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Social Aspects of Crisis Effects on Households: The Case of Ukraine

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This study has been developed in the framework of research networks initiated and monitored by wiiw under the premises of the GDN–SEE partnership.

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Social Aspects of Crisis Effects on Households: The Case of Ukraine

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Abstract

The paper investigates the effect of crisis on households' welfare and severity of poverty in Ukraine. We use Ukrainian Household Survey for three years – 2006, 2009, and 2010 that allows us to investigate separately economic conditions before, during and after the crisis. Welfare in our paper is measured by total income and total expenses per equivalent member; poverty is measured using an income and expenses approach, three different poverty lines are investigated. Most welfare and poverty determinants change over time, as the economic situation changes, although such determinants as education and work experience are equally important in all periods. Residents of Kyiv earn and spend, on average, by 9-11% more than residents of the rest of the country. Based on empirical results some policy recommendations were suggested: family-support policies, support for small business, subsidizing new job-creation, healthy life-style support policies, public investment into child day-care facilities, and improvement of job-matching and professional training.

JEL code: D10, I32, O15

Keywords: Welfare function, Poverty, Transition, Survey, Ukraine, Financial crisis

1. Introduction

The severe economic downturn of 2008-2009 led to far-reaching changes in the economic environment of many countries worldwide. Changes to labor market conditions, such as an increase in unemployment and decrease in earnings, raised individual risks and created additional pressure on the income-support system.

Our focus on Ukraine was not by accident, as the crisis affected the economy of Ukraine stronger than any other economy in the Central and Easter Europe (CEE) and the Commonwealth of Independent

States (CIS). In 2009 GDP per capita in Ukraine fell by 12.9%, unemployment went up by 37.5%, FDI net inflows dropped by 55.9%, lending interest rate climbed by 3.4 percentage points. Inflation was high a few years prior to the crisis, because of the overheated economy; and it was extremely high in 2008 reaching 25.2%. During 2008-2009 structural deficiencies in safety-net policies that were less apparent in the period of economic growth made some groups of the households more vulnerable to the negative socio-economic consequences of the crisis.

Table 1: Macroeconomic indicators in Ukraine

	2005	2006	2007	2008	2009	2010	2011
GDP per capita (€ PPP)*	4 488	4 960	5 078	4 972	4 569	5 070	5 209
Inflation, CPI (annual %)	13.6	9.1	12.8	25.2	15.9	9.4	8.0
Unemployment (% of labor force)	7.2	6.8	6.4	6.4	8.8	8.1	7.0
FDI net inflows (€ millions)*	6 276	4 463	7 217	7 420	3 453	4 899	5 178
Lending interest rate (%)	16.2	15.2	13.9	17.5	20.9	15.9	16.0

* *Translated from US Dollars using European Central Bank indicative exchange rates.*
Source: World Development Indicators, State Statistics Service of Ukraine, European Central Bank

Since 2010 Ukraine's economy started to revive – GDP per capita, in purchasing power parity Euro, increased by 11.0% and 2.8% in 2010 and 2011, respectively; inflation and lending interest rates decreased, FDI climbed by 35% and 11% in years 2010 and 2011.

An in-depth assessment of households before and after the crises implemented with the Ukrainian Household Survey of years 2006, 2009 and 2010 (State Statistics Service) provides valuable data for analysis of changes in households' economic standing. Due to the pro-cyclical policy of the government, the Ukrainian Pension and Unemployment Funds were unable to support households that suffered the most. This resulted in a new round of poverty growth and accentuated the necessity of reforms in the Ukrainian social sector.

In 2010 the newly elected President of Ukraine presented his program of structural changes in all social sectors (pension reform, healthcare and education reform, safety-net and social benefits reform). It was expected that after the crises the people would be less resistant for necessary but unpopular reforms. This paper analyses household behavior and economic standing before, during and after crises, and therefore contributes towards deeper understanding of households' behavior as well as suggests additional policy instruments needed to support households.

In years 2004-2008 incomes of most households were steadily growing at a pace higher than the economy. After the crises the system found itself on the verge of collapse and some household groups found themselves without social support they heavily needed. Analysis of crises outcomes on micro-level in social sector before, during and after the financial crises could help to identify the most vulnerable population groups, analyze the changes in their level of welfare and poverty, and economic behavior, and lead to suggesting certain improvements of social policy instruments.

Availability of micro-level data for the year 2010, when Ukrainian economy started to recover, allows analysis and comparison of economic recovery for various types of households.

Research question

We aim to investigate the effect of crisis on welfare and poverty among households, identify the most vulnerable and prone types of households, depending on a set of parameters – such as social, economic, demographic, and geographic. Another goal is to identify types of households that were the most successful in improving their welfare after the crisis.

The report is organized in the following way: Section 2 provides overview of the available empirical literature regarding the issue, Section 3 describes social protection policies implemented in Ukraine, Section 4 provides description of the data and preliminary summary of most important variables, Section 5 presents estimation methodology used for the investigation, Section 6 presents analysis of the estimation outcomes and provides policy implications, and Section 7 concludes.

2. Literature review

2.1. Empirical papers

The empirical investigation of crises impact on poverty in an individual country, based on household surveys or similar type of data is a widely-used research instrument.

In that token, Suryahadi and Sumarto (2003) find that the consequences of the Indonesian crisis were especially devastating for the poor. Their study found that not only did the poverty rate increase significantly, but also that much of the increase was due to a large increase in the chronic poor category. Furthermore, their study argues that the proportion of households that have high vulnerability to poverty has more than doubled since the economic crisis. As a result, the proportion of the total vulnerable group jumped from less than one-fifth of the population before the crisis to more than one-third after the crisis.

Zin (2002), analyses the impact of the financial crisis on poverty and inequality in Malaysia. She found that rural households were hurt less than urban ones, but after the crisis, the recovery of urban households was smoother than that of rural ones. A paper of interest for Ukraine is one by Lokshin and Ravallion (2000), examining the welfare effects of the 1998 financial crisis in Russia. They found that the crises uncovered that formal social safety net was of little use for most Russian households.

Gerry and Li (2008) analyze which household groups were hit the most during the 1998 Russian financial crisis, when Russian GDP fell by 5.3%, and Ruble depreciated by 400%. In that respect, they found that married individuals living in small households, with educated heads in urban areas are better equipped to smooth consumption. Furthermore, and similarly to Lokshin and Yemtsov (2004),

who studied the Russian 1998 financial crisis as well, they found that outside of pension payments, the formal social safety nets do not facilitate consumption smoothing, thus heightening the importance of informal coping institutions, principally in the form of increased home production.

Brück Tilman et. al (2010) investigated determinants of household poverty in Ukraine during the transition period prior to 2004. This paper investigates the effect of explanatory variables grouped into household characteristics, productive assets and human capital, as well as geographic controls on welfare and poverty. The authors analyzed both an income-based and an expenses-based welfare and poverty function. They found that during 1996-2004 poverty and inequality slightly declined, identified the poverty risk related to having children, and the importance of having productive assets (land plots) especially for poorer people. However, this paper did not aim to implement policy analysis and provide respective policy implications.

2.2. Policy papers

Also, several seminal policy papers on poverty-reduction policies were prepared by the World Bank and European Commission, with contribution from the local experts and scientists. Overview of the policy recommendations from such papers is useful for several reasons: it provides description of best-practice poverty-reduction policies, besides it gives benchmarks to compare the results of our paper.

The report on "Social Protection and Social Inclusion in Ukraine" (2009), which was prepared by scientists of Ukrainian National Academy of Sciences for the use of European Commission, argues that current social policies are oriented to provide assistance to broad range of population, but vulnerable groups are not considered in comprehensive manner. The main risk groups are families with many children, elderly, unemployed, and persons with low education. Another conclusion of the paper is that there is no state strategy of social policy development and integration. The authors argue that accumulation of budget deficit is a serious risk for stability of social net policies and support for vulnerable groups. Other poverty drivers, and labor market problems, in Ukraine, analyzed by the authors, are as follows: low labor costs that do not motivate introduction of new technology and do not prevent employed from poverty; lower employment activity of women, compared to that of men, caused by the lack of affordable quality of child care facilities, strong incentive to obtain education and low retirement age; disadvantaged situation with rural areas – absence of jobs, poor social infrastructure, poor living conditions, limited access to quality education and health-care; ineffective social support system which, among its other flaws, has excessive number of privileges to certain categories without testing for the level of income. An important conclusion is about the need to change from assistance of vulnerable population to the labor market development and maximal expansion of employment, encouraging economic activity and ensuring decent wages, increase level of professional and occupational training.

The study by World Bank "The Job Crisis" (2011) investigates the following consequences of the 2008-2009 financial crisis: labor market adjustments, household coping strategies, and government

social protection initiatives – for the Eastern European and Central Asian countries. Actual measures to protect the affected households include: developing passive labor market programs (unemployment assurance for registered unemployed, though eligibility criteria were tightened and benefit periods reduced) and active labor market programs – financing programs to support employed, support new employment, improve employability and enhance job-matching (reduce in non-wage costs, expanding public work and public investment programs, expanding access to training and retraining), strengthening social assistance, maintaining or increasing minimal pension, ensuring access to health and education services. Household coping mechanisms are those referring to increase in labor supply by households, dissaving and borrowing, increase in informal and formal transfers, cutting expenses on food and healthcare, reduction in education expenses. The report suggests means to improve responses to subsequent job crises: implement automatic stabilizers (unemployment insurance benefits, last-resort social assistance), adjusters (unemployment insurance parameters, social assistance parameters, binding minimum wage level) and starters (public works, entrepreneurial and educational initiatives).

Our investigation concentrates on the 2008-2009 crisis effect for welfare/ poverty consequences of Ukrainian households. The availability of household-level data *before*, *during* and *after* the crisis allows to adopt the mainstream methodology and investigate the peculiarities of the crisis effect on various groups and to formulate policy recommendations.

3. Safety Net Policies in Ukraine

Ukraine operates a mix of safety nets, which consume a significant portion of the state budget, though they are not effective enough either due to insufficient funding, inadequate coverage or targeting.

The crisis mechanisms which hurt the poor include the reduction in real wages, the decline in social services as public revenues shrank, and the decline in worker's remittances. According to the Country Economic Memorandum on Ukraine, World Bank (2010), such events are particularly serious for families already below the poverty line, especially those with limited coping mechanisms, such as elderly and those with young children.

Table 2: Selected Social indicators in Ukraine

Indicator *(in Euro)*	**2008**	**2009**	**2010**
Average monthly wage	*233*	*176*	*213*
Average monthly pension	*116*	*92*	*109*
Average monthly assistance to the poor	*35*	*33*	*47*

Source: State Statistics Committee of Ukraine

Spending for safety net policies (other than contributory pension) in Ukraine, in terms of share in GDP, is comparable to the other CIS and even OECD countries. Total spending on social assistance

(not considering for pensions) equals 2.0 percent of GDP in Ukraine, compared to 1.8 percent in Russian Federation, 1.3 percent in Poland and 2.5 percent the OECD average.

The comparison of the size of the average monthly wage, the average pension and social contribution to the poor is presented in Table 2. All three indicators decreased in year 2009, because of the crisis, but monthly assistance showed the highest growth rate in 2010. Average assistance to the poor is approximately 15% of the average wage and 35-50% of the average pension. Social aid programs are not expected to overcome poverty, but rather to support the poor. For example, assistance to low-income families is limited by 75% of the official subsistence level, based on Law of Ukraine "On Adoption of Mechanism for Determination and Provision of State Assistance to Low Income Families".

Available safety nets in Ukraine are of three major groups: social benefits, social assistance and subsidies. Some of the most popular safety nets include: public utilities subsidies, birth grants, child allowance, unemployment benefits, and categorical benefits (e.g. disabled, those suffered from Chornobyl nuclear disaster, war veterans, teachers) many of which are "rights based" rather than "needs based". Some of these are described below.

Birth grants and child allowances are regulated by the Law "On State Assistance to Families with Children". It envisages several types of allowances: pregnancy allowance, childbirth allowance, child adoption allowance, assistance for child care before the age of three, child allowance to single mothers.

The amount of child allowance till the age of three years was 12-16 EUR per child monthly during 2002-2007. Birth grants were introduced in 2007 and comprised 525 EUR paid after a child is born and also included another 525 EUR paid during the subsequent 12 months in equal installments. In 2010 birth grants increased (Table 3).

Table 3: Birth Grants in Ukraine

Indicator (in Euro)	**First child**	**Second child**	**Third** *(and >3)* **child**
Total grant (formula)	*30 subsistence minimums*	*60 subsistence minimums*	*120 subsistence minimums*
Size of total grant in 2010	*2405*	*4809*	*9617*
Paid right after the birth	*802*	*802*	*802*
Paid subsequently	*1603*	*4007*	*8815*
Period of pay (in months)	*24*	*48*	*72*
Average monthly pay	*67*	*83*	*122*

Source: Law "On State Assistance to Families with Children"

Public utilities subsidies are aimed at low-income families to cover their public utilities expenses. This type of state aid is among the most wide-spread. The availability of these subsidies depends on per capita income of a household in comparison to the official subsistence minimum. Total annual amount and average monthly amount per receiving household for the past several years were as follows: 2008

– UAH 128 million and 137 UAH per household; 2009 – UAH 143 million and 157 UAH; 2010 – UAH 237 million and 163 UAH; 2011 – UAH 281 million and 194 UAH.

Existing social assistance system is not effective in overcoming poverty, due to the lack of targeting of social assistance (Libanova et. al., 2009). Problems of the existing safety nets are the following, according to the Program of Economic Reforms for 2010-2014:

- Low coverage of poor population by social safety nets. Only 56,8% of the poor (based on official subsistence level) receive at least one type of social aid;
- Low level of targeting resources. Public transfers are unfair, as only 23% of total aid goes to the poor;
- Delivery of public utilities subsidies is based on inefficient norms for consumption of these services (for example, water consumption norm in Ukraine is 108 m^3 per person per annum versus 73 m^3 in Europe).

4. Data analysis

Our investigation relies on Ukrainian household survey (UHS), that contains a wide set of indicators regarding households' characteristics, income and expenses, as well as those of individual members. UHS is updated annually since 1999 and includes most types of households, excluding the following groups of persons: in military service, imprisoned ones, permanent residents in orphanages and marginalized segments of the population. Number of observed households for the UHS is approximately 13 000 households and 25 000 individuals. In 2010 the sample size was 10 428 households and 25 906 members (2009 – 10 459 households and 25 095 members; 2006 – 11 161 households and 26 253 members). Available data for years 2006 ('before the crisis'), 2009 ('during the crisis') and 2010 ('after the crisis') makes it possible to test difference in parameters between the three years – 2006, 2009 and 2010. Therefore, the Ukrainian household survey is a well-suited dataset for the analysis of crisis effect on various groups of households, as it captures household and household members' indicators *before*, *during* and *after* the crisis and provides data on various types and categories of households and household members.

Table 4: Key household indicators

Indicator	2006	2009	2010
Share of males (*%)*	49,7	43,6	44,3
Share of rural population (*%)*	38,6	34,1	34,2
Average household size (*persons)*	2,5	2,5	2,4
Share of households with children (*%)*	34,1	32,3	29,2
Average number of children* (*persons)*	1,4	1,4	1,4
Mean monthly wage (*UAH)*	2 610	4 904	5 661
Mean monthly wage (*EUR)*	412	451	538

** For households with children*

During 2006 – 2010 certain changes occurred in demographic patterns (table 4). The key changes include the following ones: decreasing share of male population, shrinkage of rural population due to urbanization and negative natural population dynamics, decrease in the number of households with children. Average monthly wage increased from EUR 412 in 2006 to EUR 538 in 2010.

The household survey provides detailed information on income and expenses by different categories of households (including social benefits received, nutrition expenses, and health-care preferences). Household categorizations include these ones: urban / rural, with children /without children, type of dwelling; included are several quantifiable household parameters, such as the number of children, number of working adults, years of academic study, years of work experience, employment status, amount of social benefits received, health and life styles.

We produced basic analysis of income and expenses structure dynamics for the sake of identifying changes in economic behavior of an average household during the period under study, as well as presenting the composition of income and expenses used in the empirical part. Such an analysis could reveal certain issues and trends, which should be investigated in more detail in the empirics sections. In order to have information about an average household , we obtained combined incomes and expenses for all the households in the sample.

The analysis of dynamics of household income structure does not reveal any change. The only changes were a decrease of the share of salary and an increase in the share of entrepreneurial income and social assistance during 2006-2010.

Table 5: Household income structure

Income category	**2006**	**2009**	**2010**
Salary	44 %	44 %	42 %
Entrepreneurial income	5 %	6 %	6 %
Sale of property and dissaving	3 %	2 %	2 %
Produced consumption	7 %	5 %	6 %
Social assistance (in cash, in kind)	28 %	30 %	31 %
Gifts (in cash, in kind)	7 %	7 %	7 %
Other cash income	7 %	5 %	6 %
Total income	**100 %**	**100 %**	**100 %**

The analysis of the dynamics of an average household expenses structure (provided in Table 6) reveals some changes during the period of 2006-2010: first, households started eating food of lower quality; second, they started spending less on furniture, consumer electronics and recreation. At the same time households intensified harmful habits and healthcare expenses; started to communicate and travel more in order to couple with the crisis by putting higher effort: workers searching for new jobs instead of the lost ones, businessmen communicating with counterparties to identify more effective ways of

doing business; people started to invest their time and funds in education more heavily. On the investment side, households substituted from financial investments into real estate (and repairs).

Table 6: Household expenses structure

Expenses category	**2006**	**2009**	**2010**
Foods and beverages	48.3 %	48.1 %	48.4 %
Alcohol and cigarettes	2.7 %	3.4 %	3.5 %
Clothes and footwear	6.4 %	6.4 %	6.7 %
Utilities	9.9 %	9.8 %	9.7 %
Furniture and electronics	3.1 %	2.6 %	2.6 %
Healthcare	2.6 %	3.4 %	3.5 %
Transport and communications	6.4 %	6.8 %	6.5 %
Education	1.2 %	1.4 %	1.3 %
Recreation	4.5 %	4.4 %	4.3 %
Real estate, repairs	2.2 %	4.4 %	4.7 %
Financial investments	2.3 %	0.6 %	0.6 %
Other consumption	10.5 %	8.7 %	8.4 %
Total expenses	**100 %**	**100 %**	**100 %**

In order to develop the dataset to be used in the regression analysis we transformed the initially separate databases on households and on individuals into equivalent members database using the following algorithm: first, we collapsed the selected data on individual members into sums grouped by household number; second, we merged the later subset into the household database of the respective year; third, we calculated the number of equivalent household members for each household (using several equivalency scales) and calculated values of numeric variables per each equivalent household member.

As the economic needs of a household do not grow with each additional member in proportion, because of economies of scale in consumption, we used a special equivalence scale to determine the number of equivalent members for each household. In our research we used the three most widely used equivalence scales – the OECD equivalence scale, the OECD-modified scale, and the square-root scale, as suggested by OECD (2009). The scaling methodology is as follows:

- the number of equivalent members based on the *OECD scale*: 1 – household head, 0,7 – each additional adult member, 0,5 – each child;
- the number of equivalent members based on the *Modified OECD scale*: 1 – household head, 0,5 – each additional adult member, 0,3 – each child;
- the number of equivalent members based on the *Square root scale*: square root of the number of actual household members.

Summary statistics of the datasets for years 2006, 2009, and 2010 used for regression analysis are presented in Table 7.

Table 7: Selected summary statistics

Variable	2006			2009			2010		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
head_gender	0.458	0	1	0.450	0	1	0.438	0	1
head_married	0.537	0	1	0.528	0	1	0.519	0	1
region_kyiv	0.077	0	1	0.076	0	1	0.074	0	1
region_west	0.157	0	1	0.172	0	1	0.170	0	1
businessman	0.009	0	1	0.011	0	1	0.008	0	1
Eq.members1	1.91	1	5.9	1.91	1	5.2	1.86	1	4.9
Eq.members2	1.62	1	4.5	1.62	1	4	1.59	1	3.5
Eq.members3	1.52	1	3.46	1.52	1	3.6	1.49	1	3.6
Total_Inc	17670	138	317257	32666	362	1996125	37197	3050	660251
Total_Exp	16483	1337	506063	31206	1633	1162579	34317	3013	857267
Rural	0.36	0	1	0.32	0	1	0.32	0	1
# children	0.48	0	5	0.46	0	5	0.42	0	5
#work_age	1.05	0	3	1.05	0	3	1.02	0	3
Age	99	13	431	98	16	330	98	16	344
Education	23	0	106	24	0	90	24	0	92
Experience	43	0	225	42	0	161	42	0	154
Exercising	0.68	0	9	0.69	0	7	0.67	0	6
Living area	60	12	260	60	10	500	60	12	279
Land area	123	0	10060	113	0	5258	115	0	38225
Subsidies	4724	0	68988	9434	0	79085	11145	0	192000

Eq.members1, *Eq.members2* and *Eq.members3* – number of equivalent household members, according to respectively, the OECD scale, the modified OECD scale, and the square root scale.

Total_Inc and *Total_Exp* – quarterly income and expenses of households.

Rural – dummy variable, 1 for rural area and 0 otherwise.

 # children – number of children in a household.

#work_age – number of working adults within household.

Age and *Education* – respectively, total age and education level of the household. In regression analysis *Age* and *Education* per equivalent member were used.

Living area and *Land area* – respectively, dwelling area and land area owned/rented by a household. In regression analysis *Living_area* and *Land_area* per equivalent member were used.

Subsidies – total quarterly amount of government payments (stipend, pensions, benefits etc.) per household. In regression analysis *Subsidies* per equivalent member were used.

5. Estimation methodology

In order to assess the crisis effect on poverty, we are going to follow the estimation approach by Brück et al. (2010), and estimate both a "welfare function", based on a continuous measure of household

welfare (income and expense), as well as a "poverty function", which is a binary variable defined on the basis of the poverty line. Each approach has its cons and pros:

Advantages of "*welfare function*" – utilizes full information on the distribution of income, while the poverty function collapses welfare measure into just two values;

Advantages of "*poverty function*" – pays explicit attention to the poor, while the welfare function does not and gives excessive weight to outliers.

5.1. Welfare function estimation

Approach one. Estimate separate OLS regressions - for years 2006, 2009 and 2010. The structural change due to the crisis is then analyzed via analysis of the change in coefficients (*t*-test is applied to test difference in coefficients between years). General form of estimation equation:

$$w_i = a + L_i\beta + A_i\gamma + V_i\delta + \varepsilon_i \qquad (1)$$

Where,

wi – welfare measured by total income of household (monetary and non-monetary income including in-kind benefits, gifts, subsidies, pensions and self-employment production);

Li – household characteristics: gender of household head, marital status of head, equivalent household member age, number of children, number of working adults, being an employer, public social assistance received;

Ai – productive assets and human capital indicators: productive assets - land plots, cattle, real estate; human capital – education years, doing physical exercises, work experience;

Vi – geographic controls: residence in Kyiv, residence in Western regions, rural residence;

εi – error term.

Empirical results obtained based on this approach are presented in Appendices 1,2 and 4. Coefficients tests are presented in Appendices 3 and 5. Discussion of estimation results is provided in subsection 6.1.

In order to further improve our analysis we run quantile regressions (for 0.25^{th}, 0.50^{th} and 0.75^{th} quantiles) and observe differences in coefficients across the distribution of income. This approach would help us to analyze whether parameters are different for poorer households versus ones that are better-off in terms of welfare. Unlike an OLS model, where parameters are estimated at the conditional sample mean of the dependent variable, the quantile regression methodology analyzes determinants of income at specific percentiles of its distribution.

Approach two. Transform monetary values in data for 2010 and 2009 to real values with base year 2006. Take differences for equation 1 (year 2010 minus 2009, and year 2009 minus 2006) for households that were observed in all three years – equation 2.

$$\Delta w_i = \Delta L_i \beta + \Delta A_i \gamma + \Delta V_i \delta + \Delta \varepsilon_i \quad (2)$$

An intercept can be added into equation 2, which would capture the shift exclusively due to crisis. The interaction of household characteristic dummy-variables with such intercept might help determining the social group most vulnerable to the crisis. Although, this differences equation is expected to be useful in analysis of welfare dynamics and in designing short- and medium-run forecasts, it is technically possible if and only if non-rotating households are identifiable across periods. In the case with the UHS database this approach, as well as panel data analysis, is impossible due to data limitations – design of UHS is such that it does not allow identification of same households and individuals across periods. For the abovementioned data-limitation, equation 2 was not estimated in our paper.

5.2. Poverty function estimation

We follow Libanova and Makarova (2009) and use three poverty lines:

- Official poverty line: calculated as 75% of the median equivalent total expenditures;

- Extreme poverty line: calculated as 60% of the median equivalent total expenditures;

- OECD extreme poverty line: calculated as 60% of the median equivalent total income;

We assume the old OECD equivalence scale in our paper for the calculation of the abovementioned poverty lines for years 2006, 2009 and 2010.

The official subsistence level, which is calculated by the Ukrainian health-care authority, based on WHO norms of food and nutrition needs, as well as needs for clothes and social goods (Table 5, Figure 3), is rarely used for policy and academic analysis of poverty issues. According to the Law, the subsistence minimum is the nominal amount for the provision of a food products set, which is sufficient to provide for the normal functioning of the human organism and the maintenance of health, as well as a minimum set of non-food items and minimum set of services to satisfy basic social and cultural needs of a personality. Despite its definition, the subsistence minimum is not free of subjective influences, because it is the base for most social allowance and assistance programs.

In 2009 there was a significant depreciation of the Ukrainian currency Hryvnia – from 7.34 to 10.87 UAH per EUR[1]. Even though the subsistence minimum, expressed in UAH, increased in 2009 by 4.6%, it decreased by 25% expressed in Euro.

[1] Ukrainian Central Bank applies exchange rate targeting policy based on the US Dollar exchange rate. In our paper all translations into Euro were performed using European Central Bank indicative exchange rates.

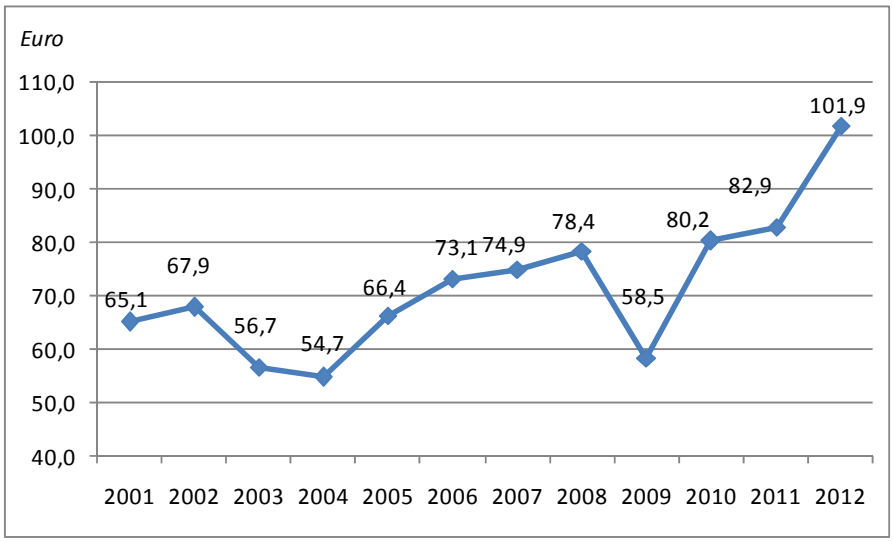
Table 8: Poverty lines and poverty rates dynamics

Poverty indicator*	2006		2009		2010	
	UAH	Poverty rate, %**	UAH	Poverty rate, %	UAH	Poverty rate, %
75% expenses line	5 601	27,0%	10 929	26,5%	12 440	23,9%
60% expenses line	4 481	13,3%	8 743	12,6%	9 952	10,2%
60% income line	4 841	7,4%	9 077	8,6%	10 572	6,6%

* Based on 'Old OECD' equivalency scale. Amounts in UAH represent poverty line per equivalent household member.

** Share of all households below the indicated poverty line.

Figure 1: Official Subsistence Minimum in Ukraine (translated into Euro)



Source: Law "On State Budget of Ukraine"

Having obtained the poverty line, we will estimate the "poverty function" (equation 3).

$$\text{Prob}(p_i = 1 \mid L_i, A_i, V_i) = F(L_i\beta + A_i\gamma + V_i\delta + \varepsilon_i) \qquad (3)$$

Where,

Prob(pi=1|Li,Ai,Vi) – the probability of a household to move below the poverty line, given the explanatory variables below.

Li – household characteristics;

Ai – productive assets and human capital indicators;

Vi – geographic controls;

εi – error term.

As poverty is expressed by a binary variable, we employ Probit model for estimation of poverty function. In equation 3, *F(.)*, our Probit model, is standard normal cumulative distribution function,

which is between zero and one for all values of explanatory variables. Probit parameters are estimated via the maximization of the maximum likelihood function (Woldridge, 2003).

For a Probit model a measure for goodness of fit statistic is the pseudo *R*-squared, measured as *{1 – LUR/L0}*, where *LUR* – is the log-likelihood value (unrestricted) for the estimated model, and *L0* is the log-likelihood value for the model with an intercept only.

Having estimated equation 3 for years 2006, 2009 and 2010 separately, we could analyze the effect of structural changes due to the financial crisis, similar to the abovementioned analysis for the equation 1. Also we should use the likelihood ratio statistic for Probit models in order to compare differences in coefficients between years 2006, 2009 and 2010 (Wooldridge, 2003).

The likelihood ratio statistic is obtained as *LR = 2(LUR - LR)*, where *LUR* – is the log-likelihood value for the non-restricted value, while *LR* – log-likelihood value for restricted model (e.g. one or several coefficients of the 2010 and 2009 models are restricted to their values in 2006 model).

The empirical results obtained based on this approach are presented in Appendix 6; coefficients tests are presented in Appendix 7. The discussion of the estimation results is provided in subsection 6.2.

6. Estimation results and analysis

6.1. Results from the Welfare function approach

The general explanatory power of income equations as measured by the R^2 (0.33 – 0.45) exceeds that of the expense equations (0.19 – 0.30). This is explained mainly by the higher precision and reliability of income information, for example there is no data on the amount of savings made by the households (an expense), but, at the same time there is information on amounts of 'dissaving' (adds up to income).

The analysis of various household characteristics, productive assets and human capital indicators, as well as geographic controls follows.

Gender of head. This variable is positive and significant in the income equations and insignificant in the expenses equations. In other words, households with a male head consume, on average, the same amount as households with a female head, but they earn more by 2.5-4.5%. This income effect has decreased in 2010, as compared with 2009.

Marital status of head. Households with married head spend by 4.3-12 % more and earn by 7.7-14.3% more, than households with a not married head. This effect did not significantly differed across years, based on the test of differences in parameters between the years.

Residence in Kyiv. Households residing in the capital city Kyiv earn by 9.0-13.7% more per equivalent member and also spend more by 6.0-11.9%. In 2010 the income gap between households from Kyiv and the ones from the rest of the country increased. The highest gap is observed between households

belonging to the upper quartile of the income distribution, that reflects existing higher employment opportunities for qualified work force in Kyiv, as compared to the rest of the country.

Residence in Western regions. Empirical results point towards dramatic change that occurred to households residing in Western regions. Prior to the crisis these households earned, and spent, by 3.9-4.8% more, compared to other regions, except the city of Kyiv; which is because members of these households were in the most favorable position to earn and receive workers' remittances from abroad. In 2009 and thereafter this difference shrank, and in 2010 households in the western regions earned on average by 4.3-5.0% less than the ones in other parts of the country; during the crisis remittances shrank significantly, besides Western regions do not have developed the industrial infrastructure as their Eastern counterparts.

Being an employer. Businessmen earn and spend on average by one third more, than other households. This effect has weakened during the crisis, but it revived in 2010 also not in a statistically significant manner. The significance of this coefficient is a very strong argument towards development support policies (e.g. informational, tax and legal) for small businesses, and their additional support during crisis periods. Sound development of small businesses might have even a higher effect, because this variable does not capture the effect of decreased employment / increased unemployment in small businesses due to the crisis.

Rural residence. This variable is statistically significantly different across years, meaning that during crisis and revival from the crisis the coefficient changed. Before the crisis households in rural areas received, on average, income higher by 2.9-4.8 % than urban households, and at the same time spent by 3.9-6.0% less. During the crisis, in year 2009, the negative income differential decreased but expense differential increased. In 2010 rural households already earned by 3.6-5.7% more than urban ones. The comparative increase in earnings of rural households was due to the development of the agricultural sector in Ukraine, as it was the only sector that was growing even during the crisis. The establishment of social policies towards 'ruralization' (as opposite of urbanization) of the population would also stimulate the savings rate of the economy, because rural households spend a lower percentage of their income, as also captured by our empirical results.

Number of children. Empirical results show that households with children improved their relative performance compared to households without children during and after the crisis. In year 2006 each additional child was associated by a decrease in equivalent member income by 1 – 5%, while in year 2009 each additional child was associated by a narrower decrease or even an increase in equivalent member income. The main reason is the higher newborn subsidy, which was introduced in years 2008 and 2009. Another probable factor is a psychological one – a higher sense of responsibility and diligence of working adults in a households with a greater number of children.

Number of working adults did not changed in a statistically significant way throughout the years. On average, each additional working adult increases household income per equivalent member by 21-23%, also expenses grow by 11-12%.

Average age of an equivalent member. The effect of this variable did not change significantly over years 2006-2010. The general trend is that, on average, one additional year to the age of an equivalent household member leads to a decrease in income by 0.5% and expenses by 0.9%. This relation increases along the income scale, i.e. the effect is highest for the richest quartile.

Education. Empirical evidence, obtained in this paper, argues for a positive impact of education on income and expenses differentials. In 2006 and 2010 each additional year of education correlated with an increase in income of 1.4-1.6%, while for the crisis year of 2009 the effect is stronger – each additional year of education explains 1.6-1.7% increases in income. This means that more educated people were more prone to the crisis and government should introduce social policies related to the professional training of the work-force. Another interesting observation is that each additional year of education leads to higher expenses (by 1.8-2.3%), which might be costs related to education itself. Moreover, the positive effect of education is increasing in a significant manner along the distribution of income; its effect is twice larger for the highest quartile compared to the lowest one.

Work experience. Although work experience is a significant variable, its effect is 2-3 times smaller compared to that of education. The coefficient did not prove to differ in a significant manner across years and quartiles.

Doing physical exercises, being a proxy for healthy lifestyle, at least once per week proved to be a very important variable – households that exercise earn by 6-7% more than other ones. Moreover, expenses of exercising households are even higher (by 7-9%). The coefficient of doing physical exercises does not change significantly across years and income quartiles.

Proxies for *Physical assets* used in this paper include two variables – *land area per equivalent member* and *living area per equivalent member*. Both variables show a small correlation with income, disregarding the crisis – an increase by 1,0 m^2 relates to an increase in income by 0.2-0.4% (expenses increase by 0.6-0.7%). The relation between these proxies for physical assets and income could be that of reverse causality between measure of physical assets and income.

Public social policies coefficient shows that the relative weight of social policy – related income significantly increased during the crisis by 3 percentage points. This was caused by the fact that social expenses did not contract during the crisis, unlike salary incomes and profits.

To summarize, the most important variables for average income of an equivalent household member are being a businessman, being married, number of working adults ('big families'), being physically active, education, residence in Kyiv, and social policy. The following subsection analyzes these variables from the viewpoint of their effect on poverty probability.

6.2. Results from the Poverty function approach

The overall explanatory power of Probit poverty regressions is lower than that of welfare regressions, it varies from 0.095 to 0.2. The lower explanatory power is one of the minuses of this approach with the binary dependent variable. The analysis of the estimated coefficients by variable is presented below.

Gender of head. Households with a male head have on average somewhat higher chances of becoming poor. This somewhat contradicts to the outcome obtained for the welfare empirical analysis. Although the effect is not pronounced, as it is insignificant for the 60% income poverty line.

Marital status of head. Households with a married head have a lower probability (by 11 – 47%) of getting poor, the highest effect was observed for the 60% income line. This effect did not seem to change across years in a statistically significant manner.

Residence in Kyiv. Households residing in the capital city Kyiv were 22 - 27% less probable of getting poor during the crisis in 2009 and were 26 – 48% less probable of getting poor after the crisis in 2010. The effect of this regional variable was insignificant before the crisis in 2006.

Residence in Western regions. Residing in a western region was a factor to decrease the probability of getting poor by 28- 33% before the crisis in 2006. But this effect shrank to 19% during the crisis in 2009. Still, the evidence is such that remittances from household members working abroad provide an important coupling instrument in Western Ukraine, although it usually does not provide high welfare (as evidenced in sub-section 6.1).

Being an employer. Operating one's own business is another important factor that could prevent getting poor. Although due to the small number of observations of businessmen (over 100), the coefficients should be treated critically.

Rural residence. Before year 2010 residing in a rural area was a significant factor for increasing probability to go below a poverty line. Rural households were on average by 16 – 20% more probable to become poor, compared to urban ones in years 2006 and 2009. But in 2010 the effect seems to have disappeared in the case of extreme poverty lines, although it remains for the 75% expense line.

On average, *each additional child* increases the probability of poverty by 9 – 12%. The effect is not significantly different across the years of study. At the same time *each additional working adult* decreased the probability of poverty by a quarter before the crisis and by a third during and after the crisis.

Average age of equivalent member. After age of 52, which is the mean age of an equivalent member (based on OECD scale), each additional year increases the probability of poverty by 0.5 – 1.9%. The relation did not change significantly during the time-span.

Education. For the two expenses poverty lines each additional year of education (above the mean of 12 years per equivalent member) decreased the probability of poverty by 3 – 5%. During the crisis year education was significant for the income line as well – each additional year decreased the probability by 2%. Each additional *year of work experience* helps to decrease the probability of poverty by 2%. In this respect a program of implementing internship opportunities for students and schoolchildren could become an effective factor of social support and poverty reduction.

Households *doing physical exercises* at least once per week are by 18 – 20% less probable to become poor. Although during the crisis this effect somewhat shrank.

Proxies for *Physical assets.* The availability of living area and productive land decreases the probability of poverty in a statistically significant manner, although the coefficients are not high.

Public social policies is a significant variable to combat poverty. It contributes for about 19 – 25% of the poverty probability decrease, and its effect strengthened during the crisis year.

Table 9: Portrait of targeted household groups

Groups of households	**During crisis – 2009**	**After crisis – 2010**
Least vulnerable/ Most capable to revive	Households with married head (operating own business), consisting of two or more well-educated and well-experienced working adults aged over 18 years old (a couple + one's parent(s), without children, exercising regularly, residing in Kyiv.	Households with married head (operating own business), consisting of two or more well-educated and well-experienced working adults aged over 18 years old (a couple + one's parent(s), without children, exercising regularly, residing in Kyiv.
Most vulnerable/ Least capable to revive	Households consisting of a single adult aged over 55-60 years, having low education and poor experience, not actively exercising, with one or more children, residing in rural area of a western region, living mainly on social contributions.	Households consisting of a single adult aged over 55-60 years, having low education and poor experience, not actively exercising, with one or more children, residing in urban area of a western region, living mainly on social contributions.

6.3. Inference on household groups and policy implications

In order to answer our research question as stated in the introduction, based on the empirical results described in subsections 6.1 and 6.2, here we specify most (least) vulnerable types of households during the crisis, and also specify households that were most (least) successful in improving their welfare after the crisis. Table 9 summarizes the results.

Of course, table 9 summarizes certain 'corner solution' types of households. But it helps to understand the features that make households more (or less) prone to financial crises and more (or less) capable of reviving after the crisis. Also, this might be useful for providing social policy implications.

Empirical results suggest some policy implications, which could be useful for improving social net policies and decreasing poverty:

- First, we found that households with married heads are more advantaged in terms of welfare, and have a lower poverty probability. This finding provides evidence in favor of family-supporting policies.
- Second, heads that earn income from own business, have higher welfare, and halved probability of getting poor. Providing state policies to support small businesses, such as developing business incubators, granting tax vacations, could help save work places and salary levels during a crisis.
- Third, policies aimed at support for new employment and improved employability among rural population could be useful in combatting poverty. Examples of such policies are subsidizing job creation, subsidies for houses, modernizing infrastructure (wireless and broadband internet, roads, social and cultural infrastructure) within new production projects within rural areas. Similar programs are to some extent already implemented in other CIS countries, including Russia and Belarus.
- Fourth, having a child increases poverty risk by itself, besides one working adult member becomes unemployed for a couple of years, therefore there is a need for more public investment in proper child care such as kindergartens and child day-care centers. State could initiate creation of part-time employment schedules for persons from households with small children. Thus households will be able to combine employment status and related income with bringing-up children.
- Fifth, healthy lifestyle contributes towards greater social inclusion and, hence, poverty decrease; its effect is comparable to that of education. Policies to support creation of sports infrastructure and improving its accessibility, combatting alcoholism, would provide contribution towards social welfare and poverty reduction.
- Sixth, implementation jointly by state and corporate sector of strategic programs to provide relevant professional training programs to students and workers, as well as internship programs

for students and schoolchildren would help them to become productive workers in the future and increase overall social welfare.

To our mind, each of the suggested policy implications requires a separate investigation and research. We plan to investigate some of the suggested policy-measures in our future research.

7. Summary and Concluding Remarks

We analyzed the implications of financial crisis for the welfare and poverty position of Ukrainian households. We analyzed the determinants that explain welfare differentials, including the analysis of those at different quartiles, of equivalent members, as well as poverty probability determinants; besides we tested whether respective coefficients were different in periods prior to the crisis, during crisis, and after the crisis. Having analyzed the UHS dataset for the years before, during and after the financial crisis of 2008-2009, we were able to determine the most vulnerable household groups as those consisting of a single adult aged over 55-60 years, having low education and poor experience, not actively exercising, with one or more children, residing in a western region, and living mainly on social contributions; also most economically sound households were those with married head, consisting of two or more well-educated and well-experienced working adults aged over 18 years old (a couple + one's parent(s), without children, exercising regularly and residing in Kyiv.

Based on the empirical results obtained, we formulated several policy implications, such as family-support policies, subsidizing new job-creation, healthy life-style policies, public investment into child day-care facilities, and well improved job-matching and professional training. Some of these issues will be investigated in our future analysis.

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Appendix 1: Income equation: Estimation results

Log of income	*OECD Scale*			*Modified OECD scale*			*Square root scale*		
	2006	**2009**	**2010**	**2006**	**2009**	**2010**	**2006**	**2009**	**2010**
head gender	0.0341***	0.0429***	0.0235**	0.0357***	0.0430***	0.0250***	0.0367***	0.0456***	0.0269***
head married	0.0851***	0.0767***	0.0825***	0.1225***	0.1155***	0.1217***	0.1430***	0.1373***	0.1433***
region_kyiv	0.0897***	0.0967***	0.1371***	0.0904***	0.0957***	0.1343***	0.0938***	0.0956***	0.1322***
region_west	0.0386***	-0.0002	-0.0495***	0.0436***	0.0062	-0.0461***	0.0473***	0.0129	-0.0427***
business	0.3320***	0.2024***	0.2481***	0.3268***	0.1991***	0.2410***	0.3264***	0.2007***	0.2360***
rural	0.0291***	-0.0272***	0.0364***	0.0401***	-0.0185*	0.0481***	0.0478***	-0.0119	0.0568***
# children	-0.0718***	-0.0473***	-0.0450***	-0.0396***	-0.0165**	-0.0159**	-0.0477***	-0.0259***	-0.0263***
# working	0.2060***	0.1931***	0.1908***	0.2214***	0.2083***	0.2067***	0.2381***	0.2275***	0.2263***
age	-0.0043***	-0.0053***	-0.0048***	-0.0041***	-0.0051***	-0.0046***	-0.0036***	-0.0046***	-0.0041***
educ	0.0147***	0.0171***	0.0157***	0.0143***	0.0164***	0.0150***	0.0140***	0.0156***	0.0142***
exper	0.0045***	0.0054***	0.0053***	0.0040***	0.0048***	0.0046***	0.0036***	0.0044***	0.0040***
sports	0.0665***	0.0534***	0.0545***	0.0553***	0.0436***	0.0455***	0.0496***	0.0382***	0.0419***
space	0.0039***	0.0040***	0.0039***	0.0027***	0.0029***	0.0028***	0.0021***	0.0023***	0.0022***
land	0.0002***	0.0002***	0.0001	0.0001***	0.0002***	0.0000	0.0001***	0.0002***	0.0000
log_policy	0.1476***	0.1709***	0.1674***	0.1493***	0.1735***	0.1703***	0.1493***	0.1755***	0.1735***
cons	7.3970***	7.7450***	7.9000***	7.4720***	7.8135***	7.9704***	7.4910***	7.8240***	7.9739***
R^2	*0.329*	*0.349*	*0.337*	*0.387*	*0.397*	*0.384*	*0.440*	*0.449*	*0.435*
No obs	*7 474*	*7 456*	*7 429*	*7 474*	*7 456*	*7 429*	*7 474*	*7 456*	*7 429*

Appendix 2: Expense equation: Estimation results

Log of expense	*OECD Scale*			*Modified OECD scale*			*Square root scale*		
	2006	**2009**	**2010**	**2006**	**2009**	**2010**	**2006**	**2009**	**2010**
head gender	-0.0172	0.0012	-0.0085	-0.0145	0.0019	-0.0064	-0.0129	0.0052	-0.0040
head married	0.0569***	0.0473***	0.0426***	0.0955***	0.0932***	0.0853***	0.1207***	0.1194***	0.1101***
region_kyiv	0.0604**	0.1185***	0.1093***	0.0613***	0.1173***	0.1060***	0.0653***	0.1172***	0.1035***
region_west	0.0719***	0.0420***	0.0152	0.0785***	0.0510***	0.0200*	0.0838***	0.0596***	0.0243**
business	0.3859***	0.2472***	0.3057***	0.3798***	0.2438***	0.2948***	0.3785***	0.2458***	0.2885***
rural	-0.0611***	-0.0841***	-0.0251**	-0.0485***	-0.0721***	-0.0119	-0.0394***	-0.0640***	-0.0018
# children	-0.0548***	-0.0572***	-0.0447***	-0.0244***	-0.0256***	-0.0179**	-0.0361***	-0.0382***	-0.0309***
# working	0.1183***	0.1289***	0.1068***	0.1331***	0.1465***	0.1233***	0.1515***	0.1689***	0.1447***
age	-0.0088***	-0.0086***	-0.0077***	-0.0085***	-0.0084***	-0.0076***	-0.0081***	-0.0078***	-0.0070***
educ	0.0230***	0.0193***	0.0215***	0.0217***	0.0183***	0.0199***	0.0204***	0.0175***	0.0186***
exper	0.0093***	0.0078***	0.0079***	0.0086***	0.0071***	0.0071***	0.0081***	0.0065***	0.0064***
sports	0.0658***	0.0733***	0.0879***	0.0539***	0.0614***	0.0744***	0.0482***	0.0549***	0.0686***
space	0.0062***	0.0054***	0.0055***	0.0047***	0.0039***	0.0040***	0.0037***	0.0031***	0.0032***
land	0.0001***	0.0001***	0.0000	0.0001***	0.0001***	0.0000	0.0001***	0.0001***	0.0000
log_policy	0.0997***	0.1312***	0.1149***	0.1026***	0.1348***	0.1190***	0.1035***	0.1374***	0.1229***
cons	7.7727***	8.1835***	8.3647***	7.8693***	8.2681***	8.4565***	7.9126***	8.2805***	8.4686***
R^2	0.194	0.230	*0.224*	0.219	0.259	*0.224*	0.252	0.297	*0.279*
No obs	*7 474*	*7 456*	*7 429*	*7 474*	*7 456*	*7 429*	*7 474*	*7 456*	*7 429*

Appendix 3: Income equation parameter testing

Log of Income	*OECD Scale*		*Modified OECD scale*		*Square root scale*	
	2009 vs 2006 *(probability)*	**2010 vs 2009** *(probability)*	**2009 vs 2006** *(probability)*	**2010 vs 2009** *(probability)*	**2009 vs 2006** *(probability)*	**2010 vs 2009** *(probability)*
head gender	0.3643	0.0372	0.4482	0.0516	0.3523	0.0419
head married	0.4395	0.5722	0.5223	0.5501	0.6064	0.5676
region_kyiv	0.6697	0.0254	0.7494	0.0312	0.9116	0.0396
region_west	0.0002	0.0000	0.0003	0.0000	0.0008	0.0000
business	0.0264	0.5404	0.0290	0.5707	0.0321	0.6316
rural	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
children	0.0010	0.7538	0.0010	0.9307	0.0022	0.9501
#working	0.0416	0.7124	0.0383	0.7983	0.0941	0.8501
age	0.0260	0.2440	0.0095	0.2109	0.0039	0.1640
educ	0.0488	0.2488	0.0468	0.1834	0.0986	0.1412
exper	0.1277	0.9075	0.1517	0.7151	0.1372	0.4863
sports	0.2988	0.9281	0.2793	0.8492	0.2503	0.6994
space	0.7747	0.7961	0.4140	0.7499	0.5232	0.5676
land	0.5142	0.0010	0.0010	0.0001	0.0020	0.0000
policy	0.0032	0.6739	0.0020	0.7021	0.0007	0.8050
cons	0.0000	0.0280	0.0000	0.0270	0.0000	0.0336

Appendix 4: Quantile regressions (based on OECD Scale): Estimation results

Log of income	2006			2009			2010		
	0,25-q	**0,50-q**	**0,75-q**	**0,25-q**	**0,50-q**	**0,75-q**	**0,25-q**	**0,50-q**	**0,75-q**
head gender	0.0217**	0.0268***	0.0495***	0.0187*	0.0292***	0.0454***	0.0007	0.0208**	0.0392***
head married	0.0966***	0.1011***	0.0787***	0.0969***	0.0817***	0.0490***	0.0823***	0.0845***	0.0783***
region_kyiv	0.0334**	0.0535***	0.0996***	0.0758***	0.0816***	0.0963***	0.0717***	0.1143***	0.1639***
region_west	0.0458***	0.0502***	0.0312**	0.0157	0.0034	-0.0155	-0.0299***	-0.0305***	-0.0516***
business	0.3262***	0.3351***	0.3762***	0.1416***	0.1993***	0.2185***	0.2018***	0.2341***	0.3871***
rural	0.0681***	0.0607***	0.0369***	0.0100	0.0058	-0.0188	0.0509***	0.0462***	0.0173
# children	-0.0539***	-0.0611***	-0.0768***	-0.0298***	-0.0498***	-0.0657***	-0.0297***	-0.0433***	-0.0477***
# working	0.2365***	0.2313***	0.2160***	0.2280***	0.2208***	0.1907***	0.2115***	0.2104***	0.2006***
age	-0.0016***	-0.0032***	-0.0052***	-0.0036***	-0.0052***	-0.0065***	-0.0027***	-0.0044***	-0.0055***
educ	0.0069***	0.0130***	0.0172***	0.0106***	0.0149***	0.0208***	0.0101***	0.0135***	0.0176***
exper	0.0039***	0.0030***	0.0035***	0.0047***	0.0049***	0.0050***	0.0038***	0.0046***	0.0041***
sports	0.0631***	0.0624***	0.0643***	0.0481***	0.0579***	0.0520***	0.0533***	0.0753***	0.0742***
space	0.0028***	0.0034***	0.0039***	0.0030***	0.0032***	0.0034***	0.0029***	0.0032***	0.0044***
land	0.0001***	0.0002***	0.0002***	0.0002***	0.0002***	0.0002***	0.0001***	0.0002***	0.0002***
log_policy	0.2032***	0.1757***	0.1492***	0.2569***	0.2187***	0.1703***	0.2426***	0.2030***	0.1728***
cons	6.6786***	7.1149***	7.6064***	6.7599***	7.3437***	8.0359***	7.0197***	7.5792***	8.0571***
pseudo R^2	*0,200*	*0,208*	*0,210*	*0,212*	*0,209*	*0,207*	*0,193*	*0,192*	*0,209*
No obs	*7474*	*7474*	*7474*	*7456*	*7456*	*7456*	*7429*	*7429*	*7429*

Appendix 5: Quantile regression: Parameter testing

Log of Income	2006		2009		2010	
	0,50 vs 0,25 *(probability)*	**0,75 vs 0,50** *(probability)*	**0,50 vs 0,25** *(probability)*	**0,75 vs 0,50** *(probability)*	**0,50 vs 0,25** *(probability)*	**0,75 vs 0,50** *(probability)*
head gender	0.6011	0.0432	0.3050	0.2688	0.0483	0.1593
head married	0.6828	0.0751	0.1827	0.0452	0.8444	0.6670
region_kyiv	0.1979	0.0081	0.7330	0.5355	0.0142	0.0205
region_west	0.6932	0.1327	0.2776	0.2340	0.9582	0.1393
business	0.8674	0.4980	0.2057	0.7621	0.6069	0.0496
rural	0.4350	0.0229	0.6888	0.0876	0.6353	0.0147
children	0.2986	0.0426	0.0076	0.1271	0.0786	0.0000
#working	0.3815	0.0194	0.2516	0.0005	0.8648	0.2085
age	0.0005	0.0001	0.0009	0.0710	0.0006	0.1000
educ	0.0000	0.0035	0.0016	0.0028	0.0148	0.0217
exper	0.1349	0.5139	0.8054	0.9018	0.2700	0.5572
sports	0.9569	0.8915	0.4417	0.7460	0.0809	0.9418
space	0.0343	0.1192	0.5521	0.6751	0.2512	0.0001
land	0.0000	0.2059	0.9587	0.3112	0.0002	0.7004
policy	0.0000	0.0005	0.0000	0.0000	0.0000	0.0010
cons	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Appendix 6: Poverty equation (based on OECD Scale equivalency): Estimation results

Prob of (poor=1)	*75% line – Expenses*			*60% line – Expenses*			*60% line – Income*		
	2006	**2009**	**2010**	**2006**	**2009**	**2010**	**2006**	**2009**	**2010**
head gender	0.1103***	-0.0093	0.0927**	0.0479	-0.0082	0.1171**	0.0467	-0.1008	0.0831
head married	-0.1966***	-0.1117**	-0.1559***	-0.1806***	-0.1577***	-0.2049***	-0.3659***	-0.4559***	-0.4731***
region_kyiv	0.0115	-0.2211***	-0.2627***	0.0019	-0.2399***	-0.2723***	-0.1799	-0.2691**	-0.4778***
region_west	-0.2847***	-0.1905***	-0.1441***	-0.3303***	-0.1960***	-0.2777***	-0.2814***	-0.0759	0.0642
business	-0.5372**	-0.5200**	-0.7803**	-0.1390	-0.8682**	*(omitted)*	-0.0427	-0.9201*	*(omitted)*
rural	0.1620***	0.1901***	0.1161***	0.2101***	0.1826***	0.0547	-0.0308	0.0107	0.0783
# children	0.1240***	0.1200***	0.1325***	0.0940***	0.0978***	0.0701*	0.1286***	0.1202***	0.0725*
# working	-0.2421***	-0.3124***	-0.2749***	-0.2528***	-0.3035***	-0.2525***	-0.5109***	-0.5951***	-0.5369***
age	0.0182***	0.0186***	0.0168***	0.0175***	0.0179***	0.0147***	0.0056**	0.0053**	0.0024
educ	-0.0547***	-0.0426***	-0.0503***	-0.0403***	-0.0308***	-0.0458***	-0.0034	-0.0206***	-0.0008
exper	-0.0215***	-0.0195***	-0.0188***	-0.0234***	-0.0220***	-0.0209***	-0.0288***	-0.0208***	-0.0196***
sports	-0.2199***	-0.1757***	-0.2354***	-0.2004***	-0.1803***	-0.2427***	-0.3709***	-0.0947	-0.1583*
space	-0.0150***	-0.0123***	-0.0149***	-0.0169***	-0.0172***	-0.0179***	-0.0172***	-0.0138***	-0.0175***
land	-0.0003***	-0.0005***	-0.0003***	-0.0003***	-0.0003**	-0.0001	-0.0005***	-0.0009***	-0.0009***
log_policy	-0.1913***	-0.2699***	-0.2411***	-0.1989***	-0.2555***	-0.2258***	-0.3374***	-0.3691***	-0.3910***
cons	1.8403***	2.4193***	2.3630***	1.3521***	1.8569***	1.8474***	2.7386***	3.3328***	3.3598***
pseudo R^2	*0,095*	*0,098*	*0,100*	*0,095*	*0,103*	*0,105*	*0,197*	*0,191*	*0,200*
No obs	*7 474*	*7 456*	*7 429*	*7 474*	*7 456*	*7 395*	*7 474*	*7 456*	*7 395*

Appendix 7: Poverty equation (based on OECD Scale equivalency): Parameter testing

Prob of (poor=1)	*75% line – expenses*		*60% line – expenses*		*60% line – income*	
	2009 vs 2006 *(probability)*	**2010 vs 2009** *(probability)*	**2009 vs 2006** *(probability)*	**2010 vs 2009** *(probability)*	**2009 vs 2006** *(probability)*	**2010 vs 2009** *(probability)*
head gender	0.0028	0.0115	0.2446	0.0144	0.0162	0.0047
head married	0.0559	0.3252	0.6655	0.4044	0.1783	0.8103
region_kyiv	0.0009	0.5771	0.0071	0.7496	0.4334	0.1643
region_west	0.0343	0.3100	0.0131	0.1777	0.0014	0.0371
business	0.9425	0.4392	0.0149	*n/a*	0.0774	*n/a*
rural	0.4783	0.0653	0.5556	0.0106	0.4724	0.2915
children	0.8894	0.6721	0.9103	0.4421	0.8356	0.2488
#working	0.0062	0.1625	0.1062	0.1425	0.0486	0.2036
age	0.8338	0.3341	0.8710	0.1676	0.9191	0.3248
educ	0.0218	0.1644	0.1333	0.0339	0.0276	0.0296
exper	0.4526	0.7988	0.6370	0.7358	0.0308	0.7819
sports	0.3930	0.2594	0.7525	0.3715	0.0003	0.4388
space	0.0215	0.0279	0.8687	0.6800	0.0558	0.0800
land	0.0290	0.0281	0.8759	0.0806	0.0639	0.9997
policy	0.0002	0.1954	0.0209	0.2556	0.2523	0.4480
cons	0.0025	0.7821	0.0218	0.9694	0.0211	0.9244