

LABOR FORCE DYNAMICS IN UKRAINE:  
EXPLAINING WITH MICRO DATA

by

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Abstract

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The aim of the thesis is to study labor market behavior of individuals in Ukraine from 1997 to 2002 during the transition to a market economy. The data from a nationally representative longitudinal survey of Ukrainian citizens and Labor Force Survey (Derzhkomstat) was used. Employing the Markovian assumption, we identified the pattern of transition between labor market states. The results indicate that in 2002 generally labor market in Ukraine is more dynamic comparatively to 1997. The probability to become employed within one year for an unemployed individual has increased since 1997 by 4.2%. The probabilities not to change the initial state decreased. To investigate individual transition factors multinomial logit estimates were analyzed. They demonstrate that women have lower probabilities of favorite employment outcomes comparatively to men in both periods. But the dynamics of changes for different genders does not support the hypothesis about decreasing of employment chances for women. Aged workers experience the reduction of employment chances as a less competitive group during the process of transition. The youngest group (less than 25 years old) is the most dynamic labor market group. State sector in 2002 creates more unemployment outcomes than privatized sector, on the contrary to 1997. Self-employed persons have lower probability to leave employment than state enterprises workers and the pattern is more distinct in later period than in earlier one. In 2002 the larger the size of enterprise, the smaller is the probability of maintaining employment. Labor market in Kyiv city area provides greater employment opportunities comparatively to province regions and the gap is increasing with time. The estimated probabilities of positive employment outcomes increase monotonically with education level, while the estimated probabilities of negative employment outcomes decrease with educational level. The differences between favorable employment outcomes probabilities of workers with higher level of education and workers with lowest levels of education have increased over time, implying higher returns of educational attainment (in terms of employment opportunities) in 2002.

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## GLOSSARY

**FSU countries** are the Former Soviet Union countries.

**CEE countries** are the Central and Eastern Europe countries.

**MNLM** is a multinomial logit model.

**Employed are** all people of age between 15-70 years who were in paid employment or self-employment for at least an hour during the reference week (including women on maternity leave).

**Unemployed** include all people of age between 15-70 years who during the reference week fulfilled all the following conditions: (a) had no work or self-employment; (b) were actively seeking for work or trying to organize their own business during 4 weeks before a survey; (c) were ready to start working in two weeks.

**Out- of –labor- force** are the remaining people of age between 15-70 years.

## INTRODUCTION

During transition in Ukraine, as well as in the other countries of Former Soviet Union and Central and Eastern Europe, the labor market has been experiencing dramatic changes: after the assured job availability and official absence of unemployment a huge number of people lost their jobs and became unemployed or left the labor force because of deep economic recession and necessary transformation and restructuring. On the other hand, part of these workers was absorbed by new-born private sector and part became self-employed. But still, the inflow into employment decreased, since the recession and financial instability lowered the ability of employers to hire labor. So, the labor market, which was almost steady before the transition, became highly dynamic, people started to change their labor statuses more frequently than before.

This paper focuses on the analysis of the labor force dynamics in Ukraine, namely, the determinants of the gender, age, education, working environment unemployment gap. Unemployment is considered to be a hard and complicated problem for every country in transition. The aggregate unemployment rate is one of the most important indices of economy condition, but microeconomic determinants of dynamic nature of labor force are also very important. So, the first question of the paper is how the probabilities of changing labor status fluctuate with individual demographic, regional, educational and economic

characteristics. Understanding these driving forces and determining factors is extremely important to soften the process of labor market restructuring. Such knowledge of the likelihood of labor status change is important for state policy makers, since it helps to monitor the risk for a particular demographic group to be unequally affected by employment conditions in a country. Flow analysis should also be helpful for the achievement of higher efficiency of active and passive labor market policy, namely, of the abatement of the unemployment level and unemployment duration.

Another question that arises is how these probabilities have changed since the beginning of the transition? For which group (by gender, education level, age group) in Ukraine is the probability of job loss, for example, higher in 2003 than in 1997? That is, which demographical group is better off, comparing the beginning of transition and current situation, and whose chances to become employed descended?

The answer to these questions is the main contribution of the paper, since, to our knowledge, there are no papers investigating the issue of the labor market dynamics in Ukraine in terms of micro data.

Ukraine as a FSU country might have different story to tell than CEE countries have, since the paths of labor market adjustment differed substantially between CEECs and the FSU countries. Boeri and Terrell (2001) show the difference in the responsiveness of employment to output changes the level of



real wage reduction, the reallocation of labor from public to private sector and the timing of the raise and duration of unemployment. In spite of similar patterns of output decline in both group of countries, FSU countries demonstrated relatively flat increase in unemployment and accumulation of long-term unemployment, which was caused by the low non-employment benefits and low real wage level. So, at the early stages of transition the Ukrainian labor market demonstrated comparatively low levels of unemployment along with great amount of workers on short-time work or involuntary leave. Absence of legal bankruptcy procedures, great subsidies and taxation exempts contributed to the process of wage arrearage and to the delay of labor shedding.

So, Ukrainian data is expected to demonstrate higher probability of employment for so called vulnerable groups (women, less-skilled, less-experienced, older workers etc.) comparatively to more competitive labor groups (men, more-skilled, younger workers respectively) in earlier periods (1997-1998) of transition than in later periods (2002-2003). Analyzing regional differences, urban workers are expected to have much higher probabilities of moving between states than rural workers. Living in metropolitan area increases chances of employment.

The paper is organized as follows. In Chapter 1 theoretical frameworks employed in analysis of individual labor market histories are overviewed and

empirical methods and findings are presented. Chapter 2 discusses the methodology; the data description and empirical results are given in Chapter 3.

## *Chapter 1*

### LITERATURE REVIEW

Labor force transitions have been the object of a considerable number of studies in Western economies as well as in East Europe Countries and Former Soviet Union. From the econometrical point of view in most of the papers two methodological frameworks are used – hazard models for unemployment duration analysis or modelling individuals' transition among the labor force states as a Markov chain process (multinomial logit (MNL)).

In duration analysis a researcher is mainly interested in determining how the various demographic characteristics or treatment change time of being in certain state. For example for the group of people who became unemployed during a certain period, wage on last work, the unemployment benefit and the gender, education level, age, marital status, experience are observed when the person becomes unemployed. Then the distribution of unemployment duration conditional on the covariates is specified. The hazard function allows estimating the probability of exiting the initial state (unemployment) within a certain interval (week or months) conditional on having certain characteristics at the starting point of interval.

The hazard models for duration analysis are much more intensively used in researches done for Western economies, than for transition countries and the

explanation is that using duration analysis implies that durations are observed to fall into fixed intervals, often weekly or monthly. This becomes the main obstacle of using this method for transition economics, since data in labor force surveys is usually of annual or quarter type. The only data that provide information on more frequently basis is data on registered unemployment. Another reason for more intensive usage of modelling individuals' transition among the labor force states as a Markov chain process in transition countries is that subject to a strong and sudden structural shock the importance of individual working history may be mitigated.

In case when dependent categorical variable is classified into few categories (e.g. labor force states could be employed, unemployed and out-of-labor-force) estimation is undertaken by means of generalization of the logit or probit models, which are multinomial logit and the multinomial probit respectively. These generalizations are motivated by employing the random utility model (Kennedy, 1998). In the random utility model the utility to an individual of an alternative is specified as a linear function of the characteristics of the individual and the attributes of the alternative and the error term. The probability that an individual will choose a particular alternative is given by the probability that the utility of that alternative to that individual is greater than the utility to that individual of all other available alternatives. The individual chooses the alternative that maximises his or her utility. The multinomial logit, as well as the multinomial probit, follows from

assumption made concerning the distribution of the error term in this random utility model.

If the random utility error terms are assumed to be independently and identically distributed as a log Weibull distribution, MNLM is employed. The main advantage of MNLM is ease in computation, since the probability of an individual selecting a given alternative is easily expressed and likelihood function can be derived and maximized in straightforward fashion. The disadvantage of MNLM is so called *independence of irrelevant alternatives* (IIA) property, when category almost identical to an existing alternative is added to the set of choices. It may be expected that the probability from the model of choosing the similar alternative would be cut in half and the probabilities of choosing the other choices would be unaffected. But this not the case, implying that under IIA assumption the using of MLNM is restricted in case when two choices are close substitutes.

Comparing to hazard models the multinomial logit model is more convenient in terms of availability of data. The multinomial logit method is used in our research and more detailed description of it is given in the Chapter 2 (Methodology).

The literature estimating and analyzing labor market flows for whole labor market as well as for certain social groups or an economic sector in Western economies is substantial. Microeconomic evaluation of labor force flows in

transition economies is provided also, but since the process of transition began earlier in CEE countries, the proper information and data for different researches and access to them is more available in this countries comparing to Former Soviet Union countries and relations with western economists and researches are more developed and prolonged in CEE countries, the more effort was concentrated on these economies. So far there exist a number of papers concerning microeconomic determination of labor flows in Czech Republic (Stefanova and Terrell (2002), Vit and Terrell (1999)), Slovenia (Orazem and Vodopivec(1997)), Eastern Germany (Bellman et al. (1994)). As to our knowledge, there exists only one paper estimating labor flows in FSU, (Foley (1997) for Russia).

The most researches in Western economies (and part of those for transition countries) are devoted mainly not to gross labor flows decomposition, but to analysis of labor mobility in certain social groups (less-educated youth or aged citizens, workers with disabilities etc) or analysis of labor flows changing by gender and educational level.

Thus, less-educated youth is considered to be less competitive and more vulnerable group on labor market. The probability of entering employment for young individuals with low educational level is traditionally low and it also varies with gender, race, and experience. Holzer and LaLonde (1998) investigated job and employment instability in the less-educated group of youth in the USA. The authors use multinomial logit model. First, they control for the educational

accomplishment (as a proxy for skill). Then, the authors choose to control for the cognitive skill, using as a proxy the math test score. Finally, they add dummies for occupation, industry and initial wage, that is, the characteristics of the working environment. The conclusion is that the problem of early employment instability is caused mainly by the poor cognitive skills of the workers, rather than by their educational accomplishments. The quality of working environment of such workers influences the turnover rates of less-educated workers independently of their individual characteristics. The higher turnover rates of young and less-educated women are closely related to the marital status and childbearing, thus, the transition rates are higher for those never been married and for mothers of one or more child.

The trends of unemployment and labor force participation for young and less-educated men, especially blacks in the USA between years 1979 and 2000 were explored Holzer and Offner (2001). The authors compare outcomes across different racial and gender groups, and across subgroups (by age, education, or area of residence) within the population of young black men. The results indicate substantial deeper decline in employment and labor force participation for young black men than for whites and Hispanics young men during the 80's as well as the 90's. The employment and labor force participation decrease for less-educated males for this age group (young men) in general, but less so for whites and

Hispanics than for blacks and less for this age group than for the youngest.

The dependence of probability of labor force status changing on education as well as on experience was investigated by Orazem and Vodopivec (1997). Using multinomial logit and hazard models, the authors estimated changes in value of human capital in Slovenia. The impact of human capital on labor market transition is investigated by identifying the determinants of exit from both employment and unemployment. Exit from unemployment is analyzed by fitting proportional hazard models to pre-transition and transition periods, while exit from employment was estimated by fitting a multinomial logit model to the same periods. The main result is that the wage and employment premiums to education and to the experience grew sharply in the transition period, that is, (i) the probability to find a job increased for more educated workers in transition period; (ii) more educated workers' probability of job-to-job movement is higher; (iii) after transition probability to leave labor force became lower for the more educated; (iv) the least experienced group has higher probability of becoming unemployed in transition period; (v) labor force participation of the more experienced decreased to lower extent than for the less experienced (except for those with less than three year experience and for the most experienced ( of pensionable age)).



The micro determinants of labor force status among older Americans were studied by Benitez-Silva (2000). The authors report multinomial logit estimates of the transitions out of the different labor force status and also the binomial logit results of the shorter transitions. The findings of this paper are that those looking for job actively after retirement or dismissal are more likely to become employed again. More healthy persons and those who have been working in previous year also have higher probability to be hired. Married persons are more likely to stay out of labor force. An important point is that different period data (monthly, quarterly, yearly) was analyzed and qualitative results appear to be robust to the period changes, except the magnitudes of effects differentiate.

Baldwin and Schumacher (1999) studied job mobility among workers with disabilities along with the wage effects of job changes by observing workers' within-firm and across-firm job changes for USA in 1990. They estimated a multinomial logit model of the decision to change job depending on worker's human capital, demographic characteristics, and features of the initial job and demand determining factors. The dependent variable distributes workers into three types: job stayers, internal changers or external changers. Based on results authors argue for no difference in the probability of an internal job change between disabled and nondisabled workers, while disabled are more likely to make external job change. Health insurance inversely influences probability of job

change and this impact is surprisingly lower for disabled workers than for nondisabled. Disabled female or black workers are less mobile than their nondisabled counterparts. Disabled workers are more likely to experience an involuntary job change. So, the results are consistent with the theory that disabled workers are discriminated in the labor market.

The estimation of gender determinant of labor force flows is incorporated in almost every study, yet often it is a main research question in many studies, as in researches of Boheim and Taylor (2000) and Booth and Francesconi (1999) for British labor market and Lauerova and Terrell (2002) for Czech Republic.

Boheim and Taylor (2000), using multivariate analysis in a discrete time independent competing risk framework with flexible baseline hazard rates models, tried to determine the causes of unemployment duration for both genders in Britain in 90ths, namely what is the effect of individual and labor market characteristics on the probability of moving from the unemployment to full, part-time employment, self-employment and out-of labor-force status. The results show that the median duration of unemployment spells for men is 5 months, while for women it is 3 months. Men of age 25 are more likely to leave unemployment for full-time work and at the same time their possibility of entering unemployment is the lowest. Individuals with employed spouse at the

start of the spell have higher rate for exit from unemployment to full- and part-time job. Education and previous working experience increase possibility for individuals to enter the employment, while for men this increase is higher than for women. The local unemployment rate has negative impact on the probability of exiting the unemployment, but increases probability of entering the full-time work for women.

Booth and Francesconi (1999) investigated gender differences of different forms of job mobility (namely promotions, quits and lay-offs). The data allowed distinguishing between internal and external job mobility. An important feature of the paper is that it separates quits and lay-offs. Using multinomial logit regressions, the authors found that on average job mobility rates do not differ between males and females, but while controlling for individual characteristics, for women the promotion probabilities are lower and quit probabilities are higher, comparative to the men. The probabilities of being promoted are higher for married or cohabiting persons, while the tenure and experience have statistically significant negative effect on promotion. The inverse relationship between the experience and promotion is explained by an age effect, since more experienced are the older workers. Women are more likely to be laid off on average and with individual characteristics control.

Estimating gender-specific multinomial logit models, Lauerova and Terrell (2002) argue that gender gap in unemployment rate (in Czech Republic as well as in the other transition countries) is explained mainly by the women's lower probability of leaving unemployment for a work. Single persons have lower probability than married ones to quit or lose their job for unemployment, while married women are particularly unlikely to exit unemployment for a job. More educated are less likely to leave employment and more likely to find a job. Younger persons (age 15-34) are more likely to leave employment but they are also more likely to enter the employment. The directions of age and education effects are the same both for men and women but the magnitudes differ and women are considered to be a more vulnerable group.

There exist a few studies of labor market behavior, in which authors use complex set of individual characteristics (besides gender, age and education, they use occupational variables, regional aspects, type of enterprise ownership, level of income etc) and representative the whole labor market samples, trying to investigate the pattern of labor force status fluctuating for the whole economy.

So, the first research for transition country was conducted by Bellman et al. (1994). The paper investigates the behavior of labor market in the early stages of transition (that in 1990 -1991) in eastern Germany (by gender, industry sector,

demographic features and region) and tries to predict labor market changes in near future. The highest probability of exiting of employment is for oldest workers and for higher level of income (unemployment benefit), as well as this probability is higher for women comparatively to men. At the same time, women's probability to enter the employment private ownership results in a higher outflow rates from employment. The presence of children and higher education rise probability of entering the labor market. This research was one of the first for transition countries and the authors' findings ensure the appropriateness of standard methodology for examining of labor markets in transition.

An analysis of labor market dynamics from 1992 till 1996 was done for Russia by Foley (1997). With the help of multinomial logit method the paper describes the dynamics of labor status change probabilities of different enterprise ownership groups, demographic (gender, marriage status, age, number of children) groups, level of education, income and region groups. The probability of reemployment fell by 25% from 1992 to 1996, while the probability to lose job increased by 75%. Among the most vulnerable groups are women, since they have the lowest probability for job-to-job transition as well as a higher-than-men probability to leave the labor force, while married women are less likely to leave the labor force as their work experience increases. Younger workers change from

job to job and from job to self-employment status most frequently, unlike the older individuals. State sectors employment was more stable than private sector one or self-employment jobs, while moves to the state sector employment are mostly from unemployment pool, while to the private sector and self-employment workers were hired from employment pool directly. Education level appears to be positive determinant of unemployment-to-job flows.

Sorm and Terrell (1999) for Czech Republic calculated gross probabilities of mobility and then estimated functions with the micro data. The results suggest a significant shift in the structure of employment by industrial sector. Agriculture and industry experienced the largest declines, while the most rapidly creating employment sectors were those previously neglected under old regime, namely trade, financial sector, hotels and restaurants. The hazard analysis points out that in declining sector workers have different flows than in the growing ones. In declining sectors workers are more likely to exit the labor force as well as unemployment (to leave the labor force) and less likely to leave the unemployment. However, workers in growing sectors are not more likely to stay in employment. The most vulnerable groups are older persons (they demonstrate the lowest mobility), less educated (they are less likely to stay employed, more likely to change job). Single persons have higher probability of becoming unemployed. The authors conclude that Czech labor market demonstrated

efficiency and flexibility in the transition process.

This paper tries to fill the gap in empirical literature about microeconomic determination of labor market development and focuses on Ukraine, one of the largest and the most developed former soviet republics, surveying the labor force dynamics since 1997.

First, we will investigate what are the determinants of transitions' probabilities in 1997 and 2002. Second, we will compare chances for certain demographic groups of appearing in the certain labor state in given points of time, namely, 1997 and 2002.

## Chapter 2

### METHODOLOGY

In defining the three main states of the labor market, the internationally accepted International Labor Organization definitions:

*the employed* (E) include all people of employable age (from 15 to 70 years) who were in paid employment or self-employment for at least an hour during the reference week (including women on maternity leave);

*the unemployed* (U) include all people of employable age (from 15 to 70 years) who during the reference week fulfilled all the following conditions (irrespective to whether they were registered or not at the Public Employment center): (a) had no work or self-employment; (b) were actively seeking for work or trying to organize their own business during 4 weeks before a survey; (c) were ready to start working in two weeks.

*the out-of-the labor force* (O) are the remaining people of age between 15-70 years.

In calculating transition probabilities, the analytical approach follows, among others, Bellmann et al (1992), Foley (1997), Lauerova and Terrell (1999), by assuming that movements between labor market states are governed by a Markov process. The probability of transition depends only on the state currently occupied. The change from one state of the labor market to another can be



considered as a dynamic process, where time is treated as a discrete variable and the dynamics are given by a system of difference equation. Our case can be described as a Markov process with three stationary states (E, U and O) and by the flow probabilities of moving from one state  $k$  in period  $t$  to state  $j$  in period  $t+1$  ( $P_{kj}$ ).

So, nine potential transitions across labor market states can be presented by the following P matrix:

$$P = \begin{bmatrix} P_{EE} & P_{EU} & P_{EO} \\ P_{UE} & P_{UU} & P_{UO} \\ P_{OE} & P_{OU} & P_{OO} \end{bmatrix}, \quad (1)$$

where  $P_{EE}$ , for example, is a probability that an individual is observed employed at period  $t$ , given that his was observed employed at period  $t+1$ .

The gross probability of transition from state  $k$  to state  $j$  is given as:

$$P_{kj} = \frac{Flow_{kj}}{Stock_{kj}} \quad k, j = \{E, U, O\} \quad (2)$$

where  $Flow_{kj}$  is a number of individuals in state  $k$  at time  $t$  who are in state  $j$  at time  $t+1$  and  $Stock_k$  is the original stock of individuals in state  $k$  at time  $t$ .

Individual transition equations are estimated by multinomial logit regression. The Markov probability of state transition can be represented as a function of the individual characteristics and microeconomic environment observed before the transition occurs. So, the probability of individual  $i$  moving from original labor market state  $k$  to destination one  $j$  during the sampling period is given as:

$$\Pr[Y_{it} = j | Y_{it-1} = k] = \frac{\exp(\beta'_j x_i)}{\sum_k \exp(\beta'_k x_i)}, \quad (3)$$

where  $j, k = 1, 2, 3$  are the three labor market states.  $x_i$  is a vector of personal and origin state characteristics.

The log-likelihood function for the sample is:

$$\ln L = \sum_{i=1}^N \sum_{j=1}^3 D_{ij} \ln \Pr[Y_{it} = j | Y_{it-1} = k], \quad (5)$$

where  $D_{ij} = 1$  if the individual  $i$  is moving from state  $k$  to state  $j$  and equals to 0 otherwise.

The interpretation of the regression coefficients is not straightforward and the marginal impacts of explanatory variables on a transition probability into state  $j$  are reported. The marginal impact of a given single explanatory variable,  $x_i$ , on the transition probability to state  $j$ ,  $P_j$ , is given as:

$$\frac{dP_j}{dx_i} = P_j [b_j - \sum_k P_k b_k] \quad (6)$$

where  $b$  is the appropriate element of the parameter vector  $\beta$ . Therefore, the magnitude of impact of variable  $x_i$  depends on the choice of  $P_j$ .

## *Chapter 3*

### EMPIRICAL ANALYSIS

#### 3.1. DATA DESCRIPTION

The micro-data employed for the main analysis are from the Ukrainian Longitudinal Monitoring Survey (ULMS).

The ULMS is a household-based survey of retrospective character. It contains data on individual characteristics and work histories of members of about 8 thousands households of Ukraine 1991 in December 1997, then since 1998 till the end of 2003. For the purpose of research data on 7042 (4092 females and 2950 males) individuals for 1997-1998 transition and 7437 (4307 females and 3130 males) individuals for 2002-2003 transition is considered. The observations on individuals who are younger than 15 years old and older than 70 years old are dropped from the sample in order to concentrate the research on working age individuals. From available information panel set was constructed for December 1997, December 1998, April 2002 and April 2003. This data set allows to estimate long-run (year) transition probabilities in 1997-1998 and 2002-2003 and to compare them.

There are several problems with the data. We recognize important problem in the way we constructed the panel data set, since being retrospective this data involves the potential for the measurement error. Another problem is

unavailability of important information which might influence the results. For example, information on wage arrears is present in the ULMS data set but this information is not linked to specific time periods (only presence of wage arrears in work history of individual is inquired). So, we are not able to determine whether an individual experienced the wage arrears problem in initial time period or not. However, the results of research done for Russia indicate that presence of wage arrears does not appear to be significant factor influencing labor force mobility. For example, Foley (1997) in his study of labor force mobility in Russia for the period of 1992-96 claims that “growing wage arrears has not significantly influenced labor market transitions”<sup>1</sup>

The sample compositions for 1997-1998 and 2002 -2003 samples are given in Appendices 1 and 2 respectively.

As for the individual characteristics the level of education is described in four categories (we use dummies for these variables): base general (which include up to eight years of schooling), complete general (high school), vocational (high level of specific skills) and higher education (institute or university). The share of females with higher education is higher than share of males with this level of education for both periods, while the share of females with vocational education is lower than respective share of males for both periods too.

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<sup>1</sup> The conclusions of Earle and Sabirianova (2000) in their study of wage arrears in Russian labor market in 1994-96 are less clear: they showed that the effect of wage arrears on labor mobility varies with the extent of wage arrears in the local labor market (probability of a worker to quit in response to wage arrears is positive in regions with low wage arrears and negative in regions with high wage arrears).

Age variable is included in form of three dummies: for those who are of age less than 25 years old, who are of more than 50 years old and those who are of age between 25 and 50 years old (so called primeage).

We include also the marital status dummies (married or single (including single itself, divorced and widowed individuals)), presence of children and interaction terms (for married females and females having children).

The influence of regional differences is reflected in place of living, namely, dummies indicate the region (west, east, north, south, center and Kyiv) and type of settlement (urban or rural area).

For individuals that were employed initially we define also working environment characteristics: type of ownership of enterprise (state, privatized, de novo private (in presenting the results we refer to this category as just “private”), other (including freelancers)) and size of enterprise (number of workers less than 20, 20-250, 250-1000 and more than 1000 people).

As can be seen from Appendices 3 and 4, overall employment decreased over the period 1997-1998, as well as over the period of 2002-2003. The unemployment seems to fall during 1997-1998, but it increased during 2002-2003. The out-of-labor-force pool increases both in 1997-98 and 2002-03 periods.

In our work we used additional data set from the Labor Force Survey (LFS), which is collected on quarterly basis by the Ukrainian Statistical Office (Derzhkomstat) and provides information on approximately 26000 randomly

selected households, which is nearly 1% of the population of Ukraine. The methodology of the survey uses a rotation scheme, where 3 groups out of 7 are rotated each quarter. We obtain data from 1Q2003 and 2Q2003, where 3 groups are panel data and provide information on about 20000 of households.

The observation of 20192 females and 17093 males of age between 15 and 70 are used. The descriptive statistics of main attributes of individuals is given in Appendix 5.

So, LFS data will be used for analysis of short-run (within quarter) transition probabilities in 1<sup>st</sup> quarter 2003. However, not all variables are available from this data. Thus, we have only individual demographic variables, namely gender and age, individual characteristics (marital status and education level) and regional characteristics (regions and type of settlement). The form of the variables is the same as for ULMS part of data. We include also interaction term for married females (same as in ULMS sample).

### 3.2. EMPIRICAL RESULTS FOR GROSS FLOWS.

Defining three labor market states yield the following transition probability matrices:

<b>Table 1</b>				
<b>Labor market transition probabilities</b>				
<b>1997 to 1998 (in %)</b>				
		<b>Destination state</b>		
<b>i</b>	<b>Origin state</b>	<b>E</b>	<b>U</b>	<b>O</b>
1	E	92,05	3,42	4,43
2	U	18,75	60,14	21,11
3	O	4,46	0,93	94,61

<b>Table 2</b>				
<b>Labor market transition probabilities</b>				
<b>2002 to 2003 (in %)</b>				
		<b>Destination state</b>		
<b>i</b>	<b>Origin state</b>	<b>E</b>	<b>U</b>	<b>O</b>
1	E	86,99	5,66	7,35
2	U	22,95	53,96	23,09
3	O	5,28	5,49	89,23

The gross transition probabilities in Table 1 and Table 2 suggest that most individuals, about 92% in 1998 and 87% in 2003 of those who were employed initially and 95% in 1998 and 89% in 2003 of those who were out of labor force initially, remain in their initial state. The unemployment pool presents itself to be stagnant, since 60.14% of initially unemployed remained unemployed in a year

(1998), while in 2003 those who remained unemployed constituted only 53.96%. Hence, we may conclude that overall probability to stay job-seeker decreased since 1998 by 6.18%. But the probability to leave unemployment for job increased by 4.2% and the probability of leaving unemployment for out-of-labor-force category increased by 1.98%. The probability for inactive part of population to become employed or unemployed increased by 0.82% and 4.56% respectively. Employed persons in 2002 face higher chances to lose job: by 2.2 % higher chances to become unemployed and by 2.82% to become out of labor force, comparatively to 1997. Compared to the pattern observed in selected OECD countries and transition countries, as Table 3 shows, we can see that probability to remain unemployed is rather high in Ukraine in both periods (although in some countries it is even higher than in Ukraine).

<b>Table 3.</b>			
<b>Labor Force Status of those Unemployed 12 Month Earlier</b>			
<b>Selected OECD Countries and transition countries</b>			
	<b>Employment</b>	<b>Unemployment</b>	<b>Out of Labor Force</b>
Belgium <sup>1</sup>	22	69	9
Denmark <sup>1</sup>	49	37	14
France <sup>1</sup>	29	54	17
Ireland <sup>1</sup>	18	69	13
Italy (1983) <sup>1</sup>	32	61	7
Netherlands <sup>1</sup>	24	62	14
UK <sup>1</sup>	29	51	20
US <sup>1</sup>	49	26	25
East. Germany (1990) <sup>2</sup>	35	37	28
Czech Republic (1994) <sup>3</sup>	50	37	13
Czech Republic (1996) <sup>3</sup>	46	44	10



Czech Republic (1997) <sup>3</sup>	43	48	9
Czech Republic (1998) <sup>3</sup>	34	57	9
Bulgaria(1994) <sup>3</sup>	32	43	24
Poland (1992) <sup>3</sup>	36	48	16
Russia (1992) <sup>1</sup>	52	32	16
Russia (1995) <sup>1</sup>	40	46	14
Russia (1993) <sup>1</sup>	52	32	16
Source: figures refer to 1985 unless a different year is indicated.			
1. Foley (1997)			
2. Bellmann et al. (1995)			
3. Sorm, Terrell (2000)			

Overall, we have to note that pools of stayers (those who do not change their status) became less stagnant, so labor market may in general be considered to become more dynamic.

**Disaggregating the gross flows by gender**, we obtain following results:

Table 4 for 1997-1998 period and Table 5 for 2002-2003 periods.

<b>Table 4</b>							
<b>Labor market transition probabilities by gender</b>							
<b>1997 to 1998 (in %)</b>							
i	origin state	Destination state			Difference		
		E	U	OLF	M-W		
1	<i>E</i>				E	U	OLF
w	women	92,91	3,57	3,52	-1,63	-0,29	1,93
m	men	91,27	3,28	5,45			
2	<i>U</i>						
w	women	16,44	57,53	26,03	5,90	6,65	-12,55
m	men	22,34	64,18	13,48			
3	<i>OLF</i>						
w	women	3,85	0,76	95,39	1,87	0,54	-2,41
m	men	5,71	1,30	92,99			

We can see that both in 1997 and in 2002 the probability to stay employed is higher for women than for men while the gap is decreasing, since the difference in the probability to become unemployed becomes greater (it is higher for females than males by 0.29% in 1997 and by 2.05% in 2002). The probability to find a job after unemployment or after being out of labor force for a woman is lower than for a man in both periods, but in this case the gap is decreasing in favor for women (in 1997 the probability to find a job after unemployment is 5.90% higher for men than for women and in 2002 this probability is only 1.94% higher). The women are also more likely, comparatively to men, to leave unemployment for inactivity (while the difference is greater in 1997 than in 2002) and more likely to stay inactive (the difference is greater in 2002 than in 1997).

<b>Table 5</b>							
<b>Labor market transition probabilities by gender</b>							
<b>2002 to 2003</b>							
<b>i</b>	<b>origin state</b>	<b>Destination state</b>			<b>Difference</b>		
		<b>E</b>	<b>U</b>	<b>OLF</b>	<b>M-W</b>		
1	<i>E</i>				<b>E</b>	<b>U</b>	<b>OLF</b>
w	women	87,53	6,70	5,77	-1,05	-2,05	3,10
m	men	86,48	4,66	8,87			
2	<i>U</i>						
w	women	22,09	50,97	26,94	1,94	6,69	-8,62
m	men	24,02	57,66	18,32			
3	<i>OLF</i>						
w	women	4,05	5,11	90,84	3,87	1,20	-5,07
m	men	7,92	6,31	85,76			

Interesting fact is that difference in probabilities for unemployed men and women to stay unemployed is almost the same in both periods (6.65% and 6.69% in 1997 and 2002 respectively).

**Disaggregating gross job flows by age** is presented in Appendix 5 (for 1997-98) and Appendix 6 (for 2002-2003).

We can see that comparing to base group (25-50 years old) age groups of “<25” and “>50” have lower chances to stay employed. They also have higher chances to become inactive after unemployment and employment and much higher chances to stay inactive within year (the youngest mainly due to studies period and the oldest due to retirement). However, we see that chances to find job after inactivity for the oldest are much lower than for primeage workers and the gap is widening (differences substitutes 6.99% in 1997 and 8.05% in 2002). In 2002 the oldest group also has lower chances to stay active job seekers, comparatively to primeage individuals, while in 1997 the situation was opposite: those who have more than 50 years old were more likely to stay on labor market in order to seek for a job. The aged are much more likely to leave the labor market for inactivity in 2002 (difference with base age group is 26.23%) than in 1997 (difference is 2.89%)

The youngest group seems to be the most dynamic one. Thus, the youngest individuals have higher probability to find job after unemployment or

inactivity comparatively to the base group (prime age workers) and the difference is increasing in time (comparing two periods). They also have the highest chances of leaving the employment, but this does not necessarily imply that they are less desired by employers. At the same time they have higher chances to leave for inactivity. This gap is decreasing, that is chances to lose job in 2002 are lower than in 1997. If in 1997 the youngest had higher probability of leaving unemployment for inactivity than primeage group, in 2002 the situation is opposite, that is the youngest group has lower chances to stop job seeking comparing to primeage group. Since the differences in these transition probabilities for the youngest individuals and the base group are increasing in time we may conclude that the youngest group became more dynamic since 1997.

Finally, we focus on transition **disaggregated by education** (Appendices 7 and 8 for 1997-98 and 2002-2003 respectively). Clearly, there is an inverse association between the probability of losing the employment and educational attainment. The less educated are more likely to leave the labor force for inactivity and are more likely to stay inactive. The patterns for 1997-98 and 2002-2003 periods are similar, however they are more pronounced in later period due to overall greater dynamics of labor market. The inverse relation between education and unemployment is a distinct shift from the Soviet period when there was positive relationship between education and unemployment, higher educated

workers had a great incidence of unemployment and longer duration spells (Foley, 1997).

**Conclusion.** The main conclusions from gross flow analysis are the following. Given that the probabilities not to change the initial state decreased (pools of stayers become less stagnant) and probabilities to transit from one labor state to another increased, we can conclude that the labor market in Ukraine in general became more dynamic. We find that the changes in patterns of mobility for both men and women correspond to the general tendency of changes in labor force transitions over time. Regarding gender differences in mobility, we did not find that dynamics of changes for different genders does not support the hypothesis about decreasing of employment chances for women. Specifically, women have increasing probability to lose job, but at the same time they have an increase in probability to find job after unemployment (comparatively to men). Again, the difference for men and women in probability to stay unemployed is almost unchanged since 1997. As far as the age differences are concerned, the general pattern of changes is preserved, namely all of the age groups demonstrate the increase in mobility. However, the gaps in transition probabilities between aged workers and primeage workers are widening, hence supporting the hypothesis about contracting employment chances of aged workers. The youngest

group (less than 25 years old) on labor market is the most dynamic one and its mobility has increased since 1997. Concerning the differences between education groups, we find that the estimated probabilities of employment or being an active job seeker increase monotonically with education level, while the estimated probability of losing job or leaving the labor market decrease with education level. The differences between favorable employment outcome probabilities of workers with higher levels of education and workers with lowest level of education have increased over time, implying higher returns to educational attainment (in terms of employment opportunities) in 2002.

### 3.3. MULTINOMIAL LOGIT ESTIMATES

The estimated coefficients of the multinomial logit are presented separately by the state of origin: Appendixes 9 and 10 for 1997-98 and 2002-2003 respectively, and Appendixes 11 and 12 for exits from unemployment for 1997-98 and 2002-2003 respectively. The coefficients and standard errors in all tables indicate that there are significant differences in the flows by age, gender, marital status and education.

#### 3.3.1. EXITS FROM EMPLOYMENT

Models for exits from employment shows that in 1997-98 periods the workers which are most at risk for loss of employment (for unemployment) are single persons, workers without higher education and aged or younger workers. The probability to become inactive is much higher for individuals without higher, vocational or complete general education than for those who have it. Females have higher probability to leave the employment for inactivity. Married females seem to have higher probability to leave the employment both unemployment and inactivity, but coefficients are estimated to be insignificant.

Employment in private and privatized sector is unstable comparatively to state employment. This may be due to the fact that state enterprises facing much softer budget constraint than privatized enterprises (and moreover, private ones) were not shedding labor. Again, great share of state sector constitute budgetary organizations (namely, educational and health care sector, military services etc.), where employment contractions are socially undesirable. Besides, private sector does not demonstrate significant difference in exit to inactivity in 1997, which may point to the fact that more active labor force is attracted by private sector and outflows from employment to unemployment may constitute not only from lay off but from quits also.

Comparing those patterns to 2002-2003 (Appendix 10) we may conclude that the pattern is preserved, however, it is more pronounced. Thus, women's probability to leave employment for inactivity is twice as much bigger than in 1997. The probability for aged workers to leave for inactivity is also much higher in later period. The youngest, while demonstrating positive probability to become unemployed in both periods (comparatively to base group of 25-50 years old), in 2002 have much lower probability to become inactive than in 1997. In 2002 fact of being married still positively influences probability to stay employed, while married females have higher probability to become inactive.

Presence of children in general significantly influences the probability to become inactive in later period, which may be explained by higher share of



women leaving active labor force for child caring. This suggestion is supported by significant positive coefficients for females with children, indicating that they have higher probability to become out of labor force in both periods (comparatively to males with children or childless individuals).

In 2002 lower educational level is still associated with leaving the employment for unemployment or inactivity. Moreover, higher education attainment becomes more important in later period (marginal effects on probability to stay employed are much higher for high-educated in 2002 than in 1997).

As for ownership type of an enterprise in 2002, the private sector remains to be unstable comparatively to state one; however the probability to become inactive or unemployed for worker in privatized firm is lower than for worker of state enterprise. Possible explanation is that till 2002 the process of restructuring and change of management at most of privatized enterprises has to be going on or over. Hence, economic growth in many industries and more efficient management create fewer incentives for privatized enterprises to shed labor. In 2002 self-employment has, on the contrary to 1997, positive outflows from employment. Thus, we may conclude that self-employment sector becomes more dynamic.

Another working environment characteristic included in our analysis, the establishment size, in 1997 is influencing positively the employment outflows into

inactivity for enterprises of small (less than 20 workers) size, if compared to the largest enterprises with more than 1000 workers. In 2002, the pattern has changed, namely outflows from employment into inactivity are much lower for enterprises of size less than 1000 workers. Facing hard budget constraint large industrial enterprises prefer to shed labor. Besides, the small and medium enterprises demonstrate lower probability to increase inflows into unemployment, which might indicate their best adjustment to market structure and skills of available labor force.

As for regional characteristics, there were no significant regional differences in employment outflows to unemployment in 1997. However, this fact has changed by 2002, namely, Eastern, and Central and Southern regions have higher probabilities of unemployment than Kyiv city. Considering employment outflows into inactivity, in both periods regional variation in given outflows is present for both periods (1997 and 2002). Rural workers are considered to have lower probability to become unemployed or inactive, but only the coefficient for 2002 employment outflow into inactivity appeared to be significant.

As for the short-run transition probabilities for exits from employment, obtained from LFS sample, we draw the following conclusions<sup>2</sup>: for the youngest group the chances to leave for unemployment are significantly higher than for primeage group. The aged workers are significantly less likely to enter

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<sup>2</sup> The results which are not shown can be obtained from the author upon request.

unemployment, but more likely to leave for inactivity (comparatively to primeage workers). Gender does not influence chances to enter either unemployment or inactivity in short run. The fact of being married negatively affects probability to leave labor force, but at the same time for married females probability to become inactive is higher than for other individuals. Higher education significantly negatively affects probability to become inactive. Gap in chances to lose job (for inactivity or unemployment) for Kyiv city and regional oblasts is in favor for Kyiv. So, the general pattern of employment exits in short run (1Q 2003) agrees with that in long-run (within year). Urban workers have higher chances to become unemployed or inactive if compared to their rural counterparts.

### 3.3.2. EXITS FROM UNEMPLOYMENT

Appendices 11 and 12 represent the results for the models of unemployment exits. For 1997 women have higher probability to become inactive after unemployment comparatively to men. This fact does not change by 2002, but the marginal impact is twice as lower as in previous period, so, women's chances to become inactive decreases over time.

The youngest group has higher chances to become employed in both periods, while the marginal effect is greater for 2002. Hence, this is another

evidence of the fact that this group becomes more dynamic with time. The oldest workers experiences lower chances to become employed in 1997 (in comparison to base group). Married females had negative probability for leaving the unemployment for inactivity in 1997, but positive probability for 2002. Presence of children positively affects probability to leave unemployment for inactivity in period of 2002. In 2002 for females fact of having children decreases probability to become employed after unemployment and also increases probability to become inactive. The impact of difference in education level becomes significant only in 2002, but not in 1997.

Regional difference in probability to become employed after unemployment become significant in later period (2002) and the conclusion is that leaving in non-metropolitan (not Kyiv city) region decreases chances to become employed. The chances to leave unemployment pool for inactivity are higher for non-Kyiv regions in both periods (1997 and 2002). The probability to become inactive is lower for rural workers than for urban ones in both periods.

The MNLM estimates of LFS part of data shows that in short-run aged workers are significantly more likely to become inactive after unemployment and less likely to enter employment (comparatively to prime aged workers).

***Conclusions.*** We may conclude that multinomial logit estimates support our hypothesis about decreasing possibility of positive employment outcomes and

increasing possibility of negative ones for more vulnerable labor groups. With respect to demographic variables we may infer that *ceteris paribus* women demonstrate significantly higher probability to become inactive comparatively to men and this probability is increasing over time. Females are more likely to leave unemployment for inactivity, but tendency is also decreasing over time. Older individuals are less likely to experience positive employment outcome than their prime age counterparts and this difference is also increasing with time. The youngest workers also have increase in probability to become unemployed, but they are less likely to leave the labor force. Yet, the youngest group's chances to enter employment increased since 1997 (comparatively to prime age group). Married individuals experience lower chances to become unemployed and married women are more likely to leave the labor force. In 2002 having children increases possibility to become inactive and the result is due to higher probability for females with children to become inactive. Education plays an important role in exiting from unemployment: negative relationship between the educational level and the probability of leaving employment is observed. However, only the university degree demonstrates significant advantage in maintaining employed in both periods. Workers with the highest level of education have highest chances to become employed after unemployment (comparing to basically educated workers) and they also have the lowest chances to become inactive after active job seeking, but this relationship appears to be significant only in later period. State sector is

relatively more stable than private or privatized in earlier periods of transition, but in 2002 privatized sector creates less unemployment inflow than state one. Self-employed persons have lower probability to leave employment than state enterprises workers and the pattern is more pronounced in later period than in earlier one. By 2002 the size of enterprise becomes significantly inversely related to probability of maintaining employment. Regional differences also become significant in later period. Being an urban habitant significantly increases the probability of becoming inactive. Short-run analysis provides support, although weak one, of conclusions obtained from long-run estimates.

## CONCLUSIONS

In our research paper we analyzed the labor market behavior of individuals in Ukraine from 1997 to 2002 during the transition to market economy; in particular, we investigated how the probabilities of changing labor force status vary with individual demographic, educational, regional and working environment characteristics and how these probabilities evolve over time.

The method used in our study is based on the assumption that movements between labor market states are governed by a Markov process. The probability of transition depends only on the state currently occupied. This method allows computing gross probabilities of transition. For individual transition estimation multinomial logit regression is used, where the Markov probability of labor state transition can be represented as a function of the individual characteristics and microeconomic environment observed before the transition occurs.

Following the methodology we estimated that in 2002 generally labor market in Ukraine is more dynamic comparatively to 1997. The probability to become employed within one year for unemployed individual was 23%, having increased since 1997 by 4.2%. The probability to become unemployed in 2002 increased from 3.42% to 5.66% in 1997. The probabilities not to change the initial state decreased (pools of stayers become less stagnant).

After performing multinomial logit analysis, we conclude that women have lower probabilities of favorite employment outcomes comparatively to men in both periods. But, although the tendency in changes of mobility for both males and females are adequate to the general tendency of changes in labor force transitions over time, the dynamics of changes for different genders do not support the hypothesis about decreasing of employment chances for women. Women have increasing probability to lose job, but at the same time they have an increase in probability to find job after unemployment (comparatively to men). Again, the difference for men and women in probability to stay unemployed is almost unchanged since 1997. Women demonstrate increased probability to leave employment for inactivity, but they have decreased probability to become inactive after unemployment.

The hypothesis about the reduction of employment chances of aged workers, as a less competitive group, during the process of transition to market economy is confirmed. All of the age groups demonstrate the increase in mobility, but the differences in transition probabilities between aged workers and primeage workers are increasing in favor of primeage workers. The youngest group (less than 25 years old) is the most dynamic one on labor market and its mobility has increased since 1997.



Being relatively more stable than private sector or privatized one in earlier periods of transition 1997, state sector in 2002 creates more unemployment outcomes than privatized sector. Self-employed persons have lower probability to leave employment than state enterprises workers and the pattern is more distinct in later period than in earlier one. In 2002 the larger the enterprise, the smaller is the probability of maintaining employment, confirming the hypothesis that smaller firms became more adjusted to market conditions and characteristics of labor supply than the bigger one. Labor market in Kyiv city area provides greater employment opportunities comparatively to province regions and the gap is increasing with time. Being an urban habitant significantly increases the probability of leaving the labor force.

Human capital effects on labor mobility have become more concentrated. The estimated probabilities of positive employment outcomes increase monotonically with education level, while the estimated probabilities of losing job or leaving the labor market decrease with education level. The differences between favorable outcome probabilities of workers with higher levels of education and those with lowest one have increased over time, implying higher returns to educational attainment (in terms of employment opportunities) in 2002. However, only higher education provides an advantage in maintaining employment.

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## APPENDICES

### APPENDIX 1. SAMPLE COMPOSITION OF ULMS SAMPLE (1997)

<b>TOTAL</b>	7042		
<b>Gender</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>
	4092	2950	7042
<b>Age</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>
Mean	40.90	39.41	40.27
<b>Rural/urban location</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>
Urban	2204	1541	3745
Rural	1888	1409	3297
<b>Education</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>
Higher	1466 (35.83%)	978 (33.15%)	2444 (34.71%)
Vocational	902 (22.04%)	823 (27.89%)	1725 (24.50%)
Complete general	1032 (25.23%)	731 (24.77%)	1763 (25.08%)
Base general	692 (16.90%)	418 (14.19%)	1110 (15.71%)
<b>Marital status</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>
Married	3138 (76.69%)	2278 (77.22%)	5416 (76.91%)
Single	954 (23.31%)	672 (22.78%)	1626 (23.09%)

### APPENDIX 2. SAMPLE COMPOSITION OF ULMS SAMPLE (2002)

<b>TOTAL</b>	7437		
<b>Gender</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>
	4307	3130	7437
<b>Age</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>
Mean	44.77	43.90	44.41
<b>Rural/urban location</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>
Urban	2352	1650	4002
Rural	1955	1480	3435
<b>Education</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>
Higher	1599 (37.12%)	1059 (33.83%)	2658 (35.74%)
Vocational	1008 (23.41%)	820 (26.19%)	1828 (24.58%)
Complete general	1089 (25.28%)	803 (25.65%)	1892 (25.44%)
Base general	611 (14.19%)	448 (14.31%)	1059 (14.24%)
<b>Marital status</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>
Married	2824 (65.57%)	2308 (73.74%)	5132 (69.01%)
Single	1483 (34.43%)	822 (26.26%)	2305 (30.99%)

APPENDIX 3. SAMPLE COMPOSITION BY LABOR FORCE STATUS (1997).

<b>Labor force status</b>	<b>1997</b>	<b>1998</b>
<b>Employed</b>	3977 (56.48%)	3901 (55.39%)
<b>Unemployed</b>	718 (10.20%)	590 (8.38%)
<b>Out-of-labor-force</b>	2347 (33.33%)	2551 (36.23%)
<b>TOTAL</b>	7042	7042

APPENDIX 4. SAMPLE COMPOSITION BY LABOR FORCE STATUS (2002).

<b>Labor force status</b>	<b>2002</b>	<b>2003</b>
<b>Employed</b>	3944 (53.03%)	3746 (50.37%)
<b>Unemployed</b>	745 (10.02%)	777 (10.45%)
<b>Out-of-labor-force</b>	2748 (36.95%)	2914 (39.18%)
<b>TOTAL</b>	7437	7437

APPENDIX 5. SAMPLE COMPOSITION OF LFS SAMPLE (1Q 2003).

<b>TOTAL</b>	37285		
<b>Gender</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>
	20192	17093	37285
<b>Age</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>
Mean	42.56	41.08	41.88
<b>Rural/urban location</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>
Urban	13790 (68.29%)	11276 (65.97%)	25066 (67.23%)
Rural	6402 (31.71%)	5817 (34.03%)	12219 (32.77%)
<b>Education</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>
Complete higher	8152 (40.37%)	5162 (30.20%)	13314 (35.71%)
Vocational	2868 (14.20%)	4241 (24.81%)	7109 (19.07%)
Complete general	5792 (28.68%)	4964 (29.04%)	10756 (28.85%)
Base general	3380 (16.74%)	2726 (15.95%)	6106 (16.37%)
<b>Marital status</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>
Married	12154 (60.19%)	11506 (67.31%)	29796 (79.91%)
Single	8038 (39.81%)	5587 (32.69%)	7489 (20.09%)

APPENDIX 6. LABOR MARKET TRANSITION PROBABILITIES BY AGE,  
1997 TO 1998

1997 to 1998 (in %)				
		Destination state		
i	Origin state	Employed	Unemployed	OLF
1	<i>Employed</i>			
	<25	84,42	8,00	7,58
	25-39	94,68	3,06	2,25
	>50	86,23	1,66	12,10
2	<i>Unemployed</i>			
	<25	23,53	43,75	32,72
	25-39	16,62	69,87	13,51
	>50	11,48	72,13	16,39
3	<i>OLF</i>			
	<25	10,53	1,98	87,48
	25-39	7,14	5,49	87,36
	>50	0,15	0,45	99,40

APPENDIX 7. LABOR MARKET TRANSITION PROBABILITIES BY AGE,  
2002 TO 2003

2002 to 2003 (in %)				
		Destination state		
i	Origin state	Employed	Unemployed	OLF
1	<i>Employed</i>			
	<25	81,88	9,38	8,74
	25-39	90,04	5,59	4,36
	>50	81,45	3,98	14,57
2	<i>Unemployed</i>			
	<25	32,45	50,99	16,56
	25-39	20,38	59,24	20,38
	>50	16,95	36,44	46,61
3	<i>OLF</i>			
	<25	18,57	17,77	63,66
	25-39	8,49	2,21	89,30
	>50	0,44	0,66	98,91

APPENDIX 8. LABOR MARKET TRANSITION PROBABILITIES BY EDUCATION LEVEL, 1997 TO 1998

1997 to 1998 (in %)				
Origin state		Destination state		
i	Origin state	Employed	Unemployed	OLF
1	<i>employed</i>			
	High	93,74	2,93	3,34
	Vocational	92,50	3,53	3,97
	Complete General	91,45	3,82	4,72
	Base General	80,49	4,88	14,63
2	<i>unemployed</i>			
	High	21,21	62,63	16,16
	Vocational	18,53	60,78	20,69
	Complete General	16,02	59,71	24,27
	Base General	14,63	59,76	25,61
3	<i>OLF</i>			
	High	6,44	0,95	92,61
	Vocational	5,46	1,64	92,90
	Complete General	4,92	1,04	94,04
	Base General	2,30	0,51	97,19

APPENDIX 9. LABOR MARKET TRANSITION PROBABILITIES BY EDUCATION LEVEL, 2002 TO 2003

2002 to 2003 (in %)				
Origin state		Destination state		
i	Origin state	Employed	Unemployed	OLF
1	<i>employed</i>			
	High	89,67	4,21	6,12
	Vocational	85,68	7,63	6,69
	Complete General	84,69	6,08	9,23
	Base General	79,31	5,17	15,52
2	<i>unemployed</i>			
	High	23,85	53,56	22,59
	Vocational	22,94	59,14	17,92
	Complete General	18,99	50,84	30,17
	Base General	16,67	37,50	45,83
3	<i>OLF</i>			
	High	9,06	9,24	81,70
	Vocational	7,49	6,47	86,04
	Complete General	4,33	5,52	90,15
	Base General	0,81	1,63	97,56



APPENDIX 10. MNLM – EMPLOYMENT TRANSITION: 1997 TO 1998

	TO UNEMPLOYMENT		TO OUT OF LABOR FORCE	
	Estimate	Marginal effect	Estimate	Marginal effect
Female	- 0.132 (0.358)	-0.004	0.948** (0.426)	0.023
AGE (years)				
<25	0.526 * (0.329)	0.014	1.728 * * * (0.222)	[0.092]
>50	0.615 * * (0.256)	0.020	0.853 * * * (0.265)	[0.032]
Married	- 0.918*** (0.309)	-0.035	0.116 (0.401)	0.004
Married*Female	0.454 (0.416)	0.013	0.031 (0.469)	(0.001)
Child	-0.112 (0.339)	-0.002	-0.462 (0.363)	-0.015
Female*Child	0.364 (0.422)	0.010	0.330 (0.409)	0.009
EDUCATION				
Higher	-0.531* (0.326)	-0.015	-1.018* * * (0.246)	-0.027
Vocational	-0.450 (0.357)	-0.011	-0.639 * * (0.261)	-0.016
Complete General	-0.338 (0.362) [-0.008]	-0.008	-0.667 * * * (0.257) [-0.016]	-0.016
OWNERSHIP TYPE				
Private	0.560 * * (0.248)	[0.023]	0.162 (0.279)	[0.004]
Privatised	0.457 * (0.276)	[0.012]	0.843 * * * (0.289)	[0.019]
Other	-0.701* (0.449)	[-0.013]	-1.184 * * (0.525)	[-0.021]
ESTABLISHMENT SIZE (No. of employees)				
250-1000	-0.122 (0.336)	-0.004	0.485 (0.383)	[0.016]

20-250	0.120 (0.288)	0.003	0.183 (0.264)	[0.005]
<20	-0.048 (0.889)	-0.002	0.478 * (0.288)	[0.016]
REGIONS				
East	-0.061 (0.369)	[-0.002]	0.826 * (0.486)	0.027]
Center	0.062 (0.420)	[0.000]	1.091 ** (0.512)	[0.046]
North	0.216 (0.419)	[0.005]	1.181 ** (0.515)	[0.052]
South	-0.265 (0.419)	[-0.007]	0.776 * (0.510)	[0.029]
West	-0.000 (7.404)	[-0.002]	0.626 (0.515)	[0.022]
Rural	-0.056 (0.197)	[-0.002]	-0.059 (0.172)	[-0.002]
Constant	-2.771*** (0.555)		-2.427*** (0.595)	
Number of Observations	3972			
Log likelihood	-1191.88			
Pseudo R2	0.10			

Source: Ukrainian Longitudinal Monitor Survey (ULMS)

Note: Standard errors in parentheses.

\*, \*\* and \*\*\* denote significance of at 0.10, 0.05 and 0.01 levels respectively

Base groups are: 15-24 year old, base general education, Kyiv city, male, single, urban, size of enterprise more than 1000 workers, state ownership of enterprise.

APPENDIX 11. MNLM – EMPLOYMENT TRANSITION: 2002 TO 2003

	TO UNEMPLOYMENT		TO OUT OF LABOR FORCE	
	Estimate	Marginal effect	Estimate	Marginal effect
Female	0.341 (0.298)	0.014	0.905 *** (0.322)	0.048
AGE (years)				
<25	0.392 * (0.225)	[0.019]	0.624 *** (0.234)	[0.040]
>50	0.192* (0.113)	[0.014]	1.405 *** (0.143)	[0.108]
Married	-0.425* (0.254)	-0.020	-0.349 (0.285)	-0.018
Married*Female	0.192 (0.344)	[0.008]	0.548* (0.332)	[0.031]
Child	0.268 (0.292)	0.012	0.172** (0.086)	0.080
Female*Child	0.754 ** (0.379)	0.034	0.585 * (0.339)	0.039
EDUCATION				
Higher	- 0.191* * (0.091)	[-0.081]	-0.696 *** (0.246)	[-0.036]
Vocational	0.319 (0.369)	[0.017]	-0.347 (0.257)	[-0.017]
Complete General	0.133 (0.379)	[0.008]	-0.306 (0.254)	[-0.015]
OWNERSHIP TYPE				
Private	0.038 (0.229)	[0.003]	-0.503 ** (0.214)	[-0.023]
Privatised	-0.381* (0.211)	[-0.016]	-0.491 ** (0.182)	[-0.024]
Other	-0.462 * * (0.246)	[-0.019]	-0.695 *** (0.288)	[-0.030]
ESTABLISHMENT SIZE (No. of employees)				
250-1000	0.038 (0.229)	[0.003]	-0.503 ** (0.214)	[-0.023]
20-250	-0.381* (0.211)	[-0.016]	-0.491 ** (0.182)	[-0.024]

<20	-0.462 ** (0.246)	[-0.019]	-0.695 *** (0.288)	[-0.030]
REGIONS				
East	0.572 * (0.369)	[0.030]	0.176* (0.337)	[0.008]
Center	0.708 * (0.411)	[0.038]	0.908 *** (0.349)	[0.060]
North	0.541 (0.428)	[0.031]	0.256 (0.376)	[0.013]
South	0.672 * (0.408)	[0.041]	0.055 (0.367)	[0.000]
West	0.553 (0.406)	[0.031]	0.296 (0.337)	[0.015]
Rural	-0.171 (0.153)	-0.007	-0.492 *** (0.140)	-0.027
Constant	-2.905 *** (0.607)		-2.395 *** (0.516)	
Number of Observations	3944			
Log likelihood	-1751.28			
Pseudo R2	0.07			

Source: Ukrainian Longitudinal Monitor Survey (ULMS)

Note: Standard errors in parentheses.

\*, \*\* and \*\*\* denote significance of at 0.10, 0.05 and 0.01 levels respectively

Base groups are: 15-24 year old, base general education, Kyiv city, male, single, urban, size of enterprise more than 1000 workers, state ownership of enterprise.

APPENDIX 12. MNLM – UNEMPLOYMENT TRANSITION: 1997 TO  
1998

	TO EMPLOYMENT		TO OUT OF LABOR FORCE	
	Estimate	Marginal effect	Estimate	Marginal effect
Female	0.015 (0.429)	-0.046	1.547*** (0.493)	0.208
AGE (years)				
<25	0.643 ** (0.301)	[0.051]	1.203 *** (0.302)	[0.168]
>50	- 0.654 * (0.465)	[- 0.093]	0.358 (0.420)	[0.080]
Married	0.164 (0.349)	[ 0.001]	0.822 ** (0.456)	[0.104]
Married*Female	0.120 (0.481)	[0.041]	0.678 * (0.429)	[0.099]
Child	0.015 (0.389)	[0.014]	-0.326 (0.467)	[-0.050]
Female*Child	-0.501 (0.453)	[-0.068]	0.239 (0.493)	[0.018]
EDUCATION				
Higher	0.234 (0.373)	[0.035]	0.064 (0.381)	[0.001]
Vocational	-0.462 (0.357)	[-0.014]	0.194 (0.354)	[0.031]
Complete General	-0.266 (0.362)	[-0.038]	-0.046 (0.345)	[0.002]

REGIONS				
East	-0.193 (0.492)	[-0.011]	0.398 (0.437)	[0.076]
Center	-0.071 (0.558)	[-0.010]	0.769* (0.535)	[0.091]
North	-0.216 (0.419)	[-0.039]	1.471 * * * (0.575)	[0.143]
South	-0.265 (0.419)	[-0.023]	1.254 * * (0.536)	[0.135]
West	-0.698 * (0.512)	[-0.074]	0.908 * * (0.506)	[0.099]
Rural	0.135 (0.224)	[0.040]	-0.553 * * * (0.221)	[-0.089]
Constant	-1.049 (0.686)		-1.519*** (0.4721)	
Number of Observations	717			
Log likelihood	-625.99			
Pseudo R2	0.08			

Source: Ukrainian Longitudinal Monitor Survey (ULMS)

Note: Standard errors in parentheses.

\*, \*\* and \*\*\* denote significance of at 0.10, 0.05 and 0.01 levels respectively

Base groups are: 15-24 year old, base general education, Kyiv city, male, single, urban.

APPENDIX 13. MNLM – UNEMPLOYMENT TRANSITION: 2002 TO  
2003

	TO EMPLOYMENT		TO OUT OF LABOR FORCE	
	Estimate	Marginal effect	Estimate	Marginal effect
Female	0.425 (0.311)	0.042	0.646* (0.421)	0.083
AGE (years)				
<25	0.518 ** (0.285)	[0.116]	-0.309 (0.334)	[-0.073]
>50	0.421 (0.290)	[-0.004]	1.215 *** (0.259)	[0.209]
Married	0.169 (0.342)	[0.044]	-0.283 (0.366)	[-0.056]
Married*Female	0.169 (0.342)	[0.044]	-0.283 (0.366)	[-0.056]
Child	0.042 (0.313)	[-0.018]	0.017 * (0.010)	[0.085]
Female*Child	- 0.468 * (0.357)	[-0.039]	0.930 *** (0.385)	[0.128]
EDUCATION				
Higher	0.549 * (0.371)	[0.065]	-0.625 * (0.412)	[-0.086]
Vocational	-0.637 * (0.387)	[-0.077]	-0.721 ** (0.423)	[-0.072]
Complete General	-0.796 ** (0.401)	[-0.118]	-0.214 (0.425)	[-0.002]

REGIONS				
East	-0.062 (0.428)	[-0.024]	0.261 (0.557)	[0.047]
Center	-0.390* (0.239)	[-0.105]	0.869 * (0.565)	[0.192]
North	-0.673 * (0.401)	[-0.131]	0.799 * (0.526)	[0.187]
South	-0.044 (0.470)	[-0.046]	0.703 (0.587)	[0.135]
West	-0.300 (0.467)	[-0.097]	0.920 * (0.571)	[0.192]
Rural	0.110 (0.204)	0.107	-0.182* (0.096)	-0.025
Constant	-0.418 (0.593)		-1.794*** (0.722)	
Number of Observations	743			
Log likelihood	-705.24			
Pseudo R2	0.06			

Source: Ukrainian Longitudinal Monitor Survey (ULMS)

Note: Standard errors in parentheses.

\*, \*\* and \*\*\* denote significance of at 0.10, 0.05 and 0.01 levels respectively

Base groups are: 15-24 year old, base general education, Kyiv city, male, single, urban.