

**BUDAPEST WORKING PAPERS
ON THE LABOUR MARKET**

BWP. 2001/1

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January 2001

Budapest Working Papers No.2001/1
Labour Research Department, Institute of Economics, Hungarian Academy of Sciences
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This Research was undertaken with financial support from the SOCO Research Project. No. 98-1-155, and from the OTKA Research Project No. T 026113.

**THE PATTERNS OF NON-EMPLOYMENT IN HUNGARY'S
LEAST DEVELOPED REGIONS**

JÁNOS KÖLLŐ

***Abstract:** At the eve of 1999 the Hungarian government introduced radical reforms including a further cut of UI benefits and the abolishment of UA for benefit exhausters. The reforms were based on the assumption that the generosity of unemployment benefits combined with the availability of informal jobs bear responsibility for the low level of search activity and job finding.*

The welfare risk implicit in the reform is particularly high in Hungary's poorest regions where 50 per cent of the working age population is out of work. The paper analyses the specifics of non-employment in these regions and speculates about the possible impact of the reform. Generally the data do not provide strong evidence supporting the approach of the reform and raise concerns over its implications for the poorest regions.

The research is primarily based on discrete time duration analysis using LFS panel data from 1997-98. The data do not support the assumption that exit to job probabilities are strongly affected by benefit receipt. Informal incomes are likely to play a role in the stabilization of low employment levels in the Northern Plain (one of the two depressed macro-regions) but not in the North. Generally, the 'stagnant pool' characterisation of unemployment does not hold in these regions – they are in low-employment state combined with continuously (North) or seasonally (Northern Plain) high mobility.

***Acknowledgement:** The author thanks Zsombor Gergely for contributions to the paper, Gyula Nagy and Gábor Kőrösi for helpful advice and is grateful to Mária Lackó for allowing access to her estimates on the size of the informal economy. This research was undertaken with support from the Institute for Human Sciences' SOCO Program, which is financed by the Austrian Federal Chancellery's Fund for Cooperation with Central and Eastern Europe, and by the Ford Foundation.*

1. INTRODUCTION

At the eve of 1999 the Hungarian government chose new policies to combat the unemployment problem. The maximum duration of unemployment insurance benefit (UI) was reduced from 12 to 9 months.¹ The flat-rate, means-tested assistance benefit for UI exhausters (UA) was abolished. In the new regime the long-term unemployed may apply for means-tested general social benefit under the condition that they do publicly useful work for at least 30 days after application, for a payment not lower than the minimum pension but occasionally lower than the minimum wage. The turn to a new approach to the unemployment problem was completed in February 2000 when the government prohibited the National Labour Centre from publishing the registered unemployment rate.

These practical and symbolic reforms were based on strong assumptions about the nature of joblessness. In the debates preceding the reforms the prime minister and some members of his government blamed the generosity of unemployment benefits combined with the availability of informal jobs for the low level of search activity (which induces a wedge of 3–4 percentage points between the Labour Force Survey based and registry-based unemployment rates and a gap of about 35 percentage points between search unemployment and total joblessness). The stringent measures put in effect in May 2000 are expected to put an end to ‘unemployment holidays’, increase job search and thereby speed up the reemployment process.²

The reforms were admittedly not preceded by targeted research trying to measure up the suitability of the above mentioned actions and the relevance of the assumptions behind them. Research findings questioning the disincentive effect of UI benefit receipt (*Galasi, 1994; Micklewright and Nagy, 1994; 1995*); calling for a cautious weighing of pros and cons in the evaluation of UA (*Micklewright and Nagy, 1998*); hinting at inefficiencies in the public works program (*Galasi et al., 1999*) or calling into question the informational value of some key LFS data (*Micklewright and Nagy, 1999*) were ignored. No action was taken to predict how the reforms would affect the labour market in Hungary’s poorest regions where the welfare risk implicit in the reform is particularly high.

¹ Exception was made with workers joining retraining courses prior to the expiry of their benefits – they are entitled for an additional year of UI payment.

² It should be added that the prime minister’s original plan was setting the maximum duration of UI at 3 months with no allowance made for workers in retraining and stronger emphasis on workfare. The final outcome reflects a compromise between him and officials of the Ministry of Family and Social Affairs,

This paper addresses the regional aspect by looking at the composition and flow patterns of non-employment in Eastern and North-Eastern Hungary. At the end of the transition period less than 1/2 of the working-age population was in work in these parts of the country as opposed to nearly 2/3 in the western regions and over 3/5 in other districts. The relative position of the crisis regions has even deteriorated since then. Any policy bringing about radical change in the population's access to welfare assistance should, in my opinion, treat the implications for these districts – inhabiting 40 per cent of the non-employed workers who want a job – as a central issue.

Austerity measures of the type taken in Hungary may have positive impact on the depressed labour markets (at least on the long run) in case there is a strong causal linkage leading from access to informal jobs and benefits to low search intensity, low job finding probabilities and high rates of joblessness. The existence of this type of causality is undisputable. As unemployment rises and wages fall the return from searching and working diminishes which potentially leads to massive exclusion from the labour market in the depressed areas. This is particularly the case if the unemployment-related benefits are flat-rate or regionally unadjusted and the returns to informal activities or household production do not substantially differ across regions. Whether these effects are weak or strong is an open question, however, which calls for the empirical study of flows between labour market states.

Flows will be analyzed by following samples of non-employed (and employed) workers over time and estimating how personal, household-level and environmental characteristics affect their chances of finding employment (keeping their job). Stock samples observed in the 1997:1 and 1997:3 waves of the LFS will be followed for 1.5 years by pooling observations from six consecutive quarterly waves. Special attention will be paid to the effect of variables relating to job search, benefit receipt and the availability of informal jobs. In evaluating the results additional information will be drawn from the Household Budget Survey.

The data used in the paper are undoubtedly second best for the purposes of flow analysis and the study of incentive effects. Furthermore, the findings are subject to uncertainties due to the small sample size and the use of correlated region-level variables. The motivation to use these data and methods was partly given by the unavailability of better sources of information. The more important motivating factor, however, was to see what these distinguished, publicly available data sets (at the government's disposal among others) could have told about the feasibility of the reforms and their possible impact on the country's most depressed regions – had the reforms been preceded by some sort of data analysis.

The paper proceeds as follows. Section 2 will briefly introduce Hungary's regions. Section 3 deals with the modelling of labour market flows within the limits of the available information. Sections 4 presents the results of the discrete time duration models with special attention paid to regional turnover rates, job search and the estimated effects of the hidden economy and benefits. Section 5 discusses the implications of the findings for research and policy.

2. HUNGARY'S REGIONS

In preparing for the EU accession Hungary created seven statistical macro-regions³. We follow this categorization in presenting the principal data. The composition of the working age population – comprised of women aged 15-54 and men aged 15-59 – is shown in *Table 1* for the first quarter of 1997 which is the starting date of our analysis.

Table 1

The composition of the working-age population (WAPOP), 1997:1

Regions	Cent- ral	West Transd.	North Transd.	South Plain	South Transd.	North Plain	North	Total
WAPOP=100								
Employed	61,6	65,6	58,5	58,9	56,0	48,9	50,5	57,5
Full time student	15,7	13,9	14,1	13,5	13,7	13,1	12,4	14,1
Other (non-employed)	22,7	20,5	27,4	27,6	30,3	38,0	37,1	28,4
NON-EMPLOYED=100								
<i>Males</i>								
Retired	44,8	38,7	44,5	46,3	50,7	41,2	40,6	43,7
On child care	0,5	0,0	1,0	0,3	0,5	0,3	0,8	0,5
Receives UI	11,0	14,9	12,9	18,2	12,5	12,1	11,4	12,9
Receives UA	5,6	8,6	12,3	8,7	11,8	20,2	24,4	14,1
Wants a job	43,9	46,6	43,0	47,3	43,9	50,7	54,7	47,7
Searching	30,7	35,8	29,3	25,3	27,1	26,7	37,1	30,4
Searching/wants a job	70,0	76,7	68,2	53,4	61,8	52,6	67,8	63,9

³ See *Map A1* of the appendix.

<i>Females</i>								
Retired	24,2	19,1	19,9	27,2	26,7	27,8	27,6	25,2
On child care	35,7	43,9	44,0	34,9	36,0	36,1	34,4	37,0
Receives UI	6,3	8,8	4,5	5,7	7,0	6,1	6,6	6,3
Receives UA	3,8	3,2	7,2	4,4	3,7	7,4	9,8	5,7
Wants a job	25,2	22,3	27,9	26,9	29,3	27,6	36,7	28,1
Searching	14,0	13,9	12,3	11,0	13,1	9,0	15,2	12,6
Searching/wants a job	55,6	61,0	44,0	41,0	44,6	32,7	41,4	44,9

Source: LFS, 1997.Q1

As shown, in the Northern Plain (Szabolcs, Hajdú and Szolnok counties) as well as in the Northern region (comprised of Borsod, Heves and Nógrád counties) only one of two prime-age adults was in work. Almost 40 per cent was either unemployed or inactive. The latter ratio was almost twice as high as in the Western region (Győr, Vas and Zala neighbouring Austria and Slovenia) and some 50 per cent higher than in other regions.

The composition of the male non-employed population of the depressed regions was biased for people reporting that they wanted to have paid employment. The proportion of job seekers within this category sharply differed, however, with the Northern Plain having the lowest and the North having one of the highest rates of search intensity. The proportion of females wanting a job was close to the national average in the Northern Plain but much higher in the North. Search intensity was substantially lower than the national average in the former but close to the average in the latter case.

Workers receiving earnings-related, insurance-based UI benefits accounted for 12–15 per cent of the non-employed population in the case of men and 5–7 per cent in the case of women in the seven regions of the country. The regional differences in terms of UA receipt (means-tested, flat rate benefit available for UI exhausters and equal to the minimum pension) were much larger than that. In the depressed regions 20–25 per cent of the non-employed males and 7–10 per cent of the females received UA as opposed to the 14 and 6 per cent national average ratios, respectively. On the national level, 33 per cent of the working-age non-employed males who received no pension, child care benefit or UI were supported by UA. This ratio was 44 per cent in the Northern Plain and 52 per cent in the North. For females the respective shares were 18, 25 and 31 per cent.

Table 2

Basic indicators of Hungary's macro regions, 1997

	Cent- ral	West Transd.	North Transd.	South Plain	South Transd.	North Plain	North
<i>National average = 100</i>							
GDP ¹	149	105	96	78	78	69	67
Personal income ²	124	94	94	84	87	84	89
Educational level ⁵	107	101	99	96	98	94	97
<i>Per cent</i>							
Employment ratio ³	61,6	65,6	58,5	58,9	56,0	48,9	50,5
Unemployment rate (LFS) ³	7,7	6,8	8,9	9,9	9,9	12,8	15,8
Unemployment rate (reg.) ³	5,6	7,3	9,9	11,0	13,1	16,4	16,8
<i>Central region = 100</i>							
Wages ⁴	100	73	78	69	71	69	72
Wages (firms) ⁴	100	74	81	68	71	69	73
Wages (firms, adjusted) ⁴	100	91	95	88	87	84	84
Labour cost (firms, adjusted) ⁴	100	96	99	92	92	90	90
<i>National average = 100</i>							
<i>Industrial structure</i>							
Share of agriculture ⁵	44	107	96	171	128	142	88
Share of trade ⁵	122	109	99	97	103	95	90
Business density ⁶	179	75	76	77	79	56	55
<i>Proxies of the unregistered economy, based on:</i>							
Electricity consumption (a)	117	96	94	96	98	92	87
Electricity consumption (b)	106	99	93	105	103	99	96
Electricity consumption (c)	112	91	79	112	110	100	94
Employment (a) ⁸	106	89	78	144	98	93	72
Employment (b) ⁹	104	86	81	106	98	94	71

1) Central Statistical Office, 1997 2) Ministry of Finance, 1995

3) The LFS-based figures relate to the population aged 15-55/59. Registry figure: National Labour Centre, 1997

4) Budget institutions and firms employing 10 or more workers. 'Adjusted' stands for regression estimates holding gender, age, education, industry, firm size, ownership and, in the case of labour costs, the firm's productivity constant. Author's calculation from the National Labour Centre's Wage Survey 1997

5) 1990 Census. Educational level measured with schoolyears completed by the adult population.

6) Registered business establishments per 100 inhabitants 1995. Calculated from the CSO TSTAR data base

7) Mária Lackó's estimate using household electricity consumption data. (a) County level, Lackó (1999) (b) Micro-region level (c) Micro-region level, part of the informal economy related to agricultural activities. Lackó (2000b). For details see Section 3

8) Persons working at least one hour on the reference week without having an employment contract. All persons working at least one hour = 100. Mean value from the 1997-98 waves of the LFS. See Section 3.

9) Same as 8) but sole-proprietors and assisting family members excluded

These data call the attention that despite their similar employment ratios (and some similarities in the composition of their non-employed population) major differences exist between the depressed Northern Plain and North. *Table 2* summarises further indicators reinforcing these first impressions.

Both regions have low GDP and wage levels; have always been characterized by low share of the tertiary sector; and they both have low levels of business density (only slightly higher than half of the national average in 1995).

The list of dissimilarities might be started with the ratio of LFS to registry unemployment – 94 per cent in the North but only 78 per cent in the Northern Plain – and followed by indicators of their industrial composition. The urban centres of the North have been heavily industrialized under state socialism and, as suggested by the available estimates and proxies, has a rather undeveloped informal economy. The Northern Plain has rural character. Its informal economy appears to be large compared to the North but rather small compared to other rural areas. The population of the Northern Plain has particularly low educational level while the North is better off in this respect.

These pieces of information suggest that ‘single-issue explanations’ are likely to fail in explaining why Hungary’s north-eastern regions have so extremely low employment levels. The presence of a variety of possible factors – rather differently mixed in two groups of counties – calls for addressing the problem using individual observations and this is what the forthcoming chapters will try to do.

3. ANALYSING FLOWS - MODELLING AND DATA

3.1. Modelling

In analysing flows we shall rely on standard assumptions of the theory of job search assuming that job finding probabilities are affected by reservation wages on the one hand and ‘job offer arrival rates’ on the other. The former will be measured indirectly using household-level, individual and region-level variables capturing workers’ income while non-employed whereas the latter will be approximated by means of variables depicting the markets where workers look for jobs.

Flows from non-employment to employment will be analysed with the ‘easy estimation method for discrete time duration models’ proposed by *Jenkins* (1995) for the ‘serious but occasional econometrician’. The model is used

to estimate how personal and environmental characteristics affect the probability that a spell of non-employment started t quarters ago is interrupted by exit to employment before the $t+1$. quarter.

Our samples consist of people aged 15-54/59 who did not work, or worked less than one hour, on the week before they were interviewed in the 1997:1 or 1997:3 waves of the LFS.⁴ The Hungarian LFS is a rotating panel with each cohort staying in the sample for six quarters. The workers in the stock samples or 'risk groups' are thus observed for up to 6 quarters. People may leave the risk group by entering employment or dropping out from the LFS, whichever comes first.

As *Jenkins* (1995) shows randomly selected stock samples observed in regular time intervals like these ones can be conveniently analysed with discrete time duration models. The convenience stems from the fact that the model can be transformed to a binary choice model by transforming the data, notably, by treating quarterly (weekly, monthly) spells rather than individuals as the units of observation. Each individual contributes to the sample likelihood with as many quarterly spells as he or she has with a known outcome. In the transformed model the dichotomous dependent variable refers to a quarterly spell: 1 stands for exit to employment and 0 stands for survival in non-employment. Spells ending in drop-out from the LFS are disclosed from the sample (that is analogous to censoring in continuous-time hazard models). The model, if estimated with logit, has the form of:

$$(1) \quad \ln[h(t)/(1-h(t))] = f(t) + \mathbf{b}'(\mathbf{X}, \mathbf{Z}_t)$$

where h designates the conditional probability of exit to employment between the t . and $t+1$. quarters of joblessness, t stands for quarters spent in non-employment and X and Z_t are vectors of explanatory variables. The Z variables can change from spell to spell during the observed period. Unless t varies in a very wide range the best choice for measuring duration effects is defining $f(t)$ as $\mathbf{b}'[t_1, t_2, \dots, t_k]$ where $t_k = 1$ if $t=k$ and 0 otherwise. Unlike in basic continuous-time duration models assuming non-constant hazard (like the Weibull) the b -s of the discrete-time model can capture non-monotonous changes in the baseline hazard.

In analysing flows from employment to non-employment the event of interest will be slightly differently defined because the LFS provides no information on the duration of employment spells. What is recorded is tenure in the job held by the respondent so what we can actually analyse is the prob-

⁴ Full time students are classified as employed and shifts to full time studies are treated as exit from non-employment.

ability that a job spell started t quarters ago is interrupted by exit from the job before the $t+1$ quarter.

Before starting we first discuss why the analysis addresses flows between employment and *non-employment* rather than unemployment, as usual. Secondly, a more detailed account is given of how the dependent variables were defined. Third we discuss how the explanatory variables were selected and introduce the specifications.

3.2. Why non-employment?

The forthcoming analysis sets the dividing line between employment and non-employment rather than employment and (search) unemployment. There are some general and specific reasons justifying this choice.

Generally, the usefulness of making strict *ex ante* distinction between unemployment and non-participation is questionable in an economy recovering from a deep recession. Large flows back to the labour force in such periods have been observed in the US (*Clark and Summers, 1982*) as well as in Western Europe (*Decressin and Fatás, 1995; Jimeno and Bentolila, 1998*). This is expected to happen in Hungary too, as suggested by a recent paper of *Micklewright and Nagy (1999)* based on LFS data from 1997–98. Their paper shows that non-employed men who were actively searching (the ‘unemployed’) and those who were just wanting a job (the ‘inactive’) had equal probabilities of being hired during the survey period. It was not the case with women, however.⁵

Specifically, some pieces of information raise the conjecture that the Hungarian LFS crudely overestimates the rate of male inactivity. In the LFS-based statistics Hungary appears as a heavy outlier with far the highest prime-age male non-participation rate in Europe: 15 per cent as opposed to 11.9 in the Netherlands and 9-11 per cent in most of the continent’s low-employment countries. (*KILM 1999*). This is shown at the scatterplots of *Figure A1*, comparing LFS-based unemployment and inactivity rates in the population aged 25–54 for European countries where both figures are available.

⁵ The analysis will be similar to that of *Micklewright and Nagy (1999)* in several respects: the dividing line will be set between employment and non-employment; flows will be analysed by means of discrete time duration models; panels constructed from consecutive waves of the LFS will be used. I shall deviate from their path of analysis at several points, however. While they studied an inflow sample this paper will follow several stock samples. The emphasis will be on regional differentials – an aspect of secondary importance in their paper. Last but not least, this paper will look at flows into both directions.

Further suspicions arise because the LFS unemployment figure lags substantially behind the registry-based rate: 6.6 versus 10.4 per cent, as rumours said in March 2000. The measures of search unemployment reported in various surveys of the Central Statistical Office are themselves differing depending on the formulation of the questions asked from the respondents. In 1996 when data on economic activity were simultaneously collected in the LFS, the Microcensus, and the Household Budget Survey (HBS) the rates for workers aged 15-54/59 were 10.8, 12.2 and 16.4 per cent, respectively.⁶ These surveys applied job search as the criterion of classification but the questions were differently asked, with the LFS being the most restrictive in classifying workers as ‘unemployed’. The differences between the job seeker/WAPOP ratios calculated from the LFS and the HBS were 6.0 percentage points for men and 3.7 points for women, respectively.

In view of these specifics we prefer distinguishing between employed and non-employed workers and letting the estimation results tell how to disentangle ‘unemployment’ from ‘non-participation’.

3.3. Why 1997–98?

The Hungarian LFS was started in 1992 and the waves of 1999 are already available for researchers now, in April 2000. Despite of that the analysis should be restricted to the waves between 1997:1 and 1998:4. Prior to 1995 workers classified as ‘inactive’ were not asked about their duration of joblessness. In 1995-97 duration was coded very roughly in the case of the inactive. Therefore 1997:1 is the first wave providing usable information on duration.

In 1999 no distinction was made between full-time students and other inactive persons. Therefore 1998:4 is the last wave yielding meaningful information on the size of the non-employed population.

3.4. Defining job finding

A quarterly spell was supposed to be interrupted by exit from non-employment in two cases. (i) The worker was observed as non-employed in t and employed in $t+1$ (ii) The worker was observed as non-employed in both t and $t+1$ but he/she reported a non-employment spell shorter than three months in $t+1$. Full-time studies were treated as employment, conse-

⁶ Own calculations using data from the Microcensus, the HBS and the 1996:2 wave of the LFS.

quently students were excluded from the risk group and shifts to full-time studies were treated as exit to employment. Workers were followed until exit or drop-out, that is, they were not ‘allowed’ to return to the risk group once they left it. Workers supposed to reach the retirement age in 1998 were excluded from the analysis. The models were separately estimated for men and women.

3.5. Explanatory variables – Individual level

Among the variables affecting the value of being non-employed I considered the number of children (distinguishing between kids under 7, aged 7-15 and youngsters older than 15); status in the household (husband or wife, child, relative, other); employment status of the spouse; the dependent/wage earner ratio of the household; and the receipt by the respondent of pension, child care benefit, UI or UA. (No information was available on social transfers received by other household members. Social transfers other than the above-mentioned were not observed in the LFS). The access of workers to income while non-employed was approximated with region-level proxies of the informal economy discussed later in this section.

The number of job offers examined by the workers was assumed to depend on search behavior. Workers classified as unemployed by the CSO on the grounds that they were searching and were available for employment have been distinguished from those reporting that they simply wanted a job without searching. The latter group is broader than the CSO’s category of ‘discouraged workers’ that is restricted to workers having lost their jobs ‘for economic reasons’ as stated in the questionnaire.

The dummies relating to search and social transfers were time-varying, that is, were allowed to differ between spells belonging to the same individual. However, as shown by the survival analysis of *Micklewright and Nagy* (1999) and reinforced by my own calculations workers searching in the first quarter were rather likely to search throughout the survey period. This applies even more to benefit receipt.

Both the search- and the benefit-related variables were tested using interactions with local unemployment and regional non-employment. Being flat-rate the UA benefit increases the income replacement ratio by higher rates where unemployment is high and wages are low therefore its disincentive effect is expected to be stronger in depressed regions.⁷ Search may

⁷ In fact, this applies to some extent to the earnings-related UI benefit, too, because a high proportion of the recipients are entitled to the minimum benefit as shown in another paper by *Micklewright and Nagy* (1995).

have lower return in high-unemployment regions where locating a vacancy is more costly.

Finally, the probability of job finding was assumed to depend (potentially) on the duration of joblessness. Since the LFS provides only crude information on workers and their careers the time coefficients are also expected to capture changes over time in the composition of the risk group. (Workers with higher prior probability of job finding are likely to leave the risk group faster which results in declining exit rate over time even in lack of duration dependence.) Further uncertainties arise because the period of follow-up was short relative to the mean duration of jobless spells at the moment of sampling (5,5 quarters with men and 6,5 quarters with women selected for a deeper analysis). This implies that the baseline hazard actually reflects the effect of a selection procedure taking place before rather than during the observed period.

The duration of joblessness was measured with quarter dummies designating the time elapsed since the start of non-employment. Workers non-employed for more than 28 quarters – those having lost their job before 1990 and those who left school before 1990 but never worked – were treated as if they had been non-employed for 29 quarters and actually dropped from the analysis after a first, exploratory stage of the estimations. The detailed analysis refers to workers having lost their job after 1992. (See *Appendix 1*).

3.6. Explanatory variables – Region level

The ‘job offer arrival rate’ was assumed to depend on demand conditions in the regions approximated with the registered unemployment rate of the worker’s labour office district. (Hungary has 169 such districts with an average population of 47 thousand plus the Budapest district with 2 million inhabitants).

Proxies of the informal economy need a more detailed introduction. On the one hand we used *Mária Lackó’s* (1999) widely acknowledged estimates based on electricity consumption data.⁸ The county-level panel estimations rely on a two-equations model. The first equation of the structural form is based on the assumption that total electricity consumption depends on regional GDP, the contribution of industry to GDP, the share of energy-intensive branches within industry, the use of alternative sources of energy

⁸ *Lackó’s* model was primarily developed for cross-national comparison. *Lackó* (1998) and (2000a) give detailed account of how the estimations proceed. The model and the results will be extensively discussed in the forthcoming March 2000 issue of the *Journal of Economic Literature* as well.

and the size of the informal economy. The second equation tries to capture the benefit for workers and costs for employers of formal (registered) as opposed to informal transactions and the scope for evading registration. The size of the informal economy (a latent variable) is assumed to be negatively affected by net wages holding labour costs constant, positively affected by labour costs holding net wages constant, and also influenced by the per capita number of registered sole-proprietorships in the county. By substituting the second equation to the first Lackó comes to an estimable reduced form and predicts the size of the informal economy by substituting the estimated coefficients back to the second equation. We use her estimates for 1995 suggesting that 19 to 24 per cent of the electric energy was used in the informal economy in the country-side and 29 per cent in Budapest.

Lackó (2000*b*) also provides estimates for micro-regions. In this model household electricity consumption is regressed on household income levels, alternative sources of energy and proxies of agricultural activities known to create informal job opportunities like the production of wine and sugar (brandy, that is). I tested several indicators drawn from this model but they have been working less successfully than the county-level estimates, as yet.

The county-level estimates of the informal economy are rather strongly correlated with the size of the tertiary sector. This is measured with employment in trade (1990) and related to *Lackó's* estimates on panel (a) of *Figure A6* of the Appendix. Undoubtedly, since the tertiary sector is one of the major fields of informal employment the finding of a strong positive correlation can be interpreted as a piece of supporting evidence.

A doubtful interpretation would note that the share of the hidden economy for region k (designated with h_k) is calculated in *Lackó's* model after all as:

$$(2) \quad h_k = (aT_k + bW_k + cS_k) / E_k$$

where W stands for the employers' wage cost, T stands for wage-related taxes paid by the employees, S stands for (lagged) self-employment, E denotes energy consumption and the parameters a, b and c come from an equation where the impact of W, T and S on E had been controlled for GDP, degree of industrialization, composition of manufacturing and the use of alternative sources of energy. One might argue that out of two regions with similar GDP levels and degree of industrialization the one with higher wages, more small businesses and lower energy consumption will have a higher estimate of h_k irrespective of how many of the businesses are registered. If our understanding of the model is correct high values of h_k

may hint at developed regions with economies biased for the tertiary sector and small businesses.

This conjecture is supported by the patterns of correlation between h_k , the size of the tertiary sector (S) and agriculture (A). Calculating county-level partial correlation coefficients we get $r(h,S) = 0,71$ and $r(h,A) = -0,1$ that is insignificant even at the 0,6 level.⁹ *Lackó's* estimates seem to be practically unaffected by the size of agriculture though this sector is an undoubtedly important provider of unregistered jobs. It may be the case that the tertiary sector is even more important, justifiably dominating the estimates of the total hidden economy. Alternatively, h_k may be interpreted as a fine measure of the level reached by a region in the course of modern, post-industrial economic development.

In any case there is a need to find variables approximating the size of the rural informal economy that is apparently not reflected in *Lackó's* county level estimates. Hungary's land is cultivated by large capitalist enterprises (once Soviet-type cooperatives) on the one hand and private farmers on the other, and I believe that informal jobs are typically offered by the latter. The size of this sector was approximated with the ratio of self-employed persons and their assisting family members to the total employed population. In order to rely on a sufficiently large number of observations this indicator was calculated by pooling eight waves of the LFS (1997:1–1998:4) and taking county-level means. The relation between the size of the total agricultural sector and this indicator is shown on panel (b) of *Figure A5*. There is rather strong connection between the two variables but Bács and Csongrád counties have particularly high rates of self-employment. These regions indeed have labour-intensive agriculture (fruit, wine, gardening in heated tents) and have always been renowned for employing 'black' labour on a massive scale. By contrast, Hajdú or Szolnok with similar size of agriculture – dominated by large estates – have low rates of self-employment.¹⁰

The introduction of the variables ought to be continued now with explaining how the informal economy is expected to affect job flows in principle and in the LFS-based panel samples under examination. The sequence will be reversed by estimating the effect of the proxies first and discussing their interpretation later in Section 5.

⁹ S and A relate to employment in the given sector divided by the active population on the basis of the 1990 census.

¹⁰ Note that this indicator is different of the one used in *Lackó's* estimates (per capita registered sole-proprietorships). The county-level correlation between them was 0,105 in 1995.

3.7. Sample restrictions

The non-employed population as a whole is too heterogeneous for being analyzed with a single model. In order to see the main differences between groups, detecting outliers and thus arriving at a reasonably defined sample the hazard models of job finding were first estimated for the total sample (*Table A1*) and workers having lost their job after 1989 and not receiving pension (*Table A2*). The most important individual-level variables and county dummies were used.

The data suggest that prime-age workers receiving pension (retired men in particular) are very unlikely to return to employment. Given their close-to-zero exit rate and large share in the jobless stock the best choice is excluding them from further analysis.

Most of the variables depicting the respondent's status in the household like marital status, size of the family, or the labour market status of the spouse proved insignificant in almost all specifications and sub-samples and were omitted already from *Tables A1* and *A2*. The number of children appeared to affect women's exit rate and was chosen for closer inspection. Males living with their parents and/or studying part-time appeared to have lower than average exit rate in some specifications. The case was just the opposite with females but the effects were insignificant in most cases.

The receipt of UI had no measurable effect on job finding in the various specifications and sub-samples tested as also shown in *Tables A1* and *A2*. Omitting this variable had no impact on other parameters (including those capturing the baseline hazard) therefore it was not used in the estimations later on.

The estimated baseline hazard of men appeared to decrease until about the 15th quarter of joblessness and seemed untrended later (*Figure A2*). In the case of females there is a temporary increase in the hazard at about 3 years of non-employment when mothers typically return to employment after baby-care. After this point the hazard seems to have no trend.

In view of these first results the analysis of job finding was restricted to workers who received no pension during the survey period and had a job before which was lost later than 1992. Setting the latter limit is justified by the shape of the baseline hazard (*Figure 2*) suggesting that a selection procedure is at work among the non-employed with less than 4 years of joblessness while in cohorts 'older' than that the exit rate is uniformly low. Models were estimated for these cohorts too but the results will be only briefly mentioned.

Instead of region dummies the equations include region-level means of variables relevant for the choice between employment and continued non-employment. The registered unemployment rate was measured on the level of 170 micro-regions and was time-varying. Lackó's measure of the informal economy and the ratio of self-employment to total LFS-based employment were used to capture the size of the informal economy on the county level, as was discussed earlier. Dummies stood for Budapest and villages with less than 3,000 inhabitants. Likewise, dummies were used in some sub-samples to distinguish heavy outliers like Hajdú or Vas counties.

3.8. Analysing jobloss

A quarterly spell of employment was supposed to be interrupted by exit to non-employment in two cases. (i) The worker was observed as employed in t and non-employed in $t+1$ (ii) The worker was observed as employed in both t and $t+1$ but he/she reported a job spell shorter than three months in $t+1$. Full-time students and workers supposed to reach the retirement age in 1998 were excluded from the analysis. Moves from employment to full-time studies were treated as drop-out from the survey. The analysis was restricted to workers reporting that they had a main job at the time of sampling and telling the starting date of that job.

The termination of a job spell was treated as an event which always leads to non-employment, that is, cases when an employment spell was interrupted by a short period of joblessness – non-employment was just a way station between two jobs – were not singled out.

One reason to do so was that we obviously lack information on the duration of joblessness in case of workers leaving the risk group during the last period of observation. Generally, the later they left the less was known about their career making a classification by type of exit difficult and partly impossible.

Another way of distinguishing between types of exit could have been using information on the causes of jobloss or quit. Unfortunately, the answers to this question are rather difficult to interpret because of a large number of partly overlapping options offered for the respondents. Furthermore, 'voluntary quits', retirement, or moves to maternity aid are often motivated by the deterioration of a worker's job prospects therefore these answers do not provide a solid ground for distinguishing between jobloss and voluntary job change.

Finally, and most importantly, I thought there was no need for such a typology. If the rates of job termination are equal in regions A and B but

voluntary labour turnover is higher in A it should appear in the exit to job equations referring to the same period.

The explanatory variables of this model were age; the level of education; legal status of the worker (employee, self-employed, casual worker and so on); usual worktime; industry and the same regional variables as in the exit to job equations. The duration of the job spell was measured in the same way, too. Spells started prior to 1990 were treated as 29 quarters long in 1997:1 and 31 quarters long in 1997:3 but it bore no great importance because these observations were excluded after the first, exploratory stage. The models were estimated for workers having lost their jobs after 1992.

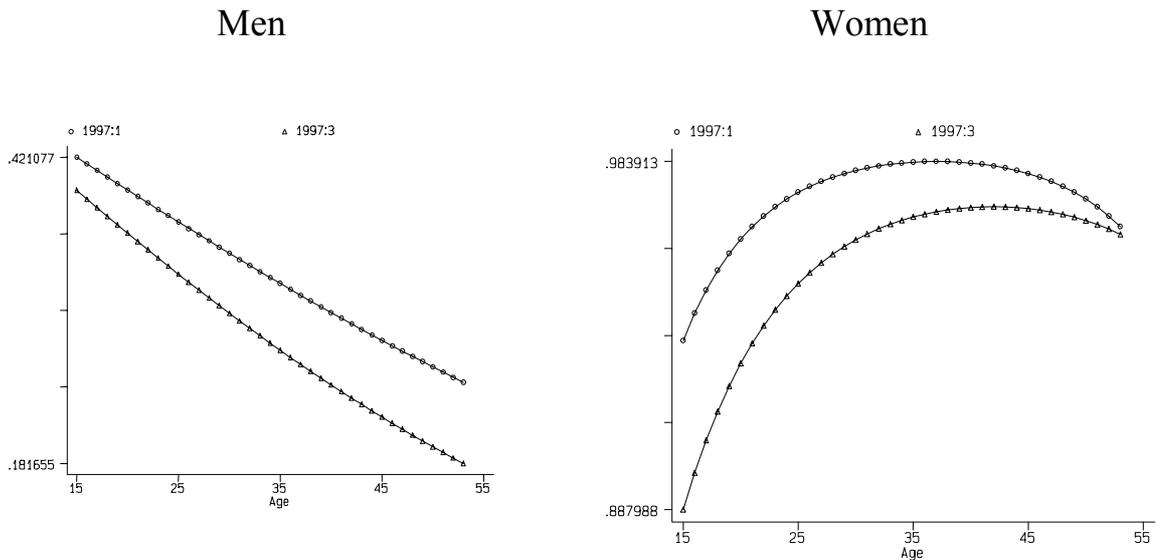
4. RESULTS

This section first presents the results on the effect of basic individual variables like age or education and the results of the jobloss model. Then it turns to the issues of regional turnover rates, job search, benefit effects and influence of the informal economy. The estimated coefficients, test statistics and sub-sample means of the variables are presented in *Tables A5–A8* (job finding) and *A9–A12* (jobloss). Charts are attached to show the shape of the baseline hazard. In the text the results are summarised for the two genders and periods with the aid of small, untitled summary tables and figures.

4.1. Individual differences in job finding

Age. The effect of age on exit sharply differs by gender. Men's job finding probability falls with age. Young and elderly women are less likely to return to employment than their middle-aged counterparts. The age-exit profiles are shown below for the two genders and samples suggesting that older men and younger women benefited the most from the supply of seasonal job opportunities available for the stock of 1997:1 but not for the 1997:3 cohort.¹¹

¹¹ The profiles are similar for men having lost their job prior to 1993 but age effects are insignificant in the case of women.



Excerpt from *Tables A5–A8*. Predicted at zero value of all other variables.

Education. The level of schooling has marked effect on job finding probabilities though the differences by gender and season are non-trivial. The summary table below shows the estimated odds ratios treating primary school attainment as the reference category.

	1997:1	1997:3	1997:1	1997:3
	Men		Women	
Vocational	1,26	1,75 ^{***}	1,53 ^{**}	1,72 ^{***}
Secondary	1,36 [*]	1,71 ^{***}	1,75 ^{***}	2,35 ^{***}
Higher	2,87 ^{**}	2,25 ^{***}	2,14 ^{**}	3,34 ^{***}

Excerpt from *Tables A5–A8*.

Significant at the *) 0,1 **) 0,05 ***) 0,01 level

Females with secondary school attainment seem to have higher advantage over primary school graduates than have males. This is consistent with the fact that females have high share in general and business-related as opposed to technical secondary education. The parameters suggest that primary school graduates, males in particular, had less difficulty in finding a job in January–June than in July–December.

Family status. Persons who live with their parents account for almost 1/4 of the non-employed males with previous job experience but only 1/20 of the females. The boys do not differ from other jobless persons in terms of

exit probability but the girls are about twice as likely to find a job then to stay compared to other jobless females.

The number of children has no effect in the case of men. Women with children were less likely to find employment in the 1997:1 sample but not in the 1997:3 sample raising the conjecture that seasonal job opportunities were typically taken by women without children. The same is suggested by the parameter for the receipt of child care benefit (CB) that has negative albeit insignificant effect in the 1997:1 sample and no effect in the 1997:3 sample.

The number of children and CB receipt are correlated therefore including both of them into the equations may potentially bias their parameters. Dropping the number of children from the equations results in significant negative parameter for CB receipt in the 1997:1 sample (0,63 significant at the 0,01 level) but not in the 1997:3 sample (0,88 significant at 0,51). By contrast, dropping CB receipt has no effect on the parameters of the number of children. (Odds ratios of 0,813 versus 0,833 in the first sub-sample and 1,044 versus 1,049 – both insignificant – in the second). From this we conclude that the number of children rather than the receipt of child care benefit is what actually affects women's choice and/or 'employability'.¹²

Baseline hazard. On the basis of the likelihood ratio tests we can reject the assumption of constant hazard in the samples analysed. (It was not the case with workers having lost their job prior to 1993). The baseline hazard was decreasing with men. With women the hazard was falling until $t=10$ but increasing after this point until about $t=14$ and falling afterwards again. At the given sample size the 95 per cent confidence intervals are wide making the evaluation of the estimates rather difficult. Further difficulties arise because the period of follow-up was short relative to the mean duration of jobless spells at the moment of sampling, as was previously discussed.

4.2. DIFFERENCES IN JOBLESS

Age. The probability that a job spell terminates falls with age in the case of men and estimated to be virtually unaffected by age in the case of women. Younger workers had somewhat higher probability of losing/leaving their job in the 1997:3 sample but the differences across samples are minor.

Education. The more educated a worker the less likely the event of job-loss/quit. The relative risk of jobloss of male primary school graduates

¹² The same patterns and magnitudes apply to women having lost their job before 1993.

seemed to be higher in the 1997:3 sample than in the 1997:1 stock as shown by the odds ratios below. It was not the case with women.

	1997:1	1997:3	1997:1	1997:3
	Men		Women	
Vocational	0,827*	0,614	0,701	1,230*
Secondary	0,760*	0,699	0,577	0,864*
Higher	0,623*	0,416	0,518*	0,514*

Excerpt from *Tables A9–A12*.

*) Significant only at the 0.1 level

Job status. Compared to employees, the members of coops and partnerships, sole-proprietors and owners had low probability of leaving employment. Casual workers employed in 1997:3 were very likely to lose their position (unlike those in the 1997:1 stock). Part-timers and workers reporting that their *usual* worktime is highly volatile or zero (in their main job) had higher than average risk of jobloss.

Industry. Perhaps surprisingly, industry effects appear to be rather weak. In the 1997:1 male and female sub-samples all the coefficients are insignificant. In the 1997:3 male sample only the public sector had a significant positive parameter (a curiosity we can not explain at present) while in the female sub-sample agriculture and food appears as a major source of job-loss that is consistent with the expectations.

Time patterns. *Tables A9–A12* present specifications including quarter dummies alongside with the duration dummies. The coefficients suggest that workers observed as employed in January-March 1997 were rather likely to lose their jobs in July-September 1997. Further evidence of seasonality emerges from *Figure A5* showing the baseline hazards reestimated after dropping the quarter dummies. The hazards begins to fall at $t=5$ in the cohorts followed from 1997:1 but already at $t=1$ in the samples of the 1997:3 stock. Generally, shorter job spells were more likely to terminate. The standard errors of the estimates are rather large at the given sample size but the likelihood ratio tests reject the assumption of constant hazard.

4.3. REGIONAL TURNOVER RATES

The coefficients of the exploratory specifications presented in *Tables A1-A4* provide a first, crude overview of regional differentials. As shown in *Figure A4* men's probability of job finding was above the average in the low-employment counties of the North and the Northern Plain (with the exception of Hajdú) in the 1997:1 sample. In the case of women a clear negative correlation seemed to emerge between the employment ratio and the exit rate with the low-employment counties having the highest exit rates (and Hajdú and Vas being heavy outliers).

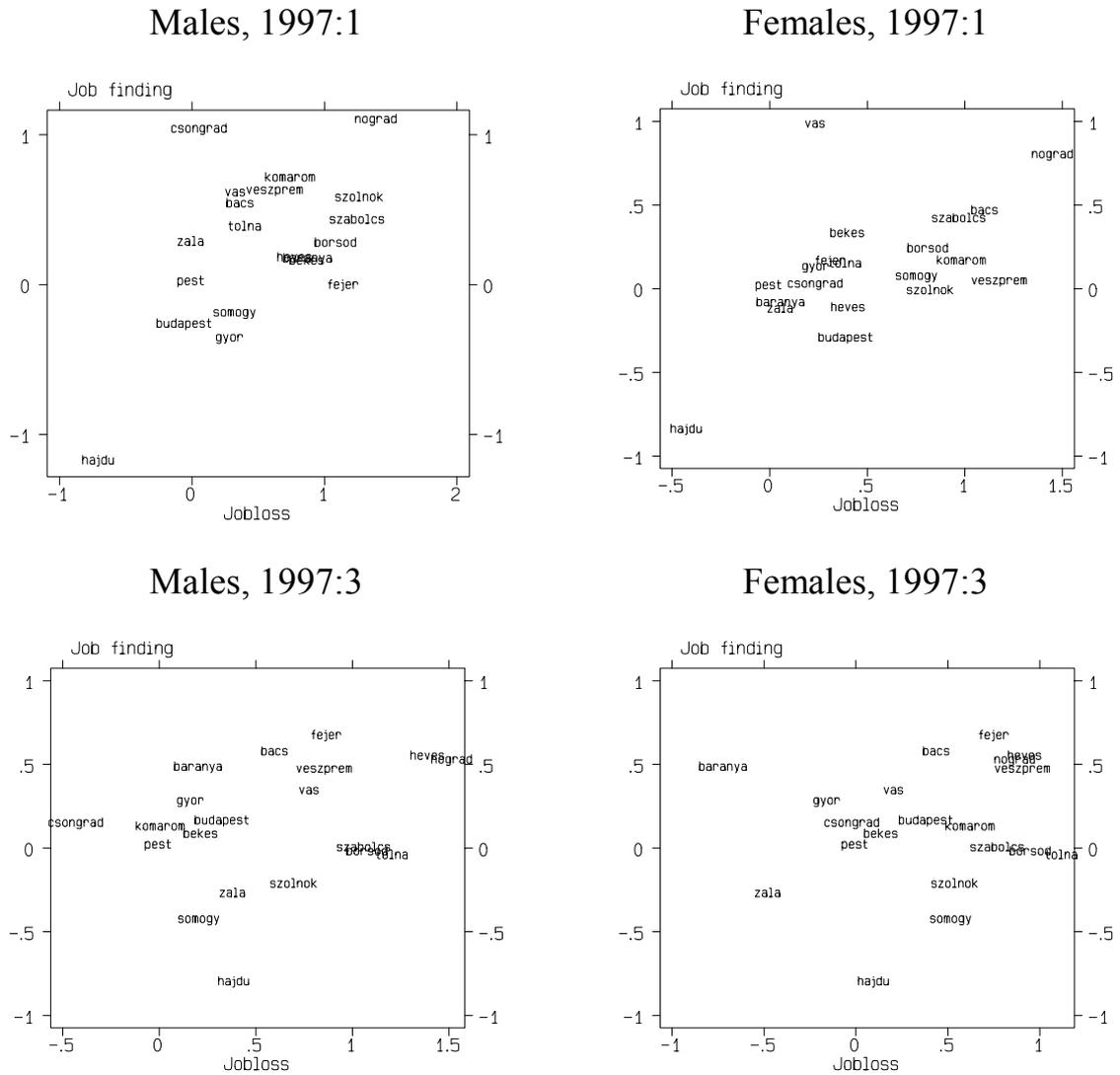
In the 1997:3 sample of males the estimates for Szabolcs, Borsod and Szolnok fell close to the national average. Nógrád and Heves continued to have high exit rates and Hajdú was an outlier with extremely low job finding rate in this sample, too. In women's case the negative correlation between the employment ratio and job finding became apparently weaker but it was still true in the 1997:3 sample that the low-employment counties of the North and the Northern Plain (except for Hajdú) had higher than average exit rates. Vas county deviated from the 'mainstream' again by having an exceptionally high rate of job finding.¹³

Job finding and jobloss rates were rather closely correlated in the 1997:1 sample as shown in *Figure 2*. Low-employment counties typically had high flows between employment and non-employment with the notable exception of Hajdú county. In the 1997:3 sample the positive connection between jobloss and jobfinding became weaker in the male sub-sample and virtually disappeared in the female sub-sample. The counties of the North (Nógrád, Heves and Borsod) continued to have high jobloss rates while their job finding rates were also close to, or higher than the national average. By contrast, the counties of the Northern Plain (Szabolcs, Szolnok, Hajdú) had high jobloss rates combined with average or low rates of job finding.

The first results, crude as they are, thus call into question the general belief that the non-employed stock of the depressed regions should be thought of as a 'stagnant pool' with very low turnover for either demand- or supply-side reasons.

¹³ We note here that the coefficients of the county dummies in *Tables A1* and *A2* are often insignificantly different from the base category (Pest county). This comes as no surprise given the small number of exits. The impressions from these first results will be reinforced, however, by the evidence presented later.

Figure 2

Regional (county-level) differentials in job finding and jobloss(Estimates from *Tables A1 and A3*)

The results also call the attention that beside the rate of unemployment – that is positively correlated with exit to job in our samples but expected to have a negative causal effect on job finding in any reasonable model of the labour market – some other region-specific factors are at work. Specifications of the job finding equation using only the unemployment rate and a Budapest dummy for capturing the region effects would yield significant positive (nonsense) parameters for the unemployment rate. In the specifications of *Tables A5–A8* the local registered unemployment rate already has negative impact on job finding probabilities though the parameters are insignificant in three out of four cases. Likewise we got robust negative

coefficients for the Budapest dummy in the pilot stage which changed for positive – as normally expected – in the specification finally chosen.¹⁴

The forces implying average or higher than average turnover rates in most of the low-employment counties may be rather different in the Northern Plain – where one can observe marked signs of seasonality – versus the North where mobility appears to be continuously higher than the average.

4.4. THE IMPACT OF JOB SEARCH

While *Micklewright and Nagy* (1999) found no difference between the job finding probabilities of men who search and men who only ‘want a job’ they did so in the case of women. Our results are similar in finding no return to search with men. A closer look at how search, labour market conditions and exit rates are interrelated suggests there is little if any return to search in the case of women either.

The table below summarises the estimated odds ratios for men and women reporting that (i) they wanted a job but were not searching (ii) reporting search during the week preceding the LFS-interview. The two groups are divided into two sub-groups depending on the local unemployment rate. (‘High’ stands for rates exceeding the 11 per cent national mean). Workers who reported that they did not want to work were treated as the base category irrespective of their places of residence. 5 per cent of the spells belonging to this category resulted in exit in the 1997:1 sample (6 per cent in the 1997:3 one), with minor differences across regions.

Obvious caveats apply when we use these variables for the study of exit to jobs because workers’ responses relate to a point in time while job finding may come two or three months later. Workers can change their mind during this period and their environment can change too. Still, what we do is not so far from what the statistical offices and governments do when they distinguish between the unemployed and the inactive under the assumption that this categorisation is socially meaningful and economically useful (in that it helps to predict what part of the non-employed population have strong ties to the labour market and what part have chosen not to participate in the labour force).

¹⁴ The jobloss equations suggest that micro-regions with high unemployment rates lost more male jobs in both periods but the effects were weak in the case of women. The results are consistent with the observation of slightly growing regional differentials in terms of registered unemployment after 1996.

	1997:1	1997:3	1997:1	1997:3
	Men		Women	
Wants a job without searching				
* Low unemployment	1,59	2,01	1,96	2,61
* High unemployment	1,70	0,98	1,85	1,90
Searching				
* Low unemployment	1,14	1,52	3,06	3,63
* High unemployment	1,92	1,51	1,57	1,83
Wants a job*	1,59	1,50	1,98	2,35
Searching*	1,46	1,54	2,39	2,96

Excerpt from *Tables A5–A8*.

*) Same model as in *Tables A5–A8* but no interaction between search variables and unemployment

The last two rows show the results from a specification similar to that used by *Micklewright and Nagy (1999)* yielding similar results: there is no difference between men who search and men who just want a job but female job seekers have higher exit probability. (It might be noted that even in the case of women the seemingly large differentials between the ‘unemployed’ and the ‘inactive’ can be regarded as statistically significant only at the 0,32 and 0,25 levels at the given sample size).

The results broken down by region provide us with further interesting details. In the 1997:1 sample people who wanted a job had similar probabilities of exit across genders and regions (odds ratios of about 1.6-1.9). Search brought no improvement in the odds ratios except for females searching in low-unemployment regions (3,06 versus 1,96). Male job seekers in low-unemployment regions even had lower risk of exit than had non-searchers.

In the sample followed from 1997:3 workers just wanting a job in ‘bad’ regions had lower probability of exit than had the workers, both men and women, of ‘good’ regions (0,98 versus 2,01 and 1,90 versus 2,61). Search brought to the workers of ‘bad’ regions no or minor improvement in the exit probability. (In the case of men the odds ratios of 0,98 and 1,5 are significantly different at the 0,105 level). The case was similar with men living in low-unemployment areas: here again we get lower estimates of the exit probability for the ‘unemployed’ than for the ‘inactive’.

Women searching for jobs in ‘good’ regions had an impressive odds ratio of 3,63. However, women just wanting a job in such regions also had a high ratio of 2,61 that could be regarded as lower than 3,63 only at the 0,2 level of significance. Women actively searching in ‘good’ regions definitely had higher job finding probabilities than had the actively searching women in ‘bad’ regions but their relative risk was not so high compared to the ‘inactive’ women of their own regions.

These results cast further doubts on the division between ‘unemployment’ and ‘inactivity’ – as it is made in the Hungarian LFS – and reinforce the conjecture that something is wrong with the categorisation of non-employed men. Most probably, the questionnaire ignores some ways of collecting information about the labour market. People, especially those living in small villages or socially ‘dense’ urban ghettos need not repeatedly ‘inquire at friends and relatives’ or ‘contact employers’ in order to get information about job offers, for instance. Informing their friends when they lose their job and doing nothing afterwards can be an efficient way of collecting information – their need for a job will not be forgotten. It is also likely that the number of workers expecting ‘recall’ is underestimated in the survey because it seems to ignore the cases of regular calls for casual work, regular invitation to house-building teams and other work opportunities involving no formal employment contract.

4.5. INFORMAL ECONOMY

In agricultural regions with high self-employment ratios exit probabilities were higher in the Spring when most of the exits from the 1997:1 non-employed stock took place. The estimated exit probability at 6 quarters of duration for a 30 years old man looking for a job outside Budapest (setting the local unemployment rate at 15 per cent and taking other variables into consideration at their mean or default value) was 8,7 per cent at the minimum of the regional self-employment ratio but 14,5 per cent at its maximum. During the Autumn and Winter (typical dates of exit from the 1997:3 stock) no significant effect was detected.

Counties with high self-employment ratios did not have particularly high jobloss rates in either of the two samples. The estimated coefficients for this variable were negative but insignificant in the 1997:3 samples. Village dwellers employed at 1997:3, however, had high probability of jobloss unlike the villagers observed in the 1997:1 cohort.

The coefficients for *Lackó*’s estimates of the informal economy were significant in all but one specifications and sub-samples suggesting lower exit rates in regions with larger hidden economy. The effect was somewhat

stronger in the 1997:3 sample contradicting to what we got for our proxy of the agricultural informal sector.

	1997:1	1997:3	1997:1	1997:3
	Men		Women	
Informal economy	0,911*	0,878	0,826	0,804

Excerpt from *Tables A5–A8*.

*) Significant only at the 0.1 level

It would be early to draw conclusions from these coefficients for the ‘dis-incentive effect’ of the informal economy. We come back to their interpretation later keeping in mind that the estimated effect, whatever should be meant by that, is a strong one. A 30 years old female worker actively looking for a job in a high-unemployment labour office district (1997:3 sample, 6 quarters of joblessness, 15 per cent rate of unemployment and mean/default value of other variables) had 8.1 per cent risk of exit at 22 per cent share of the informal economy but only 5.4 per cent in a county with a 20 per cent estimate.

The proxy of the hidden economy is strongly and negatively correlated with the probability of jobloss, too, with no difference across genders and cohorts. (See the table below). The finding that regions with a high share of the informal economy have low turnover (low mobility between employment and non-employment) is perplexing at first sight and calls for detailed inspection.

	1997:1	1997:3	1997:1	1997:3
	Men		Women	
Informal economy	0,833	0,839	0,808	0,874

Excerpt from *Tables A–A12*

The attribute ‘informal’ stands for employment relationships not reported to the tax authorities. The question how these transactions appear in the LFS is an open one and without having at least a hypothetical answer to it we are clearly unable to interpret the estimation results. We try to get to an answer by starting from two extreme scenarios.

Suppose that workers are distributed between formal employment (E), informal employment (I) and non-employment (N). If the main rule is that workers report their informal jobs (case a) then the researchers dealing with LFS data are likely to find them in the stock of employed workers. If they do not report their informal jobs (b) they will be observed in the non-employed stock. The distribution of workers by their true states and LFS-based states in the two regimes is shown in the small table below. The shaded areas show the composition of the ‘employed’ and ‘non-employed’ stock samples drawn from an LFS wave.

True	LFS observation	
	(a)	(b)
E	E	E
I	E	N
N	N	N

Before exploring the practical implications of this peculiar situation we need to make assumptions on the stability of informal sector jobs, in general. Demand-side factors suggest both stability and instability. On the one hand, employers share the gain from tax evasion with their employees which makes them interested in maintaining informal jobs as long as they can. On the other hand, firms offering informal jobs are more vulnerable than others; their activities are often seasonal and heavily exposed to the pressures of competition; their jobs are not protected by law, and so on. The behavior of the supply side is also difficult to predict. Workers’ interest in maintaining informal as opposed to formal jobs may be weaker because they do not collect eligibility for pension and social security and have poor career prospects. On the other hand they are interested in maintaining their jobs since they share the benefits from tax evasion with their employers and may also collect welfare benefits on the ground of being unemployed. Depending on the strength of these effects higher values of $I/(I+E)$ may affect the survival rate of informal jobs positively, negatively, or not at all. In the same time, the frequent closing and opening of jobs in the informal sector is likely to increase the exit rate of the ‘true’ non-employed.

What shall we, users of the LFS, see if we look at how flows are related to the regional share of the informal economy in regime (a) when workers tell the truth? The effect on jobloss will be indeterminate for reasons mentioned above. The non-employed stock now consists of ‘genuinely’ non-employed workers. A higher share of the informal economy may have

positive or negative impact on their job finding probabilities depending on job turnover in the informal sector.

Actually, in case (a) when workers report their informal jobs to the interviewers of the LFS we find ourselves in a rather unpleasant situation: since we do not know what to expect we simply cannot interpret the correlations between $I/(I+E)$ and the intensity of labour market flows.

What if workers do not report their informal jobs? In this case unregistered workers are observed in the non-employed stock. Cases when workers shift between non-employment and informal employment remain unobserved in the LFS so a large part of the mobility stream stemming from high job turnover in the informal sector will not be reflected in the data. By contrast, the willingness of informal sector workers to stay allegedly non-employed, cheat on taxes and collect benefits will have an impact on the observed job finding probabilities. We can therefore expect that the share of the informal economy will have a negative effect on the observed job finding ratio in the LFS-based panel estimates. In scenario (b) the employed stock is composed of formal sector workers. Their jobloss rate will hardly be affected by a higher share of informal job holders within the (alleged) non-employed stock so we expect zero correlation between the observed jobloss rates and the share of the informal economy.

In case (b) the finding of a negative impact on jobloss of the informal economy should be interpreted as a kind of accidental correlation. Regions with a small share of the informal economy may have high jobloss rates because their economies are still in the stage of post-communist restructuring (this is why they have undeveloped hidden economies among others), and some of them may have a high share of seasonal activities. Regions with high share of the informal economy may have low jobloss rates because their economies are well-functioning. Their developed tertiary and small-business sectors may have simultaneously helped them survive the transformational recession, respond to the challenges of transition - and develop a large non-agricultural hidden economy.

The apparent correlation between the rates of jobloss and job finding can lead to biased estimates on the side of job finding. If at least a part of the job losers leave vacancies behind then higher rates of jobloss imply higher rates of job finding per se. Regions with high share of the informal economy (and low jobloss rates) may have low job finding rate for that reason.

Therefore we get closer to measuring the disincentive effect of the informal economy – under the assumption that case (b) applies to the LFS – by including the estimated region-specific differentials in jobloss rates into the estimation of job finding probabilities. At this point we get close to the limits allowed by the data because having one more region-level variable in the estimation further increases the risk of unstable and biased estimates

due to multicollinearity. Furthermore, importing results from one model to the other without importing the estimation errors is an undoubtedly questionable operation. Admitting these risks and shortcomings we reestimate the models of *Table A5–A8* by including the regional parameters of the respective jobloss equations from *Table A3*. Unimportant variables and interaction effects are dropped.

The parameters presented in *Table A13* have reasonable sign and we indeed get positive coefficients for both the contemporaneous and the lagged county-specific jobloss rates. In all but one case the parameters of this variable are significant. The adverse effect of the informal economy proxy on job finding seems weaker now - it is significant at the 0,05 level in only one of the six equations. We can evaluate the result as a weak evidence for disincentives due to the informal economy, at best.

4.6. BENEFIT RECEIPT

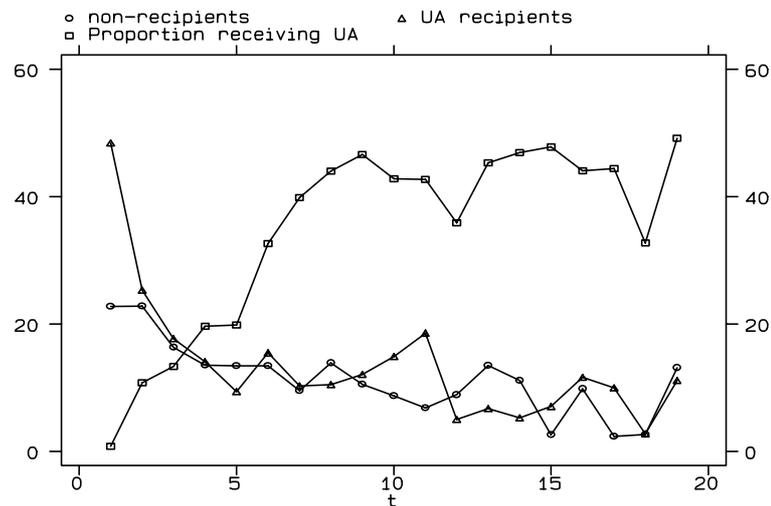
As was previously mentioned we found the exit rates of both men and women to be unaffected by the receipt of UI. Obviously, this finding does not exclude the possibility of a disincentive effect given that we measure benefit receipt with a single dummy variable and cannot properly control for other determinants of the exit probability. The finding, however, is consistent with finer results by *Galasi (1994)* or *Micklewright and Nagy (1994, 1995)* suggesting no marked disincentives due to UI receipt in Hungary.

Males observed as UA recipients do not seem to differ from the rest of the non-employed population in terms of job finding probabilities. This remains true if we restrict the estimation to low-educated workers with high probability of UA receipt; estimate the sample separately for low- and high-unemployment regions; or interact the UA variable with unemployment or other regional variables. Actually, it remains true even if we look at the raw data, that is, we let the UA variable absorb a series of factors negatively affecting the exit probability of the typical UA recipient. (Low educational level, longer duration of joblessness, unfavourable conditions at the local labour market.) This is illustrated by the chart below. The quarterly spells observed in the follow-up of the 1997:1 stock are ordered by duration (t) and the rates of exit are shown in the groups of UA recipients and non-recipients. Apart from $t=1$ the exit rates are practically equal to each other. The results are similar for the 1997:3 sample.

Figure 3

The rate of job finding among UA recipients and non-recipients

(Males. spells observed in the follow-up of the 1997:1 stock)



In the case of women we got parameters for UA receipt of 0,673 significant at the 0.087 level (1997:1 sample) and 0.829 significant at the 0.791 level (1997:3 sample). We are tempted to regard it as an indication of stronger response to seasonal job offers among the non-recipients rather than an evidence of disincentives. Interactions of UA receipt and regional variables (like unemployment that is correlated with wages) proved to be insignificant though we would expect stronger disincentive effect on the part of the flat-rate UA in the high-unemployment, low-wage regions.

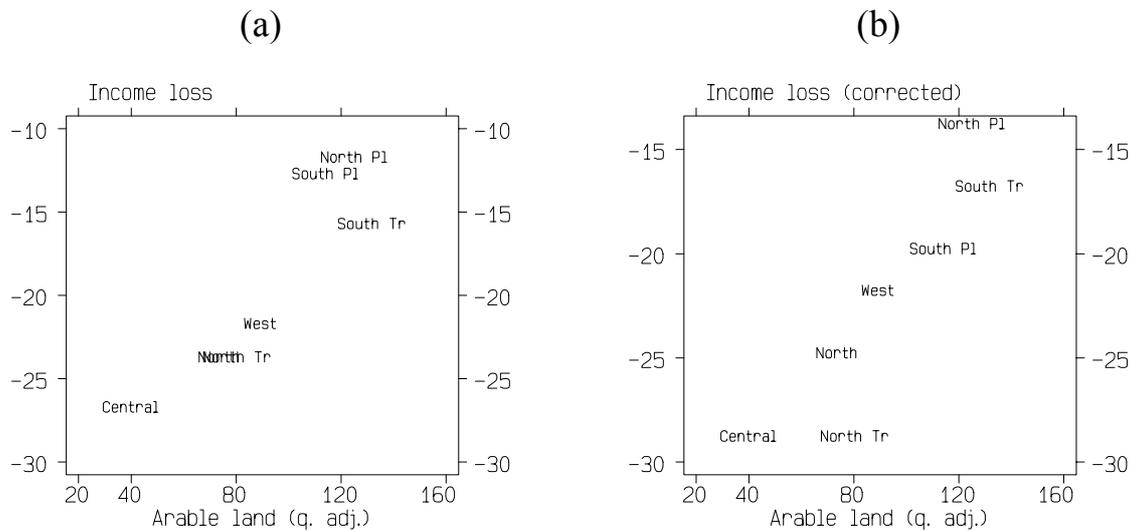
Since benefits increase a worker's income while non-employed the finding of no effect on the duration of joblessness can reflect specification error. Alternatively, it can reflect that workers' income while non-employed is strongly affected by intakes other than benefits. Some preliminary results from an ongoing research using data from the Household Budget Survey (HBS) yield at least weak supporting evidence for the latter interpretation.

The calculations presented in *Appendix 2* refer to a pooled sample of households observed in consecutive annual waves of the HBS between 1993 and 1998. The change of real per capita income of households losing one wage earner is compared across regions. On average these households lost 25 per cent of their income. In case of a job loser receiving benefit (either UI or UA) the loss amounted to 18 per cent.

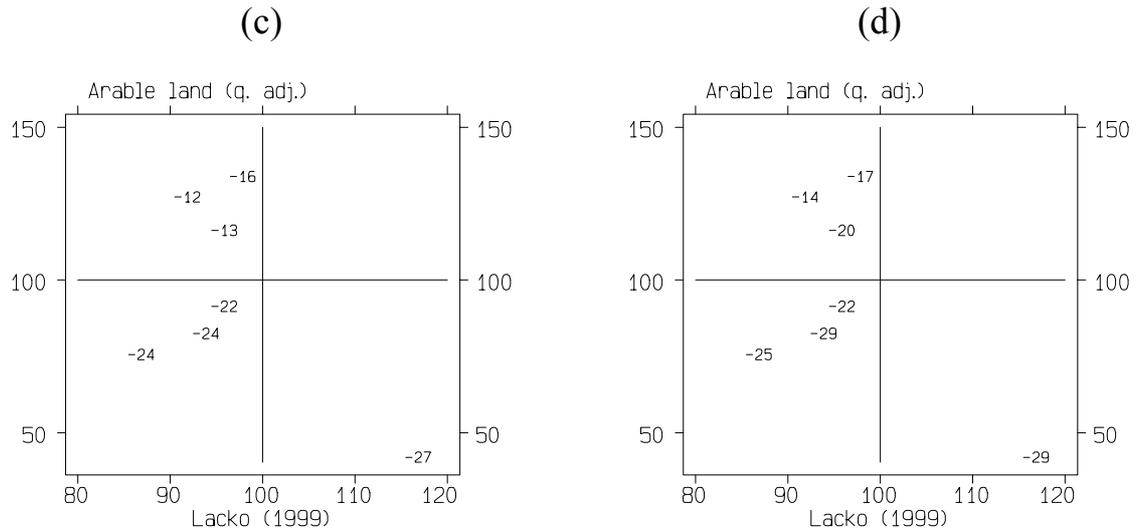
Compared to this difference the regional differentials appear to be rather large – dispersed in a wide, 15 percentage points range – and seem to be systematic. In those agricultural regions where high-quality arable land is available at large quantities households have less severe income losses. This is shown at panels (a) and (b) of *Figure 4* plotting regions by quality-adjusted arable land per capita and income loss as estimated in Appendix 2.¹⁵ Panels (c) and (d) show the estimated income loss by endowment with land and Lackó’s estimate of the hidden economy. In the South Plain and the North Plain income losses are estimated to be around 15 per cent, in the Southern Transdanubian area about 20 per cent. In the Northern, Western and Northern Transdanubian regions they fall to the 22-29 per cent range while in the Central region they are close to 30 per cent. Large differences are found between regions with similar levels of *Lackó*’s estimates depending on their endowment with fertile land.

Figure 4

**Proxies of income loss from jobloss, available land
and informal economy**



¹⁵ The former indicator was calculated as a weighted macro region-level average of arable land per capita using micro-region level observations on the quantity and quality of land and weighting with the so called ‘golden crown value’ of the soil. The data were taken from the CSO’s T-star data base.



- (a) Real income loss from jobloss estimated from the HBS (*Appendix 2*) versus quality-adjusted arable land per capita
- (b) Real income loss from jobloss, controlled for income change in reference households, as estimated from the HBS (*Appendix 2*) versus quality-adjusted arable land per capita
- (c) Quality-adjusted arable land per capita, *Lackó's* (1999) estimate of the informal economy and region-specific real income loss from jobloss as estimated from the HBS (*Appendix 2*)
- (d) Quality-adjusted arable land per capita, *Lackó's* (1999) estimate of the informal economy and region-specific real income loss from jobloss (controlled for income change in reference households) as estimated from the HBS (*Appendix 2*)

Note: The proxies of land and informal economy are expressed in per cent of the national mean

Though the calculations presented here are preliminary and rough they do support the conjecture that farming and/or the local economies organised around farming can substantially raise workers' income while unemployed. This effect may dominate the effect of benefits on reservation wages.

4.7. IMPLICATIONS FOR THE UNDEVELOPED REGIONS

In the case of Northern Hungary we found both the jobloss rates and the job finding rates to be continuously high.

Understanding why the jobloss rate is higher than the average leads the observer to the demand side of the market. The available results suggest no significant regional differences in the behavior of continuously operating businesses. Testing several specifications of the standard labour demand model *Kőrösi* (1999) found the employment-to-output and employment-to-wage elasticities to be similar in the North and other regions in 1992–97. (As a courtesy he also estimated these models for high turnover counties like Nódrád, Heves, Szabolcs and Borsod versus other regions with similar

results). The reason why the ‘mortality rate’ of jobs is relatively high may rather be connected with the prolonged process of ‘transition’ in this region characterised by heavy industry on the one hand and low-income agriculture on the other. At least it is true – as shown at *Figure A7* – that the turnover rate of the North became *relatively* high after 1996. While the rates of flows between employment and non-employment generally declined in Hungary after 1992 they remained close to their previous levels in the North. (See the last row of *Figure A7*).

Why workers have high exit to job rates in the North? On the one hand, it is naturally explained by the high rate of jobloss characteristic of the prolonged restructuring process. On the other hand, pieces of evidence presented in the previous section suggested that workers return to employment quickly because their income while non-employed is relatively low. The workers of the North seem to have huge income losses from jobloss, similar to those estimated for the developed Western and Northern Transdanubian areas and substantially more severe – almost twice as high – as those in the Northern Plain.

It must be emphasised that the majority of the non-employed workers of the North live in rural areas, that is, in micro-regions with a population lower than 50,000. Their share was 67 per cent in 1997:1, for instance, some 9 per cent higher than the national average and only 3 per cent lower than the average of the Northern Plain. The difference between the North and the Northern Plain thus has not too much to do with the ‘urban-rural’ or the ‘industrial-agricultural’ divide. Though some of the industrial centres of the area (Ózd and Kazincbarcika in particular) are themselves depressed the rural areas bear most of the burden of the crisis. The worst affected micro-regions are the ones without sizeable urban centres and poor land quality like the Cserehát area where several villages (Szemere, Csenyété, Rakaca, Pamlény) had unemployment rates exceeding 90 per cent in 1993 and probably not much lower than that recently. The reason why families have difficulties in compensating the loss of a wage earner in these districts may be related to the scarcity of fertile land, the lack of a viable local economy organized around farming, and the absence of a developed, partly informal tertiary sector.

The data tell a different story about the Northern Plain which appears as a typical case of an undeveloped, low-employment rural region. We found average or lower than average exit rates in the counties of this region during the Autumn and Winter but seasonal effects kept the mobility of workers between labour market states relatively high during the Spring and Summer (apart from Hajdú county). Though a relatively high proportion of the non-employed report willingness to work their search intensity is low. Households are able to compensate the loss of a wage earner more than anywhere else in the country.

We conclude from these pieces of information that the key to diagnose and cure high unemployment in the North should be looked for at the demand side of the labour market. Understanding the similarly low employment level of the Northern Plain rather requires research into the nature of the rural economy and the ways households fight against the detrimental implications of jobloss and seasonality.

5. SUMMARY, CONCLUSIONS AND IMPLICATIONS FOR POLICY

We tried to learn about the specifics of non-employment in Hungary's two depressed macro-regions as far as possible using data from regular surveys like the LFS and the HBS, and speculate about the suitability of the radical reforms introduced recently by the Hungarian government. Generally we found no strong evidence supporting the approach of these reforms and have concerns about their implications for the poorest regions.

(i) The findings are questioning the usefulness of 'abolishing' the registered unemployment rate or other alternative indicators of joblessness. They support the conclusion, first drawn by *Micklewright* and *Nagy* (1999), that relying on the ILO-OECD measure of unemployment as the single measure of joblessness misleads the observer. It is particularly the case on the male labour market.

(ii) The data of the LFS do not support the assumption that exit to job probabilities are strongly affected by benefit receipt. Workers not receiving benefits have about the same exit to job rate than have the recipients taking other things equal.

The results do not exclude the possibility that the Hungarian benefit system increases the rate of unemployment in less trivial, indirect ways. High benefits may imply high levels of inactivity among low-qualified workers – especially in rural areas – regardless of whether they do or do not receive benefits. As argued in *Boeri* (1999) by increasing the effective minimum wage high benefits may sort out low-qualified workers from the urban labour markets. It makes them interested in staying passively where their alternative incomes are relatively high, that is, in rural areas. At least, this can be the case in some rural areas providing adequate conditions for subsistence farming and work in the partly informal local economy.

We found weak evidence of lower exit to job rates in regions where the informal economy has a higher share according to the first best available estimates of the hidden economy by *Lackó* (1999). Since these estimates indicate higher share of the hidden economy in developed regions this effect,

provided it really exists, tends to narrow the gap between regions. It definitely cannot explain why the North and the Northern Plain have so dramatically low employment levels.

Preliminary findings based on the HBS seem to suggest that households living in regions well endowed with high-quality land are more successful in compensating the loss of a wage earner. The resulting impact on reservation wages is probably part of the problem at the Northern Plain but not at the North.

(iii) The findings suggest that the extremely high non-employment rates of Hungary's depressed regions can not be generally explained by workers' low exit to job rates. In fact, workers in the North have one of the highest exit to job rates in the country. The Northern Plain had average job finding rate during the Spring and Summer of 1997 and not significantly lower than the average in the second part of that year, except for Hajdú county where mobility was miles below the average in the period examined in the paper.

Both the North and the Northern Plain had relatively high jobloss rates in 1997–98. Generally, the 'stagnant pool' characterisation of unemployment does not seem to hold in these regions. They are in low-employment state combined with continuously (North) or seasonally (Northern Plain) high mobility.

Curing this type of high unemployment by further cutting benefits, introducing workfare and starting crusade against the informal economy seems to us as an effort in vain with unfavourable welfare effects, especially in the North where workers' alternative incomes seem to be low, their propensity to work and search activity high – and generally their problem to be rooted in the demand side of the market. Shifting the burden of income replacement onto the seasonal rural economy in the Northern Plain is perhaps a feasible option but can hardly be regarded as the first most important task of employment policies. Without the creation of steady, stable, non-seasonal jobs in the near future this region may be locked in the status of the 'poor rural periphery' with meagre hope of integrating to the European economy.

The analysis provides some lessons for future research. First it calls for caution in using the Hungarian LFS-based statistics since the way it classifies workers (by labour market states) seems to be ill-suited. Second, the non-trivial differences found between results from the 1997:1 and 1997:3 stock samples call the attention to the risks of research based on a single sample. Third, the paper called the attention that the regional differences in job finding rates are difficult to interpret without having information on jobloss rates.

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Table A1

Job finding (total sample)

Discrete time duration model (logit), odds ratios, baseline hazard shown separately

	Males		Females	
	1997:1	1997:3	1997:1	1997:3
Age	0,974 ***	,9627 ***	1,183 ***	0,969
Age squared	..	..	0,998 ***	1,000
Education: vocational	1,115	1,962 ***	1,494 ***	1,633 ***
Secondary	1,177	2,214 ***	1,621 ***	2,403 ***
Higher	2,167 **	1,896 **	1,883 ***	4,451 ***
Status in family: child	0,795 *	1,007	1,539 *	1,069
Part-time studies	0,628	0,436 ***	1,503	1,518 **
Wants a job without searching	1,871 ***	1,254 *	1,812 ***	1,565 ***
Searching for a job	1,739 ***	1,598 ***	2,626 ***	2,837 ***
Receives pension	0,074 ***	0,153 ***	0,233 ***	0,164 ***
Receives child care benefit	..	..	0,740 **	0,608 ***
Receives UI	1,208	1,111	0,986	0,970
Receives UA	1,071	1,201	0,647 **	0,711 *
Szabolcs	1,506 **	0,983	1,491 *	1,254
Borsod	1,291	0,960	1,246	1,332
Nógrád	2,945 ***	1,661 *	2,186 ***	2,071 **
Szolnok	1,749 **	0,791	0,970	1,437
Hajdú	0,301 ***	0,440 ***	0,423 **	,0676
Heves	1,170	1,699 **	0,875	2,068 ***
Békés	1,144	1,065	1,364	1,090
Tolna	1,439	0,939	1,137	1,077
Baranya	1,163	1,590 *	0,901	0,762
Somogy	0,810	0,641	1,056	0,517 *
Komárom	1,996 **	1,113	1,159	1,638 *
Bács	1,679 **	1,744 **	1,563 **	1,854 ***
Fejér	0,974	1,922 ***	1,157	1,270
Veszprém	1,830 **	1,573	1,029	1,434
Csongrád	2,767 ***	1,138	1,009	0,685
Zala	1,301	0,748	0,869	0,827
Győr	0,685	1,299	1,117	1,174
Budapest	0,751	1,154	0,731	0,933
Vas	1,809 *	1,383	2,625 **	2,637 ***
Number of observations	9,580	9,091	12,129	11,168
Pseudo-R2	0,2148	0,1926	0,1232	0,1387
Likelihood ratio test for time dummies	94,37 ***	66,15 ***	102,3 ***	85,67
Constant of the log form	-1,164	-1,774	-5,690	-2,950

Significant at the ***0,01 **0,05 *0,1 level. References are: primary school, employee, weekly worktime >40 hours, manufacturing industry, Pest county. Counties ordered by employment ratio at 1997:1 (from lowest to highest).

Table A2

Job finding

(Workers having lost job after 1989, not receiving pension)

Discrete time duration model (logit), odds ratios, baseline hazard shown separately

	Males		Females	
	1997:1	1997:3	1997:1	1997:3
Age	0,975 ***	0,966 ***	1,177 ***	1,113 *
Age squared	..	..	0,998 ***	0,998 **
Education: vocational	1,160	1,699 ***	1,611 ***	1,667 ***
Secondary	1,249	1,681 ***	1,732 ***	2,239 ***
Higher	2,247 **	2,035 *	1,960 ***	3,675 ***
Status in family: child	0,834	1,007	1,537 *	1,108
Part-time studies	0,263 *	0,543	1,173	1,255
Wants a job without searching	1,531 **	1,223	1,871 ***	1,641 ***
Searching for a job	1,424 **	1,339 **	2,518 ***	2,569 ***
Receives child care benefit	..	..	0,705 **	0,813
Receives UI	1,221	1,079	1,018	0,969
Receives UA	1,055	1,228	0,633 **	0,816
Szabolcs	1,368	0,801	1,549 *	1,307
Borsod	1,210	0,920	1,361	1,291
Nógrád	2,861 ***	1,547	2,034 **	2,006 *
Szolnok	1,574	0,711	1,144	1,730 *
Hajdú	0,291 ***	0,413 ***	0,476 ***	0,849
Heves	1,156	1,111	0,824	2,159 ***
Békés	1,059	0,889	1,485	1,125
Tolna	1,542	0,720	1,351	1,276
Baranya	1,039	1,066	0,840	0,712
Somogy	0,775	0,322 **	1,096	0,615
Komárom	1,849 *	0,976	1,120	2,124 **
Bács	1,589 *	1,440	1,400	1,902 **
Fejér	0,968	0,949	0,959	0,780
Veszprém	1,950 **	1,376	1,135	1,326
Csongrád	2,357 ***	0,985	1,173	0,679
Zala	1,481	0,817	0,794	0,862
Győr	0,689	1,148	1,139	1,336
Budapest	0,690	1,173	0,725	1,095
Vas	1,908 *	0,758	3,602 ***	2,782 ***
Number of observations	4,150	3,169	6,138	5,074
Pseudo-R2	0,0750	0,0701	0,0785	0,0836
Likelihood ratio test for time dummies	81,94 ***	53,69 ***	64,75 ***	74,83 ***
Constant of the log functional form	-0,9930	-1,037	-5,744	-5,089

Significant at the ***0,01 **0,05 *0,1 level. References are: primary school, employee, weekly worktime >40 hours, manufacturing industry, Pest county. Counties ordered by employment ratio at 1997:1 (from lowest to highest).

Jobloss (all workers)

Discrete time duration model (logit), odds ratios, baseline hazard shown separately

	Males		Females	
	1997:1	1997:3	1997:1	1997:3
Age	0,866 ***	0,919 **	0,995	0,959
Age squared	1,002 ***	1,001 **	0,999	1,000
Education: vocational	0,749 ***	0,601 ***	0,856	1,001
Secondary	0,598 ***	0,539 **	0,634 ***	0,787 *
Higher	0,392 ***	0,303 ***	0,674 ***	0,420 ***
Was unemployed before	1,375 ***	1,510 ***	1,105	1,576 ***
Member of partnership or coop	0,606 ***	1,107	1,064	0,813
Sole-proprietor	0,410 ***	0,705 *	0,675 ***	0,872
Employer	0,162 ***	0,344 **	0,938	0,543
Casual worker	2,082 ***	2,504 ***	2,056 ***	1,441
Assisting family member	0,306 ***	0,933	0,927	1,214
Usual worktime: Variable	1,718 ***	1,503 **	1,250	2,156
Zero	5,311 ***	2,721 ***	13,76 ***	5,675 ***
Less than 40 hours	1,876 **	1,942 *	1,472 ***	2,334 ***
Agriculture and food	1,263	1,303 *	1,460 ***	2,281 ***
Construction	1,134	1,191	1,326	0,747
Trade, hotels and restaurants	1,327 ***	1,332 *	1,153	1,210
Other non-public	0,922	0,777	1,030	0,755
Public sector	1,208 *	1,793 ***	0,905	0,773
Szabolcs	3,505 ***	2,901 ***	2,654 ***	2,170 ***
Borsod	2,981 ***	2,950 ***	2,261 ***	2,596 ***
Nógrád	4,043 ***	4,577 ***	4,283 ***	2,388 ***
Szolnok	3,562 ***	2,017 ***	2,290 ***	1,721 *
Hajdú	0,497 **	1,480	0,656	1,105
Heves	2,185 ***	4,035 ***	1,501	2,518 ***
Békés	2,399 ***	1,246	1,497	1,151
Tolna	1,502	3,357 ***	1,480	3,074 ***
Baranya	2,413 ***	1,230	1,063	0,487 *
Somogy	1,392	1,235	2,135 ***	1,685 *
Komárom	2,118 **	1,012	2,686 ***	1,873 *
Bács	1,451 *	1,829 **	3,025 ***	1,557 ***
Fejér	3,156 ***	2,388 ***	1,372	2,129 ***
Veszprém	1,885 *	2,365 ***	3,262 ***	2,489
Csongrád	1,063	0,653	1,270	0,984
Zala	0,998	1,469	1,060	0,622
Győr	1,340	1,182	1,272	0,858
Budapest	,9510	1,392	1,484 **	1,472
Vas	1,399	2,185 ***	1,269	1,233
Number of observations	27,201	22,820	22,059	18,276
Pseudo-R2	0,1301	0,1400	0,1636	0,1356
Likelihood ratio test for time dummies	132,7 ***	225,3 ***	129,4 ***	101,7 ***
Constant of the log form	-0,931	-1,318	-2,729	-1,853

Significant at the ***0,01 **0,05 *0,1 level. References are: primary school, employee, weekly worktime >40 hours, manufacturing industry, Pest county. Counties ordered by employment ratio at 1997:1 (from lowest to highest).

Jobloss (job spells started after 1989)

Discrete time duration model (logit), odds ratios, baseline hazard shown separately

	Males		Females	
	1997:1	1997:3	1997:1	1997:3
Age	0,893 ***	0,929 **	1,076 *	0,973
Age squared	1,002 ***	1,001 **	0,998 **	0,999
Education: vocational	0,813 *	0,604 ***	0,733 **	1,195
Secondary	0,680 ***	0,580 ***	0,529 ***	0,943
Higher	0,439 ***	0,360 ***	0,577 ***	0,630 *
Was unemployed before	1,389 ***	1,416 ***	1,001	1,471 ***
Member of partnership or coop	0,475 ***	0,613 *	1,053	0,731
Sole-proprietor	0,402 ***	0,781	0,719	0,777
Employer	0,179 ***	0,406 *	1,306	0,516
Casual worker	1,289	2,989 ***	2,306 *	1,528
Assisting family member	0,317 ***	1,035	0,834	0,889
Usual worktime: Variable	1,701 ***	1,342 **	1,344	2,105 ***
Zero	3,667 ***	1,861 ***	15,05 ***	5,704 ***
Less than 40 hours	1,952 ***	1,776 **	1,337 *	2,111 ***
Agriculture and food	1,457 ***	1,353 *	1,253	2,817 ***
Construction	1,336 *	1,299	1,041	0,828
Trade, hotels and restaurants	1,638 ***	1,398 **	1,052	1,274
Other non-public	1,204	0,756	0,774	0,809
Public sector	1,423 **	2,128 ***	0,709 *	0,702 *
Szabolcs	3,224 ***	4,368 ***	3,289 ***	1,889 **
Borsod	2,230 ***	4,400 ***	2,256 ***	2,131 ***
Nógrád	3,106 ***	5,765 ***	5,539 ***	1,936 *
Szolnok	2,589 ***	2,991 ***	3,179 ***	1,618
Hajdú	0,473 *	1,384	1,031	0,806
Heves	2,225 ***	5,550 ***	2,237 ***	2,244 ***
Békés	2,505 ***	1,843 *	1,965 **	0,988
Tolna	1,489	4,801	2,511 ***	2,796 ***
Baranya	1,880 **	1,554	1,566	0,404 *
Somogy	1,297	1,723	3,304 ***	1,454
Komárom	1,496	1,365	3,941 ***	1,946 *
Bács	1,229	2,373 **	3,930 ***	1,426
Fejér	2,782 ***	1,979 **	1,268	2,058 **
Veszprém	1,648 *	2,664 ***	5,445 ***	2,353 ***
Csongrád	1,326	0,893	1,412	0,503
Zala	0,721	1,834	1,734	0,541
Győr	1,145	1,318	1,352	0,495
Budapest	0,643 *	1,876	1,619	1,280
Vas	1,005	3,653 ***	1,679	0,934
Number of observations	16,805	14,603	12,759	10,663
Pseudo-R2	0,1160	0,1439	0,1711	0,1350
Likelihood ratio test for time dummies				
Constant of the log form	-1,677	-2,318	-4,063	-2,685

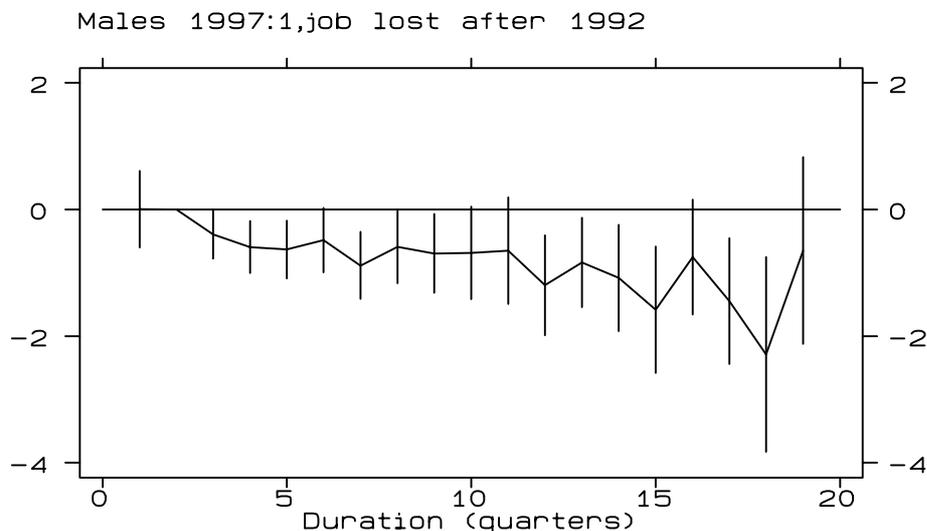
Significant at the ***0,01 **0,05 *0,1 level. References are: primary school, employee, weekly worktime >40 hours, manufacturing industry, Pest county. Counties ordered by employment ratio at 1997:1 (from lowest to highest).

Job finding 1997:1 – 1998:2
(Males having lost their job after 1992)

Discrete time duration model estimated with logit for clustered sample

	Odds ratio	Z	p	Sample mean
Age	0,979	-3,079	0,002	36,40
Education: vocational	1,263	1,769	0,077	0,49
Secondary	1,356	1,627	0,104	0,14
Higher	2,874	2,426	0,015	0,01
Status in familiy: child	0,837	-1,164	0,244	0,22
Receives UA	1,038	0,246	0,806	0,28
Wants a job (U<mean)	1,599	2,014	0,044	0,10
Wants a job (U>mean)	1,702	2,350	0,019	0,14
Searching (U<mean)	1,139	0,635	0,525	0,30
Searching (U>mean)	1,921	3,352	0,000	0,29
Unemployment rate (micro-region)	0,963	-1,947	0,052	11,6
Informal economy (county)	0,911	-1,631	0,103	22,50
Self-employment ratio (county)	1,047	2,209	0,027	7,50
Village	1,245	1,767	0,077	0,49
Budapest	1,009	0,018	0,985	0,09
Hajdú county	0,247	-3,944	0,000	0,08
Mean of the dependent variable				0,135
Constant of the log functional form				1,025
Mean duration at sampling (quarters)				5,131
Number of observations				3,611
Pseudo-R2				0,058
Likelihood ratio test for dropping duration dummies (sign. 0,0000)				53,35

Baseline hazard (95 per cent confidence intervals shown)

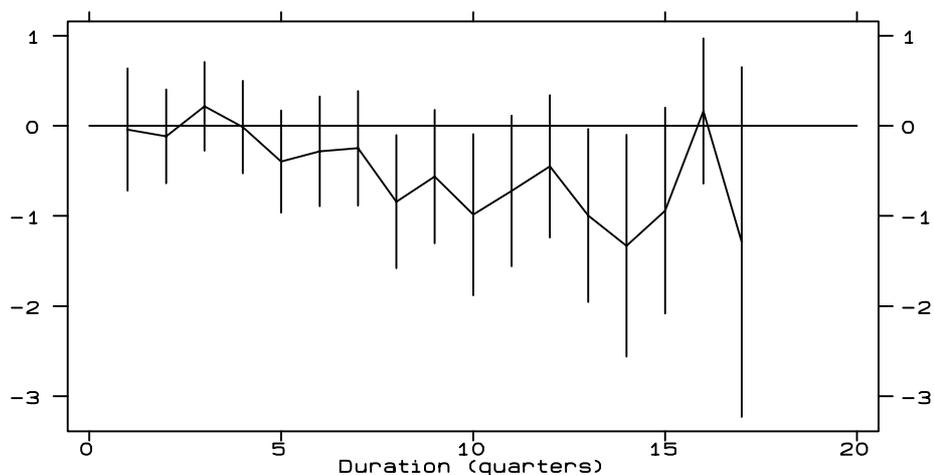


Job finding 1997:3 – 1998:4

(Males having lost their job after 1992)

Discrete time duration model estimated with logit for clustered sample

	Odds ratio	Z	p	Sample mean
Age	0,972	-3,894	0,000	36,0
Education: vocational	1,750	3,857	0,000	0,49
Secondary	1,710	2,676	0,007	0,14
Higher	2,254	2,021	0,043	0,02
Status in familiy: child	0,987	-0,083	0,934	0,24
Receives UA	1,155	0,926	0,355	0,28
Wants a job (U<mean)	2,012	3,056	0,002	0,11
Wants a job (U>mean)	0,978	-0,082	0,934	0,12
Searching (U<mean)	1,519	2,241	0,025	0,29
Searching (U>mean)	1,513	2,029	0,042	0,24
Unemployment rate (micro-region)	0,981	-0,722	0,470	11,1
Informal economy (county)	0,878	-2,124	0,034	22,4
Self-employment ratio (county)	1,024	1,112	0,266	7,61
Village	1,205	1,404	0,160	0,46
Budapest	3,201	2,520	0,012	0,09
Mean of the dependent variable				0,127
Constant of the log functional form				1,328
Mean duration at sampling (quarters)				5,339
Number of observations				2,668
Pseudo-R2				0,0529
Likelihood ratio test for dropping duration dummies (sign: 0,0010)				40,78

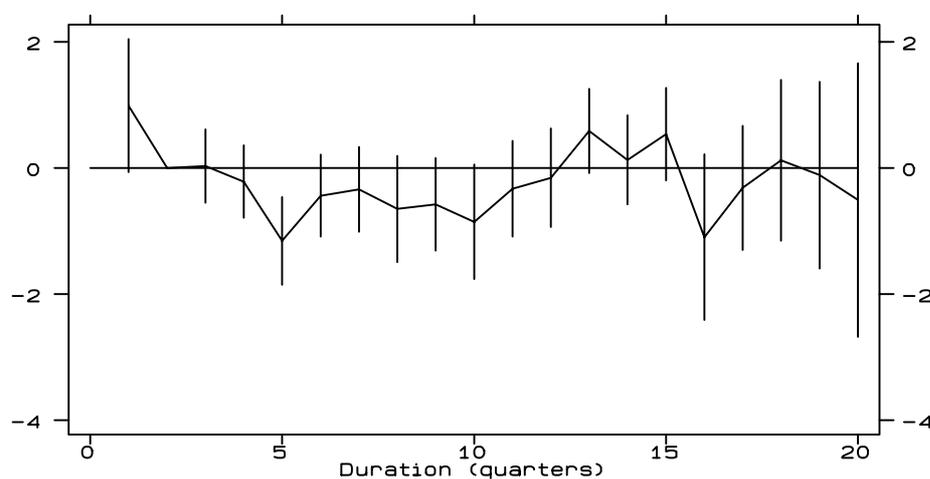
Baseline hazard (95 per cent confidence intervals shown)

Job finding 1997:1 – 1998:2

(Females having lost their job after 1992)

Discrete time duration model estimated with logit for clustered sample

	Odds ratio	Z	p	Sample mean
Age	1,249	2,879	0,004	32,3
Age squared	0,997	-2,880	0,004	1121,0
Education: vocational	1,533	2,301	0,021	0,31
Secondary	1,746	2,965	0,003	0,33
Higher	1,830	1,910	0,056	0,08
Status in familiy: child	2,139	2,568	0,010	0,04
Number of children	1,833	-2,333	0,020	1,58
Receives child care benefit	1,747	-1,353	0,176	0,54
Receives UA	0,673	-1,724	0,085	0,09
Wants a job (U<mean)	1,963	2,835	0,005	0,08
Wants a job (U>mean)	1,854	2,238	0,025	0,08
Searching (U<mean)	3,055	5,091	0,000	0,12
Searching (U>mean)	1,568	1,716	0,086	0,08
Unemployment rate (micro-region)	0,997	-0,151	0,880	10,2
Informal economy (county)	0,826	-2,600	0,009	23,2
Self-employment ratio (county)	1,049	2,043	0,041	7,75
Village	1,037	0,254	0,800	0,39
Budapest	2,451	1,632	0,103	0,16
Vas county	2,898	3,250	0,001	0,02
Mean of the dependent variable				0,063
Constant of the log functional form				-2,687
Mean duration at sampling (quarters)				6,786
Number of observations				4,829
Pseudo-R2				0,0828
Likelihood ratio test for dropping duration dummies (sign: 0,0000)				61,77

Baseline hazard (95 per cent confidence intervals shown)

Job finding 1997:3 – 1998:4
 (Females having lost their job after 1992)
 Discrete time duration model estimated with logit for clustered sample

	Odds ratio	Z	p	Sample mean
Age	1,183	2,437	0,015	31,6
Age squared	0,998	-2,447	0,014	1079,0
Education: vocational	1,718	2,805	0,005	0,31
Secondary	2,353	4,535	0,000	0,30
Higher	3,339	4,054	0,000	0,07
Status in familiy: child	2,089	2,523	0,012	0,05
Number of children	1,049	0,619	0,536	1,54
Receives child care benefit	0,970	-0,151	0,880	0,50
Receives UA	0,829	-0,791	0,429	0,12
Wants a job (U<mean)	2,605	4,044	0,000	0,11
Wants a job (U>mean)	1,898	2,774	0,006	0,07
Searching (U<mean)	3,631	6,072	0,000	0,13
Searching (U>mean)	1,830	2,114	0,034	0,06
Unemployment rate (micro-region)	0,983	-0,674	0,501	9,77
Informal economy (county)	0,804	-3,074	0,002	23,0
Self-employment ratio (county)	1,020	0,710	0,478	7,75
Village	0,978	-0,157	0,875	1,39
Budapest	3,056	2,204	0,028	0,14
Vas county	2,397	2,279	0,023	0,02
Mean of the dependent variable				0,074
Constant of the log functional form				-1,531
Mean duration at sampling (quarters)				6,929
Number of observations				3,989
Pseudo-R2				0,0878
Likelihood ratio test for dropping duration dummies (sign: 0,0000)				52,84

Baseline hazard (95 per cent confidence intervals shown)

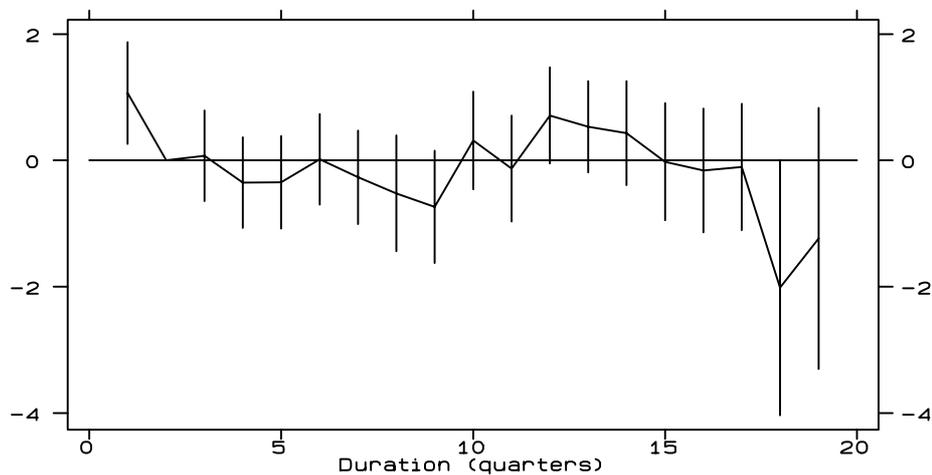


Table A9

Jobloss 1997:1 – 1998:2
(Males starting their job after 1992)
Discrete time duration model estimated with logit for clustered sample

	Odds ratio	Z	p	Sample mean
Age	0,916	-1,874	0,061	33,2
Age squared	1,001	2,023	0,043	1207
Education: vocational	0,827	-1,022	0,307	0,48
Secondary	0,760	-1,193	0,233	0,25
Higher	0,623	-1,312	0,190	0,10
Was unemployed before	1,477	2,703	0,007	0,41
Member of partnership or coop	0,517	-1,813	0,070	0,05
Sole-proprietor	0,449	-2,963	0,003	0,09
Employer	0,254	-1,937	0,053	0,03
Casual worker	1,113	0,245	0,806	0,01
Assisting family member	0,366	-1,510	0,131	0,01
Usual worktime: Variable	2,231	3,733	0,000	0,14
Zero	2,149	2,706	0,007	0,04
Less than 40 hours	2,036	1,844	0,065	0,03
Agriculture and food	1,438	1,591	0,112	0,14
Construction	1,361	1,331	0,183	0,13
Trade, hotels and restaurants	1,437	1,563	0,118	0,20
Other non-public	1,230	0,774	0,439	0,20
Public sector	1,506	1,592	0,111	0,08
Unemployment rate (micro-region)	1,040	2,139	0,032	9,20
Informal economy (county)	0,833	-2,843	0,004	23,2
Self-employment ratio (county)	1,012	0,471	0,638	7,90
Village	1,223	1,361	0,174	0,38
Budapest	2,593	1,725	0,084	0,17
Second quarter	1,072	0,609	0,542	0,28
Third quarter	1,962	4,860	0,000	0,22
Fourth quarter	0,928	-0,310	0,757	0,10
Mean of the dependent variable				0,045
Constant of the log functional form				1,480
Mean duration at sampling (quarters)				5,750
Number of observations				9,810
Pseudo-R2				0,0974
Likelihood ratio test for dropping duration dummies (sign: 0,0000)				81,30

Table A10

Jobloss 1997:1 – 1998:2
(Females starting their job after 1992)
Discrete time duration model estimated with logit for clustered sample

	Odds ratio	Z	p	Sample mean
Age	1,053	0,818	0,413	33,1
Age squared	0,999	-0,946	0,344	1196
Education: vocational	0,701	-1,664	0,096	0,30
Secondary	0,577	-2,330	0,020	0,36
Higher	0,518	-1,631	0,103	0,12
Was unemployed before	1,216	1,153	0,249	0,36
Member of partnership or coop	1,289	0,502	0,616	0,04
Sole-proprietor	0,766	-0,754	0,451	0,07
Employer	0,658	-0,545	0,586	0,01
Casual worker	2,391	1,313	0,189	0,00
Assisting family member	1,949	0,835	0,404	0,01
Usual worktime: Variable	1,406	1,012	0,312	0,07
Zero	11,771	9,402	0,000	0,04
Less than 40 hours	1,507	1,560	0,119	0,09
Agriculture and food	1,435	1,224	0,221	0,07
Construction	0,735	-0,382	0,702	0,02
Trade, hotels and restaurants	1,145	0,594	0,552	0,26
Other non-public	0,928	-0,262	0,793	0,17
Public sector	0,727	-1,158	0,247	0,25
Unemployment rate (micro-region)	1,017	0,590	0,555	8,9
Informal economy (county)	0,808	-2,367	0,018	23,6
Self-employment ratio (county)	1,015	0,507	0,612	7,8
Village	1,194	0,974	0,330	0,34
Budapest	3,443	1,931	0,053	0,21
Second quarter	1,646	4,149	0,000	0,28
Third quarter	2,662	6,339	0,000	0,22
Fourth quarter	1,360	1,103	0,270	0,09
Mean of the dependent variable				0,056
Constant of the log functional form				0,995
Mean duration at sampling (quarters)				5,490
Number of observations				7,342
Pseudo-R2				0,1305
Likelihood ratio test for dropping duration dummies (sign: 0,0003)				41,41

Jobloss 1997:3 – 1998:4
(Males starting their job after 1992)
Discrete time duration model estimated with logit for clustered sample

	Odds ratio	Z	p	Sample mean
Age	0,929	-1,806	0,071	33,1
Age squared	1,001	1,743	0,081	1200
Education: vocational	0,614	-3,454	0,000	0,47
Secondary	0,699	-1,928	0,054	0,25
Higher	0,416	-2,322	0,020	0,10
Was unemployed before	1,312	2,097	0,036	0,42
Member of partnership or coop	0,708	-0,868	0,386	0,05
Sole-proprietor	0,732	-1,132	0,258	0,08
Employer	0,333	-1,980	0,048	0,02
Casual worker	2,857	3,270	0,001	0,02
Assisting family member	0,961	-0,077	0,939	0,01
Usual worktime: Variable	1,444	1,857	0,063	,014
Zero	2,354	3,454	0,000	0,05
Less than 40 hours	1,901	1,724	0,085	0,02
Agriculture and food	1,271	1,215	0,224	0,14
Construction	1,355	1,510	0,131	0,13
Trade, hotels and restaurants	1,465	1,801	0,072	0,19
Other non-public	0,813	-0,876	0,381	0,17
Public sector	2,348	4,352	0,000	0,10
Unemployment rate (micro-region)	1,065	3,785	0,000	9,3
Informal economy (county)	0,839	-2,776	0,005	23,1
Self-employment ratio (county)	0,986	-0,663	0,507	7,8
Village	1,410	2,529	0,011	0,38
Budapest	5,003	3,207	0,001	0,15
Second quarter	0,487	-2,225	0,026	0,11
Third quarter	0,791	-1,231	0,218	0,46
Fourth quarter	0,991	-0,045	0,964	0,25
Mean of the dependent variable				0,044
Constant of the log functional form				2,204
Mean duration at sampling (quarters)				5,530
Number of observations				8,483
Pseudo-R2				0,1323
Likelihood ratio test for dropping duration dummies (sign: 0,0000)				98,27

Table A12

Jobloss 1997:3 –1998:4
(Females starting their job after 1992)
Discrete time duration model estimated with logit for clustered sample

	Odds ratio	Z	p	Sample mean
Age	0,923	-1,340	0,180	32,7
Age squared	1,000	1,092	0,275	1167
Education: vocational	1,230	0,968	0,333	0,29
Secondary	0,864	-0,611	0,541	0,39
Higher	0,514	-1,648	0,099	0,12
Was unemployed before	1,533	2,684	0,007	0,38
Member of partnership or coop	0,690	-0,588	0,557	0,03
Sole-proprietor	0,729	-0,869	0,385	0,05
Employer	0,352	-1,352	0,177	0,02
Casual worker	1,186	0,318	0,750	0,00
Assisting family member	0,994	-0,012	0,990	0,01
Usual worktime: Variable	1,639	1,771	0,077	0,06
Zero	5,825	8,236	0,000	0,09
Less than 40 hours	1,970	2,147	0,032	0,07
Agriculture and food	2,840	3,963	0,000	0,07
Construction	0,268	-1,198	0,231	0,01
Trade, hotels and restaurants	1,455	1,598	0,110	0,26
Other non-public	1,184	0,557	0,578	0,17
Public sector	0,826	-0,712	0,477	0,24
Unemployment rate (micro-region)	1,019	0,877	0,380	8,90
Informal economy (county)	0,874	-1,727	0,084	23,4
Self-employment ratio (county)	0,974	-0,889	0,374	7,80
Village	1,427	2,115	0,034	0,35
Budapest	2,731	1,614	0,107	0,18
Second quarter	0,650	-1,139	0,255	0,10
Third quarter	1,182	0,637	0,524	0,47
Fourth quarter	1,272	0,899	0,369	0,25
Mean of the dependent variable				0,037
Constant of the log functional form				1,264
Mean duration at sampling (quarters)				5,45
Number of observations				6,174
Pseudo-R2				0,1239
Likelihood ratio test for dropping duration dummies (sign: 0,0000)				53,20

Table A13

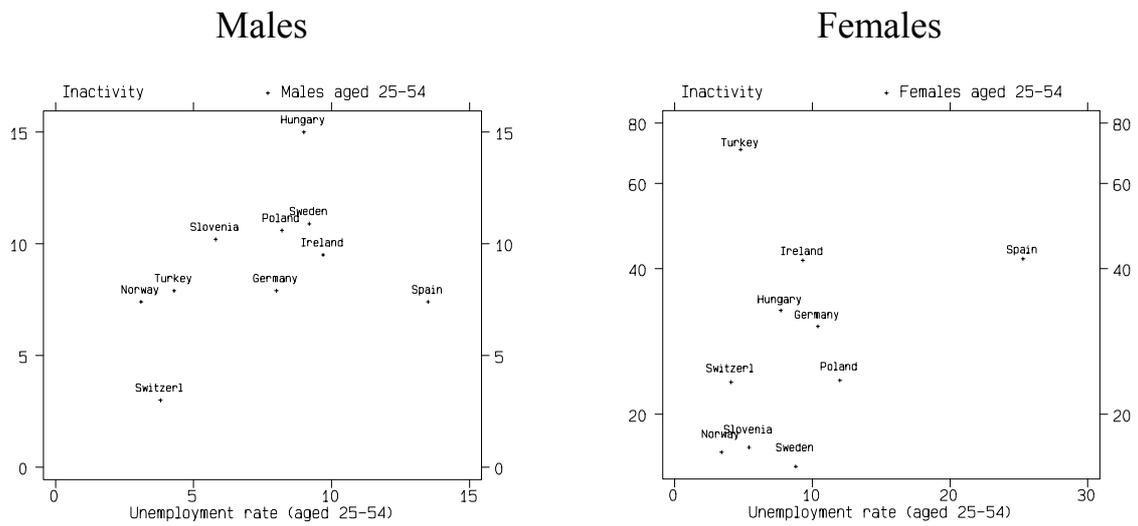
**Job finding equations controled
for county-specific differences in the rate of jobloss**

	1997:1		1997:3			
	Male	Female	Male	Male	Female	Female
Age	0,985 (-2,62)	1,159 (2,03)	0,973 (-4,00)	0,973 (-4,00)	1,096 (1,42)	1,093 (1,38)
Age squared	..	0,998 (-2,06)	..	..	0,999 (-1,51)	0,999 (-1,48)
Education: vocational	1,238 (1,62)	1,483 (2,14)	1,791 (3,67)	1,765 (3,59)	1,785 (2,99)	1,738 (2,85)
Secondary	1,309 (1,45)	1,681 (2,77)	1,735 (2,46)	1,736 (2,46)	2,389 (4,66)	2,400 (4,67)
Higher	2,688 (2,33)	1,725 (1,77)	2,179 (1,37)	2,135 (1,32)	3,259 (4,07)	3,254 (4,08)
Number of children	..	0,858 (-1,74)	..	..	1,111 (1,38)	1,109 (1,37)
Receives UA	1,017 (0,12)	0,716 (-1,45)	1,149 (0,79)	1,167 (0,89)	0,861 (-0,62)	0,854 (-0,66)
Wants a job without searching	1,678 (2,69)	2,124 (4,10)	1,452 (1,76)	1,483 (1,86)	2,344 (4,57)	2,366 (4,65)
Searching	1,519 (2,39)	2,958 (5,72)	1,506 (2,26)	1,533 (2,39)	3,247 (6,63)	3,261 (6,65)
Registered unemployment	0,973 (-1,87)	0,971 (-1,56)	0,976 (-1,19)	0,975 (-1,23)	0,941 (-2,58)	0,950 (-2,21)
Self-employment ratio	1,059 (3,02)	1,025 (1,10)	1,017 (0,83)	1,009 (0,44)	1,015 (0,55)	0,993 (-0,25)
Informal economy	0,929 (-1,88)	0,931 (-1,78)	0,995 (-0,12)	1,020 (0,47)	0,917 (-2,18)	0,934 (-1,64)
Jobloss rate*	1,530 (3,65)	1,374 (1,79)	1,137 (0,77)	..	1,483 (2,42)	..
Jobloss rate, lagged*	n.a.	n.a.	..	1,305 (2,05)	..	1,513 (2,28)
Nobs	3,611	4,829	2,660	2,660	3,966	3,966
Constant of the log form	-0,584	-4,563	-1,261	-1,507	-2,637	-3,016
Pseudo-R2	0,0494	0,0711	0,0463	0,0482	0,0803	0,0801
L. ratio test for duration	52,39 (0,000)	64,15 (0,000)	44,74 (0,000)	44,12 (0,000)	55,06 (0,000)	55,42 (0,000)

*) Log of the county-specific odds ratios presented in *Table A3*. 'Lagged' stands for estimates from the 1997:1 sample.

Figure A1

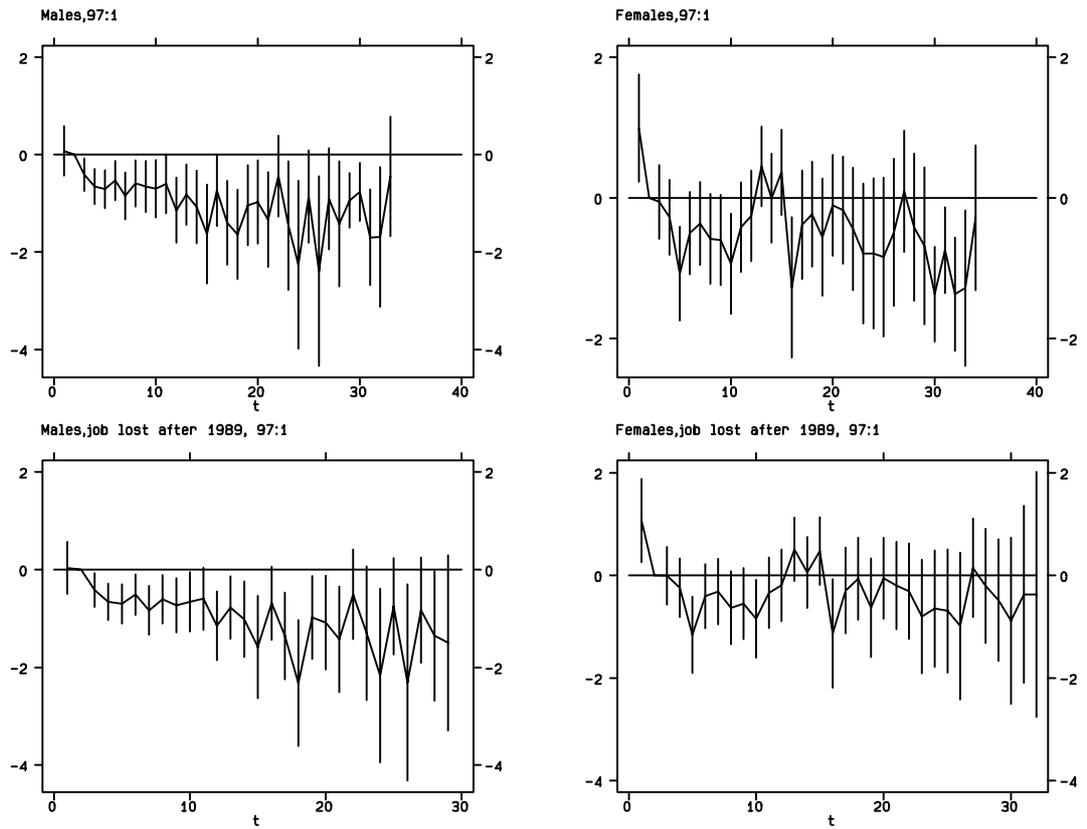
**Inactivity versus search unemployment among
the 25–54 years old in selected European countries, 1997**



Key Indicators of the Labour Market, ILO, Geneva, 1999.

Figure A2

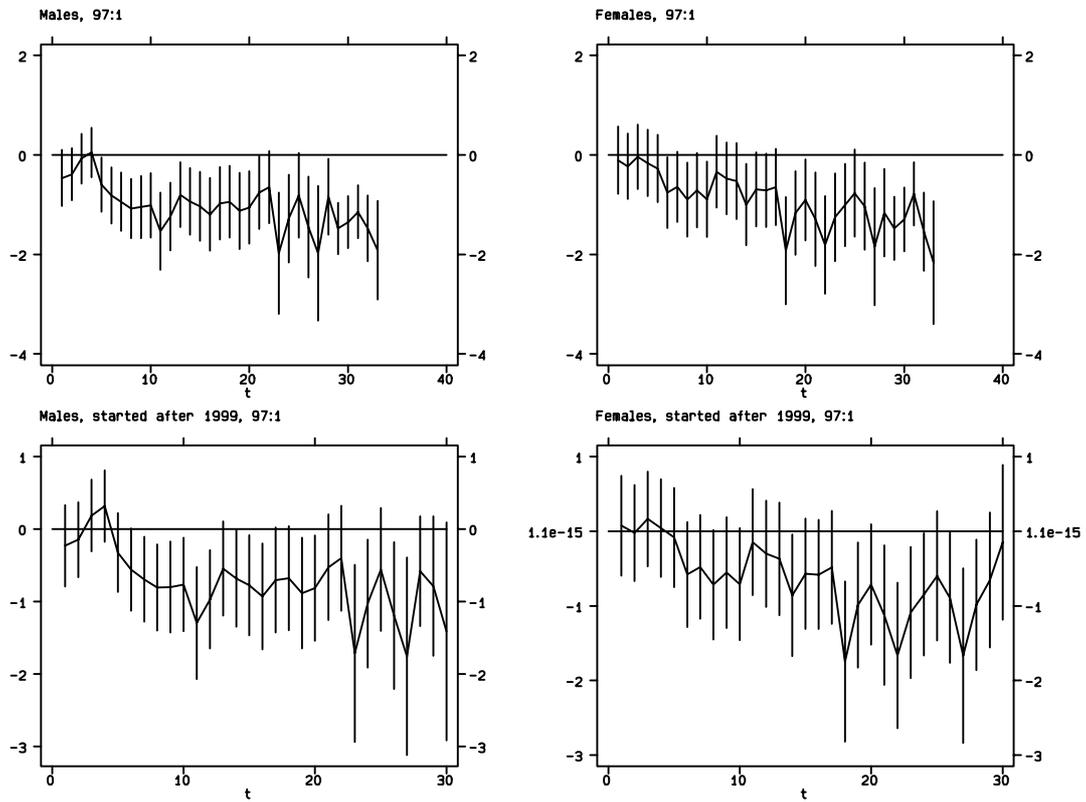
Job finding – Baseline hazard
(95% confidence intervals shown)



Also see *Tables A1* and *A2*

Figure A3

Jobloss – Baseline hazard
(95% confidence intervals shown)

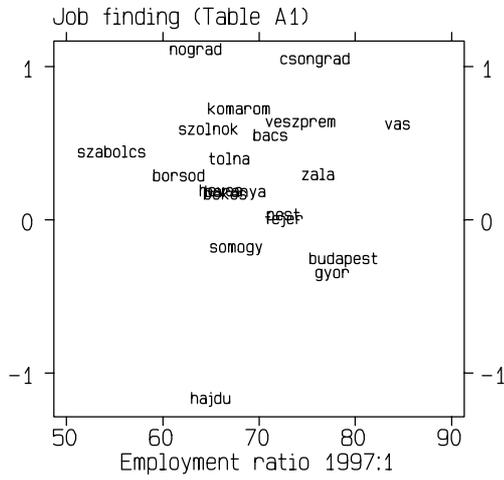


Also see *Tables A3 and A4*

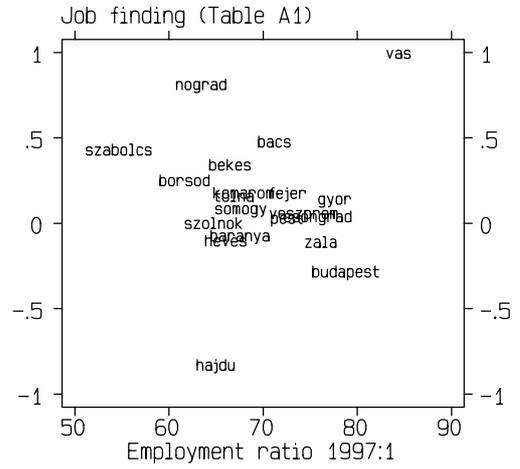
Figure A4

Regional differentials in job finding* and the level of employment

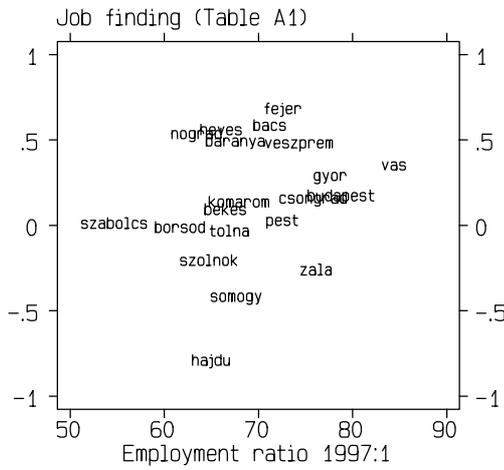
Male 1997:1



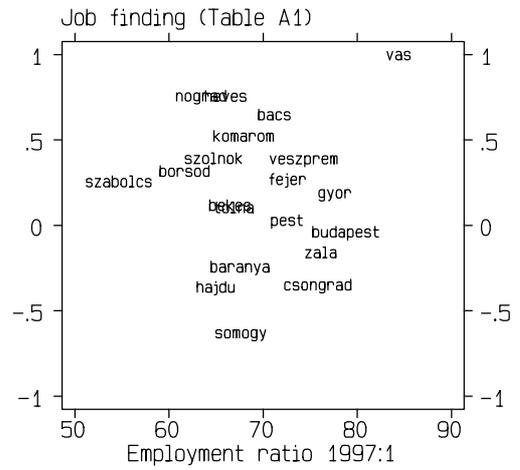
Female 1997:1



Male 1997:3



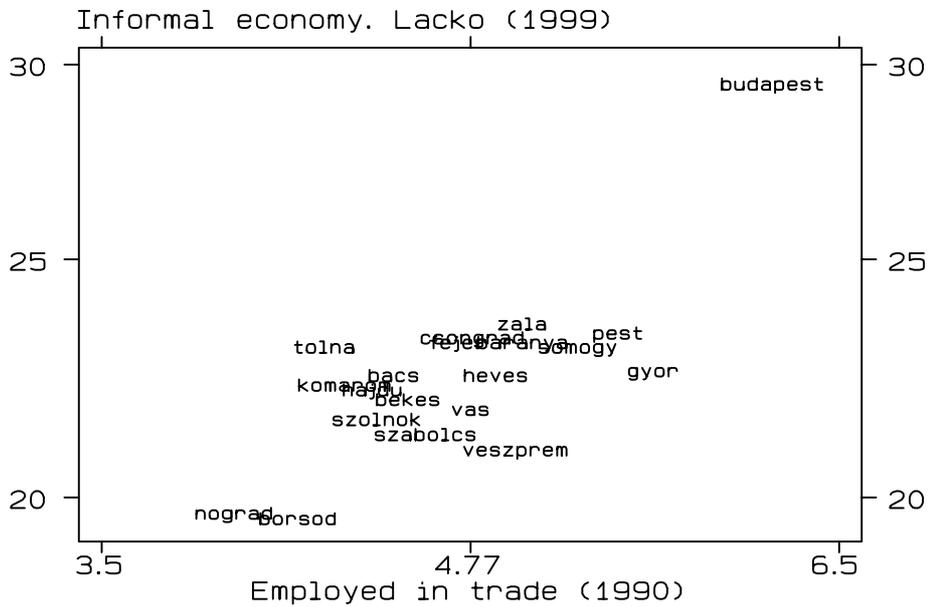
Female 1997:3



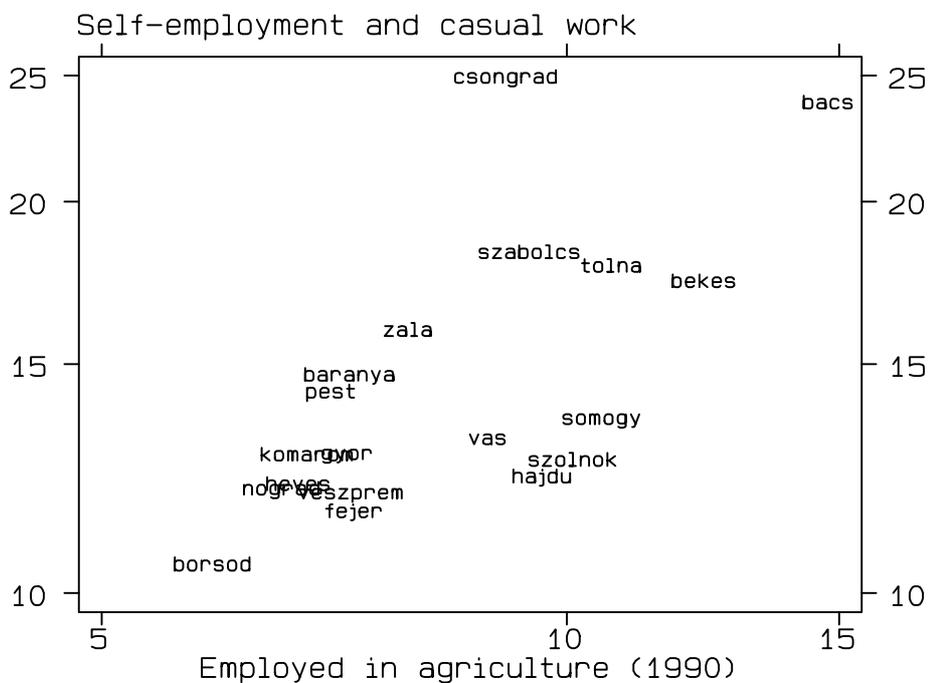
*) Coefficients from Table A1

Figure A5

(a) The size of the trade sector and estimates of the informal economy (Lackó, 1999) by counties



(b) The size of the trade sector and the share of self-employed and casual workers (1997–98) by counties

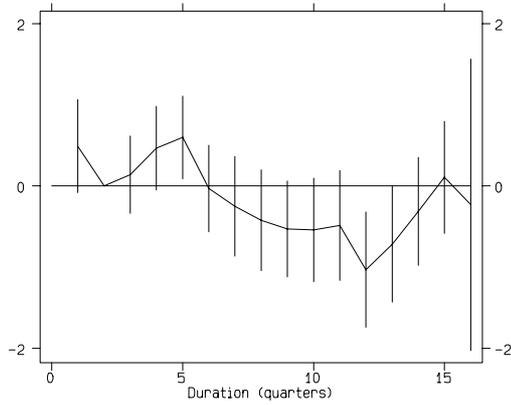


Note: Budapest excluded from (b). For the definitions see the text.

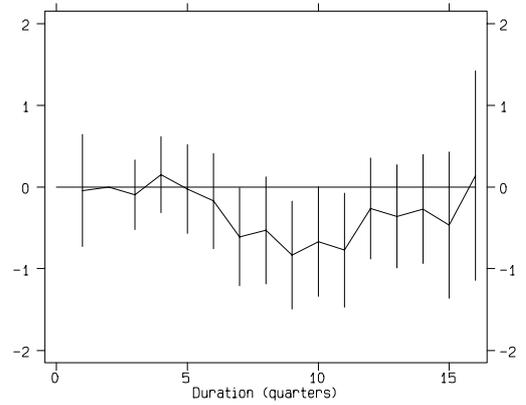
Figure A6

Baseline hazard of jobloss
(Workers starting their job after 1992)

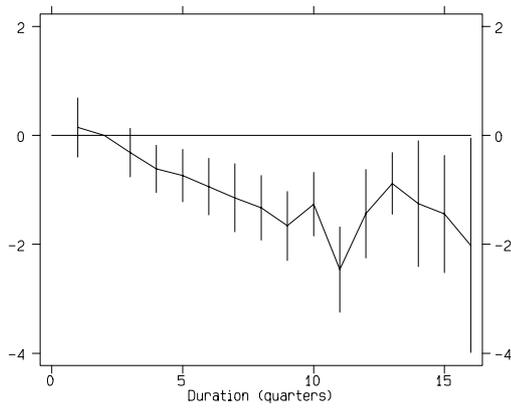
Males, 1997:1



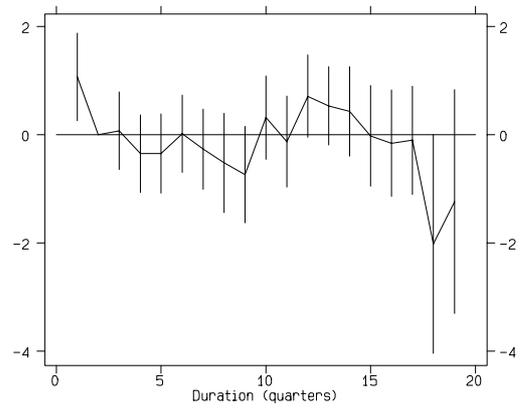
Females, 1997:1



Males, 1997:3



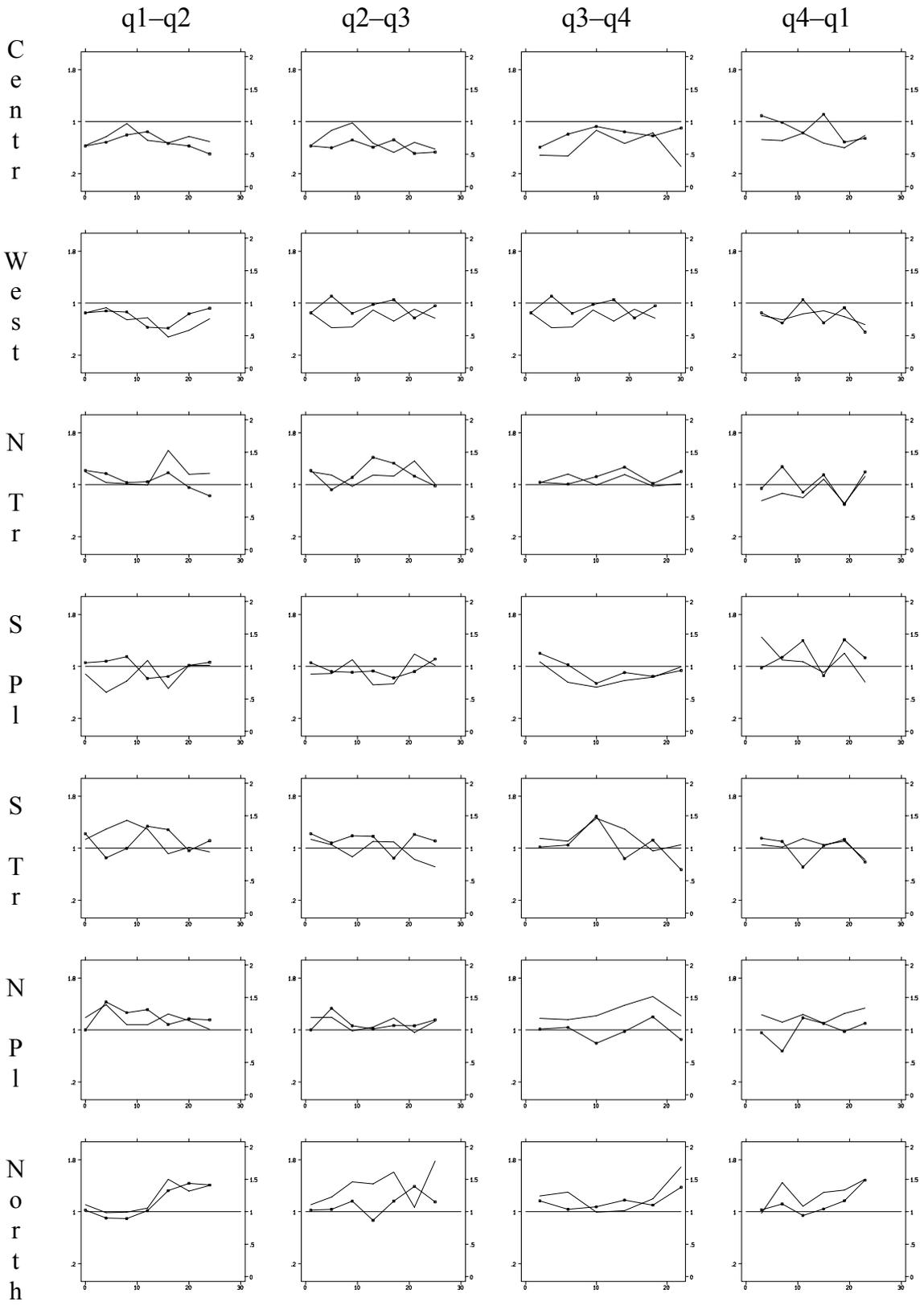
Females, 1997:3



Also see *Tables A9–A12*

Figure A7

Quarterly flows between employment and non-employment 1992-98
 By regions and quarters, national average rates = 1



O = flow from E to NE . = flow from NE to E. Per cent of WAPOP

The samples referenced in *Tables A5-A12*

Sample	Work- ers	Spells	Exits at quarter after sampling				
			1	2	3	4	5
Non-employed							
1997:1, male	1,537	3,611	232	146	92	27	12
1997:1, female	1,847	4,832	132	92	70	32	7
1997:3, male	1,286	2,699	182	75	54	27	9
1997:3, female	1,757	3,991	146	71	37	33	18
Employed							
1997:1, male	3,512	9,810	153	125	169	29	17
1997:1, female	2,641	7,342	112	139	143	26	6
1997:1, male	3,598	8,483	216	112	59	18	11
1997:3, female	2,661	6,174	142	66	30	13	6

**Preliminary results on income loss from jobloss
on the basis of HBS data**

In cooperation with Zsombor Gergely

We try to measure the income effect of jobloss using a special database built of households observed in the Hungarian Household Budget Survey (HBS). The sample will be used for a detailed study of income loss from jobloss and income gain from job finding. In this *Appendix* we present some preliminary findings on change of income in households losing a wage earner.

The HBS is conducted regularly by the Hungarian Central Statistics Office (HCSO). It contains information on household consumption and income, demographics and detailed information on the household members. Its sample size varied considerably over time, but always remained around 10000 households. The survey has a three year rotating panel structure, so one-third of the cross-section sample is carried over three, and two third over two years. We used the latter structure and compiled four two-period panels from the period between 1993 and 1998.

Gross income was computed using the definitions of the HCSO; this includes agricultural sales and expenses but excludes 'rainfall' cash-inflows from selling durables or houses, or from raising credit. Net income is gross income less taxes and social security contribution payed. Every monetary measure is converted to its 1998 value using the consumer price index. We picked the CPI against the wage-index because the large number and variety of income and consumption types.

The database referenced here is a pool of four two year panels (from 1993 to 1998). We select those households where one and only one person shifted from employment to non-employment¹⁶ between the first period and the second. Changes are registered for the working age population (people over 15 and below 54, 59 years of age –for females and males, respectively). Since our main focus is the analysis of the change in income we impose further restrictions on the data to eliminate unwanted effects. We drop pensioner households from the sample and – to control for demographic change – also those where the number and intra-family status of

¹⁶ The change is defined as a transition from employment to 1) unemployment 2) pension 3) and to „other“, which means „other“ than all the listed activity categories. This way we do not register the transition from/to student status and maternity leave, the two second most frequent cause of change for certain age and age/gender groups.

household members have changed over time¹⁷. The resulting sample contains 5460 households with 521 job losers. There is a net loss of jobs in the sample, but this is almost completely eliminated by weighting.

Since the HBS is not a snapshot of a given timepoint – its sample is actually a pool of monthly subsamples – a status changer person have income data for each status. These are registered as yearly totals, and there is no duration record for most part of the timeframe of interest. The individual's yearly income is finally combined with the yearly family income. Even if we had access to the individual snapshots corresponding to the statuses, we could not separate the family income of one status-period from the other. As a result, despite individuals are labeled as 'employed' or 'non-employed', none of them has a 'clean' record, ie. with only labour income or unemployment benefit even in that case when she/he receives only one of them at one point in time. Two necessary burdens emerge from this. The first is that we are not able to account properly with spell histories. The second is, as a corollary, that the figures will always carry the effect of composition in a regional breakdown. They will never refer to a 'representative' household, but are real macro-aggregates. If the periods of non-activity are dissimilarly distributed across regions, our estimates will be biased.

Table 1 of Appendix 2

Regional distribution of the status changers			
	stable	job loser	income*
Central	25,42	20,56	455
North Transd.	9,86	14,60	406
West Transd.	11,81	8,84	457
South Transd.	13,18	14,99	457
North	13,21	12,60	411
North Plain	15,85	20,71	399
South Plain	10,67	7,70	395
Total/Average	100,00	100,00	

*First period

The regional distribution of the sample¹⁸ is shown in Table 1 by status change. The last column shows net income figures for every region.

¹⁷ The first correction does not affect the status changers (by definition), but the second does. We experimented by comparing the demographically corrected and uncorrected results, and found that the distributional characteristics of the sample does not change substantially.

Table 2 shows the levels and change of income. The mean income levels are estimated to have a slight downward trend between two panel periods with stable households. This is consistent with the overall depression of real income from 1993 to 1998. Job losers lost a quarter of their income in the year of status change on average. Workers receiving UI or UA in the second period lost only 18 per cent. (They seem to belong to families with income levels close to the average. Job losers not receiving benefit in the second period appear to have some 8 per cent higher income level than the average).

Table 2 of Appendix 2

**Group means of per capita annual real household
income by status change**

(In 1998 Forints (x1000) and percentages)

	Income					
	Period 1	Period 2	Change		Corrected change	
			Ft	%	Ft	%
Stable	436	429	-7	-2	0	
Job losers						
– All	473	355	-118	-25	-111	-23
– Receiving UI or UA	440	362	-78	-18	-71	-16

Income is net of deductions. Both income and expenditure are total yearly per capita measures. Per capita means the usage of consumption units here, following the recent standards of the HCSO. In households with at least one active earner, every but the first adult weights 0,75. The first child (under 15) weights 0,65, the second 0.5 and every other 0,4. In households with no active earner, the first adult weights 0,9, and every other 0,65. This scale is less progressive than the OECD scale. Our figures are higher than those in the HCSO yearbook, since those are calculated by using the raw number of household members.

Table 3 presents the mean changes and corrected changes for the seven macro-regions. (Unfortunately the sample is too small for breaking down benefit recipients by region or type of benefit). Income loss is substantially under the mean in the South Trans-Danubian region and both the southern and the northern parts of the Plain.

¹⁸ The regional distribution is by no means comparable to that of the whole population. This is mainly due to the severe sample attrition of the panels, which is not corrected by the weight used.

*Table 3 of Appendix 2***Income changes of job loser households by region**

	raw	corrected
Central	-29	-27
North Transd.	-29	-24
West Transd.	-22	-22
South Transd.	-17	-16
North	-25	-24
North Plain	-14	-12
South Plain	-20	-13

Regions of Hungary according to the EUROSTAT nomenclature

Map1 NUTS-II level regions



NUTS-III level regions



NUTS-IV level regions