Risk Attitudes and Informality, with an Application to Russia

(Working Title & Preliminary Work in Progress)

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Structure of the talk

1. Introduction – Motivation, Facts about Informality in Russia, putting our paper in context

2. Theoretical framework

3. Data work thus far done

Motivation (1)

- Risk is an important aspect of informality, but few studies consider it
- Theoretical models usually consider only the risk of not finding employment and assume risk-neutral agents (e.g., Albrecht et al. 2009; Zenou 2008).
- However, standard microeconomic theory and empirical evidence suggest individuals are risk averse
- Risk preferences are important for the decision of whether to be informally employed / whether to quit a formal job

Motivation (2)

- Theoretical models of informality usually are based on search-and-matching theory and divide employment into formal and informal (Kolm and Larsen, 2003; Albrecht et al., 2009; Boeri and Garibaldi, 2006)

- Attrition rates from jobs are given exogenously: if a worker quits a low-paid job then she may be unlucky and not find a higher wage job

- Recent search-and-matching models incorporate worker's choice between formal and informal jobs

- Risk attitudes are not allowed in these models; none of the models are designed with peculiar institutional features of transition economies

Motivation (3)

- In transition economies, quitting involves risks (incl. losing social services and benefits)

- … but staying in a formal job may also involve the risks
  - of ending up with obsolete skills / depreciated human capital or
  - being displaced in the future

This paper

- Develops a theoretical model that explicitly accounts for risk aversion, quits and informality

- Takes into account peculiarities of transition economies:
  - risk of quitting AND risk of staying
  - Distinguishes between skills relevant for formal sector and skills relevant for informal sector

- Tests the model with unique representative data – the Russian Longitudinal Monitoring Survey (RLMS) plus a supplement on informality to RLMS in 2009

Existing literature

- Competing paradigms about informality (segmented vs. integrated LM) both have some raison d'être in transition economies:
  - In Russia, quitters are mainly "pulled" into informal employment (voluntary), in contrast to displaced who are "pushed"
  - So in Russia: segmented LM for displaced, while a rational choice for quitters (Lehmann, Razzolini, Zaiceva, (2012)
  - Informal sector might be two-tier as shown in Ukraine (Lehmann and Pignatti, 2007) and Russia (Lehmann and Zaiceva, 2013)
- But self-selection into informal employment is correlated with risk preferences (Dohmen, Khamis and Lehmann, 2012 is the only study on risk and informal employment - Ukraine)
  - risk-lovers are more likely to engage in voluntary informal employment and self-employment (both formal and informal)

Informality in Russia

- Averaging across 1999-2006, Russia ranks the third among 21 transition countries (after Georgia and Ukraine) in terms of the size of its estimated shadow economy (Schneider et al., 2010)

- Over 1999-2005, the estimated share of the shadow economy in Russia (in % of GDP) increased slightly from 46.4 to 47.3% and decreased again to 46.4% in 2006 (Schneider et al., 2010)

- Slonimczyk (2012): informal employment has risen among employees over 1998-2009 from 6 to 12%. On the other hand, the incidence of remunerated irregular activities has declined over the same period from around 12 to 8-10%.

Employment in informal sector in the Russian Federation, 2003 and 2010. Rosstat

	Total individuals, thous.		Main job, %		Additional job, %		Total employed in the informal sector in % of total employed population	
	2010	2003	2010	2003	2010	2003	2010	2003
Russian Federation	11583	10586,8	88.8	82.4	11.2	17.6	16.6	16.1
Central region	2443	2304	90.3	79	9.7	21	12.7	13.2
Moscow	299	146.2	94.5	83.4	5.5	16.6	5	3.4
North-Western region	618	897.3	87.9	85.1	12.1	14.9	8.7	12.7
Sankt-Petersburg	58	85.8	85.3	90.6	14.7	9.4	2.2	3.6
Southern region	1477	1851	88.7	87.7	11.3	12.3	23	22.4
North-Caucasus region	1372	-	94.1	-	5.9	-	37.9	-
Volga region	2585	2645.3	85.5	77.2	14.5	22.8	17.5	18.2
Ural region	797	986.4	91	85.3	9	14.7	13	14
Siberia region	1791	1518.8	86.9	86.4	13.1	13.6	19.2	16.8
Far East region	499	499.9	88.9	83.8	11.1	16.2	15.5	14.4

Source: Rosstat, "Social Situation and Life of the Population of Russia", 2011 and 2004. (rus: "Socialnoje polozhenije I uroven zhizni naselenija Rossii"). www.gks.ru

Notes: in 2003 North Caucasus was included within Southern region, thus these regions are not directly comparable across two years.

Existing studies for Russia – LFS data

- Gimpelson and Zudina (2012): Russian LFS data; productivity-based definition of informality (without registration)
- Informal employment has increased from 13 to 18% of total employment over 1999-2008, while the share of wage employees in total IE has risen from 30 to 60%
- Males, workers with low education, employed in construction, retail trade and the hotel and restaurant business have a higher probability to be informal
- At the regional level, the share of informal employment is positively correlated with local U rate and negatively correlated with shares of tertiary education, of young and older workers

Existing studies for Russia - RLMS

- Karabchuk and Nikitina (2011): RLMS data over 2003-2009. Informally employed are those who work in firms < 5 employees, or who report not working in an enterprise/organization and also who work in an enterprise but do not have an official contract
- IE increased over 2003-2009, reaching its peak in 2004 with 17.6%. The majority of IE is not in an enterprise/organization

- Kapeliushnikov (2012): 2009 supplement to the RLMS on informality and tests the robustness of different definitions of informality.
- Depending on definition, the incidence of informal employment can vary between 10% and almost 25%; determinants depend on the definition

Existing studies for Russia - RLMS

- Lehmann and Zaiceva (2013) use RLMS main data of years 2003 to 2009 and informality supplement of 2009.
- Like Kapeliusznikov they find a widely varying incidence of IE, which depends on definition used; unlike Kapeliushnikov they find determinants robust to the definition (apart from firm size)
- Lehmann and Zaiceva also find a segmented informal sector, with penalties in the lower part of the wage distribution and wage premia in the upper part
- Lehmann, Razzolini, Zaiceva (2012): RLMS data 2003-2009 and 2008 Supplement on job separations. Study the impact of worker flows on informal employment
- Those who separate from jobs have a higher prob. to end up in a subsequent informal job, especially if displaced involuntarily and if having low human capital

Existing studies for Russia - RLMS

- Slonimczyk (2012): the effect of the 2001 tax reforms (reduced taxes, particularly for highly-paid) on informality. RLMS data over 1998-2009
- The reform reduced significantly the incidence of informal employment. The largest reduction is for informal irregular activities and for the individuals in the top income brackets

- Slonimczyk (2013): RLMS data over 2002-2011, analyzes mobility across different forms of formal and informal employment
- Informal: entrepreneurs and employees not working in firms/organizations; those working not officially, and those with irregular activities
- Little evidence of entry barriers to the formal sector (with the exception of irregular activities – small flows).
- Informal entrepreneurship - stepping-stone toward formal entrepreneurship. Informal employees are not more likely than unemployed to get a formal position.
- Significant gap between formal entrepreneurship (best paid) and other forms of employment

Theoretical Framework (preliminary):

1. Introduction

- **Informal work involves risks** (operating outside official protection, long-term financial insecurity, etc.).

- But staying in a **formal job may also be risky** (high expected job destruction rate; may be seen as dead-end, skills becoming obsolete).

- We formulate and test a very simple model to **capture role of both these risks in workers' decisions**.

• Reduced form, focusing on binary decision in current period: **Quit from a formal job (*Q*) or Don't Quit (*DQ*)**.

• Assume utility is a function of mean and variance of income, with **risk-aversion** parameter *r*. But also include a '**skill**' parameter *s*.

• Under well-known conditions, a standard mean-variance utility function yields the same preferences as von Neumann-Morgenstern (vNM) utility with CARA.

• But, following McLaren (2009), we specify an alternative mean-variance utility function equivalent to vNM utility with CRRA when income lognormal.

- We consider two types of skills

  - Skill (e.g., formal educational attainment) is assumed to be particularly relevant to formal work (D*Q*).

  - Skill (e.g., initiative, selling ability) is assumed to be particularly relevant to informal work (*Q*).

- A worker makes a current decision based on own {*s, r*} and on **subjective evaluation** of prospects if *Q* or if *DQ*.

- Includes forecast of **displacement probability** in each period *t* in the future; and **potential earnings distribution** at each *t* in formal and in informal work (if choose *DQ* now, can still choose *Q* at any *t*).

- Simple formulation aimed at using available data **to infer the workers' subjective evaluations of the risks involved**.


derivation

2. Formal Skill

• A worker has a formal job; option: quit (*Q*) and enter informal labour market or don't quit (*DQ*).

• Utility:

$$(1)\quad u(E)=\frac{1}{1-r}\exp\left[(1-r)\ln\mu_E(s)-\frac{1}{2}r(1-r)\ln\left(1+\frac{v_E(s)}{\left(\mu_E(s)\right)^2}\right)\right];$$

$$(E=Q,DQ)$$

$\mu_E(.)$ and $v_E(.)$ are the respective **mean** and **variance** of the PV of income for *E=Q,DQ.*

• Assume that $s \in [\underline{s}, \bar{s}]$ where $\underline{s} > 0$, and that

(2) $\mu'_E(s) > 0; \mu''_E(s) \leq 0; \nu'_E(s) > 0; \infty > \nu''_E(s) > 0$

$(E = Q, DQ)$

Mean income for *E* increases with *s* at a decreasing rate; variance of income increases with *s* at an increasing rate

(e.g., consistent with evidence that variance of wages is higher for occupations/educational achievement where wages are higher.)

• **Greater skill has a positive value for both *DQ* and *Q*, but more for *DQ***:

(3) $$\frac{du(DQ)}{ds} > \frac{du(Q)}{ds} > 0.$$

• We also assume

(4) $$\mu'_{DQ}(s) > \mu'_{Q}(s), \quad \nu'_{DQ}(s) > \nu'_{Q}(s).$$

At any given *s*, a marginal increase in *s* has a greater effect on the mean and variance for *DQ* than for *Q*.

- $u(Q) = u(DQ)$ at

(5) $$r = r_0(s).$$

For any given s, $r_0(s)$ is the value of r at which the worker is indifferent between *DQ* and *Q*.

• To draw $r_0(s)$ it is useful to define

$$\mu_Q(s^\mu) = \mu_{DQ}(s^\mu); \tag{6}$$
$$\nu_Q(s^\nu) = \nu_{DQ}(s^\nu).$$

Means and are equal at s^μ; variances are equal at s^υ

$$\mu_{DQ}(s) > (<)\mu_Q(s) \text{ as } s > (<)s^\mu;$$

$$\nu_{DQ}(s) > (<)\nu_Q(s) \text{ as } s > (<)s^\nu.$$

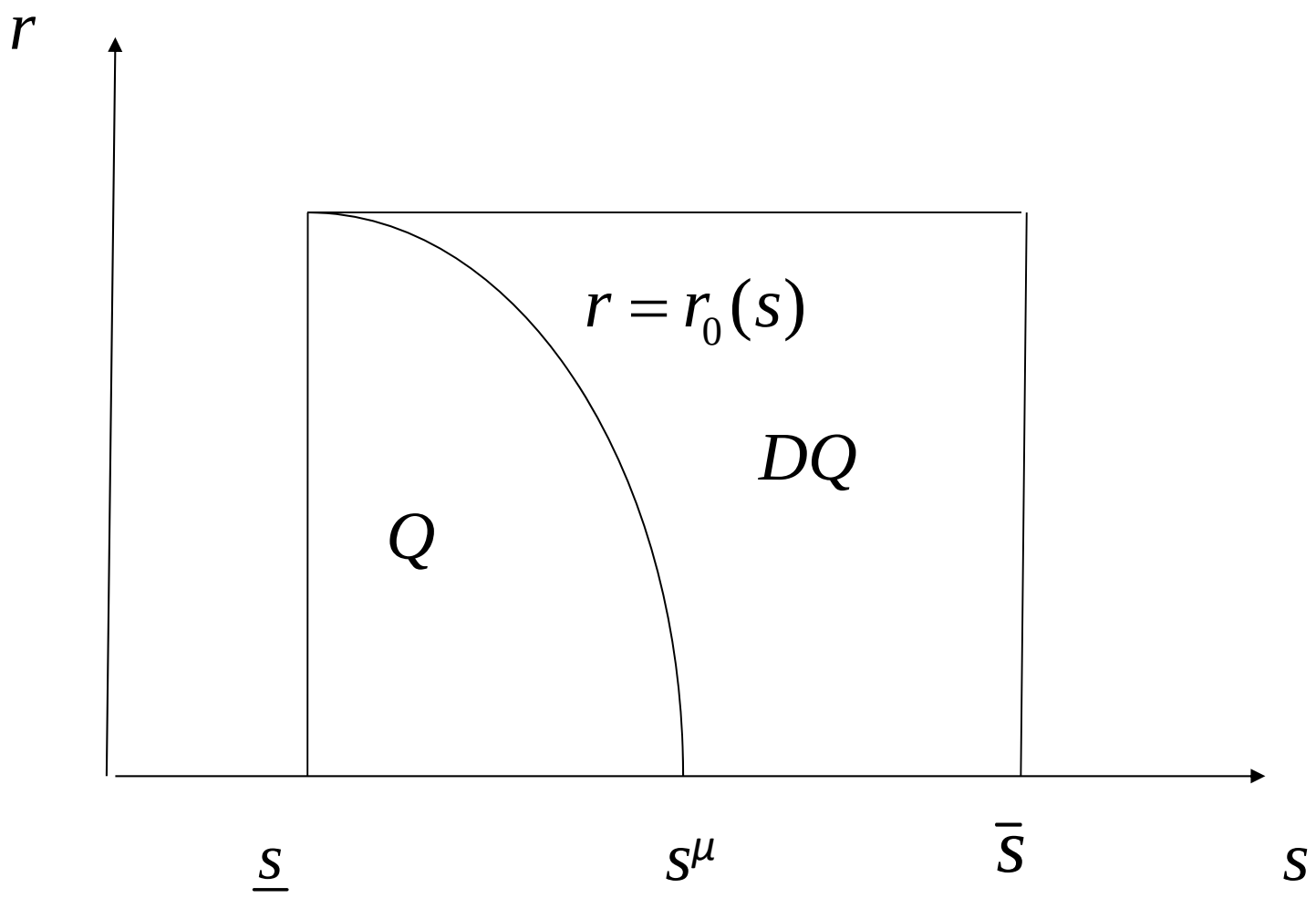


Figure 1: $s^\mu < s^\nu$

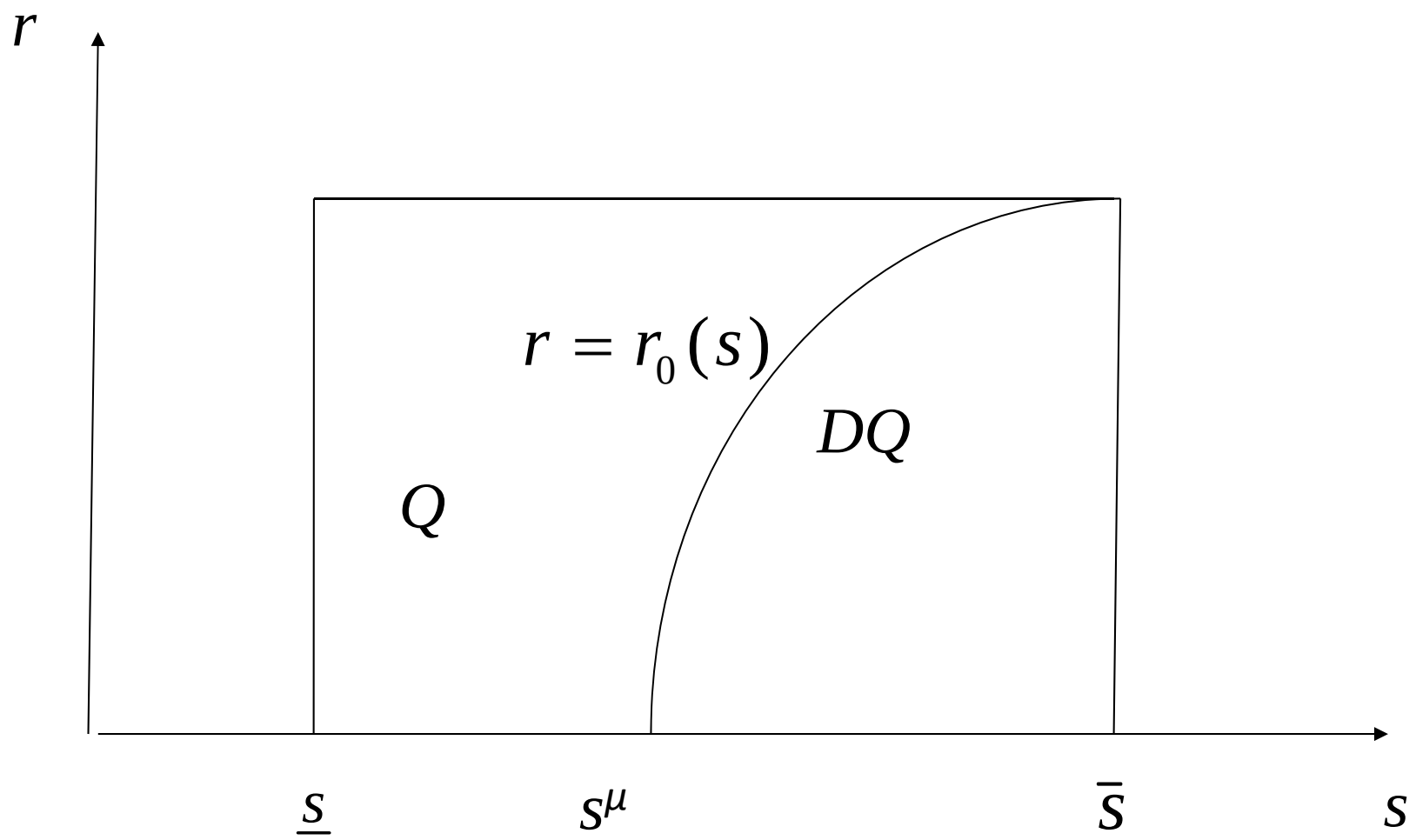


Figure 2: $s^{\mu} > s^{\nu}$

- Intuition

  - Consider Figure 1, which is drawn for $s^{\mu} < s^{\nu}$.

  - At any point on $r = r_0(s)$ the worker is indifferent between *DQ* and *Q*.

  - Now raise *r* slightly, holding *s* constant.

  - Since $s < s^{\mu} < s^{\nu}$ (i.e., *s* is smaller than the value at which variances are equal for *Q* and *DQ*) it follows from (4) that $\nu_{DQ} < \nu_{Q}$.

- Therefore, at the new point, *u(DQ) > u(Q).*

- Given (3),
  - at any point horizontally to the right of this point, *u(DQ) > u(Q)*;
  - and if we move far enough to the left, *u(DQ) = u(Q)*.

- **Therefore,** $r = r_0(s)$ **slopes down from left to right, as shown in Figure 1.**

- Similar reasoning applies if $s^{\mu} > s^{\nu}$, but then $r = r_0(s)$ slopes up from left to right (Figure 2).

• Thus, for a given group of workers, and for a measure of formal skill s, we first test the preliminary hypothesis that

- **at each level of *r*, a higher level of *s* is associated with *DQ*, rather than *Q*.**

• Then, by estimating the slope of $r = r_0(s)$ we can infer whether

- near the margin of choice between *Q* and *DQ*, workers believe the riskier option is *Q* (Figure 1) or *DQ* (Figure 2).

3. Informal Skill

- Formal skill may be of little relevance to informal work; but informal skill such as initiative and selling ability may be more useful.

- If we now interpret *s* as informal, rather than formal, skill the preceding analysis still holds, but with *Q* and *DQ* interchanged.

- Thus, in the revised figures at each level of *r*, for a sufficiently high level of *s, Q is chosen.*

- Focusing on Figure 1, $r = r_0(s)$ is again downward sloping, but *Q* is preferred for (*s, r*) combinations to the right and *DQ* to the left.

- Near the margin of choice between *Q* and *DQ*, workers believe the riskier option is *DQ*.


fig1_inf

- This captures the idea that in an economy undergoing fundamental restructuring some skills may have large returns in informal work.


fig2_inf

- The converse reasoning holds in Figure 2.

Empirical work (in progress)

Data employed

- We use data from the RLMS including two supplements:
  - The 2008 supplement on displacement that allows us to reconstruct each respondent's labor market history between 2003 and 2008 and to identify informal employment over this period (using oral contract as a proxy).
  - The 2009 informality supplement that includes information on risk attitudes of respondents.
- The main RLMS data set is used to define different measures of skills and to generate standard control variables in, e.g., earnings equations.
- Sample: age 16-55 (women), 16-60 (men), non-missing information on main variables including separations

Constant absolute vs. constant relative risk aversion – what do the data tell us?

- Use following lottery question of supplement:

Imagine you were given 100.000 Rubles and received the following offer: You could either keep all the money or keep part of it and allocate the remaining amount to a lottery in which there is the 50% chance to double the amount of money that you allocate to the lottery. It is equally possible that you lose half of the amount that you put into the lottery. You have the opportunity to put the full amount into the lottery, part of the amount or nothing. How much money would you be willing to put into the lottery?

1 The entire amount, 100.000 Rubles
2 80.000 Rubles
3 60.000 Rubles
4 40.000 Rubles
5 20.000 Rubles
6 Nothing, I would decline the offer
7 DS
9 RA

|__|

lottery question

Constant absolute vs. constant relative risk aversion – what do the data tell us?

Table: Correlation between income/wages and willingness to play in a lottery, 2009

Ln(hh_income)	Ln(wage)	Ln(money_all_sources)
OLS		
-0.050***	-0.073***	-0.072***
(0.020)	(0.021)	(0.019)
Ordered probit		
-0.069***	-0.098***	-0.096***
(0.025)	(0.026)	(0.024)

Notes: Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. Coefficients are reported. Dependent variable is ordered from 1 to 6 with 1 meaning would put all given money into a lottery and 6 meaning would not play in a lottery and leave all the money to himself (i.e. increasing measure reflects being more risk averse). Controls include age and gender.

Informality definition 2009

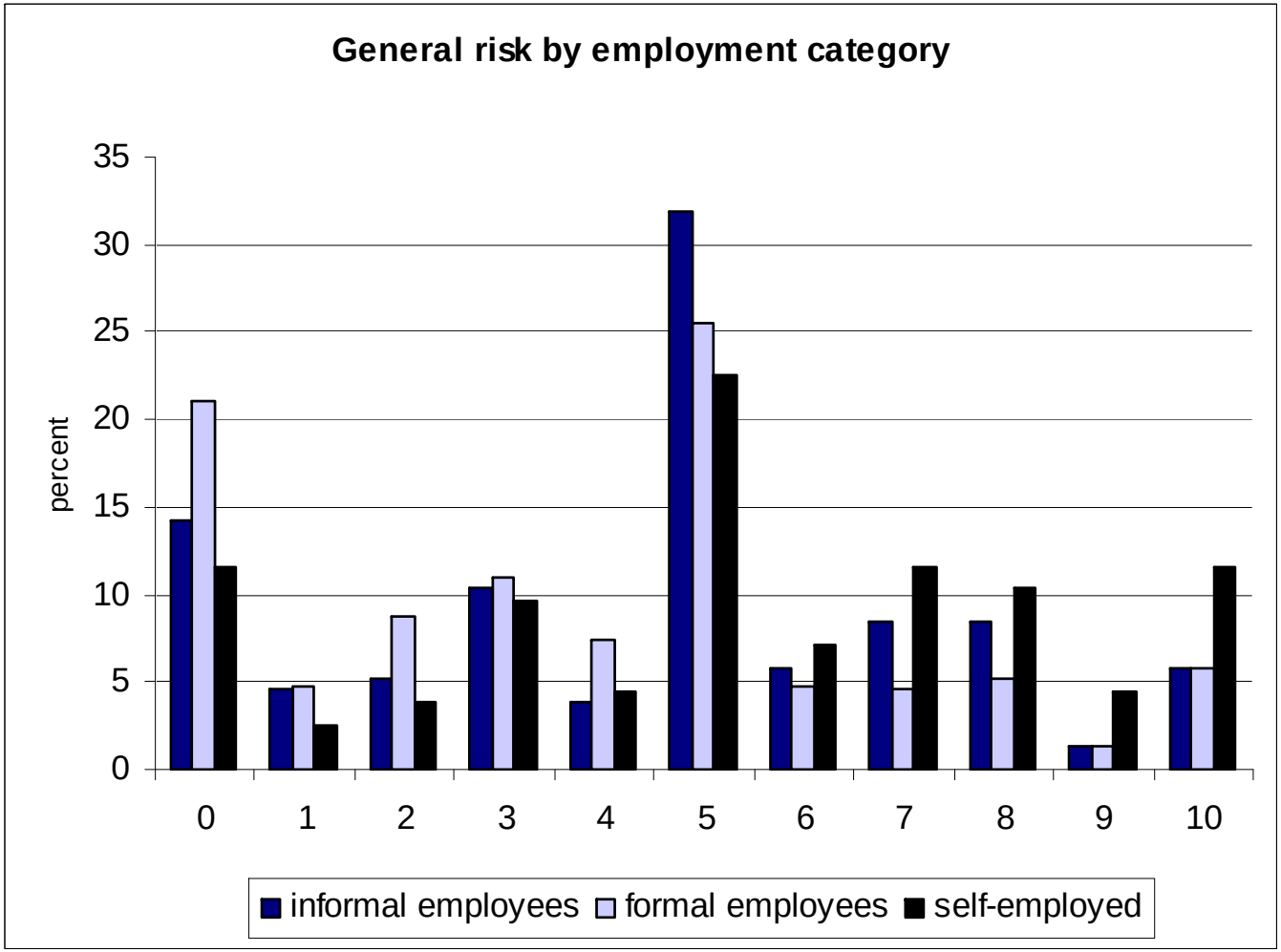
- Main survey:
  - officially employed, i.e. with work contract agreement
    - Involuntary (“employer didn’t want”)
    - Voluntary (“you / both didn’t want”)
  - Self-employed (Slonimczyk, 2012; Lehmann, Razzolini, Zaiceva, 2012):
    - Works in enterprise/organization and is personally an owner or co-owner of the enterprise? AND In his opinion, is doing entrepreneural work at this job (formal or informal)
    - Does not work in enterprise/organization but is involved in an entrepreneurial or individual labor activity (informal)
    - Informal self-employed – assumed voluntary

Measures of skills 2009

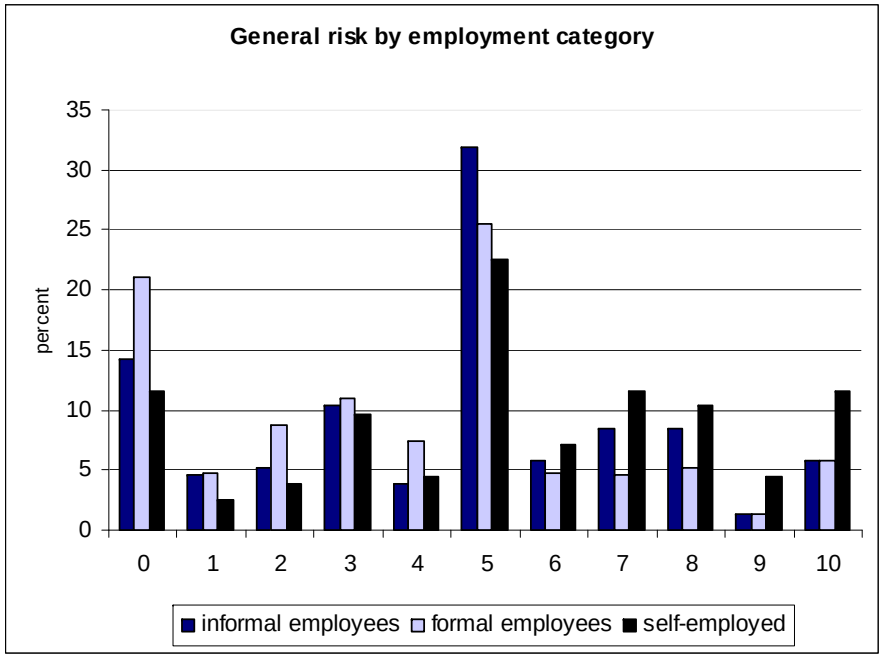
- Formal skills:
  - Education level:
    - Primary (0-6 years of primary school, not finished secondary (7-9 years))
    - Secondary (finished secondary and secondary specialized)
    - Higher (finished higher and above)
  - Years of schooling: adjusted from education categories/years (Gorodnichenko and Sabirianova Peter, 2005)
  - Tenure
  - Foreign language knowledge
  - Subjective professionalism ("imagine a 9-steps scale of professional skills/mastership")
- Informal skills relevant for the informal sector(e.g. entrepreneurship):
  - Residuals from the regressions of earnings on informal self-employment status and additional controls (predicted for the whole sample)

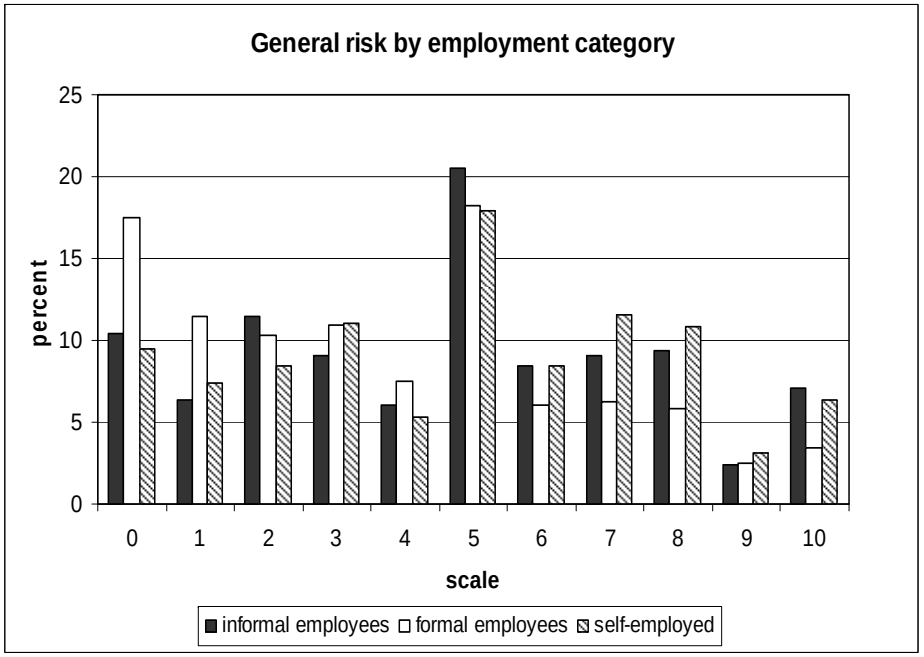
Measures of risk attitudes – supplement 2009

- Supplement uses meaures of risk attitudes experimentally validated in the German context (Dohmen et al., 2011)
  - General Risk attitude measure - scale from 0 to 10
  - Risk attitude measures for different domains (e.g., financial, career, health, sports, car driving)
  - Objective risk attitude measure - hypothetical investment amount
- Dohmen et al. (2011) find:
  - that there exists a stable risk preference relevant for risky behavior in general and in specific context
  - General risk attitude measure is the only good predictor for all different contexts (domain specific best for specific context)
  - Hypothetical investment measure performs worst


General risk by employment category
percent
35
30
25
20
15
10
5
0
0
1
2
3
4
5
6
7
8
9
10
informal employees
formal employees
self-employed

Russia vs. Ukraine





Primary Determinants of General Risk Attitudes – marginal effects

	(1)	(2)	(3)	(4)
Male	0.111***	0.114***	0.084***	0.064***
	(0.016)	(0.016)	(0.017)	(0.023)
Age	-0.007***	-0.007***	-0.007***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)
Height	0.000	0.000	-0.000	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Log(Indiv. Income)	0.003			
	(0.003)			
Log(Hh. Income)		0.024***	0.025***	0.037***
		(0.009)	(0.009)	(0.012)
Weight			0.001	0.000
			(0.000)	(0.001)
Smoke			0.063***	0.047***
			(0.013)	(0.016)
Life satisfaction			0.003	0.002
			(0.006)	(0.007)
Subjective health			0.015	0.006
			(0.010)	(0.012)
Secondary edu.				-0.019
				(0.022)
Higher edu.				-0.021
				(0.027)
City				0.012
				(0.017)
Village				0.015
				(0.019)
Married				-0.055***
				(0.021)
Child				0.020**

Measures of quits, 2003-2008

- Supplement 2008:
  - Start and stop dates of all employment episodes over 2003-2008
  - Measures of self-employment for each spell (formal if works in enterprise/organization and and is an owner OR undertakes registered entrepreneurial activity not as juridical entity; informal if individual activity is not registered)
  - Reasons for separation from the main job for each employment episode over 2003-2008
    - last separation is quit from formal job (and =0 if it is displacement from formal or always-stayers in the formal job)
    - last separation is quit from formal job TO INFORMAL JOB (and =0 if it is displacement from formal or always-stayers in the formal job)
    - At least one separation over 2003-2008 was a quit from formal (=0 for always stayers in formal)
    - At least one separation over 2003-2008 was a quit from formal TO INFORMAL, =0 for always stayers in formal

General risk and informality: Multinomial Logit

	involuntary informal employee	voluntary informal employee	informal self-employed	formal self-employed
Risk	1.034	1.082*	1.119***	1.210***
	(0.91)	(1.80)	(3.12)	(3.53)
Age	1.004	0.974*	1.042***	1.009
	(0.30)	(-1.65)	(3.36)	(0.50)
Male	2.015***	1.873*	2.124***	1.978*
	(3.04)	(1.89)	(3.28)	(1.84)
Married	0.543**	0.900	1.109	2.235
	(-2.23)	(-0.27)	(0.33)	(1.22)
Child	0.851	0.854	1.501***	0.760
	(-0.86)	(-0.83)	(3.28)	(-1.06)
Sec. edu.	0.839	0.751	1.563	1.556
	(-0.59)	(-0.83)	(1.17)	(0.71)
Higher edu.	0.373**	0.368**	1.368	2.947
	(-2.17)	(-2.01)	(0.72)	(1.62)
Ln.hh. income	0.919	0.914	1.250	2.350***
	(-0.43)	(-0.41)	(1.22)	(3.09)
Months of non-empl.	1.035***	1.042***	0.986	1.008
2003-2008	(4.17)	(3.81)	(-0.83)	(0.53)
North-West	0.343*	0.380*	1.606	2.396
	(-1.68)	(-1.68)	(0.89)	(1.21)
Central-Volga	0.601	0.425**	2.170**	2.758*
	(-1.53)	(-2.46)	(1.99)	(1.93)
South	0.470*	0.235***	2.046*	1.032
	(-1.70)	(-2.81)	(1.76)	(0.04)
East	1.027	0.324**	2.102*	2.497
	(0.08)	(-2.58)	(1.84)	(1.58)
Sectors	YES	YES	YES	YES
Observations		3655		
Pseudo R2		0.18		

Notes: Relative Risk Ratios are reported. z-statistics in parentheses, standard errors are robust. * significant at 10%; ** significant at 5%; *** significant at 1%. Base category – formal employees. General risk is measured on a scale from 0 to 10.

SO FAR…

- Testing the main assumptions/implications of the model
- Without/with controls for risk

Are returns to (formal) skills larger in the informal than in the formal sector?

	(1)	(2)	(3)
	all	less18	more18
Yrs. school*formal	0.094***	0.087***	0.102***
	(0.005)	(0.007)	(0.007)
Yrs. school*invol.informal	0.086***	0.078***	0.095***
	(0.008)	(0.009)	(0.012)
Yrs. school*vol.informal all	0.105***	0.098***	0.112***
	(0.006)	(0.008)	(0.009)
Yrs. school*formal self-empl.	0.116***	0.093***	0.136***
	(0.009)	(0.011)	(0.014)
Observations	4277	1994	2283
R-squared	0.32	0.34	0.31

Pooled OLS. Dependent variable is log of hourly wages (net wages in the last 30 days/ actual number of hours worked in the last month). Voluntary informal employees and informal self-employed are lumped together. “less18” stands for less than 18 y.o. in 1991. Additional controls include age and its square, gender, marital status, region and sector dummies.

Yes, but mainly due to (voluntary) informal self-employed

	(1)	(2)	(3)
	all	less18	more18
Yrs.school*formal	0.093***	0.087***	0.101***
	(0.005)	(0.007)	(0.007)
Yrs.school*invol.informal	0.085***	0.077***	0.095***
	(0.008)	(0.009)	(0.012)
Yrs.school*vol.informal empl.	0.092***	0.085***	0.096***
	(0.007)	(0.009)	(0.011)
Yrs.school*inf.self-empl.	0.115***	0.115***	0.118***
	(0.007)	(0.009)	(0.010)
Yrs.school*formal self-empl.	0.116***	0.093***	0.136***
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Correlation between different measures of formal skills and risk intensity (the higher it is the more risky is a respondent)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Yrs school	Yrs school, less18	Yrs school, more18	Edu level	Edu level, less18	Edu level, more18	Tenure	Tenure less18	Tenure, more18
risk	0.030	-0.030	0.091***	0.069	-0.097	0.268***	-0.021***	-0.077***	-0.014**
	(0.018)	(0.026)	(0.027)	(0.066)	(0.088)	(0.099)	(0.006)	(0.016)	(0.006)
Observations	5434	2623	2811	5434	2623	2811	5066	2456	2610
R-squared	0.07	0.05	0.05	0.07	0.05	0.05	0.07	0.06	0.05
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Risk	For lang	For lang, less18	For lang, more18	Subj prof	Subj prof, less18	Subj prof, more18	Wages	Wages, less18	Wages, more18
	-0.099	-0.146	-0.030	0.012	-0.011	0.029	0.149**	0.042	0.238***
	(0.093)	(0.122)	(0.143)	(0.021)	(0.030)	(0.031)	(0.066)	(0.101)	(0.087)
Observations	5422	2618	2804	5167	2475	2692	4159	1938	2221
R-squared	0.07	0.05	0.04	0.07	0.05	0.04	0.07	0.04	0.05

Pooled OLS. Dependent variable is risk scale. “less18” stands for less than 18 y.o. in 1991. Additional controls include age, gender, marital status and region dummies.

Correlation between informal skills and risk intensity

	(1) All	(2) less18	(3) more18
Residuals	0.202***	0.205**	0.228***
	(0.053)	(0.084)	(0.062)
age	-0.050***	-0.041***	-0.067***
	(0.004)	(0.014)	(0.011)
sex	0.888***	0.866***	0.905***
	(0.091)	(0.136)	(0.137)
married	0.033	-0.112	0.126
	(0.094)	(0.141)	(0.141)
nw	0.285	0.264	0.340
	(0.221)	(0.322)	(0.317)
cv	0.079	0.080	0.106
	(0.129)	(0.177)	(0.160)
south	0.129	-0.102	0.349*
	(0.166)	(0.233)	(0.212)
east	0.322**	0.445**	0.241
	(0.131)	(0.200)	(0.186)
Constant	5.505***	5.327***	6.194***
	(0.192)	(0.390)	(0.511)
Observations	4150	1936	2214

Notes: Standard errors are bootstrapped with 300 replications and are reported in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. "Residuals" stand for predicted residuals from the regression of earnings for informal self-employed, where controls include risk, age and its square, sex, marital status, education dummies, region and sectors.

So far we have established…

- …that the returns to skills (correlation between hourly wages and skills) are larger in the informal than in the formal sector if we include informal self-employed into the “informality” group
- …and the difference is particularly large if we compare informal self-employed to formal employees
- …robust to different measures of skills
- …for some measures of skills the returns to skills obtained during the Soviet era are indeed lower than those obtained later in the informal sector

So far we have established…

- the correlation between formal skills and risk intensity is positive (apart from tenure)
  - → suggesting a negative relation between skills and risk aversion (negative slope)

- the correlation between informal skills and risk intensity is positive
  - → suggesting a negative relation between skills and risk aversion (negative slope)

$\Rightarrow$ scenario given by figure 1

Testing implications of the model wrt quits: correlation between quits and formal skills; correlation between quits and informal skills;

- Holding risk aversion constant, if formally skilled individuals have a lower propensity to quit:

$$\Pr(Q) = \beta_1 S + \beta_2 r + \gamma X + \varepsilon$$

$$\beta_1 < 0$$

- Holding risk aversion constant, if formally skilled individuals have a higher propensity to quit:

$$\Pr(Q) = \beta_1 S + \beta_2 r + \gamma X + \varepsilon$$

$$\beta_1 > 0$$

Correlation between propensity to quit and formal skills, holding risk constant

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	All				Older than 18 y.o. in 1991				Younger than 18 y.o. in 1991			
	to any, last	to informal, last	to any, any	to informal, any	to any, last	to informal, last	to any, any	to informal, any	to any, last	to informal, last	to any, any	to informal, any
yrs. schooling	-0.010**	-0.014***	-0.013***	-0.003**	-0.014**	-0.009***	-0.018***	-0.000	-0.004	-0.022***	-0.004	-0.009**
	(0.004)	(0.003)	(0.004)	(0.002)	(0.005)	(0.002)	(0.006)	(0.001)	(0.007)	(0.006)	(0.007)	(0.004)
risk	0.008***	0.003	0.011***	0.002	0.006	-0.002	0.008*	-0.000	0.012**	0.014***	0.016***	0.008**
	(0.003)	(0.002)	(0.003)	(0.001)	(0.004)	(0.002)	(0.004)	(0.001)	(0.005)	(0.005)	(0.005)	(0.004)

Notes: Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

"to any" refers to dependent variable being equal to one if the last separation is quit from formal job to any job; "to informal" refers to dependent variable being equal to one if the last separation is quit from formal job to informal dependent employment or informal self-employment. "Last" indicates quits from last job (in this case the dependent variable is equal to 0 if it is displacement from formal or always-stayers in the formal jobs); "any" indicates if any separation from formal job over 2003-2008 was a quit (in this case the dependent variable is equal to 0 for always stayers in the formal jobs).

Additional controls include age, sex, marital status, household income and region dummies.

Correlation between propensity to quit and informal skills, holding risk constant

less covariates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	All				Older than 18 y.o. in 1991				Younger than 18 y.o. in 1991			
	to any, last	to informal, last	to any, any	to informal, any	to any, last	to informal, last	to any, any	to informal, any	to any, last	to informal, last	to any, any	to informal, any
Residuals	0.026**	0.014**	0.023**	0.006	-0.003	0.002	-0.005	-0.003	0.041*	0.019	0.038*	0.030**
	(0.011)	(0.007)	(0.012)	(0.004)	(0.014)	(0.006)	(0.014)	(0.003)	(0.022)	(0.020)	(0.020)	(0.014)
Risk	0.008**	0.002	0.011***	0.001	0.006	-0.002	0.009**	-0.000	0.011**	0.011*	0.015***	0.005
	(0.003)	(0.002)	(0.003)	(0.001)	(0.004)	(0.001)	(0.004)	(0.001)	(0.006)	(0.006)	(0.006)	(0.004)

Notes: Notes: standard errors are bootstrapped with 300 replications and are reported in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. “Residuals” stand for predicted residuals from the regression of earnings on informal self-employment status and other controls.

“to any” refers to dependent variable being equal to one if the last separation is quit from formal job to any job; “to informal” refers to dependent variable being equal to one if the last separation is quit from formal job to informal dependent employment or informal self-employment. “Last” indicates quits from last job (in this case the dependent variable is equal to 0 if it is displacement from formal or always-stayers in the formal jobs); “any” indicates if any separation from formal job was a quit (in this case the dependent variable is equal to 0 for always stayers in the formal jobs).

Additional controls include age, sex, marital status, household income, education and region dummies.