Very preliminary and incomplete

Risk Attitudes, Time Preferences and the Incidence of Informality among Workers: Evidence from a Transition Country

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Abstract

I. Introduction

There exists a large literature on the informal economy and labor market segmentation along the formal-informal divide in developing countries. However, no studies exist that investigate the link between risk attitudes and time preferences of economic agents and the incidence of informality. This paper is a first attempt to establish such a link employing a unique panel data set of the Ukrainian labor market, the Ukrainian Longitudinal Monitoring Survey (ULMS). In this paper we use the three available waves of the ULMS, collected in the years 2003, 2004 and 2007. The 2007 wave has a special module on risk attitudes and time preferences, which is used for the analysis. Our study, apart from looking at the link between risk attitudes/time preferences and informality, also contributes to the small but growing literature on informal employment in transition countries.

To better understand the contribution of our study it is important to briefly look at the competing paradigms in the literature on labor market segmentation and informality. The existence of the informal segment of the labor market alongside the formal sector and the reasons posited for its existence have given rise to several paradigms in the literature. One key question in the labor market literature for developing countries is whether informal employment or self-employment reflects voluntary choice or is involuntary due to segmentation in the labor market (Guasch 1999).

The traditional dualistic view, based on Harris and Todaro (1970), sees the informal segment as the inferior sector, the option of last resort. Due to barriers to entry, minimum wages, unions or other sources of segmentation, formal jobs are rationed. Workers in the informal sector are crowded out from the formal sector involuntarily, their wage being less than that in the formal sector. For example, an increase in the statutory wage in the formal sector will reduce formal employment but

lead to a lower informal wage and higher informal employment. During a recession informal employment and output expands because formal employment is reduced, while the informal labor market clears. In this view labor market segmentation between formality and informality is the defining feature of the labor market.

In contrast, in a competitive labor market one would expect workers to be able to move freely between occupations, and for wages (broadly interpreted) to equalize accordingly. In this view the informal and informal labor markets are not segmented, but integrated. Voluntary choice regarding jobs and particular attributes of these jobs, such as flexible hours, working as a self-employed and being one's own boss as a micro-entrepreneur, and not valuing social security benefits, can be the reasons for remaining in or moving to the informal sector (Maloney 1999, 2004; Cunningham and Maloney 2001). Here, contrary to the segmentation case, formal and informal employment are not necessarily negatively correlated over the business cycle.

Segmentation and integration of the formal and informal labor market are two very distinct perspectives on the interaction of formality and informality. Still, it is possible, given the heterogeneity of the informal labor market, that these features co-exist in the same labor market. Fields (1990) subdivides the informal sector of the labor market into two categories: an 'easy-entry' informal sector, which constitutes the involuntary segment, and an 'upper-tier' informal sector, in which participation is voluntary. Hence, the labor market is divided into the formal sector, a 'disadvantaged' subsistence-level informal sector and the 'small firm' and micro-entrepreneur informal sector.

Empirical evidence on informality in transition economies is currently sparse. In a study comparing Latin American countries and transition economies a wage gap for formal versus informal salaried jobs is found in the Latin American context but

not for the transition economies (Pages and Stampini 2007).[1] High mobility from informal to formal jobs is found in all countries, which suggests a preference and choice for formal work. For the case of self-employment and formal salaried work they find no clear pattern in the wage gap in terms of significance or sign and very low mobility between the two labor market sectors. Assessing labor mobility during economic transition, a study on Georgia finds support for labor market segmentation for both formal and informal wage employees and some self-employed. Formal employment is preferred over informal work, which also serves as buffer in recessions (Bernabe and Stampini 2008). A high degree of mobility between sectors alongside a significant formal-informal wage gap highlights a potential case of labor market segmentation in Bosnia and Herzegovina (Krstic and Sanfey 2007). In the study by Lehmann and Pignatti (2007) the role of the informal sector in labor market adjustment in Ukraine is assessed, using the 2003 and 2004 waves of the ULMS. Their evidence supports the notion of labor market segmentation for wage employees, and the informal sector is found to be split into two tiers, with an upper-tier voluntary in the sector and the majority in the involuntary lower-tier.[2]

When assessing the issue of whether workers select themselves into informal employment relationships, their risk attitudes and time preferences might be particularly important determinants of informality in a transition context. A priori one might moot that the work force in transition countries is a lot more risk averse than the work force in a "regular" developing country where uncertainty has been a way of life for generations for all but the most privileged strata. In contrast, most of the older workers in transition countries are used to total security provided by the state and might, for example, be very reluctant to engage in unsure self-employment in the

[1] Latin America: Argentina, Mexico, Venzuela; Transition Economies: Albania, Georgia, Ukraine.
[2]Another study of the informal economy in Ukraine finds a formal-informal wage gap (Commander, Isachenkova and Rodionova 2008).

informal sector. Lehmann and Pignatti (2007) provide some preliminary evidence of this reluctance on the part of older workers.

A second important area that might impact on informality is the time preferences of workers. Here we would expect that many workers in transition countries have very high discount rates since they experienced terrible turmoil in their lives during the first decade of the transition (this is especially true in countries of the former Soviet Union). Such high discount rates can have different implications as far as choosing informality or formality is concerned. On the one hand, workers might discard benefits that are in a distant future (e.g., pension benefits accruing in formal employment), and thus be more willing to take up informal employment that might be associated with higher net wages. On the other hand, if, e.g., the fruits of being engaged in informal self-employment can be reaped only in a somewhat distant future, workers might prefer formal employment as it guarantees a certain wage now even if over a longer time period income from informal self-employment is higher.

Given the large macro shocks that occurred in the first decade of transition and the relatively muted response of the labor market in CIS countries (Boeri and Terrell 2002), we can treat the observed risk attitudes and time preferences as exogeneous factors impacting on the choice workers make regarding the formal-informal divide. In other words, in CIS labor markets, it is not working in the informal sector that determines risk attitudes and time preferences (as might be the case in a "regular" developing country) but risk attitudes and time preferences that determine whether a worker decides to work as a salaried employed, informally or formally, or as an informal or formal self-employed. Thus our analysis of risk attitudes and time preferences and their effects on the incidence of informality in a labor market of the CIS can be considered in a context where we have a quasi-natural experiment.

The next section discusses the ULMS data set, definitional issues related to informality, and the module on risk attitudes and time preferences. Section III discusses which predictions regarding the impact of risk attitudes and time preferences on informality are consistent with the various paradigms that we have briefly sketched above. This is followed by the presentation of our results: the unconditional correlations of our risk measures with demographic characteristics and with types of employment, the determinants of the incidence of informal employment in probit and multinomial logit regressions that include covariates modeling risk attitudes and time preferences as well as the determinants of flows between various employment states [needs to be still done]. A final section offers some conclusions.

II. Data, Definitions and Measurement Issues

Our principal source of information is the ULMS, a nationally representative survey of the Ukrainian work force, 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. Data of the third wave were collected in 2007 with 3101 questionnaires of households and 6774 individual questionnaires filled out. In the first part of our study we concentrate on the 2007 data but will extend our work by using the panel element of the data for the years 2003, 2004 and 2007.

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 concerning the labor market experience of Ukrainian workers. In the 2003 questionnaire, besides the reference week sections, there is an extensive retrospective part, which ascertains each individual's labor market circumstances

beginning at specific points in time, namely December 1986, December 1991 and December 1997. The first two points are chosen to minimize recall bias, since the first date is close to the Chernobyl incident and the second date marks the end of the Soviet Union. The respective module is then structured in such a way that the data record the month and year of every labor market transition or change in circumstance between December 1997 and the date of interview. The surveys for 2004 and 2007 have a similar retrospective part covering the intervals 2003 to 2004 and 2004 to 2007.

The definition of informality is a very complex issue as nicely exposited, for example, in chapter 1 of World Bank (2007) and in Kanbur (2009). We concentrate in this study on the "social protection/legalistic" definition since we find that using the "productivity-based" concept that defines informal or formal sectors would in transition countries be rather misleading. For example, to take all self-employed or workers in micro firms as belonging to the informal sector might be appropriate in a developing country but will introduce large measurement error in transition countries (see Lehmann and Pignatti, 2007, for discussion of Ukraine on this issue). As pointed out by Kanbur (2009), it is vital to be clear what is meant by informality and stick to the criterion one has chosen. We, therefore, use the information we have for the reference weeks and define an employment relationship as formal if employees answer the following question by choosing option 1, informal if they choose option 2:

Tell me, please, are you officially registered at this job, that is on a work Roster, work agreement or contract?
1. Registered 2. Not Registered.

For the self-employed we use a similar question:

Is your activity registered?
1. Yes 2. No

We consider all self-employed giving option 1 as formal, while those answering No are considered informal. The self-employed decide for themselves whether to register their activity or not. We, therefore, think of all informal self-employed as voluntary informal self-employed. For employees we elicit the additional information about the (in-) voluntary nature of their informal job by asking the following question:

Why are you not officially registered at this job?
1. *Employer does not want to register.*
2. *I do not want to register.*
3. *Both.*

Answer 1 classifies a person as involuntary informal employed, answers 2 and/or 3 as voluntary informal employed.

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, i.e. in a registered firm, but that their job might not be registered. In other words, we identify an informal employment relationship and not necessarily employment in the informal sector. As far as self-employment is concerned, there exist countervailing reasons for registration or non-registration of activities by the self-employed in Ukraine. On the one hand, registering one's activity as self-employed one has to pay only a monthly flat tax, which amounts to approximately the equivalent of 60 US dollars; so on purely economic grounds registration is clearly not expensive and is beneficial. On the other hand, many might shy away from registration in order to avoid becoming the victim of corruption by state officials or worse.

On our measure we calculate an incidence of informality of roughly 15% that includes informal employees and informal self-employed. However, we need to stress that our definition of informality does not capture all activities in the shadow economy, but only informal employment relationships in the primary job. In addition,

in Ukraine, like in many successor states of the Soviet Union, the assessment of informality is complicated by the fact that many firms pay a large part of workers' salaries as undeclared "envelope payments" even if their workers have a formal job. How to treat workers in registered jobs who receive a substantial fraction of their salaries off the books is a contentious issue. Empirically, we can only solicit information on total wages, but cannot distinguish between the "official" and "unofficial" parts of wage payments. Workers in formal employment relationships are, therefore, treated as formally employed salaried workers, even if they might receive part of their wages in an informal fashion. Lehmann and Pignatti (2007) provide a more detailed discussion of the ambiguous nature of informality in a CIS labor market. We attempt to overcome this ambiguity here by exclusively relying on the definition of a registered job as a formal employment relationship, and of a registered activity of a self-employed person as formal self-employment.

We use two risk measures, a general risk measure and a measure related to career choices. Information on the first measure is collected by posing the following question:

> *How do you see yourself? Are you generally a person who is fully willing to take risks or do you try to avoid taking risks? Please give a number from 0 to 10, where the value 0 means: "Completely unwilling to take risks" and the value 10 means "Completely willing to take risks". You can take the values in between to make your estimate.*

Dohmen et al. (2005) have provided evidence on the experimental validity of this question. The validity of the risk questions has also been shown with the 2004 wave of the German Socioeconomic Panel (GSOEP) (Bonin et al. 2006; Caliendo et al. 2008). The career related risk measure was calculated using the answers to the following question:

> *People can behave differently in different situations. How would you rate your willingness to take risks in career matters? (0 to 10 as before).*

To receive information on workers' time preferences in Ukraine we posed the following hypothetical question:

> *Imagine that you were offered to receive 1000 Hryvnias today or 1200 Hryvnias in a year from now. What would you prefer? (1) 1000 today (2) 1200 a year from now.*

A person answering (1) was given in subsequent questions delayed amounts of 1400, 1600, 1800 and 2000 Hryvnias.[3] As we shall see below, the attempt to elicit enough information about Ukrainian workers' time preferences by posing this simple question was not very successful since a large majority of workers voted for immediate receipt even when offered an interest rate of 100% for the willingness to delay the receipt by one year. Estimates of time preference based on simple "choice tasks" of this form suffer from a variety of weaknesses (Frederick, Loewenstein and O'Donoghue 2002). For example, if the individuals' utility function is concave (there is risk aversion) the inferred time preference is biased upward (time preference is conflated with diminishing marginal utility). Also, there is evidence that recent experience of economic uncertainty and inflation can result in replies that undervalue future rewards even if the questions abstracted from these concerns, a consideration certainly relevant for the Ukrainian economy in transition. These caveats need to be kept in mind during the discussion of the impact of time preferences on the incidence of informality.

III. Competing paradigms on informality and risk attitudes

To be completed….

IV. Results

[3] In 2007 1000 Hryvnias amounted to roughly 200 US$, a non-trivial amount given that the average monthly wage was roughly XXX US$.

IV.1 Risk measures, employment categories and demographic characteristics – a descriptive analysis

Most members of the Ukrainian workforce are very reluctant to take risks in general as Figure 1 demonstrates. The modal for all respondents is at the value 0, with 20% of all respondents not willing to take any risk, while the second highest frequency is found at value 5. If we take values above 5 as an indication of the propensity to take risks in general, then we find roughly 20% of Ukrainian workers to have this disposition. In comparison, Dohmen et al. (2005) find the German workforce somewhat more prone to take risks in general since they locate about 30% of German workers as willing to take on risks in general. What is particularly striking in this comparison is the fact that the modal in the German case is at the value 5 (with roughly 22% of the respondents) and that those German workers not willing to take any risks amounts only to about 8%, i.e. the Ukrainian distribution is much more skewed towards non-risk takers than is the German distribution. The Ukrainian sample exhibits typical behavior for a transition economy that has faced several major upheavals over the last fifteen years.

The distribution of the general risk measure when calculated only for the employed is, however, different as figure 2 shows. Having derived the measure for three employment categories, we see that for the informal and formal employees as well as for the self-employed the modal value is 5. We can also clearly infer from the figure that formal employees are more risk averse than the other two categories and that the self-employed are most willing to engage in risky activities. When we splice the data along the formal-informal divide, we see more mass at higher values of the general risk measure for informal than for formal workers (figure 3). A similar relationship holds when we split informal employees into their voluntary and involuntary segments (figure 4).

Table 1 gives averages of the general risk measure for informal employees, formal employees and the self-employed by demographic characteristics and region. Inspection of these averages drives the point home that formal employees are less willing to take risks compared with the other two employment categories no matter what correlate we look at. Looking inside the sets of demographic characteristics we see that men are more willing to take risks as are younger workers and workers with university education. The higher propensity to take risks for these groups holds independently of the employment category. On the other hand, among the informal employees those who are married and have children have a far lower willingness to take general risks. It is also striking that informal employees residing in Kiev have a substantially higher propensity to take risks. For the other employment categories region is not associated with differing risk attitudes. Finally those who are voluntarily informal employees making up about one third of all informal employees profess a larger tendency to take risks than the involuntarily informal employees, i.e. those among the informal employees whose jobs are not registered even though they would prefer registration. It is also striking that the self-employed who register their activity have a slightly higher propensity to take risks than the non-registered (informal) self-employed.

Thus far we have only looked at a general risk measure, but in our context it might be also fruitful to see the willingness of workers to take risks in career matters. A comparison of figures 5 and 1 makes clear that the Ukrainian workforce is particularly risk averse when it comes to career choices. The modal at value 0, reaching about 27%, is nearly twice as large as the next largest frequency that occurs at value 5. The rest of the distribution is very similar to the distribution of the general risk measure. Consequently, the more conservative stance in career matters comes

about because some respondents seem to shift their answers from a professed average risk attitude to a response that implies an absolute unwillingness to take risks.

In contrast to the general risk measure where the modal was at value 5 when looking at the three employment categories, for the formal employees and the self-employed the modal of the career risk measure is at value 0; only with the informal employees do we see the highest frequency at value 5 (figure 6). As is the case with the willingness to take risks in general, formal employees are more conservative than their counterparts among informal employees and among the self-employed. When combining all formal and informal workers into two subsets, we get the same result that we had with the general risk measure: formal workers are far more risk averse than informal workers (figure 7).

The overall averages of the career risk measures shown for three employment categories in table 2 are about half a point smaller than the averages of the general risk measures in table 1. Otherwise, for the various demographic characteristics and regions we see the same relative risk patterns as in table 1. The larger propensity to take risks of voluntary informal employees and of formal self-employed is also confirmed when risk taking is about career choices.

Figure 8 shows the time preferences of the respondents in our sample as we plot the fractions of those who are willing to delay receipt of 1000 hryvnias in return for an annual interest ranging between 20 and 100 percent. It is immediately obvious from the figure that 70% of respondents are only interested in immediate consumption no matter what the interest rate offered. As mentioned above, given the hazardous experience of many persons living in Ukraine in the nineties, our questions eliciting information on time preferences might have been too simple to counter the strong bias that exists for immediate consumption. At any rate, for the sub-sample of those

willing to delay receipt no clear patterns arise for the various “discount rates” when we slice the data by employment category (figure 9).

IV.2 Regression results

We begin with simple probit regressions estimating the probability to be in an informal job. All salaried employees whose job is not registered and all self-employed whose activity is not registered are considered informal and assigned the value 1. We use four variables for risk attitudes; the general risk measure that can take values between 0 and 10 and the general risk indicator that is assigned 0 for values of the general risk measure between 0 and 5, and 1 for values between 6 and 10. The career risk indicator is constructed in a similar way from the career risk measure that also can take values between 0 and 10. We thus employ 4 specifications that add to each risk variable an identical set of covariates.

Virtually in all cases, the regressions in table 3 show very stable marginal effects on the covariates employed across the 4 specifications. A person who is ten years older than his colleague has a probability to be informal that is 1 percentage point lower, while a female worker’s likelihood of being informal is by roughly 2 percentage points lower than her male counterpart’s likelihood. The latter result is in contrast to what is observed in many developing countries where the incidence of informality is usually much larger among females, but in line with the findings of Lehmann and Pignatti (2007) about the Ukrainian labor market in the years 2003 and 2004. Being married and having completed university also lowers the probability of being informal in a substantial way as does higher household income. The most striking effect works through the labor market since workers with a non-employment spell between 2004 and 2007 have a far higher likelihood to find themselves in an informal job or activity.

The coefficients on all risk variables are significant at conventional levels and have a positive sign. The coefficients on the risk indicators, which are particularly easy to interpret, imply that a person professing to take risky actions in general and in career matters has a probability to be informal that is about 2 percentage points higher than a person stating to be relatively risk averse.

How important are risk attitudes in the determination of informality relative to other factors? Another way to highlight the relative importance of the explanatory variables is to perform beta regressions. We, therefore, estimate a linear probability model. We present its coefficients and also coefficients on standardized coefficients (i.e. beta coefficients). The beta regressions show by how many fractions the standard deviation of the dependent variable is changed by an increase of the independent variable by one standard deviation. This normalization allows us to compare the relative importance of each determinant of informality. In table 4 the coefficients of the linear probability model and in brackets the coefficients of the standardized explanatory variables, the beta coefficients, are reported. These coefficients show that risk plays a role as important as age, having completed university and household income, while being female and married plays a slightly bigger role. The most important factor determining informality is clearly a previous non-employment spell, being about two and a half times more important than risk attitudes. Whatever the relative importance of risk attitudes may be, and we have shown that they are as important as some central demographic characteristics, risk attitudes remain an important predictor of informality even when we control for many variables.

Time preferences, on the other hand, do not seem to have any predictive power, at least with the measure constructed by us. We employ a dummy variable taking the value 1 for immediate and the value 0 for delayed consumption. Adding

this variable to the set of regressors in table 3, we find no significance for this proxy of time preferences and, therefore, do not report the results here.[4]

Since we have detailed information on the type of employment we can divide the set of the employed in 5 mutually exclusive groups: (1) formal employees, (2) involuntary informal employees, (3) voluntary informal employees, (4) formal self-employed and (5) informal self-employed. Using the same set of covariates and risk variables as in tables 3 and 4, we can thus estimate the probability of a person to be in one of the states using multinomial logit models. For each risk variable we present separate results in tables 5 – 8, where the shown coefficients are relative odds ratios with respect to the probability of being a formal employee.

Table 5 which has the general risk measure as our risk variable provides interesting evidence regarding the other covariates in the model. Being Ukrainian or female or married lowers the likelihood of being informally self-employed in a substantial fashion. Being married also lowers the likelihood of being an involuntary informal employee as does the completion of university education. Previous non-employment ratios dramatically raise the odds ratios for all the employment states but formal self-employment: a non-employment spell in the period 2004 to 2007 more than triples the likelihood to be a voluntary or involuntary informal employed and more than doubles the likelihood of being an informal self-employed. Finally, household income nearly doubles the relative odds to be in formal self-employment and lowers the probability to be an involuntary informal employee. In table 6 where we use the general risk indicator as our risk variable produces very similar results with respect to the mentioned covariates.

The general risk measure raises the relative probabilities to be formally or informally self-employed or to be a voluntary informal employee, with formal self-

[4] These results are available from the authors on request.

employment showing the strongest effect. General risk attitudes do not affect the relative probability of being an involuntary informal employee, a result that confirms our priors. In other words, since involuntary informal employees have non-registered jobs against their will their general risk attitudes should not heighten the likelihood of being in an informal job relative to the likelihood of being in a formal job. When we use the general risk indicator (table 6) risk strongly affects formal and informal self-employment. Turning to the career risk measures (tables 7 and 8), we get very similar effects of the other covariates on the relative odds to be in a particular state. The career risk measure produces positive and significant relative effects only for formal self-employment and involuntary informal employees, where this effect is slightly higher for the latter category. The career risk indicator in turn produces effects that reverse this order but gives qualitatively identical results.

References

FIGURES

Figure 1

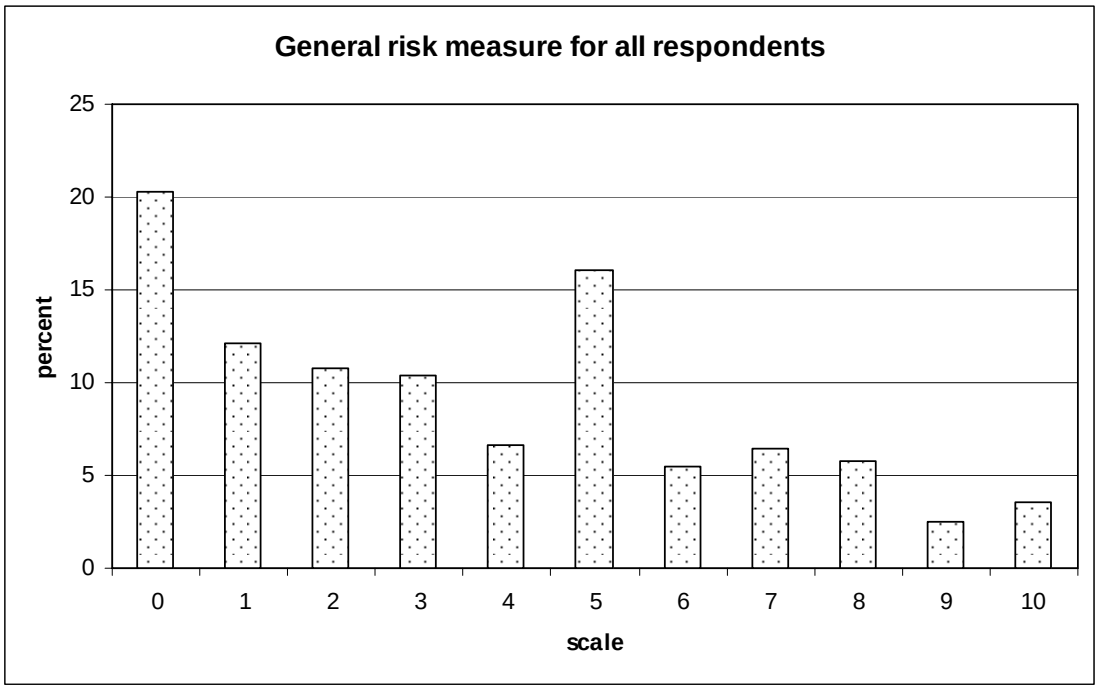


Figure 2

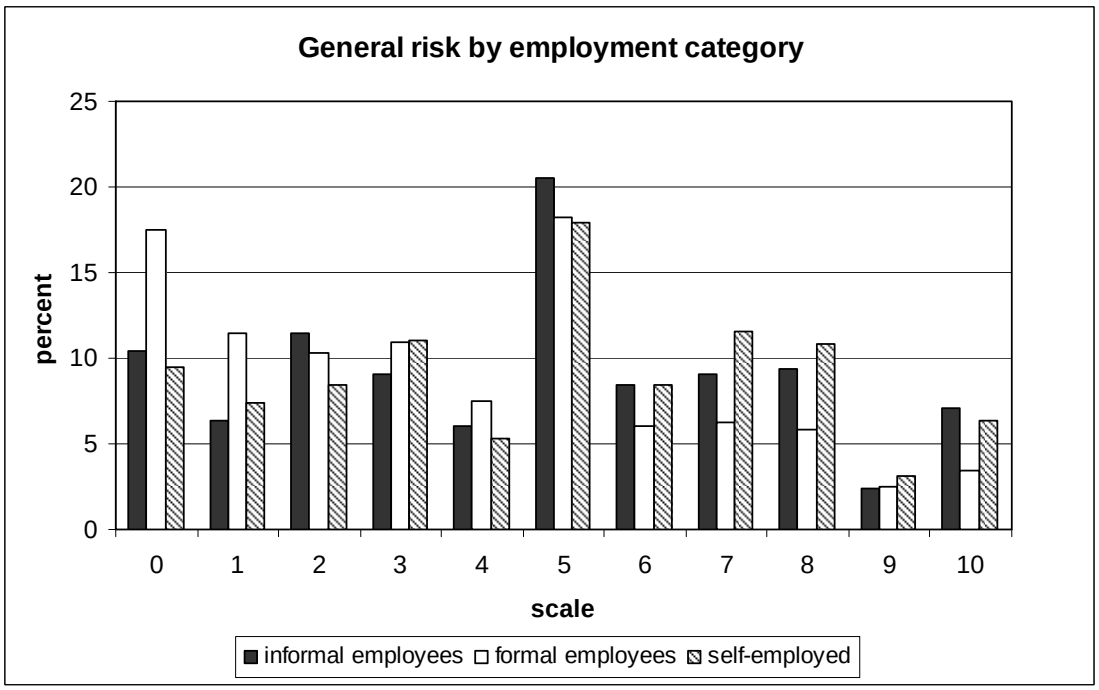


Figure 3

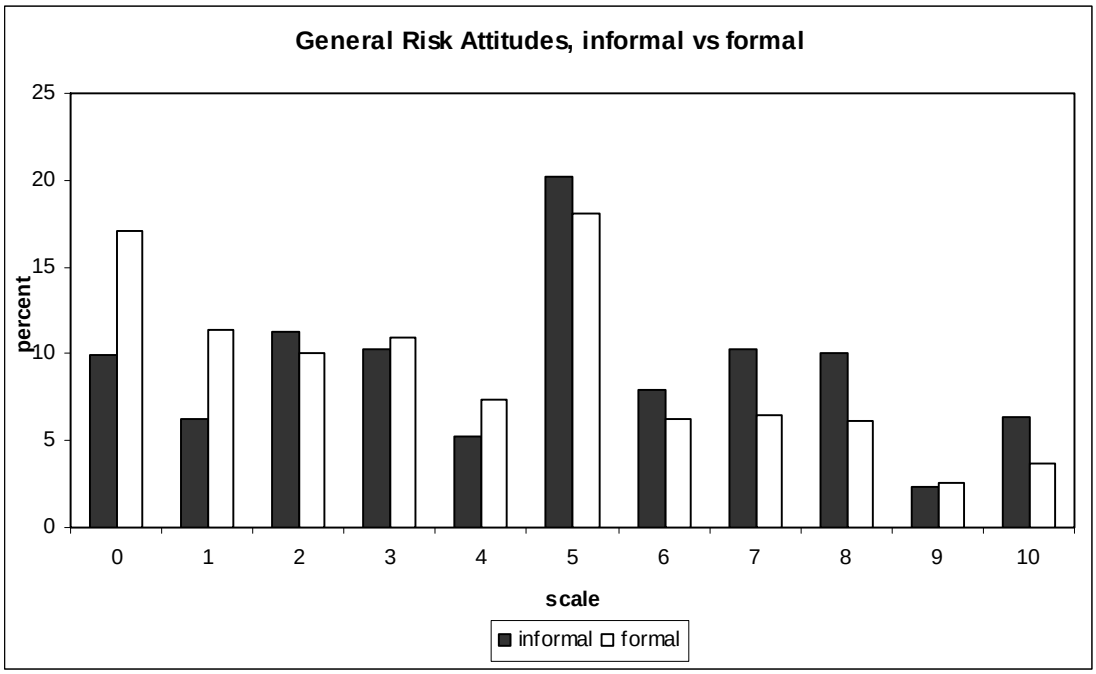


Figure 4

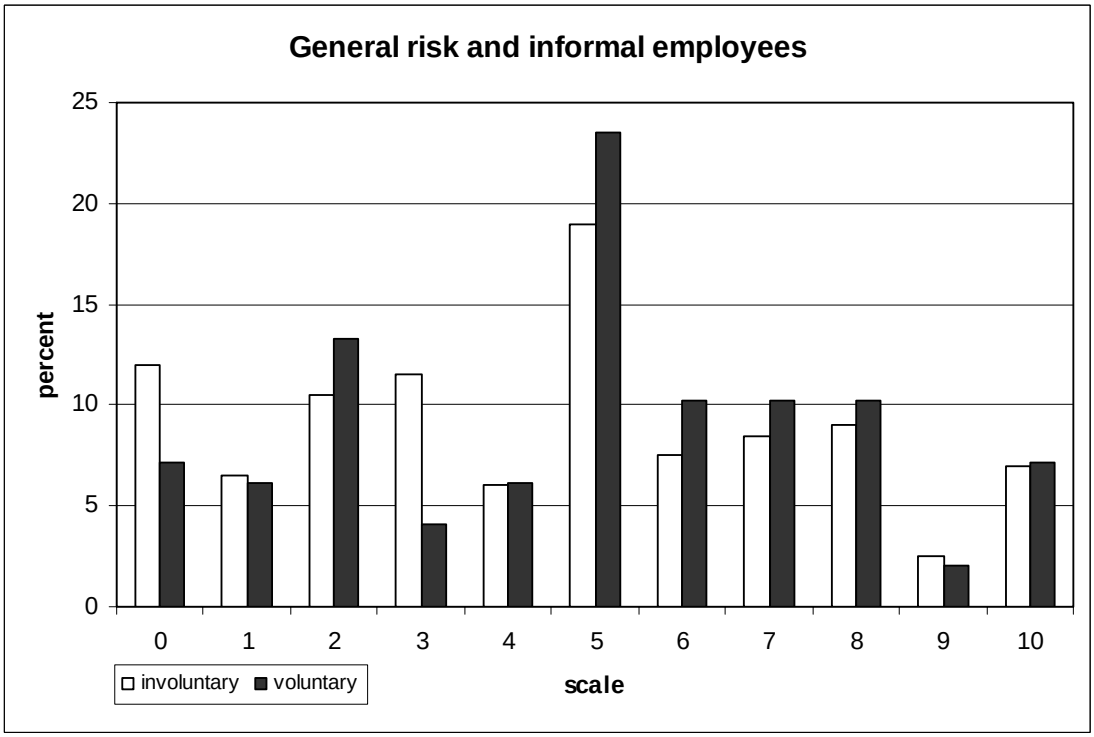


Figure 5

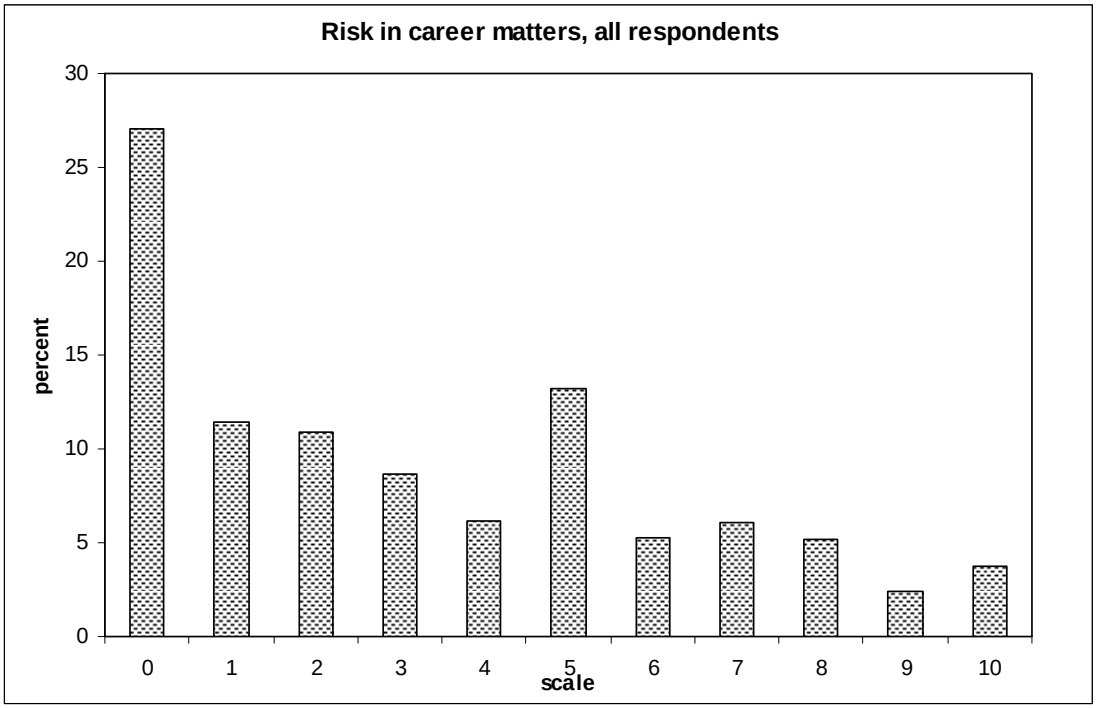


Figure 6

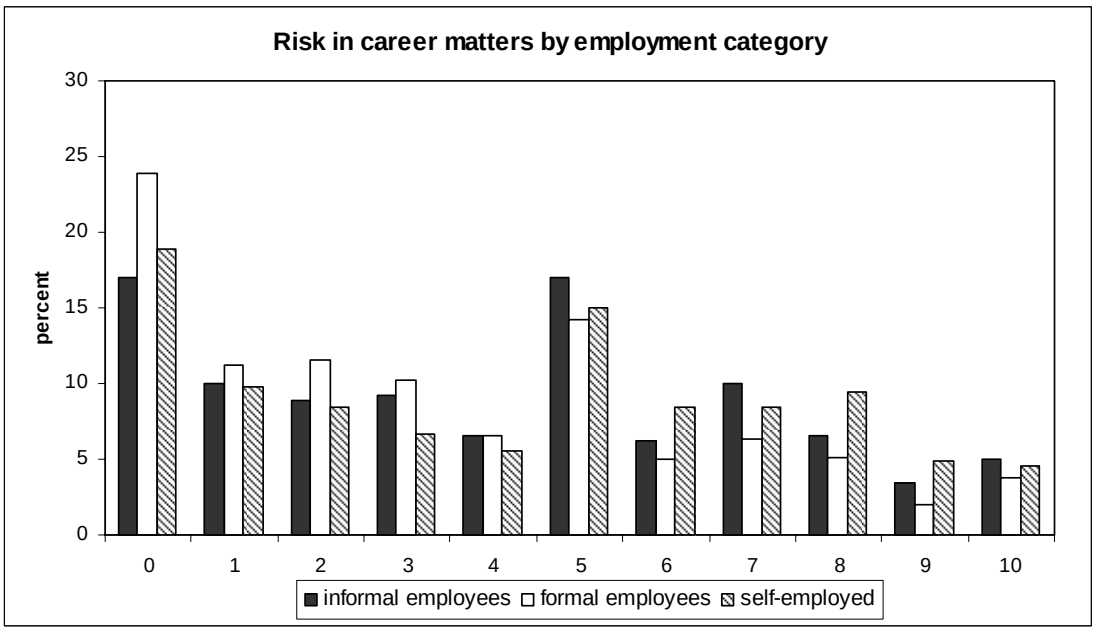


Figure 7

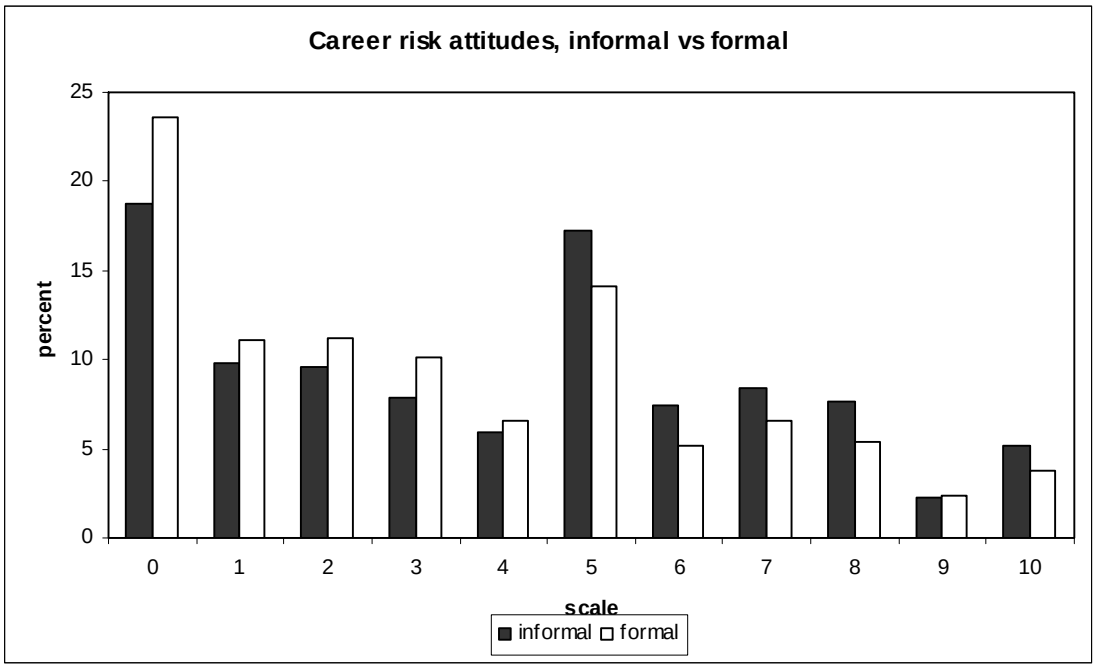


Figure 8

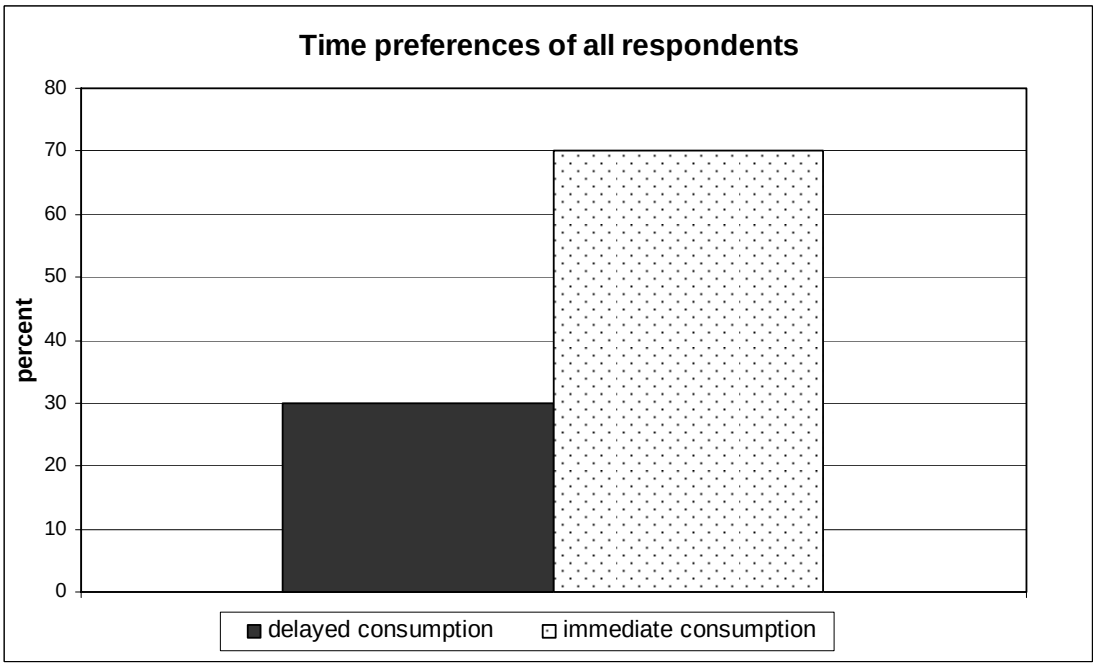
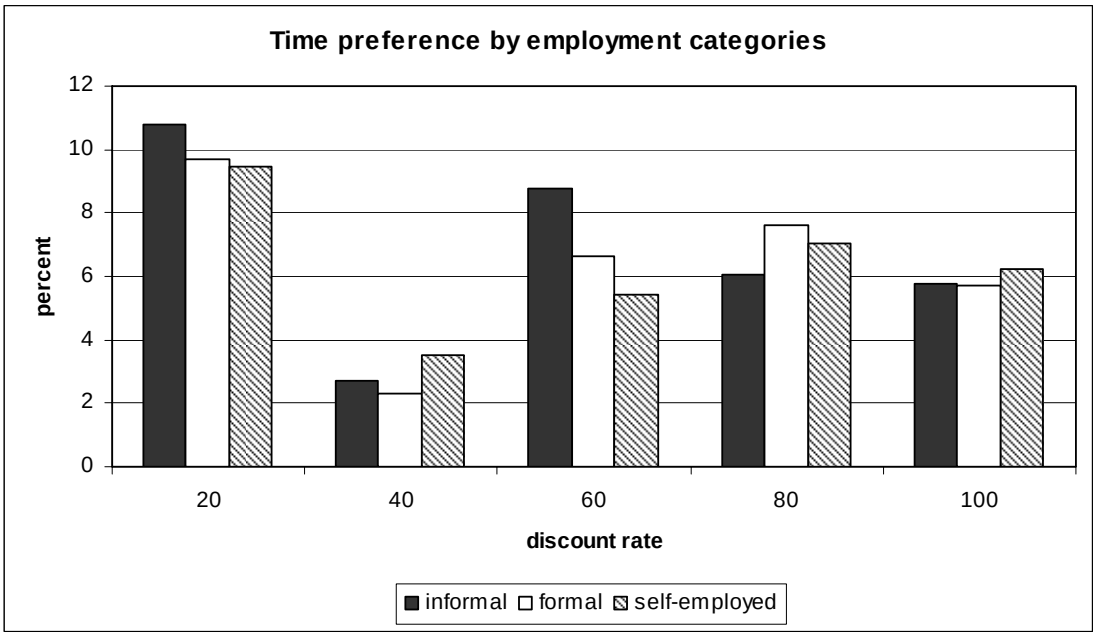


Figure 9


Time preference by employment categories
12
10
8
6
4
2
0
percent
20
40
60
80
100
discount rate
informal
formal
self-employed

TABLES

Table 1

Average measures of risk attitudes for informal, formal and self-employed work

	Informal employees		Formal employees		Self-employed 1/	
	Average of Risk Index	N	Average of Risk Index	N	Average of Risk Index	N
All	4.634	298	3.692	2725	4.786	379
Gender						
Men	5.325	166	4.334	1332	5.192	214
Women	3.765	132	3.078	1393	4.261	165
Age Group						
15-25	5.302	96	4.575	388	5.237	38
26-35	5.256	78	4.139	583	5.250	76
36-45	3.887	62	3.557	687	4.817	120
46-55	3.467	45	3.097	725	4.330	106
56-65	3.692	13	3.544	283	4.935	31
65+	4.250	4	3.068	59	3.250	8
Education 3/						
High School	4.159	69	3.710	455	4.613	75
University	5.125	24	3.995	646	5.600	65
Married						
Yes	3.741	135	3.537	1811	4.792	255
No	5.374	163	4.002	921	4.774	124
Kids 4/						
Yes	4.237	97	3.586	1064	4.576	139
No	5.364	33	3.468	408	4.551	78
Region						
Kiev	7.000	10	3.409	154	5.214	14
Center	4.015	65	3.699	667	4.688	96
West	4.745	47	3.911	471	5.684	76
East	4.795	78	3.590	748	4.771	83
South	4.622	98	3.711	685	4.209	110
Registration details 5/						
Registered Self-employed	…	…	…	…	4.926	162
Not registered Self-employed	…	…	…	…	4.702	218
Involuntary informal	4.500	200	…	…	…	…
Voluntary informal	4.908	98	…	…	…	…

Source: Authors' calculations based on Ukrainian Longitudinal Monitoring Survey (ULMS) 2007.

Notes:

1/ Self-employed: this category includes self-employed and entrepreneurs/employers from the ULMS.

2/ N: number of observations.

3/ Completed level.

4/ Kids: kids in household

5/ If the employer does not want to register the employee, this is classified here as "involuntary informal".

Table 2

Average measures of career risk attitudes for informal, formal and self-employed work

	Informal employees		Formal employees		Self-employed 1/	
	Average of Risk Index	N	Average of Risk Index	N	Average of Risk Index	N
All	4.081	259	3.334	2482	4.182	286
Gender						
Men	4.454	141	3.740	1214	4.294	177
Women	3.636	118	2.946	1268	4.000	109
Age Group						
15-25	4.786	84	4.349	361	4.258	31
26-35	4.375	64	3.963	536	4.617	60
36-45	3.456	57	3.105	636	4.515	97
46-55	3.512	41	2.708	644	3.863	73
56-65	2.300	10	2.870	254	2.810	21
65+	3.667	3	2.627	51	2.000	4
Education 3/						
High School	4.082	61	3.303	396	3.842	57
University	4.682	22	3.910	625	5.618	55
Married						
Yes	3.387	124	3.149	1649	4.052	191
No	4.719	135	3.702	831	4.442	95
Kids 4/						
Yes	3.778	90	3.252	957	4.182	110
No	5.172	29	2.997	376	3.920	50
Region						
Kiev	5.556	9	3.782	147	4.571	14
Center	3.365	63	3.016	618	3.316	76
West	4.158	38	3.400	420	4.627	59
East	4.493	67	3.438	657	4.964	55
South	4.098	82	3.389	640	4.073	82
Registration details 5/						
Registered Self-employed	…	…	…	…	4.587	138
Not registered Self-employed	…	…	…	…	3.810	147
Involuntary informal	3.892	176	…	…	…	…
Voluntary informal	4.482	83	…	…	…	…

Source: Authors' calculations based on Ukrainian Longitudinal Monitoring Survey (ULMS) 2007.

Notes:

1/ Self-employed: this category includes self-employed and entrepreneurs/employers from the ULMS.

2/ N: number of observations.

3/ Completed level.

4/ Kids: kids in household

5/ If the employer does not want to register the employee, this is classified here as "involuntary informal".

Table 3

Risk Measures and Informal Labour Market: Probit Regressions				
	(1)	(2)	(3)	(4)
risk	0.004***	…	…	…
	[0.002]	…	…	…
risk indicator	…	0.018*	…	…
	…	[0.011]	…	…
career risk	…	…	0.003**	…
	…	…	[0.001]	…
career risk indicator	…	…	…	0.022*
	…	…	…	[0.012]
age	-0.001***	-0.001***	-0.001**	-0.001**
	[0.000]	[0.000]	[0.000]	[0.000]
ukrainian	-0.014	-0.014	-0.01	-0.009
	[0.012]	[0.012]	[0.011]	[0.011]
female	-0.021**	-0.025**	-0.024**	-0.025**
	[0.010]	[0.010]	[0.010]	[0.010]
married	-0.051***	-0.053***	-0.036***	-0.036***
	[0.014]	[0.014]	[0.013]	[0.013]
kids in household	0.008	0.007	0.002	0.002
	[0.005]	[0.005]	[0.005]	[0.005]
completed secondary	0.008	0.008	0.009	0.009
	[0.011]	[0.011]	[0.011]	[0.011]
university completed	-0.029***	-0.029***	-0.029***	-0.029***
	[0.010]	[0.010]	[0.009]	[0.009]
non-employment (2004-2007)	0.089***	0.088***	0.086***	0.085***
	[0.019]	[0.019]	[0.020]	[0.020]
ln household income	-0.014**	-0.014*	-0.012*	-0.012*
	[0.007]	[0.007]	[0.007]	[0.007]
Other controls				
Sectors	YES	YES	YES	YES
Regions	YES	YES	YES	YES
Observations	2429	2429	2183	2183
Pseudo R Squared	0.246	0.243	0.248	0.246

Source: Authors' calculations based on the ULMS 2007.

Standard errors in brackets. Marginal Effects reported.

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

Dependent variable: all informals (waged employees and self-employed) 1 and rest of employed (formals) 0. Probability of being informally employed.

Mean Dependent Variable: 0.148

Risk/Career Risk: Risk measure 0-10.

Risk Indicator/Career Risk Indicator: 0-5 is 0 and 6-10 is 1.

Table 4

General Risk and Informal Labour Market: Beta Regressions				
	(1)	(2)	(3)	(4)
risk	0.006***	…	…	…
	[0.053]	…	…	…
risk indicator	…	0.024*	…	…
	…	[0.034]	…	…
career risk	…	…	0.005**	…
	…	…	[0.049]	…
career risk indicator	…	…	…	0.030**
	…	…	…	[0.042]
age	-0.001**	-0.001**	-0.001**	-0.001**
	[-0.047]	[-0.051]	[-0.044]	[-0.047]
ukrainian	-0.02	-0.021	-0.013	-0.012
	[-0.027]	[-0.027]	[-0.017]	[-0.016]
female	-0.033**	-0.037***	-0.038***	-0.039***
	[-0.053]	[-0.061]	[-0.064]	[-0.066]
married	-0.070***	-0.071***	-0.051***	-0.052***
	[-0.096]	[-0.098]	[-0.072]	[-0.073]
kids in household	0.01	0.01	0.003	0.003
	[0.026]	[0.025]	[0.008]	[0.008]
completed secondary	0.01	0.01	0.011	0.011
	[0.012]	[0.012]	[0.014]	[0.014]
university completed	-0.035**	-0.034**	-0.036**	-0.035**
	[-0.047]	[-0.046]	[-0.050]	[-0.050]
non-employment (2004-2007)	0.121***	0.120***	0.123***	0.122***
	[0.139]	[0.137]	[0.144]	[0.143]
ln household income	-0.019*	-0.019*	-0.019*	-0.020*
	[-0.037]	[-0.036]	[-0.039]	[-0.040]
Other controls				
Sectors	YES	YES	YES	YES
Regions	YES	YES	YES	YES
Observations	2429	2429	2183	2183

Source: Authors' calculations based on the ULMS 2007.

Normalized beta coefficients in brackets

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

Dependent variable: all informals (waged employees and self-employed) 1 and rest of employed (formals) 0.

Risk: Risk measure 0-10.

Risk Indicator: 0-5 is 0 and 6-10 is 1.

Table 5

Multinomial Logit Regression: Informality and Risk				
	formal self-employed	informal involuntary employees	informal voluntary employees	informal self-employed
risk	1.143***	1.068	1.130*	1.122**
	[0.041]	[0.043]	[0.055]	[0.049]
age	0.998	0.983	0.982	0.983
	[0.01]	[0.01]	[0.013]	[0.012]
ukrainian	0.934	1.11	0.819	0.528*
	[0.239]	[0.308]	[0.275]	[0.149]
female	0.728	0.625	1.066	0.404**
	[0.161]	[0.158]	[0.339]	[0.122]
married	0.94	0.491**	0.565	0.400**
	[0.246]	[0.12]	[0.178]	[0.112]
kids in household	1.066	1.143	1.199	1.237
	[0.139]	[0.161]	[0.204]	[0.174]
completed secondary	0.909	1.293	1.069	0.965
	[0.268]	[0.333]	[0.372]	[0.298]
university completed	0.961	0.305**	0.665	0.594
	[0.25]	[0.136]	[0.277]	[0.219]
non-employment (2004-2007)	0.728	3.468***	3.161***	2.367**
	[0.239]	[0.834]	[0.956]	[0.666]
ln household income	1.968***	0.603**	1.049	1.045
	[0.364]	[0.112]	[0.257]	[0.227]
Other controls				
Sectors		YES		
Regions		YES		
Observations		2417		

Source: Authors' calculations based on the ULMS 2007.

Standard errors in brackets

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

Relative Odds Ratios

Base Category: formal employees

Risk: Risk measure 0-10.

Table 6

Multinomial Logit Regression: Informality and Risk Indicator				
	formal self-employed	informal involuntary employees	informal voluntary employees	informal self-employed
risk indicator	2.388***	1.503	1.312	1.754*
	[0.519]	[0.366]	[0.405]	[0.453]
age	0.997	0.982	0.979	0.982
	[0.01]	[0.01]	[0.013]	[0.012]
ukrainian	0.951	1.12	0.805	0.529*
	[0.244]	[0.31]	[0.27]	[0.149]
female	0.708	0.609*	0.926	0.372***
	[0.156]	[0.152]	[0.29]	[0.111]
married	0.953	0.492**	0.532*	0.391***
	[0.25]	[0.12]	[0.167]	[0.109]
kids in household	1.045	1.143	1.185	1.237
	[0.137]	[0.161]	[0.201]	[0.174]
completed secondary	0.904	1.282	1.08	0.951
	[0.267]	[0.331]	[0.375]	[0.294]
university completed	0.898	0.299**	0.704	0.59
	[0.237]	[0.134]	[0.292]	[0.218]
non-employment (2004-2007)	0.679	3.395***	3.110***	2.291**
	[0.224]	[0.818]	[0.943]	[0.645]
ln household income	1.969***	0.605**	1.059	1.049
	[0.363]	[0.112]	[0.26]	[0.228]
Other controls				
Sectors		YES		
Regions		YES		
Observations		2417		

Source: Authors' calculations based on the ULMS 2007.

Standard errors in brackets

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

Relative Odds Ratios

Base Category: formal employees

Risk Indicator: 0-5 is 0 and 6-10 is 1.

Table 7

Multinomial Logit Regression: Informality and Career Risk				
	formal self-employed	informal involuntary employees	informal voluntary employees	informal self-employed
career risk	1.124**	1.048	1.143**	1.086
	[0.041]	[0.041]	[0.058]	[0.052]
age	1.001	0.983	0.983	0.984
	[0.011]	[0.011]	[0.014]	[0.013]
ukrainian	0.912	0.911	0.888	0.722
	[0.251]	[0.258]	[0.337]	[0.243]
female	0.63	0.585*	1.012	0.293***
	[0.149]	[0.153]	[0.345]	[0.105]
married	0.863	0.595*	0.773	0.388**
	[0.24]	[0.154]	[0.278]	[0.126]
kids in household	1.032	0.991	0.925	1.292
	[0.151]	[0.156]	[0.194]	[0.201]
completed secondary	0.955	1.421	1.073	0.911
	[0.303]	[0.378]	[0.409]	[0.313]
university completed	0.959	0.346*	0.591	0.567
	[0.265]	[0.156]	[0.265]	[0.242]
non-employment (2004-2007)	0.719	3.530***	3.183***	2.403**
	[0.256]	[0.884]	[1.053]	[0.769]
ln household income	2.106***	0.568**	1.337	1.034
	[0.422]	[0.111]	[0.356]	[0.254]
Other controls				
Sectors		YES		
Regions		YES		
Observations		2171		

Source: Authors' calculations based on the ULMS 2007.

Standard errors in brackets

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

Relative Odds Ratios

Base Category: formal employees

Career Risk: Risk measure 0-10.

Table 8

Multinomial Logit Regression: Informality and Career Risk Indicator				
	formal self-employed	informal involuntary employees	informal voluntary employees	informal self-employed
career risk indicator	2.416***	1.258	2.037*	1.816
	[0.57]	[0.341]	[0.671]	[0.56]
age	1.000	0.982	0.981	0.983
	[0.011]	[0.011]	[0.014]	[0.013]
ukrainian	0.918	0.92	0.908	0.727
	[0.253]	[0.26]	[0.344]	[0.245]
female	0.634	0.575*	0.972	0.295***
	[0.149]	[0.15]	[0.33]	[0.106]
married	0.849	0.589*	0.756	0.387**
	[0.236]	[0.153]	[0.272]	[0.125]
kids in household	1.027	0.984	0.913	1.286
	[0.15]	[0.155]	[0.191]	[0.199]
completed secondary	0.962	1.42	1.079	0.916
	[0.306]	[0.377]	[0.411]	-0.316
university completed	0.93	0.349*	0.61	0.559
	[0.258]	[0.157]	[0.273]	[0.239]
non-employment (2004-2007)	0.701	3.512***	3.115***	2.342**
	[0.25]	[0.88]	[1.03]	[0.752]
ln household income	2.096***	0.570**	1.341	1.035
	[0.42]	[0.111]	[0.357]	[0.253]
Other controls				
Sectors		YES		
Regions		YES		
Observations		2171		

Source: Authors' calculations based on the ULMS 2007.

Standard errors in brackets

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

Relative Odds Ratios

Base Category: formal employees

Career Risk Indicator: 0-5 is 0 and 6-10 is 1.