Alma Mater Studiorum
Università degli Studi di Bologna

Dipartimento di Scienze Economiche

Dottorato di ricerca in Economia

XVIII ciclo

The Effects of Economic and Systemic Reforms on Labor Market Outcomes in Ukraine

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Settore scientifico-disciplinare:

SECS-P/02 Politica Economica

Esame finale anno 2007

Contents

Overview of the thesis

Transition countries are undertaking big efforts to be able to take advantage of the ongoing process of globalization and to catch up, eventually, with the most developed countries. These efforts take the form of economic and systemic reforms that have a strong impact on the structure of the countries and on the welfare of their citizens.

Labor markets are one of the main channels through which these reforms affect single individuals, with an even stronger impact on the most vulnerable within these countries. For this reason the implementation of any reform should be preceded by an effort to gain a greater understanding of its potential consequences, in order to devise strategies capable of maximizing the positive effects of reforms while minimizing the undesired side effects.

This thesis is a collection of three papers, having in common the goal to increase the understanding of the functioning of labor markets in developing and transition countries. Writing these three papers I took advantage of data only recently available to explore various issues that have not been examined in detail so far, also due to lack of proper data.

The title of the first paper (written together with Hartmut Lehmann and Jonathan Wadsworth) is: **The Incidence and Cost of Job Loss in the Ukrainian Labor Market.**

In this paper, using the Ukrainian Longitudinal Monitoring Survey (ULMS) data we establish for the first time the extent and the cost of job loss in a labor market of a CIS economy. Our estimates contradict the frequently held notion that involuntary separations are unimportant in CIS labor markets because of low labor costs. The estimated displacement rates over the last decade (between 2.7 and 4.9 percent), indicate that in the period 1992-2002 Ukrainian firms have been laying off workers permanently at rates comparable to those in mature market economies. The characteristics of displaced workers are similar to those displaced in the West, in so far as displacement is concentrated

on the less skilled. By the standards of industrialized economies, Ukrainian displaced workers have extremely low return rates. Around one third of displaced workers find re-employment immediately while the majority continues into long-term non-employment. The wage costs of displacement for the sub-sample of displaced workers do not seem to be large. The main cost for displaced workers in Ukraine consists in the extremely long non-employment spell that the average worker experiences after layoff.

The second paper's aim is to test the existence and the characteristics of labor markets segmentation in Ukraine (this paper is written together with Hartmut Lehmann). Its working title is: **Informal Employment and Labor Market Segmentation in Transition Economies: Evidence from Ukraine**.

Research on informal employment in transition countries has been very limited, above all because of a lack of appropriate data. The Ukrainian Longitudinal Monitoring Survey (ULMS), enables us to provide some empirical evidence on informal employment in Ukraine and the validity of the three schools of thought in the literature that discuss the role of informality in the development process. Thus, the paper has a two fold motivation. On the one hand, we provide an additional data point in this discussion, having better data, i.e. richer and longitudinal data, at our disposal than researchers usually have when analyzing this phenomenon. On the other hand, we investigate to what extent the informal sector plays a role in labor market adjustment in a transition economy. This investigation is undertaken with the aim to establish which elements of informality in a transitional context are idiosyncratic and which elements can be related to the existing paradigms in the literature. Our analysis shows that the majority of informal salaried employees are involuntarily employed and that the informal sector is segmented into a voluntary "upper tier" part and an involuntary lower part where the majority of informal jobs are located.

The purpose of the third paper, written by me, to take advantage of available ULMS data to look at the impact of labor market segmentation (particularly of informality) on women in developing and transition countries. Its working title is: **Labor Market Segmentation and Gender Wage Gap in Ukraine.**

This paper is probably the first attempt to analyze jointly and thoroughly labor market segmentation and the gender wage gap in the context of a country in transition.

In this work I have identified several differences in the patterns characterizing the participation of men and women to the labor market. These results, however, appear to show a picture of the labor market that is very different from the one that characterizes labor markets of developing countries. Looking at the determinants of informality I have found that women and men with identical characteristics might show different patterns of participation to informality with respect to men. This means that gender has an influence on the choice between formality and informality.

This result reflects in different probabilities of women and men to move across states between the two periods under exam. Both men and women show higher propensity to go to the formal sector from the informal one than vice versa. However, this effect is much stronger for women than for men and this appears to depend both from different endowments than from different "behavioural" patterns. This result is surprising, as segmented labor market theories predict an higher concentration of women in the informal sector, both for demand side and supply side reasons.

How does this translate in terms of gender earnings differential? On average, Ukrainian women do earn less than men and this is true both in the informal and in the informal sector. However, when we decompose the gender earnings differential we find evidence of two very different patterns between the informal and the informal sectors. In the formal sector, the earnings differential is entirely due to the unexplained component, usually indicated as an indicator of wage discrimination. In the informal sector, on the contrary, when the earnings differential is significantly different from zero, it is entirely due to differences in the explained component (personal, household and job characteristics). I interpret this as an indication that, probably because of the greater competition, in the informal sector it might

be more difficult to discriminate women paying them less than men doing the same job and having the same characteristics.

Overall, these results can be interpreted as the evidence that the Ukrainian labor market is indeed segmented and that women suffer some sort of discrimination. This discrimination is not taking place through the segregation of women in the informal sector but, more likely, through different remuneration of characteristics in the formals sector and different career opportunities and the exclusion of women from the better remunerated jobs at the top of the hierarchy. This might also explain why women in the upper tier of the wage distribution experience higher earnings when they are self-employed compared than when they are salaried, both in the formal and in the informal sector.

Overall, after this thesis, we can say that we know better the way labor markets work in the a transition country such as Ukraine. Given that this was the initial motivation of my thesis, I feel my main goal in writing it has been achieved.

Moreover, in the process I have learned a lot and I had the possibility to work with many good economists. I would like to thank them for their suggestions and help, starting from my supervisor and co-author in two papers, Professor Hartmut Lehmann, and continuing with my other co-author in the first paper, Jonathan Wadsworth. Of course, the responsibility of all errors remain mine .

Bologna, 14 Marzo 2007

Chapter 1

The Incidence and Cost of Job Loss in the Ukrainian Labor Market [1]

[1] Written together with Hartmut Lehmann and Jonathan Wadsworth. Forthcoming in the Journal of Comparative Economics, June 2006

1.1 Introduction

How prevalent is worker displacement in the labor markets of the Commonwealth of Independent States (CIS) countries? Despite an extensive literature that examines large-scale privatization and structural reforms in developing and transition economies,[2] little has been written about job displacement as a possible consequence of the reforms in these countries. The numerous studies on privatization and restructuring in CIS economies, cited in Djankov and Murrell (2002), touch almost exclusively on efficiency issues when they discuss labor reallocation. Yet is seems important to investigate the fate of workers who are involuntarily affected by this process, especially since, as we show for Ukraine, the incidence of job loss is of the same order of magnitude as in the labor markets of developed economies.

CIS labor markets are said to have followed different adjustment patterns from those of Central Europe after the initial transition shock (Boeri and Terrell, 2002). Partial indexing of nominal wages to inflation, resulting in a dramatic fall in real wages, wage arrears and unpaid forced leave for a large fraction of the workforce were the most important mechanisms with which CIS enterprises responded to a collapse in the demand for their products. Since these mechanisms effectively lowered the cost of labor, a relatively moderate rate of labor shedding was observed over an extended period.[3] Anecdotal evidence from the Ukraine suggests that these adjustment mechanisms were more pronounced even than in Russia for most of the nineties (Konings, Kupets, and Lehmann, 2003).[4] However, these authors and Brown and Earle (2003) also establish that the small net fall in employment that Ukraine experienced through the nineties obscured relentless gross job and worker reallocation. This pattern of

[2] See for example for example Djankov and Murell (2002) and the references therein.

[3] For Russia, see for example, Lehmann, Wadsworth, and Acquisti (1999), Earle and Sabirianova (2002), and the symposium on Russian labor markets edited by Earle and Lehmann (2002).

[4] Standing and Zsoldos (2001) provide some hard evidence for Ukrainian industry on this point.

large job and worker reallocation continued after the Ukrainian economy began growing again in 2000 (Lehmann, Kupets, and Pignatti, 2005).

In an environment, where labor reallocation is relentless, job loss might affect a substantial fraction of the workforce, even when net changes of employment are modest. For Russia, Earle and Sabiarianova Peter (2004) maintain that the incidence of displacement is less than 10 percent of all job separations. However, their evidence is based on the responses of managers who might have an incentive to understate the real level of displacement. Our paper is the first study that uses a nationally representative data set with rich enough information to establish the true extent of worker displacement in a CIS country.

The only two studies on displacement in transition countries that we are aware of focus on job loss and its consequences in Estonia (Lehmann, Philips and Wadsworth, 2005) and in Slovenia (Orazem, Vodopivec and Wu, 2005)). In what follows, we analyze changes in the pattern of displacement in the Ukrainian labor market for two distinct periods of transition, the years 1992 to 1997 and 1998 to 2002. The first period is characterized by a deep depression accompanied by a prolonged episode of hyperinflation, and subsequently the implementation of restrictive stabilization policies that result in a stable currency by 1997. By 1998, the "transition cycle" had reached a trough, GDP began to grow in 1999 and accelerated from 2000 onward. For the two periods, we differentiate the characteristics of displaced workers from other workers who experience joblessness and from those workers who remain continuously employed. We investigate whether displaced workers experience longer or shorter non-employment spells and whether systematic differences arise between the two groups of job separations. For the second period, when inflation and the currency had stabilized, we also analyze earnings changes associated with displacement to establish the pecuniary costs of job displacement.

In stressing equity considerations of the labor reallocation process, we follow a long tradition in the Western literature of inquiry into the consequences of job loss. Kletzer (1998)

and Kuhn (2002) summarize the large empirical Western literature on job displacement. This literature focuses on seniority, firm-specific human capital premia, and union wage premia as the main reasons that displaced workers experience substantial earnings losses.

However, we may not observe similar features in a transition economy, because institutional factors are less likely to attenuate the costs of job loss, since unemployment benefit systems are often underdeveloped or ungenerous in many transition countries, and trade unions have far less influence on the design of social policies than in mainland Western European economies (Lehmann, Philips, and Wadsworth, 2005). With more rapid restructuring and labor reallocation than in the West, a transition economy might create a sufficiently dynamic environment in which individuals could move quickly between jobs and productivity levels in the new or restructured sectors might offer relatively good wage prospects. In this case, the costs of job loss would be small. So, countervailing forces could be at work and empirical evidence is essential to establish the wage costs of job loss in the labor market of a transition economy. The limited empirical evidence on wage costs of displacement in transition is not conclusive, as Orazem, Vodopivec and Wu (2005) find large wage penalties for re-employed displaced workers in Slovenia but Lehmann, Philips and Wadsworth (2005) find that any wage penalties are negligible in Estonia.

In Ukraine, these countervailing forces might be more pronounced than in Central European labor markets. On the one hand, the potential costs of job loss could be high because unemployment benefit payments are low and strict eligibility criteria exclude many of the unemployed, (Lehmann, Kupets, and Pignatti, 2005). As a consequence, most displaced individuals excluded from benefit have to try to return to work quickly. If high search costs then compromise efficient matching this could increase the intensive cost of displacement by raising the likelihood of wage penalties associated with displacement. On the other hand, wage profiles in non-restructured enterprises might be flat and steeper in new private or restructured firms, reflecting substantial depreciation of human capital in the former

enterprises and large productivity gains in the new private or restructured firms (Lehmann and Wadsworth (2000)). Lehmann, Kupets, and Pignatti (2005) document large job creation rates in the new private sector in Ukraine. If these new jobs are high productivity jobs, as the evidence in their paper seems to suggest, displaced workers could obtain wages in their new job that would be comparable to, or higher than those in the previous job.

With no clear theoretical guidance as to the likely wage change following displacement and eventual re-employment in the Ukrainian labor market, empirical evidence is required. For the period 1998 to 2002, a period of a stable currency and of growth, we estimate wage costs of displacement. We compare the wage profiles of displaced workers and of those who stay in their job over a period stretching form two years prior to displacement to two years after displacement. Our study is, therefore, one of the few that is capable of building a credible counterfactual of wage movements for displaced workers and of establishing whether those who are eventually displaced suffer relative wage losses before displacement occurred.

The time spent in non-employment is another potential cost of being displaced. If displaced workers can find new work relatively quickly and receive wages that exceed those in their former job, policymakers will have less concern over job displacement than in a situation characterized by long-term unemployment and a future of low paying jobs. Orazem, Vodopivec and Wu (2005), examine official administrative data on workers displaced in Slovenia between 1987 and 1993, finding substantial long-term unemployment among displaced workers. Lehmann, Philips, and Wadsworth (2005) find that in Estonia more than 40 percent of those who lose their job do not return to employment after six months. We show in this paper that return rates to employment of displaced workers are even lower in Ukraine. For example, in the growth period 1998 to 2002 less than half of the displaced return to work

within a year. In all three transition economies return rates are substantially lower than in developed economies pointing to larger output losses brought on by displacement.[5]

The next section outlines the Ukrainian Longitudinal Monitoring Survey (ULMS) data used in our study and section 3 discusses the general patterns of displacement and the incidence of job loss in Ukraine that was spread broadly across the population throughout the period. Section 4 shows that a minority of displaced return to work within a very short period, while the majority become long-term jobless. In section 5, we establish that there negligible income losses for displaced workers who find a new job. Section 6 offers some conclusions on the overall cost of displacement and on social policy.

1.2 The Data

Our principal source of information is the ULMS, a nationally representative survey, similar to the Russian Longitudinal Monitoring Survey (RLMS), of around 4,000 households and approximately 8,500 individuals, undertaken for the first time in the spring of 2003. A household questionnaire contains items on the demographic structure of the household, its income and expenditure patterns together with living conditions. The core of the survey is the individual questionnaire, which elicits detailed information concerning the labor market experience of Ukrainian workers. There is an extensive retrospective section, which ascertains each individual's labor market circumstances beginning at specific points in time chosen to try to minimize recall bias (December 1986, just after Chernobyl and December 1991, the end of the Soviet Union and December 1997). From the end of 1997 onward, the data then records the month and year of every labor market transition or change in circumstance between these

[5] The return rates refer to formal employment. In Ukraine, the fraction of long-term unemployed engaged in informal sector activities is estimated to be around 30 percent (Lehmann, Kupets, and Pignatti (2005)). Social losses might be, therefore, lower than the estimated return rates imply.

dates and the date of interview.[6] Before these dates we know only if and when the job held in the benchmark years ended and when any job held in December 1997 started. These responses therefore allow us to estimate job tenure in each job, annual separation, displacement and quit rates along with the duration (in months) of any non-employment spell resulting from a separation. In doing so, we are obliged to assume that there were no multiple job holding spells for those who left a job between 1991 and 1997.[7] Individuals who end one job and start a new job in the same month are classified as job-to-job transitions, alongside those who answer directly that they began work with a different employer within one month as a separation. All job-to-job moves are given the value 1 (month) for the duration spell variable and the value of one month is added to all other duration spells in the data set to facilitate the estimation process. We can calculate actual work experience from 1986 onward, but for those in work at this time we only know the date at which that job began and nothing of previous labor market history. Therefore, we are obliged to use age as a proxy for actual work experience.

To analyze hazard rates from non-employment, we use discrete time hazard estimation methods because the spell data are measured in monthly intervals. Sample size limitations prevent us from distinguishing between those displaced workers who entered unemployment and those who became economically inactive, although we do exclude those who say they are retired from the inactive. We therefore count any jobless spell as a period of non-employment. Often the same non-employment spell involves periods of both unemployment and economic inactivity and the degree of search activity which conditions classification into these states

[6] If an individual was of working age in 1986 the labor market record begins here. If the individual was of working age in 1991 the record begins here.

[7] A more detailed description of the genesis and the content of the data set can be found in Lehmann (2005). In practice the number of multiple spells in the 1998-2003 data is very low. The frequency distribution of spells is available from the authors upon request.

might be considered endogenous to the rate of job offer arrival. Moreover in a transition economy such as Ukraine where eligibility of unemployment benefit is restricted and the level of benefit is low, any distinction between unemployment and inactivity will be less obvious.

Table A1 in the appendix demonstrates our definition of displacement, mirroring that used in the Western literature, in which displaced workers are typically classified as those who are separated involuntarily from their jobs by mass layoff or plant closure. The ULMS allows us to distinguish between job loss because of plant closure, firm reorganization, bankruptcy, privatization, dismissal initiated by employer, and personnel reduction (items 1 through 6 in Table A1). Our measure of displacement is conservative in that we exclude separations due to end of contract or probation time (items 7 and 8). These two reasons and items 9 through 24 then constitute job quits, so, our estimates may well be lower bounds on the extent of displacement.[8]

For the period 1998 to 2003, workers leaving or losing a job are asked to give their final salary measured as gross monthly wages in Hryvnia. If workers are paid in another currency (e.g. dollars or rubles), they are asked to state the currency. Workers starting a new job are asked to give their starting salary. All those with a job are asked to give their wages in December of each year. We exclude individuals who work abroad. Due to concerns over the reliability of retrospective data in periods of hyperinflation and also when the carbovanets was the national currency, we exclude the years before 1998 from our wage analysis. Since the official retirement age is 60 for men and 55 for women, but many work beyond these age limits, we construct measures of separations, displacements and quits based on two age intervals in the given year, 15 to 59 and 15-72. However, as our measures are not very

[8] Our estimates of displacement rates would be only slightly larger if we included expiration of probation period and of employment contract in our definition of displacement, since only between 1.4 and 5.4 percent of all separations are due to these two reasons.

sensitive to the choice of age interval, we present in the main text only figures associated with the statutory retirement age.

1.3 The Incidence of Displacement

The top panel of Figure 1 outlines the pattern of annual job displacement rates in Ukraine in the year immediately after independence and the years 1998 to 2002 when the economy was coming out of a deep and prolonged recession. Displacement is relatively low in 1992 but rises to between four and five per cent in the years 1998 to 2002. These latter figures are broadly comparable with those from the Western literature; for example, U.S., Dutch, German and British displacement rates average between 3 to 6 percent of the workforce in a year (Kuhn, 2002). In the mature stage of transition, Estonia had a displacement of 6% (Lehmann, Philips, and Wadsworth, 2005). Hence, Ukraine has displacement rates only slightly lower than one of the fast reformers among the transition economies. As the central panel of Figure 1 shows, redundancies rather than plant closures account for the majority of displacement. Plant closures reach a peak, at slightly more than one fifth of all displacements, in 1998. Bankruptcies, on the other hand, are the least important reason for displacement.

The incidence of quits is much larger than that of displacements, accounting for around two thirds of separations. Quits grew between 1992 and 2002, reaching 14% of employment in the latter year. The bottom panel of Figure 1 shows that voluntary job separations and retirements are responsible for the majority of quits throughout the period.

If an exogenous shock affects all sectors equally, displaced workers would not be different from other workers. Multinomial logit estimates of relative displacement

probabilities shown in Table 1 for the periods 1992 to 1997 and 1998 to 2002[9] suggests that displacement is broadly random across observable characteristics. For the earlier period, female workers do have a displacement probability 2.2 percentage points significantly higher than men for the early period and 0.6 percentage points higher for the years 1998 to 2002. However, once we control for industry, there is little difference in the displacement probability across age, education ethnicity and region.

In the early period, displacement was higher for medium term tenure, while essentially unaffected by tenure in the years 1998 to 2002. Job loss is significantly lower in the energy, education, transport, health, and social work sectors relative to the default manufacturing sector throughout the period, while displacement in the wholesale and retail trade, hotel and finance sectors is similar to displacement in the base group.[10] One plausible implication of these findings is that the former group of industries did not undergo any major restructuring effort throughout the period. Displacement rates are also consistently lower for workers in privatized enterprises. These results make clear that the higher raw displacement rates of workers in the new private sector, not shown here, are at least partially linked to a composition rather than an ownership effect. Calculations, which are not reported here, show that about two thirds of all employment in new private firms is concentrated in the sectors industry, construction and wholesale/ retail trade/hotels and restaurants.

In contrast, the likelihood of quitting appears to be more systematic since it does vary considerably with personal characteristics. In the first period, job quits are much the preserve of older workers, while in the second period, job quits are highest among youths, other things

[9] The marginal effects are not directly comparable across the two periods, since the construction of the data allows the estimation of annual probabilities only for the latter period, while we can only estimate the probability of being displaced or of quitting at any point in time in the interval 1992 to 1997.

[10] The average displacement rate in manufacturing is around 5%.

equal. Quits are also higher among the least skilled workers and those living in Kyiv and its immediate surroundings.

In summary, throughout the period, industry affiliation and job characteristics rather than personal characteristics were the main determinants of closures and permanent layoffs. All survey data on displacement are plagued to some degree by selection bias. If workers have rational expectations about the economic viability of their firm, those workers with good prospects in the labor market may quit the firm before the firm is closed down or before mass layoffs occur. Hence, workers with worse characteristics remain. In restructuring firms that do not close down but initiate mass layoffs, the better-quality workers may stay with the firm because of potential post-restructuring productivity gains that generate high wage growth.[11] Whether selection problems related to mass layoffs and plant closure are particularly strong in transition economies is a contentious issue. Potential failure or poor performance of firms may be easier to perceive in a transition economy and, as a result, good workers would be more likely to leave the firm before closure or large-scale labor shedding. Conversely, good workers may have more reason to retain their old job in restructuring firms because of the prospect of higher future rewards after restructuring. Workers may also keep their jobs because of greater uncertainty in a rapidly changing transition labor market or because of poor outside options, which both characterize the situation in the Ukrainian labor market throughout the sample period. Since we are unable to discern which of these scenarios prevails, we allow for the possibility of unobserved heterogeneity in the estimates of jobless duration and the cost of job loss. In the next two sections, we outline the possible costs of job loss in Ukraine and investigate to what extent these costs have changed over time.

[11] Pfann (2001) finds workers with higher expected productivity growth are the "better quality" workers retained by the firm. In a transition context, such workers might want to stay in restructuring firms.

1.4 The Cost of Job Displacement in Ukraine: Duration of Joblessness

Job loss involves both a risk of non-employment and a possibility of lower wages for those workers who find new employment. We first report the cumulative return rates to employment, conditional on non-employment duration, of displaced workers and compare these to return rates of quits for the two periods.[12] The rates in Table 2 are based on the complement of the Kaplan-Meier estimator of survivor functions (Smith, 2002) in non-employment. In the years 1992 to 1997 only a small fraction of both displaced workers and workers who separated voluntarily get back into employment immediately through a job-to-job move. However, most of the 43 percent of the displaced who return to work within a year do so during the first three months. It is striking that less than half of all workers who separated from a job find reemployment after one year, leading to a large incidence of long-term non-employment among these workers.

During the recovery period between 1998 and 2002, around about one-third of workers returned to work through a job-to-job move after having been displaced, while only an additional 13 percentage points return to work within a year. Kuhn (2002) finds that two-thirds of displaced workers in the United States are re-employed within six months. In Britain, half of the displaced workers return within two months. By western standards, Ukrainian displaced workers have low return rates. In general, workers who separated voluntarily have return rates that are roughly 10 percentage points higher at each spell length. Finally, the median duration of completed spells, which stays at 1 month for the latter period, also demonstrates that in the interval of 1998 to 2002 most who return to work do so nearly immediately after having separated from their previous job. The Ukrainian hazards are similar to those found in Estonia by Lehmann, Philips, and Wadsworth, (2005) and in

[12] We now remove early retirements from the job quit sample because their return to work probabilities are very low.

Slovenia by Orazem, Vodopivec and Wu (2005) could therefore suggest that these return rate patterns could well characterize the experience of displaced workers under transition.

The Kaplan-Meier estimates of these rates over the sample period are given in Figure 2 confirm the findings of Table 2.[13] In the early years of the sample, hazard rates into employment are high during the first two months of a jobless spell. Thereafter, the hazard rates fall dramatically and stay uniformly low. In the later years of the sample, the hazard rates fall precipitously after the first month. Since many of those coded with a one month jobless spell are job-to-job movers, this pattern is consistent with improved hiring rates following the country's movement from recession into growth. The hazard rates for displaced workers are generally not statistically different from those of quits at spell lengths other than job-to-job moves.

Unemployment benefits and related welfare payments are low and often not paid in many regions of Ukraine.[14] Hence, any incentive problems associated with the benefit system are unlikely to explain this flat hazard rate after two months. Figure 2 shows no obvious spikes in the hazard rates around the time of benefit exhaustion, which for the maximum benefit is given after 12 months of unemployment. Rather, a third of the displaced workers with presumably appropriate characteristics are re-employed rapidly, while those unable to move into employment quickly incur large income losses. However, any implied income losses would be exaggerated if individuals work in the informal sector, which is estimated to be substantial in Ukraine.[15]

[13] The standard errors for these hazard rate estimates are in the order of 0.001 to 0.002.

[14] The Ukrainian unemployment benefit system is earnings-related; in Kyiv, where average wages are much higher that in the rest of the country, benefit payments can on average be quite generous. Such generosity is absent in the rest of the country.

[15] Lehmann, Kupets, and Pignatti (2005) estimate that between 27 and 33 percent of the unemployed are engaged in informal activities in the latter sample period.

We model the hazard rates and the determinants parametrically using the complementary log-log model suggested in the literature, e.g. Jenkins (2003), when the underlying spell data are intrinsically continuous but the researcher observes only that the spell length j falls within a discrete interval, in our case 1 month. In this case, the discrete-time hazard rate for individual i endowed with a set of characteristics *X*, can be written as: $h_i(j, X) = 1 - \exp[\exp(\beta' X + \gamma_j)]$, where γ_j summarizes the pattern of duration dependence in the discrete-time hazard function. We model this duration dependence flexibly by introducing a piecewise constant, which in practice amounts to the addition of 3 dummy variables for the first 6 months of any jobless spell.[16]

The *X* vector contains a set of individual characteristics that might be expected to influence the opportunity cost of not working in addition to a set of characteristics of the job from which the worker was displaced. The presence of unobserved individual specific characteristics that affect the return to employment would, of course, lead to biased estimates of the parameters of these exit rates. If the unobserved heterogeneity, v, is distributed independently of any observed *X* variable, it can be integrated out by assuming a functional form that can be summarized in a few parameters. For this, we use a Gamma-distributed parametric function and allow for right censoring of any spells. To focus on the comparative aspects of displacement, we exclude those who leave a job for retirement from the sample of quits. For the two periods, we pool the non-employment spell data and estimate discrete-time, proportional hazard functions for displaced workers and quits in Table 3.

In contrast to the findings in Table 1 concerning the incidence of job loss, the estimates in Table 3 suggest that not only job attributes of previous employment but also individual characteristics are important determinants of the return to work hazard rate. Female workers have substantially lower return rates. Workers with university education have

[16] Additional dummy variables for the periods beyond 6 months were not significant in both time periods.

substantially higher hazard rates throughout the decade, regardless of whether they are displaced or quit. It is noteworthy that ethnicity has no explanatory power with respect to the hazard from non-employment.

Importantly, job tenure does influence the hazard rate in the earlier period, as displaced workers having job tenure of medium length in the old job return to work earlier. This tenure effect is no longer present in the second period. Those with previous employment in manufacturing, retail and education and health return to work earlier than those who worked in agriculture in the latter period. It is striking that in both periods regional location does not seem to affect outflows from non-employment whether we deal with displaced workers or those who quit. The duration dependence parameters confirm the pattern of the Kaplan-Meier estimates; the probability of finding work within the first three months of any jobless spell is high but the hazard rate is low thereafter. In the latter period, this return to work probability is significantly higher only within the first month of any jobless spell.

1.5 The Earnings Cost of Job Displacement in Ukraine

We begin by examining re-entry wages for displaced workers. Table 4 gives estimates of the determinants of the log of the new real wage and of the change in the log of real wages for displaced workers who find a new full-time job conditional on observed individual characteristics and the characteristics of the old job.[17] We obtain wages from the job history data in the ULMS from the December of each year from 1997 to 2002. Since we have shown that less than one third of displaced workers return to work during the sample interval, Ordinary Least Squares (OLS) estimates of these wage determinants based only on the sub-sample of returnees may be subject to selectivity bias. The effects of the independent variables on the wages of those not yet re-employed may differ from the effects on those who

[17] Results for wage changes of those who quit and found a new job are available on request.

return to work. To address this issue, we contrast OLS estimates with those based on the maximum likelihood estimation of the selection bias correction model of Heckman (1979). The selection equations and sample means of the covariates for the two sub-samples of displaced returnees and non-returnees are given in Table A2 of the Appendix. The selection equations are identified by controls for the number of children, which are also used by Podgursky and Swaim (1987), marital status, and reliance on land to produce food in the year prior to displacement. These variables are used also in Table 3 and are assumed to affect both the opportunity cost and the probability of return to work, but not the wage offered.

Column 1 of Table 4 indicates that wage premia were paid to men, workers with higher vocational and university education, those with jobs in the capital and workers in large establishments. In the Western literature, industry-specific human capital is considered to be important for maintaining previous wage levels in new jobs (Neal, 1995). Hence, changing industry should result in a wage penalty. This hypothesis is clearly supported by the data. In addition, a significant wage penalty accrues to those who were out of work for more than one month. On the other hand, the ownership type of the firm in the old job does not appear to affect wages on return to work. There is however a significant premium for those workers who changed regions after displacement, probably reflecting higher wages on offer in the capital city. Note that there is no reward to seniority (age) in the new jobs filled by displaced workers. A wage penalty for previously working in agriculture and a premium for having worked in firms with more than 100 employees are the only additional noteworthy results in column 1.

In contrast to Lehmann, Philips, and Wadsworth (2005), using Estonia data, but in line with Orazem, Vodopivec, and Wu (2005) for Slovenia, the selection terms are positive.[18] This

[18] The selection terms are given by the coefficients on Lambda. These coefficients represent the correlation coefficient between the error term of the wage equation and the error term of the selection equation. The sign and magnitude of the selection term estimates can be sensitive to the choice of identifying variables.

indicates that workers who could potentially command higher wages are more likely to be found back at work and may point to the nature of job creation at this stage of the transition process in the Ukraine. The coefficient estimates of the Heckman correction model in column 2 are however broadly similar to the OLS estimates. In columns 3 and 4 we add the last wage observed in the job before displacement to the vector of controls as an additional control for individual unobserved heterogeneity and also to investigate whether regression to the mean in wages occurs among displaced workers.[19] The coefficients on the last wage are highly significant and all coefficients are less than one, indicating that workers who were relatively highly paid before displacement experience higher proportionate wage losses if they return to work. The addition of the selection controls also raises the significance of the job tenure variables which suggest that high tenured workers suffer greater relative wage loss on a return to work.

When the last wage is included, the size of many of the individual and job coefficients is reduced because the effect of many of these variables is absorbed by previous earnings. However, the significance of the effects is unaltered. In columns 5 and 6, we examine the change in wages by imposing a coefficient of 1 on lagged wages and removing any unobserved individual fixed effects that may determine wage levels. There are significant effects of education, firm size, tenure, industry change and change of region on wage changes.

The results of Table 4 do not capture any earnings loss due to displacement. To evaluate whether wage loss is a significant aspect of displacement in the Ukraine, we must compare the wage in the new job with its counterfactual, i.e. the wage that would have prevailed if the worker had not been displaced and had remained in the original job.

[19] See for example Podgursky and Swaim (1987). If $LnW_{ti} = b_1 LnW_{t-1i} + b_2 Z_{t-1i}$, then the proportional change in wages due to displacement, $Ln(W_{ti}/ W_{t-1i}) = (b_1 -1)LnW_{t-1i} + b_2 Z_{t-1i,}$. Hence the coefficient on the last wage measures the extent to which future wage changes depend on past earnings. The past wage should also capture any time invariant and serially correlated unobserved heterogeneity.

Therefore, we next construct difference-in-difference estimators, comparing the 2 year change in the log of monthly wages of workers who those who remain in work with the two-year change for displaced workers. The class of these estimators can be written as follows:

$$\{E(w_2 \mid X; d=1) - E(w_1 \mid X; d=1)\} - \{E(w_2 \mid X; d=0) - E(w_1 \mid X; d=0)\} \quad (1)$$

or

$$E(w_2 \mid X; d=1) - E(w_2 \mid X; d=0) + E(w_1 \mid X; d=0) - E(w_1 \mid X; d=1) \quad (2)$$

where w_1 and w_2 are wages in the first and second period, and X is a vector of conditioning variables. The variable d takes a value of one in the treatment case, i.e., displacement and zero in the no-treatment case, i.e., the worker remains in the job. If $E(w_1 \mid X;d=0) = E(w_1 \mid X;d=1)$ in equation (2), i.e. if the conditional expectation of the wage before displacement were the same for displaced workers and those who remain, the effect of displacement on earnings would be given by the first two terms in equation (2). Therefore, the earnings loss would be identified by this difference-in-differences estimator. [20]

The sample of displaced workers with wages observed before and after displacement is rather small. Of the 1362 workers in our sample who were displaced sometime between December 1997 and December 2002, 262 are observed with wages in the December before and the December after displacement, (reflecting the low rates of return to employment of displaced workers observed in Table 4), and 168 are observed with wages in all 6 consecutive years.

Table 5 outlines the results of the difference-in-differences exercise. The results in Table 4 suggest that unobservable factors may determine re-entry wages for displaced workers. This indicates a classic self-selection problem and $E(w_2 \mid X;d=1)$ could be biased. However, differencing the wage removes any unobservable fixed effects that influence wage levels, although any selection effects on wage changes remain. If the latter are important, our

[20] See Manski (1995) for a lucid discussion of identification.

results apply only to the subset of displaced workers who return to work. Given these caveats, the results of Table 5 suggest that there is no short-run wage penalty to displacement. The difference-in-differences estimator (the interaction of the displacement dummy and the second period time dummy) is always insignificantly different from zero.[21] When the displacement dummy is replaced by the spell length in panel B, the difference in difference estimates of the effects of spell length are negative but not statistically significant.

To measure the medium-term wage costs of displacement we follow the standard methodology in the literature (for example Jacobsen et al. (1993) or Stevens (1997)) comparing wages of displaced workers with those of a control group of workers who are not displaced from their jobs over the same period, and estimate equations of the form

$$\ln W_{i,t} = X_{it}\beta + Z_{it}\gamma + \sum_{k=-2}^{2} D_{it}^{k}\delta_{k} + a_{i} + u_{it} \qquad (3)$$

Where X_{it} is a set of fixed and time varying individual controls, Z_{it} is a set of job characteristics that may influence both wage levels and displacement probabilities. The model also contains a set of year-specific dummy variables to capture aggregate movements in real wage levels.

Given the relatively short span of our data, the set of D_{it} dummy variables indicate job displacement in the preceding two, current or next two years. The δ_k coefficients on the dummies are the estimated differences in wages between displaced workers and those who remain measured k years before or after displacement. If the identification condition for the difference in differences estimate is satisfied, the coefficients should not be significantly different from each other over the various years before displacement because differences would indicate diverging wage growth between displaced workers and those who remain. The

[21] Real wages are falling over the sample period, hence the significant negative term on the second period time dummy.

dummy variable of the period in which displacement occurs picks out the immediate effect of displacement on the return-to work wage relative to job stayers. The (two) dummy variables for the years after displacement will pick up any persistence in displacement effects. To control for any unobserved individual-specific heterogeneity on wage levels we employ standard fixed and random effects estimation strategies.

The top panel of Table 6 indicates that there are no wage costs of displacement for this sub-sample of displaced workers. The mean wage change for this sample of displaced workers (panel A), when benchmarked against stayers is nearly always positive and between 2 and 4 log points, whether or not unobserved heterogeneity is allowed for, but none of the point estimates are statistically different from zero. Using before and after displacement dummy variables, (panel B), there is some suggestion that wages may begin to fall in the year prior to displacement and that this loss is not recovered in the first year after the return to work in a new job, though the after displacement effects are often only significant at the 10% level.

6. Conclusion

Using Ukrainian household survey data we establish for the first time the extent and the cost of job loss in a labor market of a CIS economy. We estimate that displacement rates over the last decade were between 2.7 and 4.9 percent, indicating that Ukrainian firms have been laying off workers permanently at rates comparable to those in mature market economies. These estimates contradict the frequently held notion that involuntary separations are unimportant in CIS labor markets because of low labor costs.

Multinomial regressions show that displacement is broadly random across personal characteristics. Instead industry affiliation, tenure and ownership type matter more. Workers in manufacturing, construction and wholesale and retail trade and hotel services were particularly hard hit by displacement throughout the years 1992 to 2002. Other things equal, a

causal effect of ownership type on displacement can only be established for privatized firms, where workers have a slightly lower displacement incidence.

By the standards of industrialized economies, Ukrainian displaced workers have extremely low return rates. While a minority of workers finds reemployment after a very brief spell of non-employment, the majority of workers linger on in non-employment for a very long time. Consequently, the Ukrainian unemployment pool cannot be characterized as dynamic as mooted by some. While the individual costs in terms of non-employment spells are large in Ukraine, wage losses due to displacement are rather limited. For those who return to work, there is evidence of a small fall in wages one year prior to displacement, and that this loss is not recovered in the first year after the return to work in a new job. Our analysis makes it clear that the main cost for displaced workers in Ukraine consists in the extremely long non-employment spell that the average worker experiences after layoff. It is this group of workers lingering on in long-term unemployment that Ukrainian policy makers should focus their attention on.

Acknowledgements

The authors are grateful for valuable comments and suggestions to Dan Black, John Bonin, Tilman Brück, Matteo Cervellati, Tom Coupé, Andrew Newell, Christopher Pissarides, two anonymous referees and participants of a session at the ASSA Meetings in Philadelphia in January 2005, of the IZA-EBRD conference on "Labor Market Dynamics, the Role of Institutions and Internal Labor Markets in Transition and Emerging Market Economies" in May 2005 in Bologna, of the 2nd IZA Prize Conference on "Frontiers in Labor Economics" in October 2005 in Berlin and of seminars at Heriot-Watt University, the Kiev School of Economics and at the University of Bologna, . This paper is part of the CERT-RWI project "Analysis of Labor Market Adjustment with Large Micro Data Sets." Financial support from

EROC at NAUKMA, Kiev and the Upjohn Institute is also gratefully acknowledged. This study utilizes the ULMS data set, a project initiated within the IZA-program "Labor Markets in Emerging and Transition Economies." The project is financially supported by a consortium led by IZA, Bonn. The other permanent members of the consortium are CERT, Heriot-Watt University, Edinburgh, EERC-Ukraine and RWI-Essen.

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Figures

Figure 1. Ukrainian Worker Separation Rates by Year

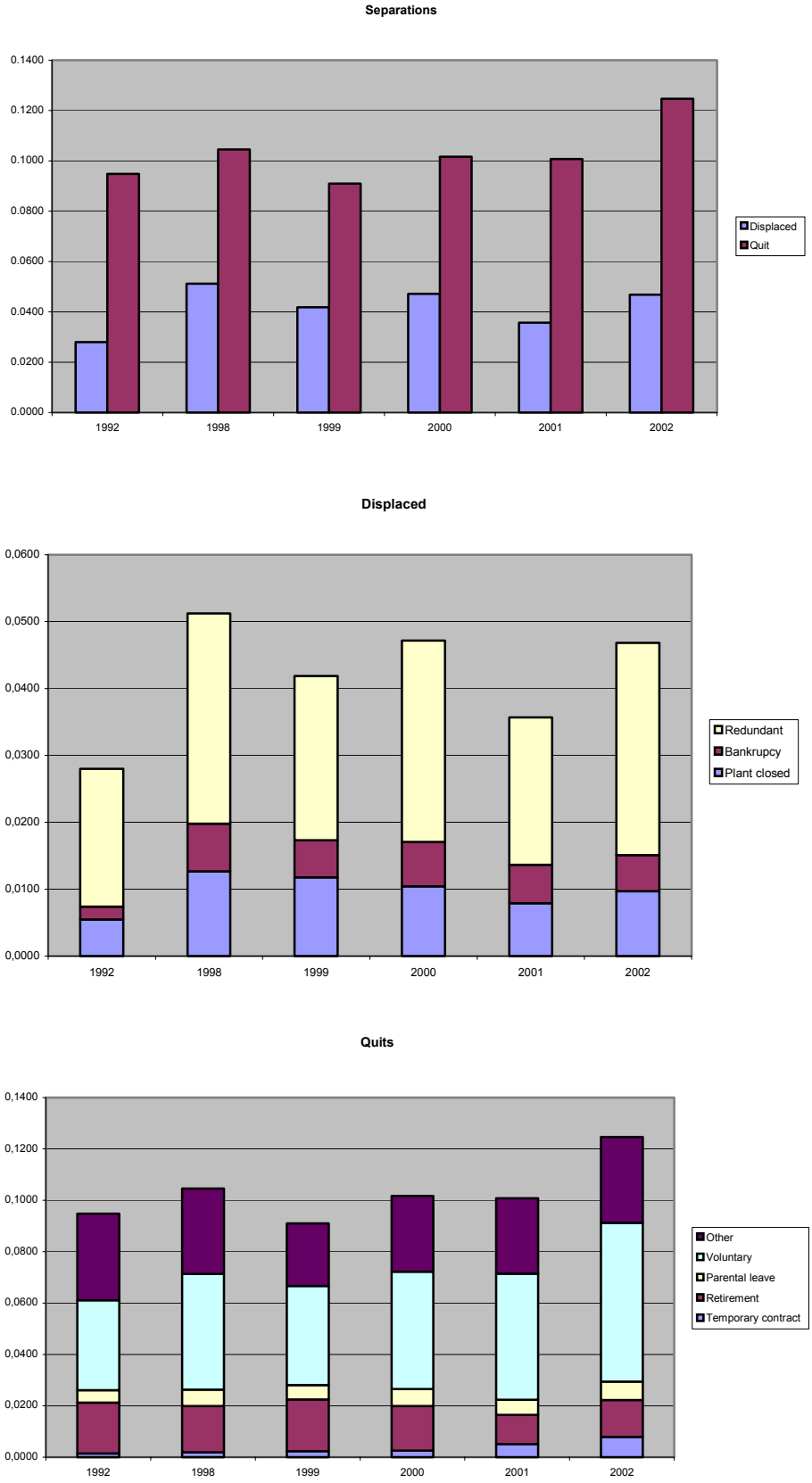
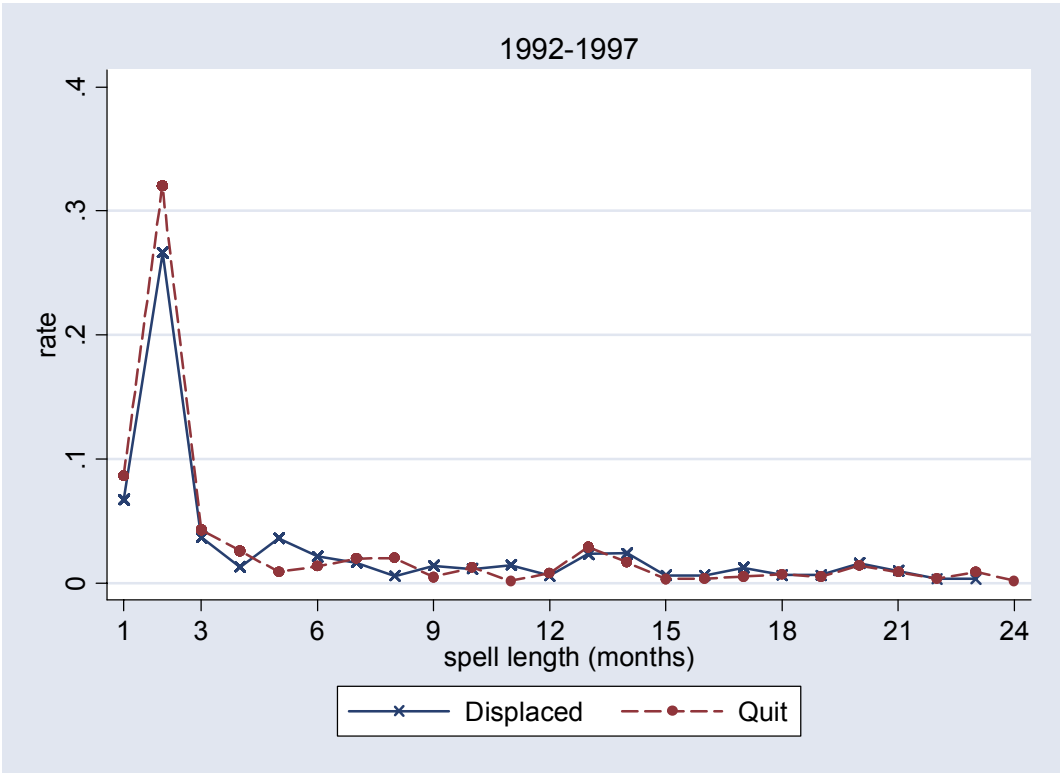
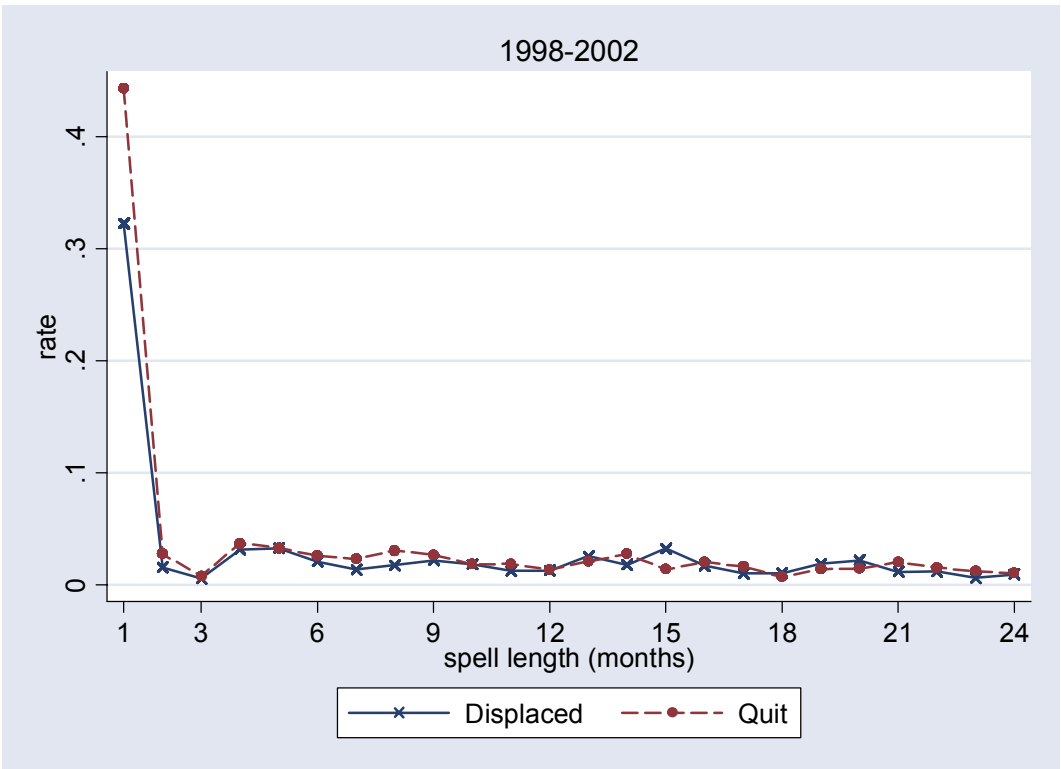


Figure 2. Hazard Rates for Displaced Workers and Job Quits n the Ukraine: 1997-2002





Tables

Table 1. Displacement and Quits: Multinomial Logit Estimation 1992 to 2002

	1992-1997		1998-2002	
	Displaced	Quit	Displaced	Quit
Female	0.022	0.047	0.006	-0.004
	(0.010)*	(0.015)*	(0.003)*	(0.004)
Age 16-24	-0.045	-0.148	0.003	0.061
	(0.018)*	(0.024)*	(0.006)	(0.011)*
Age 25-34	-0.009	-0.190	-0.003	-0.004
	(0.014)	(0.017)*	(0.004)	(0.006)
Age 35-44	0.025	-0.233	0.003	-0.027
	(0.013)*	(0.015)*	(0.003)	(0.005)*
Ukrainian	-0.008	-0.068	-0.004	0.005
	(0.025)	(0.038)	(0.007)	(0.011)
Russian	0.021	-0.055	-0.003	0.019
	(0.029)	(0.037)	(0.007)	(0.014)
General Secondary	0.029	-0.067	0.002	-0.016
	(0.016)	(0.020)*	(0.004)	(0.006)*
Vocational Elementary	0.013	-0.060	-0.004	-0.019
	(0.024)	(0.029)*	(0.005)	(0.007)*
Vocational Secondary	0.028	-0.051	-0.005	-0.012
	(0.019)	(0.024)*	(0.004)	(0.006)
Professional /Incomplete Higher	0.009	-0.086	-0.002	-0.015
	(0.016)	(0.020)*	(0.004)	(0.006)*
University	0.011	-0.116	-0.010	-0.014
	(0.018)	(0.021)*	(0.004)*	(0.006)*
<1 year	-0.012	0.225	-0.006	0.029
	(0.021)	(0.036)*	(0.004)	(0.010)*
1 year	0.056	0.088	0.001	0.047
	(0.024)*	(0.031)*	(0.005)	(0.010)*
2 to 5 years	0.036	0.081	0.001	0.022
	(0.015)*	(0.021)*	(0.004)	(0.007)*
6 to 10 years	0.025	-0.014	0.009	0.008
	(0.015)	(0.022)	(0.004)*	(0.007)
New enterprise	-0.034	-0.115	0.001	0.016
	(0.032)	(0.049)*	(0.004)	(0.007)*
Cooperative	0.126	0.083	0.010	0.025
	(0.048)*	(0.059)	(0.013)	(0.021)
Privatized enterprise	-0.050	-0.201	-0.008	-0.021
	(0.014)*	(0.021)*	(0.003)*	(0.006)*
Agriculture	-0.080	0.014	-0.006	-0.002
	(0.011)*	(0.025)	(0.004)	(0.007)

Energy	-0.076	-0.035	-0.024	-0.033
	(0.022)*	(0.053)	(0.004)*	(0.010)*
Construction	-0.015	0.120	0.012	0.008
	(0.020)	(0.037)*	(0.007)	(0.010)
Retail	0.026	0.095	0.007	0.003
	(0.021)	(0.034)*	(0.006)	(0.008)
Transport	-0.077	0.024	-0.011	-0.012
	(0.013)*	(0.030)	(0.004)*	(0.008)
Financial	-0.043	-0.061	0.003	0.006
	(0.030)	(0.060)	(0.010)	(0.016)
Public Administration	-0.021	0.041	-0.013	-0.019
	(0.020)	(0.039)	(0.005)*	(0.009)*
Education, health	-0.100	-0.028	-0.035	-0.043
	(0.011)*	(0.025)	(0.003)*	(0.006)*
Other service	-0.006	0.010	-0.007	0.008
	(0.020)	(0.036)	(0.005)	(0.010)
Other activities	-0.011	-0.029	-0.011	-0.018
	(0.060)	(0.109)	(0.012)	(0.019)
100-249	0.020	-0.037	-0.002	0.002
	(0.017)	(0.022)	(0.004)	(0.007)
250-499	-0.012	0.028	0.007	-0.008
	(0.017)	(0.026)	(0.005)	(0.008)
500-999	0.008	0.048	0.006	-0.013
	(0.019)	(0.028)	(0.005)	(0.008)
1000+	-0.008	0.021	-0.005	-0.003
	(0.014)	(0.023)	(0.004)	(0.007)
West	0.001	-0.098	-0.008	-0.018
	(0.022)	(0.030)*	(0.005)	(0.008)*
East	-0.014	-0.057	-0.003	-0.015
	(0.020)	(0.030)	(0.006)	(0.008)*
Center and North	-0.022	-0.085	0.002	-0.011
	(0.020)	(0.030)*	(0.006)	(0.008)
South	-0.020	-0.078	0.007	-0.027
	(0.021)	(0.031)*	(0.007)	(0.007)*
N	4851		19168	
Pseudo R^2	0.0815		0.0363	

Source: ULMS

Notes: coefficients are marginal effects. Clustered standard errors are in brackets. * means statistically significant at the 5% level; Default categories are male, age 45-60, other nationality, grade 1 to 11, tenure >10 years, previously working in state owned firm , production sector, firm>1000 employees, Kyiv city. Only workers with full-time jobs are included.The probability of a positive outcome, evaluated at the means of the independent variables, is 0.129 for displacement and 0.339 for quitting in the first period; in the second they are instead 0.036 for displacement and 0.091 for quitting. Hausman and Small-Hsiao tests do not reject the null hypothesis for the Independence of Irrelevant Alternatives.

Table 2. Cumulative Return Rates for Job Movers: 1992 to 2002

	1992-1997		1998-2002	
% returning	Displaced	Quit	Displaced	Quit
<1 month (job to job)	6.7	8.6	32.2	44.3
<3 months	31.5	40.6	33.6	46.3
<6 months	38.6	43.4	39.1	51.2
<=12 months	42.6	47.1	44.7	57.2
Median completed duration (months)	5	3	1	1
Median number of spells	1	1	1	1
N	434	1169	862	1714

Source: ULMS. Notes (i) The fractions are based on one minus the Kaplan-Meier survivor function. (ii) Retirements are excluded from quits.

Table 3. Discrete Piecewise Proportional Hazard Estimates of Jobless Spell Excluding Movements into Retirement (Gamma Unobserved Heterogeneity)

	1992-97		1998-2002	
	Displaced	Quit	Displaced	Quit
Individual				
Age 16-24	0.509	0.701	0.522	0.156
	(0.300)	(0.217)*	(0.212)*	(0.139)
Age 25-34	0.201	0.743	0.335	0.144
	(0.183)	(0.195)*	(0.168)*	(0.127)
Age 35-44	0.132	0.839	0.343	0.223
	(0.163)	(0.129)*	(0.151)*	(0.128)
Female	-0.252	-1.097	-0.781	-0.735
	(0.205)	(0.217)*	(0.203)*	(0.143)*
Kids	0.489	-0.024	-0.037	0.146
	(0.213)*	(0.177)	(0.164)	(0.122)
Female*Kids	-0.045	0.385	0.296	0.118
	(0.234)	(0.228)	(0.216)	(0.156)
Married	-0.400	0.051	-0.064	-0.030
	(0.152)*	(0.129)	(0.124)	(0.092)
Ukrainian	-0.170	-0.047	0.200	-0.064
	(0.138)	(0.124)	(0.125)	(0.092)
Education				
Professional/Incomplete	0.119	0.047	0.128	0.233
Higher	(0.138)	(0.128)	(0.126)	(0.105)*
University	0.150	0.735	0.473	0.522
	(0.156)	(0.162)*	(0.164)*	(0.119)*
Works Land Plot	-0.102	-0.036	0.003	-0.095
	(0.116)	(0.107)	(0.112)	(0.082)
Job				
Tenure <1 year	-1.051	-0.750	-0.193	-0.249
	(0.566)	(0.346)*	(0.202)	(0.146)
Tenure 1-5 years	0.099	-0.387	-0.065	-0.067
	(0.167)	(0.169)*	(0.161)	(0.121)
Tenure 5-10 years	0.299	-0.081	0.132	0.183
	(0.152)*	(0.141)	(0.156)	(0.128)
Firm Size 1000+	0.070	-0.124	-0.070	-0.131
	(0.130)	(0.127)	(0.153)	(0.117)
Industry				
Manufacturing	1.010	1.156	0.464	0.505
	(0.182)*	(0.170)*	(0.148)*	(0.116)*
Retail	1.026	0.927	0.648	0.452
	(0.227)*	(0.169)*	(0.188)*	(0.128)*
Transport	0.924	0.752	0.400	0.640
	(0.303)*	(0.245)*	(0.242)	(0.206)*
Finance	1.787	0.428	0.561	0.410
	(0.413)*	(0.377)	(0.354)	(0.261)
Education&Health	1.324	1.215	0.651	0.624
	(0.246)*	(0.191)*	(0.224)*	(0.137)*
Ownership				
New Private	0.482	0.020	-0.053	0.024
	(0.411)	(0.368)	(0.163)	(0.117)
Privatised/Foreign	-0.720	-0.507	0.106	-0.015

	(0.497)	(0.337)	(0.204)	(0.133)
Region				
Central/North	0.001	-0.007	-0.389	0.003
	(0.156)	(0.169)	(0.151)*	(0.111)
Kyiv	-0.334	0.052	0.201	0.291
	(0.239)	(0.204)	(0.214)	(0.151)
South	-0.062	0.162	0.086	-0.019
	(0.198)	(0.171)	(0.164)	(0.128)
West	-0.210	-0.094	-0.217	-0.205
	(0.162)	(0.168)	(0.162)	(0.122)
Duration				
<1 month	1.569	0.957	2.830	3.040
	(0.364)*	(0.294)*	(0.199)*	(0.165)*
1-3 months	2.326	2.178	-0.192	0.050
	(0.198)*	(0.149)*	(0.251)	(0.183)
3-6 months	0.771	-0.169	0.194	0.304
	(0.234)*	(0.230)	(0.220)	(0.169)
Constant	-4.797	-3.942	-4.235	-4.020
	(0.332)*	(0.357)*	(0.291)*	(0.245)*
$Ln(\sigma^2_{gamma})$	-2.934	-0.374	-2.668	-1.878
	(5.208)	(0.348)	(3.886)	(1.247)
Log L	-1668	-3188	-1565	-2568

Source: ULMS Note: Standard errors in brackets. * significant at 5% level. Default categories are male aged 45-60, single, no children, previously working in state owned firm , living in eastern Ukraine, production sector, firm<100 employees, previous job tenure 10 years +, out of work 6months+. Full-time jobs only. Dummy variable for missing values on firm size included.

Table 4. After-Displacement Wage Determinants: 1998-2002

	Ln wage		Ln wage		ΔLn wage	
	OLS	Heckit	OLS	Heckit	OLS	Heckit
Individual						
Age 16-24	-0.003	0.026	0.014	0.099	0.045	0.116
	(0.136)	(0.165)	(0.129)	(0.151)	(0.154)	(0.189)
Age 25-34	-0.052	0.116	-0.027	0.164	0.018	0.201
	(0.088)	(0.109)	(0.084)	(0.101)	(0.115)	(0.136)
Age 35-44	0.001	0.078	-0.009	0.116	-0.024	0.068
	(0.084)	(0.097)	(0.082)	(0.092)	(0.104)	(0.112)
Female	-0.337	-0.407	-0.175	-0.225	0.119	0.025
	(0.070)*	(0.083)*	(0.071)*	(0.078)*	(0.079)	(0.096)
Single	-0.182	-0.205	-0.167	-0.207	-0.137	-0.171
	(0.086)*	(0.105)*	(0.082)*	(0.095)*	(0.103)	(0.127)
Professional	0.201	0.287	0.148	0.214	0.051	0.154
	(0.077)*	(0.088)*	(0.071)*	(0.078)*	(0.089)	(0.106)
University	0.445	0.589	0.358	0.437	0.200	0.372
	(0.097)*	(0.121)*	(0.091)*	(0.104)*	(0.106)	(0.139)*
Region						
Centre &	-0.470	-0.646	-0.297	-0.538	0.017	-0.225
North	(0.131)*	(0.156)*	(0.119)*	(0.136)*	(0.139)	(0.163)
East	-0.410	-0.388	-0.303	-0.389	-0.101	-0.114
	(0.116)*	(0.137)*	(0.106)*	(0.119)*	(0.121)	(0.147)
South	-0.383	-0.404	-0.199	-0.228	0.207	0.111
	(0.139)*	(0.157)*	(0.128)	(0.145)	(0.150)	(0.179)
West	-0.223	-0.575	-0.067	-0.204	0.251	-0.122
	(0.151)	(0.195)*	(0.133)	(0.153)	(0.161)	(0.189)
Firm						
Privatised	-0.046	-0.094	-0.073	-0.214	-0.094	-0.144
	(0.139)	(0.152)	(0.119)	(0.132)	(0.124)	(0.163)
New Private	0.021	0.039	0.006	0.014	-0.032	-0.073
	(0.114)	(0.117)	(0.106)	(0.108)	(0.120)	(0.125)
Foreign Own	0.276	0.021	0.180	-0.061	-0.005	-0.336
	(0.220)	(0.295)	(0.230)	(0.276)	(0.332)	(0.345)
Job Tenure						
<1 yr	0.317	0.410	0.299	0.398	0.266	0.406
	(0.138)*	(0.153)*	(0.133)*	(0.141)*	(0.162)	(0.182)*
1-5 yrs	0.244	0.425	0.208	0.290	0.144	0.395
	(0.108)*	(0.121)*	(0.104)*	(0.109)*	(0.126)	(0.139)*
5-10 yrs	0.110	0.153	0.104	0.103	0.095	0.144
	(0.097)	(0.110)	(0.096)	(0.102)	(0.135)	(0.140)
Industry						
Agriculture	-0.198	-0.450	-0.071	-0.194	0.158	-0.030
	(0.128)	(0.152)*	(0.114)	(0.134)	(0.132)	(0.146)
Construction	0.069	0.111	0.026	0.082	0.023	0.112
	(0.130)	(0.151)	(0.120)	(0.131)	(0.138)	(0.168)
Retail	0.191	0.217	0.157	0.198	0.058	0.135
	(0.118)	(0.131)	(0.113)	(0.117)	(0.125)	(0.138)
Transport	0.003	0.095	0.052	-0.068	0.098	0.211
	(0.117)	(0.153)	(0.115)	(0.136)	(0.142)	(0.177)
Finance	-0.227	-0.039	-0.210	-0.141	-0.296	-0.081
	(0.165)	(0.214)	(0.137)	(0.161)	(0.181)	(0.207)

Public Service	0.213	0.202	0.170	0.129	0.078	0.060
	(0.143)	(0.204)	(0.132)	(0.160)	(0.166)	(0.221)
Education/	-0.154	-0.158	-0.040	-0.018	0.149	0.100
Health	(0.149)	(0.173)	(0.150)	(0.164)	(0.200)	(0.210)
Other Services	0.039	0.135	0.087	0.068	0.072	0.209
	(0.152)	(0.171)	(0.153)	(0.164)	(0.192)	(0.211)
Firm_size 100-999	0.172	0.323	0.161	0.293	0.140	0.312
	(0.093)	(0.111)*	(0.083)	(0.095)*	(0.102)	(0.126)*
Firm Size 1000+	0.229	0.363	0.168	0.279	0.056	0.215
	(0.114)*	(0.138)*	(0.112)	(0.122)*	(0.142)	(0.159)
Change Industry	-0.140	-0.225	-0.147	-0.220	-0.161	-0.193
	(0.067)*	(0.073)*	(0.062)*	(0.063)*	(0.072)*	(0.067)*
Change Occupation	-0.059	-0.005	0.001	0.021	0.118	0.118
	(0.067)	(0.060)	(0.066)	(0.056)	(0.080)	(0.070)
Change Region	0.351	0.300	0.327	0.320	0.282	0.261
	(0.138)*	(0.128)*	(0.124)*	(0.100)*	(0.152)	(0.100)*
Move to Privatised	0.127	0.198	0.109	0.114	0.074	0.066
	(0.188)	(0.183)	(0.191)	(0.204)	(0.240)	(0.221)
Move to foreign-own	-0.001	0.081	0.034	0.128	0.096	0.259
	(0.194)	(0.140)	(0.145)	(0.121)	(0.134)	(0.141)
Time Out						
Job-to-Job	0.183	0.163	0.136	0.133	0.051	0.008
	(0.073)*	(0.060)*	(0.069)*	(0.058)*	(0.085)	(0.075)
1-5 months	0.037	0.062	0.012	0.036	-0.033	-0.135
	(0.129)	(0.116)	(0.126)	(0.113)	(0.152)	(0.128)
Ln old_wage			0.355	0.440		
			(0.058)*	(0.069)*		
Lambda		0.698		0.561		0.772
		(0.112)*		(0.069)*		(0.139)*
Constant	4.839	3.731	3.023	2.141	-0.268	-1.459
	(0.178)*	(0.283)*	(0.354)*	(0.427)*	(0.204)	(0.341)*
R^2	0.42		0.48		0.18	

Dependent variable log gross monthly wage. Robust standard errors in brackets. * significant at 5 %. Default categories are male aged 45-60, single, no children, previously working in state owned firm , living in eastern Ukraine, production sector, firm<100 employees, previous job tenure 10 years +, out of work 6months+. Full-time jobs only. Dummy variable for missing values on firm size included. Sample size 268.

Table 5. Difference in Difference Estimates of Wage Costs of Displacement: 1998-2002

	(1)	(2)	(3)
Panel A			
2nd Period Dummy	-0.003	-0.001	-0.001
	(0.003)	(0.002)	(0.002)
Displaced	-0.059	-0.102	-0.089
	(0.051)	(0.046)*	(0.051)
Displaced*2nd Period	0.007	0.002	0.049
	(0.060)	(0.059)	(0.061)
Individual controls	No	Yes	Yes
Job controls	No	No	Yes
R-squared	0.03	0.19	0.26
Panel B			
2nd Period Dummy	-0.098	0.002	0.002
	(0.007)*	(0.003)	(0.003)
Spell Length	-0.043	-0.028	-0.020
	(0.040)	(0.033)	(0.031)
Spell length*2nd Period	-0.107	-0.068	0.024
	(0.128)	(0.129)	(0.146)
Individual controls	No	Yes	Yes
Job controls	No	No	Yes
R-squared	0.01	0.19	0.26
Sample size	9785	9785	9785

Notes: Robust standard errors in parentheses; * significant at 5%. Regressions also include year dummies.

Table 6. Short-Run and Longer-Term Wage Costs of Displacement: 1998 - 2002

	OLS	Fixed Effects	Random Effects	OLS	Fixed Effects	Random Effects	OLS	Fixed Effects	Random Effects
Panel A	1	2	3	4	5	6	7	8	9
Displaced	0.029	0.042	0.040	-0.026	0.030	0.022	0.029	0.030	0.037
	(0.032)	(0.027)	(0.025)	(0.030)	(0.026)	(0.025)	(0.037)	(0.026)	(0.026)
Individual controls	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Job controls	No	No	No	No	No	No	Yes	Yes	Yes
Panel B									
Years Before/After Displacement									
2 years before	0.048	-0.077	-0.061	-0.003	-0.029	-0.027	-0.026	-0.068	-0.059
	(0.070)	(0.039)*	(0.038)	(0.051)	(0.034)	(0.033)	(0.059)	(0.039)	(0.038)
1 year before	-0.021	-0.130	-0.115	-0.059	-0.072	-0.069	-0.091	-0.124	-0.117
	(0.060)	(0.034)*	(0.033)*	(0.047)	(0.030)*	(0.029)*	(0.054)	(0.034)*	(0.032)*
Year of Displacement	0.037	-0.063	-0.049	-0.051	-0.065	-0.062	0.060	-0.045	-0.023
	(0.058)	(0.033)	(0.032)	(0.049)	(0.030)*	(0.029)*	(0.069)	(0.036)	(0.035)
1 year after	0.013	-0.071	-0.057	-0.061	-0.062	-0.060	-0.008	-0.075	-0.060
	(0.065)	(0.036)*	(0.035)	(0.056)	(0.033)	(0.032)	(0.063)	(0.036)*	(0.035)
2 years after	-0.007	-0.045	-0.033	-0.076	-0.047	-0.046	-0.013	-0.056	-0.041
	(0.067)	(0.039)	(0.038)	(0.057)	(0.036)	(0.035)	(0.063)	(0.039)	(0.038)

Robust standard errors in parentheses. * significant at 5% level; Sample size 7722. Sample restricted to those with 6 continuous wage observations.

Appendix

Table A1. Reasons for leaving job classification*

REASON	CLASSIFICATION
1 Closing down of enterprise/organization	Displacement
2 Reorganization of enterprise/organization	Displacement
3 Bankruptcy of enterprise/organization	Displacement
4 Privatization of enterprise/organization	Displacement
5 Dismissal initiated by employer	Displacement
6 Personnel reduction	Displacement
7 Expiring of employment contract	Quit
8 Expiring of probation time	Quit
9 Military service	Quit
10 Imprisonment	Quit
11 Own illness or injury	Quit
12 Studies	Quit
13 Retirement	Quit
14 Early retirement	Quit
15 Marriage	Quit
16 Parental leave	Quit
17 Need to take care of other members of family	Quit
18 Change of residence	Quit
19 Wanted/was proposed higher salary	Quit
20 Wanted/was proposed better working conditions	Quit
21 Wanted/was proposed more interesting work	Quit
22 Wanted to start own business	Quit
23 Main job became second job	Quit
24 End of farming/sole proprietorship	Quit
25 Other	Variable (quit in most cases)

* The ULMS allows the respondent to give multiple answers as to the reasons for a job separation. In cases where this occurs, we use the following classification criteria:

- We ignore displacements caused by expiration of the employment contract
- If any of the answers is closing down of enterprise/organization, the person is classified as displaced
- If there is no displacement activity, subsequent priority goes to answers suggesting a voluntary quit (wanted/was proposed higher salary, better working conditions, more interesting work, wanted to start own business, studies, marriage, parental leave, need to take care of family member)
- in all remaining cases priority goes again to causes of displacement (reorganization, bankruptcy, privatization, personnel reduction);
- when we have dismissal initiated by the employer together with any of the causes classified as quit, we have a quit.

Table A2. Probit Estimates of After Displacement Wage Sample (1st Stage Selection)

	Wage Level	Wage Change	Sample Mean no returns	Sample Mean returns
Individual				
Age 16-24	0.077	0.001	0.11	0.11
	(0.193)	(0.196)		
Age 25-34	0.330	0.331	0.19	0.28
	(0.136)*	(0.141)*		
Age 35-44	0.287	0.252	0.32	0.36
	(0.117)*	(0.118)*		
Female	-0.123	-0.078	0.54	0.51
	(0.102)	(0.102)		
Single	0.083	0.098	0.20	0.23
	(0.129)	(0.131)		
Vocational higher	0.175	0.184	0.22	0.25
	(0.109)	(0.117)		
Graduate	0.290	0.276	0.12	0.17
	(0.140)*	(0.144)		
Region				
Centre & North	-0.568	-0.471	0.29	0.19
	(0.197)*	(0.200)*		
East	-0.088	-0.011	0.27	0.40
	(0.185)	(0.181)		
South	-0.195	-0.078	0.17	0.20
	(0.201)	(0.204)		
West	-0.783	-0.729	0.21	0.09
	(0.211)*	(0.207)*		
Firm				
Privatised	-0.168	-0.179	0.06	0.07
	(0.187)	(0.178)		
New Private	-0.126	-0.064	0.17	0.22
	(0.147)	(0.148)		
Foreign Owned	-0.473	-0.449	0.02	0.02
	(0.397)	(0.393)		
Tenure <1 year	0.084	0.078	0.11	0.11
	(0.176)	(0.182)		
Tenure 1-5 years	0.469	0.399	0.25	0.39
	(0.141)*	(0.143)*		
Tenure 5-10 years	0.137	0.130	0.20	0.21
	(0.137)	(0.139)		
Industry				
Agriculture	-0.456	-0.458	0.12	0.10
	(0.172)*	(0.173)*		
Construction	0.020	0.033	0.07	0.08
	(0.181)	(0.183)		
Retail	0.145	0.103	0.14	0.23
	(0.151)	(0.152)		
Transport	0.010	0.025	0.07	0.07
	(0.192)	(0.189)		
Finance	0.177	-0.017	0.02	0.03
	(0.256)	(0.310)		
Public Service	-0.217	-0.296	0.05	0.03

	(0.260)	(0.278)		
Education/Health	-0.185	-0.049	0.08	0.06
	(0.218)	(0.241)		
Other Services	0.165	0.059	0.06	0.07
	(0.205)	(0.252)		
Firm_size 100-999	0.253	0.219	0.28	0.29
	(0.131)	(0.131)		
Firm Size 1000+	0.218	0.203	0.15	0.17
	(0.166)	(0.172)		
Ethnic Minority	-0.051	-0.132	0.21	0.29
	(0.085)	(0.088)		
Children <6 years	0.033	0.053	0.12	0.15
	(0.136)	(0.173)		
Female*children<6	-0.201	-0.352	0.06	0.06
	(0.188)	(0.184)		
Divorced/widowed	0.346	0.327	0.03	0.04
	(0.186)	(0.220)		
Farms a plot of land	0.089	-0.041	0.59	0.44
	(0.078)	(0.094)		
Log(old_wage)			4.48	4.81
Constant	-1.046	-1.000		
	(0.263)*	(0.268)*		

Notes Standard errors in brackets. * statistically significant at the 5% level. Sample of non-returners is 619.

Chapter 2

Informal Employment and Labor Market Segmentation in Transition Economies: Evidence from Ukraine*

* Written together with Hartmut Lehmann. The authors are grateful to Randall Akee and participants of the IZA-Worldbank Workshop "The Informal Economy and Informal Labor Markets in Developing, Transition and Emerging Economies" in Bertinoro, Italy in January 2007 for comments and suggestions. Financial support from the European Commission within the framework 6 project "Economic and Social Consequences of Industrial Restructuring in Russia and Ukraine (ESCIRRU)" is also acknowledged.

2.1. Introduction

There has been a revival of research on informal employment and labor market segmentation in developing countries over the last decade. This research has been accompanied by heated discussions about the nature of informal employment, taking recourse to three schools of thought.

The traditional school sees informal employment as a predominantly involuntary engagement of workers in a segmented labor market: there is a primary – formal - labor market with "good" jobs, i.e. well paid jobs with substantial fringe benefits, and a secondary – informal - labor market with "bad" jobs, i.e. having the opposite characteristics of the good jobs. All workers would like to work in the primary labor market, but access to it is restricted, while there is free entry to the secondary labor market. Given the non-existence of income support for the unemployed in developing countries, workers who are not hired in the primary sector essentially queue for it while working in the secondary, informal sector.

The second, revisionist school of thought goes at least back to Rosenzweig (1988) and is recently associated with the work of Maloney (1999, 2004). In his understanding, many workers choose informal employment voluntarily and, given their characteristics, have higher utility in an informal job than in a formal one. This school of thought thus raises doubts about the preferability of formal sector jobs along the various dimensions mentioned in the traditional literature on labor market segmentation. For example, formal employment is linked with the provision of pension benefits; in less developed countries such benefits might be of a dubious nature in the eyes of the employed as the government might be perceived as a potential "raider" of pension funds in a future budgetary crisis. Health care benefits provide a second example for the dubious nature of fringe benefits connected to formal employment: having health care insurance might be undesirable because of the low quality of health services or unnecessary because of family coverage of the health insurance of another member of the household. Given that fringe benefits generate costs to

the employer – who might or might not be able to shift these costs on to the worker – it is not a priori clear that wages are lower in the informal sector, thus empirical evidence is required.

Another interesting insight put forth by the revisionist school of thought is the general nature of the labor market. Rather than comprehending the labor market as segmented, in this paradigm the various employment relations are seen as a continuum of options that workers have at a point in time as well as over the life cycle. For example, young workers enter informal salaried employment to gain some training, which in turns enables them to enter at a later stage formal salaried employment. Having acquired physical and more human capital as formal salaried employees, as they get older they leave this employment state for informal self-employment or entrepreneurship. If their activities or businesses are successful they will finally enter formal self-employment or entrepreneurship. This vision of labor market options over the life cycle is in stark contrast with the traditional view, where young workers work in the informal sector but essentially queue for a formal sector job. Once they have achieved a formal employment relationship they try to remain formally employed until retirement.

The third strand in the literature starts out with a labor market segmented into a formal and informal sector. It paints, however, a more complex picture of labor market segmentation than the traditional school of thought as it sees "upper tier jobs" and "free entry jobs" in the secondary, informal sector (see, e.g., Fields, 1990, 2006). Access to "upper tier jobs" – good jobs that people like to take up in the informal sector – is restricted. Most of the jobs in the secondary, informal sector are "free entry jobs"; these are jobs that can be had by anyone and that people only involuntarily take up.

Research on informal employment in transition countries has been very limited, above all because of a lack of appropriate data. A new rich panel data set from Ukraine, the Ukrainian Longitudinal Monitoring Survey (ULMS), enables us to provide some empirical evidence on informal employment and the validity of the various schools of thought. Hence, the paper has a two fold motivation. On the one hand, it provides an additional data point having better data, i.e. richer

and longitudinal data, at our disposal than researchers usually have when analyzing this phenomenon. On the other hand, it attempts to investigate to what extent the informal sector plays a role in labor market adjustment in a transition economy and which school of thought is most credible in a transitional context.

To better understand the role of informal employment in a transition country like Ukraine, we sketch the evolution of the employment structure in the Ukrainian labor market since independence in the next section. This is followed by a description of the ULMS data set and a discussion of issues related to wage arrears and the normality of log wages in the two years 2003 and 2004. The fourth section looks at the components of employment, namely formal salaried employment, informal involuntary salaried employment, informal voluntary salaried employment, formal self-employment and informal self-employment[22] and the factors driving the incidence of informality for these various components. Still in the same section we produce several types of transition probability matrices to get a grip on movements between labor market states and their determinants. Subsequently, we look at the determination of log wages and of the change in log wages. This is again done for the various components of employment. A final section concludes.

2.2. The evolving employment structure in Ukraine: 1991-2004

Ukraine has found itself in a prolonged transition recession for most of the nineties of the last century. Reform efforts have been inconsistent and incoherent, making Ukraine one of the laggards among the transition countries in general as well as in the countries of the Commonwealth of Independent States (CIS). "State capture" by various oligarchic groups made it difficult for entrepreneurs to develop their creative potential and thus hampered growth for nearly a decade. Only towards the end of the nineties have reform efforts by the government, which, among other things, were intended to loosen the grip of oligarchs on the economy, led to positive growth of

[22] All informal self-employment is considered voluntary. Because of too few cases we cannot look at entrepreneurs and exclude them from the analysis.

observed GNP between 1999 and 2004 (Figure 1). Especially between 2003 and 2004 we see a rapid expansion of Ukrainian GDP.

Using the Ukrainian Longitudinal Monitoring Survey (ULMS), a nationally representative survey of the Ukrainian working age population that numbers roughly 4000 households and 8500 individuals[23], we present the dynamics of the employment structure in Ukraine between 1991 and 2004. In spite of the poor reform record of Ukraine in the nineties, the employment structure of the Ukrainian economy has significantly changed between 1991 and 2004 as Table 1 makes clear. The sectoral distribution of employment changed substantially, as one would expect. Like in many transition countries, the agricultural and industrial sectors lost employment share while the sector services grew.[24] In our presentation of the net changes that occur, we divide the years since independence into two sub-periods, 1991-1997, and 1997 – 2004. The first sub-period relates to the years that saw a hyperinflation and prolonged stagnation with virtually complete paralysis in the management of reform efforts. The beginning of the period 1997 to 2004 saw the start of a concerted reform effort resulting in robust economic growth towards the end of the period (see Figure 1). In the first sub-period the employment share of agriculture was nearly stable while the share of services increased roughly by the amount that the employment share of industry declined. Between 1997-2004 agricultural employment contracted slightly while employment contraction in industry was more moderate than in the early years. At the same time, the share of services grew vigorously, leading to an overall share of about 60 percent in 2004. Hence, as far as the employment shares of the three sectors are concerned, the Ukrainian economy has made progress towards a more modern sectoral distribution, even if agricultural employment had a relatively large share in 2004.

However, the "laggard status" of the Ukrainian economy is clearly reflected in the employment structure as of 2004, if we look at employment shares by ownership. Employment in

[23] The ULMS is briefly presented in the data section of this paper. For a more detailed of the ULMS, see Lehmann (2007).

[24] In some transition economies, e.g. Bulgaria and Romania, we see a large increase in the share of agricultural employment. In these countries, agriculture provides a "buffer" for labor released from industry, as much of this new

privatized and new private firms amounted to about 40 percent in 2004, a share far lower than in most other transition countries. For example, by 1997, the average employment share in the private sector in Central European countries was 65 percent (Boeri and Terrell, 2002), while by 2004 still about half of all employment was in the state sector in Ukraine. What is noteworthy, on the other hand, is the rapid growth of the new private sector between 1997 and 2004.

Very striking is also the share of the self-employed, which is very low in international perspective. Boeri and Terrell (2002), for the year 1998, cite shares of self-employment of 13 percent for both the Czech Republic and Hungary, and shares of 16 percent and 6 percent for Poland and Russia respectively. Given these levels, it is clear that the 4 percent of self-employed are an indication of worse start-up conditions for the self-employed in Ukraine.

Finally, we see steady progress in the size distributions of Ukrainian firms. In centrally planned economies, much of production took place in large conglomerates and enterprises were vertically and often also horizontally integrated. An important measure of reform progress is, therefore, the employment share of workers in relatively small firms, i.e. in firms with less than 100 or less than 50 employees. In 1997, Ukraine has a fraction of employment in firms with less than 100 employees that is roughly equal to the average fraction in Central European transition countries (41.7 percent). We also see a rise in the shares of workers in small firms that is accelerating between 1997 and 2004, with the result that by 2004 nearly half the workforce is employed in firms that have less than 50 employees.

The presented data of the evolving employment structure in the Ukrainian labor market make clear that informal employment in a country of the former Soviet Union has to be seen embedded in a different context than informal employment in a developing country even if the degree of development as measured by per capita income is similar. In the case of Ukraine, in 2004 a large part of the workforce still worked in industry and in relatively large firms. More importantly, most members of the work force sold their labor to firms and only a small fraction to themselves. This is

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agricultural employment consists in subsistence agriculture. In Ukraine where until very recently land could not be

in sharp contrast to most developing countries. In Mexico, for example, 25.5 percent of the employed were self-employed in 1991/92 (Maloney, 1999 and Bosch and Maloney, 2005). This important difference between Mexico and Ukraine - the two countries might stand for developing and transition countries here – might be explained by mainly two factors. First, the overemphasis on large industrial conglomerates under central planning and the only rudimentary nature of the industrial sector in developing countries imply a very different employment structure at the outset of the analyzed period. This different employment structure leaves much more room for self-employment in developing countries than in transition economies. A second factor, which we wish to highlight, is of a psychological nature. Many if not most workers in developing countries have lived in precarious conditions for decades, while a large majority of workers in a transition economy like the Ukrainian one have experienced secure, life-long employment. One would, therefore, expect a much lower average propensity to take up self-employment with risky prospects in the formal or informal sector in a transition economy than we would observe in a developing economy. This lower average propensity for risky activities by workers in a transition is not limited to self-employment but can be generalized to the informal sector at large.

2.3. Data and data issues

Our principal source of information is the ULMS, a nationally representative survey, similar to the Russian Longitudinal Monitoring Survey (RLMS), undertaken for the first time in the spring of 2003, when it was comprised of around 4,000 households and approximately 8,500 individuals. The second wave was administered between May and July of 2004, when sample sizes fell to 3,397 and 7,200 respectively.[25] The household questionnaire contains items on the demographic structure of the household, its income and expenditure patterns together with living conditions. The core of the

privately owned, agriculture clearly could not fulfill such a buffer function.

[25] Attrition is not entirely random as far as employment status is concerned. While the overall attrition is about 19 percent, salaried formal workers attrite by 18.8 percent, self-employed by 14.6 percent and informal salaried by 25.5 percent.

survey is the individual questionnaire, which elicits detailed information concerning the labor market experience of Ukrainian workers. In the 2003 questionnaire there is an extensive retrospective section, which ascertains each individual's labor market circumstances beginning at specific points in time chosen to try to minimize recall bias (December 1986, just after Chernobyl and December 1991, the end of the Soviet Union and December 1997). From the end of 1997 onward, the data then records the month and year of every labor market transition or change in circumstance between these dates and the date of interview. Before these dates we know only if and when the job held in the benchmark years ended and when any job held in December 1997 started. These responses therefore allow us to estimate job tenure in each job. We can calculate actual work experience from 1986 onward, but for those in work at this time we only know the date at which that job began and nothing of previous labor market history. Therefore, we are obliged to use age as a proxy for actual work experience.

The central data used in this paper are those from the two reference weeks in 2003 and 2004. We can identify salaried workers and self-employed workers. Informality for salaried workers in a job in the reference week is identified by the answer to the question: "Tell me, please, are you officially registered at this job, that is, on a work roster, work agreement, or contract"? To identify the voluntary nature of informal employment for salaried workers, we ask the question: "Why aren't you officially registered at this job"? If the answer to this question is "Employer did not want to register me", we categorize the employee as involuntarily informally employed. If, on the other hand, the answer is "I did not want to register" or "Both", we consider the employee's informal employment as voluntary. With registration, salaried workers acquire several fringe benefits, pension rights as well as substantial job security, the latter at least on paper. We should note that workers might be employed in the formal sector, but that their job might not be registered. In other words, we identify informal employment and not necessarily employment in the informal sector. For the self-employed there is a question on whether the activity is registered or not, which again

allows us to identify informality. Informal activities of the self-employed are, of course, considered voluntary.

Salaried employees are asked in the two reference weeks to give their last monthly net salary in Hryvnia. If workers are paid in another currency (e.g. dollars or rubles), they are asked to state the currency and we convert this salary into Hryvnia. The self-employed are asked to give an estimate of net income for the last month preceding the reference week. Since we do not have a measure of the capital used by the self-employed, we cannot include returns to capital in net monthly income. However, we do not think that this component is substantial in the Ukrainian context.

Like in all CIS countries, salaried workers in Ukraine have been confronted with wage arrears. While this phenomenon was less rampant in 2003 and 2004 than in the nineties, even in our reported period a substantial fraction of workers received less than the contractual wage in the last month preceding the reference week. Some persons, on the other had received more than the contractual wage in this month, since they are paid some of the previously withheld wages. In our wage regressions, we, therefore, include a dummy variable for those whose last wage exceeds the contractual wage and a dummy variable for those whose last wage is less.

A second issue is the potential non-normality of log hourly earnings (Heckman and Honoré, 1990). Figures 1 and 2 show actual log hourly earnings including outliers and superimposed normal densities. The actual log earnings do not seem to be normal and a Jarque-Bera (1980) test of normality does reject the null hypothesis in both years. With outliers trimmed (see Figures 3 and 4) the test fails to reject the null hypothesis of normality for 2003, but not for 2004. Consequently, in the wage regressions that we perform we still use the untrimmed log hourly earnings. To attenuate the problem connected to non-normality we, however, also estimate earnings functions using robust and quantile (median) regression.

2.4. A closer look at informality and the movements between labor market states

Table 2 shows the composition of employment in 2003 and 2004. In both years, the vast majority of workers are formal salaried employees. We do see, however, a substantial increase in informal employment over the period, rising from 9.6 percent to 13.5 percent of the total workforce. What is particularly noteworthy is the much higher incidence of involuntarily informal employees than workers who voluntarily have entered an informal employment relationship in both years. So, on our measure of informality, about two thirds of the informally employed have been denied a formal employment relationship that they presumably would have preferred. On the other hand, more than half of the self-employed seem to find it advantageous in 2004 not to register their activity.

Which factors are correlated with the incidence of an informal employment relationship for the various components? We speak of correlation rather than of causal effects here since some of the right-hand-side variables in the presented probit regressions are potentially endogenous. Tables 3 and 4 show the results of probit regressions for all employees, for the self-employed, salaried workers, the self-employed outside agriculture and the salaried workers excluding those who are voluntarily informal for the years 2003 and 2004 respectively. In both years, higher educational attainment is associated with less informal employment. Again in both years, we see a monotonic inverse relationship between tenure and the incidence of informality. This result is hardly surprising in a transition context where nearly all continuously employed workers with long tenure have a formal employment relationship. In 2003, being single increases the probability of informal employment for the self-employed, while in 2004 this effect is only present for the self-employed outside agriculture. Working part-time is for most components associated with a higher incidence of informal employment. In 2003, formal employment of another household member decreases the incidence for an informal employment relationship among the self-employed and salaried workers. This result, being in line with the notion that informality is an undesirable labor market state that workers whose spouses are in the formal sector are in a position to shun, vanishes in 2004. The most striking results of the probit regressions are the age and gender neutrality of informality in the

Ukrainian labor market. The scarce evidence that exists on developing countries often finds women involved in informal activities to a much larger degree than men (see, e.g., Funkhouser, 1997). This gender bias cannot be found in our data.

The panel nature of our data allows us to estimate transition probabilities between origin states in 2003 and destination states in 2004. Turning to these estimates, we have raw and predicted transition probabilities for four states in Tables 5 and 6, i.e. for formal employment, informal employment, unemployment and not-in-the-labor force. The first panel in Table 5 shows the conventional transition probabilities that assume an underlying Markov process and where the transition probability is estimated by the ratio of the flow out of the origin state in 2003 to the destination state in 2004 over the total stock of the origin state in 2003. The estimated transition probabilities are, of course, only meaningful if "round-tripping" problems are minimal.[26] Since the main purpose of the presented transition probabilities is to see whether in an expanding economy workers move out of informal employment into formal employment in a disproportionate fashion, we need to produce comparable transition probabilities. In both periods, formal employment is a much larger sector than informal employment as the last row (P.j) and column (Pi.) of the upper panel of Table 5 show. To make the transition probabilities comparable we standardize them in the middle panel of Table 5 by dividing through with P.j, i.e. the size of the destination state in 2004, and arrive at the "Q"-matrix. It can occur, however, that persons would like to move from an origin to a destination state, but it might be difficult to move out of a state and difficult to move into a state because of little churning. Under Markovian assumptions, duration of state occupancy is exponentially distributed and given by the reciprocal of the outflow rate, i.e. for the origin state by (1/(1-Pii)), while for the destination state by (1/(1-Pjj)). Clearly, the larger the durations of occupancy of origin and destination states, the harder it is for a worker to move from the origin to the destination state. In the bottom panel of Table 5 the "Q"-matrix is multiplied by the product of the durations of state occupancy to account for the lack or the existence of churning. The values of

the thus derived "V"-matrix are, of course, no longer transition probabilities but give the propensity of a person to move from one state to another. A high value essentially means that a person has spent a lot of effort to move even though it was very difficult to do so.[27]

Comparing the last row and the last column in the upper panel of Table 5, we see a constant share of formal employment over the two years and a rising share of informal employment. The net employment expansion in the Ukrainian labor market between 2003 and 2004 is thus entirely due to an increase in informal jobs. The upper panel also shows churning rates for the states formal employment and not-in-the-labor-force that are large in international perspective. Particularly striking are, however, the high churning rates of informal employment and particularly unemployment, hinting at the arrival of a dynamic labor market in Ukraine.[28] When we standardize by the size of the destination state, we see a larger outflow rate from informal to formal employment than vice versa. We also note that the transitions from unemployment to employment are disproportionately large into informal jobs. Inspection of the values in bottom panel of Table 5 produces two interesting results. First, we see a substantially higher propensity to move from the informal to the formal sector than from the formal to the informal sector. So, despite the fact that job growth is nearly entirely linked to informal employment relationships, persons try particularly hard to get into a formal employment relationship. Second, the propensity to get from unemployment to informal employment is only slightly higher than the propensity from that state into formal employment. When we compare these propensities with the respective entries in the middle panel, we see that, if at all possible, unemployed persons will try to find formal employment but are restricted of doing so, and hence enter into an informal employment relationship. So, our numbers seem to provide at least partial evidence for the hypothesis that informal employment is a waiting stage and that people queue in this state for formal jobs.

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[26] Since we have the complete labor market history between 2003 and 2004 up to monthly intervals, we could check for "round-tripping". The data do not show any serious problems, though.

[27] For a more detailed discussion of the "Q" and "V" matrices, see Bosch and Maloney (2004).

The values in the upper panel of Table 5 are unconditional mean transition probabilities between the various states. In order to take account of compositional effects, we also produce mean transition probabilities conditioned on observable characteristics. The resulting predicted transition probabilities that are based on multinomial logit regressions (see appendix), sharpen the above presented message. Once we control for observable characteristics (see Table 6), we find a propensity to move from informal to formal employment that is double the propensity for the opposite move. Also, the unemployed now strive predominantly to get directly into formal employment.

One reason for constructing the Q and V matrices, which are by no means uncontroversial, is to be able to compare our evidence of mobility across labor market states to the evidence of Maloney (1999) who depicts similar movements across states in Mexico for the years 1991 to 1992, which, like the reported period for Ukraine, is a period of strong growth. In Mexico, he finds nearly symmetrical moves between the formal and informal states and also a large churning rate of formal employment. He takes this latter result as evidence for the low likelihood of the existence of a segmented labor market and the former as an indication that workers do not queue in the informal sector for formal sector jobs. The evidence for Ukraine is very different. The normalized transition rate from the informal to the formal sector is twice as high as the rate in the other direction as is the propensity to move from the formal into the formal sector (see middle panel and bottom panels of table 5 respectively). Using the same tools as Maloney we get results that seem to support a variant of the segmented labor market hypothesis.

Tables 7 and 8 record transitions with a finer disaggregation of the employment state, namely formal and informal salaried workers as well as the informally self-employed.[29] The upper panel of Table 7 (unconditional transition probabilities) tells us that most of the growth in informal

[28] In the 1990's unemployment was extremely stagnant (Lehmann, Kupets and Pignatti, 2005); the labor market seems to have responded to the vigorous growth observed for the Ukrainian economy since 1999 only in 2003, and thus with a long lag.

[29] Since there are too few moves out of formal self-employment, we have to drop this state when estimating predicted transitions. Consequently, we also drop this state when calculating the unconditional transitions.

employment occurred with salaried workers. Another interesting finding is the relatively high churning rates of informal salaried workers, while the duration of state occupancy in informal self-employment is long. The "Q" matrix in the middle panel points to higher transitions from informal salaried to formal salaried than vice versa. The highest transition rate from this state is, however, to informal self-employed. Outflow rates from unemployment are especially high into the state of informal salaried workers, which might be taken as evidence that the unemployed are taking up informal jobs mainly involuntarily. The propensities to move, shown in the bottom panel of Table 7 have the same patterns as the transitions in the "Q" matrix: informal salaried persons have a greater propensity to move into formal salaried positions than the other way round. The largest propensity out of this state is into informal self-employment although the differences are small. By far the largest willingness to move out of informal self-employment is into the state of informal dependent employment. The latter state is also the largest destination for movers out of unemployment. The predicted transition probabilities in the upper panel of Table 8 imply much longer durations of state occupancy in the formal salaried sector and among the informal self-employed than the unconditional probabilities. As a consequence, while the patterns of the various propensities to move are the same as in Table 7, the differences are much more pronounced.

The multinomial regressions, on which the predicted transition probabilities in tables 6 and 8 are based, are for the moment relegated to the appendix. One interesting finding seems, however, to be present in these regressions. Maloney (1999) tests for the presence of queuing in the informal sector by estimating MNL regressions of the transitions between the various states and including experience as a covariate. For the queuing hypothesis to hold experience should be positively correlated with the transition from the informal to the formal sector. He finds no such correlation in the case of the Mexican labor market, taking also this as evidence for the non-segmented nature of the labor market. In our regressions we use age as a proxy for experience and find a large positive coefficient on age for the transition from informal salaried employment and from informal self-employment to formal employment. The significance at the 10 percent level is border-line in both

cases but actually given in the case of informal self-employment as the origin state. Given the few transitions that we observe this is certainly no evidence in favor of the hypothesis of non-segmentation. However, more work needs to be done with additional data to come to more definite conclusions.

2.5. Wages and employment status

As mentioned in the data section, log earnings are not normally distributed. Therefore, apart from OLS regressions, we also estimated log hourly earnings using robust and quantile (median) regression. In addition, we also used a selection correction model, where the selection equation was estimated with a multinomial logit model. Since the results of these regression models, especially the estimated coefficients of interest, are very similar to those of the simple OLS regressions, we relegate the results of these models to the appendix and present the OLS results for the years 2003 and 2004 respectively in Tables 9 and 10.

In 2003, female workers received an hourly wage that was 25 percent lower in informal employment and 20 percent lower in formal employment. This wage gap increases in the latter employment type in 2004 to 23 percent, but disappears in informal employment completely. As this type of employment boomed in 2004, it might have been more difficult to pay female workers with the same characteristics less than male workers. The most important result given by the two regressions, is however, the fact that in both years there are returns to education and tenure in a formal employment relationship, but not in an informal one. In 2004 we also see returns to experience in formal jobs. In addition, while in 2003 there is a wage premium of roughly 20 percent for being formally self-employed, we see a higher premium (33 percent) for the informally self-employed in the boom year of 2004. Finally, salaried persons who choose informality experience a premium of approximately 20 percent in 2004, which is absent in 2003.

It is also important to see how movements between formal and informal employment affect wage growth. This is shown in Table 11. Concentrating on the results with robust standard errors (column 2), we see that people moving from formal to informal employment have (FI), ceteris paribus, a wage growth that is 28 percent lower than those persons who stay in the formal sector. Workers who remain in informal employment (II) experience a 10 percent lower wage growth than the default category, although when applying robust standard errors the estimate is not significant at any conventional level. An additional important result is that those who leave for another job out of their free will, have 18 percent higher wage growth. Finally, workers who move voluntarily from formal to informal employment (FI*choice informal) experience a wage gain rather than a wage penalty. With robust standard errors this gain is, however, not significant at conventional levels.

The wage regressions provide strong evidence in favor of a segmented labor market in Ukraine, although the segmented sector seems itself to be segmented into a voluntary ("upper tier") part and an involuntary lower part. There are several pieces of evidence for this statement in our regressions. First in the level regressions of both years we observe large and highly significant returns to education in formal employment, while these returns are absent in informal employment. For the year 2004 we can also find returns to experience and tenure with workers in a formal employment relationship, while the informally employed do not have any of these returns. The wage growth regression has the most noteworthy result in our opinion. If most persons moved voluntarily into informal employment the coefficient would be positive, this is precisely the opposite of what we observe. So, most movers from formal to informal jobs experience a large wage penalty. Only for those workers who state that they have moved to a non-registered job in 2004 out of their own will, do we see a wage premium. These results in conjunction with Table 2 imply that the labor market is segmented into three parts, a formal sector, a voluntary informal sector and a larger involuntary informal sector.

2.6. Conclusions

Research on informal employment in transition countries has been very limited, above all because of a lack of appropriate data. A new rich panel data set from Ukraine, the Ukrainian Longitudinal Monitoring Survey (ULMS), enables us to provide some empirical evidence on informal employment in Ukraine in the years 2003 and 2004, a period of strong economic growth. The data allow us to "test" the validity of the three schools of thought in the literature that discuss the role of informality in the development process. We also investigate to what extent the informal sector plays a role in labor market adjustment in a transition economy and whether informality plays a different role relative to the context of a developing economy.

We find above all evidence for the third paradigm that sees the labor market segmented into a formal sector and an informal sector, which is in turn segmented into a restricted "upper tier" and voluntary part and a "free entry" and involuntary lower part. The ULMS has information on the voluntary nature of informal employment, and simple cross tabulations show that roughly two thirds of informal salaried workers would have preferred a formal job. This proportion is around 50 percent for the informal self-employed. Probit regressions establish the surprising result that young people and females are not disproportionately affected by informal employment, so unlike in many developing countries there is no gender bias of informality in the Ukrainian labor market.

Following the methodology of Maloney (1999) we estimate transitions between labor market states that include informal salaried workers and informal self-employment. The upshot of these estimations consists in larger flows from the informal to the formal sector than the flows in the opposite direction in times of strong growth. This is in contrast to what Maloney finds for a developing country like Mexico and in our opinion evidence in favor of a segmented Ukrainian labor market.

The level wage regressions and the regressions that estimate wage growth also seem to favor the hypothesis of a segmented labor market. Workers in informal employment relationships have no returns to education, experience and tenure, while these returns are given in formal employment

relationships and are particularly strong for educational attainment. The wage growth regression points to a large average wage penalty for all those who move from the formal to the informal sector. This wage penalty is, however, reversed for those who make this move voluntarily.

The apparent difference in the role of informality in a transition economy like Ukraine and in a developing country like for example Mexico is not yet fully explained in this paper. Some explanations are, however, put forth in the paper. Even if Ukraine and Mexico have similar levels of per capita GDP (in terms of PPP) the development process is very different. In the case of Ukraine the economy has come out of central planning where large industrial conglomerates, even if inefficient, were the predominant agents. In case of a country like Mexico industry has been much more embryonic and never be of the same importance as in the republic of the former Soviet Union. Another important difference mentioned in the paper is the very different psychological mindset of the population and the workforce in transition and developing countries. While in the former we have a workforce used for the most part to life-long employment in one firm, workers in developing countries have experienced precariousness in their majority for decades. It, therefore, does not seem farfetched that there will be on average a substantially lower propensity to take risky informal jobs in transition countries than in the developing world. While these thoughts might give some answers to the question why we observe such obvious differences between a transition and a developing country when it comes to informality, it is also clear that we need a more thorough discussion of the historical, cultural or institutional differences that drive the differences in the findings between a transition country like Ukraine and a developing country like Mexico.

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FIGURES

Figure 1. Real GDP, Employment (1990=100)

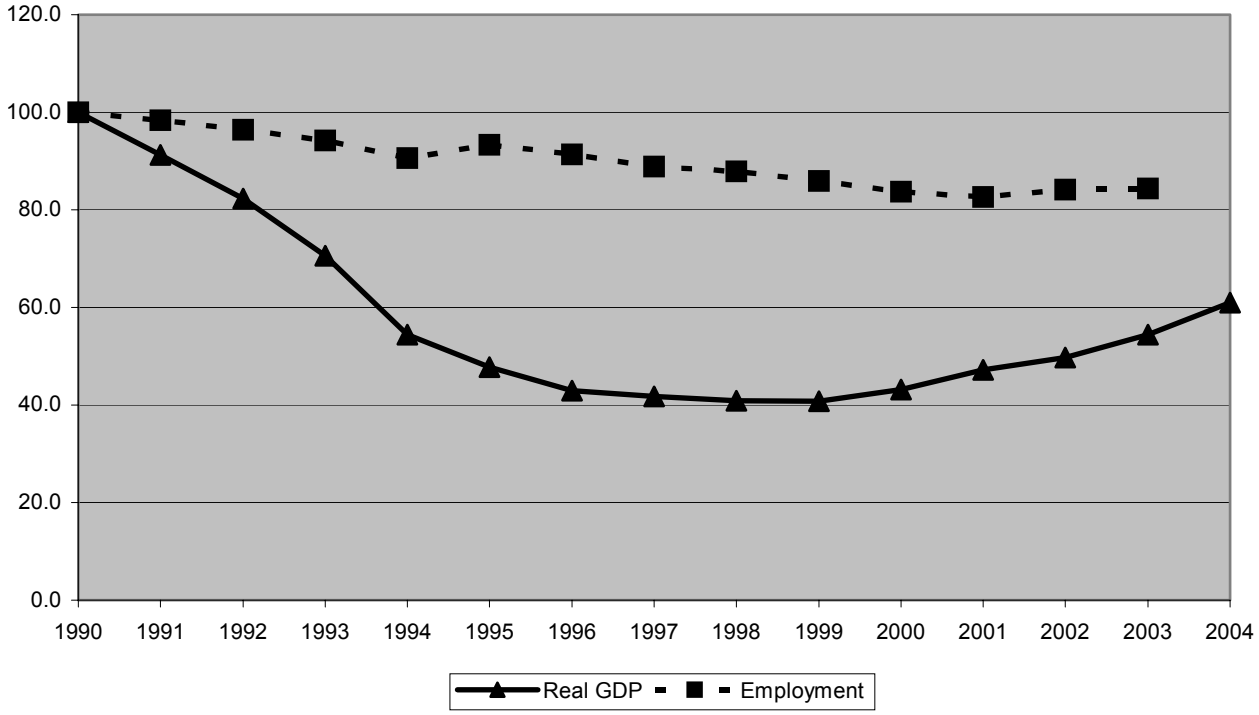


Figure 2 Log working earnings 2003 – Not trimmed

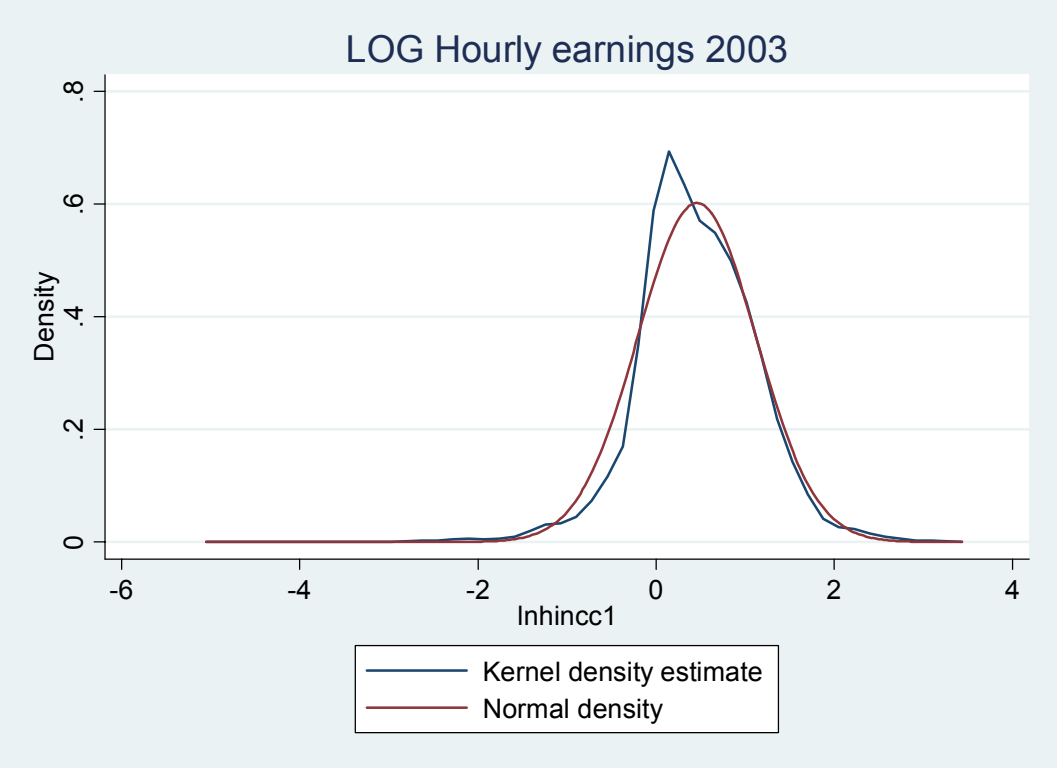


Figure 3 Log working earnings 2004 – Not trimmed

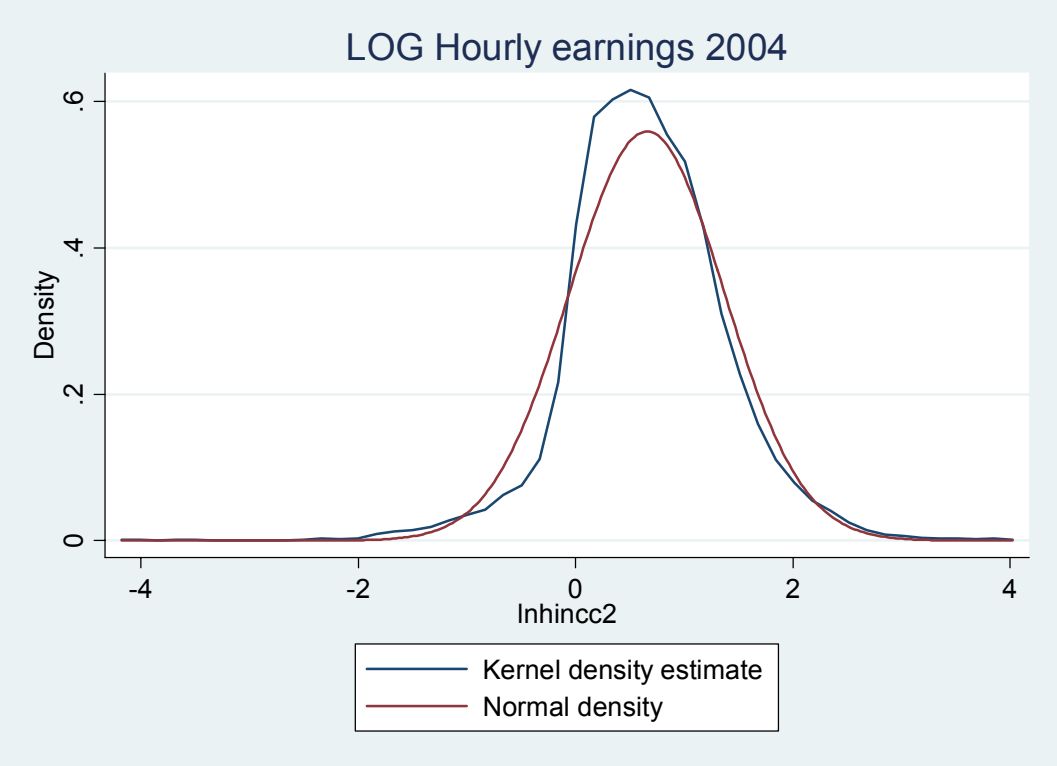


Figure 4 Log working earnings 2003 – Trimmed

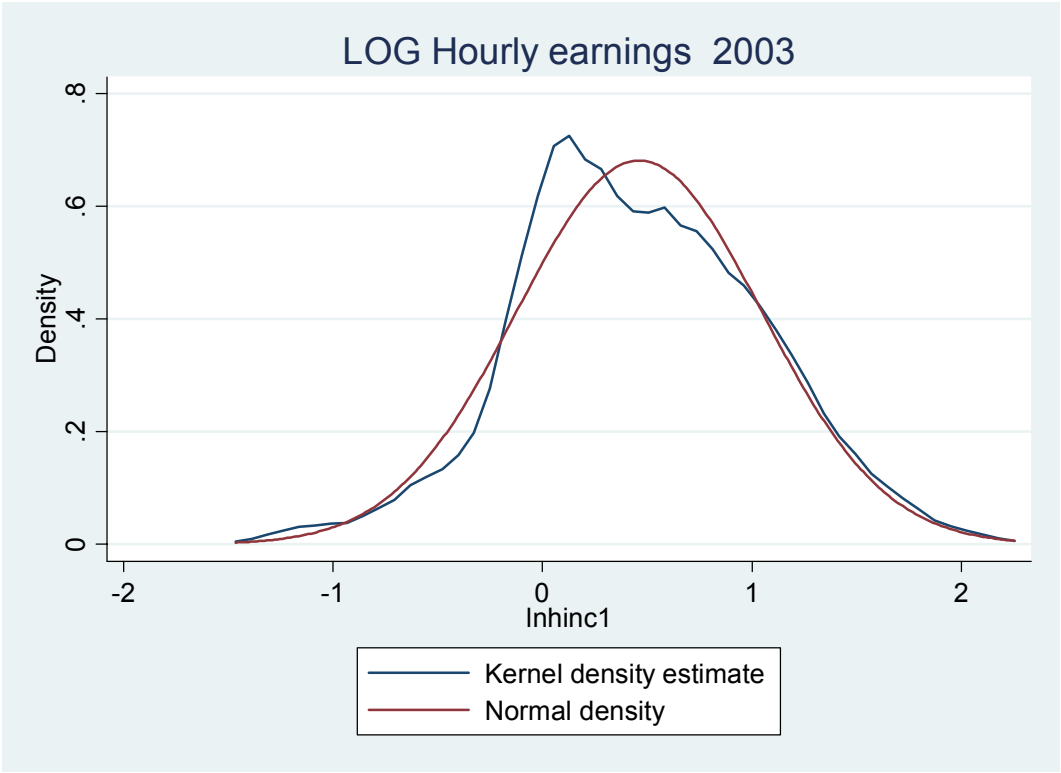
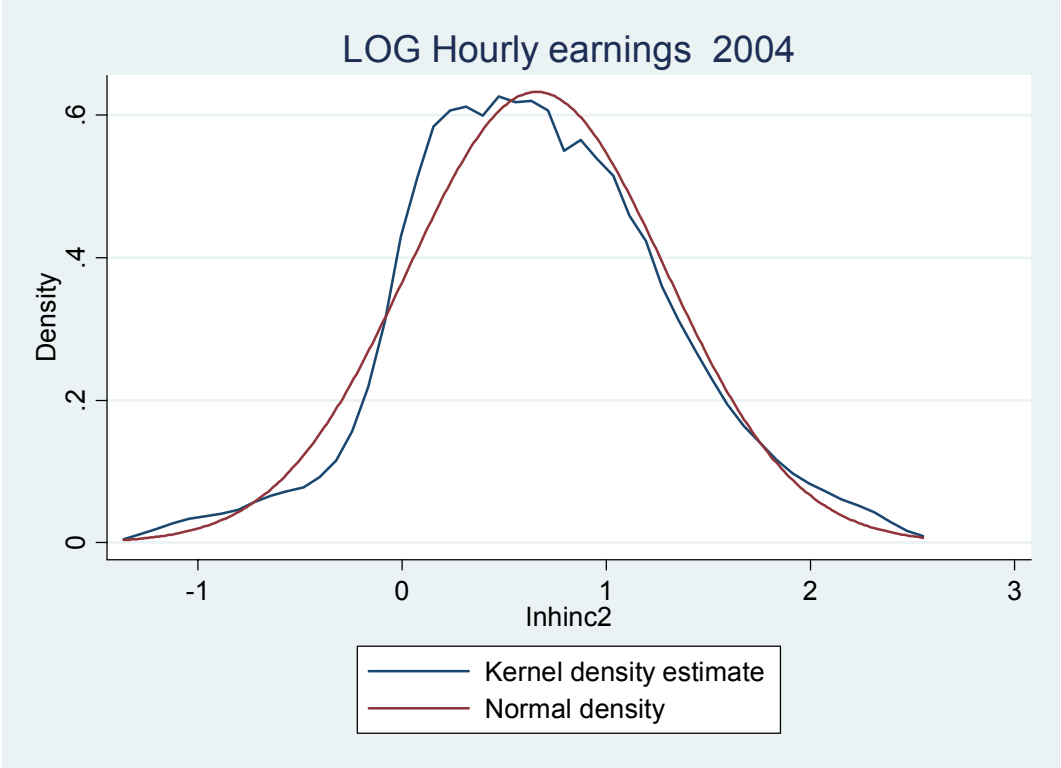


Figure 5 Log working earnings 2004 – Trimmed



TABLES

Table 1: Employment changes by sector, ownership and size, 1991-2004

	Sector[1]			Ownership			Size	
	Agriculture (%share)	Industry (%share)	Services (%share)	Privatized (%share)	New Private (%share)	Non agricultural self-employed (%share)	Employed in Firms with empl<100 (%share)	Employed in Firms with empl<50 (%share)
1991[a]	15.98	32.01	47.21	1.59	1.26	0.33	33.77	23.54
1997[a]	16.30	26.21	52.89	11.73	8.33	2.02	41.36	30.13
2004[b]	13.59	23.07	59.18	19.59[2]	20.09	4.36	53.98	43.52
Δ share 91-97	0.32	-5.80	5.68	10.14	7.07	1.69	7.59	6.59
Δ share 97-04	-2.71	-3.14	6.29	7.86	11.76	2.34	12.62	13.39

[a]End of the year
[b]Reference week

Source: ULMS
Notes:[1]Share of employed in Public Administration (PA) not shown – The PA share stays roughly at 4% during the whole period (1991-2004)
[2]Includes collective enterprises

Table 2. Composition of Employed

	2003		2004	
	share	N	share	N
Formal Salaried	0.869	3,408	0.828	2,765
Informal salaried Voluntary	0.020	79	0.025	86
Informal salaried Involuntary	0.039	152	0.060	203
Self Employed Formal	0.035	138	0.034	116
Self Employed Informal	0.037	144	0.050	169

Source: ULMS

Table 3. Probit regressions: Determinants of informality – 2003

	Total	Self Employed	Salaried	Self Employed without Agriculture	Salaried excluding voluntary

					informal
Female	0.002	0.124	0.093	-0.230	0.117
	(0.065)	(0.172)	(0.079)	(0.209)	(0.092)
Age	0.022	0.058	0.006	0.116	-0.008
	(0.019)	(0.061)	(0.023)	(0.073)	(0.025)
Age^2	-0.000	-0.000	-0.000	-0.001	0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Secondary	-0.198	-0.052	-0.302	0.128	-0.361
	(0.077)***	(0.218)	(0.090)***	(0.261)	(0.101)***
University	-0.553	-0.662	-0.665	-0.429	-0.677
	(0.106)***	(0.271)**	(0.129)***	(0.319)	(0.148)***
Tenure	-0.061	-0.163	-0.087	-0.107	-0.075
	(0.019)***	(0.063)**	(0.030)***	(0.089)	(0.034)**
$Tenure^2/100$	-0.124	1.046	-0.158	0.317	-0.172
	(0.117)	(0.450)**	(0.233)	(0.729)	(0.257)
Single	0.270	0.796	0.237	0.973	0.280
	(0.120)**	(0.369)**	(0.139)*	(0.438)**	(0.161)*
Divorced & other	0.006	-0.047	0.133	0.015	0.237
	(0.095)	(0.278)	(0.110)	(0.332)	(0.122)*
Children<6	0.116	0.626	0.096	0.510	0.169
	(0.115)	(0.319)**	(0.136)	(0.362)	(0.156)
Children>6	-0.051	0.134	-0.028	-0.244	-0.133
	(0.087)	(0.226)	(0.106)	(0.277)	(0.128)
Formal in household	-0.201	-0.230	-0.169	-0.105	-0.135
	(0.044)***	(0.107)**	(0.052)***	(0.122)	(0.060)**
Part-time	0.552	0.264	0.386	0.714	0.340
	(0.116)***	(0.244)	(0.156)**	(0.276)***	(0.180)*
Center-North	0.235	0.281	0.043	-0.232	0.428
	(0.140)*	(0.576)	(0.154)	(0.598)	(0.220)*
South	0.426	0.574	0.162	-0.061	0.655
	(0.141)***	(0.580)	(0.156)	(0.603)	(0.218)***
East	0.250	0.333	0.132	-0.059	0.522
	(0.134)*	(0.568)	(0.144)	(0.585)	(0.209)**
West	0.110	0.285	-0.069	0.012	0.221
	(0.144)	(0.581)	(0.159)	(0.590)	(0.229)
Constant	-1.260	-1.550	-0.845	-2.505	-1.296
	(0.411)***	(1.371)	(0.473)*	(1.637)	(0.548)**
Observations	3828	273	3555	210	3476
Pseudo-R2	0.16	0.09	0.18	0.11	0.19

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4. Probit regressions: Determinants of informality – 2004					
	Total	Self Employed	Salaried	Self Employed without Agriculture	Salaried excluding voluntary informal
Female	0.015	0.219	0.041	-0.352	0.056
	(0.066)	(0.196)	(0.079)	(0.262)	(0.088)
Age	0.019	-0.001	0.044	0.048	0.053
	(0.020)	(0.066)	(0.025)*	(0.080)	(0.028)*
Age^2	-0.000	0.000	-0.001	-0.000	-0.001
	(0.000)	(0.001)	(0.000)**	(0.001)	(0.000)**
Secondary	-0.480	-0.804	-0.449	-0.562	-0.527
	(0.080)***	(0.273)***	(0.094)***	(0.380)	(0.103)***
University	-0.924	-1.722	-0.809	-1.577	-0.914
	(0.114)***	(0.342)***	(0.134)***	(0.465)***	(0.152)***
Tenure	-0.080	-0.001	-0.122	-0.069	-0.116
	(0.008)***	(0.021)	(0.014)***	(0.032)**	(0.016)***
$Tenure^2/100$	0.083	0.006	0.125	0.073	0.119
	(0.008)***	(0.021)	(0.014)***	(0.031)**	(0.015)***
Single	0.185	0.958	0.152	1.244	0.202
	(0.121)	(0.473)**	(0.135)	(0.552)**	(0.151)
Divorced & other	0.120	0.067	0.261	0.145	0.138
	(0.094)	(0.318)	(0.109)**	(0.376)	(0.126)
Children<6	-0.028	0.580	-0.086	0.465	-0.126
	(0.120)	(0.397)	(0.137)	(0.460)	(0.155)
Children>6	-0.011	0.010	-0.050	-0.190	0.038
	(0.091)	(0.248)	(0.109)	(0.309)	(0.120)
Formal in household	-0.007	-0.015	-0.008	-0.013	-0.017
	(0.007)	(0.021)	(0.008)	(0.022)	(0.011)
Part-time	0.552	0.717	0.364	1.150	0.300
	(0.120)***	(0.329)**	(0.153)**	(0.401)***	(0.173)*
Center-North	0.007	-0.532	-0.100	-0.877	0.255
	(0.168)	(0.615)	(0.193)	(0.595)	(0.246)
South	0.418	-0.325	0.281	-0.882	0.579
	(0.173)**	(0.631)	(0.199)	(0.633)	(0.252)**
East	0.025	-0.569	0.076	-0.807	0.332
	(0.165)	(0.619)	(0.186)	(0.602)	(0.241)
West	-0.106	-0.997	-0.011	-1.195	0.143
	(0.175)	(0.645)	(0.198)	(0.635)*	(0.256)
Constant	-0.719	0.903	-1.182	0.072	-1.706
	(0.417)*	(1.537)	(0.492)**	(1.788)	(0.571)***
Observations	2988	243	2745	170	2656
Pseudo-R2	0.19	0.21	0.24	0.26	0.22

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5. Mobility in Ukrainian Labor market
4 Labor market states
Transition Probabilities

TRANSITION PROBABILITIES : Pij

	F	I	U	NLF	**Pi.**
Formal	**0.861**	0.031	0.036	0.072	0.433
Informal	0.235	**0.578**	0.093	0.093	0.044
Unemployed	0.253	0.132	**0.338**	0.277	0.091
Not in labor force	0.061	0.038	0.073	0.829	0.432
P.j	0.433	0.067	0.082	0.419	

Q MATRIX: Pij/P.j - "Probability standardized by size of the destination state at the end of the period"

	F	I	U	NLF
Formal		**0.464**	**0.441**	0.171
Informal	**0.544**		**1.142**	0.223
Unemployed	**0.586**	**1.963**		0.661
Not in labor force	0.141	0.564	0.887	

V MATRIX: Pij / (P.j*(1-Pii)*(1-Pjj)) - "Disposition to move to a sector"

	F	I	U	NLF
Formal		**7.915**	**4.795**	7.202
Informal	**9.280**		**4.090**	3.087
Unemployed	**6.375**	**7.026**		5.832
Not in labor force	5.924	7.798	7.823	

Table 6. Mobility in Ukrainian Labor market
4 Labor market states
Predicted Transition Probabilities

TRANSITION PROBABILITIES : Pij

	F	I	U	NLF	**Pi.**
Formal	**0.890**	0.017	0.032	0.061	0.433
Informal	0.229	**0.624**	0.084	0.063	0.044
Unemployed	0.258	0.123	**0.351**	0.269	0.091
Not in labor force	0.031	0.030	0.036	0.903	0.432
P.j	0.433	0.067	0.082	0.419	

Q MATRIX: Pij/P.j - "Probability standardized by size of the destination state at the end of the period"

	F	I	U	NLF
Formal		**0.253**	**0.391**	0.146
Informal	**0.529**		**1.027**	0.151
Unemployed	**0.596**	**1.833**		0.643
Not in labor force	0.072	0.447	0.440	

V MATRIX: Pij / (P.j*(1-Pii)*(1-Pjj)) - "Disposition to move to a sector"

	F	I	U	NLF
Formal		**6.126**	**5.481**	13.657
Informal	**12.801**		**4.209**	4.127
Unemployed	**8.355**	**7.513**		10.208
Not in labor force	6.717	12.260	6.993	

Table 7. Mobility in Ukrainian Labor market
5 Labor market states
Transition Probabilities

TRANSITION PROBABILITIES : Pij

	FS	IS	SEI	U	NLF	**Pi.**
Formal salaried	**0.861**	0.024	0.006	0.037	0.073	0.420
Informal salaried	0.279	**0.485**	0.048	0.085	0.103	0.026
Self employed informal	0.081	0.081	**0.631**	0.117	0.090	0.017
Unemployed	0.246	0.103	0.030	**0.342**	0.279	0.093
Not in labor force	0.058	0.022	0.016	0.073	0.831	0.444
P.j	0.419	0.043	0.024	0.084	0.430	1.000

Q MATRIX: Pij/P.j - "Probability standardized by size of the destination state at the end of the period"

	FS	IS	SEI	U	NLF
Formal salaried		**0.550**	**0.242**	**0.439**	0.169
Informal salaried	**0.665**		**1.980**	**1.015**	0.240
Self employed informal	**0.193**	**1.877**		**1.401**	0.210
Unemployed	**0.587**	**2.377**	**1.238**		0.650
Not in labor force	0.138	0.512	0.646	0.870	

V MATRIX: Pij / (P.j*(1-Pii)*(1-Pjj)) - "Disposition to move to a sector"

	FS	IS	SEI	U	NLF
Formal salaried		**7.669**	**4.718**	**4.798**	7.213
Informal salaried	**9.284**		**10.406**	**2.993**	2.760
Self employed informal	**3.766**	**9.864**		**5.762**	3.366
Unemployed	**6.406**	**7.010**	**5.090**		5.859
Not in labor force	5.897	5.898	10.366	7.837	

Table 8. Mobility in Ukrainian Labor market
5 Labor market states
Predicted Transition Probabilities

TRANSITION PROBABILITIES : Pij

	FS	IS	SEI	U	NLF	
Formal salaried	**0.893**	0.010	0.002	0.032	0.063	0.420
Informal salaried	0.271	**0.584**	0.013	0.058	0.074	0.026
Self employed informal	0.02	0.086	**0.868**	0.012	0.014	0.017
Unemployed	0.252	0.023	0.096	**0.356**	0.273	0.093
Not in labor force	0.03	0.015	0.008	0.036	0.911	0.444
Total	0.419	0.043	0.024	0.084	0.430	1.000

Q MATRIX: Pij/P.j - "Probability standardized by size of the destination state at the end of the period"

	FS	IS	SEI	U	NLF
Formal salaried		**0.233**	**0.083**	**0.381**	0.147
Informal salaried	**0.647**		**0.542**	**0.690**	0.172
Self employed informal	**0.048**	**2.000**		**0.143**	0.033
Unemployed	**0.601**	**0.535**	**4.000**		0.635
Not in labor force	0.072	0.349	0.333	0.429	

V MATRIX: Pij / (P.j*(1-Pii)*(1-Pjj)) - "Disposition to move to a sector"

	FS	IS	SEI	U	NLF
Formal salaried		**5.225**	**5.900**	**5.528**	15.385
Informal salaried	**14.530**		**9.864**	**2.577**	4.648
Self employed informal	**3.380**	**36.422**		**1.681**	2.771
Unemployed	**8.728**	**1.997**	**47.054**		11.077
Not in labor force	7.519	9.422	28.374	7.477	

Table 9. Log hourly earnings – 2003 OLS without selection			
	All	Informal	Formal
Female	-0.206	-0.258	-0.204
	(0.024)***	(0.120)**	(0.024)***
Age	0.011	0.011	0.008
	(0.006)*	(0.028)	(0.006)
Age^2	-0.000	-0.000	-0.000
	(0.000)**	(0.000)	(0.000)*
Secondary	0.064	-0.001	0.078
	(0.030)**	(0.121)	(0.031)**
University	0.334	0.237	0.349
	(0.041)***	(0.182)	(0.042)***
Tenure	0.005	0.020	0.009
	(0.003)	(0.040)	(0.003)**
$Tenure^2/100$	-0.009	-0.350	-0.017
	(0.009)	(0.291)	(0.009)*
Choice Informality		0.046	
		(0.114)	
Self Employed		0.039	0.194
		(0.147)	(0.111)*
Part time	0.168	0.334	0.131
	(0.050)***	(0.158)**	(0.053)**
Positive Δ^a	0.426	0.507	0.429
	(0.086)***	(0.116)***	(0.087)***
Negative Δ^b	-0.660	-0.856	-0.646
	(0.056)***	(0.339)**	(0.057)***
occupation4	-0.168	-0.237	-0.167
	(0.040)***	(0.289)	(0.039)***
occupation5	-0.298	-0.513	-0.233
	(0.048)***	(0.205)**	(0.049)***
occupation6	-0.322	-0.245	-0.328
	(0.100)***	(0.430)	(0.102)***
occupation7	-0.096	-0.305	-0.072
	(0.037)***	(0.246)	(0.037)**
occupation8	-0.096	-0.031	-0.092
	(0.048)**	(0.230)	(0.049)*
occupation9	-0.286	-0.353	-0.269
	(0.035)***	(0.203)*	(0.034)***
Mining Manufacturing	0.555	0.898	0.494
	(0.045)***	(0.208)***	(0.047)***
Electricity Gas Water	0.560	0.000	0.514
	(0.058)***	(0.000)	(0.059)***
Construction	0.417	0.661	0.381
	(0.069)***	(0.247)***	(0.069)***
Trade Hotels Repair	0.392	0.717	0.297
	(0.057)***	(0.196)***	(0.060)***
Transport Communication	0.539	0.873	0.492
	(0.051)***	(0.224)***	(0.053)***
Financial Real Estate	0.430	0.209	0.414
	(0.080)***	(0.296)	(0.083)***
Education Health Social services	0.168	1.178	0.123
	(0.042)***	(0.251)***	(0.043)***
Other Service Activities	0.338	0.529	0.292
	(0.055)***	(0.223)**	(0.057)***
Other Activities	0.235	0.732	0.133
	(0.114)**	(0.413)*	(0.118)

State	-0.042	0.067	-0.023
	(0.037)	(0.276)	(0.041)
Cooperative	-0.563	-0.570	-0.532
	(0.091)***	(0.263)**	(0.105)***
Privatized	-0.089	-0.469	-0.044
	(0.043)**	(0.171)***	(0.046)
Center North	-0.329	-0.521	-0.328
	(0.043)***	(0.219)**	(0.042)***
South	-0.255	-0.366	-0.254
	(0.044)***	(0.198)*	(0.045)***
East	-0.259	-0.381	-0.250
	(0.040)***	(0.192)**	(0.040)***
Westr	-0.241	-0.322	-0.236
	(0.042)***	(0.223)	(0.042)***
Constant	0.393	0.391	0.436
	(0.126)***	(0.583)	(0.127)***
Observations	3174	262	2885
R-squared	0.31	0.30	0.32

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received
[b] wage arrears or other unexpected decrease in monthly earnings received

Table 10. Log hourly earnings – 2004 OLS without selection			
	All	Informal	Formal
Female	-0.221	-0.088	-0.232
	(0.027)***	(0.107)	(0.028)***
Age	0.009	-0.009	0.015
	(0.006)	(0.025)	(0.006)**
Age^2	-0.000	0.000	-0.000
	(0.000)**	(0.000)	(0.000)***
Secondary	0.126	0.133	0.126
	(0.034)***	(0.094)	(0.036)***
University	0.455	0.143	0.467
	(0.048)***	(0.147)	(0.050)***
Tenure	0.007	-0.008	0.007
	(0.002)***	(0.016)	(0.002)***
$Tenure^2/100$	-0.007	0.009	-0.007
	(0.002)***	(0.015)	(0.002)***
Choice Informality		0.191	
		(0.111)*	
Self Employed		0.326	0.093
		(0.146)**	(0.132)
Part time	0.144	0.424	0.025
	(0.070)**	(0.202)**	(0.071)
Positive Δ^a	0.413	0.000	0.411
	(0.140)***	(0.000)	(0.139)***
Negative Δ^b	-0.681	-0.810	-0.668
	(0.092)***	(0.336)**	(0.096)***
occupation4	-0.179	0.109	-0.165
	(0.045)***	(0.272)	(0.045)***
occupation5	-0.303	-0.213	-0.287
	(0.061)***	(0.206)	(0.067)***
occupation6	-0.437	0.540	-0.482
	(0.112)***	(0.263)**	(0.113)***
occupation7	-0.044	0.281	-0.059
	(0.041)	(0.202)	(0.041)
occupation8	-0.108	0.240	-0.118
	(0.054)**	(0.336)	(0.054)**
occupation9	-0.367	-0.237	-0.334
	(0.041)***	(0.185)	(0.041)***
Mining Manufacturing	0.397	0.403	0.387
	(0.049)***	(0.197)**	(0.049)***
Electricity Gas Water	0.278	0.000	0.259
	(0.061)***	(0.000)	(0.061)***
Construction	0.381	0.385	0.369
	(0.069)***	(0.221)*	(0.068)***
Trade Hotels Repair	0.288	0.408	0.227
	(0.061)***	(0.182)**	(0.067)***
Transport Communication	0.364	0.021	0.347
	(0.056)***	(0.322)	(0.056)***
Financial Real Estate	0.273	0.871	0.254
	(0.083)***	(0.233)***	(0.083)***
Education Health Social services	0.116	0.238	0.090
	(0.047)**	(0.278)	(0.046)*
Other Service Activities	0.240	0.578	0.163
	(0.062)***	(0.223)***	(0.061)***
Other Activities	0.164	0.714	-0.184
	(0.233)	(0.468)	(0.189)

State	0.046	-0.265	0.068
	(0.039)	(0.237)	(0.042)
Cooperative	0.035	0.706	-0.001
	(0.190)	(0.218)***	(0.197)
Privatized	0.004	-0.030	0.021
	(0.040)	(0.129)	(0.044)
Center North	-0.329	-0.573	-0.318
	(0.061)***	(0.184)***	(0.064)***
South	-0.299	-0.576	-0.259
	(0.066)***	(0.196)***	(0.069)***
East	-0.321	-0.468	-0.314
	(0.058)***	(0.164)***	(0.061)***
West	-0.311	-0.412	-0.307
	(0.062)***	(0.204)**	(0.065)***
Constant	0.672	0.875	0.535
	(0.142)***	(0.508)*	(0.147)***
Observations	2584	326	2242
R-squared	0.27	0.28	0.29

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received
[b] wage arrears or other unexpected decrease in monthly earnings received

Table 11. Determinants of change in log hourly earnings		
	OLS	OLS with robust SE
IF	-0.100	-0.100
	(0.100)	(0.147)
FI	-0.284	-0.284
	(0.093)***	(0.118)**
II	-0.107	-0.107
	(0.063)*	(0.103)
Occupation change	0.030	0.030
	(0.048)	(0.064)
II*choice informal	-0.022	-0.022
	(0.188)	(0.153)
FI*choice informal	0.598	0.598
	(0.228)***	(0.470)
Chose to leave (job)	0.178	0.178
	(0.058)***	(0.070)**
Chose to leave (family)	0.214	0.214
	(0.209)	(0.161)
Chose to leave (other)	0.075	0.075
	(0.148)	(0.148)
Forced to leave	-0.013	-0.013
	(0.099)	(0.125)
Positive Δ [a] - 2003	-0.300	-0.300
	(0.100)***	(0.103)***
Negative Δ [b] - 2003	0.601	0.601
	(0.053)***	(0.071)***
Positive Δ [a] - 2004	0.306	0.306
	(0.152)**	(0.147)**
Negative Δ [b] - 2004	-0.398	-0.398
	(0.085)***	(0.104)***
Occupation change from 4	-0.128	-0.128
	(0.088)	(0.091)
Occupation change from 5	0.049	0.049
	(0.113)	(0.116)
Occupation change from 6	0.167	0.167
	(0.143)	(0.138)
Occupation change from 7	-0.058	-0.058
	(0.084)	(0.088)
Occupation change from 8	-0.251	-0.251
	(0.127)**	(0.178)
Occupation change from 9	0.074	0.074
	(0.066)	(0.087)
Constant	0.211	0.211
	(0.015)***	(0.014)***
Observations	2097	2097
R-squared	0.09	0.09

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received
[b] wage arrears or other unexpected decrease in monthly earnings received

Appendix

Table A1. Multinomial logit – 4 states			
Transitions from formal employment (F)			
	FI	FU	FN
Female	-0.428	0.143	0.370
	(0.234)*	(0.210)	(0.157)**
N. formal in household	-0.175	-0.142	-0.021
	(0.146)	(0.139)	(0.096)
Age	0.085	0.173	-0.176
	(0.078)	(0.074)**	(0.038)***
Age^2	-0.002	-0.002	0.002
	(0.001)*	(0.001)**	(0.000)***
Higher education	-0.951	-0.732	-0.501
	(0.227)***	(0.210)***	(0.154)***
Tenure	-0.180	-0.103	-0.044
	(0.045)***	(0.034)***	(0.021)**
$Tenure^2$ /100	0.391	0.259	0.104
	(0.151)***	(0.102)**	(0.051)**
Constant	-2.141	-4.998	0.410
	(1.284)*	(1.338)***	(0.756)
Observations	2794	2794	2794
Pseudo-R2	0.07		
FF is the base outcome			
Transitions from informal employment (I)			
	IF	IU	IN
Female	-0.141	0.470	0.623
	(0.306)	(0.451)	(0.488)
N. formal in household	0.437	0.464	0.275
	(0.206)**	(0.283)	(0.302)
Age	0.119	0.011	-0.457
	(0.100)	(0.127)	(0.121)***
Age^2	-0.002	0.000	0.006
	(0.001)	(0.002)	(0.002)***
Higher education	-0.492	0.252	0.568
	(0.316)	(0.452)	(0.493)
Tenure	-0.224	-0.285	0.082
	(0.114)**	(0.193)	(0.237)
$Tenure^2$ /100	1.192	0.703	-2.279
	(0.816)	(1.672)	(2.263)
Constant	-2.031	-2.717	4.555
	(1.612)	(2.218)	(1.900)**
Observations	283	283	283
Pseudo-R2	0.10		
II is the base outcome			
Standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%			

Table A1. Multinomial logit – 4 states, continued

Transitions from unemployment (U)			
	UF	UI	UN
Female	0.105	-0.432	0.705
	(0.218)	(0.277)	(0.220)***
N. formal in household	0.013	-0.112	-0.269
	(0.142)	(0.181)	(0.148)*
Age	0.024	0.074	-0.183
	(0.064)	(0.079)	(0.055)***
Age^2	-0.001	-0.001	0.002
	(0.001)	(0.001)	(0.001)***
Higher education	0.009	-0.762	-0.258
	(0.225)	(0.279)***	(0.222)
Constant	-0.313	-1.081	2.753
	(1.084)	(1.340)	(0.961)***
Observations	598	598	598
Pseudo-R2	0.04		
UU is the base outcome			
Transitions from not in the labor force (N)			
	NF	NI	NU
Female	-0.675	-0.225	-0.811
	(0.174)***	(0.218)	(0.159)***
N. formal in household	0.016	-0.288	-0.099
	(0.108)	(0.148)*	(0.103)
Age	0.233	0.193	0.226
	(0.034)***	(0.038)***	(0.032)***
Age^2	-0.004	-0.003	-0.004
	(0.000)***	(0.000)***	(0.000)***
Higher education	0.636	0.075	0.322
	(0.184)***	(0.221)	(0.173)*
Constant	-4.733	-4.766	-4.051
	(0.553)***	(0.649)***	(0.501)***
Observations	2853	2853	2853
Pseudo-R2	0.14		
NN is the base outcome			
Standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%			

Table A2. Multinomial logit – 5 states

Transitions from formal salaried employment (F)				
	FS	FI	FU	FN
Female	-1.601	-0.236	0.135	0.355
	(0.653)**	(0.269)	(0.212)	(0.160)**
N. formal in household	-0.716	-0.066	-0.158	-0.001
	(0.411)*	(0.164)	(0.141)	(0.098)
Age	0.285	0.070	0.171	-0.169
	(0.235)	(0.085)	(0.074)**	(0.039)***
Age^2	-0.005	-0.001	-0.002	0.002
	(0.003)	(0.001)	(0.001)**	(0.000)***
Higher education	-0.271	-0.898	-0.721	-0.448
	(0.517)	(0.265)***	(0.211)***	(0.157)***
Tenure	-0.096	-0.252	-0.108	-0.043
	(0.089)	(0.060)***	(0.033)***	(0.021)**
$Tenure^2$ /100	0.436	0.468	0.267	0.105
	(0.293)	(0.223)**	(0.102)***	(0.051)**
Constant	-6.744	-2.316	-4.917	0.234
	(3.764)*	(1.418)	(1.336)***	(0.776)
Observations	2687	2687	2687	2687
Pseudo-R2	0.08			
FF is the base outcome				
Transitions from informal self employment (S)				
	SF	SI	SU	SN
Female	-1.482	-1.019	0.242	0.617
	(1.191)	(0.897)	(0.771)	(0.881)
N. formal in household	0.330	0.975	0.740	0.339
	(0.626)	(0.476)**	(0.441)*	(0.508)
Age	0.678	-0.149	0.229	-0.320
	(0.397)*	(0.242)	(0.224)	(0.215)
Age^2	-0.011	0.002	-0.003	0.004
	(0.006)*	(0.003)	(0.003)	(0.003)
Higher education	-1.680	0.789	-0.148	0.201
	(0.946)*	(0.838)	(0.776)	(0.886)
Tenure	0.363	0.022	0.509	0.468
	(0.469)	(0.286)	(0.659)	(0.732)
$Tenure^2$ /100	-5.042	-0.621	-13.507	-11.446
	(5.051)	(2.141)	(11.157)	(11.967)
Constant	-10.599	-0.391	-5.672	2.849
	(6.327)*	(4.004)	(4.038)	(3.640)
Observations	106	106	106	106
Pseudo-R2	0.21			
SS is the base outcome				
Standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%				

Table A2. Multinomial logit – 5 states, continued

Transitions from informal salaried employment (I)				
	IF	IS	IU	IN
Female	-0.150	-1.402	0.405	0.309
	(0.463)	(0.962)	(0.781)	(0.767)
N. formal in household	0.985	0.669	0.361	0.526
	(0.304)***	(0.667)	(0.517)	(0.458)
Age	0.637	-1.169	-2.007	-0.815
	(0.473)	(1.199)	(1.125)*	(0.861)
Age^2	0.076	0.267	0.044	-0.391
	(0.153)	(0.412)	(0.200)	(0.180)**
Higher education	-0.001	-0.003	0.000	0.005
	(0.002)	(0.006)	(0.003)	(0.002)**
Tenure	0.044	2.514	0.542	1.347
	(0.487)	(1.351)*	(0.769)	(0.763)*
$Tenure^2$ /100	-0.429	0.691	-0.521	-0.195
	(0.250)*	(0.927)	(0.365)	(0.395)
Constant	-1.937	-8.731	-3.394	3.558
	(2.289)	(6.771)	(3.329)	(2.661)
Observations	142	142	142	142
Pseudo-R2	0.19			
II is the base outcome				
Transitions from unemployment (U)				
	UF	US	UI	UN
Female	0.057	-0.775	-0.337	0.703
	(0.220)	(0.549)	(0.302)	(0.220)***
N. formal in household	0.042	-0.392	-0.042	-0.270
	(0.142)	(0.381)	(0.196)	(0.148)*
Age	0.015	0.164	0.071	-0.182
	(0.064)	(0.159)	(0.089)	(0.055)***
Age^2	-0.001	-0.002	-0.001	0.002
	(0.001)	(0.002)	(0.001)	(0.001)***
Higher education	-0.001	-1.001	-0.693	-0.258
	(0.226)	(0.528)*	(0.307)**	(0.222)
Constant	-0.194	-4.587	-1.196	2.744
	(1.084)	(2.944)	(1.472)	(0.960)***
Observations	594	594	594	594
Pseudo-R2	0.04			
UU is the base outcome				
Standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%				

Table A2. Multinomial logit – 5 states, continued

Transitions from not in the labor force (N)				
	NF	NS	NI	NU
Female	-0.637	0.202	-0.527	-0.821
	(0.178)***	(0.354)	(0.276)*	(0.159)***
N. formal in household	0.006	-0.403	-0.219	-0.101
	(0.110)	(0.251)	(0.183)	(0.104)
Age	0.219	0.181	0.305	0.228
	(0.035)***	(0.060)***	(0.059)***	(0.032)***
Age^2	-0.003	-0.002	-0.005	-0.004
	(0.000)***	(0.001)***	(0.001)***	(0.000)***
Higher education	0.621	0.270	-0.130	0.316
	(0.187)***	(0.314)	(0.300)	(0.173)*
Constant	-4.547	-6.621	-6.217	-4.077
	(0.558)***	(1.145)***	(0.911)***	(0.501)***
Observations	2846	2846	2846	2846
Pseudo-R2	0.15			

NN is the base outcome

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table A3. Selection equation (multinomial logit) – 2003			
	Informally Employed	Unemployed	Not in the labor force
Female	-0.085	0.071	0.953
	(0.113)	(0.082)	(0.063)***
Age	-0.051	-0.071	-0.498
	(0.030)*	(0.022)***	(0.014)***
Age^2	0.000	0.000	0.006
	(0.000)	(0.000)	(0.000)***
Secondary	-0.327	-0.134	-0.608
	(0.132)**	(0.101)	(0.071)***
University	-1.038	-0.921	-1.564
	(0.201)***	(0.149)***	(0.103)***
N° of formal members in household	-0.394	-0.287	-0.202
	(0.080)***	(0.056)***	(0.040)***
Children<6	-0.827	-1.281	-0.691
	(0.724)	(0.556)**	(0.404)*
Children 6+	-0.181	-0.307	-0.307
	(0.537)	(0.418)	(0.304)
Children<6*Age	0.033	0.045	0.042
	(0.024)	(0.019)**	(0.014)***
Children 6+*Age	0.004	0.004	0.013
	(0.015)	(0.012)	(0.008)
Constant	0.095	0.962	8.156
	(0.519)	(0.377)**	(0.251)***
Observations	8180	8180	8180
Pseudo-R2	0.21		
Formally employed is the base outcome			
Standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%			

Table A4. Selection equation (multinomial logit) – 2004			
	Informally Employed	Unemployed	Not in the labor force
Female	-0.051	0.084	0.922
	(0.106)	(0.098)	(0.071)***
Age	-0.101	-0.116	-0.490
	(0.026)***	(0.024)***	(0.015)***
Age^2	0.001	0.001	0.006
	(0.000)**	(0.000)***	(0.000)***
Secondary	-0.770	-0.291	-0.689
	(0.123)***	(0.126)**	(0.084)***
University	-1.790	-1.019	-1.587
	(0.207)***	(0.176)***	(0.116)***
N° of formal members in household	-0.526	-0.299	-0.231
	(0.078)***	(0.065)***	(0.044)***
Children<6	-0.847	0.321	-0.552
	(0.713)	(0.696)	(0.436)
Children 6+	0.212	-0.201	-0.100
	(0.465)	(0.469)	(0.359)
Children<6*Age	0.029	-0.013	0.041
	(0.024)	(0.025)	(0.015)***
Children 6+*Age	-0.001	0.006	0.003
	(0.013)	(0.013)	(0.010)
Constant	1.673	1.567	8.055
	(0.468)***	(0.428)***	(0.282)***
Observations	6634	6634	6634
Pseudo-R2	0.22		
Formally employed is the base outcome			
Standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%			

Table A5. Determinants of log earnings – 2003 OLS with selection			
	All	Informal	Formal
Female	-0.200	-0.213	-0.195
	(0.024)***	(0.151)	(0.028)***
Age	0.005	-0.007	0.001
	(0.008)	(0.050)	(0.013)
Age^2	-0.000	0.000	-0.000
	(0.000)	(0.001)	(0.000)
Secondary	0.059	0.013	0.068
	(0.031)*	(0.124)	(0.035)*
University	0.319	0.302	0.324
	(0.045)***	(0.229)	(0.059)***
Tenure	0.006	0.015	0.008
	(0.003)*	(0.041)	(0.003)**
$Tenure^2/100$	-0.013	-0.313	-0.017
	(0.010)	(0.300)	(0.010)*
Choice Informality		0.038	
		(0.115)	
Self Employed		0.034	0.194
		(0.147)	(0.111)*
Part time	0.186	0.340	0.131
	(0.051)***	(0.157)**	(0.053)**
Positive Δ^a	0.428	0.503	0.430
	(0.086)***	(0.116)***	(0.087)***
Negative Δ^b	-0.657	-0.855	-0.650
	(0.056)***	(0.341)**	(0.057)***
occupation4	-0.169	-0.216	-0.166
	(0.039)***	(0.286)	(0.039)***
occupation5	-0.277	-0.504	-0.231
	(0.048)***	(0.205)**	(0.049)***
occupation6	-0.313	-0.244	-0.328
	(0.101)***	(0.429)	(0.102)***
occupation7	-0.087	-0.297	-0.072
	(0.037)**	(0.247)	(0.037)*
occupation8	-0.086	-0.001	-0.092
	(0.048)*	(0.235)	(0.049)*
occupation9	-0.273	-0.345	-0.268
	(0.035)***	(0.201)*	(0.034)***
Mining Manufacturing	0.542	0.901	0.494
	(0.045)***	(0.209)***	(0.047)***
Electricity Gas Water	0.552	0.000	0.513
	(0.059)***	(0.000)	(0.059)***
Construction	0.418	0.662	0.380
	(0.069)***	(0.248)***	(0.069)***
Trade Hotels Repair	0.385	0.723	0.297
	(0.057)***	(0.196)***	(0.060)***
Transport Communication	0.536	0.860	0.491
	(0.052)***	(0.231)***	(0.053)***
Financial Real Estate	0.432	0.263	0.414
	(0.080)***	(0.298)	(0.083)***
Education Health Social services	0.164	1.211	0.123
	(0.042)***	(0.247)***	(0.043)***
Other Service Activities	0.332	0.532	0.291
	(0.055)***	(0.221)**	(0.057)***
Other Activities	0.232	0.707	0.130
	(0.115)**	(0.417)*	(0.118)
State	-0.042	0.105	-0.022

	(0.039)	(0.272)	(0.041)
Cooperative	-0.551	-0.572	-0.527
	(0.091)***	(0.263)**	(0.105)***
Privatized	-0.088	-0.482	-0.045
	(0.044)**	(0.175)***	(0.046)
Center North	-0.332	-0.511	-0.327
	(0.042)***	(0.219)**	(0.042)***
South	-0.250	-0.357	-0.254
	(0.043)***	(0.197)*	(0.045)***
East	-0.253	-0.368	-0.250
	(0.039)***	(0.193)*	(0.040)***
West	-0.234	-0.305	-0.235
	(0.042)***	(0.231)	(0.042)***
lambda1	-0.037		
	(0.038)		
lambda21		-0.291	
		(0.535)	
lambda11			-0.054
			(0.083)
Constant	0.531	1.190	0.612
	(0.184)***	(1.725)	(0.311)**
Observations	3145	262	2883
R-squared	0.31	0.30	0.32

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received
[b] wage arrears or other unexpected decrease in monthly earnings received

Table A6. Determinants of log earnings – 2004 OLS with selection			
	All	Informal	Formal
Female	-0.215	-0.046	-0.210
	(0.029)***	(0.117)	(0.034)***
Age	0.005	-0.034	0.001
	(0.009)	(0.035)	(0.016)
Age^2	-0.000	0.000	-0.000
	(0.000)	(0.001)	(0.000)
Secondary	0.120	0.184	0.105
	(0.036)***	(0.114)	(0.043)**
University	0.429	0.282	0.422
	(0.053)***	(0.192)	(0.071)***
Tenure	0.006	-0.009	0.007
	(0.002)***	(0.016)	(0.002)***
$Tenure^2/100$	-0.006	0.009	-0.007
	(0.002)***	(0.015)	(0.002)***
Choice Informality		0.218	
		(0.114)*	
Self Employed		0.342	0.092
		(0.152)**	(0.132)
Part time	0.136	0.419	0.034
	(0.073)*	(0.204)**	(0.073)
Positive Δ^a	0.416	0.000	0.411
	(0.138)***	(0.000)	(0.137)***
Negative Δ^b	-0.684	-0.693	-0.645
	(0.093)***	(0.365)*	(0.095)***
occupation4	-0.183	0.115	-0.175
	(0.046)***	(0.306)	(0.046)***
occupation5	-0.309	-0.225	-0.288
	(0.062)***	(0.208)	(0.067)***
occupation6	-0.435	0.544	-0.491
	(0.112)***	(0.267)**	(0.115)***
occupation7	-0.054	0.281	-0.063
	(0.042)	(0.203)	(0.041)
occupation8	-0.116	0.231	-0.114
	(0.055)**	(0.327)	(0.055)**
occupation9	-0.378	-0.237	-0.338
	(0.042)***	(0.187)	(0.041)***
Mining Manufacturing	0.398	0.422	0.394
	(0.049)***	(0.200)**	(0.049)***
Electricity Gas Water	0.255	0.000	0.258
	(0.061)***	(0.000)	(0.061)***
Construction	0.385	0.398	0.386
	(0.071)***	(0.226)*	(0.069)***
Trade Hotels Repair	0.268	0.418	0.233
	(0.063)***	(0.182)**	(0.068)***
Transport Communication	0.360	0.028	0.360
	(0.056)***	(0.317)	(0.056)***
Financial Real Estate	0.242	0.889	0.246
	(0.085)***	(0.232)***	(0.084)***
Education Health Social services	0.112	0.238	0.100
	(0.047)**	(0.279)	(0.046)**
Other Service Activities	0.227	0.633	0.166
	(0.063)***	(0.232)***	(0.061)***
Other Activities	0.050	1.104	-0.167
	(0.233)	(0.453)**	(0.187)
State	0.035	-0.191	0.065
	(0.041)	(0.257)	(0.042)
Cooperative	0.034	0.663	-0.008
	(0.205)	(0.230)***	(0.216)
Privatized	-0.011	-0.041	0.020
	(0.042)	(0.132)	(0.045)
Center North	-0.345	-0.566	-0.320
	(0.062)***	(0.183)***	(0.064)***
South	-0.299	-0.567	-0.260
	(0.067)***	(0.195)***	(0.069)***
East	-0.336	-0.469	-0.317
	(0.059)***	(0.165)***	(0.061)***
West	-0.318	-0.360	-0.305
	(0.063)***	(0.203)*	(0.065)***

lambda2	-0.041		
	(0.047)		
lambda22		-0.282	
		(0.273)	
lambda12			-0.102
			(0.096)
Constant	0.804	1.660	0.867
	(0.224)***	(0.940)*	(0.386)**
Observations	2475	317	2217
R-squared	0.27	0.28	0.29

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received
[b] wage arrears or other unexpected decrease in monthly earnings received

Table A7. Determinants of log earnings – 2003 Robust regression			
	All	Informal	Formal
Female	-0.192	-0.184	-0.200
	(0.021)***	(0.107)*	(0.021)***
Age	0.012	0.012	0.013
	(0.005)**	(0.026)	(0.005)**
Age^2	-0.000	-0.000	-0.000
	(0.000)***	(0.000)	(0.000)***
Secondary	0.066	-0.077	0.090
	(0.026)***	(0.117)	(0.026)***
University	0.320	0.080	0.351
	(0.034)***	(0.177)	(0.035)***
Tenure	0.005	0.015	0.007
	(0.003)*	(0.038)	(0.003)**
$Tenure^2/100$	-0.005	-0.216	-0.009
	(0.008)	(0.297)	(0.008)
Choice Informality		0.097	
		(0.129)	
Self Employed		-0.017	0.049
		(0.137)	(0.066)
Part time	0.109	0.494	0.063
	(0.041)***	(0.168)***	(0.043)
Positive Δ^a	0.369	0.475	0.360
	(0.070)***	(0.726)	(0.068)***
Negative Δ^b	-0.591	-0.569	-0.574
	(0.037)***	(0.255)**	(0.037)***
occupation4	-0.175	-0.337	-0.171
	(0.039)***	(0.299)	(0.038)***
occupation5	-0.292	-0.513	-0.266
	(0.042)***	(0.189)***	(0.045)***
occupation6	-0.286	-0.284	-0.306
	(0.070)***	(0.294)	(0.073)***
occupation7	-0.064	-0.376	-0.052
	(0.032)**	(0.213)*	(0.032)
occupation8	-0.064	-0.012	-0.070
	(0.045)	(0.349)	(0.044)
occupation9	-0.290	-0.500	-0.268
	(0.030)***	(0.161)***	(0.031)***
Mining Manufacturing	0.463	0.637	0.416
	(0.036)***	(0.216)***	(0.037)***
Electricity Gas Water	0.465	0.000	0.426
	(0.057)***	(0.000)	(0.056)***
Construction	0.397	0.770	0.339
	(0.053)***	(0.197)***	(0.057)***
Trade Hotels Repair	0.277	0.467	0.242
	(0.043)***	(0.157)***	(0.048)***
Transport Communication	0.447	0.718	0.413
	(0.044)***	(0.393)*	(0.044)***
Financial Real Estate	0.379	-0.041	0.366
	(0.075)***	(0.556)	(0.075)***
Education Health Social services	0.088	1.011	0.052
	(0.036)**	(0.399)**	(0.037)
Other Service Activities	0.231	0.329	0.199
	(0.045)***	(0.202)	(0.047)***
Other Activities	0.142	0.555	0.058
	(0.111)	(0.388)	(0.118)
State	-0.061	0.119	-0.055
	(0.030)**	(0.398)	(0.034)
Cooperative	-0.541	-0.431	-0.545
	(0.127)***	(0.360)	(0.146)***
Privatized	-0.099	-0.332	-0.071
	(0.037)***	(0.214)	(0.040)*
Center North	-0.305	-0.514	-0.296
	(0.038)***	(0.220)**	(0.038)***
South	-0.254	-0.470	-0.244
	(0.040)***	(0.215)**	(0.040)***

East	-0.233	-0.444	-0.220
	(0.036)***	(0.211)**	(0.036)***
West	-0.239	-0.515	-0.227
	(0.038)***	(0.227)**	(0.038)***
Constant	0.440	0.811	0.402
	(0.108)***	(0.540)	(0.114)***
Observations	3174	262	2885
R-squared	0.31	0.30	0.32

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received
[b] wage arrears or other unexpected decrease in monthly earnings received

Table A8. Determinants of log earnings – 2004 Robust regression			
	All	Informal	Formal
Female	-0.228	-0.083	-0.235
	(0.025)***	(0.103)	(0.025)***
Age	0.009	-0.017	0.015
	(0.005)*	(0.022)	(0.006)***
Age^2	-0.000	0.000	-0.000
	(0.000)**	(0.000)	(0.000)***
Secondary	0.140	0.164	0.137
	(0.031)***	(0.098)*	(0.034)***
University	0.433	0.174	0.436
	(0.042)***	(0.187)	(0.043)***
Tenure	0.008	-0.002	0.008
	(0.002)***	(0.014)	(0.002)***
$Tenure^2/100$	-0.008	0.002	-0.008
	(0.002)***	(0.013)	(0.002)***
Choice Informality		0.154	
		(0.109)	
Self Employed		0.339	0.007
		(0.127)***	(0.073)
Part time	0.099	0.502	-0.019
	(0.050)**	(0.158)***	(0.054)
Positive Δa	0.484	0.000	0.484
	(0.140)***	(0.000)	(0.132)***
Negative Δb	-0.748	-0.803	-0.730
	(0.062)***	(0.290)***	(0.061)***
occupation4	-0.170	0.132	-0.164
	(0.045)***	(0.291)	(0.044)***
occupation5	-0.347	-0.256	-0.312
	(0.048)***	(0.176)	(0.053)***
occupation6	-0.365	0.660	-0.409
	(0.091)***	(0.755)	(0.089)***
occupation7	-0.032	0.291	-0.046
	(0.037)	(0.178)	(0.038)
occupation8	-0.122	0.338	-0.136
	(0.048)**	(0.301)	(0.047)***
occupation9	-0.327	-0.225	-0.296
	(0.035)***	(0.148)	(0.037)***
Mining Manufacturing	0.409	0.575	0.384
	(0.040)***	(0.178)***	(0.042)***
Electricity Gas Water	0.321	0.000	0.298
	(0.063)***	(0.000)	(0.062)***
Construction	0.431	0.616	0.390
	(0.056)***	(0.173)***	(0.064)***
Trade Hotels Repair	0.315	0.562	0.239
	(0.049)***	(0.162)***	(0.055)***
Transport Communication	0.393	0.124	0.375
	(0.048)***	(0.320)	(0.049)***
Financial Real Estate	0.323	0.990	0.294
	(0.086)***	(0.752)	(0.084)***
Education Health Social services	0.110	0.390	0.076
	(0.041)***	(0.369)	(0.042)*
Other Service Activities	0.237	0.634	0.176
	(0.053)***	(0.193)***	(0.056)***
Other Activities	-0.052	0.893	-0.143
	(0.159)	(0.389)**	(0.184)
State	0.017	-0.205	0.008
	(0.032)	(0.259)	(0.036)
Cooperative	0.160	0.793	0.092
	(0.148)	(0.748)	(0.148)
Privatized	-0.013	-0.063	-0.017
	(0.034)	(0.152)	(0.039)
Center North	-0.307	-0.628	-0.291
	(0.057)***	(0.225)***	(0.058)***
South	-0.269	-0.502	-0.262
	(0.061)***	(0.230)**	(0.062)***

East	-0.296	-0.448	-0.294
	(0.056)***	(0.217)**	(0.057)***
West	-0.313	-0.379	-0.324
	(0.058)***	(0.236)	(0.059)***
Constant	0.615	0.817	0.525
	(0.125)***	(0.473)*	(0.133)***
Observations	2584	326	2242
R-squared	0.32	0.33	0.33

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received
[b] wage arrears or other unexpected decrease in monthly earnings received

Table A9. Determinants of log earnings – 2003 Quantile (median) regression			
	All	Informal	Formal
Female	-0.180	-0.173	-0.189
	(0.029)***	(0.152)	(0.030)***
Age	0.015	0.024	0.014
	(0.007)**	(0.032)	(0.007)**
Age^2	-0.000	-0.000	-0.000
	(0.000)***	(0.000)	(0.000)**
Secondary	0.070	-0.018	0.094
	(0.027)***	(0.153)	(0.034)***
University	0.321	0.058	0.359
	(0.043)***	(0.208)	(0.042)***
Tenure	0.002	-0.002	0.005
	(0.004)	(0.049)	(0.005)
$Tenure^2/100$	-0.001	-0.034	-0.009
	(0.009)	(0.416)	(0.013)
Choice Informality		0.193	
		(0.146)	
Self Employed		0.173	0.119
		(0.199)	(0.146)
Part time	0.092	0.418	0.057
	(0.069)	(0.189)**	(0.081)
Positive Δ^a	0.389	0.457	0.383
	(0.111)***	(0.272)*	(0.123)***
Negative Δ^b	-0.626	-0.670	-0.615
	(0.060)***	(0.429)	(0.061)***
occupation4	-0.171	-0.419	-0.155
	(0.045)***	(0.517)	(0.044)***
occupation5	-0.249	-0.315	-0.224
	(0.058)***	(0.294)	(0.055)***
occupation6	-0.279	-0.365	-0.289
	(0.080)***	(0.828)	(0.081)***
occupation7	-0.043	-0.180	-0.036
	(0.039)	(0.355)	(0.043)
occupation8	-0.014	0.073	-0.030
	(0.059)	(0.368)	(0.057)
occupation9	-0.271	-0.370	-0.253
	(0.035)***	(0.286)	(0.036)***
Mining Manufacturing	0.472	0.719	0.407
	(0.044)***	(0.286)**	(0.049)***
Electricity Gas Water	0.416		0.381
	(0.062)***		(0.070)***
Construction	0.339	0.769	0.271
	(0.084)***	(0.320)**	(0.078)***
Trade Hotels Repair	0.225	0.537	0.160
	(0.061)***	(0.233)**	(0.062)***
Transport Communication	0.437	0.817	0.391
	(0.063)***	(0.363)**	(0.065)***
Financial Real Estate	0.347	0.151	0.316
	(0.087)***	(0.459)	(0.090)***
Education Health Social services	0.044	1.010	-0.007
	(0.045)	(0.391)**	(0.042)
Other Service Activities	0.156	0.334	0.132
	(0.061)**	(0.313)	(0.065)**
Other Activities	0.028	1.107	-0.033
	(0.192)	(0.718)	(0.198)
State	-0.075	0.101	-0.068
	(0.047)	(0.431)	(0.061)
Cooperative	-0.414	-0.305	-0.492
	(0.151)***	(0.376)	(0.166)***
Privatized	-0.179	-0.339	-0.146
	(0.053)***	(0.205)*	(0.064)**
Center North	-0.295	-0.529	-0.300
	(0.055)***	(0.290)*	(0.054)***
South	-0.237	-0.419	-0.231
	(0.053)***	(0.274)	(0.055)***

East	-0.218	-0.481	-0.210
	(0.051)***	(0.260)*	(0.052)***
West	-0.204	-0.513	-0.207
	(0.053)***	(0.302)*	(0.055)***
Constant	0.378	0.342	0.390
	(0.139)***	(0.773)	(0.147)***
Observations	3174	262	2885
Pseudo-R2	0.18	0.22	0.19

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received
[b] wage arrears or other unexpected decrease in monthly earnings received

Table A10. Determinants of log earnings – 2004 Quantile (median) regression			
	All	Informal	Formal
Female	-0.244	-0.148	-0.248
	(0.027)***	(0.143)	(0.032)***
Age	0.009	-0.022	0.015
	(0.007)	(0.031)	(0.007)**
Age^2	-0.000	0.000	-0.000
	(0.000)**	(0.000)	(0.000)***
Secondary	0.115	0.142	0.115
	(0.037)***	(0.112)	(0.035)***
University	0.421	0.192	0.455
	(0.054)***	(0.185)	(0.047)***
Tenure	0.008	-0.000	0.007
	(0.002)***	(0.023)	(0.002)***
$Tenure^2/100$	-0.008	0.001	-0.007
	(0.002)***	(0.023)	(0.002)***
Choice Informality		0.156	
		(0.149)	
Self Employed		0.248	0.079
		(0.157)	(0.099)
Part time	0.110	0.522	0.033
	(0.064)*	(0.269)*	(0.066)
Positive Δ^a	0.452		0.455
	(0.162)***		(0.179)**
Negative Δ^b	-0.658	-1.117	-0.631
	(0.142)***	(0.603)*	(0.158)***
occupation4	-0.130	0.471	-0.112
	(0.043)***	(0.403)	(0.046)**
occupation5	-0.299	-0.124	-0.289
	(0.047)***	(0.280)	(0.053)***
occupation6	-0.305	0.542	-0.320
	(0.125)**	(0.412)	(0.117)***
occupation7	-0.019	0.336	-0.025
	(0.039)	(0.268)	(0.038)
occupation8	-0.099	0.347	-0.100
	(0.047)**	(0.398)	(0.047)**
occupation9	-0.305	-0.229	-0.270
	(0.032)***	(0.224)	(0.035)***
Mining Manufacturing	0.439	0.479	0.422
	(0.042)***	(0.240)**	(0.049)***
Electricity Gas Water	0.358		0.318
	(0.055)***		(0.061)***
Construction	0.433	0.526	0.418
	(0.075)***	(0.274)*	(0.073)***
Trade Hotels Repair	0.316	0.468	0.273
	(0.060)***	(0.253)*	(0.069)***
Transport Communication	0.468	0.116	0.439
	(0.048)***	(0.457)	(0.053)***
Financial Real Estate	0.335	0.825	0.274
	(0.088)***	(0.554)	(0.086)***
Education Health Social services	0.126	0.566	0.104
	(0.040)***	(0.456)	(0.042)**
Other Service Activities	0.234	0.502	0.188
	(0.064)***	(0.313)	(0.061)***
Other Activities	0.017	0.114	-0.058
	(0.223)	(0.901)	(0.295)
State	0.001	-0.233	0.027
	(0.035)	(0.412)	(0.041)
Cooperative	0.036	0.785	0.038
	(0.349)	(0.437)*	(0.361)
Privatized	-0.024	-0.093	0.009
	(0.037)	(0.167)	(0.042)
Center North	-0.335	-0.683	-0.298
	(0.069)***	(0.273)**	(0.060)***
South	-0.325	-0.529	-0.281
	(0.070)***	(0.264)**	(0.066)***
East	-0.319	-0.515	-0.301
	(0.065)***	(0.238)**	(0.061)***
West	-0.338	-0.497	-0.326
	(0.068)***	(0.322)	(0.065)***

Constant	0.645	0.980	0.475
	(0.148)***	(0.632)	(0.163)***
Observations	2584	326	2242
Pseudo-R2	0.18	0.19	0.19

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received
[b] wage arrears or other unexpected decrease in monthly earnings received

Chapter 3

Labor Market Segmentation and Gender Wage Gap in Ukraine[30].

[30] Financial support from the European Commission within the framework 6 project "Economic and Social Consequences of Industrial Restructuring in Russia and Ukraine (ESCIRRU)" is acknowledged.

3.1. Introduction

Segmentation of labor markets has been a subject of debate for labor and development economists for a long time. In his famous survey Cain(1976), summarizing the challenges raised by the theories of Segmented Labor Markets (SLM from here on) to the classical and neoclassical schools of labor economics, goes back until the end of the 19th century quoting John Stuart Mills as one of the first economists aknowledging the segmentation of the labor markets together with the existence of persistent wage differentials among different groups of workers.

Since then several of the issues raised by the SLM theorists' have stayed in the research agenda, as those issues remain important despite the historical and economic changes that have taken place all over the world. In particular, over the last decade there has been a revival of research on informal employment and labor market segmentation in developing countries, generating a lively debate about the interpretation of the nature of informal employment. At the same time, the persistence of the gender wage gap at the world level[31] has been indicated as one of the most important obstacles to the reduction of poverty.

These two different aspects of SLM theories might look , at a first glance, not so closely related. Indeed, the existing literature has studied them mostly independently from each other. However, there are reasons to believe that it might not be the case.

Labor market segmentation can be characterized as a situation in which people working in some jobs or in some sectors experience difference in earnings and enjoy different levels of protection and sets of opportunities with respect to others with similar productivity. To have labor market segmentation, however, we need also this situation to be "rigid", that is, these differences must persist and it must be difficult for the disadvantaged workers to move to the "good" jobs or segments of the market.

[31] A very recent ILO study finds that "in most economies, women still earn 90 per cent or less of what their male co-workers earn" ILO (2007) .

Segmentation translates then into dramatically different levels of vulnerability which make some individuals much more likely to end up in a state of poverty and deprivation than others, especially in less developed countries, as labor is the main source of income for most poor people in the developing world (Fields (2006))[32].

If labor markets are becoming more segmented , such increase in segmentation is then likely to affect negatively the most vulnerable groups among workers. Women are one of these groups[33]. Past research, in fact, tells us that women tend to be more vulnerable than men, showing lower participation rates and, even when they do enter the labor market, to earn less and to advance more slowly in their career.

It follows from this that, if we are to fully understand the nature and the reasons of the persistence of the gender wage gap we have to take into account also the impact that the existence of different sectors in the labor market (formal and informal) has on this measure.

Research on informal employment in transition countries has been very limited, above all because of a lack of appropriate data. On the other side, there have been several works studying the extent of of the gender gap in earnings, both at the beginning and in the subsequent phases of transition.

This paper is probably the first attempt to analyze jointly and thoroughly labor market segmentation and the gender wage gap in the context of a country in transition. Using the data of the two available waves of the ULMS (2003 and 2004) I am going to identify the patterns characterizing male and female employment, both in terms of mobility across labor market states and in terms of earnings, in an attempt to establish the extent to which labor market segmentation appears to influence the relative positions of the two genders in terms of wages. There might be reasons to believe that it might be insightful to study them jointly.

[32] This is an especially worrying consequence of segmentation, as a recent ILO report (ILO, 2006), the types of jobs that have been created worldwide in the last years have been mostly 'bad' jobs – insecure, low-paid, precarious – which fail to provide workers and their households enough income to escape poverty.

[33] It is not an accident that Standing (1999) referred to the 'downward' convergence of male and female employment patterns calling this process 'global feminization'.

This chapter begins with a desctription of the the debate about the nature of the informal labor market; of how economic theory envisions the relationship between women and the informal sector and what are the hypotheses to be test. In section 3 we will introduce the data used. In section 4 we will see the determinants of informality and the patterns of mobility in the Ukrainian labor markets. In section 5 I will explore the links between earnings, employment status and gender differentials. Finally, in section 6, I will conclude.

3.2. The debate about the informal labor market under a gender perspective

3.2.1 The debate about the nature of the informal labor market

The discussion of labour market segmentation dates back to the post-world war period (Roy, 1951; Lewis, 1954; Doeringer and Piore, 1971). In the last decade, it has been the subject of a renewed debate, mainly in the context of developing countries (see Fields, 2005, for a recent review) .

Traditionally, the formal sector has been characterized as the "good" sector, in which jobs give right to higher pay, more security, better working conditions and better opportunities for advancement. The primary/formal sector coexists, according to the "traditional" school with a secondary/informal one providing no benefits, protections or guarantees, little or no chances of promotion, poor working conditions and low pay. To have segmentation, limited (and asymmetrical) mobility has to exist between the "restricted access" formal sector and the "free entry" informal sector. In this traditional view, then, people in the secondary/informal sector find it extremely difficult to move to the formal sector. It is this separation that justifies different remuneration of factors in the two sectors. For example, the formal sector has always been associated with higher remuneration of human capital characteristics with respect to the informal one where human capital appears to be less remunerated.

The evolution of the debate, however, has led to a shift in the focus of the analysis from the comparison between formal and informal sector to a more detailed study of the features

characterizing the informal part of the labor market. It is now recognized by most economists that informal jobs are not all identical and that some informal jobs might be actually preferable to some formal ones. The main debate now is on the extent to which informality is *chosen* rather than accepted as the only alternative to unemployment and on the freedom to move across the different sectors[34].

According to the first of the two "revisionist" schools of thought that have emerged, (see for example Maloney 1999, 2004), the movement across the two segments of the labor market (formal and informal) is generally believed to be free. If this is true, most workers are choosing informal employment instead of formal employment as they (given their personal characteristics and preferences) get higher utility from working in an informal job than in a formal one. According to this interpretation, then, taking into account worker characteristics and preferences, labor market segmentation would not exist or would be negligible and formal sector jobs would not be "superior" to informal ones.

The other main "revisionist" school argues instead that the freedom of movement between different segments of the labor market is still limited and the share of individuals forced to stay in "bad" jobs despite their personal characteristics and preferences is not negligible. The distinction between formal and informal jobs however does not correspond anymore to the distinction between "good" and "bad" jobs, as the informal sector itself is segmented, characterized by the simultaneous presence of "upper tier" (restricted access) jobs and "lower tier" (free entry) jobs. Upper tier informal jobs in terms of utility are now almost indistinguishable from (and sometimes preferable to) formal ones, while lower tier informal jobs constitute the "truly disadvantaged" segment (see, e.g., Fields, 1990, 2006).

3.2.2 Informal labor market and gender

If labor market are segmented, with limited possibility of movement between the "free entry / low quality" jobs and the "restricted / high quality" jobs, men and women might be hit differently if they

[34] Here I will only sketch the main differences between the differents school of thoughts. For a more detailed exposition, see Lehmann and Pignatti (2007).

had different propensity to enter one or the other segment of the labor marked. Indeed, several possible explanations have been offered about why women might be more present in the informal sector than men. Among these we find supply side explanations and demand side explanations. An interesting development of the literature on gender differences in the labor markets distinguishes also between the horizontal and the vertical dimension of occupational segregation.

Supply side

It has been suggested that women may actually prefer working in the informal sector because it offers the flexibility they need (in terms of working time, work location, seasonal patterns, etc.) to be able to combine paid work and homework and nurturing activities. This argument goes back to the theory of compensating differentials. According to this theory, workers are ready to trade-off part of their wage for what they consider more desirable working conditions – in the case of women, for greater flexibility (Maloney, 2004). If this is the case, Maloney argues, the provision of social support to informal workers becomes less compelling than traditionally has been assumed.

A number of studies has shown that some variables such as marriage, the number of children and the presence of other women in the household affect the decision to work outside the household *vs.* at home for women and not for men (Amuedo-Dorantes, 2004; Das, 2003; Gallaway and Bernasek, 2002 among others). Marriage and the number of children decrease the probability of entering the labor force while the presence of other women or the lack of a male in the household increase this probability. The presence of children increases the probability of working in the informal sector for women but it is either non-significant or has a negative effect for men, while a higher number of adults in the household is generally associated with a lower probability of informal employment for women (Amuedo-Dorantes, 2004; Das, 2003; Funkhouser, 1996; Gallaway and Bernasek, 2002). This evidence suggests that women may be willing to participate in informal employment as a way to better combine participation in the labor market and household responsibilities. However, this does not exclude that in an ideal world with a broader range of options (as the possibility to engage in flexible forms of *formal* employment or in the presence of family-friendly policies aiming at

reconciling paid and unpaid work) they would still prefer to work in the informal sector, especially if this was associated with a wage penalty.

Demand side

There might also be demand-side motivations for a concentration of women in the informal sector. Traditional employers' discrimination theories are the "taste for discrimination" (Becker, 1957) and the "statistical discrimination" (Phelps, 1972). According to the former, employers prefer men to women, either because working with women creates a disutility to male employees, or because being served by a woman creates a disutility to customers. Statistical discrimination instead exists when employers, in a context where the productivity of each single worker is not known a-priori, prefer to hire men because they are on average more productive. Both types of discrimination can explain why men may be preferred to women for jobs in the formal sector but none of these explanations is compatible with persisting discrimination in the long-run, when competition favours employers who do not discriminate (in the case of the taste for discrimination theory) or better information allows employers to hire productive women (in the case of the statistical discrimination theory).

Other possible demand-side explanations of discrimination are based on the higher hiring costs of women with respect to men. Women could be forced to accept informal jobs because the employers in the formal labor market respond with cut in wages and employment discrimination practices to their higher costs, such as those related to mandatory leave legislation. Evidence of this type of legislation on the demand for women employees has been found in different works (World Bank, 2001; Paci, 2002). Finally, women can be also forced into the informal sector because of limited physical mobility because of social norms (Chen, 2001).

Horizontal versus vertical segregation and the "overcrowding" theory

So far we have seen reasons why women might be more likely to end up in the informal sector than men. However, this type of segregation (horizontal segregation) is not the only one possible. The

most recent literature distinguishes between two types of occupational segregation, one being the horizontal one we have discussed so far and the other being vertical segregation. Vertical segregation refers to the hierarchy or status of women within each occupation or sector, in particular to the fact that men are more likely to be in supervision/managerial positions within each occupation or sector (Hakim, 1992; Blackburn et al., 2001; Charles and Grusky, 1995).

It might be then that, not only are women concentrated in the informal sector, but that gender segmentation exists also within formal and informal employment.

This view is compatible with the "overcrowding" theory (Zellner, 1972; Bergmann 1971 and 1974), according to which women tend to be more concentrated in relatively few "female" occupations mostly in the secondary segment of the market. This would explain the existence of gender wage differentials both in the informal and in the formal sector with different degrees of competition men and women have to face.

3.2.3 Specificities of transition countries

The theories exposed in the previous sector where essentially thought for developed or developing countries. There are, however, several reasons to believe that the results obtained for developing countries might not hold necessarily in the case of transition countries.

First of all, the structure of the economy at the beginning of transition is much different from that of developing countries. While in developing countries we have a very underdeveloped industrial sector and several possibilities to engage in entrepreneurial activities, in transition countries the industrial sector at the beginning of the transition was already developed and organized in very large industrial conglomerates, with a very rigid and centrally planned system. Even after several years of transition, the industrial base of the economy tends to remain large, despite the growing role of the service sector and large firms still employ a large number of people.

From the individual point of view, on one side, individuals enjoyed of secure, life-long employment, on the other they had (especially in the former Soviet Union) no possibility to engage independently in entrepreneurial activity. Moreover, the labor force in socialist countries start with

much higher levels of human capital, with the large majority of the population having secondary education or higher education, a situation very different from the one we find in developing countries..

Looking more specifically at the situation of women in transition countries we find that females labor force were "encouraged" to participate to the labor force offering a "guarantee" of equal pay[35], generous maternity benefits and other incentives all aimed at this purpose. Even if this was only partially true in practice (there is evidence in the literature on transition countries that women tended to be segregated in some sectors of the economy and in certain types of occupation[36]), this led to participation rates much higher than those in developing, but also developed countries. Even nowadays, despite the reduction in female participation rates following the transition, levels of participation in ex-socialist countries remain relatively high. Generous maternity leave rules (allowing long periods of leave, more flexibility and monetary benefits to women with children) and protective legislation in general are still in place in several countries, together with anti-discriminatory legislation[37]. One might well argue that in the presence of such incentives and of a relatively small informal sector women might prefer a formal sector job rather than a job in the informal sector and that only those whose opportunities in the formal sector are extremely scarce might decide to move to the informal sector.

How might women in general and the gender wage differential be affected in the short or medium term when the control over the central planner breaks apart?

First of all we can expect a widening of the wage structure (with a change in the remuneration to observed and unobserved skills as well as rents), which is going to penalize those who occupy the lower part of the distribution[38]. However, since skills will be better remunerated than before the

[35] In reality, also under state socialism female-male wage differentials existed. However, women in socialist countries were performing certainly better than their counterparts in developing countries.
[36] Brainerd (2000); Newell and Reilly (1996).
[37] Among which we also find Ukraine, where gender discrimination is prohibited by article 24 of the constitution as documented in Ganguli and Terrell (2005)
[38] Brainerd (2000) suggests that this tended to be the case in socialist countries prior to the transition.

regime's switch and since women in general were generally more educated[39], this would tend to push the wage differential in the opposite direction.

A second channel through which the gender wage differential might be influenced is the changes in discriminatory behaviour by enterprises. Also in this case, however, it is unclear a priori whether discrimination should increase or decrease. On the one hand, employers might be more free to discriminate because of the end of state control. On the other hand, however, it might be true the opposite if market competition makes it too costly for them to discriminate.

A final differential effect could come from the existence of gender differences in risk-aversion. It is arguable that in a transition setting we might, expect on average a much lower average propensity to take up activities with riskier prospects (for example becoming self-employed or moving to the informal sector) than we would normally observe in a developing economy. This is due to the long-term experience of security and of lifetime employment during the Soviet era. Literature analyzing gender differences in risk aversion, women do appear to be more risk averse than men (see for example Chauvin and Ash (1994) , Powell, Ansic (1997) or Fehr-Duda, Gennaro, Schubert (2006)). If this is true, this should be reflected in patterns of mobility and, potentially, also on gender wage differentials as earnings dynamics differ in the two sectors. In this case, in contrast to what is predicted by theory in the case of developing countries, women could well prefer the security offered by the formal sector to the flexibility offered by the informal one.

3.2.4 Labor market segmentation on the gender wage gap in Ukraine: scope for analysis

The aim of this paper is to analyse the Ukrainian labor market from a gender perspective in order to understand:

- to what extent the evidence is in line with the predictions given by the theory about labor market segmentation in developing countries;
- how labor market segmentation, if it exists in Ukraine, contributes to the gender wage differential.

[39] Brainerd (2000).

This appears to be particularly relevant as, in the years under analysis the growth in the Ukrainian employment rate is driven mainly by the growth of the informal sector.

A first important issue to be tested is the overall existence of labor market segmentation when we look at the two genders separately. In other words, do the determinants of informality differ between men and women; are the patterns of mobility and of labor force participation similar or different between the two groups; can we say, after controlling for observable characteristics, that women are more likely to end up in the informal sector than men as it is suggested by the theory on informal labor markets in developing countries?

After analysing these aspects, we will move to the analysis of the wage gap in Ukraine. Is the existing gender wage gap in Ukraine (Ganguli and Terrell, 2005; Lehmann and Pignatti, 2007) due to the higher concentration of women in the informal segment of the labor market, which pays on average lower wages? Or are other factors important in the determination of this gap? For example, do different labor market segments remunerate observable characteristics of men and women in the same way or differently? Is there any evidence of unexplained factors having an important roles in determining the gender earnings differential?

3.3. Data and data issues

This work is based on the ULMS, a nationally representative survey, undertaken for the first time in the spring of 2003, when it was comprised of around 4,000 households and approximately 8,500 individuals. The second wave was administered between May and July of 2004, when sample sizes fell to 3,397 and 7,200 respectively. The Ukrainian Longitudinal Monitoring Survey (ULMS) is a household panel established to monitor Ukraine's path of transition from Communism to a market-oriented economy. The target of the household survey is the working age population, spanning years of age 15 to 70.

The household questionnaire contains items on the demographic structure of the household, its income and expenditure patterns together with living conditions.

The central data used in this paper are those from the individual questionnaire for the two reference weeks in 2003 and 2004. We can identify salaried workers and self-employed workers. Informality for salaried workers and self-employed in the main job held during the reference week is identified by the answer to specific questions[40]. With registration, salaried workers acquire several fringe benefits, pension rights as well as substantial job security, the latter at least on paper. It should be emphasized that in my analysis I am looking at informal employment relationships (job not registered in either informal or formal sector firms) rather than to employment in the informal sector (individuals working in informal sector firms).

For consistency with the analysis that is going to follow, I have chosen to identify four major labor market states:

- Formal employment (including formal salaried and formal self-employed);
- Informal employment(including informal salaried and informal self-employed);
- Unemployment;
- Out of the labor force.

Salaried employees are asked in the two reference weeks to give their last monthly net salary in Hryvnia. The self-employed are asked to give an estimate of net income for the last month preceding the reference week[41].

Like in all CIS countries, salaried workers in Ukraine have been confronted with wage arrears. While this phenomenon was less rampant in 2003 and 2004 than in the nineties, even in this period a substantial fraction of workers has reported to have received less than the contractual wage in the

[40] For expositional ease, the questions for the identification of informality are repeated from chapter 2. For salaried workers the question is: "Tell me, please, are you officially registered at this job, that is, on a work roster, work agreement, or contract". Salaried workers are subsequently asked: "Why aren't you officially registered at this job"? If the answer is that the employer did not want to register him/her, then the worker is classified as involuntarily informally employed. If the answer instead is that it was the worker who choose not to register or that he decided together with the employer, he/she is classified as voluntarily informally employed. For the self-employed there is a question on whether the activity is registered or not, which again allows us to identify informality. Informal activities of the self-employed are, of course, considered voluntary.

[41] Since in the ULMS is not available a measure of the capital used by the self-employed, I cannot include returns to capital in net monthly income. However, as suggested in Lehmann and Pignatti (2007) this component is not likely to be substantial in the Ukrainian context.

last month preceding the reference week. Some workers, on the other hand received more than the contractual wage in this month, since they were paid some of the previously withheld wages. In order to take into account the effects of these "disturbances", I include in the wage regressions a dummy variable for those whose last wage exceeds the contractual wage and a dummy variable for those whose last wage is less.

Another issue is represented by the non-normality of log hourly earnings. As in Lehmann and Pignatti (2007), Jarque-Bera (1980) tests of normality reject the null hypothesis in both years. This results remains true even when we disaggregate earnings by gender. With outliers trimmed the test rejects the null hypothesis of normality for 2003 and for 2004 for both genders. Consequently, in the wage regressions that I perform I still use the untrimmed log hourly earnings. To check whether the problem connected to non-normality is likely to affect significantly the results of the analysis I also estimate earnings functions using robust and quantile regressions. The main patterns remain broadly the same. However the results seem to indicate that at least in some case there might be some interesting difference between what happens in the center and the tails of the distribution. For this reason I will not only discuss the OLS wage equations (with and without correcting for selection), but also the results for the quantile regressions calculated at the tenth percentile, at the median and at the ninetieth percentile.

3.4. Informality and mobility between labor market states: differences across genders

3.4.1. Descriptive analysis

In table 1 we can see a first set of indicators showing how the two genders are distributed across the four labor market states, their participation rates and their share of the sample. In the last two columns we can see the ratio Formal/Informal for each gender and (for 2004) the percentage change in the ratio from the previous year.

In the Ukrainian working age population, women are more numerous than men. This is obviously true both in 2003 and in 2004, with women representing about 58 percent of the sample in both periods. When we look at the distribution across labor market states we can immediately see that women tend to participate to the labor force significantly less than men (51% against 65 % in both periods). In this respect Ukraine tends to show a similar behaviour to other countries, even thought the level of participation for both genders remains a bit higher than in most developing countries and (not surprisingly) more in line with participation rates of transition countries. On the other side, when we compare employment rates, we cannot identify a clear difference between men and women, with both groups around 83% in the first period and above 85% in the second period[42]. In this case the pattern is clearly different from that we find in developing countries, where women tend also to have lower employment rates.

Looking at the ratio of formal to informal employment by gender, we find a first interesting result indicating that the Ukrainian labor market behaves differently from what "standard" theories on gender would predict.

In Ukraine women show a greater Formal/Informal ratio than men in both the years under analysis and, even in a period where employment growth was mainly driven by the informal part of the economy (Lehmann, Kupets and Pignatti, 2005), they tend to move towards informality at roughly the same speed as men (the female F/I ratio drops by about 33% against 34% for men). This does not to indicate, at first sight, any preference for informality for women. We will investigate this issue further in the section on movements between labor market states.

When we look at the distribution of characteristics in the sample we can notice that the age of women in our sample is slightly higher than that of men and their educational attainments appear to be almost always better than those of men (the only exception being the share of women with

[42] 2003 and 2004 were years of a vigorous growth for Ukraine. This growth started already in 1998 but resulted in a reduction in unemployment only in 2004 (see Lehmann, Kupets and Pignatti, 2005).

university degree or higher in the informal sector in 2003 – 9% against 12% for men)[43]. The same is true also for tenure (again, women show an higher average tenure than men in all cases except in the informal sector in 2003). If we look at how many men and women choose an informal employment (both as salaried and as self-employed) it emerges that women do choose to go informal less than men in both periods, with a larger preference for self-employment. However, in both periods, the share of women choosing voluntarily to be informally employed (over the total of the informally employed) is only about 55%, about five percentage points less than men. It is important to note, anyway, that the fraction of voluntarily informal is pretty low in both years (especially among the salaried).

If we look at the individuals choosing to be informal salaried and at the self-employed we find that the patterns that we identified for the whole sample are the similar only to those for those choosing voluntarily to be informal salaried. They are instead somehow different when we look at the self-employed. While it remains true that women's mean age and tenure are higher than those of men, when we look at education we find a more complex pattern. For example, an higher proportion of men tends to have an university degree or higher with respect to women, with the exception of formal self employed in 2004 where the share of women with a university degree is 35% against 30% for men. If we consider the share of individuals with secondary education or higher, the pattern we have identified before seems to be respected.

Women and men appear to behave differently when we compare their work choices with their level of education. For both groups it is true that the higher share of most educated individuals appears in the formal sector of the economy. However, when we look at the choice of being informal salaried versus the choice of being informally self-employed we find that the share of women with university degree or higher is much higher among the informal salaried who voluntarily chose to become informal than among the informally self-employed, especially in 2004.

[43] This is certainly a consequence of the investment in public education that has taken place in this country and of the large exit from the workforce of less skilled women as reported by Ganguli and Terrel (2005).

The opposite is true for men and it becomes also more evident when we look at what happens in the second period.

In table 3 I report the mean and median earnings for males an females at the aggregate level as well as disaggregated by sector (formal/informal) for 2003 and 2004. Women appear to experience negative wage differentials with respect to men in both the formal and the informal sector, with the wage gap being larger in the formal sector in 2003 and in the informal sector in 2004. The mean and median earning differentials range between 22 and 29 percent in 2003 and between 24 and 36 percent in 2004.

If we look at the distribution of men and women across sectors and occupations (tables 4 and 5), we find evidence that both groups tend to be more present in the sectors identified by the literature analyzing labor markets of transition countries after the fall of the Soviet Union (Fong and Paul, 1992; Brainerd, 2000). Employed women are concentrated in Services (which include Health and Education sectors) both in the informal sectors, while men are more evenly distributed. The second largest sectors in terms of concentration of women are industry in the formal sector and agriculture in the informal sector. In particular, in the second period (2004) an unexpected change takes place, with the share of women employed in the informal service sector dropping from 55% of total employment to 49% and the share of women in informal agriculture rising from 24% to 34%. Men behave differently, with the shares in construction and industry increasing while other sectors were shrinking. In almost all sectors (with most significant exceptions being the formal agricultural sector and the "other services and activities" sector), women experience a negative wage differential.

There are differences in the distribution of men and women between the formal and the informal sector. In the formal sector women tend to be more concentrated in the occupations classifiable as "highly skilled" (ISCO categories 1 to 3) than men (45% against 28% in the first period and 46% against 27% in the second period). However, they are always less concentrated than men to the top (managerial positions) and more in the categories of professionals and technicians. The second

category where women are more concentrated in the formal sector is category 9 “elementary occupations”. Men are instead more concentrated in both periods the occupational category classified as “craft and related trades workers” (ISCO category 7) and, slightly less than women (18% against 20%), in category 9. If we look to the informal sector, women appear to be more concentrated in categories 5 and 9 (service workers and shop and market sales and elementary occupation). It is worth noting that the share of women in managerial positions in the informal sector is larger than men’s. Looking at unconditional wages, however, we can see that despite this women in managerial position earn always less than men. Men’s distribution among the different occupations inside the informal sector does not differ significantly from that in the formal one.

From this descriptive analysis already some interesting patterns emerge. Ukrainian women are not disproportionately found in the informal sector and that their human capital (as measured by the variables we have considered) is not considerably lower than that of men. However, there seem to be clear (different) patterns in the distribution of both groups among different occupations and sectors and also evidence of the existence of unconditional wage differences among men and women across occupational groups and sectors.

3.4.2. Determinants of informality

We have just seen that women appear to be less informally employed than men. This result, however, does not control for the different individual characteristics that might be associated to an individual being formally rather than informally employed. In a recent paper (previous chapter of this thesis), Lehmann and Pignatti (2007) have found the gender dummy to be insignificant when used to predict the likelihood to be informal. This tells us that, controlling for a number of observable characteristics, there does not appear to be on average a gender specific bias towards the informal sector. What this result cannot tell us, however, is whether the relation between individual

characteristics and men's and women's probability to end up in the informal sector is the same or is somehow different[44]

In order to shed some light on this issue I adopt the following strategy. First, I run two sets (one for each year) of three probit regressions (one including all the employed, one only for the self-employed and the last only for the employees) having as dependent variable a dummy variable having value 1 when the individual is employed informally and 0 when he/she is employed formally. Then, in order to be able to test meaningfully if the different coefficients appearing in probit regressions for men and women are different, I perform a "seemingly unrelated estimation", combining the parameter estimates and associated (co)variance matrices of each couple of regressions (all men/all women, self-employed men/self-employed women, salaried men/salaried women) into a single parameter vector and simultaneous (co)variance matrix of the sandwich/robust type. Doing this allows me to test for the equality of the estimated coefficient across the two genders, allowing for the distributions of the robust standard errors (clustered by household) to be different between between men and women.

Testing the hypothesis of all the coefficients of the regression taken jointly being identical between the two genders, I find that this hypothesis can be rejected in two cases out of three (at the 5% level, the exception being the equations for the salaried) in 2003 and in all cases in 2004 (at the 5% for the self-employed and to the 10% in the remaining cases - table 6). It seems, thus, that differences between men's and women's coefficients existed both 2003 and 2004. The probit regressions produced to implement this test are in tables 7 to 12.

I move then to test the same hypothesis (coefficients being identical for males and females) considering the coefficients individually. Not surprisingly, I am able to identify for all sets of equations, a number of situations in which men's and women's coefficients appear to be significantly different.

[44] In the text I speak of correlation rather than of causal effects since some of the right-hand-side variables in the presented probit regressions are potentially endogenous.

A first example is age, which in 2003 is negatively correlated (table 8) with the probability of self-employed women of being informal, while it is positively correlated with that of self-employed men. This is not the only case in which age is found to have different impacts on men and women. Also in 2004, both taking self-employed and salaried workers together (table 10) and self-employed alone (table 11), men's and women's coefficients differ, with age being positively correlated with informality for men and negatively for women.

The impact of education variables on the probability of being informal does not appear to differ very much between the two genders. In 2003, taking all employed together (table 7), we find university education to be more strongly (negatively) correlated with the probability of being informal for women than for men. However, when we take the self-employed and the salaried workers salaried, we cannot reject anymore the hypothesis that the coefficients for men and women are the same. In 2003 the coefficients for secondary education do not appear to differ significantly between men and women. In 2004, the only educational attainment that appears to have a different impact on the probability of being informal is secondary education among the self-employed (table 11), having a much stronger negative impact on the probability of being informal for men than for women.

In 2003, being single seems to have had different implications for men and women in Ukraine, taking all the employed together (table 7) but especially among the self-employed (table 8). While for self-employed women it is associated with a reduction in the probability to be informal, in the case of self-employed men the relation is positive. While we do not find other regressions where the fact of being single has a negative relation with women's probability of being informally employed, in several cases it remains positively associated with men's probability of being informal (maybe due to a lower risk-aversion characterizing single man) while for women it is always insignificant.

Having at least a child less than six year old is significantly positively correlated the probability of self-employed men to be informal, both in (tables 8 and 11). In one case (2003) our test rejects the hypothesis that the coefficients for men and women are identical. This happens also in 2004 in

the regressions for the salaried workers. This time the probability of being informal is negatively correlated with having a child aged less than six, while for women the relation is positive but insignificant. It is surprising that the having at least a child aged less than six do not seem to affect significantly women's probability to be informal in any of the regressions, as theory would predict women behaviour to be more influenced by the presence of young children in the household than men.

In 2003, a higher number of members of the household working in the formal sector is negatively associated with the probability of working informally among the salaried, both for men and women. This might indicate the existence of some form of comparative advantage for those having other household members in the formal sector, when they look for a formal job. Among the self-employed, however men and women behave differently(table 8). Our test confirms that coefficients for men and women for the self-employed are indeed different (for women we have a negative correlation with informality while for men the relation turns out to be insignificant). This pattern is confirmed also in 2004. In the other cases no significant difference arises between genders. However, it is worth noting that all coefficients that before were significant and negative now become insignificant.

Working part-time is always associated with an higher probability of being informal. However, while in 2003 men and women coefficients were similar (the hypothesis of identical coefficients is never rejected), in 2004 this relation appears to become much stronger for men than for women (tables 10 and 12) and the test always reject the hypothesis of identical coefficients.

Of the variables that were included in the probit regressions because thought to be related with the probability of being formal, tenure is the only one for which we have never found evidence of significant differences between men and women. The link between tenure and informality appears always to be negative for salaried workers and negative or insignificant for the self-employed, a result we could expect knowing that informality is a relatively new phenomenon in Ukraine.

These results confirm that, overall, the hypothesis that men and women are linked to the informal sector in the same way has to be rejected. This becomes even more evident in 2004, where the informal sector is gaining space and the economy is starting to change faster. Causes for these differences might be several. Among those, the presence of different risk-aversion between the two gender groups or the existence of different sets of opportunities available to them. In the next section we will see if and how this reflects in the patterns of mobility of the two genders across different labor market states.

3.4.3. Gender differences in mobility across the different labor market states.

Looking at patterns of mobility across labor market states is particularly important in an analysis of labor market segmentation, as one of the characteristics of a SLM is limited mobility, especially from the secondary sector of the economy to the primary one.

Exploiting the panel structure of the ULMS we are going to look at these patterns using the same set of matrices used by Maloney (1999) and Lehmann and Pignatti (2007), with reference to the Mexican and Ukrainian labor markets. In this case, however I will split the sample in two, to test whether there are diverging patterns between males and females.

As in standard transition matrices we have unconditional mean transition probabilities, to take into account compositional effects, I also produce mean transition probabilities conditioned on a set of observable characteristics. After calculating these "predicted" transition probabilities for men and women, I will produce counterfactual tables reporting predicted probabilities obtained applying "female coefficients" to men's characteristics and "male coefficients" to women's characteristics.

Theory of SLM would seem to suggest that the segmentation effect – if it exists – should be stronger for women than for men, also due to self selection, to the potential existence of discriminating behaviour from employers and to other factors. We would also expect very limited mobility between the two sectors, especially for women.

In the upper panel of table 13 I report the raw transition probabilities across four states (formal employment, informal employment, unemployment, out of the labor force) for females and males in

the period 2003-2004. These probabilities assume that movements between states are governed by a Markov process[45] and are calculated as the ratio of the outflows from the origin state in 2003 to the destination state in 2004 over the total stock in the origin state in 2003[46].

From the observation of raw transition probabilities we see, contrary to our expectations, that women in Ukraine tend to have higher probability to remain in the formal sector and less in the informal sector. This reflects a lower share of women moving from formal to informal jobs, even more so if we consider that a higher percentage of women leaving formal employment move out of the labor force compared to men. A lower share of women leaving informal employment moves to formal employment relative to men. Women instead move more than men towards unemployment and out the labor force, indicating perhaps higher barriers to entry into the formal segment for women coming from informality. Looking at transitions from unemployment, we can identify another diverging pattern between men and women. Most men (about two thirds) flowing out of unemployment tend to enter either the formal or the informal sector. Women flowing out of unemployment instead tend to go back to work only in about half of the cases while the remaining half moves out of the labor force. Indeed, this is just another confirmation of the worldwide tendency of women's participation rates to be lower than those of men. What is striking however is that most of the difference between men and women appears to be due to a much lower fraction of women going back to work in the informal sector (9.4%) with respect to men (17.4%) while the fractions of the two groups of unemployed flowing back to work in the formal sector is very similar (25.3% for men against 24.8% for women).

The raw probabilities we have just seen, however, do not take into account the fact that departure and destination states may differ very much in terms of relative size and that labor market states' shares might grow and shrink at different paces in the period under exam (within the same

[45] As argued in Bellmann et al.(1995), the assumption that movements between states are governed by a Markov process seems appropriate for an economy subject to sudden structural shocks, where individual work histories become of lesser importance. This is indeed the case for Ukraine, which, despite having started the transition process almost a decade ago is still in an early phase of transition in the period under exam.

group and/or between the two groups). In our case, for example, the size of the formal sector remains much larger in both periods for both males and females, but the relative importance of these sectors is different for the two groups, with formal employment being the state where more men can be found in both periods while out of the labor force is the state with the number of women in both periods. Informal employment's share is growing faster for men than for women. To take into account of these effects in my analysis, I standardize the raw probabilities by the share of the destination state at the end of the period (P.j) obtaining the Q matrices (Maloney, 1999).

Even adjusting for the size of the terminal state, men show a higher probability to move from formal to informal employment, but also a higher probability to move from informality to formality. Women show instead a much higher probability to move to unemployment from informality rather than to go formal.

If we want to compare the results obtained and attempt to identify the "disposition" of individuals to move across sectors, however, we need to take into account how likely is an individual to leave the state he comes from and how difficult it can be finding an "opening" in a different state. This is the intuition behind the V matrix that we find at the bottom panel of the table. In practice, I multiply the values of the Q matrix by the reciprocal of the outflow rate from the origin and destination states[47].

Both Ukrainian men and women show a higher disposition to move from the informal sector to the formal sector than vice versa. However, this effect appears to be stronger for women than for men. If we look at the unemployed, again men seem more likely to move to informality than formality, while for women the result is the opposite. Only when we look at individuals flowing back from out of the labor force, we see a common pattern (much stronger for females than for males, this time), that is, a higher propensity to enter in the informal sector rather than in the formal

[46] One potential problem with these estimated probabilities might raise if "round tripping" problems were relevant. However, as already said Lehmann and Pignatti (2007) - see previous chapter – in this dataset round tripping is minimal.

one. This result might indicate that individuals (especially women) with lower attachment to the labor force, when they decide to go back to work might prefer informal employment to formal employment (arguably for the same reasons that cause their low attachment).

The results we have discussed so far, however, are based on unconditional mean transition probabilities between the various states that do not take into account compositional effects. For this reason, I decided to predict individual transition probabilities for males and females after estimating two sets of multinomial logit regressions (one for each gender) to control for a set of observable characteristics. I always choose the origin state as the default category. The interesting advantage of the multinomial logit model is that, once I have the estimated parameters, I can predict the probability that a new individual with a specified set of characteristics will be in one of the *j* categories available. I use this property also in my prediction of the counterfactual transition probabilities[48].

In table 14 we find the new P, Q and V matrices based on predicted probabilities. The first thing we observe is that the predicted probability of remaining in the origin state is higher for both groups. However, when we look at the differences across genders we see that now the pattern is exactly the opposite than it was before. Once we control for observable characteristics, men's probability to stay in the formal sector is higher than women's, while the opposite becomes true for informal employment. Women appear to be more represented in the formal sector (and less in the informal sector) mainly because of the different characteristics they have. This, however, has the effect to strengthen the results we found before. Now women show an even higher disposition to move from the informal sector to the formal sector compared to the disposition towards the opposite movement (matrix V). This time, this becomes more evident also for men. We confirm that individuals in Ukraine seem to prefer moving from informal to formal than vice-versa (the only exception being the high propensity of women out of the labor force to move to informality).

[47] Under Markovian assumptions, this corresponds to the duration of state occupancy (exponentially distributed). For a more detailed description of Q and V matrices, please see Lehmann and Pignatti (2007) - previous chapter – or Maloney (1999).

To conclude the analysis of mobility across labor market states, in the effort to disentangle the effects due to the different distribution of characteristics across genders from those due to different coefficients I calculated two counterfactuals. First, I calculated the predicted transition probabilities for men applying women's coefficients to their characteristics. Then, I applied men's coefficients to women's characteristics. The results are in table 15.

Counterfactual transition probabilities confirm that, keeping characteristics constant, men would be more likely to stay in formal employment and less in the informal one if they "behaved" as women (had women's coefficients). They would also be more "keen" to move from the informal sector to the formal one and less to move in the opposite direction. On the other side, women, keeping characteristics constant and applying men's coefficients show the opposite tendency, i.e. an increased disposition to move from formal to informal and smaller disposition to move in the opposite direction. We can conclude that women in Ukraine seem not only to have characteristics making them more likely to stay in formal employment than men, but also a strong "preference" for that form of employment, both in absolute terms and relative to men.

3.5. Wages, employment status and gender differentials

After analysing labor market mobility, we also also at the way in which labor is remunerated in the formal and informal sectors and if the same mechanisms seem to hold for both men and women. Lehmann and Pignatti (2007) find evidence supporting the second "revisionist" school of labor market segmentation. First of all, they find that the formal sector remunerates education and tenure while the informal sector does not. They also find some evidence of the fact that wages tend to grow less for individuals moving from the formal to the informal sector, compared to those staying in the formal sector, with the notable exception of those who choose voluntarily an informal job. Finally, they find that female workers in the formal sector are disadvantaged in both years with respect to men. This is also true for the informal sector, but only for the first period.

[48] The results of the multinomial logit regressions are in the appendix.

Their results, however do not tell us anything about the determinants of this differential. In their model, in fact, coefficients for men and women are forced to be the same. It might be that coefficients for men and women are indeed the same, or that, instead, similar characteristics are remunerated differently according to the gender of the worker (this could be true, for example, if one of the two groups was discriminated against).

In this section I intend to test two hypotheses: whether this wage differential is due to a different remuneration of similar characteristics (coefficients) or to a difference in endowments (characteristics). I will also try to identify the determinants of the log earnings in the two periods and in the two sectors of the labor market for men and for men and women, looking for additional evidence for or against labor market segmentation. To test for the relevance on non-normality on the results, also estimate robust regressions and median regressions. However, as the main patterns identified do not seem to differ from those identified with OLS regressions, I will mainly base my analysis on OLS results.

To decompose the wage differential, I will perform a twofold Oaxaca decomposition of the difference in mean predicted wages, choosing males as the "non-discriminated group". This is, in fact, the usual assumption in literature studying the gender wage differential. This procedure decomposes the difference in the mean predicted wages in an explained component (due in our case to differences in endowments between men and women) and an unexplained one (due to differences in coefficients and to the interaction of coefficients and endowments). Using the results obtained by separate wage regressions for men and women in both sectors and in both years, I perform the Oaxaca decomposition of the gender earnings differential. The results of the OLS regressions (with and without correcting for selection) are reported in tables 16 to 20.

The simple OLS regressions I perform show the existence of some common trends, but also some differences across genders. Both in 2003 and 2004, for example, the formal sector remunerates more individuals (men and women) with higher human capital, while in the informal sector this does not seem to happen. In one case, (table19), to higher age (my proxy for experience)

was associated a wage penalty. Another interesting result is represented by the dummy for the self employed in the informal sector that becomes significant and positive for both men and women in 2004. For women, also having chosen to work informally in 2004 leads to an increase in expected wage. Unfortunately, however, when we look at median and robust regressions, the effect for women becomes insignificant. I suspect that this, coherently with the most recent versions of the theory on market segmentation, might hide radically different behaviours in the top of the distribution with respect to the bottom. For this reason, in addition to robust and median regressions, I perform two sets of quantile regression. calculated at the 10^{th} percentile, and at the 90^{th} percentile. The results of these regressions, at least for 2004, indeed show different patterns not only between genders but also within the genders themselves[49].

The first difference is related to the significance of the variables choice to be informal and self-employed. In the regression for males the coefficient remains significant at the median but it is not significant anymore in the tails of the distribution (10^{th} and 90^{th} percentile). The opposite is true for women. The effect of these variables at the 10^{th} percentile and at the median is insignificant. However, when we look at the upper tier of women working in the informal sector we find that both the choice of being informal salaried and that of being self-employed increases significantly the expected wage. This is a very interesting result, in line with what segmentation theories suggest: informal sector segmented in itself, with an upper and a lower tier. Women choosing to be informal in the upper tier of the wage distribution appear to reap the (monetary) benefits of being informal, while those of the lower tiers do not. It is interesting to note that also in the formal sector the variable relative to self-employment is significantly positive only for the upper tier women distribution, while it is not so for men.

Going back to OLS, gender differences emerge also in other cases. For example, women working part-time experience in most cases (except in the formal sector in 2004), *ceteris paribus*,

[49] This does not happen for 2003. For completeness, even thought they will not be discussed here, I add also the tables for median and robust regressions relative to 2003.

higher hourly salaries than women working full time, while this is not true for men[50]. Again, women seem to gain more from having university degree or higher. Looking at quantile regressions we see that these gains are larger for those at the top of the distribution and lower for those at the bottom[51].

To control for selection, I also run a second set of OLS regressions, where the selection equation was estimated with a multinomial logit model, following the methodology suggested by Lee (1983). The results in columns 3 and 4 of tables 10 to 13, however, do not differ significantly from those of the OLS regressions without selection. Only in one case, does the selection term become significant, in the case of men working in the formal sector in 2004.

After estimating wage equations, I can implement the Oaxaca decomposition of the earning differential between men and women. As we are trying to test if earnings dynamics differ, not only between genders in general, but also within the different sectors, I apply the Oaxaca decomposition separately to the two sectors. The results of the Oaxaca decomposition (adjusted and not adjusted for selection) are in table 28.

We immediately notice some differences between the results for the formal and those for the informal sector. Looking at the decomposition not adjusted for selection we see that in both sectors the difference in the mean predicted earnings is fairly similar (slightly higher in the formal sector in 2003 and in the informal sector in 2004). However, when we look at the decomposition of the differential, a big difference emerges. While in the informal sector the positive differential of men is almost entirely due to differences in characteristics (personal characteristics, job characteristics or sector characteristics) , in the formal sector the differential appears to be due to unexplained factors (we can think of this as evidence of discrimination against women in the formal sector). When we adjust for selection, the main conclusions do not change for the formal sector (despite the fact that we have seen the selection term being significantly different from zero only for the formal sector in

[50] This is confirmed by robust regressions, but it does not appear to be significant in quantile regressions.
[51] In 2004 most sectorial coefficients turn out to be insignificant in the informal sector, except the coefficient for Other services and activities for women, showing a significant and positive effect on wages.

2004) result remain valid, with an increase in the predicted differential in 2003 and a reduction in the predicted differential for 2004. For the informal sector, instead, the estimated gender differential becomes insignificant. However, given the increase of the imprecision of the predicted differential because of the introduction of the selection term in the regression and taking into account that the selection term is never significant in our regressions for the informal sector, we cannot rule out the possibility that the correct decomposition results are unadjusted ones.

Overall, these results seem to confirm the existence of gender "discrimination" in the formal sector. For the informal sector instead, maybe because of stronger competition between employers, earnings differentials appear to be in line with the different characteristics associated with the individual and with the type of job. This means that, if discriminatory behaviours take place, they might be in the form of vertical segregation, that is allowing men to have a faster career progression with respect to women and segregating women at the lower levels of the hierarchy[52]. This however might also be simply the consequence of the greater desire of flexibility by women, self selecting themselves in positions characterized by lower responsibilities.

Conclusions

My aim in this work was twofold:

- verify to what extent the evidence is in line with the predictions given by the theory about labor market segmentation in developing countries;
- see how labor market segmentation, if it existed in Ukraine, contributed to the gender wage differential.

In this work I have identified several differences in the patterns characterizing the participation of men and women to the labor market. These results, however, appear to show a picture of the labor market that is very different from the one that characterizes labor markets of developing countries. Ukrainian women are on average much more educated than women in developing

[52] The literature on gender differences in risk aversion, for example, gives a possible explanation of why employers might discriminate women when they have to fill the higher ranks of the hierarchy. See Chauvin and Ash (1994) and Powell and Ansic (1997).

countries and they also tend to show higher participation rates, albeit smaller than men's. They are also at least as educated as Ukrainian men. This explains why I find that a large share of women is working as manager, professional of technician. Looking at the determinants of informality I have found that women and men with identical characteristics might show different patterns of participation to informality with respect to men. This means that gender has an influence on the choice between formality and informality.

This result reflects in different probabilities of women and men to move across states between the two periods under exam. This emerges clearly from the analysis of the transition matrices. Both men and women show higher propensity to go to the formal sector from the informal one than vice versa. However, this effect is much stronger for women than for men and this appears to depend both from different endowments than from different "behavioural" patterns. This result is surprising, as segmented labor market theories predict an higher concentration of women in the informal sector, both for demand side and supply side reasons.

How does this translate in terms of gender earnings differential? Ukrainian women do not appear to earn less than Ukrainian men because of horizontal segregation, as the proportion of women in the informal sector is lower than that of men. This excludes that Ukrainian women might earn less because of a concentration in the "disadvantaged" informal sector. We find evidence of the fact that women actually choosing to be informal in the "upper tier" of the wage distribution (either as salaried or as selfemployed) earn more than those involuntarily informal, suggesting that informal labor market for women might be segmented in an "upper tier and a lower tier".

On average, Ukrainian women do earn less than men and this is true both in the informal and in the informal sector. However, when we decompose the gender earnings differential we find evidence of two very different patterns between the informal and the informal sectors. In the formal sector, the earnings differential is entirely due to the unexplained component, usually indicated as an indicator of wage discrimination. In the informal sector, on the contrary, when the earnings differential is significantly different from zero, it is entirely due to differences in the explained

component (personal, household and job characteristics). I interpret this as an indication that, probably because of the greater competition, in the informal sector it might be more difficult to discriminate women paying them less than men doing the same job and having the same characteristics.

Overall, these results can be interpreted as the evidence that the Ukrainian labor market is indeed segmented and that women suffer some sort of discrimination. This discrimination is not taking place through the segregation of women in the informal sector but, more likely, through different remuneration of characteristics in the formals sector and different career opportunities and the exclusion of women from the better remunerated jobs at the top of the hierarchy. This might also explain why women in the upper tier of the wage distribution experience higher earnings when they are self-employed compared than when they are salaried, both in the formal and in the informal sector.

The Ukrainian government is officially fighting a battle to ensure that no discrimination takes place in the Ukrainian labor market. From the results of this paper, it appears that this battle is not unjustified. But government intervention alone cannot really change things, at least not in a short time. In the short to medium run, the increased competition for workers with higher skills, or the possibility to become self-employed are probably the two best opportunities for the women to see a reduction in the earnings gap.

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Tables

Table 1. Labor market status, participation rate and employment rate by gender										
	Formal	Informal	Unemployed	OLF	Participation rate	Employment rate	Sample		Ratio F/I	% Δ from previous year of F/I ratio
							Share	N		
2003										
Women	0.383	0.038	0.084	0.495	0.505	0.833	0.579	4739	10.197	
Men	0.483	0.057	0.111	0.350	0.650	0.830	0.421	3446	8.442	
2004										
Women	0.378	0.055	0.074	0.492	0.508	0.853	0.584	3974	6.863	-0.327
Men	0.469	0.084	0.095	0.352	0.648	0.854	0.416	2826	5.571	-0.340
Source:ULMS										

Table 2. Distribution of characteristics in the sample										
	2003					2004				
	Total	Formal		Informal		Total	Formal		Informal	
		Females	Males	Females	Males		Females	Males	Females	Males
All										
N. obs.	3853	1815	1663	178	197	3392	1537	1356	242	257
age	40.18	40.68	40.66	36.79	34.65	39.96	40.71	40.65	37.80	33.81
secondary	0.61	0.61	0.60	0.72	0.54	0.63	0.61	0.65	0.64	0.60
university	0.21	0.26	0.18	0.09	0.12	0.21	0.27	0.19	0.10	0.06
tenure	9.76	11.23	9.61	2.99	3.34	8.98	11.16	8.78	2.99	2.09
choice	0.02			0.22	0.20	0.03			0.17	0.20
self	0.07	0.03	0.05	0.34	0.43	0.09	0.03	0.06	0.38	0.39
Choice of being informal										
nobs	79			40	39	94			42	52
age	32.90			33.85	31.92	33.33			35.29	31.75
secondary	0.66			0.75	0.56	0.66			0.62	0.69
university	0.10			0.10	0.10	0.11			0.21	0.02
tenure	2.25			1.99	2.52	1.29			1.71	0.93
Self-employed										
nobs	282	50	88	60	84	318	46	80	92	100
age	38.26	38.36	37.73	40.18	37.39	39.51	39.61	38.95	42.91	36.79
secondary	0.63	0.68	0.53	0.82	0.57	0.63	0.54	0.68	0.65	0.61
university	0.18	0.22	0.27	0.08	0.14	0.17	0.35	0.30	0.07	0.08
tenure	4.73	4.76	5.05	4.64	4.44	4.81	5.03	5.01	4.21	3.51
Source:ULMS										

Table 3. Mean and median earning differentials									
2003									
	Total			Formal			Informal		
	Females	Males	% earnings differential[b]	Females	Males	% earnings differential[b]	Females	Males	% earnings differential[b]
Mean earnings[a]	1.684	2.257	-25.4%	1.681	2.261	-25.7%	1.722	2.215	-22.2%
Median earnings[a]	1.333	1.875	-28.9%	1.333	1.875	-28.9%	1.250	1.708	-26.8%
N. Obs.	1746	1498		1609	1362		137	136	
2004									
	Females	Males	% earnings differential[b]	Females	Males	% earnings differential[b]	Females	Males	% earnings differential[b]
Mean earnings[a]	2.166	2.889	-25.0%	2.213	2.891	-23.5%	1.840	2.878	-36.0%
Median earnings[a]	1.634	2.294	-28.7%	1.720	2.294	-25.0%	1.318	1.946	-32.3%
N. Obs.	1568	1344		1371	1160		197	184	

Source:ULMS

[a] Real hourly earnings.

[b]The % earnings differential is calculated as follows: (wf-wm)/wm. A negative number indicates that women earn less than men.

Table 4. Distribution of employed by sector (within gender) and gender differentials between median earnings[a] by sector

	2003				2004			
	Formal		Informal		Formal		Informal	
	Females	Males	Females	Males	Females	Males	Females	Males
Agrriculture	0.08	0.15	0.24	0.25	0.08	0.14	0.34	0.21
Industry	0.22	0.38	0.08	0.12	0.23	0.40	0.08	0.16
Construction	0.02	0.07	0.01	0.23	0.02	0.06	0.02	0.28
Services	0.59	0.34	0.55	0.29	0.59	0.33	0.47	0.25
Other services and activities	0.09	0.07	0.12	0.11	0.08	0.07	0.09	0.10

	Females	Males	% earnings differential[b].	Females	Males	% earnings differential[b]	Females	Males	% earnings differential[b]	Females	Males	% earnings differential[b]
Agrriculture	1.13	0.90	0.25	0.63	0.92	-0.31	1.38	1.38	0.00	0.76	0.94	-0.18
Industry	1.56	2.19	-0.29	1.88	2.34	-0.20	1.91	2.68	-0.29	1.67	2.29	-0.27
Construction	1.77	2.00	-0.11	3.22	2.06	0.57	2.61	2.87	-0.09	2.87	2.39	0.20
Services	1.28	1.75	-0.27	1.36	1.79	-0.24	1.59	2.29	-0.31	1.41	1.91	-0.26
Other services and activities	1.30	1.56	-0.17	1.61	1.15	0.41	1.61	1.86	-0.14	1.94	1.92	0.01

Source:ULMS

[a] Real hourly earnings.

[b]The % earnings differential is calculated as follows: (wf-wm)/wm. A negative number indicates that women earn less than men.

Table 5. Distribution of employed by occupation (within gender) and gender differentials between median earnings[a] by sector												
	2003						2004					
	Formal			Informal			Formal			Informal		
	Females	Males		Females	Males		Females	Males		Females	Males	
Managers	0.03	0.06		0.16	0.13		0.05	0.08		0.14	0.12	
Professionals	0.21	0.11		0.02	0.04		0.20	0.11		0.01	0.01	
Technicians	0.21	0.11		0.01	0.03		0.21	0.08		0.00	0.02	
Clerks	0.11	0.03		0.03	0.03		0.11	0.03		0.03	0.01	
Service workers and shop and market sales	0.10	0.04		0.36	0.12		0.10	0.03		0.38	0.06	
Skilled agricultural, forestry, and fishery	0.01	0.04		0.03	0.03		0.01	0.04		0.01	0.01	
Craft and related trades workers	0.10	0.32		0.04	0.21		0.10	0.31		0.06	0.27	
Plant and machine operators and assemblers	0.03	0.11		0.00	0.04		0.03	0.15		0.00	0.06	
Elementary occupations	0.20	0.18		0.35	0.38		0.20	0.16		0.37	0.44	
	Females	Males	Diff.	Females	Males	Diff.	Females	Males	Diff.	Females	Males	Diff.
Managers	1.88	2.44	-0.23	1.48	2.82	-0.47	2.80	3.44	-0.19	0.49	2.25	-0.78
Professionals	1.89	2.20	-0.14	6.39	1.29	3.97	2.76	2.87	-0.04	2.87	5.10	-0.44
Technicians	1.25	2.00	-0.38	1.72	2.42	-0.29	1.51	2.24	-0.33		5.73	
Clerks	1.38	1.50	-0.08	1.82	1.91	-0.05	1.81	2.09	-0.13	2.68	4.25	-0.37
Service workers and shop and market sales	1.13	1.56	-0.28	1.25	1.15	0.09	1.27	1.72	-0.26	1.37	1.72	-0.20
Skilled agricultural, forestry, and fishery	1.13	0.94	0.20	0.59	1.58	-0.62	1.26	1.15	0.10	0.84	1.15	-0.27
Craft and related trades workers	1.37	2.03	-0.32	2.44	2.00	0.22	1.72	2.68	-0.36	2.46	2.87	-0.14
Plant and machine operators and assemblers	1.81	1.88	-0.03		3.00		1.90	2.18	-0.13	0.82	2.87	-0.71
Elementary occupations	1.10	1.25	-0.12	1.07	1.14	-0.06	1.18	1.43	-0.18	1.06	1.37	-0.23

Source:ULMS

[a] Real hourly earnings.

[b]The % earnings differential is calculated as follows: (wf-wm)/wm. A negative number indicates that women earn less than men.

Table 6. Testing hypothesis of identical coefficients in female-male regressions						
	2003			2004		
	All employed	Self-employed	Salaried	All employed	Self-employed	Salaried
All coefficients jointly	reject**	reject**	not reject	reject*	reject***	reject*
Individual coefficients						
Age		reject***		reject*	reject**	
Secondary					reject**	
University	reject**					
Tenure						
Single	reject**	reject***				
Divorced & others						
Children <6		reject**				reject*
Children 6-14						
Number of formal in household		reject**			reject***	
Working part time[a]				reject**		reject*

Source:ULMS

[a] working part time is not included in self employment regressions

Table 7. Determinants of informality - All employed - 2003

	Females	Males
Age	0.009	0.030
	(0.029)	(0.027)
Age^2	-0.000	-0.000
	(0.000)	(0.000)
Secondary	-0.195	-0.224
	(0.129)	(0.098)**
University	-0.779	-0.332
	(0.166)***	(0.140)**
Tenure	-0.082	-0.038
	(0.028)***	(0.025)
$Tenure^2/100$	-0.118	-0.167
	(0.166)	(0.143)
Single	0.001	0.476
	(0.154)	(0.166)***
Divorced & other	-0.103	0.145
	(0.121)	(0.168)
Children<6	0.049	0.196
	(0.168)	(0.152)
Children>6	-0.174	0.095
	(0.118)	(0.130)
Formal in household	-0.239	-0.167
	(0.068)***	(0.062)***
Part-time	0.572	0.545
	(0.149)***	(0.184)***
Center-North	0.045	0.409
	(0.200)	(0.200)**
South	0.263	0.593
	(0.199)	(0.202)***
East	0.209	0.306
	(0.186)	(0.193)
West	-0.042	0.278
	(0.198)	(0.205)
Constant	-0.687	-1.715
	(0.594)	(0.572)***
Observations	3828	

Source:ULMS
Robust standard errors in parentheses.
*significant at 10%** significant at 5%; *** significant at 1%
Default categories are: Elementary and less, married or cohabiting, Kyiv city

Table 8. Determinants of informality – Self-employed - 2003

	Females	Males
Age	-0.334	0.192
	(0.129)***	(0.072)***
Age^2	0.004	-0.002
	(0.002)***	(0.001)**
Secondary	0.113	-0.188
	(0.423)	(0.276)
University	-0.767	-0.607
	(0.537)	(0.338)*
Tenure	0.001	-0.223
	(0.128)	(0.076)***
$Tenure^2/100$	-0.208	1.492
	(0.927)	(0.512)***
Single	-1.507	1.804
	(0.781)*	(0.486)***
Divorced & other	-0.436	0.228
	(0.418)	(0.380)
Children<6	-0.715	1.004
	(0.775)	(0.366)***
Children>6	-0.332	0.272
	(0.388)	(0.299)
Formal in household	-0.435	0.013
	(0.172)**	(0.145)
Center-North	-0.173	0.236
	(0.852)	(0.757)
South	0.285	0.597
	(0.836)	(0.784)
East	0.358	0.146
	(0.816)	(0.764)
West	0.126	0.284
	(0.860)	(0.782)
Constant	6.741	-4.373
	(2.915)**	(1.680)***
Observations	273	

Source:ULMS
Robust standard errors in parentheses
*significant at 10%** significant at 5%; *** significant at 1%
Default categories are: Elementary and less, married or cohabiting, Kyiv city

Table 9. Determinants of informality – Salaried - 2003

	Females	Males
Age	0.050	-0.023
	(0.033)	(0.032)
Age^2	-0.001	0.000
	(0.000)	(0.000)
Secondary	-0.337	-0.278
	(0.143)**	(0.114)**
University	-0.859	-0.452
	(0.190)***	(0.175)***
Tenure	-0.136	-0.036
	(0.038)***	(0.041)
$Tenure^2/100$	0.055	-0.394
	(0.296)	(0.310)
Single	0.171	0.292
	(0.167)	(0.203)
Divorced & other	0.150	0.070
	(0.135)	(0.212)
Children<6	0.164	0.060
	(0.181)	(0.189)
Children>6	-0.108	0.083
	(0.137)	(0.168)
Formal in household	-0.142	-0.181
	(0.074)*	(0.075)**
Part-time	0.474	0.236
	(0.177)***	(0.285)
Center-North	-0.087	0.155
	(0.221)	(0.224)
South	-0.024	0.327
	(0.226)	(0.226)
East	0.093	0.172
	(0.201)	(0.210)
West	-0.190	0.057
	(0.217)	(0.231)
Constant	-1.310	-0.550
	(0.674)*	(0.657)
Observations	3555	

Source:ULMS
Robust standard errors in parentheses
*significant at 10%** significant at 5%; *** significant at 1%
Default categories are: Elementary and less, married or cohabiting, Kyiv city

Table 10. Determinants of informality – All-employed - 2004

	Females	Males
Age	-0.009	0.056
	(0.026)	(0.026)**
Age^2	0.000	-0.001
	(0.000)	(0.000)***
Secondary	-0.508	-0.462
	(0.119)***	(0.109)***
University	-0.992	-0.924
	(0.152)***	(0.178)***
Tenure	-0.110	-0.129
	(0.013)***	(0.019)***
$Tenure^2/100$	0.165	0.230
	(0.029)***	(0.051)***
Single	0.086	0.220
	(0.161)	(0.161)
Divorced & other	-0.004	0.224
	(0.113)	(0.165)
Children<6	0.104	-0.156
	(0.177)	(0.164)
Children>6	0.044	-0.073
	(0.121)	(0.138)
Formal in household	-0.040	0.002
	(0.027)	(0.008)
Part-time	0.319	0.909
	(0.166)*	(0.191)***
Center-North	-0.265	0.168
	(0.233)	(0.280)
South	0.159	0.594
	(0.243)	(0.296)**
East	-0.170	0.116
	(0.230)	(0.274)
West	-0.451	0.152
	(0.248)*	(0.285)
Constant	0.167	-1.218
	(0.568)	(0.558)**
Observations	2988	

Source:ULMS
Robust standard errors in parentheses
*significant at 10%** significant at 5%; *** significant at 1%
Default categories are: Elementary and less, married or cohabiting, Kyiv city

Table 11. Determinants of informality – Self employed - 2004

	Females	Males
Age	-0.202	0.141
	(0.114)*	(0.094)
Age^2	0.003	-0.002
	(0.001)**	(0.001)
Secondary	-0.109	-1.299
	(0.395)	(0.408)***
University	-1.813	-2.092
	(0.558)***	(0.485)***
Tenure	-0.102	-0.134
	(0.085)	(0.055)**
$Tenure^2/100$	0.616	0.778
	(0.381)	(0.302)**
Single	0.889	1.398
	(0.824)	(0.600)**
Divorced & other	-0.617	0.126
	(0.534)	(0.421)
Children<6	0.097	0.810
	(0.875)	(0.479)*
Children>6	0.535	-0.166
	(0.515)	(0.309)
Formal in household	-0.413	0.001
	(0.152)***	(0.017)
Center-North	-7.056	0.273
	(0.433)***	(0.756)
South	-6.874***	0.330
	(0.610)	(0.783)
East	-7.127	0.122
	(0.508)***	(0.768)
West	-8.300	0.329
	(0.573)***	(0.808)
Constant	11.427	-1.729
	(2.488)***	(2.001)
Observations	243	

Source:ULMS
Robust standard errors in parentheses
*significant at 10%** significant at 5%; *** significant at 1%
Default categories are: Elementary and less, married or cohabiting, Kyiv city

Table 12. Determinants of informality – Salaried - 2004

Age	0.043	0.052
	(0.034)	(0.032)
Age^2	-0.001	-0.001
	(0.000)	(0.000)**
Secondary	-0.428	-0.469
	(0.140)***	(0.126)***
University	-0.826	-0.934
	(0.180)***	(0.210)***
Tenure	-0.165	-0.203
	(0.024)***	(0.033)***
$Tenure^2/100$	0.246	0.405
	(0.041)***	(0.072)***
Single	0.198	0.053
	(0.174)	(0.180)
Divorced & other	0.224	0.251
	(0.134)*	(0.190)
Children<6	0.179	-0.338
	(0.190)	(0.198)*
Children>6	0.014	-0.162
	(0.139)	(0.175)
Formal in household	-0.030	-0.002
	(0.023)	(0.009)
Part-time	0.111	0.762
	(0.196)	(0.275)***
Center-North	-0.414	0.182
	(0.273)	(0.338)
South	0.029	0.485
	(0.282)	(0.351)
East	-0.088	0.178
	(0.263)	(0.329)
West	-0.323	0.263
	(0.285)	(0.342)
Constant	-0.833	-1.045
	(0.680)	(0.659)
Observations	2745	

Source:ULMS
Robust standard errors in parentheses
*significant at 10%** significant at 5%; *** significant at 1%
Default categories are: Elementary and less, married or cohabiting, Kyiv city

Table 13. P, Q and V matrices built using observed transition probabilities

MALES

TRANSITION PROBABILITIES : Pij

	F	I	U	NLF	**Pi.**
Formal	**0.855**	0.042	0.035	0.067	0.492
Informal	0.271	**0.583**	0.069	0.076	0.054
Unemployed	0.253	0.174	0.368	0.205	0.107
Not in labor force	0.072	0.037	0.097	0.795	0.347
P.j	0.488	0.083	0.094	0.335	

Q MATRIX: Pij/P.j - "Probability standardized by size of the destination state at the end of the period"

	F	I	U	NLF
Formal		**0.508**	0.371	0.201
Informal	**0.555**		0.739	0.228
Unemployed	0.520	2.079		0.612
Not in labor force	0.148	0.438	1.030	

V MATRIX: Pij / (P.j*(1-Pii)*(1-Pjj)) - "Disposition to move to a sector"

	F	I	U	NLF
Formal		**8.428**	4.058	6.779
Informal	**9.214**		2.808	2.667
Unemployed	5.686	7.897		4.716
Not in labor force	4.973	5.117	7.939	

FEMALES

TRANSITION PROBABILITIES : Pij

	F	I	U	NLF	**Pi.**
Formal	**0.865**	0.022	0.036	0.077	0.384
Informal	0.200	**0.572**	0.117	0.110	0.038
Unemployed	0.248	0.094	0.313	0.345	0.080
Not in labor force	0.055	0.038	0.061	0.846	0.498
P.j	0.387	0.056	0.074	0.483	

Q MATRIX: Pij/P.j - "Probability standardized by size of the destination state at the end of the period"

	F	I	U	NLF
Formal		**0.382**	0.493	0.159
Informal	**0.517**		1.589	0.229
Unemployed	0.642	1.657		0.715
Not in labor force	0.141	0.682	0.824	

V MATRIX: Pij / (P.j*(1-Pii)*(1-Pjj)) - "Disposition to move to a sector"

	F	I	U	NLF
Formal		**6.629**	5.325	7.672
Informal	**8.966**		5.408	3.474
Unemployed	6.929	6.133		6.762
Not in labor force	6.799	10.358	7.795	

Source:ULMS
Note: **Pi.** is the relative size of a sector at the beginning of the period; **P.j** is the relative size of a sector at the end of a period.

Table 14. P, Q and V matrices built using observed transition probabilities

MALES

TRANSITION PROBABILITIES : Pij

	F	I	U	NLF	**Pi.**
Formal	**0.899**	0.022	0.030	0.048	0.492
Informal	0.262	**0.683**	0.034	0.020	0.054
Unemployed	0.249	0.168	0.378	0.205	0.107
Not in labor force	0.045	0.024	0.060	0.871	0.347
P.j	0.499	0.074	0.078	0.349	

Q MATRIX: Pij/P.j - "Probability standardized by size of the destination state at the end of the period"

	F	I	U	NLF
Formal		**0.302**	0.388	0.139
Informal	**0.526**		0.441	0.058
Unemployed	0.499	2.268		0.586
Not in labor force	0.091	0.327	0.764	

V MATRIX: Pij / (P.j*(1-Pii)*(1-Pjj)) - "Disposition to move to a sector"

	F	I	U	NLF
Formal		**9.424**	6.168	10.641
Informal	**16.387**		2.237	1.424
Unemployed	7.933	11.509		7.304
Not in labor force	6.947	7.980	9.518	

FEMALES

TRANSITION PROBABILITIES : Pij

	F	I	U	NLF	**Pi.**
Formal	**0.889**	0.012	0.031	0.067	0.384
Informal	0.199	**0.702**	0.065	0.034	0.038
Unemployed	0.252	0.068	0.326	0.353	0.080
Not in labor force	0.019	0.032	0.025	0.923	0.498
P.j	0.379	0.053	0.053	0.515	

Q MATRIX: Pij/P.j - "Probability standardized by size of the destination state at the end of the period"

	F	I	U	NLF
Formal		**0.229**	0.590	0.131
Informal	**0.526**		1.218	0.067
Unemployed	0.665	1.296		0.686
Not in labor force	0.051	0.616	0.468	

V MATRIX: Pij / (P.j*(1-Pii)*(1-Pjj)) - "Disposition to move to a sector"

	F	I	U	NLF
Formal		**6.937**	7.921	15.409
Informal	**15.929**		6.062	2.925
Unemployed	8.920	6.986		13.288
Not in labor force	6.060	26.938	9.066	

Source:ULMS

Note: **Pi.** is the relative size of a sector at the beginning of the period; **P.j** is the relative size of a sector at the end of a period.

Table 15. Counterfactual P, Q and V matrices built using predicted transition probabilities

MALES characteristics and FEMALE coefficients

TRANSITION PROBABILITIES : Pij

	F	I	U	NLF	**Pi.**
Formal	**0.911**	0.017	0.028	0.043	0.492
Informal	0.270	**0.676**	0.036	0.018	0.054
Unemployed	0.255	0.159	0.382	0.204	0.107
Not in labor force	0.055	0.028	0.075	0.842	0.347
P.j	0.510	0.072	0.083	0.336	

Q MATRIX: Pij/P.j - "Probability standardized by size of the destination state at the end of the period"

	F	I	U	NLF
Formal		**0.242**	0.338	0.129
Informal	**0.529**		0.435	0.054
Unemployed	0.500	2.225		0.606
Not in labor force	0.108	0.391	0.908	

V MATRIX: Pij / (P.j*(1-Pii)*(1-Pjj)) - "Disposition to move to a sector"

	F	I	U	NLF
Formal		**8.417**	6.169	9.194
Informal	**18.428**		2.175	1.045
Unemployed	9.125	11.118		6.195
Not in labor force	7.711	7.621	9.278	

FEMALES with MALEScoefficients

TRANSITION PROBABILITIES : Pij

	F	I	U	NLF	**Pi.**
Formal	**0.874**	0.014	0.033	0.080	0.384
Informal	0.215	**0.699**	0.055	0.030	0.038
Unemployed	0.260	0.068	0.323	0.349	0.080
Not in labor force	0.016	0.029	0.021	0.934	0.498
P.j	0.373	0.052	0.051	0.525	

Q MATRIX: Pij/P.j - "Probability standardized by size of the destination state at the end of the period"

	F	I	U	NLF
Formal		**0.267**	0.643	0.152
Informal	**0.578**		1.069	0.058
Unemployed	0.699	1.317		0.665
Not in labor force	0.043	0.566	0.411	

V MATRIX: Pij / (P.j*(1-Pii)*(1-Pjj)) - "Disposition to move to a sector"

	F	I	U	NLF
Formal		**7.028**	7.507	18.227
Informal	**15.216**		5.256	2.927
Unemployed	8.158	7.088		14.869
Not in labor force	5.099	28.542	9.198	

Source:ULMS

Note: **Pi.** is the relative size of a sector at the beginning of the period; **P.j** is the relative size of a sector at the end of a period.

Table 16. Log hourly earnings – Females - 2003

	OLS Without Selection		OLS With Selection	
	Informal	Formal	Informal	Formal
Age	-0.021	0.014	-0.072	-0.007
	(0.046)	(0.007)*	(0.071)	(0.015)
Age^2	0.000	-0.000	0.001	0.000
	(0.001)	(0.000)**	(0.001)	(0.000)
Secondary	-0.103	0.090	-0.137	0.059
	(0.145)	(0.041)**	(0.158)	(0.045)
University	0.246	0.408	0.488	0.334
	(0.276)	(0.049)***	(0.372)	(0.068)***
Tenure	0.036	0.006	0.020	0.006
	(0.060)	(0.004)	(0.069)	(0.004)
$Tenure^2/100$	-0.314	-0.008	-0.173	-0.007
	(0.413)	(0.011)	(0.446)	(0.011)
Positive Δ^a	0.620	0.428	0.660	0.426
	(0.180)***	(0.112)***	(0.179)***	(0.111)***
Negative Δb	-0.710	-0.604	-0.662	-0.611
	(0.464)	(0.069)***	(0.459)	(0.069)***
Choice Informality	0.061		0.108	
	(0.132)		(0.135)	
Self Employed	0.062	0.202	0.084	0.197
	(0.219)	(0.164)	(0.225)	(0.163)
Part time	0.446	0.147	0.435	0.144
	(0.211)**	(0.057)**	(0.210)**	(0.057)**
occupation4	-0.087	-0.054	-0.020	-0.056
	(0.381)	(0.040)	(0.367)	(0.040)
occupation5	-0.362	-0.215	-0.315	-0.212
	(0.245)	(0.048)***	(0.236)	(0.048)***
occupation6	-0.386	-0.102	-0.363	-0.103
	(0.605)	(0.154)	(0.605)	(0.153)
occupation7	0.171	-0.068	0.440	-0.070
	(0.391)	(0.055)	(0.415)	(0.055)
occupation8		0.040		0.041
		(0.082)		(0.082)
occupation9	-0.350	-0.181	-0.284	-0.179
	(0.300)	(0.037)***	(0.286)	(0.037)***
Industry	0.944	0.291	0.969	0.288
	(0.308)***	(0.060)***	(0.313)***	(0.060)***
Construction	1.493	0.264	1.276	0.256
	(0.266)***	(0.111)**	(0.297)***	(0.111)**
Services	0.786	0.081	0.815	0.079
	(0.260)***	(0.051)	(0.258)***	(0.051)
Other services and	0.731	0.113	0.698	0.111

activities				
	(0.298)**	(0.066)*	(0.310)**	(0.066)*
State	0.739	-0.196	0.847	-0.195
	(0.317)**	(0.043)***	(0.327)**	(0.043)***
Privatized	-0.355	-0.148	-0.439	-0.148
	(0.235)	(0.058)**	(0.239)*	(0.059)**
Cooperative		-0.643	-0.779	-0.635
		(0.142)***	(0.329)**	(0.139)***
Center North	-0.144	-0.336	-0.113	-0.334
	(0.340)	(0.053)***	(0.350)	(0.053)***
South	-0.089	-0.224	-0.011	-0.227
	(0.276)	(0.057)***	(0.285)	(0.057)***
East	-0.253	-0.312	-0.171	-0.313
	(0.242)	(0.051)***	(0.252)	(0.051)***
West	-0.249	-0.237	-0.218	-0.235
	(0.318)	(0.053)***	(0.318)	(0.053)***
lambda021			-0.698	
			(0.665)	
lambda011				-0.132
				(0.081)
Constant	0.301	0.316	2.430	0.825
	(0.956)	(0.163)*	(2.561)	(0.360)**
Observations	131	1573	131	1572
R-squared	0.34	0.29	0.35	0.29

Source:ULMS

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

[a] paid wage arrears or other unexpected increase in monthly earnings received

[b] wage arrears or other unexpected decrease in monthly earnings received

Table 17. Log hourly earnings – Females - 2004

	OLS Without Selection		OLS With Selection	
	Informal	Formal	Informal	Formal
Age	0.031	0.001	-0.002	-0.019
	(0.032)	(0.008)	(0.048)	(0.019)
Age^2	-0.001	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.001)	(0.000)
Secondary	0.051	0.120	0.143	0.082
	(0.145)	(0.050)**	(0.155)	(0.058)
University	0.148	0.536	0.370	0.458
	(0.191)	(0.068)***	(0.258)	(0.092)***
Tenure	-0.022	0.012	-0.026	0.012
	(0.035)	(0.004)***	(0.034)	(0.004)***
$Tenure^2/100$	0.006	-0.022	0.024	-0.021
	(0.125)	(0.009)**	(0.121)	(0.009)**
Positive Δ^a		0.599		0.593
		(0.130)***		(0.128)***
NEGATIVE Δ^B	-0.814	-0.559	-0.725	-0.559
	(0.469)*	(0.133)***	(0.539)	(0.132)***
Choice Informality	0.266		0.280	
	(0.150)*		(0.151)*	
Self Employed	0.435	0.277	0.446	0.267
	(0.260)*	(0.253)	(0.266)*	(0.250)
Part time	0.511	0.054	0.515	0.066
	(0.243)**	(0.079)	(0.244)**	(0.081)
occupation4	0.542	-0.094	0.566	-0.103
	(0.418)	(0.051)*	(0.420)	(0.052)**
occupation5	0.216	-0.277	0.261	-0.274
	(0.352)	(0.067)***	(0.349)	(0.068)***
occupation6		-0.222		-0.220
		(0.139)		(0.138)
occupation7	0.956	-0.018	1.030	-0.019
	(0.363)***	(0.058)	(0.354)***	(0.058)
occupation8		0.069		0.071
		(0.095)		(0.095)
occupation9	0.275	-0.260	0.314	-0.260
	(0.302)	(0.048)***	(0.296)	(0.048)***
Industry	0.467	0.193	0.486	0.191
	(0.313)	(0.057)***	(0.321)	(0.057)***
Construction	0.614	0.199	0.654	0.218
	(0.412)	(0.100)**	(0.420)	(0.103)**
Services	0.393	0.151	0.395	0.149
	(0.282)	(0.050)***	(0.281)	(0.050)***
Other	0.825	0.102	0.833	0.106

services and activities				
	(0.340)**	(0.072)	(0.342)**	(0.072)
State	-0.584	-0.057	-0.483	-0.050
	(0.248)**	(0.049)	(0.294)	(0.049)
Privatized	-0.081	0.030	-0.096	0.032
	(0.180)	(0.056)	(0.184)	(0.056)
Cooperative		0.106		0.111
		(0.301)		(0.294)
Center North	-0.511	-0.184	-0.550	-0.183
	(0.285)*	(0.072)**	(0.292)*	(0.072)**
South	-0.243	-0.100	-0.279	-0.093
	(0.277)	(0.079)	(0.278)	(0.079)
East	-0.442	-0.268	-0.478	-0.269
	(0.252)*	(0.068)***	(0.258)*	(0.068)***
West	-0.390	-0.237	-0.420	-0.235
	(0.294)	(0.072)***	(0.294)	(0.072)***
lambda021			-0.445	
			(0.386)	
lambda011				-0.127
				(0.103)
Constant	-0.425	0.479	0.830	0.989
	(0.649)	(0.191)**	(1.411)	(0.470)**
Observations	162	1222	161	1213
R-squared	0.38	0.27	0.36	0.27

Source:ULMS
Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received

[b] wage arrears or other unexpected decrease in monthly earnings received

Table 18. Log hourly earnings – Males - 2003

	OLS Without Selection		OLS With Selection	
	Informal	Formal	Informal	Formal
Age	-0.017	0.007	0.018	-0.021
	(0.037)	(0.010)	(0.052)	(0.017)
Age^2	0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.001)	(0.000)
Secondary	0.142	0.086	0.031	0.052
	(0.201)	(0.043)**	(0.215)	(0.046)
University	0.267	0.238	0.156	0.156
	(0.277)	(0.073)***	(0.276)	(0.083)*
Tenure	0.066	0.013	0.070	0.013
	(0.059)	(0.006)**	(0.060)	(0.006)**
$Tenure^2/100$	-0.699	-0.028	-0.730	-0.028
	(0.384)*	(0.016)*	(0.388)*	(0.016)*
Positive Δ^a		0.487		0.483
		(0.141)***		(0.142)***
NEGATIVE Δ^B	-0.523	-0.674	-0.551	-0.679
	(0.440)	(0.088)***	(0.435)	(0.088)***
Choice Informality	-0.002		0.040	
	(0.191)		(0.199)	
Self Employed	0.145	0.185	0.159	0.192
	(0.198)	(0.155)	(0.204)	(0.155)
Part time	0.220	0.097	0.173	0.097
	(0.290)	(0.113)	(0.291)	(0.114)
occupation4	-0.353	-0.280	-0.253	-0.270
	(0.457)	(0.100)***	(0.466)	(0.100)***
occupation5	-0.926	-0.170	-0.845	-0.166
	(0.314)***	(0.111)	(0.335)**	(0.110)
occupation6	-0.086	-0.422	-0.090	-0.424
	(0.681)	(0.128)***	(0.672)	(0.128)***
occupation7	-0.383	-0.088	-0.393	-0.089
	(0.325)	(0.059)	(0.319)	(0.059)
occupation8	-0.084	-0.085	-0.097	-0.089
	(0.279)	(0.069)	(0.282)	(0.069)
occupation9	-0.262	-0.319	-0.285	-0.316
	(0.270)	(0.067)***	(0.265)	(0.067)***
Industry	0.887	0.615	0.883	0.619
	(0.283)***	(0.067)***	(0.286)***	(0.067)***
Construction	0.512	0.473	0.502	0.480
	(0.309)	(0.093)***	(0.303)	(0.092)***
Services	0.781	0.418	0.754	0.417
	(0.292)***	(0.068)***	(0.292)**	(0.067)***
Other	0.545	0.400	0.542	0.401

services and activities				
	(0.337)	(0.093)***	(0.332)	(0.092)***
State	-0.599	0.032	-0.752	0.031
	(0.416)	(0.056)	(0.378)**	(0.056)
Privatized	-0.615	0.000	-0.566	-0.004
	(0.253)**	(0.065)	(0.260)**	(0.064)
Cooperative		-0.492	-0.402	-0.476
		(0.176)***	(0.471)	(0.176)***
Center North	-0.848	-0.362	-0.852	-0.355
	(0.357)**	(0.070)***	(0.360)**	(0.070)***
South	-0.640	-0.324	-0.638	-0.314
	(0.364)*	(0.075)***	(0.358)*	(0.074)***
East	-0.507	-0.208	-0.537	-0.206
	(0.357)	(0.067)***	(0.354)	(0.066)***
West	-0.317	-0.301	-0.339	-0.302
	(0.380)	(0.070)***	(0.375)	(0.070)***
lambda021			0.686	
			(0.669)	
lambda011				-0.238
				(0.117)**
Constant	0.969	0.370	-0.712	1.066
	(0.891)	(0.198)*	(1.943)	(0.396)***
Observations	131	1312	131	1311
R-squared	0.34	0.31	0.34	0.31

Source:ULMS
Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received

[b] wage arrears or other unexpected decrease in monthly earnings received

Table 19. Log hourly earnings – Males - 2004

	OLS Without Selection		OLS With Selection	(4)
	Informal	Formal	Informal	Formal
Age	-0.075	0.025	-0.096	0.011
	(0.034)**	(0.010)**	(0.046)**	(0.017)
Age^2	0.001	-0.000	0.001	-0.000
	(0.000)*	(0.000)***	(0.001)*	(0.000)
Secondary	0.202	0.147	0.186	0.129
	(0.135)	(0.051)***	(0.191)	(0.056)**
University	0.066	0.341	0.130	0.297
	(0.287)	(0.076)***	(0.389)	(0.092)***
Tenure	-0.027	0.009	-0.020	0.009
	(0.045)	(0.006)	(0.047)	(0.006)
$Tenure^2/100$	0.168	-0.011	0.135	-0.012
	(0.183)	(0.015)	(0.189)	(0.015)
Positive Δ^a		0.119		0.115
		(0.209)		(0.211)
Negative Δ^b	-0.942	-0.767	-0.858	-0.721
	(0.289)***	(0.134)***	(0.294)***	(0.132)***
Choice Informality	0.100		0.141	
	(0.153)		(0.163)	
Self Employed	0.366	0.010	0.424	0.010
	(0.173)**	(0.148)	(0.178)**	(0.148)
Part time	0.055	-0.044	-0.001	-0.049
	(0.325)	(0.141)	(0.335)	(0.148)
occupation4	0.250	-0.136	0.882	-0.152
	(0.472)	(0.091)	(0.315)***	(0.095)
occupation5	-0.138	-0.189	-0.187	-0.187
	(0.315)	(0.115)	(0.315)	(0.116)
occupation6	0.437	-0.583	0.473	-0.597
	(0.336)	(0.148)***	(0.343)	(0.150)***
occupation7	0.004	-0.099	0.015	-0.105
	(0.251)	(0.056)*	(0.251)	(0.056)*
occupation8	0.064	-0.142	0.068	-0.137
	(0.343)	(0.070)**	(0.350)	(0.071)*
occupation9	-0.566	-0.427	-0.563	-0.434
	(0.232)**	(0.078)***	(0.237)**	(0.078)***
Industry	0.237	0.464	0.255	0.478
	(0.267)	(0.074)***	(0.272)	(0.074)***
Construction	0.252	0.419	0.263	0.437
	(0.273)	(0.092)***	(0.278)	(0.094)***
Services	0.184	0.223	0.174	0.246
	(0.266)	(0.070)***	(0.266)	(0.070)***
Other	0.041	0.156	0.263	0.157

services and activities				
	(0.311)	(0.094)*	(0.349)	(0.092)*
State	0.044	0.106	0.077	0.101
	(0.264)	(0.062)*	(0.259)	(0.062)
Privatized	0.264	0.005	0.292	0.005
	(0.178)	(0.066)	(0.192)	(0.066)
Cooperative	0.800	-0.157	0.725	-0.207
	(0.282)***	(0.212)	(0.310)**	(0.246)
Center North	-0.668	-0.498	-0.683	-0.501
	(0.262)**	(0.113)***	(0.271)**	(0.113)***
South	-1.020	-0.456	-1.061	-0.461
	(0.318)***	(0.116)***	(0.324)***	(0.116)***
East	-0.539	-0.392	-0.585	-0.396
	(0.239)**	(0.106)***	(0.246)**	(0.106)***
West	-0.502	-0.440	-0.458	-0.435
	(0.307)	(0.112)***	(0.316)	(0.112)***
lambda021			-0.077	
			(0.410)	
lambda011				-0.130
				(0.115)
Constant	2.524	0.500	2.978	0.848
	(0.761)***	(0.224)**	(1.285)**	(0.416)**
Observations	164	1020	156	1004
R-squared	0.30	0.29	0.33	0.29

Source:ULMS
Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received

[b] wage arrears or other unexpected decrease in monthly earnings received

Table 20. Quantile regressions 10th , median and and 90th percentile – Females - 2003

	Informal			Formal		
	P10	Median	P90	P10	Median	P90
Age	0.003	0.025	-0.019	0.011	0.013	0.015
	(0.058)	(0.060)	(0.072)	(0.010)	(0.010)	(0.014)
Age^2	-0.000	-0.000	0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Secondary	0.140	0.001	-0.182	0.013	0.097	0.125
	(0.254)	(0.228)	(0.325)	(0.046)	(0.040)**	(0.077)
University	0.244	0.179	0.143	0.188	0.432	0.454
	(0.335)	(0.336)	(0.591)	(0.051)***	(0.055)***	(0.097)***
Tenure	-0.006	-0.000	0.047	0.007	0.004	0.014
	(0.092)	(0.080)	(0.112)	(0.006)	(0.005)	(0.007)**
$Tenure^2/100$	0.030	0.159	-0.741	-0.014	-0.003	-0.022
	(0.841)	(0.759)	(1.409)	(0.018)	(0.013)	(0.019)
Positive Δ^a	0.678	0.619	0.101	0.337	0.406	0.602
	(0.480)	(0.299)**	(0.234)	(0.129)***	(0.148)***	(0.339)*
Negative Δ^b	-0.834	-0.775	-1.345	-0.956	-0.507	-0.496
	(0.813)	(0.749)	(0.791)*	(0.127)***	(0.077)***	(0.105)***
Choice Informality	-0.088	0.125	0.173			
	(0.211)	(0.209)	(0.279)			
Self Employed	-0.151	-0.018	0.326	-0.015	0.131	1.170
	(0.350)	(0.276)	(0.419)	(0.312)	(0.176)	(0.387)***
Part time	1.089	0.621	0.018	0.009	0.097	0.214
	(0.429)**	(0.273)**	(0.375)	(0.061)	(0.081)	(0.095)**
occupation4	0.782	-0.030	-0.962	-0.027	-0.074	-0.056
	(0.563)	(0.573)	(0.725)	(0.059)	(0.050)	(0.082)
occupation5	0.428	-0.220	-1.203	-0.251	-0.202	-0.257
	(0.455)	(0.375)	(0.568)**	(0.073)***	(0.059)***	(0.092)***
occupation6	-0.037	0.135	-0.906	-0.781	-0.073	-0.202
	(0.668)	(0.997)	(1.016)	(0.601)	(0.102)	(0.277)

occupation7	1.024	0.387	-0.503	-0.210	-0.075	0.145
	(0.695)	(0.679)	(0.974)	(0.070)***	(0.069)	(0.093)
occupation8	0.297		-1.148	-0.163	0.092	-0.211
	(0.444)		(0.554)**	(0.045)***	(0.133)	(0.091)**
occupation9	0.445	-0.202	0.555	0.438	-0.181	0.167
	(0.575)	(0.418)	(0.591)	(0.128)***	(0.039)***	(0.087)*
Industry	1.538	0.914	0.760	0.482	0.206	0.157
	(0.832)*	(0.480)*	(0.749)	(0.216)**	(0.061)***	(0.155)
Construction	0.685	1.491	0.696	0.242	0.220	-0.002
	(0.391)*	(0.696)**	(0.401)*	(0.123)**	(0.124)*	(0.074)
Services	-0.044	0.735	0.586	0.296	-0.015	-0.004
	(0.617)	(0.351)**	(0.487)	(0.141)**	(0.040)	(0.094)
Other services and activities	1.133	0.609	-0.298	-0.047	0.019	-0.259
	(0.774)	(0.463)	(0.654)	(0.076)	(0.068)	(0.077)***
State	-1.053	0.985	-0.820	-0.025	-0.221	-0.035
	(0.515)**	(0.537)*	(0.556)	(0.096)	(0.069)***	(0.119)
Privatized		-0.227		-0.016	-0.226	-0.735
		(0.349)		(0.155)	(0.076)***	(0.287)**
Cooperative	-1.000		0.281	-0.168	-0.719	-0.455
	(0.670)		(0.698)	(0.059)***	(0.269)***	(0.113)***
Center North	-0.590	-0.151	-0.494	-0.135	-0.300	-0.304
	(0.698)	(0.427)	(0.502)	(0.047)***	(0.077)***	(0.112)***
South	-0.521	0.042	-0.442	-0.172	-0.199	-0.411
	(0.613)	(0.406)	(0.502)	(0.052)***	(0.084)**	(0.115)***
East	-0.942	-0.239	-0.208	-0.095	-0.288	-0.287
	(0.667)	(0.372)	(0.597)	(0.048)**	(0.073)***	(0.130)**
West		-0.065		-0.124	-0.238	-0.015
		(0.442)		(0.111)	(0.075)***	(0.224)
Constant	-0.732	-0.603	1.901	-0.420	0.392	0.966
	(1.332)	(1.332)	(1.346)	(0.247)*	(0.231)*	(0.301)***
Observations	131	131	131	1573	1573	1573

Source:ULMS

Bootstrapped standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received

[b] wage arrears or other unexpected decrease in monthly earnings received

Table 21. Quantile regressions 10th , median and and 90th percentile – Females - 2004

	Informal			Formal		
	P10	Median	P90	P10	Median	P90
Age	-0.000	0.032	0.048	-0.001	0.008	0.011
	(0.048)	(0.037)	(0.050)	(0.009)	(0.009)	(0.018)
Age^2	0.000	-0.000	-0.001	0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Secondary	-0.168	-0.078	0.097	0.192	0.071	0.062
	(0.206)	(0.161)	(0.223)	(0.113)*	(0.045)	(0.125)
University	-0.184	-0.052	-0.420	0.440	0.454	0.663
	(0.327)	(0.257)	(0.364)	(0.131)***	(0.058)***	(0.173)***
Tenure	-0.067	-0.014	-0.084	0.007	0.008	0.015
	(0.059)	(0.056)	(0.072)	(0.005)	(0.004)**	(0.009)*
$Tenure^2/100$	0.149	-0.053	0.203	-0.007	-0.017	-0.032
	(0.244)	(0.207)	(0.301)	(0.011)	(0.009)*	(0.022)
Positive Δ^a				0.528	0.802	0.246
				(0.194)***	(0.265)***	(0.135)*
Negative Δ^b	-1.932	-1.476	-0.078	-1.217	-0.520	-0.009
	(0.791)**	(0.798)*	(0.721)	(0.247)***	(0.115)***	(0.324)
Choice Informality	0.137	0.266	0.605			
	(0.216)	(0.192)	(0.255)**			
Self Employed	-0.441	0.169	1.479	-0.487	0.310	1.228
	(0.449)	(0.321)	(0.611)**	(0.325)	(0.266)	(0.723)*
Part time	-0.295	0.497	0.279	-0.074	0.099	0.081
	(0.456)	(0.393)	(0.512)	(0.081)	(0.095)	(0.160)
occupation4	1.183	0.809	0.631	-0.194	-0.103	-0.003
	(0.789)	(0.644)	(0.908)	(0.056)***	(0.057)*	(0.158)
occupation5	0.995	0.162	0.472	-0.325	-0.283	-0.376
	(0.626)	(0.490)	(0.735)	(0.121)***	(0.059)***	(0.113)***
occupation6				-0.361	-0.246	-0.230

				(0.199)*	(0.170)	(0.384)
occupation7	1.688	0.803	0.596	-0.072	-0.088	0.008
	(0.690)**	(0.544)	(0.686)	(0.076)	(0.062)	(0.108)
occupation8				-0.025	-0.043	0.164
				(0.152)	(0.112)	(0.233)
occupation9	0.465	0.223	0.358	-0.238	-0.259	-0.293
	(0.591)	(0.433)	(0.670)	(0.064)***	(0.041)***	(0.106)***
Industry	0.009	0.296	1.252	0.066	0.275	0.264
	(0.600)	(0.423)	(0.663)*	(0.077)	(0.056)***	(0.132)**
Construction	-0.424	0.660	1.361	0.232	0.240	0.144
	(0.755)	(0.620)	(0.928)	(0.146)	(0.127)*	(0.184)
Services	-0.426	0.275	0.485	0.016	0.131	0.278
	(0.537)	(0.367)	(0.552)	(0.058)	(0.047)***	(0.114)**
Other services and activities	-1.068	0.394	1.321	0.007	0.116	0.207
	(0.643)*	(0.556)	(0.591)**	(0.097)	(0.073)	(0.158)
State	-0.041	-0.464	-0.419	0.041	-0.082	-0.063
	(0.687)	(0.537)	(0.824)	(0.086)	(0.052)	(0.106)
Privatized	-0.014	-0.194	0.349	0.046	0.050	0.002
	(0.305)	(0.249)	(0.381)	(0.114)	(0.058)	(0.101)
Cooperative				-0.295	0.375	0.043
				(0.627)	(0.322)	(0.233)
Center North	-0.289	-0.690	-0.315	-0.146	-0.119	-0.035
	(0.475)	(0.467)	(0.523)	(0.086)*	(0.096)	(0.149)
South	0.159	-0.430	0.221	-0.144	-0.003	0.080
	(0.490)	(0.466)	(0.500)	(0.085)*	(0.118)	(0.178)
East	-0.264	-0.547	-0.342	-0.258	-0.166	-0.221
	(0.480)	(0.429)	(0.445)	(0.081)***	(0.094)*	(0.135)
West	-0.508	-0.421	-0.507	-0.179	-0.182	-0.205
	(0.556)	(0.487)	(0.473)	(0.084)**	(0.099)*	(0.152)
Constant	-0.274	-0.078	-0.724	0.020	0.291	0.831
	(0.961)	(0.828)	(1.202)	(0.230)	(0.225)	(0.388)**
Observations	162	162	162	1222	1222	1222

Source:ULMS
Bootstrapped standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received

[b] wage arrears or other unexpected decrease in monthly earnings received

Table 22. Quantile regressions 10th , median and and 90th percentile –Males - 2003

	Informal			Formal		
	P10	Median	P90	P10	Median	P90
Age	-0.041	-0.044	0.005	-0.008	0.024	0.034
	(0.077)	(0.055)	(0.066)	(0.013)	(0.011)**	(0.015)**
Age^2	0.001	0.000	-0.000	0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)***	(0.000)***
Secondary	0.165	-0.029	-0.013	0.017	0.109	0.047
	(0.363)	(0.278)	(0.221)	(0.071)	(0.043)**	(0.077)
University	0.262	0.016	-0.008	0.117	0.241	0.193
	(0.551)	(0.403)	(0.394)	(0.073)	(0.071)***	(0.122)
Tenure	0.006	0.040	0.120	0.016	0.009	0.000
	(0.137)	(0.098)	(0.093)	(0.010)	(0.007)	(0.007)
$Tenure^2/100$	0.014	-0.555	-0.979	-0.036	-0.008	-0.002
	(1.009)	(0.716)	(0.806)	(0.032)	(0.019)	(0.019)
Positive Δ^a				0.512	0.447	0.725
				(0.208)**	(0.176)**	(0.359)**
Negative Δ^b	-1.219	-0.427	0.644	-1.048	-0.650	-0.419
	(0.848)	(0.726)	(0.871)	(0.193)***	(0.102)***	(0.110)***
Choice Informality	-0.241	0.027	-0.124			
	(0.358)	(0.313)	(0.290)			
Self Employed	-0.096	0.247	0.378	-0.371	0.119	0.602
	(0.375)	(0.286)	(0.334)	(0.210)*	(0.199)	(0.359)*
Part time	-0.109	0.140	0.422	0.111	-0.057	0.400
	(0.570)	(0.425)	(0.420)	(0.133)	(0.078)	(0.342)
occupation4	-0.811	0.302	-0.659	-0.319	-0.277	-0.208
	(0.917)	(0.803)	(0.688)	(0.100)***	(0.114)**	(0.163)
occupation5	-0.888	-0.843	-1.426	-0.060	-0.130	-0.296
	(0.551)	(0.544)	(0.553)**	(0.176)	(0.147)	(0.196)

occupation6	-0.929	-0.100	-0.270	-0.562	-0.420	-0.427
	(1.268)	(1.060)	(0.656)	(0.262)**	(0.106)***	(0.237)*
occupation7	-0.310	-0.163	-0.461	-0.154	-0.073	-0.102
	(0.661)	(0.474)	(0.407)	(0.077)**	(0.056)	(0.092)
occupation8	0.278	0.095	-0.573	-0.200	-0.055	-0.092
	(0.513)	(0.466)	(0.463)	(0.106)*	(0.075)	(0.113)
occupation9	-0.512	-0.352	-0.487	-0.415	-0.335	-0.367
	(0.562)	(0.432)	(0.344)	(0.083)***	(0.064)***	(0.114)***
Industry	1.247	0.496	0.421	0.749	0.510	0.555
	(0.686)*	(0.426)	(0.395)	(0.108)***	(0.060)***	(0.118)***
Construction	0.565	0.413	0.660	0.580	0.319	0.453
	(0.666)	(0.442)	(0.329)**	(0.125)***	(0.146)**	(0.137)***
Services	1.359	0.550	1.085	0.528	0.278	0.409
	(0.570)**	(0.445)	(0.285)***	(0.111)***	(0.063)***	(0.125)***
Other services and activities	0.480	0.606	0.759	0.477	0.212	0.485
	(0.661)	(0.490)	(0.573)	(0.148)***	(0.101)**	(0.197)**
State	-0.154	-0.678	-0.916	0.095	-0.056	0.028
	(0.985)	(0.704)	(1.084)	(0.091)	(0.072)	(0.102)
Privatized	-0.642	-0.494	-0.860	0.154	-0.052	-0.068
	(0.623)	(0.406)	(0.374)**	(0.084)*	(0.079)	(0.113)
Cooperative		-0.788		-0.164	-0.372	-0.771
		(0.555)		(0.285)	(0.073)***	(0.288)***
Center North	-1.361		-0.375	-0.125	-0.294	-0.371
	(0.764)*		(0.542)	(0.097)	(0.294)	(0.157)**
South	-0.148	-0.847	-0.888	-0.058	-0.399	-0.308
	(0.683)	(0.558)	(0.511)*	(0.109)	(0.082)***	(0.168)*
East	-0.515	-0.443	-0.474	-0.093	-0.185	-0.199
	(0.649)	(0.536)	(0.561)	(0.102)	(0.075)**	(0.149)
West	-0.072	-0.142	-0.037	-0.159	-0.308	-0.269
	(0.794)	(0.544)	(0.469)	(0.103)	(0.082)***	(0.159)*
Constant	0.283	1.717	1.584	-0.228	0.225	0.667
	(1.750)	(1.390)	(1.382)	(0.269)	(0.231)	(0.373)*

Observations	131	131	131	1312	1312	1312

Source:ULMS
Bootstrapped standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received

[b] wage arrears or other unexpected decrease in monthly earnings received

Table 23. Quantile regressions 10th , median and and 90th percentile –Males - 2004

	Informal			Formal		
	P10	Median	P90	P10	Median	P90
Age	-0.093	-0.102	0.020	0.019	0.029	0.036
	(0.071)	(0.044)**	(0.062)	(0.016)	(0.011)***	(0.019)*
Age^2	0.001	0.001	-0.000	-0.000	-0.000	-0.001
	(0.001)	(0.001)**	(0.001)	(0.000)	(0.000)***	(0.000)**
Secondary	-0.094	0.247	0.483	0.189	0.131	0.248
	(0.257)	(0.180)	(0.272)*	(0.090)**	(0.055)**	(0.123)**
University	0.474	0.137	-0.052	0.313	0.313	0.599
	(0.626)	(1.436)	(1.337)	(0.116)***	(0.078)***	(0.173)***
Tenure	0.067	-0.035	-0.001	0.008	0.016	0.015
	(0.114)	(0.105)	(0.127)	(0.010)	(0.006)***	(0.015)
$Tenure^2/100$	-0.200	0.176	-0.003	-0.014	-0.022	-0.026
	(0.832)	(0.998)	(1.034)	(0.024)	(0.018)	(0.036)
Positive Δ^a				-0.145	0.180	-0.252
				(0.433)	(0.368)	(0.229)
Negative Δ^b	-0.352	-0.376	-2.190	-1.151	-0.749	-0.273
	(0.420)	(0.549)	(0.864)**	(0.170)***	(0.204)***	(0.183)
Choice Informality	0.085	0.046	-0.171			
	(0.353)	(0.204)	(0.295)			
Self Employed	0.104	0.393	0.325	-0.294	0.126	0.157
	(0.441)	(0.230)*	(0.240)	(0.372)	(0.127)	(0.313)
Part time	0.308	0.134	-0.177	-0.188	-0.020	0.578
	(0.844)	(0.489)	(0.518)	(0.152)	(0.225)	(0.425)
occupation4	0.276	0.612	-0.570	-0.143	-0.123	-0.299
	(0.691)	(0.611)	(0.606)	(0.134)	(0.105)	(0.284)
occupation5	0.412	-0.469	0.327	-0.187	-0.283	-0.076
	(0.471)	(0.535)	(0.806)	(0.293)	(0.135)**	(0.217)

occupation6	1.415	0.807	-0.607	-0.806	-0.437	-0.737
	(0.800)*	(0.478)*	(0.634)	(0.299)***	(0.175)**	(0.270)***
occupation7	0.101	0.082	-0.138	-0.107	-0.042	-0.227
	(0.557)	(0.388)	(0.437)	(0.086)	(0.063)	(0.103)**
occupation8	-0.032	0.133	0.253	-0.203	-0.168	-0.037
	(0.675)	(0.501)	(0.633)	(0.098)**	(0.073)**	(0.156)
occupation9	-0.310	-0.457	-0.661	-0.530	-0.400	-0.419
	(0.403)	(0.352)	(0.442)	(0.122)***	(0.077)***	(0.127)***
Industry	0.516	0.485	0.016	0.528	0.446	0.442
	(0.445)	(0.387)	(0.431)	(0.124)***	(0.072)***	(0.170)***
Construction	0.244	0.511	-0.334	0.320	0.399	0.374
	(0.396)	(0.390)	(0.473)	(0.183)*	(0.098)***	(0.198)*
Services	0.314	0.489	0.049	0.173	0.291	0.156
	(0.432)	(0.417)	(0.452)	(0.121)	(0.072)***	(0.156)
Other services and activities	-0.117	0.408	-0.736	0.179	0.089	0.214
	(0.586)	(0.485)	(0.571)	(0.177)	(0.114)	(0.195)
State	0.474	0.343	0.303	0.089	0.027	0.097
	(0.592)	(0.427)	(0.637)	(0.101)	(0.060)	(0.130)
Privatized	0.450	0.243	-0.033	0.026	-0.014	-0.044
	(0.423)	(0.265)	(0.315)	(0.111)	(0.068)	(0.127)
Cooperative	1.422	1.100	-0.130	0.194	-0.193	0.241
	(0.786)*	(0.499)**	(0.414)	(0.300)	(0.297)	(0.545)
Center North	-1.042	-0.905	0.157	-0.456	-0.521	-0.301
	(0.590)*	(0.548)	(0.503)	(0.257)*	(0.088)***	(0.196)
South	-1.298	-1.062	-0.691	-0.299	-0.574	-0.097
	(0.736)*	(0.585)*	(0.521)	(0.247)	(0.090)***	(0.233)
East	-0.659	-0.567	-0.228	-0.353	-0.426	-0.212
	(0.612)	(0.533)	(0.492)	(0.258)	(0.082)***	(0.199)
West	-0.739	-0.617	0.217	-0.407	-0.544	-0.227
	(0.653)	(0.569)	(0.537)	(0.252)	(0.094)***	(0.223)
Constant	2.156	2.573	1.686	-0.119	0.493	0.796
	(1.634)	(1.109)**	(1.127)	(0.426)	(0.240)**	(0.486)

Observations	164	164	164	1020	1020	1020

Source:ULMS
Bootstrapped standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received

[b] wage arrears or other unexpected decrease in monthly earnings received

Table 24. Robust regression – Females - 2003

	Informal	Formal
Age	-0.001	0.012
	(0.042)	(0.007)*
Age^2	-0.000	-0.000
	(0.001)	(0.000)**
Secondary	-0.068	0.095
	(0.181)	(0.037)***
University	0.074	0.399
	(0.277)	(0.045)***
Tenure	0.006	0.006
	(0.058)	(0.004)
$Tenure^2/100$	0.019	-0.008
	(0.447)	(0.010)
Positive Δ^a		0.357
		(0.082)***
Negative Δ^b	-0.669	-0.515
	(0.442)	(0.048)***
Choice Informality	0.023	
	(0.178)	
Self Employed	-0.089	0.008
	(0.204)	(0.084)
Part time	0.605	0.080
	(0.229)***	(0.046)*
occupation4	-0.114	-0.073
	(0.444)	(0.039)*
occupation5	-0.247	-0.245
	(0.253)	(0.043)***
occupation6	-0.692	-0.041
	(0.400)*	(0.111)
occupation7	0.161	-0.044
	(0.446)	(0.045)
occupation8		0.084
		(0.076)
occupation9	-0.298	-0.198
	(0.236)	(0.036)***
Industry	0.896	0.190
	(0.326)***	(0.049)***
Construction	1.459	0.264
	(0.557)**	(0.088)***
Services	0.722	0.006
	(0.207)***	(0.043)
Other services and activities	0.705	0.026
	(0.277)**	(0.056)

State	0.822	-0.201
	(0.547)	(0.040)***
Privatized	-0.245	-0.138
	(0.296)	(0.053)***
Cooperative		-0.669
		(0.184)***
Center North	-0.411	-0.288
	(0.310)	(0.045)***
South	-0.124	-0.187
	(0.312)	(0.048)***
East	-0.322	-0.273
	(0.278)	(0.043)***
West	-0.503	-0.213
	(0.306)	(0.045)***
Constant	0.207	0.389
	(0.808)	(0.149)***
Observations	131	1573
R-squared	0.38	0.29

Source:ULMS
Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received
[b] wage arrears or other unexpected decrease in monthly earnings received

Robust regression – Females - 2004

	Informal	Formal
Age	0.006	0.005
	(0.029)	(0.008)
Age^2	-0.000	-0.000
	(0.000)	(0.000)
Secondary	0.026	0.117
	(0.137)	(0.046)**
University	0.148	0.487
	(0.220)	(0.055)***
Tenure	0.008	0.010
	(0.031)	(0.004)**
$Tenure^2/100$	-0.096	-0.019
	(0.122)	(0.010)*
Positive Δ^a	0.000	0.647
	(0.000)	(0.156)***
Negative Δ^b	-1.014	-0.558
	(0.330)***	(0.081)***
Choice Informality	0.177	
	(0.142)	
Self Employed	0.212	0.093
	(0.217)	(0.113)
Part time	0.415	0.046
	(0.208)**	(0.060)
occupation4	0.532	-0.086
	(0.348)	(0.046)*
occupation5	0.145	-0.278
	(0.240)	(0.053)***
occupation6		-0.222
		(0.137)
occupation7	0.960	-0.012
	(0.310)***	(0.054)
occupation8		0.015
		(0.088)
occupation9	0.173	-0.259
	(0.222)	(0.043)***
Industry	0.304	0.241
	(0.278)	(0.055)***
Construction	0.466	0.240
	(0.420)	(0.111)**
Services	0.301	0.149
	(0.234)	(0.048)***
Other services and activities	0.745	0.146
	(0.246)***	(0.068)**
State	-0.592	-0.084

	(0.337)*	(0.045)*
Privatized	-0.140	0.019
	(0.183)	(0.052)
Cooperative		0.440
		(0.200)**
Center North	-0.654	-0.171
	(0.277)**	(0.073)**
South	-0.319	-0.100
	(0.277)	(0.079)
East	-0.480	-0.254
	(0.254)*	(0.072)***
West	-0.409	-0.235
	(0.297)	(0.075)***
Constant	0.238	0.371
	(0.646)	(0.180)**
Observations	162	1222
R-squared	0.39	0.30

Source:ULMS
Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received

[b] wage arrears or other unexpected decrease in monthly earnings received

Table 26. Robust regression – Males - 2003

	Informal	Formal
Age	-0.047	0.015
	(0.038)	(0.009)*
Age^2	0.000	-0.000
	(0.001)	(0.000)**
Secondary	-0.111	0.098
	(0.170)	(0.040)**
University	0.014	0.229
	(0.259)	(0.060)***
Tenure	0.105	0.009
	(0.057)*	(0.005)*
$Tenure^2/100$	-0.742	-0.014
	(0.435)*	(0.014)
Positive Δ^a		0.396
		(0.117)***
Negative Δ^b	-0.222	-0.616
	(0.352)	(0.059)***
Choice Informality	0.003	
	(0.208)	
Self Employed	0.261	0.045
	(0.202)	(0.103)
Part time	0.228	-0.030
	(0.295)	(0.089)
occupation4	-0.357	-0.322
	(0.451)	(0.088)***
occupation5	-0.912	-0.138
	(0.330)***	(0.101)
occupation6	0.186	-0.390
	(0.472)	(0.105)***
occupation7	-0.531	-0.083
	(0.282)*	(0.050)*
occupation8	0.003	-0.073
	(0.389)	(0.063)
occupation9	-0.384	-0.320
	(0.244)	(0.056)***
Industry	0.702	0.570
	(0.319)**	(0.056)***
Construction	0.649	0.415
	(0.255)**	(0.082)***
Services	0.702	0.350
	(0.254)***	(0.056)***
Other services and activities	0.550	0.307
	(0.298)*	(0.079)***
State	-0.787	-0.019

	(0.651)	(0.049)
Privatized	-0.386	-0.053
	(0.334)	(0.060)
Cooperative		-0.467
		(0.239)*
Center North	-0.777	-0.373
	(0.359)**	(0.067)***
South	-0.903	-0.360
	(0.357)**	(0.070)***
East	-0.709	-0.199
	(0.359)*	(0.063)***
West	-0.309	-0.327
	(0.384)	(0.066)***
Constant	1.967	0.329
	(0.817)**	(0.185)*
Observations	131	1312
R-squared	0.37	0.30

Source:ULMS
Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received

[b] wage arrears or other unexpected decrease in monthly earnings received

Table 27. Robust regression – Males - 2004

	Informal	Formal
Age	-0.086	0.023
	(0.035)**	(0.009)**
Age^2	0.001	-0.000
	(0.000)**	(0.000)***
Secondary	0.230	0.166
	(0.147)	(0.051)***
University	0.030	0.336
	(0.421)	(0.073)***
Tenure	-0.029	0.012
	(0.044)	(0.006)**
$Tenure^2/100$	0.181	-0.015
	(0.219)	(0.016)
Positive Δ^a		0.161
		(0.232)
Negative Δ^b	-0.801	-0.818
	(0.588)	(0.095)***
Choice Informality	0.124	
	(0.173)	
Self Employed	0.395	0.006
	(0.168)**	(0.102)
Part time	0.389	-0.148
	(0.252)	(0.107)
occupation4	0.289	-0.159
	(0.600)	(0.098)
occupation5	-0.240	-0.223
	(0.318)	(0.109)**
occupation6	0.582	-0.500
	(0.838)	(0.126)***
occupation7	0.013	-0.082
	(0.239)	(0.058)
occupation8	0.015	-0.142
	(0.336)	(0.066)**
occupation9	-0.516	-0.368
	(0.208)**	(0.069)***
Industry	0.519	0.462
	(0.246)**	(0.063)***
Construction	0.541	0.448
	(0.227)**	(0.088)***
Services	0.409	0.244
	(0.240)*	(0.062)***
Other services and activities	0.125	0.180
	(0.308)	(0.090)**
State	0.057	0.025

	(0.408)	(0.054)
Privatized	0.240	-0.053
	(0.278)	(0.058)
Cooperative	0.809	-0.221
	(0.814)	(0.222)
Center North	-0.678	-0.448
	(0.385)*	(0.093)***
South	-0.852	-0.452
	(0.397)**	(0.101)***
East	-0.508	-0.352
	(0.374)	(0.091)***
West	-0.502	-0.470
	(0.399)	(0.095)***
Constant	2.377	0.514
	(0.761)***	(0.210)**
Observations	164	1020
R-squared	0.35	0.31

Source:ULMS
Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] paid wage arrears or other unexpected increase in monthly earnings received

[b] wage arrears or other unexpected decrease in monthly earnings received

Table 28. Gender wage gap – Oaxaca decomposition not adjusted and adjusted for selection

2003 and 2004

	2003			
	Formal		Informal	
	Not adjusted	Adjusted	Not adjusted	Adjusted
Difference	0.234***	0.298***	0.195*	-2.540
Explained[a]	-0.003	0.013	0.221**	0.222*
Unexplained[b]	0.236***	0.285***	-0.027	-2.762
	2004			
	Formal		Informal	
	Not adjusted	Adjusted	Not adjusted	Adjusted
Difference	0.238***	0.228**	0.280***	-0.436
Explained	-0.005	0.011	0.286**	0.268***
Unexplained	0.243***	0.218*	-0.006	-0.704

Source:ULMS

Notes:

Reference (non-discriminated) group is males.

[a] Endowments

[b] Coefficients and interaction between coefficients and endowments

* significant at 10%; ** significant at 5%; *** significant at 1%