We have also attempted to restrict the definition of employment in the denominator to "insured employment", some 85 percent of total employment under the definitions we use. We have excluded from the employed population those who apparently do not qualify for UI, i.e. the self-employed and people who have reached pension age.[5] (Details are given in the Appendix.)[6]

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[2] Figure 2 shows the inflow including both unemployment insurance and the career beginners benefit schemes (CB benefits). The latter made up only 2 percent of the inflow in March 1992.

[3] The NLC applies a similar definition in the official statistics.

[4] We could of course have chosen to measure the rate of inflow from all labour market states, implying the retention of these spells and the definition of the denominator as the simply the working age population. But since our definition of unemployment is already restricted to receipt of UI we decided it made more sense in analysis of the inflow to restrict attention to flows from employment.

[5] Pension age in Hungary is 60 years for men and 55 years for women.

[6] Although the numerators in our calculations of inflow rates are the true population totals (since we observe the complete inflow) this is not true of the denominators since they are grossed-up sample values taken from the Labour

Inflow rates by sex and manual/non-manual status are shown below.

| | manual | non-manual | all |
|---|---|---|---|
| male | 1.41% | 0.38% | 1.14% |
| female | 1.24% | 0.36% | 0.80% |
| all | 1.35% | 0.37% | 0.98% |

The total monthly inflow rate of one percent is effectively the same as the average monthly inflow rates into registered unemployment reported by Boeri (1994, Table 2) in France and in the UK in 1991 and in western Germany in 1992, at a time when their registered unemployment rates (especially in the first two) were not dissimilar to that found in Hungary in March 1992 - 9.5 percent, 8.1 percent, and 5.8 percent respectively compared to 9.8 percent. The true similarity in inflow rates is not as great on account of differences in definition. Our calculation is restricted to flows between "insured" employment and unemployment. The definitions of both numerator and denominator are broader for the three OECD countries (all registered unemployed and the working-age population). Nevertheless, the similarity is striking and shows that the inflow rate in Hungary is not high by international standards (as Boeri's analysis has been prominent in showing) so an explanation of high unemployment in Hungary that attempts to focus on the separation rate from jobs is inappropriate.[7]

The substantially higher inflow rates for manual workers - around three times those for non-manual workers - comes as little surprise. The lower overall inflow rate for women is of some interest in view of Hungary's unusual position in Eastern Europe of having a lower unemployment rate for women. This difference in male and female unemployment rates in Hungary seems entirely due to lower inflows since we show below that spell durations of women are in fact somewhat longer than those of men. The difference is much less when controlling for manual/non-manual status and the differential in the overall

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Force Survey (LFS). The LFS interviews about 30,000 households per quarter but even with a sample of this size there is significant sampling error for highly disaggreagated totals. So our calculations of inflow rates are in turn only estimates of the population values.

[7] Sensitivity to definitions is demonstrated by the comparison of our figure for the inflow rate with that of Boeri for Hungary for the whole of 1992. His figure is 0.5 percent, or half our estimate for March. The principal difference appears to be that Boeri's figure is based on the *preliminary* inflow figures taken from official sources, which we have argued may substantially understate the real level of inflows. (Figure 2 suggests that the use of an annual figure rather than one for a single month is not an important part of the explanation. The average of the published monthly inflows in 1992 was 9 percent higher than the published figure for March.)

inflow rate in part just reflects that many more women are employed in non-manual jobs than are men (about a half of women compared to only a quarter of men).

We now disaggregate by age, education, occupation and region. Figure 3 shows inflow rates by age. The low rates for teenagers are a reflection of our concentration on the inflow to UI - we are not including in the analysis those who join the register direct from full-time education or who enter from work but with insufficient employment history to qualify for UI. (We are no doubt unsuccessful in our attempt to restrict the denominator to "insured employment" for this age-group, and this pushes downwards our measured inflow rate.) Leaving this age-group aside, the inflow rates by age for the two sexes are notably different. The inflow for young men is relatively high, the rate for those aged 20-24 is 2.2 percent - three times the rate for men aged 50-54 who have the lowest rate of inflow. The female rates display less variation with age and it is those aged 25-29 who have the highest rate.[8] The rates for both sexes rise for the last age-group before retirement age, but not hugely. The pattern with age for men is qualitatively similar to that in Britain in the late 1970s (Stern, 1989). We certainly see no suggestion of job loss in Hungary in transition being concentrated on the old. Indeed, if we assume that the job-to-job flows are higher among the young then the differences in separation rates between younger and older men will be even higher than the UI inflow rates.

Inflow by schooling level is shown in Figure 4. Secondary schooling, whether "general or vocational", permits entrance to college or university (conditional on exam success) whereas the lower level vocational non-secondary schooling does not. Here the patterns are similar across the sexes - lower education is associated with higher inflow rates. While those with college or university education have an inflow rate of only 0.3 percent (taking the sexes and both forms of education together), those who failed to complete primary school enter at the rate of 2.8 percent for men and 2.4 percent for women. Unemployment inflow is highly concentrated on the less educated. An exception to this rule is shown by the very similar inflow rates for men with only primary level schooling and those who went on to vocational (but sub-secondary) schooling, and this reflects the commonly expressed view that there has been over-investment in vocational education in Eastern Europe. Also in line with this is the finding that although completion of secondary schooling is associated with substantially lower inflow rates, the rate for vocational secondary for men is higher than for general secondary.

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[8] One possible explanation for the level of the inflow rate for women aged 20-24 is that this is the age-group when child care leave is most likely, as indicated by the age-specific fertility rate (Statistical Yearbook of Hungary 1992, Table 2.29). Women on child care leave are included in the denominator of the inflow rate but can remain on child care leave if their jobs are cut.

Figure 5 shows inflow rates by county. (The city of Budapest is one county but the other counties all contain both urban and rural areas.) Taking both sexes together the county inflow rates range from 0.48 percent in Budapest to 1.94 percent of county Szabolcs - a factor of four. Figure 6 plots the inflow rates together with county unemployment rates in March 1992. The two appear quite closely related (the correlation coefficient is 0.81), suggesting that variations in inflow are an important source of regional differences in overall unemployment. (The fact that the inflow rates refer only to one month should of course be borne in mind.) Budapest has the lowest unemployment rate and lowest inflow rate. The group of three western counties bordering Austria, together with the county of Pest which surrounds Budapest, come next. Szabolcs in the east of the country is where high unemployment first developed and we see an inflow rate and unemployment rate that are both about double the national average. There are two outliers; Szabolcs's neighbour Borsod, in the north-east corner of Hungary and also a high unemployment area for some time, has only a medium level inflow rate and Bekes where inflow is high and unemployment not particularly so. We show in the next section that by contrast the county outflow rate is only weakly correlated with the unemployment rate.

## 3. SURVIVAL AND THE CONDITIONAL PROBABILITY OF EXIT

In the remainder of the paper we analyse the outflow from UI receipt. How long do spells of UI last and what characteristics are associated with spell length? How do spells of UI receipt end? In contrast to our calculation of inflow rates in the previous section, we use here the complete inflow sample for March 1992 including those individuals who appear not to have entered UI receipt from work. Our sample is therefore of 39,417 spells (We use the word "sample" although our analysis is of the complete inflow for the month in question.) In this section we use non-parametric techniques to describe spell lengths, and to show how the exit probability varies over the course of a spell.

Table 1 gives the distribution of the exit state for the 39,417 spells, as indicated by central UI records in February 1994. In order to interpret this we need to give some information on duration of UI entitlement since this puts an upper limit on the length of spells we can observe. (Details are given in Table A1 in the Appendix.) Over 90 percent of the sample receive UI under the terms of legislation effective from January 1992. We refer to these people as being on the 92 scheme. Entitlement to UI under the January 1992 rules is for between 4½ and 18 months depending on employment history in the previous 4 years (one year of work being required for the minimum and 4 years for the maximum). The 9 percent receiving UI under the rules applying to claims before January 1992 is formed almost exclusively of persons quitting jobs in 1991 and

claiming benefit in that year but who did not start their spell of UI until 1992 due to the 3 month delay in the start of benefit that is imposed for voluntary quitting. This delay also means that all 92 scheme recipients are job losers since no quitter registering in 1992 would have been able to start receipt before our inflow period ended. Entitlement periods for UI under the 91 scheme were longer, from 6 months to 2 years. More than one-third of those receiving under the 92 scheme have an entitlement period at the maximum, over a half have entitlement of 450 days or more, and nearly-three quarters at least a year (the figures are almost identical for men and women). Maximum entitlement is less common among those under the 91 scheme, but over a half have entitlement of 500 days or more. Only 8 percent of the 92 scheme claimants have entitlement of 180 days or less and only 4 percent of 91 scheme claimants. The spells labelled "censored" in Table 1 include a few spells under the 91 scheme still in progress in February 1994 but the principal reason for censoring, which accounts for 6 percent of all spells, is that we can lose track of a spell in the central UI records. We observe a final date at which benefit was still being paid but no indication of a reason for it ceasing, so we treat these spells as being censored at their final date of observation. It is likely that many of these spells later continued after a period of suspension, which may occur for a variety of reasons (see Appendix).

What is most striking about Table 1 is that *exhaustion of UI is the most common form of exit from the UI register.* Despite the quite lengthy maximum entitlement periods for benefit - 1½ or 2 years - and the fact that many of the sample are entitled to the maximum or near the maximum, the most likely way to stop receiving UI is to run out of entitlement. As much as 43 percent of the sample exhaust their entitlement to benefit. (Even if all the censored spells were to end in an exit to a job it would still be the case that exhaustion accounted for more exits than does re-employment.)

Re-employment accounts for a third of exits in Table 1 - twice as many as all other types of exit taken together.[9] Were our data to record the fate of those exhausting UI the relative importance of job exits could fall since only half of UI exhausters go on to receive Social Benefit (Lazar and Szekely, 1994, Table 1) and the others presumably leave the register. Among other types of exit, early retirement and transfer to old-age pension (6.7 percent) and disqualification (3.9 percent) are the most common. The latter occurs when a claimant has refused a job offer or training scheme found by the employment office or when the claimant "misbehaves" when following-up a vacancy found by the office, for example by attending an interview while drunk. (Disqualification is for 90

[9] Boeri (1994, Table 2) estimates outflows to jobs in Hungary from receipt of UI and Career Beginner's benefit to have been less than half of all outflows in 1992. Our data suggest a substantially higher figure, about two-thirds of recorded exits other than UI exhaustion, and we believe the reason is that Boeri's outflow figures include persons exhausting UI.

days.) Exit to a variety of labour market programmes in the form of public works, subsidised employment, start-up allowance for the self-employed and government sponsored training schemes together account for a further 5 percent. Participants in training schemes get a "training subsidy", which amounts to 10 percent more than their UI benefits. The training schemes vary considerably in nature. They may be organised by the county employment office or by private firms and last anything from a few weeks up to a year; an individual may even find his or her own scheme and then apply to the employment office for approval. Subsidised employment involves the firm receiving a wage subsidy or obtaining an investment subsidy in return for hiring from the unemployment register. Public works are typically organised by local authorities and pay close to the minimum wage. The start-up scheme for the self-employed pays an allowance equal to the claimant's unemployment benefit for a period of 6 months.

The table also shows how the distribution of exit states varies with sex and benefit scheme and this information is of considerable interest. Despite the entitlement periods to UI being very similar for men and women in practice, their exit states from UI have rather different distributions. A notably lower proportion of women exit to a job - 31 percent compared to 41 percent of men (including the category of subsidised employment). Higher proportions of women exhaust UI (46 percent compared to 42 percent), enter training, are disqualified, or leave for early retirement/reach pension age. In short, women are substantially less likely to leave UI for work and more likely to leave for some other reason or to exhaust entitlement.

The breakdown by benefit type should be interpreted as a breakdown by reason for entering the UI register, since 92 scheme claimants in our sample are job losers and 91 scheme claimants are job quitters. (We prefer to keep the columns labelled by scheme since this is a reminder that duration of entitlement differs between the schemes.) Among the 91 scheme claimants 53 percent exhaust entitlement, despite their longer entitlement periods, compared to 43 percent of the 92 scheme claimants. Only 24 percent exit to a job and more are disqualified than among claimants under the 92 scheme. Voluntary quitters are clearly less likely to leave UI for work (during the time that they receive UI) and are more likely to stay unemployed until they exhaust their entitlement.

We now consider the length of time people receive UI. In Figure 7 we show the empirical survivor function for spells of UI, estimated using the Kaplan-Meier product limit estimator. This shows the proportion of the sample who are still receiving UI at each point in time, taking into account any censoring along the way. We estimate the survivor function with two different treatments of UI exhaustion. The lower line in the figure (marked "A") treats exhaustion as an exit from UI, along with all other exits. (The 6 percent of spells in the bottom line of Table 1 are the only spells treated as censored.) In this case the survivor function drops both continuously as people leave UI for

employment, training etc, and in steps as groups of people with the same period of entitlement to UI run out of benefit.

In one sense we are indeed interested in UI exhaustion. It measures how much people do in fact use up their full UI entitlement, and it is indicative of the extent of ongoing need for further income support. However, if we wish to look at survival in "registered unemployment" from the "risk" of exit to some other labour market state, then the appropriate thing to do is to treat exhaustion as another case of censoring. Receipt of UI finishes but there is no reason to assume that this necessarily leads to a move off the unemployment register. It seems unlikely in the current state of the Hungarian labour market that many claimants can time a return to work for the week following UI exhaustion. And we know from analyses of the National Labour Centre that about half of UI exhausters go on to receive means-tested Social Benefit. On the other hand the remainder have no financial incentive to remain registered. (It is not the case that social insurance contributions continue to be paid by the National Labour Centre after UI finishes.) The upper line in Figure 7 (marked "B") estimates the survivor function treating as censored those spells ending in UI exhaustion as well as the small number of spells for which we really do not know the exit state. (The two lines coincide until the first exhaustion takes place at 145 days.) This is a treatment of exhaustion that we maintain for the rest of the paper and in view of this, we refer at times to "unemployment spells" rather than UI spells. To the extent that exhaustion does lead quickly, or even immediately, to a cessation of registration as unemployed, the true survivor function for spells of registered unemployment will lie in between the two lines in Figure 7.[10]

The bottom line in the figure shows that the median duration of receipt of UI is just over 10 months (315 days) but that a quarter receive for 450 days or more. Treating exhaustion as censoring (top line), we estimate that less than a quarter of the inflow cohort leave the register within 6 months and the median spell duration is over 13 months - 409 days.

In considering these survival probabilities it is worth pointing out that they do not give us estimates of outflow rates from unemployment of the type usually reported in international comparisons. Such comparisons are usually based on outflow from the *stock* of unemployment, and not from an inflow cohort. The outflow rate from the latter can be expected to be higher since the stock oversamples those persons with lower probabilities of leaving the register (the phenomenon of "length bias" e.g. Kiefer, 1988). We have therefore calculated the empirical survivor function for the stock of UI recipients in March 1992, who we

[10] The treatment of exhaustion as censoring is the natural choice for any researcher working with data on UI spells. This is the practice, for example, in the well-known paper by Meyer (1990) who analyses duration of receipt of UI in the USA. However, his data are characterised by a far lower incidence of exhaustion than ours with only 201 out of 3,365 spells censored due to UI exhaustion (p.761).

are also able to trace through the UI records. (In this case we analyse a 10 percent sample of the stock and not the whole population but this still gives us over 35,000 spells; we analyse the benefits received by this sample in Micklewright and Nagy, 1994.) UI exhaustion is again treated as censoring. We estimate the one month outflow rate from the stock as 4.9 percent, taking both sexes together. This is in fact higher than the outflow rate from our inflow cohort during the first month, which is only 3.7 percent. This may seem surprising but we show below that the probability of leaving unemployment in our inflow sample is at one of its lowest points in the first few weeks, and the 12 month outflow rate from the inflow sample is several points higher than that from the stock (41.3 percent and 38.2 percent respectively for all exits other than exhaustion and 28.2 percent and 25.4 percent for job exits).

The one month outflow rates from both the March 1992 stock and inflow samples will reflect conditions in the aggregate labour market during that month, which may have been abnormal. A more representative estimate of the monthly exit rate from the stock is probably obtained from the 12 month rate using the assumption that the rate of exit was constant throughout the year. This yields a monthly exit rate of 3.9 percent if we treat UI exhaustion as censoring and 8.2 percent if we do not. The true rate of exit from registered spells of unemployment that start with UI should lie somewhere in between. These figures bracket the estimate of 5.2 percent reported by Boeri (1994) for the whole of 1992 for all registered unemployment in Hungary. These estimates may be compared with monthly outflow rates from the stock of 10-15 percent for various Western European countries (also given by Boeri) and the comparison underlines the low level of the outflow rate in Hungary.[11]

Figure 8 plots the survivor function separately for men and women. That for women lies slightly above that for men, so women are less likely to leave the register. The differences are small and the lower inflow rate shown in Section 2 (admittedly only from employment) more than compensates for this small difference, resulting in the lower overall unemployment rate for women. When interpreting Figure 8 it should be remembered that all exits states are grouped together, and we have seen in Table 1 that there are some marked differences between the distribution of exit states by sex.

In the previous section we saw how county inflow rates are quite closely correlated with unemployment rates. Figure 9 demonstrates that the same is less true of the outflow rates. It shows the proportion of our inflow sample in each county who leave the UI register within 3 months of entry (there is no exhaustion within this period). There is substantial variation in outflow across

[11] The outflow during the first month from our inflow cohort of only 4 percent may be compared with a figure of 26 percent for a cohort of the male inflow in Britain in 1978, when aggregate unemployment was about 7 percent (Narendranathan et al, 1989, p22).

the country, and the rates differ by a factor of about three (compared to four for the inflow rates) from the low of less than 8 percent in Borsod to nearly 23 percent in Somogy. There are counties with both high unemployment and low outflow, notably Borsod, Nograd and Szabolcs, and those with low unemployment and high outflow, in particular the western counties of Vas and Zala. But we also see groups of counties with very similar outflow rates and quite different unemployment rates, for example the group of seven counties including Budapest with outflow rates of around 11-12 percent. The correlation coefficient is -0.46 which is only just significantly different from zero at the 5 percent level. Comparison with Figure 6 shows that Bekes stands out as a county with both high inflow and high outflow.

The variation in the probability of leaving unemployment over the course of a spell is of considerable interest but the survivor functions in Figures 7 and 8 show this only indirectly (through changes in the slope of the function). Figures 10-13 address the issue directly by plotting the empirical hazard function for the sample of spells, again estimated with the Kaplan-Meier method. (We continue to treat UI exhaustion as censoring and were we not to do so there would of course be massive spikes at the different points where groups of people exhaust.) These figures shows the probability of leaving the register in a given interval of time conditional on having survived up until that point, where we have specified the intervals as two weeks long. Defining this conditional probability or "hazard" as h, F as the cumulative density of spell length, and f as the probability density function, then $h = f/[1-F]$ (where 1-F is the survivor function that was the subject of Figures 7 and 8). Figure 10 shows the hazard for exit to any state (except exhaustion). Figure 11 shows the hazard to re-employment, i.e. the probability of leaving the register to a new job conditional on having survived all "risks" to that point. The difference between the two gives the hazard to other exit states taken together and this is shown in Figure 12 (exit to subsidised employment, subsidised self-employment, public works, training, disqualification, pension/early retirement and "other"). The vertical lines in the diagrams show the 95 percent confidence intervals and their generally small height show the great advantage in the large sample size at our disposal. The confidence intervals get bigger as time proceeds since the number of spells still "at risk" is diminishing. It is important to bear in mind that with one or two exceptions spells observed to be longer than 18 months all relate to persons receiving UI under the 91 scheme (exhaustion having already occurred under the 92 scheme). There are many fewer of these spells (the number of spells at risk falls sharply) and this is the reason for the big jump in the size of the confidence intervals at this point. The change in the hazard, which appears to fall sharply, may be a reflection of the different behaviour of these persons. As we have noted earlier, they are all voluntary quitters.

The are several interesting features of these hazards. First, there is no overall downward slope that can be discerned in Figure 10. There are three

reasons why we might expect such a slope. If behaviour of the unemployed and of employers (or other agents controlling exits) is unchanged during a spell, the overall empirical hazard must decline as those with characteristics positively correlated with finding a job (or exiting for some other reason) move off the register first, leaving behind those with lower exit probabilities. If time spent unemployed reduces motivation to search or is treated by employers as a signal of lower productivity a downward sloping hazard will again result ("negative duration dependence"). Finally, the overall unemployment rate in Hungary continued to increase throughout much of the time we observe the sample - see Figure 1 - suggesting that competition for jobs was getting tougher. But none of these possible influences appears to be reflected in the empirical hazards.

Second, the probability of exit increases early in the spell, and in fact the exit rate in the first two weeks is one of the lowest. Comparison of Figures 11 and 12 show that this change in the overall hazard is driven by the change in the hazard for exit to work. (That for other exits does not change much early in the spell.) This is open to a number of interpretations. It is possible that a successful claim for UI is followed by a short period of relatively low job search effort. Or the low hazard at this time may merely reflect conditions in the aggregate labour market in Spring 1992.

Third, there is a dip in the hazard that seems to be caused by a reduced probability of job exits at around 10 months, which, given that we are tracking a March inflow sample, is the period around Christmas/New Year. It may be that this is a period when employers hire less or when job search activity is reduced and comparison of Figures 11 and 12 shows that the dip in the overall hazard is indeed driven principally by the job exit hazard.

Fourth, we see a spike in the job exit hazard shortly before the point at which those with maximum entitlement period under the 92 scheme would exhaust benefit (540 days). This is suggestive of the operation of an increased incentive to find work as the benefit expiry point approaches. (A maximum period of benefit is the modal entitlement period in the sample, which may explain why it is easier to see any spike at this point than at earlier exhaustion points.) We intend to investigate this more closely in future work.

Fifth, the "other exits" hazard jumps sharply upwards after 180 days and then falls back somewhat to oscillate around a level above that in the first 6 months. This pattern is driven by the hazard to early retirement, for which claimants within 3 years of normal retirement age are eligible after 6 months of benefit. (The decision to allow early retirement, which leads to the individual starting receipt of the old-age pension, is discretionary; about 70 percent of individuals in the sample within the relevant age group do in fact leave the register in this way.) The other exits hazard also rises just before the end of the maximum entitlement period under the 92 scheme at 540 days. We have yet to investigate the causes of this but it may be that both claimants and local

employment offices look harder for available labour market programmes as benefit entitlement runs out.

Figure 13 shows the hazard for exit to a job separately for men and women. We saw from Table 1 that women are notably less likely to leave UI to go to a job and Figure 13 shows that this is true throughout - the two hazards appear to track one another quite closely with the female hazard always just below the male one. Rather than continue to analyse non-parametrically the differences in hazards between persons of different characteristics, we turn in the next section to multivariate analysis with a parametric assumption for the form of the hazard.

## 4. PARAMETRIC ESTIMATES OF THE OUTFLOW PROBABILITY

### i) Econometric Framework

In this section we model the probability of exit from UI to different states by adopting a simple parametric form for each hazard - the exponential. This specifies the probability for individual i of leaving registered unemployment at time s to go to state j conditional on unemployment up to s, $h_{ij}$, to be

$$h_{ij} = \exp(\mathbf{X}_i\beta_j) \qquad (1)$$

where $\mathbf{X}_i$ are observed characteristics and $\beta_j$ is a vector of coefficients to be estimated. This functional form does not allow for the hazard to vary with duration of unemployment s. While this is an undesirable restriction, the non-parametric analysis reported in Section 3 did not suggest any obvious relationship of the hazards with duration and certainly not one that could be adequately captured with a simple one-parameter specification such as the Weibull.

The hazards of exit to different states are assumed independent and we estimate this "competing risks" model by successively maximising the likelihood with respect to the parameters of the hazard of each state j while treating as censored all exits to states other than j. Let a = 1...A be individuals with completed spells of UI receipt of length $s_a$ days that end in exit to state j, and b = 1...B be individuals with censored spells (including exhaustion of UI entitlement and spells ending in exit to other states) of length $s_b$ days. The log-likelihood to be maximised with respect to $\beta_j$ is given by

$$\ln L = \Sigma_a \ln f(s_a) + \Sigma_b \ln (1-F(s_b)) \qquad (2)$$

where $1-F(s_b)=\exp(-s_b.\exp(\mathbf{X}_b\beta_j))$ and $f(s_a)=\exp(\mathbf{X}_a\beta_j).(1-F(s_a))$. We ignore the small number of exits recorded at durations longer than 540 days by censoring

the spells concerned at a value of 540 and treating exit state as unknown (these spells are all under the 91 scheme).

The model is estimated separately for men and women and we include sets of dummy variables for educational level, age, and county, together with other dummies for manual/non-manual status, whether the individual quit the last job or not, and whether UI was entered directly from employment or not. (Means of all variables are given in the Appendix.) The base categories for the dummies are primary education, age 21-25, Budapest, manual, job loser, and entry from a state other than employment.

ii) Results

Results are presented in Tables 2 to 8, one for each exit state modelled. We do not model exit to early retirement (which may happen within 3 years of pension age), normal receipt of pension (which happens automatically when pension age is reached) and the residual group "other" that includes death and military service. So spells ending in these ways are always treated as censored. Since all the explanatory variables are dummies it is convenient to present the results in the form of the exponential of each parameter, $\exp(\beta)$, which we label the "hazard ratio" in the tables of results. This shows the proportional difference between the hazard for an individual for whom the dummy variable concerned equals one, relative to the hazard for an individual for whom the dummy equals zero (holding other characteristics constant). So a figure of 0.5 indicates a halving in the conditional probability of leaving unemployment to go to that state, a figure of 1.5 indicates a 50 percent increase in the hazard, and so on. The t-statistics reported in the tables are for the test that the hazard ratio equals 1.0, i.e. that there is no significant difference in the hazard associated with the variable concerned. (The large sample sizes imply that conventional levels of significance when hypothesis testing may be insufficiently demanding - we should certainly not be impressed by a t-statistic of only 2.)

We first discuss the results for each exit state separately, before summarising the effect of different characteristics on each state.

*Employment*

We begin with the results for employment in Table 2. Employment accounts for twice as many exits as all others taken together (not including exhaustion) and is the exit state in which there is naturally the most interest. Higher levels of completed education are associated with a greater probability of getting a job for both sexes. The base is primary schooling, the modal level of completed education in the sample with 32 percent of men and 48 percent of

women. Compared to this group, those who failed to complete primary education (8 percent of each sex) have a hazard that is one third lower, something true of both men and women. Vocational schooling or secondary schooling (of either type) increases the hazard by 35-50 percent for men relative to that when there is only primary schooling but the effect is notably less for women, except in the case of vocational secondary schooling where it is the same as that for men. The small number of individuals who have been to college or university (less than 3 per cent of the sample) have a hazard that is 70-80 percent higher than that for the base group. Greater age leads to a lower probability of getting a job, although it is clear that the relationship would not be adequately modelled with a simple one or two parameter function such as a linear or quadratic specification.[12] There are also some notable differences between the sexes. Teenage men have no advantage over the base group aged 21-25 but teenage women are substantially more likely than those in their early 20s to get a job; their hazard is 60 percent higher and this is one of the biggest differences from the base-group that we find for women (a number of the t-statistics for other age groups are quite small). (It should be remembered that our restriction to UI receipt means that the teenagers in our data are only a small part of all teenagers in registered unemployment.) Those in their late 20s or early 30s have a hazard that is 12-15 percent lower than that of the base group. The hazard for men in their late 30s and early 40s declines again by another 10 percent relative to the base while for women there is little or no further decline in this age range. Then the hazard begins to drop sharply again; women aged 46-50 and men aged 46-55 have hazards that are lower than those for the base group by about 30 per cent and 45 percent respectively. The pre-retirement age groups see a very sharp fall in the hazards, which are now about one tenth of that for people aged 20-25.

These results do not support the suggestion by Boeri (1994) that the probability of leaving unemployment in Central Europe may be more or less independent of individual characteristics. The qualitative effect of age (and of education) on the hazard in Hungary is in line with findings from the extensive literature on unemployment duration in the OECD area. In general, older people find it harder to get jobs. This does not of course mean that the size of the variation of the hazard with age in Hungary is similar to that in OECD countries but in fact they seem similar to those found for British men at various levels of overall unemployment by Arulampalam and Stewart (1994) and Stancanelli (1994).[13]

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[12] A specification with a quadratic in age for men results in a log-likelihood that is about 80 points worse. (A piece-wise linear specification with the age groupings the same as for the dummy variable specification has a log-likelihood that is virtually the same as that obtained with the age dummies.)

[13] There are of course problems of comparability due to differences in sample definition and of control variables but these differences do not seem enormous.

How do these results compare to those for the inflow from employment to unemployment presented in Section 2? (In making this comparison it should be borne in mind that while the results for the outflow control for other observable characteristics those for the inflow do not.) In the case of education, we can see it is generally true that lower unemployment rates for those with higher levels of education are the result of both lower inflow rates and higher outflow rates but it is the differences in the inflow rates that are the more marked. In the case of age, it seems clear that among men it is those in their early 20s that have the greatest turnover through the unemployment register (so far as entry from and exit to a job is concerned). It is this group that has the highest entry rate but that also has the highest exit rate. Rising age is then associated with a lower inflow probability but lower outflow probability.

The next variable is a non-manual dummy. This has no significant association with the exit probability to a job. This is in marked contrast to the very large differences in inflow rates from employment between manual and non-manual workers that we found in Section 2. Of course, the results in Table 2 control for education and if we exclude the education variables, the coefficient on the non-manual dummy becomes significant. But it remains quite small, indicating an increase in the hazard for non-manual workers of 26 percent for men and of only 13 percent for women. It appears that non-manual status greatly reduces the probability of entering unemployment but has only a modest positive effect on the probability of then finding a job.

The last two individual characteristics refer to how the last job ended and how the spell of UI originated. Those who entered the UI register from employment (the sample we analysed in Section 2) are substantially more likely to leave to employment than those who did not, other things equal. The hazards are 60 percent higher for men and as much as 80 percent higher for women. This seems to make more difference than the circumstances in which the last job ended although these circumstances are also important. Quitting the last job is associated with an exit probability to a job that is about one fifth lower than that of job losers.

The set of county dummies have Budapest as the base. County may proxy a number of things including unmeasured individual characteristics as well as the more obvious possibilities of economic structure and local labour demand. We have already seen in Section 3 that taking all exits together, the outflow rates by county are not strongly correlated with the county unemployment rates. The results in Table 2 are obtained separately for men and women using the full information on spells (rather than duration up to only three months), control for

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Stancanelli's sample is of male household heads in registered unemployment in 1983-4. Arulampalam and Stewart use data on men registered as unemployed in 1978-79 and 1987-88. The variation of the hazard with age found by the latter authors for 1987-88 (when male unemployment was about 11 percent) is in fact less than we find for Hungary.

individual characteristics, and relate to the outflow to jobs, but in general the pattern is the same as in Figure 9.[14] For both sexes the hazard is significantly lower than in Budapest in only the three counties that have the highest unemployment rates - Szabolcs, Nograd and Borsod (the difference for Nograd is not significant for women and that for men only marginally so). But the differences are not very large, the hazard being some 30 percent lower in Borsod and only 15 percent in the other two. In 9 out of the total of 19 counties the hazards for either sex are not statistically different (at the 5 percent level) from those in Budapest.[15] Where the hazards are significantly higher than in Budapest the differences for men are again not very great, typically about 20-25 percent, as for example in the three Western counties of Gyor, Vas and Zala. In these three counties the hazard for women relative to that in Budapest is about 60-70 percent higher while in Somogy it is over twice that in Budapest.

*Training*

About 4 percent of recorded exits (other than those resulting from exhaustion of UI entitlement) are to a government sponsored training scheme. The findings in Table 3 concerning the determinants of this exit route are of considerable interest. In particular, those with low levels of education have far lower chances of leaving UI by this route. Among men, someone with general or vocational secondary education is over four times more likely to leave UI for a training scheme than is a person who only completed primary education. Among women, the probability is over five times higher. Those with university and college education are even better placed, particularly if men. This may reflect a variety of factors. The more educated may be more willing to re-train or may react more to the incentive that is offered (a 10 percent addition to unemployment benefit). They may be more able to find private training courses for themselves that the employment office will approve. The employment offices may offer training courses only to the more educated. The part played by selection policy of employment offices (or by national policy in the design of training schemes) seems misplaced given that the more educated have a notably higher probability of finding a job in any case.

[14] If we replace the county dummies with the county unemployment rate the maximised log-likelihood becomes far lower - there appear to be substantial county effects that cannot be captured by such a proxy for labour demand. We also tried specifications with vacancy rates and the ratio of unemployment to vacancies but with no success.

[15] If we force all county effects through the county unemployment rate with the exception of a dummy for Budapest, the coefficient on the latter indicates men having a probability of finding a job that is 25 percent less than in other counties (controlling for differences in unemployment) and women 45 percent less.

The probability of exit from UI to training also falls with age, as it does for a job exit. For a person in their late 30s the exit probability is about half that for someone in their early 20s, so again it does not seem to be the case that an exit route from UI via training is compensating for a reduced probability of getting a job. Non-manual women have a 50 percent higher probability than manual women of leaving UI for training, re-enforcing the picture for education, although interestingly manual/non-manual status makes no difference for men. Job quitters are no more or less likely to enter training schemes than job losers; persons of both sexes entering the UI register from a job have a 40 percent higher probability of going on to training than those entering from some other labour market state although this difference is barely significant at conventional levels.

With one exception, Somogy, the training exit route is either less likely in all counties than it is in Budapest or the hazard is not significantly different from that in the capital. Men in Szabolcs and Szolnok, counties with the highest and fourth highest unemployment rates in March 1992, have a probability of leaving UI to enter training of only one-fifth that in Budapest, the lowest unemployment county. In Bacs-Kiskun, where the unemployment rate was 12 percent, the difference is even greater. (These are all counties where the probabilities of training are also much lower for women.) There seems no evidence from these results that persons in areas most affected by unemployment have the greatest probability to leave UI to enter training schemes.

*Other labour market programmes*

Tables 4, 5 and 6 provide results for the exits to subsidised employment, the start-up allowance (subsidised self-employment), and public works, which each account for about one percent of recorded exits. We discuss here only selected results.

Personal characteristics do not seem important in determining the probability of exit to subsidised employment. There is some suggestion that men in their early 20s are more likely to leave in this way than other men, which is in line with the our finding that this is the group most likely to leave for a normal job, but the differences in the probabilities for other age groups are not significant at even the 5 percent level (with the exception of the pre-retirement group). Male job quitters are about half as likely as losers to leave to subsidised employment. For both sexes, the probability is notably higher in the high unemployment county of Szabolcs and the low unemployment county of Vas than it is in Budapest. Other county effects differ between the sexes with the probability being higher in Bekes and Komaron for men.

Leaving the register with an allowance to start-up one's own business is (not surprisingly) much less likely amongst those of a low educational level. Those with post-primary education are some 3-4 times more likely to leave by this route than those with primary education or less. Non-manual men have a probability double that of manual men. This exit route seems more common for both sexes in Bacs and Hajdu (relative to Budapest), for men in Borsod, Komaron, Szolnok, Vas and Zala, and for women in Baranya and Bekes. However, many of these differences in the county probabilities from Budapest are not well determined but it is notable that as with subsidised employment, the significant differences from Budapest are almost all positive rather than negative.

This finding of the probability of entry to a labour market programme being nowhere significantly lower than in Budapest is re-enforced when we look at the public works results. (It should be remembered that the opposite pattern was found for training.) Exit from the register via this route is so infrequent in the capital that we have changed the base county to Borsod in this instance so as to see more clearly the differences between the other counties. Among these, the probability in Bekes and Vas appears three times that in Borsod (even higher for women). (Komaron and Somogy for men and Hajdu for women also appear to have higher probabilities.) Looking across the county results for the three labour market programmes, Bekes and Komaron appear always to have higher probabilities for men. An exit to public works is more likely for men with low education, no doubt reflecting the nature of much of the work concerned. Among women (for whom this route out of unemployment is substantially less common) the probability is actually substantially higher for non-manual workers.

*Disqualification*

The final exit route we model is disqualification from UI for refusing a job offer or training place. This is quite important quantitatively. For every nine recorded exits to a job there is one via disqualification. To whom is this sanction applied the most? Results are in Table 7 and although there are some important exceptions the answer in a nutshell seems to be the young, the less-educated, manual workers, those not entering UI receipt from employment, and persons living in four counties including Budapest. The probability of disqualification falls monotonically with age although it is only for those in their late 30s or more where the differences from the base of the early 20s are significant. From the early 40s in the case of women and the late 40s for men the differences become quite large, the hazards in these two age groups being about half that for the base. The last five years before retirement age is associated with a very low probability of disqualification, about a tenth of that in the early 20s. In general the risk of disqualification falls with education but an incomplete primary education is associated with a lower probability of disqualification (although not very well determined), by around 40 percent relative to the base of primary education. Non-manual workers are only half as likely as manual workers to be disqualified. Being a job quitter seems irrelevant but those entering UI receipt from employment have a risk of disqualification about half that of those who do not do so.

The regional variation in the probability of disqualification is substantial. This is to be expected in that disqualification typically results from failure to accept or apply for a vacancy suggested by the local employment office and the availability of vacancies varies notably between counties. However, due to differences in office practices there may also be variation in the severity with which the sanction of disqualification is applied, even when the pressure of local labour demand is taken into account.[16]

The results display some notable differences between the sexes. In all but four counties outside Budapest (the three low unemployment western counties of Gyor, Vas, and Zala together with Somogy) men are significantly less likely to be disqualified than in the capital and in no county is the risk higher than in Budapest. Some of these differences are very large indeed. Men in Budapest are seven times more likely to be disqualified, ceteris paribus, than in Baranya, Borsod, Nograd and Szabolcs and in none of the counties where the difference is significant is the risk of disqualification less than 40 percent lower than that in the capital. The counties just mentioned are all ones where for women the risk of disqualification relative to that in Budapest is also substantially less. But for

[16] Although a specification with the ratio of unemployment to vacancies produces a significant coefficient on this variable, the log-likelihood is much higher with the full set of county dummies in Table 7.

women Budapest no longer stands out as the place where the risk is highest. In the three western low unemployment counties - Gyor, Vas and Zala - the probability of disqualification is 2-3 times higher than in the capital. As these examples illustrate, county differences are in general correlated with differences in unemployment rates - a person is more likely to be disqualified in a low unemployment county although there are exceptions; Budapest relative to the western counties is one example; another is Baranya which had in March 1992 an unemployment rate in the middle of the range but is associated with a very low disqualification probability; and there is Pest which had an unemployment rate between those of Vas and Zala but a risk of disqualification for women of only a third to a quarter of their level.

*Summary*

We summarise our findings by characteristics rather than by exit states. Overall, we find that observed individual characteristics are associated with some substantial differences in outflow probabilities, as are the different counties. Higher levels of education are associated with higher probabilities of getting a job or entering a training scheme and a lower probability of disqualification. A non-manual occupation decreases the disqualification probability, and increases the training probability for women but has no effect on the training exit for men and no effect for either sex on the probability of getting a job. The probability of getting a job, entering training and being disqualified all fall with age although the changes in the hazards with age are far from smooth. Job quitters are less likely to get jobs than job losers but there are no differences between the two groups in the probabilities of entering training or of being disqualified. Those entering directly from employment are more likely to find a job, more likely to enter training and less likely to be disqualified.

County effects on the different hazards are quite varied and difficult to summarise succinctly. We focus here on Budapest as an example. The capital stands out as a county where the probabilities of entering training and of being disqualified from UI are relatively high (as they are in Somogy) but where there is no advantage in the probability of entering other labour market programmes. Despite being the county with the lowest unemployment rate, the probability of getting a job in Budapest is significantly higher than the probabilities in only two or three other counties.

What do our results imply about how long different sorts of people stay unemployed? In order to answer this question we estimated one final model to explain the probability of leaving unemployment to go to *any* exit state (although still treating UI exhaustion as censoring). Using the results of this model we

estimate the "expected duration" of unemployment for different hypothetical people, i.e. the duration of unemployment they are predicted to have.[17]

Person A has characteristics associated with a much shorter than average spell. He is male, he went to college, he is aged 21-25, he is a non-manual worker who lost his job and entered unemployment directly from his previous unemployment, and he lives in Budapest. Person B is also male but has several less favourable characteristics. He only completed primary education, he is aged 45-50, he is a manual worker and he lives in Nograd (other characteristics are the same of those of person A). Our results indicate that A enters unemployment facing a spell of 9 months while B should expect to be unemployed for 2½ years. Person C is a woman who only completed primary school and is in her late 20s. She entered unemployment having been out of the labour force for some time. She's a manual worker and she lives in Baranya. C can expect to be unemployed for 3½ years. D is a little older than C (she is in her early 30s) but she completed general secondary school, lives in Vas, and comes to unemployment as a job loser direct from work. We predict her duration of unemployment to be 11 months.

These examples are not intended to be representative of all the different types of people experiencing unemployment in Hungary. And many people with the same characteristics as our persons A-D will have spells of unemployment that are very different in length from those predicted - shorter as well as longer. Nevertheless, the examples we have chosen do serve to illustrate two general points. First, even those person with favourable characteristics will, on average, have quite long periods of unemployment. Second, average duration of unemployment does vary substantially between different types of people and different areas.

## 5. SUMMARY AND CONCLUSIONS FOR POLICY AND RESEARCH

The evidence revealed by the data used in this paper provides new information on flows in the Hungarian labour market of which we highlight only a few features here. The inflow into unemployment insurance registers is modest - one percent of insured unemployment in the month in 1992 we considered - but probably not as modest as previously thought. Outflow rates are very low but (like inflow rates) they certainly do vary with observed individual characteristics. As a result of these low rates of flow, the stock of unemployed turns over at a slow rate (as previous authors have observed,

[17] It would have been possible to calculate expected duration from the results for the different hazards in Tables 2 to 7 but it is simpler to estimate a further model in which all the exit states are combined. Given the assumption of the exponential for the functional form of the hazard, h, expected duration is calculated straightforwardly from the results of this final model as 1/h.

notably Boeri, 1994, 1994a). Men move into and out of insured unemployment more quickly than women, who are notably less likely to leave the register to take a job. The young are also more mobile than older groups (although inflow rates showed less variation with age for women). Persons with firmer attachment to the labour market in the sense of having entered unemployment benefit direct from a job are quicker to return to work. Substantial differences in unemployment rates across counties are associated more strongly with inflow rates than with outflow rates.

*Policy*

The most obvious feature of our results with an immediate bearing on policy is the finding that the most likely way for a spell of UI receipt to end is not in a job or in any other form of re-entry to the labour market but in exhaustion of entitlement to UI. This was despite the long entitlement periods to UI of the March 1992 inflow cohort that we have studied. This raises questions for several areas of policy. First, what measures will help get people back to work more quickly so as to reduce the threat of loss of labour market attachment associated with long-term unemployment? Second, is the low outflow rate in part the result of disincentive effects in the UI system? Third, are there adequate provisions for those who exhaust UI and who have a continuing need for income support?

The steep fall in the proportion of the unemployed stock receiving UI during late 1993 and early 1994 is a sharp reminder that the third of these questions needs to be urgently addressed. Before the emergence of long-term unemployment in Hungary it may have been possible to see social assistance benefit as having a merely residual role for those unlucky enough to have failed to return to work by the time UI entitlement expires. Such a view is no longer tenable. Moreover, legislation in January 1993 substantially reduced entitlement periods to UI so it is likely that the incidence of exhaustion in recent entry cohorts is even higher than in the one we have studied. By June 1994 almost equal numbers of unemployed were receiving UI and social assistance benefit. The analysis of social assistance for the unemployed should receive an equal weight to the analysis of UI.

The volume of demand for social assistance will be affected by disincentives for the unemployed to leave the UI register while entitlement remains. The question of disincentives has not been our focus in this paper. We have however shown in what ways the probability of disqualification from UI during a claim varies with individual characteristics and how it varies across the country. Disqualification should reflect that a disincentive to job search has been formally detected. The finding that disqualification is more common among the young and (in general) the less well educated may result from both the behaviour of the individuals concerned and a decision by the employment offices

to focus on this group. Regional differences in the probability of disqualification are large and may reflect a need for a review of the way that rules are applied across counties.

On the first question raised above our results provide evidence on who has the lowest probability of re-entering employment and thus who is most in need of assistance in searching for and securing a job. The young and the more educated are best placed and yet these are the groups that are most likely to leave the register to enter government-sponsored training schemes. (The more educated also benefit from an increased probability of assistance into self-employment.) Training can be expected not only to increase an individual's short-term prospects but also to reduce the probability of future unemployment. The focus on the young may therefore be appropriate in view of their higher inflow rate. But we feel it is disappointing that the less educated, who also have high inflow rates, are not more likely to enter training. (They are more likely to enter public works schemes but these are not programmes that will typically improve their employment prospects.) There is a case for a review of policy in this area if this situation reflects decisions at a national level or of local employment office staff. And as with disqualification there are substantial regional differences in the probability of leaving unemployment via training (the same applies to other labour market programmes) and the reasons for this are not always clear. One question that arises is how active labour market programme budgets are distributed across the country and whether the criteria used are the right ones.

*Further research*

There are a range of unanswered questions concerning unemployment flows that stem from the research reported in this paper. We have pointed to the possibility that the published figure for the inflow to unemployment may be a substantial underestimate of the true figure and this merits further investigation in order to establish a correct picture of unemployment dynamics in Hungary. Our results concerning the variation of the inflow with characteristics and region refer to one month and there is the obvious question as to whether the patterns revealed are representative of other periods. The restriction of the sample to a single month's inflow also meant that we were unable to identify separately variation in the probability of leaving the register due to lengthening time unemployed from variation caused by changes in the aggregate labour market with calendar time. County "effects" on the different exit routes deserve more attention.

The stock of registered unemployment in Hungary has been falling since mid-1993, first gradually and then more quickly in the Spring of 1994. This must reflect a fall in the inflow rate or an increase in the outflow rate. Figure 2

suggests that changes in the inflow are not the explanation (although a final verdict on this must await a revised time-series of inflows). If the registered stock has fallen as a result of an increase in the outflow, then the question arises as to what has caused this increase. Our data shows the most likely event that will end a UI claim is exhaustion of entitlement. Has the outflow from registered unemployment increased mainly as a result of increases in the number of people exhausting UI entitlement who then cease to register? What happens to people when exhaustion occurs is an urgent question to resolve. Administrative sources suggest that about half of exhausters go on to receive social assistance and work currently under way at the National Labour Centre is aimed at showing what happens to the rest. Do large numbers drop out of the labour market or do many quickly find work? In the former case the family circumstances and living standards of those concerned would be of great interest. The latter would suggest that UI payments had previously acted as a substantial disincentive to searching for work and the type of data we have used in this paper are one source for the investigation of this issue.

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## Appendix

### 1. The Administrative Register of UI Benefits

The data we use are drawn from the administrative records of the UI system. The National Labour Centre (NLC) collects information on each spell of UI receipt and this is stored in computerised form that contains data resulting from the process of job matching and of benefit administration in local employment offices. The job matching data provides some basic socio-economic information such as sex, age, schooling and occupation. The computation of benefit leads to information among other things on date of last employment, reason for unemployment, benefit scheme, length of entitlement to benefit, the start and end dates of the benefit spell, reason for end of the benefit spell and periods of suspension from benefit.

### 2. Sample Selection and Definitions of Inflow

The UI database, which covers 1989 to the present, is divided into a "base" file and a "payments" file and it is the latter we use to define UI spells. The information on each continuous period of UI payment or period of suspension from UI is recorded as a separate record in this file. Suspension periods occur when there is a pause in a "live" UI claim due to maternity leave, military service, or for disciplinary reasons such as insufficient job search (formally, "failure to co-operate with the employment office"). The last of these possibilities should be distinguished from an actual disqualification from UI, which results in a live claim being discontinued completely rather than suspended for what might only be a few days or a week or two. An individual may have more than one record in this file since the UI database covers several years. Multiple records will also result even if an individual has made only one claim to UI if the spell lasts beyond the point when the nominal benefit-wage replacement ratio falls, which is about two-thirds of the way to maximum entitlement in the 92 scheme (see Micklewright and Nagy, 1994). In this case the two periods of different wage replacement ("period 1" and "period 2") are entered as separate records in the payments file; period 1 will have a termination code indicating continuous payment.

We selected from the database all spells of UI beginning between 21 February and 20 March 1992 as a result of a new claim (benefit payments re-beginning after a period of suspension were ignored as are "period 2" records

that follow on from "period 1" records). There are 43,239 such spells. Checking the benefit history of these claimants in the database we found that some of them had a new UI spell starting in the relevant period very shortly after the end of a previous spell and with no intervening period of employment indicated in the files as shown by the date of last employment. We applied special rules for deciding whether to keep such cases in the inflow. (The typical case was "benefit switching" (Micklewright and Nagy, 1994) where somebody claimed for benefit in the 92 scheme just after exhausting eligibility in the 89 benefit scheme.) From this group we excluded from the inflow cases where (i) the previous spell ended because the unemployed joined a training programme, (ii) the previous spell terminated in exhaustion and reclaiming occurred within one month, (iii) re-employment was indicated in the file as the exit code for the previous spell but the client reclaimed within a week (here we suppose that the spell was interrupted due to an administrative error; remember this rule was only applied if there was no date of last employment recorded after the end of the previous spell). We excluded for such reasons 3,822 spells from the inflow. The remaining 39,417 spells were used for the *duration analysis* in the paper (Sections 3 and 4).

Our calculations of *inflow rates* in Section 2 are aimed at measuring the flow from employment to UI receipt. To try and ensure consistency of the numerator and the denominator in these calculations we kept in the inflow only those unemployed who seemed to enter benefits directly from employment. For this purpose we excluded from the inflow all claimants who had no employment in the six months period before the claim. (Six months may seem generous but we must allow for job quitters who serve out a waiting period before UI begins.) There are 7,201 such cases out of the 39,417 new spells. The remaining sample used for the calculation of the inflow rates contained 32,216 cases.

## 3. The Follow-up of the Sample in the Register

In February 1994 we selected all payment records of the March 1992 inflow sample from the database. Using these we defined the length of spells and the reason for termination of benefit payment ("exit state"). As noted above, payments in period 1 and period 2 of benefit entitlement are registered as separate records in the NLC database and there are further reasons associated with the administration of UI why one spell of benefit may be split between two or more records. All records were joined which indicated benefit payments with no interruption - a record ending with a continuous payment code and a new record starting the day after. (We also joined the records if the gap in this situation was only one day.) Payment records interrupted with suspensions not longer than a week were joined. (In the case of longer suspensions the spell is treated as censored at the point where suspension begins.)

In this way we can follow 94 percent of spells by their end. The remaining 6 percent (2,264 spells) are labelled as censored, typically because we lose track of them in the records. There is a continuous termination code but no following payment record; these spells may include many cases where benefit stops for a period of suspension. Censoring will occur in a few cases because the spells are not finished by February 1994; these are spells in the 91 benefit scheme with maximum (two years) eligibility period.

## 4. Insured Employed in the Labour Force Survey

For the denominators of the inflow rates we estimate the number of "insured employed" from the Labour Force Survey (LFS), conducted by the Central Statistical Office. The LFS interviews about 30,000 households per quarter (10,000 per month). Figures published by CSO are grossed-up values of the survey. In the paper we use calculations based on the results of the survey for January-March 1992 (which was in fact the first quarter surveyed by the newly introduced LFS).

In estimating the "insured employed" we take account of the rules of coverage of the Hungarian benefit system. This excludes from UI eligibility all employees who are eligible for old-age pensions and all self-employed. In addition employees must have at least 12 months of employment during the 4 years preceding the claim for benefit. We defined the insured employed in terms of employment status and age: we included all male employees under the age of 60 and female employees under the age of 55 (age limits for old-age pension) but excluded all the self-employed. The number of insured employed according to this definition was 85 percent of the total employment in the LFS in the first quarter of 1992 where this total employment figure covers all age-groups from 15 upwards and also the self-employed. Figures A and B in the Appendix show the proportions of insured employed in all employed by sex, age and educational level.

There is no information in the LFS on employment history over the preceding 4 years, therefore we could not estimate the number of employees who would in fact fail to qualify for UI benefits on account of an insufficient work history. This will affect most young employees who have entered the labour force a short time before the date of the survey. The gap between our estimate of the number of insured employed and the true figure is higher in the lowest age groups and, as a consequence, we under estimate the UI inflow rate to a larger extent for the young. On the other hand, there may be some persons in the LFS who have recently taken up self-employment but who had earlier been in paid employment. They will be excluded from our denominators.

Figure A: Insured employed as the percentage of all employed by education and sex

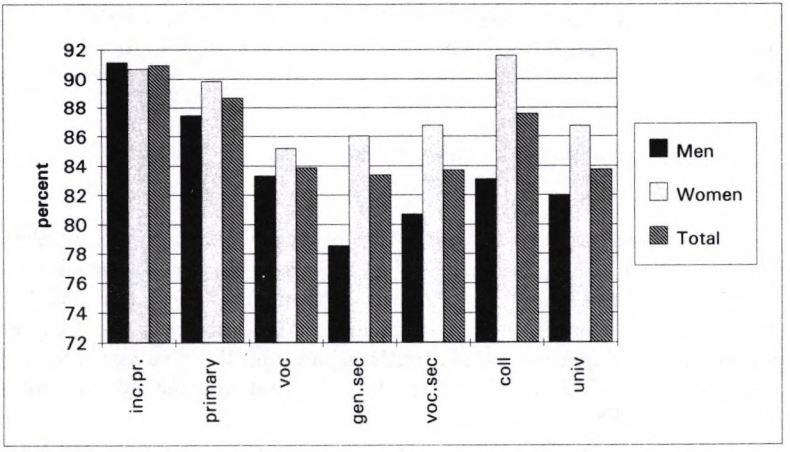
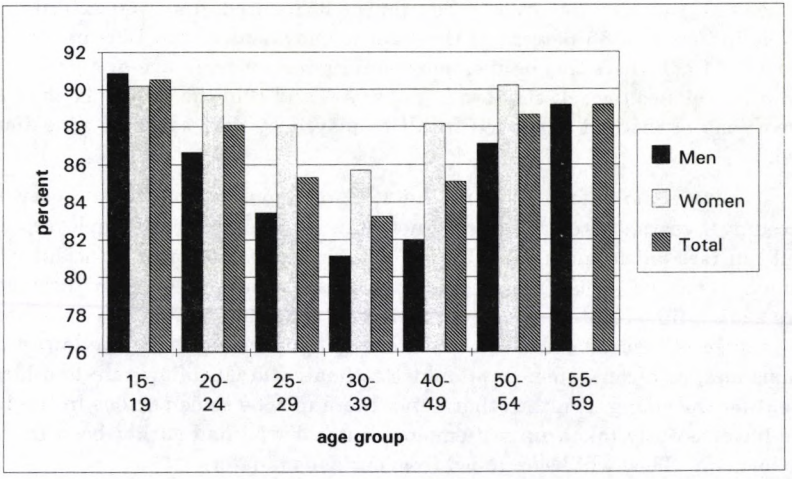



Figure B: Insured employed as the percentage of all employed by age and sex



# Tables

Table A1: Duration of Entitlement to UI of the March 1992 Inflow

Percent of Sample
(Cumulative)

| Days of Benefit Entitlement | Scheme | |
|---|---|---|
| | 1991 | 1992 |
| 135 | 0.0 | 3.6 |
| 180 | 4.0 | 7.9 |
| 225 | 4.9 | 11.9 |
| 270 | 11.9 | 15.7 |
| 315 | 18.2 | 21.5 |
| 360 | 27.3 | 27.3 |
| 405 | 28.6 | 33.8 |
| 450 | 39.1 | 44.0 |
| 495 | 49.0 | 63.3 |
| 540 | 59.1 | 100.0 |
| 600 | 70.9 | |
| 660 | 89.8 | |
| 720 | 100.0 | |
| observations | 3,634 | 35,532 |

Table A2: Means of Variables used in Parametric Model of the Hazards

| Variable | Men | Women |
|---|---|---|
| Schooling | | |
| incomplete primary | .083 | .081 |
| primary | .320 | .481 |
| vocational school | .440 | .212 |
| vocational secondary | .096 | .113 |
| general secondary | .032 | .093 |
| college | .018 | .014 |
| university | .011 | .006 |
| Age | | |
| -20 years | .052 | .048 |
| 21-25 years | .197 | .119 |
| 26-30 years | .139 | .126 |
| 31-35 years | .136 | .146 |
| 36-40 years | .153 | .171 |
| 41-45 years | .119 | .154 |
| 46-50 years | .086 | .118 |
| 51-55 years | .063 | .117 |
| 56- years | .055 | .001 |
| Occupation | | |
| non-manual | .087 | .215 |
| Circumstances of entry | | |
| entry from employment | .830 | .798 |
| job leaver | .100 | .078 |
| County | | |
| Budapest | .098 | .106 |
| Baranya | .038 | .041 |
| Bacs-Kiskun | .064 | .067 |
| Bekes | .067 | .061 |
| Borsod | .081 | .074 |
| Csongrad | .041 | .036 |
| Fejer | .037 | .044 |
| Gyor-Sopron | .029 | .029 |
| Hajdu-Bihar | .068 | .066 |
| Heves | .034 | .041 |
| Komarom | .038 | .032 |
| Nograd | .030 | .029 |
| Pest | .082 | .082 |
| Somogy | .028 | .030 |
| Szabolcs | .092 | .097 |
| Szolnok | .061 | .056 |
| Tolna | .032 | .036 |
| Vas | .024 | .019 |
| Veszprem | .034 | .034 |
| Zala | .024 | .021 |

Note: the base categories are primary schooling, age 21-25, manual, entry not from employment, job loser, and Budapest

Table 1: Exit States for Spells of UI starting in March 1992

| | Sex | | Benefit Scheme | | All |
|---|---|---|---|---|---|
| Exit State | male | female | 1991 | 1992 | |
| employment | 37.0 | 28.8 | 24.1 | 34.8 | 33.8 |
| subsidised employment | 0.9 | 1.1 | 0.6 | 1.1 | 1.0 |
| start up allowance | 1.3 | 0.8 | 0.6 | 1.1 | 1.1 |
| public works | 1.3 | 0.5 | 1.1 | 1.0 | 1.0 |
| training scheme | 2.0 | 2.8 | 2.0 | 2.4 | 2.3 |
| disqualified | 3.7 | 4.3 | 5.8 | 3.7 | 3.9 |
| pension/early retirement | 5.3 | 8.9 | 2.9 | 7.1 | 6.7 |
| other | 1.0 | 0.8 | 0.9 | 0.9 | 0.9 |
| UI exhausted | 41.9 | 46.0 | 52.9 | 42.6 | 43.5 |
| spell censored | 5.6 | 6.0 | 9.3 | 5.4 | 5.8 |
| total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Note: we exclude 2 cases receiving benefit under the 1989 scheme

Table 2: Hazard to go to Employment

| | Men | | Women | |
|---|---|---|---|---|
| Number of observations | 23,853 | | 15,564 | |
| Log Likelihood | 23,529.9 | | 12,896.0 | |
| | Hz. Ratio | t | Hz. Ratio | t |
| Schooling | | | | |
| incomplete primary | .66 | 6.8 | .65 | 5.5 |
| vocational | 1.36 | 12.0 | 1.16 | 3.9 |
| vocational secondary | 1.37 | 7.5 | 1.39 | 6.3 |
| general secondary | 1.48 | 6.4 | 1.17 | 2.8 |
| college | 1.74 | 6.8 | 1.69 | 4.7 |
| university | 1.89 | 6.3 | 1.59 | 2.6 |
| Age | | | | |
| -20 years | 1.04 | 0.7 | 1.60 | 6.2 |
| 26-30 years | .88 | 3.7 | .85 | 2.8 |
| 31-35 years | .82 | 5.6 | .88 | 2.3 |
| 36-40 years | .77 | 7.4 | .90 | 1.9 |
| 41-45 years | .73 | 8.4 | .82 | 3.5 |
| 46-50 years | .56 | 12.6 | .67 | 6.3 |
| 51-55 years | .55 | 11.1 | .13 | 16.4 |
| 56- years | .10 | 15.8 | .00 | 0.4 |
| Occupation | | | | |
| non-manual | 1.02 | 0.4 | .94 | 1.3 |
| Circumstances of entry | | | | |
| entry from employment | 1.60 | 11.9 | 1.79 | 10.9 |
| job leaver | .77 | 5.8 | .81 | 3.1 |
| County | | | | |
| Baranya | 1.02 | 0.2 | 1.00 | 0.1 |
| Bacs-Kiskun | .93 | 1.4 | 1.15 | 1.9 |
| Bekes | 1.27 | 4.6 | 1.19 | 2.4 |
| Borsod | .69 | 6.7 | .64 | 5.3 |
| Csongrad | 1.03 | 0.5 | 1.09 | 1.0 |
| Fejer | 1.35 | 4.8 | 1.37 | 3.9 |
| Gyor-Sopron | 1.27 | 3.6 | 1.71 | 6.0 |
| Hajdu-Bihar | 1.05 | 0.9 | 1.10 | 1.3 |
| Heves | .96 | 0.6 | 1.11 | 1.2 |
| Komarom | 1.11 | 1.8 | 1.01 | 0.1 |
| Nograd | .85 | 2.3 | .85 | 1.5 |
| Pest | 1.04 | 0.7 | 1.13 | 1.8 |
| Somogy | 1.23 | 2.9 | 2.35 | 10.0 |
| Szabolcs | .84 | 3.3 | .84 | 2.3 |
| Szolnok | 1.01 | 0.2 | 1.23 | 2.7 |
| Tolna | 1.06 | 0.8 | 1.18 | 1.7 |
| Vas | 1.21 | 2.6 | 1.70 | 4.8 |
| Veszprem | 1.42 | 5.7 | 1.39 | 3.9 |
| Zala | 1.19 | 2.2 | 1.61 | 4.4 |

Note: the hazard ratio is the hazard for a person for whom the variable concerned equals one relative to that for a person in the base category, holding other characteristics constant. The base categories are primary schooling, age 21-25, manual, entry not from employment, job loser, and Budapest. The t-statistic is for the test of the hypothesis that the hazard ratio equals one.

Table 3: Hazard to go to Training

| | Men | | Women | |
|---|---|---|---|---|
| Number of observations | 23,853 | | 15,564 | |
| Log Likelihood | 2,305.9 | | 1,893.9 | |
| | Hz. Ratio | t | Hz. Ratio | t |
| Schooling | | | | |
| incomplete primary | .07 | 2.7 | .11 | 2.2 |
| vocational | 1.31 | 2.0 | .96 | 0.2 |
| vocational secondary | 4.86 | 10.5 | 5.14 | 10.4 |
| general secondary | 4.28 | 7.0 | 5.14 | 10.0 |
| college | 15.24 | 12.7 | 6.08 | 7.0 |
| university | 11.07 | 8.7 | 8.05 | 6.3 |
| Age | | | | |
| -20 years | 1.17 | 0.6 | 1.14 | 0.5 |
| 26-30 years | .86 | 1.1 | .71 | 2.2 |
| 31-35 years | .63 | 3.2 | .63 | 3.0 |
| 36-40 years | .48 | 4.8 | .62 | 3.3 |
| 41-45 years | .39 | 5.4 | .34 | 6.1 |
| 46-50 years | .27 | 5.9 | .18 | 6.6 |
| 51-55 years | .17 | 5.1 | .04 | 4.6 |
| 56- years | 2.91e-06 | 0.2 | .00 | 0.1 |
| Occupation | | | | |
| non-manual | .89 | 0.8 | 1.56 | 3.7 |
| Circumstances of entry | | | | |
| entry from employment | 1.38 | 2.2 | 1.40 | 2.2 |
| job leaver | 1.24 | 1.3 | .96 | 0.2 |
| County | | | | |
| Baranya | .62 | 1.9 | .48 | 2.6 |
| Bacs-Kiskun | .07 | 4.6 | .16 | 4.6 |
| Bekes | .90 | 0.6 | .74 | 1.4 |
| Borsod | 1.01 | 0.1 | .69 | 2.0 |
| Csongrad | .27 | 3.6 | .28 | 3.5 |
| Fejer | .40 | 2.6 | .36 | 3.1 |
| Gyor-Sopron | .87 | 0.5 | .83 | 0.7 |
| Hajdu-Bihar | .46 | 3.1 | .42 | 3.4 |
| Heves | 1.35 | 1.5 | .74 | 1.2 |
| Komarom | .70 | 1.4 | .53 | 2.1 |
| Nograd | .26 | 3.2 | .36 | 2.8 |
| Pest | .97 | 0.2 | .91 | 0.6 |
| Somogy | 1.88 | 2.9 | 1.57 | 2.0 |
| Szabolcs | .19 | 5.3 | .25 | 4.8 |
| Szolnok | .21 | 4.5 | .40 | 3.3 |
| Tolna | .60 | 1.7 | .65 | 1.5 |
| Vas | .57 | 1.7 | .38 | 1.9 |
| Veszprem | .72 | 1.2 | .74 | 1.1 |
| Zala | 1.23 | 0.8 | .71 | 1.0 |

Note: see Table 2

Table 4: Hazard to go to Subsidised Employment

| | Men | | Women | |
|---|---|---|---|---|
| Number of observations | 23,853 | | 15,564 | |
| Log Likelihood | 1,214.9 | | 912.7 | |
| | Hz. Ratio | t | Hz. Ratio | t |
| Schooling | | | | |
| incomplete primary | .60 | 1.4 | .31 | 2.3 |
| vocational | 1.10 | 0.5 | 1.56 | 2.3 |
| vocational secondary | 1.39 | 1.3 | 1.45 | 1.3 |
| general secondary | 1.16 | 0.4 | 1.10 | 0.3 |
| college | 2.23 | 1.8 | 3.38 | 2.6 |
| university | 1.31 | 0.4 | 2.73 | 1.3 |
| Age | | | | |
| -20 years | .33 | 1.9 | .69 | 0.6 |
| 26-30 years | .79 | 1.1 | 1.10 | 0.3 |
| 31-35 years | .77 | 1.2 | .98 | 0.1 |
| 36-40 years | .78 | 1.2 | 1.23 | 0.7 |
| 41-45 years | .66 | 1.8 | 1.07 | 0.2 |
| 46-50 years | .68 | 1.5 | 1.34 | 0.9 |
| 51-55 years | .59 | 1.7 | .77 | 0.7 |
| 56- years | .29 | 2.3 | 2.8e-06 | 0.0 |
| Occupation | | | | |
| non-manual | .92 | 0.3 | .97 | 0.1 |
| Circumstances of entry | | | | |
| entry from employment | 1.01 | 0.0 | 1.29 | 1.1 |
| job leaver | .42 | 2.6 | .61 | 1.2 |
| County | | | | |
| Baranya | 1.91 | 1.6 | .77 | 0.6 |
| Bacs-Kiskun | .83 | 0.4 | 1.17 | 0.5 |
| Bekes | 3.06 | 3.4 | 1.80 | 1.8 |
| Borsod | 1.65 | 1.5 | .41 | 1.9 |
| Csongrad | 1.79 | 1.5 | 1.59 | 1.2 |
| Fejer | 1.4e-06 | 0.1 | 9.0e-07 | 0.1 |
| Gyor-Sopron | 1.05 | 0.1 | .42 | 1.2 |
| Hajdu-Bihar | .21 | 2.1 | 9.1e-07 | 0.1 |
| Heves | .40 | 1.2 | .28 | 1.7 |
| Komarom | 3.24 | 3.4 | 1.56 | 1.1 |
| Nograd | 1.3e-06 | 0.1 | 9.4e-07 | 0.1 |
| Pest | 2.11 | 2.3 | .86 | 0.4 |
| Somogy | .88 | 0.2 | .85 | 0.3 |
| Szabolcs | 2.52 | 3.0 | 2.93 | 4.0 |
| Szolnok | 1.90 | 1.8 | .42 | 1.6 |
| Tolna | 2.01 | 1.6 | .75 | 0.5 |
| Vas | 2.75 | 2.4 | 2.95 | 2.6 |
| Veszprem | .45 | 1.1 | 8.6e-07 | 0.1 |
| Zala | .67 | 0.5 | .96 | 0.1 |

Note: see Table 2

Table 5: Hazard to go to Start-up Allowance (Subsidised Self-Employment)

| | Men | | Women | |
|---|---|---|---|---|
| Number of observations | 23,853 | | 15,564 | |
| Log Likelihood | 1497.1 | | 657.2 | |
| | Hz. Ratio | t | Hz. Ratio | t |
| Schooling | | | | |
| incomplete primary | 4.6e-06 | 0.1 | 3.7e-06 | 0.1 |
| vocational | 2.80 | 5.5 | 2.91 | 3.8 |
| vocational secondary | 4.60 | 6.7 | 5.35 | 5.4 |
| general secondary | 4.26 | 4.9 | 4.56 | 4.7 |
| college | 5.72 | 5.3 | 3.47 | 1.9 |
| university | 5.79 | 4.5 | 9.70 | 3.5 |
| Age | | | | |
| -20 years | .88 | 0.3 | .63 | 0.6 |
| 26-30 years | .99 | 0.0 | .83 | 0.6 |
| 31-35 years | 1.28 | 1.4 | .71 | 1.0 |
| 36-40 years | .10 | 0.0 | 1.20 | 0.6 |
| 41-45 years | .86 | 0.7 | .72 | 1.0 |
| 46-50 years | .64 | 1.8 | .82 | 0.5 |
| 51-55 years | .14 | 3.3 | .10 | 2.2 |
| 56- years | 2.7e-06 | 0.1 | 5.4e-06 | 0.0 |
| Occupation | | | | |
| non-manual | 2.09 | 4.1 | 1.45 | 1.6 |
| Circumstances of entry | | | | |
| entry from employment | 1.33 | 1.3 | 1.16 | 0.5 |
| job leaver | .60 | 1.9 | .53 | 1.2 |
| County | | | | |
| Baranya | 1.22 | 0.6 | 2.46 | 2.0 |
| Bacs-Kiskun | 1.87 | 2.3 | 2.82 | 2.7 |
| Bekes | 1.59 | 1.6 | 3.71 | 3.4 |
| Borsod | 2.14 | 3.1 | 1.68 | 1.3 |
| Csongrad | .32 | 1.9 | 1.18 | 0.3 |
| Fejer | .43 | 1.4 | .98 | 0.0 |
| Gyor-Sopron | .30 | 1.6 | .43 | 0.8 |
| Hajdu-Bihar | 2.07 | 2.7 | 2.32 | 2.0 |
| Heves | 1.20 | 0.5 | 1.33 | 0.5 |
| Komarom | 2.12 | 2.5 | 2.37 | 1.8 |
| Nograd | .26 | 1.8 | .41 | 0.9 |
| Pest | 1.67 | 1.9 | 1.67 | 1.2 |
| Somogy | .61 | 0.8 | 2.8e-06 | 0.0 |
| Szabolcs | .95 | 0.2 | .99 | 0.0 |
| Szolnok | 1.96 | 2.5 | 1.68 | 1.1 |
| Tolna | .31 | 1.6 | 1.49 | 0.6 |
| Vas | 2.76 | 3.1 | 3.4e-06 | 0.0 |
| Veszprem | .71 | 0.7 | .73 | 0.4 |
| Zala | 2.13 | 2.0 | 2.5e-06 | 0.0 |

Note: see Table 2

## Table 6: Hazard to go to Public Works

| | Men | | Women | |
|---|---|---|---|---|
| Number of observations | 23,853 | | 15,564 | |
| Log Likelihood | 1,726.4 | | 465.4 | |
| | Hz. Ratio | t | Hz. Ratio | t |
| Schooling | | | | |
| incomplete primary | 1.59 | 2.6 | .70 | 0.6 |
| vocational | .68 | 3.0 | .82 | 0.6 |
| vocational secondary | .25 | 3.9 | .89 | 0.3 |
| general secondary | .18 | 2.4 | .84 | 0.4 |
| college | .42 | 1.3 | 1.98 | 1.1 |
| university | .28 | 1.2 | 1.4e-06 | 0.0 |
| Age | | | | |
| -20 years | .91 | 0.3 | 1.62 | 0.7 |
| 26-30 years | 1.23 | 1.0 | 1.07 | 0.1 |
| 31-35 years | .91 | 0.5 | 1.32 | 0.6 |
| 36-40 years | 1.34 | 1.6 | 1.10 | 0.2 |
| 41-45 years | 1.01 | 0.1 | 1.71 | 1.2 |
| 46-50 years | .94 | 0.3 | .77 | 0.5 |
| 51-55 years | .86 | 0.6 | .13 | 1.9 |
| 56- years | 2.4e-06 | 0.2 | 6.5e-06 | 0.0 |
| Occupation | | | | |
| non-manual | 1.31 | 0.8 | 2.71 | 3.1 |
| Circumstances of entry | | | | |
| entry from employment | .98 | 0.1 | 3.38 | 2.3 |
| job leaver | .90 | 0.5 | 1.39 | 0.7 |
| County | | | | |
| Baranya | .05 | 3.0 | .19 | 1.4 |
| Bacs-Kiskun | .82 | 0.5 | 3.1e-06 | 0.0 |
| Bekes | 1.03 | 0.1 | 3.50 | 1.9 |
| Borsod | 3.34 | 4.7 | 8.57 | 3.4 |
| Csongrad | .77 | -0.6 | 2.4e-06 | 0.0 |
| Fejer | .37 | 1.6 | .65 | 0.4 |
| Gyor-Sopron | .67 | 0.7 | 3.96 | 1.8 |
| Hajdu-Bihar | 1.48 | 1.3 | 4.41 | 2.3 |
| Heves | 1.34 | 0.8 | 1.35 | 0.3 |
| Komarom | 2.30 | 2.8 | 3.03 | 1.5 |
| Nograd | 1.17 | 0.4 | 1.69 | 0.6 |
| Pest | 1.19 | 0.6 | 1.46 | 0.5 |
| Somogy | 2.77 | 3.3 | 2.55 | 1.0 |
| Szabolcs | .93 | 0.2 | 1.84 | 0.9 |
| Szolnok | 1.44 | 1.2 | 1.86 | 0.8 |
| Tolna | .26 | 1.9 | 3.0e-06 | 0.0 |
| Vas | 3.57 | 4.0 | 5.75 | 2.1 |
| Veszprem | 1.09 | 0.2 | .72 | 0.3 |
| Zala | 1.33 | 0.7 | 1.61 | 0.4 |

Note: the base for the county dummies in this table is Borsod; see also Table 2.

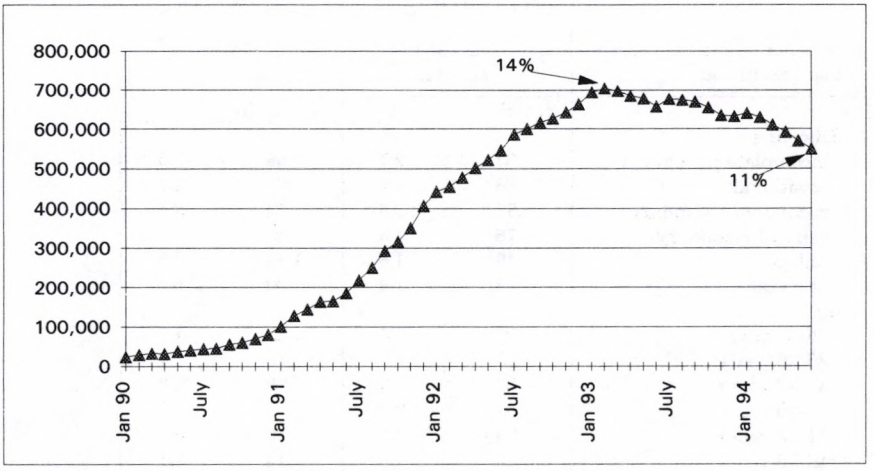
## Table 7: Hazard of UI Disqualification

| | Men | | Women | |
|---|---|---|---|---|
| Number of observations | 23,853 | | 15,564 | |
| Log Likelihood | 4,160.2 | | 3,109.8 | |
| | Hz. Ratio | t | Hz. Ratio | t |
| Schooling | | | | |
| incomplete primary | .63 | 2.7 | .58 | 3.0 |
| vocational | .88 | 1.7 | .77 | 2.7 |
| vocational secondary | .57 | 3.6 | .54 | 3.4 |
| general secondary | .76 | 1.3 | .50 | 3.3 |
| college | .46 | 1.6 | 1.34 | 0.8 |
| university | .42 | 1.4 | .00 | 0.1 |
| Age | | | | |
| -20 years | .91 | 0.5 | 1.22 | 1.1 |
| 26-30 years | .89 | 1.1 | .79 | 1.7 |
| 31-35 years | .87 | 1.3 | .79 | 1.8 |
| 36-40 years | .81 | 2.0 | .74 | 2.3 |
| 41-45 years | .73 | 2.7 | .46 | 5.1 |
| 46-50 years | .47 | 4.9 | .44 | 5.1 |
| 51-55 years | .26 | 5.9 | .09 | 8.0 |
| 56- years | .08 | 5.1 | .00 | 0.1 |
| Occupation | | | | |
| non-manual | .54 | 3.0 | .37 | 6.1 |
| Circumstances of entry | | | | |
| entry from employment | .53 | 7.4 | .61 | 5.1 |
| job leaver | 1.02 | 0.2 | 1.07 | 0.5 |
| County | | | | |
| Baranya | .14 | 6.3 | .18 | 4.4 |
| Bacs-Kiskun | .34 | 6.5 | .58 | 2.7 |
| Bekes | .49 | 4.5 | 1.27 | 1.4 |
| Borsod | .14 | 9.2 | .12 | 6.1 |
| Csongrad | .24 | 5.8 | .19 | 4.0 |
| Fejer | .56 | 3.2 | .62 | 2.1 |
| Gyor-Sopron | .82 | 1.1 | 2.47 | 5.1 |
| Hajdu-Bihar | .40 | 5.9 | .69 | 2.0 |
| Heves | .39 | 4.5 | 1.10 | 0.5 |
| Komarom | .39 | 4.7 | .63 | 1.9 |
| Nograd | .15 | 5.8 | .43 | 2.9 |
| Pest | .60 | 4.0 | .70 | 2.1 |
| Somogy | .81 | 1.2 | 1.45 | 1.7 |
| Szabolcs | .15 | 9.4 | .40 | 4.7 |
| Szolnok | .26 | 6.9 | .68 | 1.9 |
| Tolna | .36 | 4.5 | .44 | 2.7 |
| Vas | 1.04 | 0.2 | 2.96 | 5.3 |
| Veszprem | .48 | 3.6 | .72 | 1.4 |
| Zala | 1.10 | 0.6 | 2.12 | 3.6 |

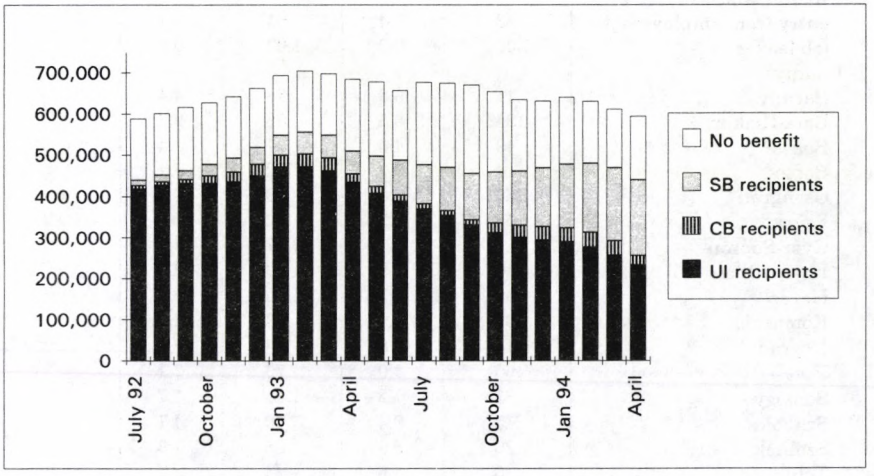
Note: see Table 2

## Figure 1: Unemployment Stock and Benefit Receipt

a) registered unemployed stock

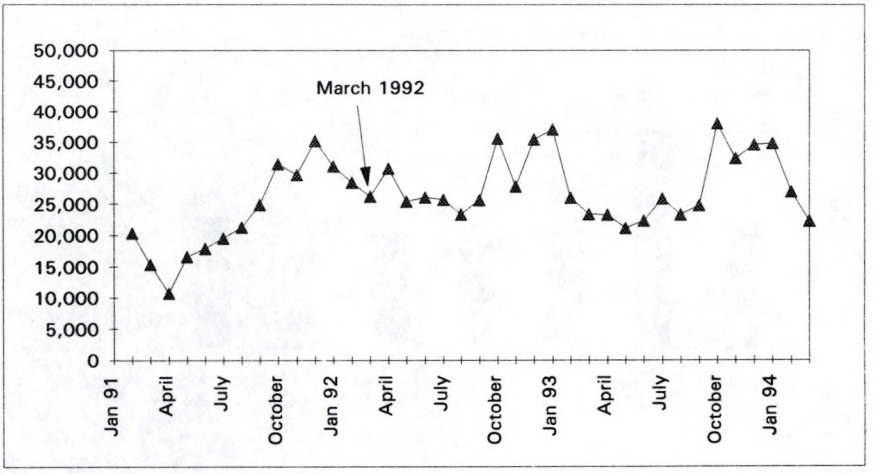



b) receipt of different benefits in the unemployed stock




Note: UI - unemployment insurance; CB - career beginners benefit; SB - social benefit
Source: NLC

Figure 2: Monthly Inflows to the Unemployment Benefit Register




Note: Figures include both UI and CB benefit recipients
Sources: NLC monthly publications

Figure 3: Inflow rates by age and sex

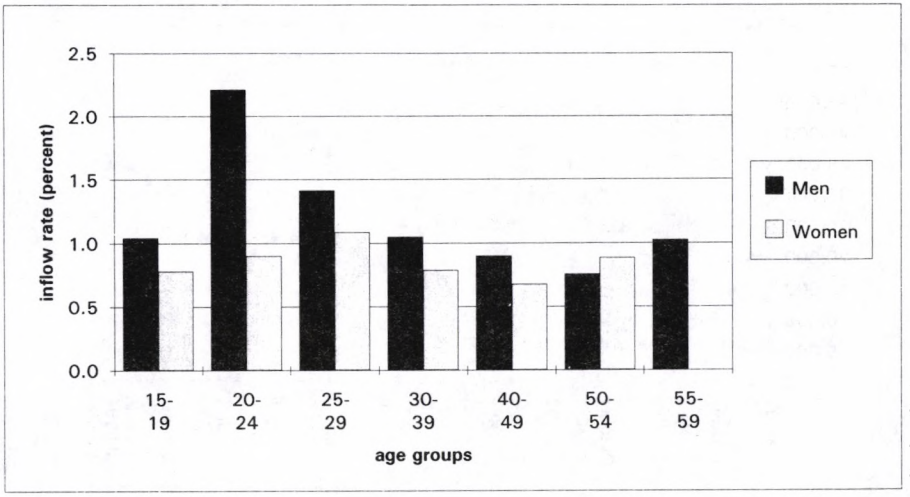



Figure 4: Inflow rates by educational level and sex

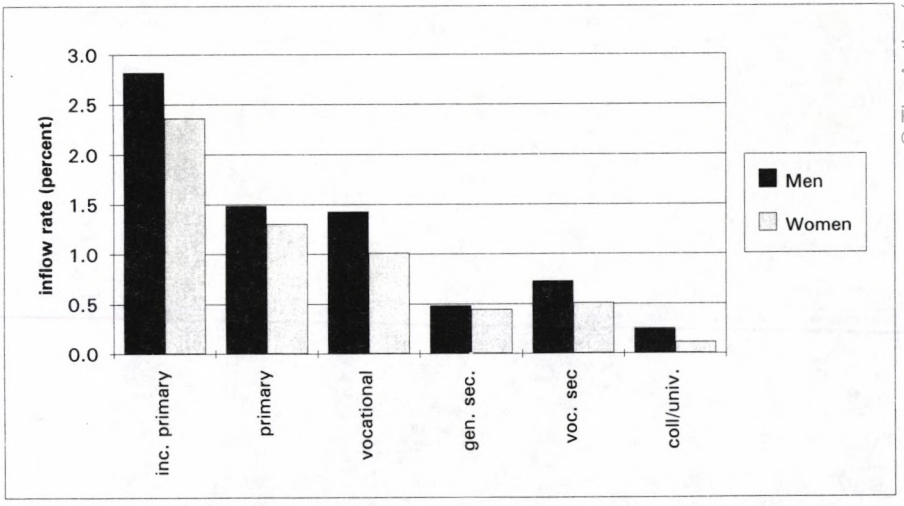


Figure 5: Inflow rates by county and sex

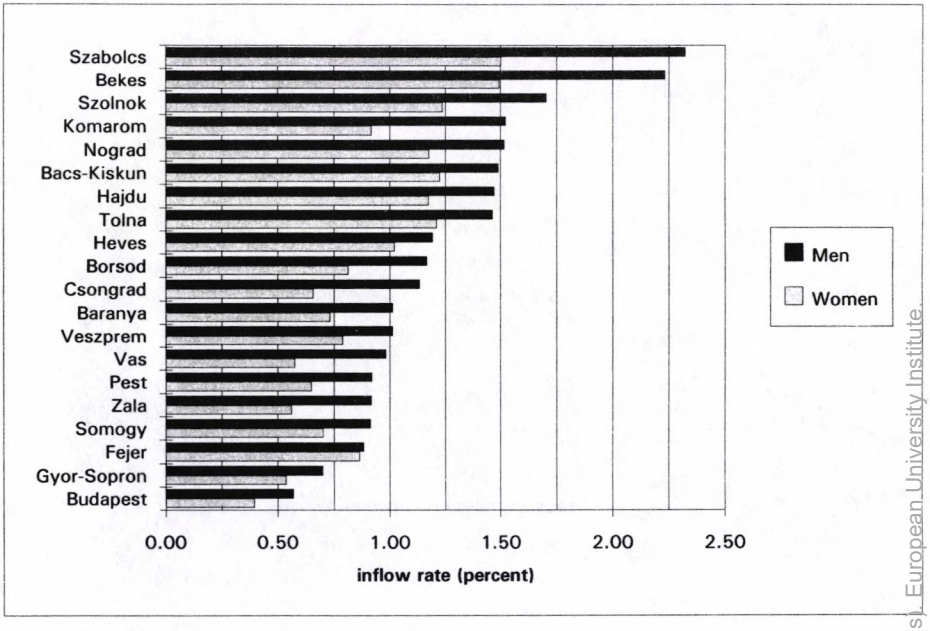


Figure 6: County Inflow Rates and Unemployment Rates in March 1992

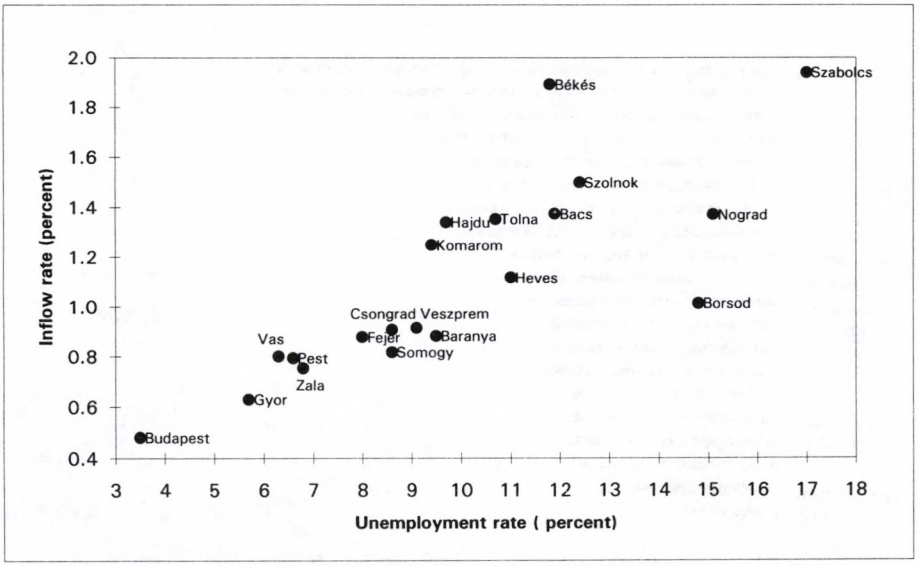
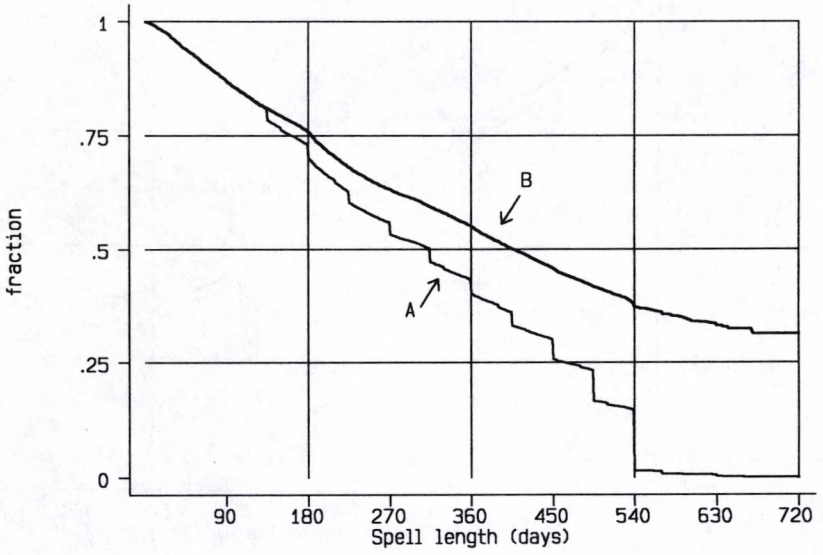


Figure 7: Survival function with different treatments of UI exhaustion




A: exhaustion of UI treated as an exit
B: exhaustion of UI treated as censoring

Figure 8: Survivor functions by sex

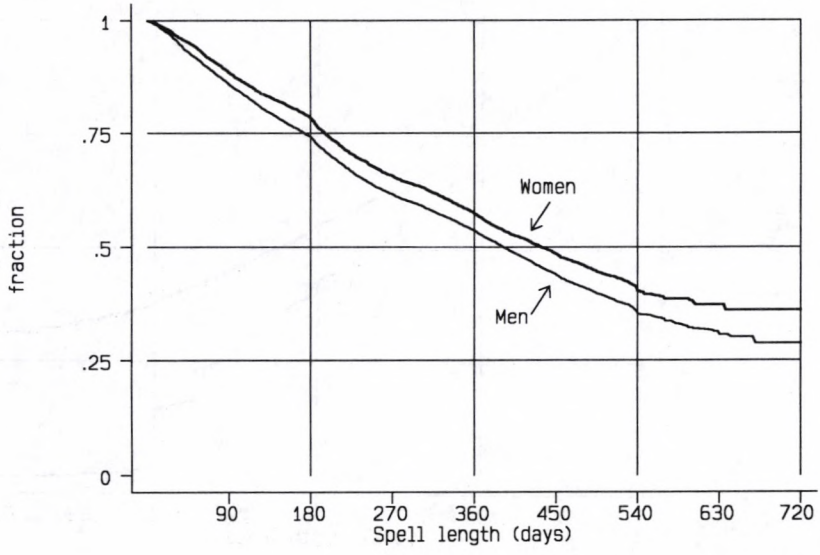


Figure 9: County Unemployment Rates and Three Month Outflow Rates

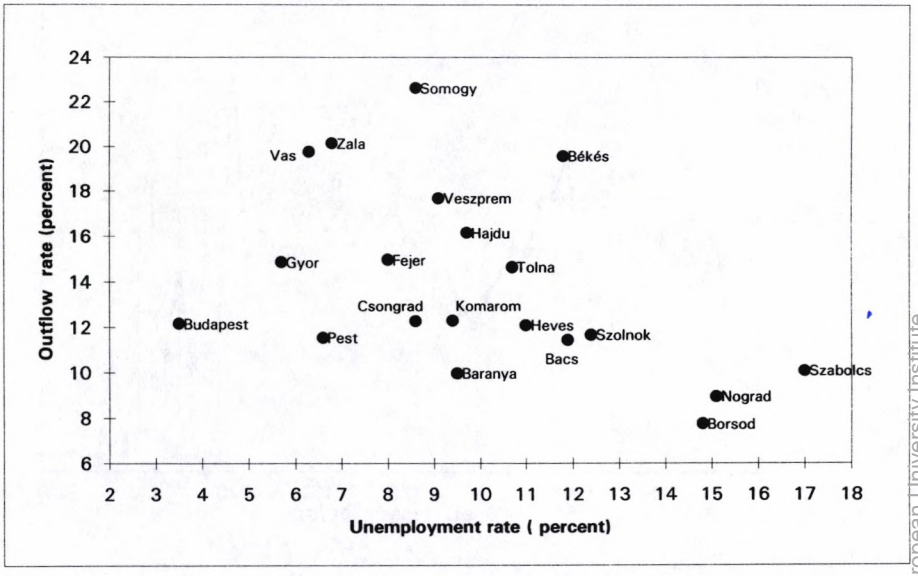


Figure 10: Hazard rate - exit to any state

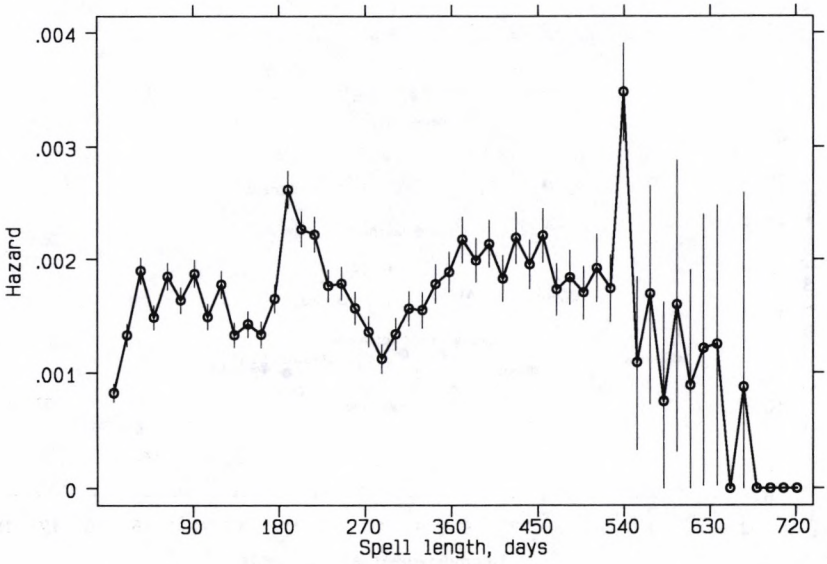


Figure 11: Hazard rate - exit to employment

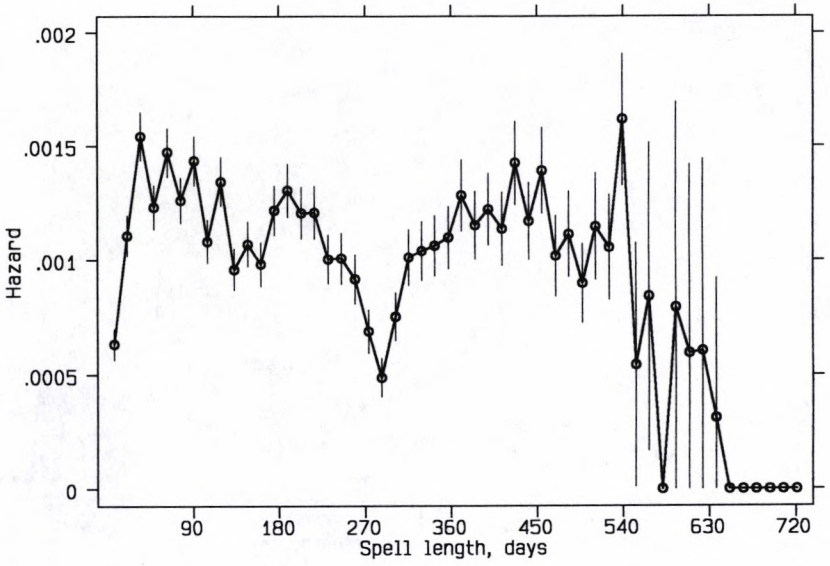


Figure 12: Hazard rate - exit to a state other than employment

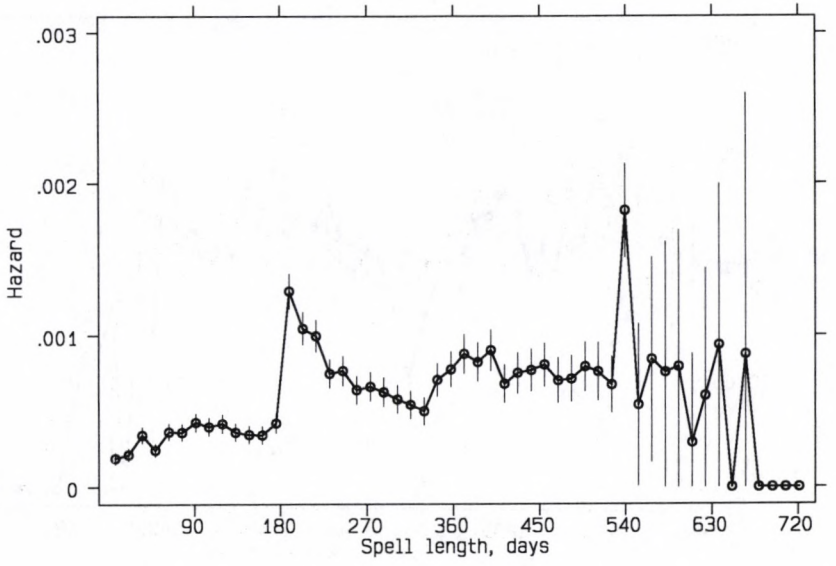
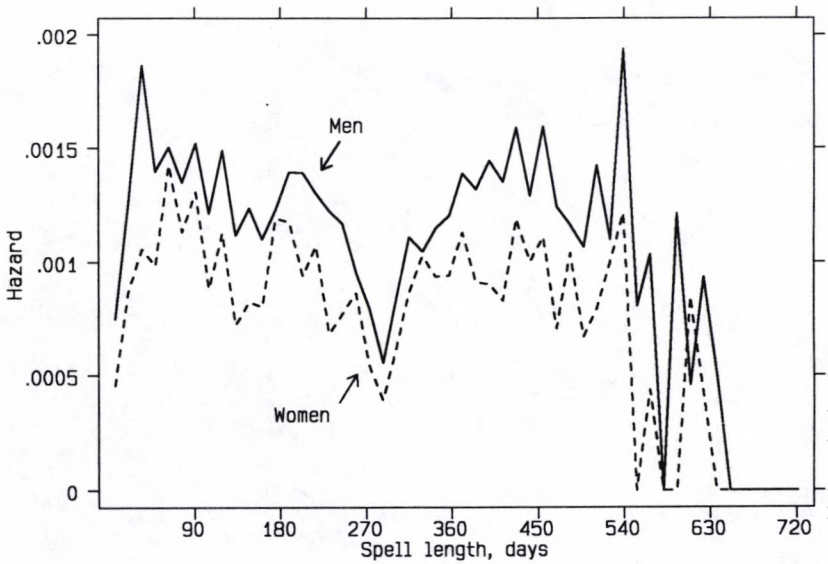


Figure 13: Hazard rates by sex - exit to employment



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