

Preliminary – please do not cite!

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

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This version: 28 February 2007

Abstract

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 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 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.

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-employment¹ 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

¹ All informal self-employment is considered voluntary. Because of too few cases we cannot look at entrepreneurs and exclude them from the analysis.

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. 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 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 individuals², 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.³ In our presentation of the net changes that occur, we

² The ULMS is briefly presented in the data section of this paper. For a more detailed of the ULMS, see Lehmann (2007).

³ 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

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 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

industry, as much of this new agricultural employment consists in subsistence agriculture. In Ukraine where until very recently land could not be privately owned, agriculture clearly could not fulfill such a buffer function.

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 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.

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.⁴ 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 survey is the individual questionnaire, which elicits detailed information

⁴ 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.

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.

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 endogeneous. 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.⁵ 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 ($\mathbf{P}_{.j}$) and column ($\mathbf{P}_{i.}$) 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 $\mathbf{P}_{.j}$, 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 $(1/(1-\mathbf{P}_{ii}))$, while for the destination state by $(1/(1-\mathbf{P}_{jj}))$. 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.⁶

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

⁵ 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.

⁶ For a more detailed discussion of the “Q” and “V” matrices, see Bosch and Maloney (2004).

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.⁷ 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.

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

⁷ 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.

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.⁸ The upper panel of Table 7 (unconditional transition

⁸ 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.

probabilities) tells us that most of the growth in informal 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.

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.

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)

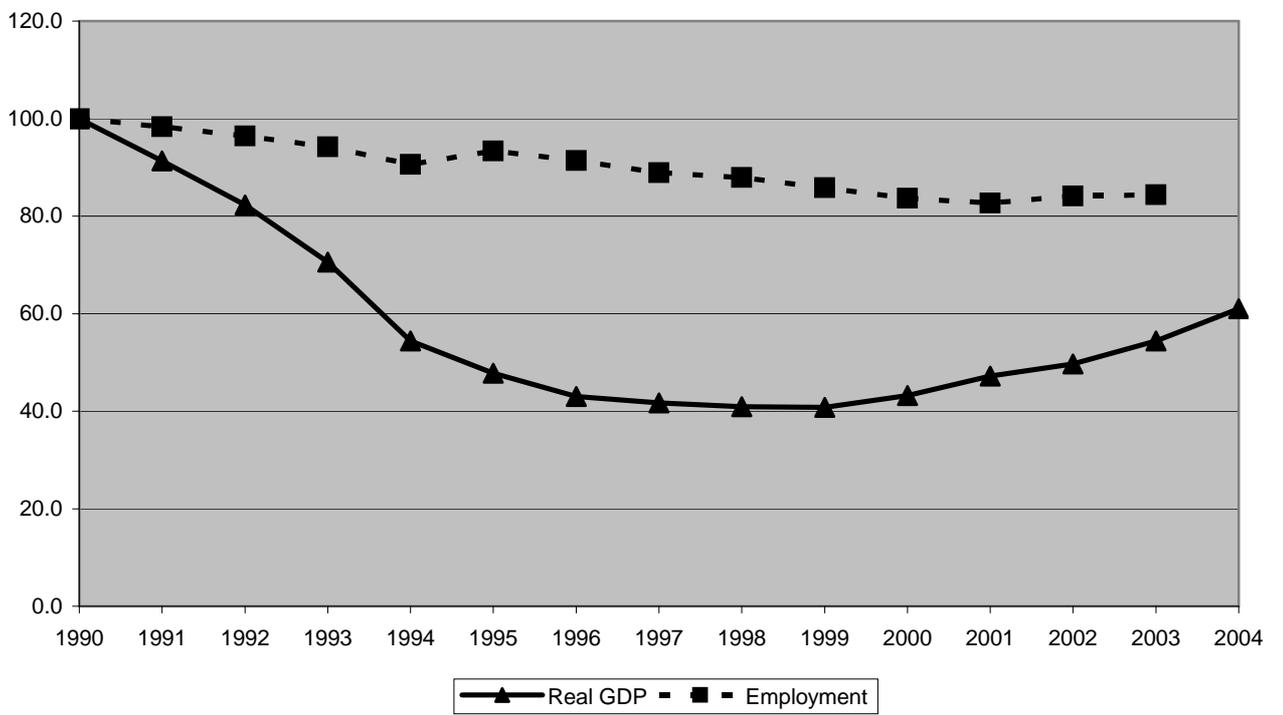


Figure 2 Log working earnings 2003 – Not trimmed

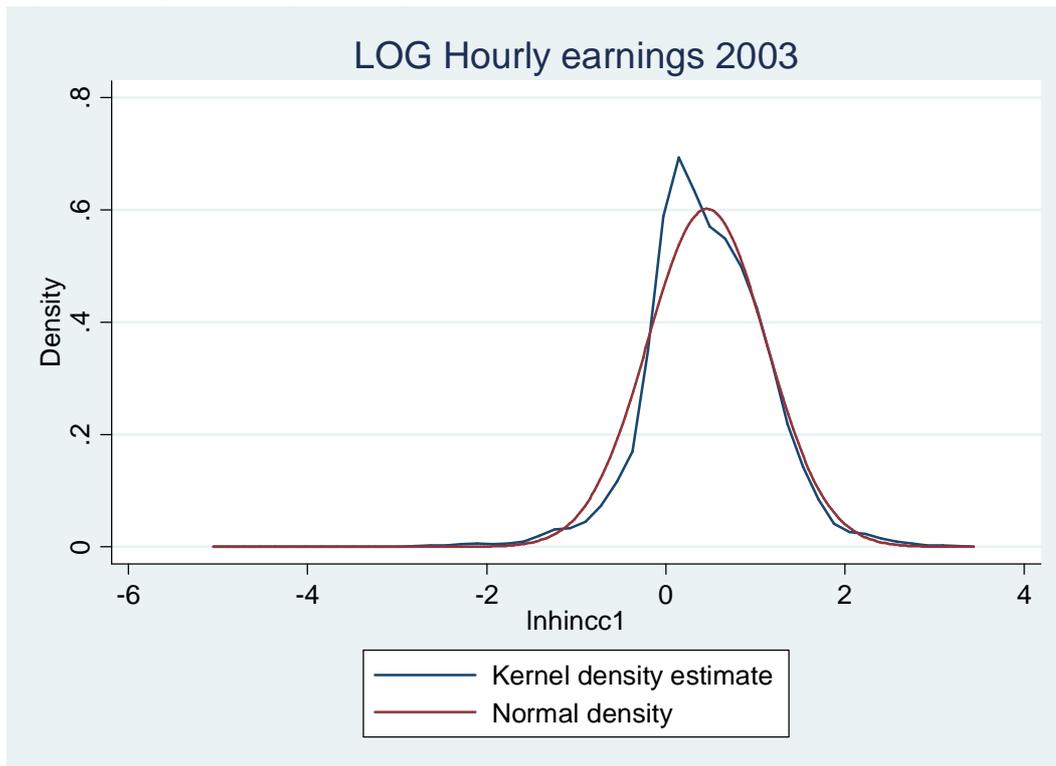


Figure 3 Log working earnings 2004 – Not trimmed

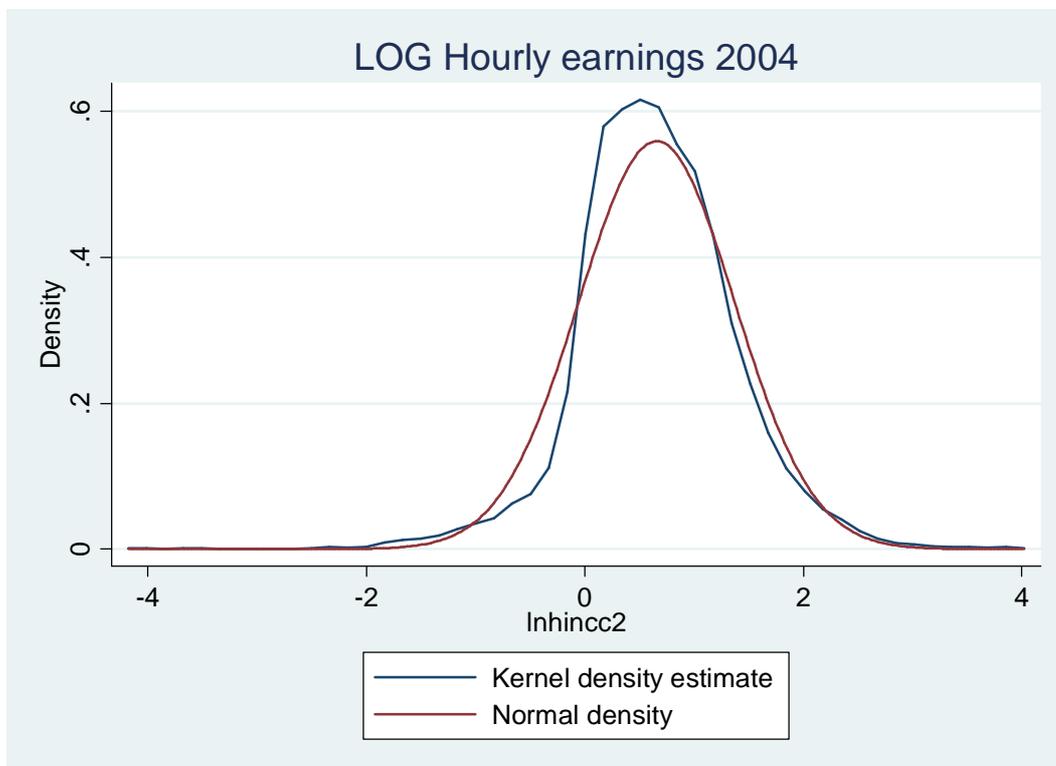


Figure 4 Log working earnings 2003 – Trimmed

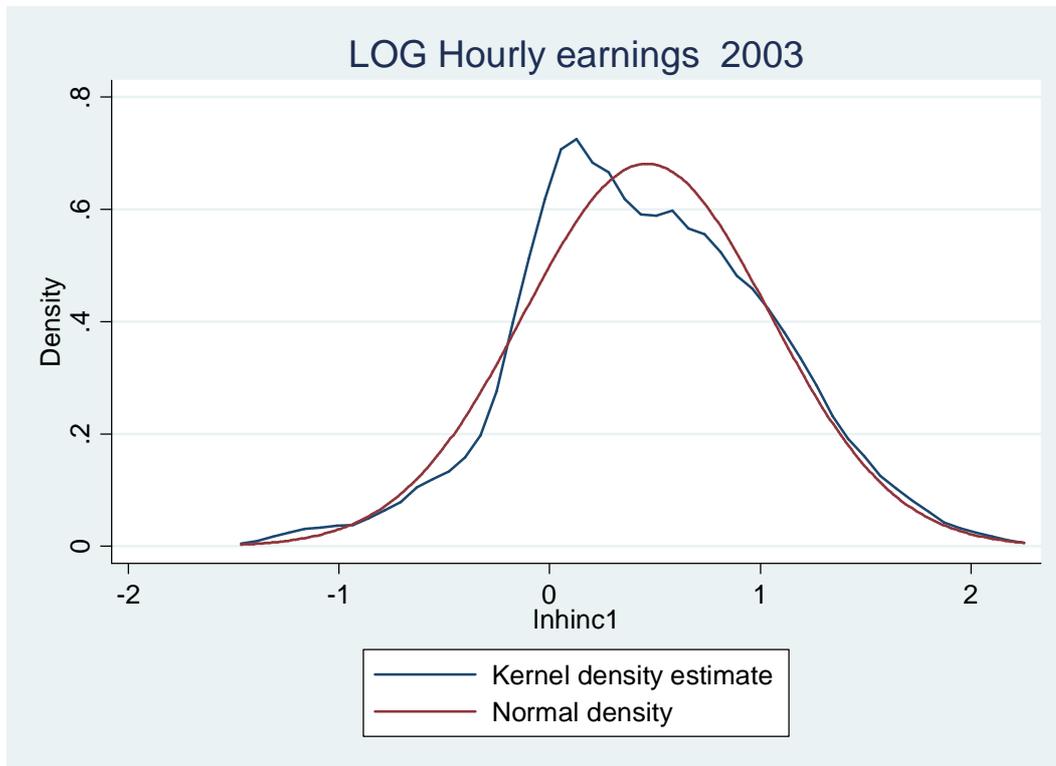
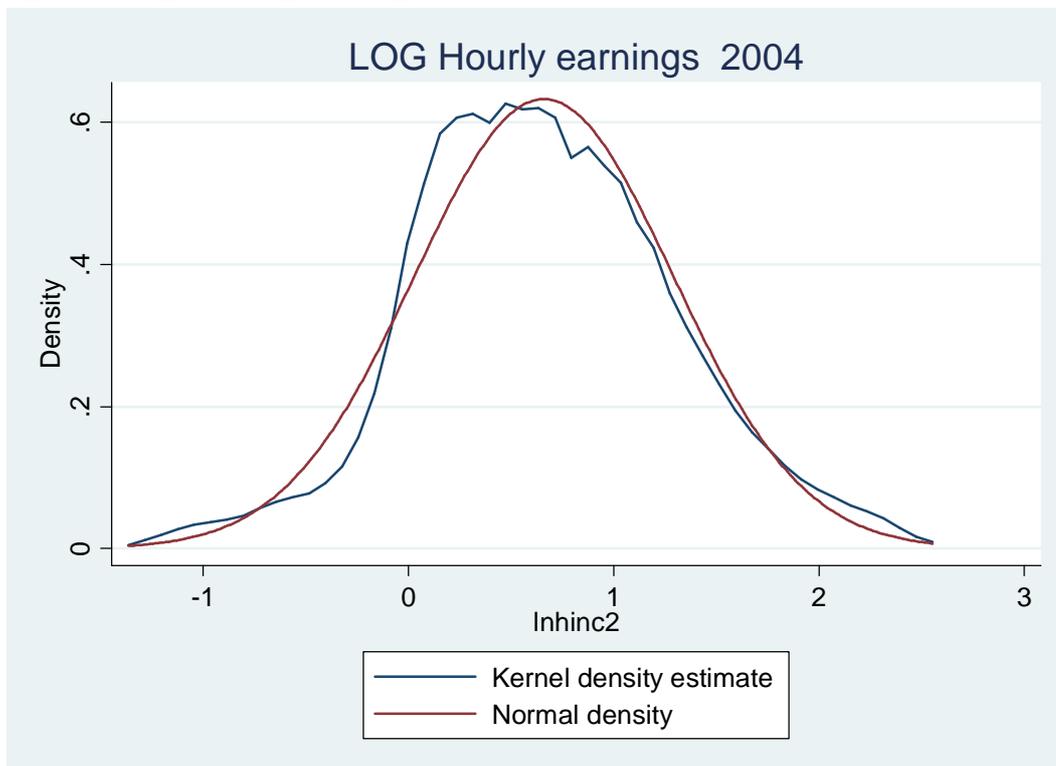


Figure 5 Log working earnings 2004 – Trimmed



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

^aEnd of the year

^bReference week

Source: ULMS

Notes: ¹Share of employed in Public Administration (PA) not shown – The PA share stays roughly at 4% during the whole period (1991-2004)

²Includes 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 (0.065)	0.124 (0.172)	0.093 (0.079)	-0.230 (0.209)	0.117 (0.092)
Age	0.022 (0.019)	0.058 (0.061)	0.006 (0.023)	0.116 (0.073)	-0.008 (0.025)
Age ²	-0.000 (0.000)	-0.000 (0.001)	-0.000 (0.000)	-0.001 (0.001)	0.000 (0.000)
Secondary	-0.198 (0.077)***	-0.052 (0.218)	-0.302 (0.090)***	0.128 (0.261)	-0.361 (0.101)***
University	-0.553 (0.106)***	-0.662 (0.271)**	-0.665 (0.129)***	-0.429 (0.319)	-0.677 (0.148)***
Tenure	-0.061 (0.019)***	-0.163 (0.063)**	-0.087 (0.030)***	-0.107 (0.089)	-0.075 (0.034)**
Tenure ² /100	-0.124 (0.117)	1.046 (0.450)**	-0.158 (0.233)	0.317 (0.729)	-0.172 (0.257)
Single	0.270 (0.120)**	0.796 (0.369)**	0.237 (0.139)*	0.973 (0.438)**	0.280 (0.161)*
Divorced & other	0.006 (0.095)	-0.047 (0.278)	0.133 (0.110)	0.015 (0.332)	0.237 (0.122)*
Children<6	0.116 (0.115)	0.626 (0.319)**	0.096 (0.136)	0.510 (0.362)	0.169 (0.156)
Children>6	-0.051 (0.087)	0.134 (0.226)	-0.028 (0.106)	-0.244 (0.277)	-0.133 (0.128)
Formal in household	-0.201 (0.044)***	-0.230 (0.107)**	-0.169 (0.052)***	-0.105 (0.122)	-0.135 (0.060)**
Part-time	0.552 (0.116)***	0.264 (0.244)	0.386 (0.156)**	0.714 (0.276)***	0.340 (0.180)*
Center-North	0.235 (0.140)*	0.281 (0.576)	0.043 (0.154)	-0.232 (0.598)	0.428 (0.220)*
South	0.426 (0.141)***	0.574 (0.580)	0.162 (0.156)	-0.061 (0.603)	0.655 (0.218)***
East	0.250 (0.134)*	0.333 (0.568)	0.132 (0.144)	-0.059 (0.585)	0.522 (0.209)**
West	0.110 (0.144)	0.285 (0.581)	-0.069 (0.159)	0.012 (0.590)	0.221 (0.229)
Constant	-1.260 (0.411)***	-1.550 (1.371)	-0.845 (0.473)*	-2.505 (1.637)	-1.296 (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 (0.066)	0.219 (0.196)	0.041 (0.079)	-0.352 (0.262)	0.056 (0.088)
Age	0.019 (0.020)	-0.001 (0.066)	0.044 (0.025)*	0.048 (0.080)	0.053 (0.028)*
Age ²	-0.000 (0.000)	0.000 (0.001)	-0.001 (0.000)**	-0.000 (0.001)	-0.001 (0.000)**
Secondary	-0.480 (0.080)***	-0.804 (0.273)***	-0.449 (0.094)***	-0.562 (0.380)	-0.527 (0.103)***
University	-0.924 (0.114)***	-1.722 (0.342)***	-0.809 (0.134)***	-1.577 (0.465)***	-0.914 (0.152)***
Tenure	-0.080 (0.008)***	-0.001 (0.021)	-0.122 (0.014)***	-0.069 (0.032)**	-0.116 (0.016)***
Tenure ² /100	0.083 (0.008)***	0.006 (0.021)	0.125 (0.014)***	0.073 (0.031)**	0.119 (0.015)***
Single	0.185 (0.121)	0.958 (0.473)**	0.152 (0.135)	1.244 (0.552)**	0.202 (0.151)
Divorced & other	0.120 (0.094)	0.067 (0.318)	0.261 (0.109)**	0.145 (0.376)	0.138 (0.126)
Children<6	-0.028 (0.120)	0.580 (0.397)	-0.086 (0.137)	0.465 (0.460)	-0.126 (0.155)
Children>6	-0.011 (0.091)	0.010 (0.248)	-0.050 (0.109)	-0.190 (0.309)	0.038 (0.120)
Formal in household	-0.007 (0.007)	-0.015 (0.021)	-0.008 (0.008)	-0.013 (0.022)	-0.017 (0.011)
Part-time	0.552 (0.120)***	0.717 (0.329)**	0.364 (0.153)**	1.150 (0.401)***	0.300 (0.173)*
Center-North	0.007 (0.168)	-0.532 (0.615)	-0.100 (0.193)	-0.877 (0.595)	0.255 (0.246)
South	0.418 (0.173)**	-0.325 (0.631)	0.281 (0.199)	-0.882 (0.633)	0.579 (0.252)**
East	0.025 (0.165)	-0.569 (0.619)	0.076 (0.186)	-0.807 (0.602)	0.332 (0.241)
West	-0.106 (0.175)	-0.997 (0.645)	-0.011 (0.198)	-1.195 (0.635)*	0.143 (0.256)
Constant	-0.719 (0.417)*	0.903 (1.537)	-1.182 (0.492)**	0.072 (1.788)	-1.706 (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 : P_{ij}					
	F	I	U	NLF	P_{i.}
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: P_{ij}/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: P_{ij} / (P_{.j}*(1-P_{ii})*(1-P_{jj})) - "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 : P_{ij}					
	F	I	U	NLF	P_{i.}
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: P_{ij}/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: P_{ij} / (P_{.j}*(1-P_{ii})*(1-P_{jj})) - "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 : P_{ij}

	FS	IS	SEI	U	NLF	P _i
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: P_{ij}/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: P_{ij} / (P_{.j}*(1-P_{ii})*(1-P_{jj})) - "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 : P_{ij}						
	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: P_{ij}/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: P_{ij} / (P_{.j}*(1-P_{ii})*(1-P_{jj})) - "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 (0.024)***	-0.258 (0.120)**	-0.204 (0.024)***
Age	0.011 (0.006)*	0.011 (0.028)	0.008 (0.006)
Age ²	-0.000 (0.000)**	-0.000 (0.000)	-0.000 (0.000)*
Secondary	0.064 (0.030)**	-0.001 (0.121)	0.078 (0.031)**
University	0.334 (0.041)***	0.237 (0.182)	0.349 (0.042)***
Tenure	0.005 (0.003)	0.020 (0.040)	0.009 (0.003)**
Tenure ² /100	-0.009 (0.009)	-0.350 (0.291)	-0.017 (0.009)*
Choice Informality		0.046 (0.114)	
Self Employed		0.039 (0.147)	0.194 (0.111)*
Part time	0.168 (0.050)***	0.334 (0.158)**	0.131 (0.053)**
Positive Δ^a	0.426 (0.086)***	0.507 (0.116)***	0.429 (0.087)***
Negative Δ^b	-0.660 (0.056)***	-0.856 (0.339)**	-0.646 (0.057)***
occupation4	-0.168 (0.040)***	-0.237 (0.289)	-0.167 (0.039)***
occupation5	-0.298 (0.048)***	-0.513 (0.205)**	-0.233 (0.049)***
occupation6	-0.322 (0.100)***	-0.245 (0.430)	-0.328 (0.102)***
occupation7	-0.096 (0.037)***	-0.305 (0.246)	-0.072 (0.037)**
occupation8	-0.096 (0.048)**	-0.031 (0.230)	-0.092 (0.049)*
occupation9	-0.286 (0.035)***	-0.353 (0.203)*	-0.269 (0.034)***
Mining Manufacturing	0.555 (0.045)***	0.898 (0.208)***	0.494 (0.047)***
Electricity Gas Water	0.560 (0.058)***	0.000 (0.000)	0.514 (0.059)***
Construction	0.417 (0.069)***	0.661 (0.247)***	0.381 (0.069)***
Trade Hotels Repair	0.392 (0.057)***	0.717 (0.196)***	0.297 (0.060)***
Transport Communication	0.539 (0.051)***	0.873 (0.224)***	0.492 (0.053)***
Financial Real Estate	0.430 (0.080)***	0.209 (0.296)	0.414 (0.083)***
Education Health Social services	0.168 (0.042)***	1.178 (0.251)***	0.123 (0.043)***
Other Service Activities	0.338 (0.055)***	0.529 (0.223)**	0.292 (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 (0.027)***	-0.088 (0.107)	-0.232 (0.028)***
Age	0.009 (0.006)	-0.009 (0.025)	0.015 (0.006)**
Age ²	-0.000 (0.000)**	0.000 (0.000)	-0.000 (0.000)***
Secondary	0.126 (0.034)***	0.133 (0.094)	0.126 (0.036)***
University	0.455 (0.048)***	0.143 (0.147)	0.467 (0.050)***
Tenure	0.007 (0.002)***	-0.008 (0.016)	0.007 (0.002)***
Tenure ² /100	-0.007 (0.002)***	0.009 (0.015)	-0.007 (0.002)***
Choice Informality		0.191 (0.111)*	
Self Employed		0.326 (0.146)**	0.093 (0.132)
Part time	0.144 (0.070)**	0.424 (0.202)**	0.025 (0.071)
Positive Δ^a	0.413 (0.140)***	0.000 (0.000)	0.411 (0.139)***
Negative Δ^b	-0.681 (0.092)***	-0.810 (0.336)**	-0.668 (0.096)***
occupation4	-0.179 (0.045)***	0.109 (0.272)	-0.165 (0.045)***
occupation5	-0.303 (0.061)***	-0.213 (0.206)	-0.287 (0.067)***
occupation6	-0.437 (0.112)***	0.540 (0.263)**	-0.482 (0.113)***
occupation7	-0.044 (0.041)	0.281 (0.202)	-0.059 (0.041)
occupation8	-0.108 (0.054)**	0.240 (0.336)	-0.118 (0.054)**
occupation9	-0.367 (0.041)***	-0.237 (0.185)	-0.334 (0.041)***
Mining Manufacturing	0.397 (0.049)***	0.403 (0.197)**	0.387 (0.049)***
Electricity Gas Water	0.278 (0.061)***	0.000 (0.000)	0.259 (0.061)***
Construction	0.381 (0.069)***	0.385 (0.221)*	0.369 (0.068)***
Trade Hotels Repair	0.288 (0.061)***	0.408 (0.182)**	0.227 (0.067)***
Transport Communication	0.364 (0.056)***	0.021 (0.322)	0.347 (0.056)***
Financial Real Estate	0.273 (0.083)***	0.871 (0.233)***	0.254 (0.083)***
Education Health Social services	0.116 (0.047)**	0.238 (0.278)	0.090 (0.046)*
Other Service Activities	0.240 (0.062)***	0.578 (0.223)***	0.163 (0.061)***

Other Activities	0.164 (0.233)	0.714 (0.468)	-0.184 (0.189)
State	0.046 (0.039)	-0.265 (0.237)	0.068 (0.042)
Cooperative	0.035 (0.190)	0.706 (0.218)***	-0.001 (0.197)
Privatized	0.004 (0.040)	-0.030 (0.129)	0.021 (0.044)
Center North	-0.329 (0.061)***	-0.573 (0.184)***	-0.318 (0.064)***
South	-0.299 (0.066)***	-0.576 (0.196)***	-0.259 (0.069)***
East	-0.321 (0.058)***	-0.468 (0.164)***	-0.314 (0.061)***
West	-0.311 (0.062)***	-0.412 (0.204)**	-0.307 (0.065)***
Constant	0.672 (0.142)***	0.875 (0.508)*	0.535 (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 (0.093)***	-0.284 (0.118)**
II	-0.107 (0.063)*	-0.107 (0.103)
Occupation change	0.030 (0.048)	0.030 (0.064)
II*choice informal	-0.022 (0.188)	-0.022 (0.153)
FI*choice informal	0.598 (0.228)***	0.598 (0.470)
Chose to leave (job)	0.178 (0.058)***	0.178 (0.070)**
Chose to leave (family)	0.214 (0.209)	0.214 (0.161)
Chose to leave (other)	0.075 (0.148)	0.075 (0.148)
Forced to leave	-0.013 (0.099)	-0.013 (0.125)
Positive Δ^a - 2003	-0.300 (0.100)***	-0.300 (0.103)***
Negative Δ^b - 2003	0.601 (0.053)***	0.601 (0.071)***
Positive Δ^a - 2004	0.306 (0.152)**	0.306 (0.147)**
Negative Δ^b - 2004	-0.398 (0.085)***	-0.398 (0.104)***
Occupation change from 4	-0.128 (0.088)	-0.128 (0.091)
Occupation change from 5	0.049 (0.113)	0.049 (0.116)
Occupation change from 6	0.167 (0.143)	0.167 (0.138)
Occupation change from 7	-0.058 (0.084)	-0.058 (0.088)
Occupation change from 8	-0.251 (0.127)**	-0.251 (0.178)
Occupation change from 9	0.074 (0.066)	0.074 (0.087)
Constant	0.211 (0.015)***	0.211 (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 (0.234)*	0.143 (0.210)	0.370 (0.157)**
N. formal in household	-0.175 (0.146)	-0.142 (0.139)	-0.021 (0.096)
Age	0.085 (0.078)	0.173 (0.074)**	-0.176 (0.038)***
Age ²	-0.002 (0.001)*	-0.002 (0.001)**	0.002 (0.000)***
Higher education	-0.951 (0.227)***	-0.732 (0.210)***	-0.501 (0.154)***
Tenure	-0.180 (0.045)***	-0.103 (0.034)***	-0.044 (0.021)**
Tenure ² /100	0.391 (0.151)***	0.259 (0.102)**	0.104 (0.051)**
Constant	-2.141 (1.284)*	-4.998 (1.338)***	0.410 (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 (0.306)	0.470 (0.451)	0.623 (0.488)
N. formal in household	0.437 (0.206)**	0.464 (0.283)	0.275 (0.302)
Age	0.119 (0.100)	0.011 (0.127)	-0.457 (0.121)***
Age ²	-0.002 (0.001)	0.000 (0.002)	0.006 (0.002)***
Higher education	-0.492 (0.316)	0.252 (0.452)	0.568 (0.493)
Tenure	-0.224 (0.114)**	-0.285 (0.193)	0.082 (0.237)
Tenure ² /100	1.192 (0.816)	0.703 (1.672)	-2.279 (2.263)
Constant	-2.031 (1.612)	-2.717 (2.218)	4.555 (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 (0.218)	-0.432 (0.277)	0.705 (0.220)***
N. formal in household	0.013 (0.142)	-0.112 (0.181)	-0.269 (0.148)*
Age	0.024 (0.064)	0.074 (0.079)	-0.183 (0.055)***
Age ²	-0.001 (0.001)	-0.001 (0.001)	0.002 (0.001)***
Higher education	0.009 (0.225)	-0.762 (0.279)***	-0.258 (0.222)
Constant	-0.313 (1.084)	-1.081 (1.340)	2.753 (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 (0.174)***	-0.225 (0.218)	-0.811 (0.159)***
N. formal in household	0.016 (0.108)	-0.288 (0.148)*	-0.099 (0.103)
Age	0.233 (0.034)***	0.193 (0.038)***	0.226 (0.032)***
Age ²	-0.004 (0.000)***	-0.003 (0.000)***	-0.004 (0.000)***
Higher education	0.636 (0.184)***	0.075 (0.221)	0.322 (0.173)*
Constant	-4.733 (0.553)***	-4.766 (0.649)***	-4.051 (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 (0.178)***	0.202 (0.354)	-0.527 (0.276)*	-0.821 (0.159)***
N. formal in household	0.006 (0.110)	-0.403 (0.251)	-0.219 (0.183)	-0.101 (0.104)
Age	0.219 (0.035)***	0.181 (0.060)***	0.305 (0.059)***	0.228 (0.032)***
Age ²	-0.003 (0.000)***	-0.002 (0.001)***	-0.005 (0.001)***	-0.004 (0.000)***
Higher education	0.621 (0.187)***	0.270 (0.314)	-0.130 (0.300)	0.316 (0.173)*
Constant	-4.547 (0.558)***	-6.621 (1.145)***	-6.217 (0.911)***	-4.077 (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 (0.113)	0.071 (0.082)	0.953 (0.063)***
Age	-0.051 (0.030)*	-0.071 (0.022)***	-0.498 (0.014)***
Age ²	0.000 (0.000)	0.000 (0.000)	0.006 (0.000)***
Secondary	-0.327 (0.132)**	-0.134 (0.101)	-0.608 (0.071)***
University	-1.038 (0.201)***	-0.921 (0.149)***	-1.564 (0.103)***
N° of formal members in household	-0.394 (0.080)***	-0.287 (0.056)***	-0.202 (0.040)***
Children<6	-0.827 (0.724)	-1.281 (0.556)**	-0.691 (0.404)*
Children 6+	-0.181 (0.537)	-0.307 (0.418)	-0.307 (0.304)
Children<6*Age	0.033 (0.024)	0.045 (0.019)**	0.042 (0.014)***
Children 6+*Age	0.004 (0.015)	0.004 (0.012)	0.013 (0.008)
Constant	0.095 (0.519)	0.962 (0.377)**	8.156 (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 (0.106)	0.084 (0.098)	0.922 (0.071)***
Age	-0.101 (0.026)***	-0.116 (0.024)***	-0.490 (0.015)***
Age ²	0.001 (0.000)**	0.001 (0.000)***	0.006 (0.000)***
Secondary	-0.770 (0.123)***	-0.291 (0.126)**	-0.689 (0.084)***
University	-1.790 (0.207)***	-1.019 (0.176)***	-1.587 (0.116)***
N° of formal members in household	-0.526 (0.078)***	-0.299 (0.065)***	-0.231 (0.044)***
Children<6	-0.847 (0.713)	0.321 (0.696)	-0.552 (0.436)
Children 6+	0.212 (0.465)	-0.201 (0.469)	-0.100 (0.359)
Children<6*Age	0.029 (0.024)	-0.013 (0.025)	0.041 (0.015)***
Children 6+*Age	-0.001 (0.013)	0.006 (0.013)	0.003 (0.010)
Constant	1.673 (0.468)***	1.567 (0.428)***	8.055 (0.282)***
Observations	6634	6634	6634
Pseudo-R ²	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 (0.024)***	-0.213 (0.151)	-0.195 (0.028)***
Age	0.005 (0.008)	-0.007 (0.050)	0.001 (0.013)
Age ²	-0.000 (0.000)	0.000 (0.001)	-0.000 (0.000)
Secondary	0.059 (0.031)*	0.013 (0.124)	0.068 (0.035)*
University	0.319 (0.045)***	0.302 (0.229)	0.324 (0.059)***
Tenure	0.006 (0.003)*	0.015 (0.041)	0.008 (0.003)**
Tenure ² /100	-0.013 (0.010)	-0.313 (0.300)	-0.017 (0.010)*
Choice Informality		0.038 (0.115)	
Self Employed		0.034 (0.147)	0.194 (0.111)*
Part time	0.186 (0.051)***	0.340 (0.157)**	0.131 (0.053)**
Positive Δ^a	0.428 (0.086)***	0.503 (0.116)***	0.430 (0.087)***
Negative Δ^b	-0.657 (0.056)***	-0.855 (0.341)**	-0.650 (0.057)***
occupation4	-0.169 (0.039)***	-0.216 (0.286)	-0.166 (0.039)***
occupation5	-0.277 (0.048)***	-0.504 (0.205)**	-0.231 (0.049)***
occupation6	-0.313 (0.101)***	-0.244 (0.429)	-0.328 (0.102)***
occupation7	-0.087 (0.037)**	-0.297 (0.247)	-0.072 (0.037)*
occupation8	-0.086 (0.048)*	-0.001 (0.235)	-0.092 (0.049)*
occupation9	-0.273 (0.035)***	-0.345 (0.201)*	-0.268 (0.034)***
Mining Manufacturing	0.542 (0.045)***	0.901 (0.209)***	0.494 (0.047)***
Electricity Gas Water	0.552 (0.059)***	0.000 (0.000)	0.513 (0.059)***
Construction	0.418 (0.069)***	0.662 (0.248)***	0.380 (0.069)***
Trade Hotels Repair	0.385 (0.057)***	0.723 (0.196)***	0.297 (0.060)***
Transport Communication	0.536 (0.052)***	0.860 (0.231)***	0.491 (0.053)***
Financial Real Estate	0.432 (0.080)***	0.263 (0.298)	0.414 (0.083)***
Education Health Social services	0.164 (0.042)***	1.211 (0.247)***	0.123 (0.043)***
Other Service Activities	0.332 (0.055)***	0.532 (0.221)**	0.291 (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 (0.029)***	-0.046 (0.117)	-0.210 (0.034)***
Age	0.005 (0.009)	-0.034 (0.035)	0.001 (0.016)
Age ²	-0.000 (0.000)	0.000 (0.001)	-0.000 (0.000)
Secondary	0.120 (0.036)***	0.184 (0.114)	0.105 (0.043)**
University	0.429 (0.053)***	0.282 (0.192)	0.422 (0.071)***
Tenure	0.006 (0.002)***	-0.009 (0.016)	0.007 (0.002)***
Tenure ² /100	-0.006 (0.002)***	0.009 (0.015)	-0.007 (0.002)***
Choice Informality		0.218 (0.114)*	
Self Employed		0.342 (0.152)**	0.092 (0.132)
Part time	0.136 (0.073)*	0.419 (0.204)**	0.034 (0.073)
Positive Δ^a	0.416 (0.138)***	0.000 (0.000)	0.411 (0.137)***
Negative Δ^b	-0.684 (0.093)***	-0.693 (0.365)*	-0.645 (0.095)***
occupation4	-0.183 (0.046)***	0.115 (0.306)	-0.175 (0.046)***
occupation5	-0.309 (0.062)***	-0.225 (0.208)	-0.288 (0.067)***
occupation6	-0.435 (0.112)***	0.544 (0.267)**	-0.491 (0.115)***
occupation7	-0.054 (0.042)	0.281 (0.203)	-0.063 (0.041)
occupation8	-0.116 (0.055)**	0.231 (0.327)	-0.114 (0.055)**
occupation9	-0.378 (0.042)***	-0.237 (0.187)	-0.338 (0.041)***
Mining Manufacturing	0.398 (0.049)***	0.422 (0.200)**	0.394 (0.049)***
Electricity Gas Water	0.255 (0.061)***	0.000 (0.000)	0.258 (0.061)***
Construction	0.385 (0.071)***	0.398 (0.226)*	0.386 (0.069)***
Trade Hotels Repair	0.268 (0.063)***	0.418 (0.182)**	0.233 (0.068)***
Transport Communication	0.360 (0.056)***	0.028 (0.317)	0.360 (0.056)***
Financial Real Estate	0.242 (0.085)***	0.889 (0.232)***	0.246 (0.084)***
Education Health Social services	0.112 (0.047)**	0.238 (0.279)	0.100 (0.046)**
Other Service Activities	0.227 (0.063)***	0.633 (0.232)***	0.166 (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 (0.021)***	-0.184 (0.107)*	-0.200 (0.021)***
Age	0.012 (0.005)**	0.012 (0.026)	0.013 (0.005)**
Age ²	-0.000 (0.000)***	-0.000 (0.000)	-0.000 (0.000)***
Secondary	0.066 (0.026)***	-0.077 (0.117)	0.090 (0.026)***
University	0.320 (0.034)***	0.080 (0.177)	0.351 (0.035)***
Tenure	0.005 (0.003)*	0.015 (0.038)	0.007 (0.003)**
Tenure ² /100	-0.005 (0.008)	-0.216 (0.297)	-0.009 (0.008)
Choice Informality		0.097 (0.129)	
Self Employed		-0.017 (0.137)	0.049 (0.066)
Part time	0.109 (0.041)***	0.494 (0.168)***	0.063 (0.043)
Positive Δ^a	0.369 (0.070)***	0.475 (0.726)	0.360 (0.068)***
Negative Δ^b	-0.591 (0.037)***	-0.569 (0.255)**	-0.574 (0.037)***
occupation4	-0.175 (0.039)***	-0.337 (0.299)	-0.171 (0.038)***
occupation5	-0.292 (0.042)***	-0.513 (0.189)***	-0.266 (0.045)***
occupation6	-0.286 (0.070)***	-0.284 (0.294)	-0.306 (0.073)***
occupation7	-0.064 (0.032)**	-0.376 (0.213)*	-0.052 (0.032)
occupation8	-0.064 (0.045)	-0.012 (0.349)	-0.070 (0.044)
occupation9	-0.290 (0.030)***	-0.500 (0.161)***	-0.268 (0.031)***
Mining Manufacturing	0.463 (0.036)***	0.637 (0.216)***	0.416 (0.037)***
Electricity Gas Water	0.465 (0.057)***	0.000 (0.000)	0.426 (0.056)***
Construction	0.397 (0.053)***	0.770 (0.197)***	0.339 (0.057)***
Trade Hotels Repair	0.277 (0.043)***	0.467 (0.157)***	0.242 (0.048)***
Transport Communication	0.447 (0.044)***	0.718 (0.393)*	0.413 (0.044)***
Financial Real Estate	0.379 (0.075)***	-0.041 (0.556)	0.366 (0.075)***
Education Health Social services	0.088 (0.036)**	1.011 (0.399)**	0.052 (0.037)
Other Service Activities	0.231 (0.045)***	0.329 (0.202)	0.199 (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 (0.025)***	-0.083 (0.103)	-0.235 (0.025)***
Age	0.009 (0.005)*	-0.017 (0.022)	0.015 (0.006)***
Age ²	-0.000 (0.000)**	0.000 (0.000)	-0.000 (0.000)***
Secondary	0.140 (0.031)***	0.164 (0.098)*	0.137 (0.034)***
University	0.433 (0.042)***	0.174 (0.187)	0.436 (0.043)***
Tenure	0.008 (0.002)***	-0.002 (0.014)	0.008 (0.002)***
Tenure ² /100	-0.008 (0.002)***	0.002 (0.013)	-0.008 (0.002)***
Choice Informality		0.154 (0.109)	
Self Employed		0.339 (0.127)***	0.007 (0.073)
Part time	0.099 (0.050)**	0.502 (0.158)***	-0.019 (0.054)
Positive Δa	0.484 (0.140)***	0.000 (0.000)	0.484 (0.132)***
Negative Δb	-0.748 (0.062)***	-0.803 (0.290)***	-0.730 (0.061)***
occupation4	-0.170 (0.045)***	0.132 (0.291)	-0.164 (0.044)***
occupation5	-0.347 (0.048)***	-0.256 (0.176)	-0.312 (0.053)***
occupation6	-0.365 (0.091)***	0.660 (0.755)	-0.409 (0.089)***
occupation7	-0.032 (0.037)	0.291 (0.178)	-0.046 (0.038)
occupation8	-0.122 (0.048)**	0.338 (0.301)	-0.136 (0.047)***
occupation9	-0.327 (0.035)***	-0.225 (0.148)	-0.296 (0.037)***
Mining Manufacturing	0.409 (0.040)***	0.575 (0.178)***	0.384 (0.042)***
Electricity Gas Water	0.321 (0.063)***	0.000 (0.000)	0.298 (0.062)***
Construction	0.431 (0.056)***	0.616 (0.173)***	0.390 (0.064)***
Trade Hotels Repair	0.315 (0.049)***	0.562 (0.162)***	0.239 (0.055)***
Transport Communication	0.393 (0.048)***	0.124 (0.320)	0.375 (0.049)***
Financial Real Estate	0.323 (0.086)***	0.990 (0.752)	0.294 (0.084)***
Education Health Social services	0.110 (0.041)***	0.390 (0.369)	0.076 (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 (0.029)***	-0.173 (0.152)	-0.189 (0.030)***
Age	0.015 (0.007)**	0.024 (0.032)	0.014 (0.007)**
Age ²	-0.000 (0.000)***	-0.000 (0.000)	-0.000 (0.000)**
Secondary	0.070 (0.027)***	-0.018 (0.153)	0.094 (0.034)***
University	0.321 (0.043)***	0.058 (0.208)	0.359 (0.042)***
Tenure	0.002 (0.004)	-0.002 (0.049)	0.005 (0.005)
Tenure ² /100	-0.001 (0.009)	-0.034 (0.416)	-0.009 (0.013)
Choice Informality		0.193 (0.146)	
Self Employed		0.173 (0.199)	0.119 (0.146)
Part time	0.092 (0.069)	0.418 (0.189)**	0.057 (0.081)
Positive Δ^a	0.389 (0.111)***	0.457 (0.272)*	0.383 (0.123)***
Negative Δ^b	-0.626 (0.060)***	-0.670 (0.429)	-0.615 (0.061)***
occupation4	-0.171 (0.045)***	-0.419 (0.517)	-0.155 (0.044)***
occupation5	-0.249 (0.058)***	-0.315 (0.294)	-0.224 (0.055)***
occupation6	-0.279 (0.080)***	-0.365 (0.828)	-0.289 (0.081)***
occupation7	-0.043 (0.039)	-0.180 (0.355)	-0.036 (0.043)
occupation8	-0.014 (0.059)	0.073 (0.368)	-0.030 (0.057)
occupation9	-0.271 (0.035)***	-0.370 (0.286)	-0.253 (0.036)***
Mining Manufacturing	0.472 (0.044)***	0.719 (0.286)**	0.407 (0.049)***
Electricity Gas Water	0.416 (0.062)***		0.381 (0.070)***
Construction	0.339 (0.084)***	0.769 (0.320)**	0.271 (0.078)***
Trade Hotels Repair	0.225 (0.061)***	0.537 (0.233)**	0.160 (0.062)***
Transport Communication	0.437 (0.063)***	0.817 (0.363)**	0.391 (0.065)***
Financial Real Estate	0.347 (0.087)***	0.151 (0.459)	0.316 (0.090)***
Education Health Social services	0.044 (0.045)	1.010 (0.391)**	-0.007 (0.042)
Other Service Activities	0.156 (0.061)**	0.334 (0.313)	0.132 (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 (0.027)***	-0.148 (0.143)	-0.248 (0.032)***
Age	0.009 (0.007)	-0.022 (0.031)	0.015 (0.007)**
Age ²	-0.000 (0.000)**	0.000 (0.000)	-0.000 (0.000)***
Secondary	0.115 (0.037)***	0.142 (0.112)	0.115 (0.035)***
University	0.421 (0.054)***	0.192 (0.185)	0.455 (0.047)***
Tenure	0.008 (0.002)***	-0.000 (0.023)	0.007 (0.002)***
Tenure ² /100	-0.008 (0.002)***	0.001 (0.023)	-0.007 (0.002)***
Choice Informality		0.156 (0.149)	
Self Employed		0.248 (0.157)	0.079 (0.099)
Part time	0.110 (0.064)*	0.522 (0.269)*	0.033 (0.066)
Positive Δ^a	0.452 (0.162)***		0.455 (0.179)**
Negative Δ^b	-0.658 (0.142)***	-1.117 (0.603)*	-0.631 (0.158)***
occupation4	-0.130 (0.043)***	0.471 (0.403)	-0.112 (0.046)**
occupation5	-0.299 (0.047)***	-0.124 (0.280)	-0.289 (0.053)***
occupation6	-0.305 (0.125)**	0.542 (0.412)	-0.320 (0.117)***
occupation7	-0.019 (0.039)	0.336 (0.268)	-0.025 (0.038)
occupation8	-0.099 (0.047)**	0.347 (0.398)	-0.100 (0.047)**
occupation9	-0.305 (0.032)***	-0.229 (0.224)	-0.270 (0.035)***
Mining Manufacturing	0.439 (0.042)***	0.479 (0.240)**	0.422 (0.049)***
Electricity Gas Water	0.358 (0.055)***		0.318 (0.061)***
Construction	0.433 (0.075)***	0.526 (0.274)*	0.418 (0.073)***
Trade Hotels Repair	0.316 (0.060)***	0.468 (0.253)*	0.273 (0.069)***
Transport Communication	0.468 (0.048)***	0.116 (0.457)	0.439 (0.053)***
Financial Real Estate	0.335 (0.088)***	0.825 (0.554)	0.274 (0.086)***
Education Health Social services	0.126 (0.040)***	0.566 (0.456)	0.104 (0.042)**
Other Service Activities	0.234 (0.064)***	0.502 (0.313)	0.188 (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			