

# **MEASURING THE INFORMAL EMPLOYMENT OF REPUBLIC OF MOLDOVA. AN EMPIRICAL ANALYSIS BASED ON HOUSEHOLD SURVEY DATA**

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***Abstract:***

*The paper investigates congruence between several empirical measures of the rate of informality using household survey data of the Republic of Moldova for 2012. Thirty-two percent of the economically active are informal according to at least one definition, and about 30% are informal according to three measures. Regression analysis is used to shed further light on differences in these measures. The objectives of the empirical analysis are to address the hypothesis that different empirical measures of informality are coincident (if different measures are capturing the same group of workers) and to assess using probit regression analysis, whether different individual characteristics have a greater association with different measures of informality. If there is only partial coincidence between different measures, which groups are more likely to be informal under one definition compared to another?*

*The main conclusion to be drawn from this research is that the different measures of informality capture in part different groups of workers. It cannot be assumed that alternative measures are broadly consistent.*

**Keywords:** informal employment, social protection, probit models, Republic of Moldova

**JEL Classification:** E24, E26, C25, C83.

## **1. Introduction**

A specific characteristic for the countries passing from centralized planned economy to market economy is the growth of the informal sector, which becomes an integral part of the economy and has an impact of all economy branches.

Informal employment refers to the jobs that in practice are not covered by the existing legislation regarding employment conditions, social protection, etc. These jobs are either outside the legal framework or the legislation is not enforced or not respected (informal de facto). Informal employment is a concept used to describe insecure forms of economic activity; it's about self-employment or own-account work, family run activity, or employment where the employer fails to provide appropriate access to social protection or formal registration of any contractual relationship.

Based on the exiting international recommendations and the available statistical tools, NBS launched in 2002 the activities for organizing and implementing in statistical practice the estimates for employment in informal sector and the estimates for informal employment within the basic survey in labour force field called Labour Force Survey (LFS).

To identify the employees with informal jobs, it was included in the LFS questionnaire the following additional questions for testing:

- working contract or verbal agreement;
- the permanent character of the job (permanent/temporary);
- the employer pays all social contributions for the employee (yes, of course/possible/no/does not know);
- possibility to benefit from annual paid leave (yes/no/does not know);
- possibility to benefit from paid sick leave (yes/no/does not know);
- possibility to benefit from maternity leave (yes, of course/possible/no/does not know/does not apply);
- possibility to be dismissed without prior notice (yes, of course/possible/no/does not know);
- payment of layoff indemnity (yes, of course/possible/no/does not know).

The principal concern of this paper is to investigate different empirical implementations of the concept of informality, and to examine the extent to which these different measures are coincident.

## **2. Informality in Republic of Moldova**

Table 1 reports summary information on economic activity in main employment for all workers aged between 18 and 65 years computed from Labour Force Surey of the National Bureau of Statistics of the Republic of Moldova for 2012.

Table 1. Employment Status—18–65 year olds

<b>Employment status- Main occupation %</b>	<b>2012</b>
<b>Employee</b>	67.40
<b>Employer (was having employees)</b>	0.6
<b>Self-employed</b>	29.41
<b>Contributing family worker</b>	2.59
<b>Total</b>	100
<b>Sample Size</b>	30124

However the proportion of employee, by definition with registered contracts reach the value of 67.4% at the end of 2012. The next largest group are the self-employed (own-account workers), comprising almost thirty of the economically active. A further one percent are entrepreneurs employing others. There is some slight evidence that contributing family workers represents about 2.6% of total employment as main occupation at the end of 2012.

In order to assess the possible size of the informal sector we adopt initially five different measures to distinguish formality and informality:

**A (contract status):** a worker is classified as formal if he has a working contract in any employment.

**B (job status):** a worker is classified as formal if they have a permanent job.

**C(social security contributions status):** a worker is classified as formal if the employer pays all social contributions for the employee.

**D(leave benefit status):** a worker is classified as formal if he have the possibility to benefit from annual paid leave.

**E(sick leave benefit status):** a worker is classified as formal if he have the possibility to benefit from paid sick leave.

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By definition, employers, self-employees and contributing family workers can not have a working contract or a verbal agreement, because they don't have employers, they have their own businesses. Due to this fact, in the database we have missing values for the five measures of informality for these category of workers.

Furthermore, we have split the employment status by type of occupation and it is important to point out that we have about 7% of employees and about 23% of self-employed workers working in informal occupations.

Table 2. Employment Status vs. Occupation

	Occupation		
Employment status(%)	Formal	Informal	Total
Employee	60.41	6.99	67.40
Employer (was having employees)	0.60	0.00	0.60
Self-employed worker	6.30	23.11	29.41
Contributing family worker	0.00	2.59	2.59
Total	67.30	32.70	100

So, we have redefined the all five measures of informality considered above, thereby:

**Measure A of informality(contract status):** a worker is classified as formal if he has a working contract and declares that have a formal occupation, adding also the employers, self-employed workers and contributing family workers who have declared to have a formal occupation.

**Measure B of informality(job status):** a worker is classified as formal if they have a permanent job and declares that have a formal occupation, adding also the employers, self-employed workers and contributing family workers who have declared to have a formal occupation.

**Measure C of informality(social security contributions status):** a worker is classified as formal if the employer pays all social contributions for the employee and the worker declares that have a formal occupation, adding also the employers, self-employed workers and contributing family workers who have declared to have a formal occupation.

**D(leave benefit status):** a worker is classified as formal if he have the possibility to benefit from annual paid leave and declares that have a formal occupation, adding also the employers, self-employed workers and contributing family workers who have declared to have a formal occupation.

**E(sick leave benefit status):** a worker is classified as formal if he have the possibility to benefit from paid sick leave and declares that have a formal occupation,

adding also the employers, self-employed workers and contributing family workers who have declared to have a formal occupation.

### **3.Variation in informality in Republic of Moldova**

The objectives of the empirical analysis which follows fall into two. The first objective is to address the hypothesis that different empirical measures of informality are coincident. In other words, the aim is assess whether different measures are capturing the same group of workers. The second objective follows from the first and is to assess, using multiple regression analysis, whether different individual characteristics have a greater association with different measures of informality. If there is only partial coincidence between different measures, which groups are more likely to be informal under one definition compared to another?

Table 3 details the proportions of workers classified as informal under each measure according to economic status.

Measures D and E provide the highest estimate of the rate of informality at 32.5% of all workers; measure B the smallest at around 30.5%. Turning to employees, informality is highest when measured by lack of paid leave benefit.

Table 3. Alternative definitions of informality by main employment status

<b>%</b>	<b>2012</b>
<b>All economically active</b>	
<b>A.No working contract</b>	31.80
<b>B.No permanent job</b>	30.50
<b>C.No social security contributions</b>	31.81
<b>D.No paid leave benefit</b>	32.57
<b>E.No paid sick leave benefit</b>	32.54
<b>Employees</b>	
<b>A.No working contract</b>	5.74
<b>B.No permanent job</b>	3.09
<b>C.No social security contributions</b>	5.75
<b>D.No paid leave benefit</b>	

	6.78
<b>E.No paid sick leave benefit</b>	6.69
<b>Self-employed workers</b>	
<b>A.No working contract</b>	23.42
<b>B.No permanent job</b>	24.67
<b>C.No social security contributions</b>	23.43
<b>D.No paid leave benefit</b>	23.19
<b>E.No paid sick leave benefit</b>	23.24

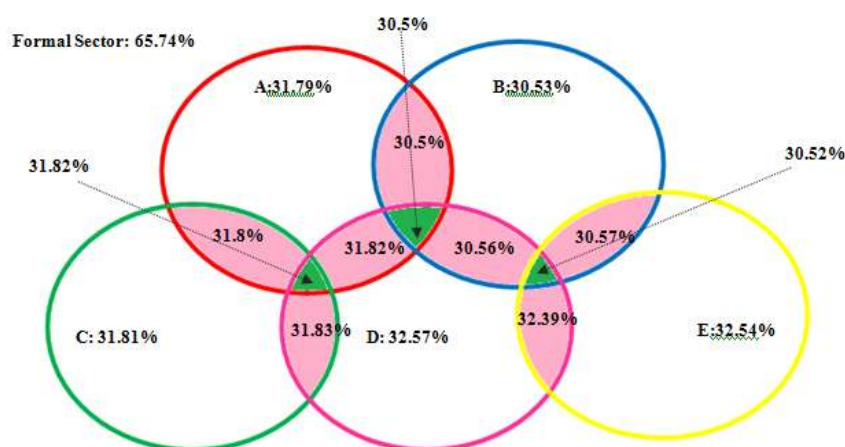


Figure 1. Coincidence of alternative definitions of informality

Note: The figure is a Venn diagram showing the overall between the different operational measures of informality in terms of percentages of the workforce. So, for example, the percentage of workers classified as informal under measure A and under measure B, but not under measure D is 30.5% of the total. The total (65.74%) is not classified as informal under any of the five measures.

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Figure 1 provides Venn diagram to show the correspondence of several measures across the full sample of the economically active for 2012. Around 65% of workforce can be classified as formal on all measures. If approximately 30% of the sample in 2012 can be classified as informal on three measures(A, B and D, B, E and D, respectively A, C and D).

Under informality measures A and B, B and D, B and E, A and C, A and D, C and D, D and E can be classified a total of about 30-32% of the workforce.

Table 4 reveals the different positions of men and women for year 2012. Across all the measures, informality is falling amongst men. There is growth in informality for men particularly for measure B. For women, the increase in informality is steepest for measure E.

Notice also that there is a difference in the orderings of the estimates for men and for women.

Male informality is highest when measured by job status (no permanent job) and lowest when measured by sick leave benefit status. Men are more likely than women not to have a registered contract.

Table 4.Descriptive analysis by informality definition-gender

%	2012
<b>Male</b>	
<b>A.No working contract</b>	55.55
<b>B.No permanent job</b>	56.41
<b>C.No social security contributions</b>	55.54
<b>D.No paid leave benefit</b>	55.32
<b>E.No paid sick leave benefit</b>	55.28
<b>Female</b>	
<b>A.No working contract</b>	44.45
<b>B.No permanent job</b>	43.59
<b>C.No social security contributions</b>	44.46
<b>D.No paid leave benefit</b>	44.68

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<b>E.No paid sick leave benefit</b>	44.72
<b>z-test for difference between women and men</b>	
<b>A.No working contract</b>	10.88*
<b>B.No permanent job</b>	11.98*
<b>C.No social security contributions</b>	10.86*
<b>D.No paid leave benefit</b>	10.61*
<b>E.No paid sick leave benefit</b>	10.52*

\*denotes  $p < 0.01$

Table 5 repeats the same analysis by age group, separating samples for 15-34 years old, 35-54 years old and 55 years and over. The table shows that the age group 35-54 years old are significantly more likely to be informal. This holds across all measures.

Table 5.Descriptive analysis by informality definition-age

<b>%</b>	<b>2012</b>
<b>15-34 years</b>	
<b>A.No working contract</b>	25.97
<b>B.No permanent job</b>	24.53
<b>C.No social security contributions</b>	26.00
<b>D.No paid leave benefit</b>	26.14
<b>E.No paid sick leave benefit</b>	26.16
<b>35-54 years</b>	
<b>A.No working contract</b>	49.76
<b>B.No permanent job</b>	49.72
<b>C.No social security contributions</b>	49.74



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<b>D.No paid leave benefit</b>	49.91
<b>E.No paid sick leave benefit</b>	49.89
<b>55 years and over</b>	
<b>A.No working contract</b>	24.27
<b>B.No permanent job</b>	25.75
<b>C.No social security contributions</b>	24.26
<b>D.No paid leave benefit</b>	23.95
<b>E.No paid sick leave benefit</b>	23.96

\*denotes  $p < 0.01$ .

Table 6 presents the descriptive analysis by urban vs. rural area, revealing the fact that informality is higher in rural area for job status followed by contract status and social security contribution status. The table shows that persons from rural area are more likely than those from urban area to be informal.

Table 6.Descriptive analysis by informality definition-area

%	2012
<b>Urban</b>	
<b>A.No working contract</b>	14.44
<b>B.No permanent job</b>	10.73
<b>C.No social security contributions</b>	14.44
<b>D.No paid leave benefit</b>	15.37
<b>E.No paid sick leave benefit</b>	15.93
<b>Rural</b>	
<b>A.No working contract</b>	85.56
<b>B.No permanent job</b>	

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	89.27
<b>C.No social security contributions</b>	85.56
<b>D.No paid leave benefit</b>	84.27
<b>E.No paid sick leave benefit</b>	84.07
<b>z-test for difference between urban and rural</b>	
<b>A.No working contract</b>	- 57.17*
<b>B.No permanent job</b>	- 58.18*
<b>C.No social security contributions</b>	- 57.18*
<b>D.No paid leave benefit</b>	- 56.68*
<b>E.No paid sick leave benefit</b>	- 56.41*

\*denotes  $p < 0.01$

Table 7 presents the informality measures by level of education, pointing out the fact that the secondary education has the greater rate of informality for all measures. By level of education, no paid leave benefit and no paid sick leave benefit measures have the highest rate for secondary education. Table shows that persons with secondary education are significantly more likely to be informal.

Table 7.Descriptive analysis by informality definition-level of education

%	2012
<b>Primary education</b>	
<b>A.No working contract</b>	36.26
<b>B.No permanent job</b>	37.65
<b>C.No social security contributions</b>	36.27
<b>D.No paid leave benefit</b>	35.59
<b>E.No paid sick leave benefit</b>	

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	35.50
<b>Secondary education</b>	
<b>A.No working contract</b>	59.14
<b>B.No permanent job</b>	58.59
<b>C.No social security contributions</b>	59.12
<b>D.No paid leave benefit</b>	59.54
<b>E.No paid sick leave benefit</b>	59.55
<b>Tertiary education</b>	
<b>A.No working contract</b>	4.60
<b>B.No permanent job</b>	3.76
<b>C.No social security contributions</b>	4.60
<b>D.No paid leave benefit</b>	4.87
<b>E.No paid sick leave benefit</b>	4.95

\*denotes  $p < 0.01$

**4. Multivariate analysis of factors associated with informality**

Although we have been able to point to differences in the definitions of informality, we can say nothing so far about any conditional association between particular characteristics and each definition. Regression analysis is able to address a range of associations between different groups of workers and a greater propensity to be informal according to one measure rather than another.

This section presents estimates of the marginal effects of different potential influences on the likelihood of informality obtained from *probit regressions*. The specification of each regression includes a range of variables to allow investigation of associations between different individual characteristics and the incidence of different measures of informality. These include individual demographic information, information on the geographical situation of the individual, information on the nature

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of the employment and information on the economic status of the remainder of the individual's family.

Indicators of demographic information and educational attainment are included (gender, age groups and level of education-reference category: female, 55 years old and over, tertiary education). The model also contain the variable age, pointing out the fact that age group 35-54 years are more likely to be informal.

Also the aspect of geographical situation is included in the model (area-reference category: urban). A binary indicator of unionization is included to capture a likely association between collective representation and formality.

Indicators of broad occupational grouping are also included in all models to assess the extent to which there may be certain occupational sectors, in which employment tends inherently to be less formal. Also we have included in the model a binary indicator „occupation” that mention the type of activity formal vs. informal.

A number of indicators of the economic status of the rest of the family are included. The presence of dependents within the family may also be associated with particular individual employment decisions or options. Also, the total number of children and formal non-employees in the family or totals of elderly (aged 65 and over) are included in the model.

Table no.8. Probit Estimates of the Likelihood of Being Informal

	<b>A. No working contract<sup>1</sup></b>	<b>B. No permanent job<sup>2</sup></b>	<b>C. No social security contributions<sup>3</sup></b>	<b>D.No paid leave benefit<sup>4</sup></b>	<b>E.No paid sick leave benefit<sup>5</sup></b>
<b>Age<sup>6</sup></b>	-0.000	0.0004**	-0.0001	-0.0001	-0.0002
<b>Male</b>	0.019*	0.027*	0.019*	0.018*	0.018*
Level of Education (reference: tertiary education)					
primary education	0.337*	0.322*	0.338*	0.341*	0.340*
secondary education	0.175*	0.173*	0.175*	0.178*	0.177*
Area/reference:urban					
<b>Rural</b>	0.214*	0.244*	0.214*	0.204*	0.202*

<sup>1</sup> Dependent variable: measure A of informality(no working contract)-a worker is classified as having an informal job if he hasn't a working contract /(0=no, 1=yes) and declares that have an informal occupation, adding also the employers, self-employed workers and contributing family workers that have an informal occupation.

<sup>2</sup> Measure B of Informality(no permanent job)- a worker is classified as having an informal job if he hasn't a permanent job /(0=no, 1=yes) and declares that have an informal occupation, adding also the employers, self-employed workers and contributing family workers that have an informal occupation.

<sup>3</sup> Measure C of Informality(no social security contributions)- a worker is classified as having an informal job if he hasn't pay social security contributions /(0=no, 1=yes) and declares that have an informal occupation, adding also the employers, self-employed workers and contributing family workers that have an informal occupation.

<sup>4</sup> Measure D of Informality(no paid leave benefit)- a worker is classified as having an informal job if he hasn't receive a paid leave benefit /(0=no, 1=yes) and declares that have an informal occupation, adding also the employers, self-employed workers and contributing family workers that have an informal occupation.

<sup>5</sup> Measure E of Informality(no paid sick leave benefit)- a worker is classified as having an informal job if he hasn't receive a paid sick leave benefit /(0=no, 1=yes) and declares that have an informal occupation, adding also the employers, self-employed workers and contributing family workers that have an informal occupation.

<sup>6</sup> Note the interesting fact that Stata computes the *net* marginal effect of a regressor including the effect through the quadratic terms if included in the model.

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<b>No union member</b>	0.381*	0.362*	0.381*	0.389*	0.388*
<b>Family total number of children</b>	0.003	0.003	0.003	0.003	0.002
<b>Family total number over 65</b>	0.186*	0.198*	0.185*	0.189*	0.189*
<b>Sample size</b>	30613	29064	30611	30926	30856
<b>Log-likelihood</b>	-13480.64	-	-13480.03	-	-13896.90
<b>LR chi2</b>	11323.60	11414.56	11329.40	11209.49	11136.37
<b>Prob&gt; chi2</b>	0.00	0.00	0.00	0.00	0.00
<b>Pseudo R2</b>	0.29	0.32	0.29	0.28	0.28

Note: Reported coefficients are average marginal effects<sup>7</sup> (which in the case of binary variables are for a discrete change in the variable) on probability of being informal. Explanatory variables are set equal to their means in the sample. \*, \*\*, \*\*\* denotes significance at 1%, 5%, 10%.

Table 8 reports estimated probit marginal effects for each measure for 2012. The likelihood ratio chi-square of 11323.60 with a p-value of 0.00 tells us that the first model as a whole is statistically significant, that is, it fits significantly better than a model with no predictors. In linear regression, if the coefficient on  $x$  is  $\beta$ , then a 1-unit increase in  $x$  increases  $Y$  by  $\beta$ . The probit regression coefficients give the change in the z-score or probit index for a one unit change in the predictor. But what exactly does it mean in probit that the coefficient on number of dependents is 0.186 and significant? It means that a increase in the number of dependents will raise the z-score of  $\Pr(Y=1)$  (probability of being informal) by 0.186 (18.6%). For indicator variables for **level of education**, having the education level situated in first group-primary education, versus the reference group tertiary education, increases the probability by 0.337.

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<sup>7</sup> It is important to interpret the *marginal effects* of the regressors, that is, how much the (conditional) probability of the outcome variable changes when you change the value of a regressor, holding all other regressors constant at some values. This is different from the linear regression case where you are directly interpreting the estimated coefficients. This is so because in the linear regression case, the regression coefficients *are the marginal effects*.

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Thus, the marginal impact of changing a variable is not constant. This expression depends on not just  $\beta_i$ , but on the value of  $x_i$  and all other variables in the equation. So to even calculate the impact of  $x_i$  on  $Y$  you have to choose values for all other variables  $x_j$ . Typical options are to set all variables to their means or their medians. In the probit models we obtained average marginal effects.

**For all measures of informality, the empirical results of probit models point out the individual characteristics that increase the predicted probability of being informal(having informal jobs): male, having primary or secondary education, not being union member, being from rural area and having dependents in family.**

Information on the statistical significance of individual coefficients is included. In general most of the covariates included in the regressions attract statistical significance although there is a considerable variation in the importance of particular associations, as indicated by the size of the average marginal effects.

Firstly, there is a difference in the size of the association between the different informality measures and being male. Being male is more strongly positively associated with measure B (no permanent job). The age does not influence in the statistically manner the probability of being informal.

Table 8 also shows an association between informality and low levels of educational attainment.

Illiteracy is most strongly positively associated with measures D and E. This suggests that improved educational attainment, notably basic skills, may provide workers with the ability to understand and engage with the social security system and the permanent character of the job.

Turning to the influence of geography, the table shows that the absence of permanent jobs is more strongly associated with rural area. Rural workers may be less likely to have a permanent job, working in agriculture.

Unionization is also more strongly positively associated with measures D and E. Unions may play a beneficial role, in that, where they are able to represent workers, their presence is associated with a reduced incidence of unprotected employment.

A final set of findings in Table 8 concerns the association between different measures of informality and economic activity elsewhere in the family. We have included in the models the number of elderly and the number of children. Informality among the elderly is associated with a higher likelihood of an individual worker being informal. This is particularly so for measure B. The number of children does not influence significantly the probability of having an informal job.

### **Conclusions**

Using data from Moldavian household surveys we have constructed five measures of informality, which attempt to reflect the various alternatives used in the literature. Informality is measured by employment contract status, by job status, by social security protection, leave benefit status and sick leave benefit status.

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These five measures are far from observationally equivalent. Around 32% of all the economically active in Moldova are informal according to at least one of the five definitions, but only 30% are informal according to each three definitions.

There is a closer correspondence between informality defined by not having a registered employment contract and not contributing to a social security scheme.

Beyond the strong conclusion that different measures of informality only partially overlap and may be subject to different trends, a number of detailed findings have emerged.

Firstly it is clear that, the experience of men and women is different. Informality in terms of employment in the entrepreneurial sector is rising amongst men; whereas there is evidence of an encouraging trend away from informality measured by the temporary character of the job.

Regression analysis suggests that men have a relatively greater likelihood of being in the informal sector. The paper has also reported a strong association between informality and poor educational attainment. In particular, policies to improve literacy may assist in improving social security system and the permanent character of the job.

Union non-membership may have a similarly beneficial role to play. Finally, there is considerable evidence that informality measured by temporary character of the job is associated with the risk associated with having to care for dependents.

Economic informality remains a significant phenomenon in many developing economies. The informal sector does not lend itself to precise measurement, and although its overall size may be relatively stable, its changing composition, particularly if measured in an encompassing manner, is subject to complex and varying factors.

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