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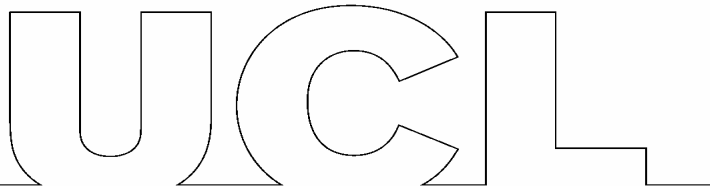

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UTILITY PAYMENTS IN UKRAINE:
AFFORDABILITY, SUBSIDIES AND ARREARS

Samuel Fankhauser, Yulia Rodionova[a]

and

Elisabetta Falcetti[c]

[a] Corresponding author: y.rodionova@ssees.ucl.ac.uk
UCL SSEES, 16 Taviton Street, London, W1 0BW, UK.

Economics Working Paper No. 87

February 2008

Centre for the Study of Economic and Social Change in Europe
UCL School of Slavonic and East European Studies
Gower Street, London, WC1E 6BT
Tel: +44 (0)20 7679 8519
Fax: +44 (0)20 7679 8777
Email: csesce@ssees.ucl.ac.uk

Utility payments in Ukraine: affordability, subsidies and arrears

Samuel Fankhauser, Yulia Rodionova and Elisabetta Falcetti

Abstract

Transition has led to a significant increase in the severity and incidence of poverty in Eastern Europe. One important aspect of poverty is access to, and the affordability of, basic services like electricity, heat and water. This paper provides evidence on this issue from the Ukraine Longitudinal Monitoring Survey (ULMS). The paper identifies considerable differences in both access and affordability between different localities in Ukraine. Social protection measures can help to alleviate affordability constraints, but the analysis finds that social support is not well targeted. The currently low tariffs prevent an escalation of affordability problems but constraints nevertheless exist. Many households have accumulated substantial arrears as a consequence, although non-payment is a complex issue and not solely a function of affordability.

Keywords: affordability, energy, water, social protection, Ukraine

JEL Classification Number: I3, P2, P3, P36, Q4, Q25

Address for Correspondence: Yulia Rodionova, UCL SSEES, 16 Taviton street, London W1 0BW, UK.

E-mail: y.rodionova@ssees.ucl.ac.uk

This paper was written for the most part when Samuel Fankhauser was Deputy Chief Economist at the EBRD, Yulia Rodionova was an Economic Analyst at the EBRD and Elisabetta Falcetti was a Senior Economist at the EBRD.

In writing this paper we have benefited from the comments of Elcin Akcura, Randolph Bruno and Alexander Muravyev. The background research for this paper was funded by the UK Department for International Development. This funding is gratefully acknowledged.

INTRODUCTION

Transition from central planning to a market economy has required deep structural changes in the way the economies, and indeed the societies, of eastern Europe are organised. This structural change has not been without cost and one side-effect of transition has been a – hopefully temporary – increase in the incidence of poverty in the transition region. Ukraine is no exception. Difficulties by many people to access and pay for basic services like electricity, heat and water is just one aspect of the increased poverty.

A small but growing literature has emerged that studies energy and water poverty in the transition region as part of a wider concern about the social impact of transition (see, for example, Fankhauser and Tepic, 2006, IPA, 2003, Kennedy, 2005, Lampietti *et al.,* 2001, Lampietti and Meyer, 2002, Lovei *et al.,* 2000, and Velody *et al.,* 2003). Several broad conclusions can be drawn from this literature.

The first conclusion is that energy and water poverty in transition countries is primarily a question of affordability, rather than access. Transition countries have inherited from communism relatively well-developed water, heat and electricity systems. In Ukraine, for instance, access to electricity is almost universal. The challenge is to maintain the high connection rates and ensure access remains affordable.

A second conclusion is that affordability problems will probably get worse over the coming years. Affordability constraints have been masked so far by unrealistically low energy and water prices (and, in some cases, poor payment discipline). Tariffs will have to go up substantially to make the underfunded networks financially viable again and finance the extensive rehabilitation needs. The rate at which tariffs need to rise may well be higher than the rate of income growth.

A third conclusion is that the social safety provisions to protect low-income consumer from further price increases are insufficient. Social safety nets, where they exist, are often underfunded, poorly managed and inefficient in reaching the target population. While weak institutions are the main reason for these shortcomings, another important factor is poor information about consumption patterns, access and affordability at the level of individual households.

This paper looks at utility payments, access and affordability in Ukraine. Unlike other studies, the paper does not aim to forecast affordability rates for different tariff scenarios or prescribe particular social safety arrangements. Its purpose is purely descriptive. The aim is to paint as detailed a picture as possible about energy and water poverty at the household level, including the level of access, the size of the utility bill, the role of social safety measures and the effect of non-payment. A particular focus is on differences between administrative districts and regions.

In doing so the paper draws on two rounds of the Ukrainian Longitudinal Monitoring Survey (ULMS). The ULMS includes both household- and individual- level questions on income and expenditure, employment states, access to and payment for services, residence ownership, health, education, town size and region. The first round of the survey took place in 2003 and includes retrospective questions for 1986, 1991, 1997-2003. The second round was conducted in 2004 and includes retrospective questions for 2003.

The panel component for the survey includes 7,201 individuals from around 3,500 households. There is also a panel component to the retrospective questions, ranging from 1,000 to 4,000 respondents for different questions. However, the panel subset of the data from 1986 to 2004 is strongly biased with respect to age (and, as a consequence, a number of other characteristics such as education). Therefore, we use mostly the consecutive years (to analyse the dynamics, as in case of utility arrears) or the cross-section data for 2004. The survey provides sample weights, which are taken into account to ensure the analysis is representative at the individual level.

One of the shortcomings of the survey for the purposes of computing affordability is that it collects information on the average monthly utility payments only once a year (unlike LSMS surveys in other countires, which do it several times per year). As a result, we are not able to trace the changes in utility payments between different seasons, which could bias our estimates of affordability and arrears.

The structure of the paper is as follows. The first two sections provide a description of access rates and the availability of targeted support in different regions and for different types of households. They try to identify regional patterns in access rates and ask to what extent social safety nets succeed in reaching the most needy consumer groups. Section 3 looks at the affordability of services and calculates affordability ratios. Defined as the share of utility expenditures in total household expenditures, affordability ratios are a common way to assess whether basic services are within the means of all population groups. To gain a better understanding of affordability constraints, the section distinguishes between gross affordability, affordability net of targeted support and affordability net of arrears. Section 4 takes a closer look at utility arrears and asks to what extent a lenient approach to billing and collection has become a substitute for targeted support. Section 5 concludes. Description of the socio-economic situation in Ukrainian regions as well as the regional map are presented in the Appendix.

1. INCOME AND SOCIAL PROTECTION

Income

We follow the World Bank methodology described in Deaton and Zaidi (2006) quite closely to compute household expenditure. Expenditure is calculated as a sum of spending on food, durables and non-durables. When computing food expenditure, we take into account the market value of home-produced food and of that received as a gift or a payment, along with the household food purchases. To value the two former categories at market prices, we multiply the corresponding quantities by the average[1] market price of that good in the region and settlement type a particular household belongs to. In the case of durables[2], we exclude purchases of housing. However, we do take into account payments received for renting out apartments and imputed rents in cases where households do not make explicit rent/kvartplata payments.

The distribution of the annual expenditure per capita by decile is presented in Table 1.A.

Table 1.1. Annual expenditure per capita by decile, 2004, UAH

Decile	Annual expenditure per capita, 2004, UAH
First	1790.7
Second	2220.9
Third	2645.1
Fourth	3045.7
Fifth	3457.3
Sixth	3926.4
Seventh	4474.5
Eighth	5308.8
Ninth	6373.8
Tenth	8314.5

Source: Authors' calculations, ULMS data.
Note: The exchange rate is 5UAH = 1USD.

Next we look at the regional distribution of the annual per capita expenditure by and within macroregion.

Table 1.2. Annual expenditure per capita by regions, 2004, UAH

Macroregion	Region	Mean	Std. dev	Median	N obs
C	Kiev city	8352.1	7031.4	6713.2	313
C	Kievskaya	6124.9	7031.4	4324.6	178
C	Kirovogradskaya	4332.6	2543.9	3697.1	201
CE	Zaporozhskaya	4287.8	2670.6	3938.3	260
C	Vinnickaya	4273.2	3937.3	3336.2	313
C	Cherkasskaya	4231.1	2909.1	3431.8	212
CE	Dnepropetrovskaya	3830.2	2311.4	3223.7	413

[1] Average and median prices do not differ significantly for most products.
[2] Calculation of the market value the durables purchases bring to a household in a given year is made using the formula C/(2T-t), where C is the current value of the durable, T is the sample average age of the good, and t is the remaining life. Due to inconsistency of the price and category questions on durables in ULMS 2004, we had to use pooled categories of durables and average prices, which could bias our expenditure estimations.

C	Chernigovskaya	3149.7	2210.1	2813.9	193
CW	Zhitomirskaya	3047.7	1237.6	3148.0	167
E	Doneckaya	5164.7	4333.1	4004.7	751
E	Luganskaya	4240.8	2964.2	3430.9	395
E	Sumskaya	4206.7	3089.6	3017.2	243
E	Harkovskaya	4206.7	3454.0	3398.9	511
E	Poltavskaya	3658.7	1891.3	3499.0	230
S	Nikolaevskaya	6338.5	6181.8	4477.8	63
S	Odesskaya	5443.3	5750.7	4100.1	306
S	Crimea	4851.3	3122.7	3985.4	271
S	Hersonskaya	4836.2	2916.4	3834.3	206
W	Rovenskaya	5430.4	3804.3	4550.5	152
W	Ivano-frankovskaya	5109.5	4517.3	3808.7	198
W	Lvovskaya	4162.6	2821.7	3489.4	289
W	Volynskaya	4061.4	2117.3	3484.8	128
W	Ternopolskaya	3709.1	3005.8	2953.4	153
W	Hmelnickaya	3461.2	1734.5	3198.1	213
W	Chernovickaya	3432.6	2008.4	2867.5	94
W	Zakarpatskaya	3342.8	2248.9	2815.6	124
Overall		**4679.5**	**3991.9**	**3667.1**	**6577**

Note: in this and following tables, C = Central region, E = East, W = West, CE = Central-Eastern region, CW = Central-Western region.

As can be seen from the two tables above, per capita expenditure in the capital city is in the top deciles of the overall expenditure distribution, followed by Kievskaya and Nikolaevskaya oblasts. Oblasts at the bottom of the regional per capita expenditure distribution are Chernigovskaya and Zhitomirskaya in the Central Ukraine, Sumskaya in the Eastern part, and Chernovickaya and Zakarpatskaya in the Western part.

Social safety nets

Housing subsidy program is an important part of the social safety provision system in Ukraine. In 1994, household utility payments covered only 4 per cent of the production costs. Government subsidies necessary to cover production costs of housing and communal services amounted to at least 75 per cent of the 1995 national budget deficit. Following its agreement with the IMF, the government of Ukraine decided to gradually introduce market prices, in order to reduce budget deficit and to encourage more efficient use of energy. In September 1995, housing and utility prices were drastically increased[3].

To compensate low-income households for the increase in housing and utility prices, utility subsidy was introduced in May - October 1995.

[3] For example, in Kiev, natural gas prices went up by 40%, maintenance payments by 50%, central heating by 110%, hot water by 120%, and water supply and sewage by 200%.

Amount of subsidy

Utility subdsidy (on communal payments including kvartplata[4]) could be received by any household if the share of utility payments in its average monthly income[5] is greater than *20 per cent* (this figure used to be 15 per cent when the subsidy was first introduced in May 1995 and was subsequently raised in 1999).

For pensioners and families with citizens unable to work, as well as families with children under 16 or invalids of Groups 1 and 2, the threshold affordability ratio is 15 per cent, if per capita income in these families does not exceed 50 per cent of the minimum wage.

Eligibility

Families with working age adults who are not working or studying and are not registered as looking for work (except mothers taking care of children under three, mothers taking care of three or more children under the age of 16, persons taking care of invalids of Group 1, children with disabilities under the age of 16, and people who are over the age of 80) are not eligible to apply for subsidies[6].

Families that own additional housing units or means of transportation for less than 10 years, as well as families who purchased housing less than a year ago, are not eligible for the subsidy.

How it is administered

Allocation of subsides and their targeted use is exercised by the housing subsidy offices created (appointed) by the Executive Committee of city, raion, settlement, and rural Radas of Peoples' Deputies and state administrations.

Local government could potentially modify the programme to meet local needs ***at local expense***. For example, Kiev passed regulations offering a higher level of protection to low-income families – they need to pay no more than 8 per cent of income for housing and communal services. In 1995, this model has been adopted by three oblast administrations.

Subsidy is given for six months[7], and after that a new application needs to be made. Usually there are fewer applicants during summer months.

The subsidy for liquid gas and solid fuel is granted annually.

Subsidies to citizens living in state and public housing, as well as those living in hostels and housing cooperatives, are provided by a *transfer to accounts of housing owners (...) and the enterprises providing communal services, selling liquid gas, or stove fuel*.

For citizens living in privatised and own houses, subsidies are *transferred by these offices directly to the accounts of enterprises providing communal services, selling liquid gas, solid fuel, and stove fuel*[8].

Non-payment

Housing and communal services organisations are supposed to inform housing subsidy offices regularly about apartment owners/users who have not paid for housing and communal

[4] Sanitary norms of ownership or rent of the total area of the dwelling and norms of communal services utilization are fixed at 21 sq.m for a tenant and every member of the family plus an additional 10.5 sq.m for the family, and for persons who live in one-room apartments, regardless of the dimensions of their apartment.

[5] The average monthly income of a family is calculated using three calendar months that precede the month when the application is submitted.

[6] However, executive committees of the city, raion, settlement, and village radas can make exceptions, taking into account circumstances in the families.

[7] Pensioners and persons whose only income comes from agriculture can ask for an extension of the subsidy period to a year.

[8] Regulations "On the Procedures of Allocating Targeted Subsidies to the Citizens to Reimburse Expenses for Housing and Communal Services, Liquid Gas, Solid Fuel, and Stove Fuel", 1995.

services for the previous month(s). This information is used when making a decision on granting a subsidy.

Immediately after the introduction of the subsidy in October 1995, 4.8 per cent of families in Ukraine were receiving it. Pensioners (one of the poorest categories of citizens in Ukraine) and other single-person families constituted 45.2 per cent of the recipients. Large families (with five or more members) constituted 5.2 per cent of recipients.

In 2000, 19.2 per cent of families were in receipt of a subsidy, 38.4 per cent of them being families consisting of pensioners only.

In 2001, 11 per cent received housing subsidy in summer and 17 per cent in winter. For single pensioners, it accounted on average for 49.2 per cent of their income.

In our sample, in 2004, 12 per cent of the families reported receiving a housing/utility subsidy. Of these, 46.6 per cent are pensioners[9] (households with individuals who report receiving a pension). Large families constituted 24 per cent of subsidy recipients, while they constitute only 18 per cent of the sample.

[9] In this category, 21 per cent report receiving housing subsidy.

2. ACCESS

Provision and tariffs

Wholesale and retail gas prices for domestic users in Ukraine do not cover expenses on gas production (purchase) completely. The price difference is being covered at Naftogas Ukraine company's cost. The following Table gives the reader an idea of the magnitude of the power and gas tariffs in Ukraine in 2004.

Table 2.1. Electricity and gas tariffs in Ukraine, 2004.

	Producer price	Wholesale price	Residential end-user price
Electricity (USc per KWh)	2	2.9 - 3.12	3.01 - 3.74
Gas (US$ per thsd. m^3)	n/a	144 - 166	94

Source: EBRD data. (Note: All prices include taxes.)

When we compare these figures to the standard economic tariffs - power around 8 USc per kWh, gas - probably at least US$ 100 per thousand cubic meters – they imply that we are underestimating the true affordability ratio.

Access rates

In most middle income countries, as in the developing world, the main issue in tackling energy and water poverty is to provide sustainable access to these services.[10] By comparison, access rates in Ukraine are still very high, although the quality of service has deteriorated markedly during transition. There are also important differences among both regions and different types of services.

Table 2.2 provides summary statistics on the access rates to various utilites by region. Access is highest for electric power, where there is an almost 100 per cent connection rate in most regions. As for other utilities, access rates to centralised gas and cold water are the highest (average access rate for both is 68 per cent), followed by central heating (56 per cent), sewerage (50 per cent) and hot water (34 per cent). There is little variation within regions; the standard error is a low 0.01 for all utlities.

A number of major trends can be observed from the descriptive statistics. Kiev, the capital city, has the highest connection rates to all utilities. Soviet legacy partly explains that. In recent years, however, Kiev had large incidents of non-payment for utility services. This problem prompted imposition of strict collection measures on non-payers, and currently 37 per cent of total change in arrears is repayment, so that utility connection rates did not suffer as a result of arrears.

Areas with heavy prior industrialisation in the Eastern and Central Ukraine, such as Harkiv, Poltava, Dnepropetrovsk, Donetsk[11] and Zaporozhye oblasts, relatively rich and having a large proportion of urban population and income level, also have high connection rates for most utilities.

Lvov (Lviv), a major political and cultural center in Western Ukraine, which is also relatively well-off, has high connection rates despite being a predominantly rural oblast. On the other hand, officially poorer agricultural areas in Western Ukraine such as Ivano-Frankovskaya and Zakarpatskaya oblasts tend to have low connection rates (centralised gas is an exception in Ivano-Frankovskaya).

[10] Reducing by half the number of people without sustainable access to safe drinking water is one of the Millennium Development Goals. (see http://www.un.org/millenniumgoals/).

[11] Donetsk oblast is doing worse compared to Dnepropetrovsk. One contributing factor could be the fact that collection action in Dnepropetrovsk led to 60 per cent of debtors settling their debts, while in Donetsk collection lead to litigation (10,000 cases being filed in court in 2001).

One striking exception is Ternopol oblast, which was the largest agricultural producer during Soviet era, has a low proportion of urban population, and is currently one of the poorest regions in Ukraine, but has connection rates comparable to those in Dnepropetrovsk region.

Table 2.2. Connection rates to different utilities by region, 2004.

Access to the utility, per cent (WEIGHTED)								
Macroregion		**Centralized gas supply**	**Electricity**	**Sewerage or indoor toilet**	**Cold water**	**Hot water**	**Central heating or radiators**	**Gas/electrical stove**
C	**Cherkasskaya**	36.9	100.0	28.0	38.9	30.3	27.0	93.7
C	**Chernigovskaya**	64.5	96.2	25.1	75.1	22.1	32.4	59.1
CE	**Dnepropetrovskaya**	87.7	99.4	52.4	78.6	38.6	78.9	92.8
C	**Kiev city**	**98.4**	**100.0**	**99.7**	**100.0**	**98.3**	**99.6**	**99.4**
C	**Kievskaya**	94.4	100.0	56.3	73.3	39.7	80.9	98.9
C	**Kirovogradskaya**	28.1	100.0	21.5	39.1	6.0	34.8	93.0
C	**Vinnickaya**	39.2	98.7	35.4	42.6	12.7	42.5	95.5
CE	**Zaporozhskaya**	56.5	99.7	58.1	87.2	55.9	56.3	97.2
CW	**Zhitomirskaya**	58.1	89.5	52.9	50.5	54.5	55.3	69.8
E	**Doneckaya**	48.7	98.7	43.5	80.3	22.0	43.9	64.8
E	**Harkovskaya**	77.8	99.7	56.8	66.8	41.6	80.4	91.6
E	**Luganskaya**	43.9	99.3	47.6	71.4	11.1	34.4	79.1
E	**Poltavskaya**	86.3	100.0	37.4	47.7	20.8	68.2	66.0
E	**Sumskaya**	59.8	100.0	22.7	34.1	15.7	22.0	42.0
S	**Crimea**	65.9	100.0	58.1	87.3	19.6	36.9	98.1
S	**Hersonskaya**	68.7	99.2	59.4	82.5	37.3	55.5	93.7
S	**Nikolaevskaya**	98.5	100.0	90.9	100.0	55.7	98.5	100.0
S	**Odesskaya**	56.8	98.4	51.3	80.6	31.1	45.1	86.4
W	**Chernovickaya**	82.1	96.2	33.0	25.8	0.0	72.1	86.4
W	**Hmelnickaya**	73.6	100.0	50.4	62.3	34.8	66.2	63.4
W	**Ivano-frankovskaya**	86.8	100.0	23.6	28.7	20.6	29.7	95.9
W	**Lvovskaya**	99.9	100.0	57.8	64.1	28.6	59.8	93.5
W	**Rovenskaya**	72.2	100.0	67.6	71.2	68.2	70.5	99.7
W	**Ternopolskaya**	88.7	98.7	43.3	75.4	39.3	77.9	96.0
W	**Volynskaya**	47.8	100.0	51.7	59.3	40.1	64.1	97.7
W	**Zakarpatskaya**	49.6	90.6	17.0	30.9	7.1	29.0	50.9
	MEAN	67.5	98.9	49.8	68.0	33.6	55.8	84.8
	STD. ERROR	0.01	0.002	0.01	0.01	0.01	0.01	0.005

To better understand the pattern of access rates, we turn to econometric analysis. Estimation equations for the access rates to the different types of services are treated as a system of seemingly unrelated regressions (SUR). The explanatory variables included household expenditure (a common proxy for household income, see below), settlement type (e.g. village or small town), ownership of the dwelling, receipt of social support, as well as regional dummies to capture differences between administrative districts.

When considering access rates to centralised gas and central heating, we note that they are highly significantly correlated (the coefficient of correlation is 0.55), so that only centralised gas equation is left in the system. The same argument applies to the access to sewerage and cold water, where the correlation is 0.59, and to hot water and centralised heat, where it is 0.51. As a result, the two equations being estimated simultaneously are access to centralised

gas and access to sewerage. Expenditure per capita (with a square term), housing (utility) subsidy, existence of utility arrears, region, settlement type and household size are used as dependent variables.
It could be argued that the receipt of a housing subsidy is endogenous to the equation, as it would, among other things, depend on whether the household is connected to utilities. The same argument could be put forward for the existence of utility arrears variable. This would lead to inconsistent and inefficient estimates. As a possible solution, an attempt is made to instrument both variables, using household size, wage arrears and type of dwelling as instrumental variables for utility arrears, and dirty fuel and transportation subsidies as IVs for housing subsidy. Utility arrears would be expected to be positively correlated with wage arrears, and also positively correlated with the dwelling being a flat in an apartment building rather than a separate house as it would be more difficult to disconnect a flat in case of severe non-payment. As for the housing subsidy, people who receive it are more likely to get dirty fuel subsidy as well, for a number of reasons. First, the transaction and waiting costs of receiving a housing subsidy would be lower as these individuals would be better informed about the application procedure; second, it could reflect self-selection, people with lower cost of time applying for all subsidies; third, this could be a proxy for local authorities' attitude towards giving subsidies. If the household receives a transportation subsidy, it is less likely to be connected to a number of utilities and receive a housing subsidy.

It would also be interesting to find out how the accumulation (or repayment) of utility arrears affects access rates. The same two equations are next estimated by SUR, including the change in arrears between 2003 and 2004 as an independent variable. This reduces the sample size since we have fewer observations on the actual amount of arrears.

The results of the regression analysis are presented in Tables 2.3 to 2.5. Table 2.3 indicates that connection rates are positively correlated with utility subsidy, the receipt of which increases connection to centralised gas by 12 per cent, and to sewerage – by 7 per cent, and with the size of the settlement. Town type settlements and small towns do not differ from villages in terms of having low connection rates, while medium and large towns have proportionally higher access rates. Ownership of a dwelling increases the probability of being connected. Access rates are also positively related to expenditure, although with a decreasing marginal effect. A two-fold increase in the per capita expenditure from its mean of UAH 4673 would increase connection rates to the centralised gas by 5 per cent, and to sewerage – by around 9 per cent. Accumulation of arrears is negatively associated with connection rates to both utilities.
An alternative specification using instrumental variables gives similar results, especially in the sign and the magnitude of the regional effects (see Table 2.3). However, we have to be cautious when interpreting them, as tests for overidentifying restrictions give a mixed impression of the validity of our instruments. In particular, when looking at the first stage of the estimation, the Anderson-Rubin test shows that the instruments are jointly significant. Anderson canonical correlations likelihood-ratio test indicates at 99 per cent that the model is identified, but Hansen J-statistic for the validity of instruments does not fare as well[12].

[12] The null hypothesis of the instruments being uncorrelated with the error is rejected at conventional levels.

Table 2.3. Marginal effects and coefficients from the access rates regressions.

Access to centralised gas				Access to sewerage		
	Bivariate probit	**TSLS**	**Bivariate probit**	**Bivariate probit**	**TSLS**	**Bivariate probit**
Subsidy (yes/no)	**0.13**	0.12	0.06	**0.07**	0.39	**-0.13**
Owner*	**0.14**	**0.18**	**0.13**	n/a	n/a	n/a
Owner_house	-0.01	-0.06	-0.01	n/a	n/a	n/a
Expenditure per capita	**0.00001**	**0.00002**	**0.00002**	**0.00002**	**0.00004**	**0.00003**
Exp. p/c squared	**-3*E(-9)**	**-3*E(-9)**	**-1*E(-9)**	**-1*E(-9)**	**-1*E(-9)**	**-1*E(-9)**
Town type Settlement	**0.05**	-0.02	-0.04	**0.23**	-0.09	**0.25**
Small town	**0.12**	0.07	**-0.32**	**0.23**	-0.04	**0.32**
Medium town	**0.23**	**0.13**	**0.17**	**0.37**	0.02	**0.55**
Large town	**0.31**	**0.18**	**0.25**	**0.53**	-0.05	**0.60**
Capital city	**0.33**	**0.20**	**0.09**	**0.60**	0.05	**0.65**
Change in arrears	**n/a**	**n/a**	**-0.002**	**n/a**	n/a	**-0.001**

Note: Coefficients in bold are significant at least at 10 per cent.

Regional effects mostly mirror access rates statistics described above, Kiev having the highest rates and major industrial areas dominating in terms of access.

Table 2.4. Marginal effects from access to centralised gas regression, 2004.

Macroregion	Region	Marginal effects
W	Lvovskaya	**0.27**
C	Kievskaya	**0.19**
W	Ternopolskaya	**0.13**
S	Nikolaevskaya	0.03
W	Ivano-frankovskaya	0.03
E	Poltavskaya	0.01
W	Chernovickaya	-0.03
W	*Zakarpatskaya*	***-0.11***
CE	*Dnepropetrovskaya*	***-0.19***
S	*Hersonskaya*	***-0.20***
C	*Chernigovskaya*	***-0.23***
W	*Hmelnickaya*	***-0.24***
CW	*Zhitomirskaya*	***-0.24***
E	*Harkovskaya*	***-0.26***
S	*Crimea*	***-0.28***
W	*Rovenskaya*	***-0.29***
S	*Odesskaya*	***-0.38***
E	*Sumskaya*	***-0.38***
W	Volynskaya	**-0.47**
CE	Zaporozhskaya	**-0.53**
C	Cherkasskaya	**-0.53**
C	Vinnickaya	**-0.55**
E	Luganskaya	**-0.63**
E	Doneckaya	**-0.63**
C	Kirovogradskaya	**-0.66**

Note: Coefficients in bold indicate significance at least at 10per cent.

As Table 2.3 demonstrates, regions could be divided into four groups according to how they differ from Kiev city in terms of connection to centralised gas, after controlling for a set of household- and town- specific parameters.

The first group consists of Lvov, Crimea and Ternopol regions. It has already been pointed out in this section that these oblasts have relatively high access rates. In the case of Lvov, it could be explained by the city being a major transport and industrial centre of the Western Ukraine. Ternopol oblast is an important agricultural centre.

The second group of regions do not exhibit statistically significant differences from Kiev city in terms of access rates. Two of them – Nikolaev and Poltava – are major industrial centers.

The third group have lower than Kiev city's access rates, but the difference is not dramatically high. This group consists primarily of large industrial and transport centers in the Eastern and Southern parts, such as Dnepropetrovskaya, Harkovskaya, Hersonskaya and Crimea oblasts.

The last group of regions contains mostly economically backward and underdeveloped regions (Sumskaya, Kirovogradskaya and Luganskaya oblasts), as well as regions, severely affected by Chernobyl disaster (Volynskaya oblast). There connection rates are much lower than those in the capital city. Interestingly, Donetskaya oblast, which is highly industrialised and relatively economically well-off, also falls into this category.

Table 4. Marginal effects from access to sewerage regression, 2004.

Macroregion	Region	Marginal effects
C	Kievskaya	**-0.44**
S	Nikolaevskaya	**-0.47**
W	Rovenskaya	**-0.47**
CW	Zhitomirskaya	**-0.47**
S	Hersonskaya	**-0.48**
W	Ternopolskaya	**-0.50**
W	Volynskaya	**-0.50**
W	Lvovskaya	**-0.51**
W	Zakarpatskaya	**-0.52**
S	Crimea	**-0.53**
W	Hmelnickaya	**-0.54**
E	Poltavskaya	**-0.54**
S	Odesskaya	**-0.54**
W	Chernovickaya	**-0.54**
CE	Zaporozhskaya	**-0.55**
C	Vinnickaya	**-0.55**
C	Chernigovskaya	**-0.55**
W	Ivano-frankovskaya	**-0.56**
C	Cherkasskaya	**-0.56**
E	Sumskaya	**-0.56**
C	Kirovogradskaya	**-0.57**
E	Harkovskaya	**-0.57**
E	Luganskaya	**-0.58**
CE	Dnepropetrovskaya	**-0.60**
E	Doneckaya	**-0.64**

Note: Coefficients in bold indicate significance at least at 10 per cent.

Table 4 presents marginal effects on the regional dummies from the access to sewerage regression. As could be seen, all regions are significantly below Kiev city (which has almost universal access) in terms of connection rates in this respect, controlling for socio-economic characteristics.

Among the areas with access rates drastically below those in Kiev are mostly poor and less economically developed regions in the Central and Eastern Ukraine, such as Luganskaya, Kirovogradskaya, Sumskaya, Cherkasskaya oblasts, as well as Chernigovskaya and Ivano-frankovskaya oblasts in the West. On the other hand, this list also contains the relatively well-off industrialised regions like Harkovskaya, Doneckaya and especially Dnepropetrovskaya oblasts, where connection rates to sewerage are in the range of 50-60 per cent, but, as suggested by our analysis, could be improved further.

3. THE AFFORDABILITY OF UTILITY PAYMENTS

We now turn to the analysis of the various measures of affordability, based on our data. Gross affordability ratios are computed first, using our estimates of family expenditure in the denominator and an estimate of the supposed monthly communal utility payments in the numerator. It has to be noted that the question asks about "supposed average monthly utility payments", including kvartplata (payments for the use of apartment), payments for cold and hot water, metered gas, central heating, radio reception, electricity, cable television, and for use of telephone including local and long-distance gas. Although the reference period is not specified, the affordability numbers we get are more consistent with the spring-summer period. This is one of the drawbacks of using this data for affordability estimations. However, our gross affordability estimates are overall consistent with those produced by the Ukrainian statistical office in the following year (Table 3.1).

The ULMS data also contains information on the actual amount of the housing subsidy received by a household, although in many cases it is missing. We use it to estimate net affordability and to compare gross affordability ratios of those in receipt of a subsidy and those who do not get it. Another relevant policy-making variable is gross affordability net of utility arrears. Again, it would be interesting to see whether households with arrears have gross affordability ratios in the top deciles of the distribution. Indeed, both of our conjectures are confirmed by the data (Table 3.2). Net affordability figures indicate that housing subsidy pushes the families in receipt of it below the average level of gross affordability, which is surprising given that the original purpose of subsidising communal payments is to bring gross affordability to the target level (20 per cent). Moreover, the magnitudes are such that subsidy cuts gross affordability by fifty per cent. The last affordability-related indicator is affordability ratio net of arrears and subsidy. Non-payment reduces the median subsidy by 10 per cent, however, it does not significantly change the mean. There are ninety-six households in the sample that have utility arrears and receive a housing subsidy at the same time. We try and check if they are clustered in a particular region, i.e., whether the authorities in certain regions are more lenient toward the non-payment of utility bills when considering a householgd being eligible for a subsidy. However, it does not appear to be the case as there are such households in all regions.

Table 3.1. Gross affordability ratio by the decile of expenditure per capita, per cent.

	Based on ULMS, 2004				Based on Ukrainian stat office data, 2005
Deciles of per capita expenditure	Mean	Std. dev	Median	N obs	Mean
First	14.5	11.4	11.8	599	8.4
Second	13.2	10.0	11.3	622	8.1
Third	11.2	8.5	8.8	622	7.8
Fourth	9.4	7.5	7.9	599	7.2
Fifth	8.6	6.7	7.0	615	7.1
Sixth	9.1	7.1	8.0	609	6.8
Seventh	8.5	5.7	8.1	569	6.7
Eighth	7.9	5.9	6.8	615	6.1
Ninth	7.5	5.6	6.1	580	5.8
Tenth	6.7	4.7	6.1	587	4.5

Note: Gross affordability ratios are weighted averages in the corresponding range.

Table 3.2. Gross and net affordability, ULMS 2004, per cent.

	Mean	**Std. dev**	**Median**	**N obs**
Gross affordability for the full sample	9	8	7	6577
Net affordability	5	7	3	776
Gross affordability for the sample above	**11**	**10**	**8**	**776**
Affordability net of arrears	13	9	10	1040
Gross affordability for the sample above	**13**	**9**	**11**	**1040**
Affordability net of arrears and subsidies	7.5	11	5	96
Gross affordability for the sample above	**14**	**12**	**12**	**96**

As the next step of our analysis, we look at the regional variation in the gross affordability ratios (Table 3.3).

Table 3.3. Gross affordability ratio by region, 2004.

	Gross affordability by region, per cent				
Macroregion	Region	Mean	Std.dev.	Median	N obs
CE	Dnepropetrovskaya	12.5	7.7	11.7	413
C	Chernigovskaya	11.1	10.4	8.4	193
CW	Zhitomirskaya	10.8	9.1	9.8	167
C	Kiev city	9.9	4.9	9.2	313
CE	Zaporozhskaya	9.6	9.2	7.2	260
C	Kievskaya	9.2	7.9	8.6	178
C	Vinnickaya	5.8	4.8	4.4	313
C	Cherkasskaya	5.7	5.5	4.0	212
C	Kirovogradskaya	3.6	4.5	2.4	201
E	Harkovskaya	11.3	8.9	9.6	511
E	Poltavskaya	10.8	7.1	9.2	230
E	Sumskaya	8.8	4.9	7.9	243
E	Luganskaya	8.5	7.4	6.1	395
E	Doneckaya	8.5	8.2	6.2	751
S	Nikolaevskaya	15.3	10.6	14.3	63
S	Hersonskaya	9.5	8.9	6.4	206
S	Crimea	8.0	6.0	6.2	271
S	Odesskaya	7.9	6.9	5.6	306
W	Ternopolskaya	12.2	6.5	10.1	153
W	Lvovskaya	11.1	7.4	6.1	289
W	Zakarpatskaya	10.8	10.1	9.8	124
W	Hmelnickaya	10.7	7.4	11.0	213
W	Chernovickaya	9.7	9.3	6.6	94
W	Volynskaya	9.7	8.4	7.3	128
W	Rovenskaya	6.9	4.9	6.3	152
W	Ivano-frankovskaya	6.0	5.1	4.4	198
	Overall	9.3	7.9	7.3	6577

Regional variation in gross affordability ratios is explained to a large extent by the differences in access rates. Highly connected regions such as Kiev city, Kievskaya and Dnepropetrovskaya oblasts in the Central Ukraine, Nikolaev and Herson regions in the South, Harkovskaya and Poltavskaya oblasts in the East, and Ternopolskaya and Lvovskaya oblasts in the West tend to have higher than average affordability rates. Regions with low connection rates such as Kirovogradskaya, Vinnickaya and Cherkasskaya oblasts in the Central part and Ivano-Frankovskaya in the West have low affordability ratios. Another group of regions is comprised of those with low connection rates and low per capita income levels. Affordability ratios in these regions (Chernigovskaya, Luganskaya, Zhitomirskaya oblasts in the Central and Eastern parts, Volynskaya and Zakarpatskaya oblasts in the West) are in the upper part of the regional distribution.

It would be interesting to compare regional affordability ratios to those based on the regression of the affordability ratio on regional and town type dummies and a number of socio-economic parameters (access rates, labour market status, the size of the household and per capita income). Estimation results are presented in Table 3.4.

Table 3.4. Estimation results from the gross affordability regression.

Dependant variable	**Gross affordability**	**Coefficient**
Access Rates	**Centralised gas**	**3.3 per cent**
	Sewerage	**1.1 per cent**
	Cold water	**1.3 per cent**
	Hot water	**1.9 per cent**
	Central heating	**1.0 per cent**
Settelement type (relative to village)	Town type settlement	**0.8 per cent**
	Small town	1.1 per cent
	Medium town	**2.0 per cent**
	Large town	**3.3 per cent**
	Capital city	**3.7 per cent**
	Unemployed	0.2 per cent
	Household size	**-1.3 per cent**
	Pensioner	**-0.4 per cent**
	Per capita expenditure	**-0.0014 per cent**
	Per capita expenditure squared	**2.2*E(-10)**
	Constant (includes contribution of electricity)	**11.4 per cent**
	Number of obs	6563
	R-squared	0.42
Robust standard errors, clustered on the household Coefficients in bold type significant at least at 10 per cent		

Affordability ratios decrease with income, although with an increasing marginal effect. At the mean income per capita, an increase of 1000 UAH a year reduces gross affordability by 1.3 per cent. Larger households have lower affordability, which could be due to economies of scale within a household (e.g., using only one TV per family). Pensioners have lower affordability ratios, possibly because of their saving habit.

Of particular interest are the contributions of individual utilities to the affordability ratio. We

find that connection to the centralised gas increases the affordability ratio by 3.3 per cent, access to sewerage – by 1.1 per cent, connection to cold water – by 1.4 per cent, connection to hot water – by 1.9 per cent, and access to central heating – by 1 per cent. Although the contribution of the central heating connection appears rather low, it could be explained by the reference period of this wave of the ULMS survey, which is June-September 2004. Regional coefficients from the regression are presented next.

Table 3.5. Regional effects from the affordability regression above.

Macroregion	Region	Coefficient	Income rank
C	Chernigovskaya	**0.028**	11
C	Kievskaya	**0.021**	8
CW	Zhitomirskaya	**0.020**	16
CE	Dnepropetrovskaya	**0.017**	4
C	Cherkasskaya	0.006	18
CE	Zaporozhskaya	0.004	2
C	Vinnickaya	-0.001	15
C	Kirovogradskaya	**-0.008**	17
E	Harkovskaya	**0.023**	6
E	Poltavskaya	**0.022**	5
E	Sumskaya	**0.019**	13
E	Doneckaya	**0.008**	3
E	Luganskaya	0.007	10
C	Kiev city	reference region, dropped	1
S	Nikolaevskaya	**0.039**	12
S	Hersonskaya	**0.018**	21
S	Odesskaya	**0.011**	9
S	Crimea	0.006	20
W	Zakarpatskaya	**0.046**	25
W	Ternopolskaya	**0.039**	24
W	Volynskaya	**0.030**	22
W	Lvovskaya	**0.029**	7
W	Hmelnickaya	**0.024**	14
W	Chernovickaya	**0.022**	26
W	Ivano-frankovskaya	**0.012**	19
W	Rovenskaya	-0.005	23

Note: coefficients in bold type are significant at least at 10 per cent.

These regression results follow to a great extent regional distribution of the gross affordability ratios presented above. Overall, Western Ukraine appears to have higher affordability ratios, controlling for other characteristics. Western regions with officially low income per capita (Zakarpatskaya, Ternopolskaya, Volynskaya) have the highest affordability ratios.

Subsidy targeting

Next we move on to considering the issue of housing subsidy targeting. As indicated in the section on social safety nets, a household with gross affordability ratio in excess of twenty per cent is eligible to receive housing subsidy. In our sample, twelve per cent of the households are subsidy recipients. Based on the gross affordability ratios computed in this paper, we try and analyse the effectiveness of the subsidy targeting. We run a probit

regression with the regional and town type dummies, age and gender of the first respondent, labour market status, the size of the household, and the receipt of other subsidies (such as dirty fuel and transportation subsidies). To test for the effectiveness of subsidy targeting, we first introduce a subsidy eligibility indicator, which is a dummy variable equal to one if the household's gross affordability ratio is greater than 20 per cent. Efficient targeting would imply that the probability to get a subsidy should be explained by this indicator alone. However, we find that the eligibility dummy is insignificant. We then replace it by the gross affordability ratio variable itself, which turns out to be significant and positive. The corresponding elasticity indicates that a 100 per cent increase in the gross affordability from its mean of 9 per cent would lead to 16 per cent increase in the probability of getting a subsidy. This result would imply under-subsidising eligible households.

However, our results indicate that age strongly positively affects the probability of getting a subsidy, which coincides with the finding that almost a half of subsidy receipients are pensioner households. Families in medium-sized and large towns are five per cent more likely (as compared to villages) to receive a subsidy, while small towns and town-type settlements do not differ from villages in this respect.

Dirty fuel subsidy recipients are eighteen per cent more likely to get housing subsidy. Households in receipt of a transportation subsidy are eleven per cent less likely to be eligible for a housing subsidy, which could be due to the fact that they live in areas with low connection rates.

As for regional influences, households in Volynskaya oblast are twenty per cent more likely to get a subsidy, while residents of Zakarpatye region are ten per cent less likely to do so.

Results on the subsidy targeting are presented in the Table 3.6 below.

Table 3.6. Subsidy probit regression, robust clustered std. errors

Predicted probability to receive a subsidy		0.099		0.101	
3.6(a)	**dy/dx**	**Mean**	**3.6(b)**	**ey/ex**	**Mean**
Eligibility dummy	0.00	0.18	**Gross affordability**	**0.16**	0.09
Town type settlement	-0.01	0.14	Town type settlement	-0.02	0.14
Small town	0.02	0.02	Small town	0.00	0.02
Medium town	**0.05**	0.13	Medium town	**0.05**	0.13
Large town	**0.05**	0.23	Large town	**0.09**	0.22
Capital city	0.04	0.21	Capital city	0.06	0.21
Gender	**0.02**	1.77	Gender	**0.50**	1.78
Age	**0.002**	46.79	Age	**1.00**	46.81
HH size	-0.01	3.41	HH size	-0.11	3.38
Unemployed	0.01	1.87	Unemployed	0.32	1.87
Dirty fuel subsidy	**0.18**	0.04	Dirty fuel subsidy	**0.06**	0.03
Transport subsidy	**-0.11**	1.91	Transport subsidy	**-2.03**	1.90
(*) dy/dx is for discrete variable					
Note: Coefficients in bold type significant at least at 10 per cent					

We also analyse subsidy targeting in a different way, cross-tabulating households in receipt of a subsidy against those eligible to receive it, based on our gross affordability data (Table 3.7). This analysis produces similar results.

Table 3.7. Subsidy targeting

	Is your household getting subsidies for utilities? (per cent)			
		No	Yes	
Eligibility Dummy (per cent)	No	**72.1**	9.9	81.9
	Yes	15.8	**2.3**	18.1
		87.8	12.2	100

Results of both types of analysis prompt us to the conclusion about the inefficiency of subsidy targeting.

4. UNDERSTANDING ARREARS

Two indicators of non-payment considered in this paper are the stock of arrears (in terms of months) at the time of the survey (June - September 2004) and the flow of arrears (also in the number of months) between June - September 2004 and April - June 2003. Negative arrears flow indicates repayment.

Tables 4.1 and 4.2 below present regional distribution of the flow and the stock of arrears, correspondingly.

Table 4.1. The flow of arrears by regions, per cent, 2004.

Arrears flow in months, 2004, per cent, weighted													
Macroregion	**Region**	**Repayment**	**0 - 1**	**1 - 3**	**3 - 6**	**6 - 12**	**12 - 18**	**18 - 24**	**> 24**	**Mean**	**SE**	**Median**	**Nobs**
C	**Kiev city**	37	7	16	3	14	2	0	20	5.27	2.96	2.00	39
C	**Kievskaja**	27	24	10	10	27	0	0	3	0.52	2.75	1.22	14
C	**Cherkasskaja**	0	16	22	38	0	0	10	14	7.30	1.92	3.48	27
C	**Kirovogradskaja**	0	18	0	0	82	0	0	0	6.06	0.81	6.67	8
C	**Chernigovskaja**	0	0	43	11	21	25	0	0	7.10	1.17	4.62	26
C	**Vinnickaja**	0	33	15	17	11	24	0	0	5.96	1.17	2.00	34
CE	**Dnepropetrovskaja**	0	10	25	17	22	9	7	10	11.12	1.29	5.00	127
CE	**Zaporozhskaja**	0	2	7	20	36	19	2	15	11.45	1.28	8.33	54
CW	**Zhitomirskaja**	0	0	0	0	25	75	0	0	13.71	1.16	12.50	9
E	**Poltavskaja**	0	21	13	25	0	13	15	14	27.63	8.35	4.00	37
E	**Sumskaja**	0	0	80	10	0	10	0	0	3.57	0.80	2.27	21
E	**Doneckaja**	0	13	21	13	28	15	4	5	9.32	1.03	6.00	132
E	**Harkovskaja**	0	19	28	22	10	7	1	12	9.44	1.79	3.00	140
E	**Luganskaja**	0	15	11	23	27	10	6	8	11.28	1.82	5.26	94
S	**Crimea**	44	37	2	5	4	2	0	5	1.94	1.58	0.30	70
S	**Hersonskaja**	39	9	36	2	7	0	0	7	2.41	2.07	0.82	29
S	**Nikolaevskaja**	34	0	19	17	24	6	0	0	2.50	1.00	3.00	22
S	**Odesskaja**	22	21	11	11	15	0	0	21	9.21	4.41	5.00	26
W	**Chernovickaja**	78	0	11	0	4	0	0	7	-1.02	3.91	-5.00	11
W	**Rovenskaja**	63	11	11	13	0	0	0	1	0.58	0.51	-0.50	27
W	**Volynskaja**	59	7	14	12	0	0	3	5	1.54	1.48	-0.29	22
W	**Lvovskaja**	26	23	14	23	9	4	0	0	2.81	0.70	2.50	45
W	**Ternopolskaja**	18	43	31	5	3	0	0	0	0.96	0.36	0.77	27
W	**Ivano-frankovskaja**	11	18	23	3	22	1	0	21	9.36	2.99	1.40	46

W	**Hmelnickaja**	1	23	37	13	8	0	19	0	5.19	1.12	2.50	34
W	**Zakarpatskaja**	0	19	32	1	48	0	0	0	4.38	0.71	2.50	24

Table 4.2. The stock of arrears by regions, per cent, 2004.

Arrears stock in months, 2004, per cent, weighted

Macroregion	Region	0 - 1	1 - 3	3 - 6	6 - 12	12 - 18	18 - 24	> 24	Mean	SE	Median	Nobs
C	Kievskaya	35	21	5	20	9	4	6	13.2	8.2	2.67	27
C	Vinnickaya	31	18	16	11	23	0	0	5.8	1.1	5.00	35
C	Kirovogradskaya	18	0	0	82	0	0	0	6.1	0.8	6.67	8
C	Cherkasskaya	16	22	38	0	0	10	14	7.3	7.3	3.48	27
CE	Dnepropetrovskaya	10	25	17	22	9	7	10	11.1	1.3	5.33	127
C	Kiev city	7	41	2	10	14	6	21	12.3	1.6	6.92	85
CE	Zaporozhskaya	2	7	20	36	19	2	15	11.5	1.3	10.00	54
C	Chernigovskaya	0	43	11	21	25	0	0	7.1	1.2	5.00	26
CW	Zhitomirskaya	0	0	0	25	75	0	0	13.7	1.2	15.38	9
E	Poltavskaya	21	13	25	13	0	15	14	27.6	8.4	5.00	37
E	Harkovskaya	19	28	22	10	7	1	12	9.4	1.5	3.43	140
E	Luganskaya	15	11	23	27	10	6	8	11.3	1.8	6.67	94
E	Doneckaya	13	21	13	28	15	4	6	9.3	1.0	6.67	132
E	Sumskaya	0	80	10	10	0	0	0	3.6	0.8	2.00	21
S	Crimea	36	17	26	6	10	0	5	6.8	1.5	2.00	93
S	Odesskaya	14	20	21	20	0	0	25	12.6	2.6	6.00	39
S	Hersonskaya	14	48	18	11	0	0	9	6.6	1.8	2.00	42
S	Nikolaevskaya	0	24	30	31	15	0	0	5.7	0.8	4.17	28
W	Ternopolskaya	45	31	18	7	0	0	0	2.1	0.3	1.16	35
W	Lvovskaya	38	17	37	6	3	0	0	3.4	0.4	2.50	62
W	Hmelnickaya	30	35	11	7	17	0	0	4.7	1.0	2.50	37
W	Rovenskaya	21	38	37	4	0	0	1	3.0	0.3	3.00	33
W	Ivano-frankovskaya	20	25	5	16	6	0	28	12.6	2.4	4.08	65
W	Volynskaya	20	59	13	0	0	6	2	4.2	0.9	2.50	30

W	**Chernovickaja**	18	8	20	37	0	12	5	9.1	2.3	8.54	15
W	**Zakarpatskaja**	17	33	1	49	0	0	0	4.5	0.6	3.50	27

Regions with high repayment rates tend not to have arrears accumulation at the same time, and vice versa, with the exception of the Kiev city, where 22 per cent of the households have arrears of a year and more, but 44 per cent are paying their arrears off.

Interestingly, regions with high repayment rates are concentrated for the most part in the Western and Southern parts. Chernovickaya oblast (W) leads in terms of repayment, with 78 per cent of households in arrears paying off their debt, followed by Rovenskaya oblast (W) with 63 per cent, Volynskaya oblast (W) with 59 per cent, Crimea (S) with 44 per cent, Hersonskaya oblast (S) with 39 per cent, Kiev city with 37 per cent, and Lvovskaya (W), Odesskaya (S) and Ternopolskaya oblasts (W) with 26 per cent, 22 per cent and 18 per cent, correspondingly.

Volynskaya oblast represents an interesting case in this respect. According to the official statistics, it is one of the poorest regions in Ukraine. Despite that, currently the region has low rates of arrears accumulation and high repayment rates. This could be due to a number of measures introduced in 2001 to try and solve utility arrears problem and to increase customer consciousness. They included service suspensions and litigation for debts of more than 5000 UAH. The customers in arrears were also offered an option of debt restructuring.

Other two areas with high repayment are Kiev city and Lvov region.

In Kiev city, debtors received warnings and court action was initiated for arrears in excess of 2000UAH. Some non-payers were disconnected. An option of debt restructuring was offered as well.

In Lvov region, litigation was initiated for debtors with arrears in excess of 3000UAH. In many cases, court decisions were enforced via salary deductions.

Informal and explanatory activities aimed at increasing compliance were also introduced, such as street cleaners reminding tenants of the necessity to pay. As a result, payment collection rose somewhat, mostly among pensioners.

In Rovenskaya oblast, representatives of heat enterprises visited apartments to assess the payment capacity of debtors and collect overdue payments.

Areas that have accumulated a large stock of arrears in 2004 are mostly industrialised regions in the Central and Eastern Ukraine, such as Kiev city (with 41 per cent of households having arrears in excess of twelve months), Vinnickaya (23 per cent), Doneckaya (25 per cent), Zaporozhskaya (36 per cent), Luganskaya (24 per cent), Poltavskaya (42 per cent), Cherkasskaya (24 per cent) and Chernigovskaya (25 per cent) oblasts, and one industrialised region in the West: Hmelnickaya oblast (19 per cent). Except for Kiev city, none of them demonstrate positive repayment flow.

Results of the regression analysis of the existence and amount of utility arrears are presented in the Appendix **[Tables A.7 – A.9]**.

First we consider the existence of utility arrears as a function of the wage arrears, housing subsidy, connection rates, per capita expenditure and per capita expenditure squared, region, settelement type, age and gender of the first respondent, household size. Gross affordability would be another variable affecting non-payment, however, it would be endogenous. It could be instrumented by the region and settlement type dummies. However, we decided to exclude it from the list of explanatory variables and control directly for region and town type. We also tried and used the type of dwelling as an explanatory variable (since houses are easier to disconnect than flats, e.g.), but due to multicollinearity we end up dropping it from the regressions. We perform both probit and instrumental variables estimations, instrumenting housing subsidy by the dirty fuel subsidy and transportation subsidy, and access rates – by the ownership of the dwelling and an interaction of the ownership variable and a dummy if a dwelling is a separate

house, as was done in the section on access rates. The validity of the instruments is confirmed by Hansen J-statistic and Anderson LR statistic.

Next we analyse the current stock of arrears and the change in arrears between the two round of the ULMS survey, using the same independent variables. Again, we perform both OLS and IV estimations (in the stock of arrears equation, instruments perform better than in the flow of arrears regression, as indicated by the corresponding Anderson Likelihood Ratio statistic).

In the analysis that follows, we could partially interpret the coefficients on the regional dummies as an indicator of the efficiency of the local utility providers, in particular, how strict the local utilities are in enforcing payments (assuming that the efficient utility provider would not tolerate large arrears).

Existence of arrears:

We first try and estimate the instrumented probit equation for the existence of arrears, however, the estimation does not converge. As a result, we use two-stage least squares (TSLS) and compare it to the probit results.

Access to the centralised gas is negatively correlated with non-payment, while access to sewerage affects it positively. Strong negative correlation in the former case suggests improved discipline in disconnecting, while in the case of non-payments for sewerage (cold water) it may be harder to do so. Subsidy is negatively correlated with arrears, but the significance is weak. Per capita expenditure and wage arrears are insignificant.

Non-payment is significantly higher relative to Kiev city in Kievskaya, Dnepropetrovskaya, Ivano-Frankovskaya, Lvovskaya, Poltavskaya, Ternopolskaya, Harkovskaya and Chernovickaya oblasts, which are (except Ivano-Frankovskaya and Chernovickaya oblasts) primarily the areas with high connection rates. It is lower in Vinnickaya, Kirovogradskaya and Cherkasskaya oblasts, where most arrears are short-term, and in Doneckaya oblast. Probability to have arrears is also higher in the medium-sized and large towns and in the cities relative to villages, which could be explained by these types of settlements having more residential flat buildings than separate houses, which (the latter) are easier to disconnect.

Larger households tend to have a higher probability of non-payment.

Results from the non-instrumented probit indicate that as before, access to sewerage is positively linked to non-payment (it increases the probability of non-payment by 35 per cent). Wage arrears are positively related to non-payment as well, which could be due primarily to psychological reasons. Arrears are negatively influenced by income, but with a positive marginal effect (there are rich non-payers). Results on regions largely coincide with those from the instrumental variables estimation: Dnepropetrovskaya, Ivano-Frankovskaya, Ternopolskaya and Harkovskaya oblasts – the well-connected regions - are more likely to have arrears than Kiev city, ceteris paribus. (In addition, we now have Crimea and Volynskaya oblast in this list.) Families in the medium-sized towns are 8 per cent more likely to have utility payments outstanding, and those in the large and capital cities – 23 and 24 per cent more likely to do so, correspondingly. Families in the settlements of the town type are 9 per cent more likely to have positive non-payment. Again, this could be explained by the relative easiness of the disconnection process in villages, where most families live in detached or semi-detached houses. Families with older members are more likely to have arrears, as are households where woman is the first respondent. In this estimation, household size is not significant, although it is positively related to arrears.

Stock of arrears:

Both OLS and IV estimations give similar results. The stock of arrears is negatively significantly correlated with the presence of wage arrears, which is in line with the fact

that wage and pension arrears could be cancelled out with utility arrears by law. Instrumental variables estimation shows that Vinnickaya, Kirovogradskaya, Rovenskaya and Hersonskaya oblasts are significantly below Kiev city in terms of accumulation of arrears, controlling for other socio-economic characterisitics. The results of the OLS estimation add four more oblasts: Rovenskaya, Sumskaya, Chernigovskaya and Ternopolskaya to the regions with the stock of arrears significantly below that in the Kiev city. This is consistent with the descripitive statistics on the stock of arrears for 2004.

Per capita expenditure, which we use as a proxy for income, exhibits the U-shaped pattern, implying that the stock of arrears is decreasing in per capita expenditure, but with a positive marginal effect. The latter indicates existence of rich non-payers for communal services. In fact, in Vinnitsa, Dnepropetrovsk and Makiivka (Donetsk oblast), to increase customer consciousness, the utility providers addressed the city Rada deputies, city executive committee officials, representatives of state administrations, prosecutor's office employees and enterprise managers with a request that all deputies pay off their utility debts. (Otherwise, debtor lists would be made public and other disciplinary measures would be used.) Coefficients on other independent variables, such as connection rates to centralised gas and sewerage, are not statistically significant.

Flow of arrears:

Instrumental variables estimation suggests that Dnepropetrovskaya and Zaporozhskaya oblasts exhibit higher accumulation of arrears compared to Kiev city, while other regional dummies are not significant. Conclusions from the OLS estimation are similar, with an additional result of small towns having higher repayment than villages, and wage arrears being negatively correlated with utility arrears accumulation.

Whether the receipt of the housing subsidy affects accumulation of arrears could be of particular interest to policy-makers. Our estimation shows that for both stock and flow of arrears, the receipt of a subsidy is negatively correlated with the dependent variable (i.e., families in receipt of a subsidy tend to accumulate less arrears, ceteris paribus, as that could affect their eligibility for the subsidy), but it is not significant at conventional levels.

5. CONCLUSION

This study sets out to analyse the effect of different socio-economic and regional indicators on the access to, the affordability of and non-payment for communal utilities in Ukraine in 2004, using a panel household- and individual-level survey data. We are especially interested in the variation in these indicators across twenty-six Ukrainian oblasts (regions) and four macro-regions.

Our findings indicate that the Ukrainian population has almost universal access to electricity and gas. This is a distinguishing feature of post-Soviet economies such as Ukraine as opposed to most developing countries, where such access rates are significantly lower. Preservation of high connection rates remains one of the main aims of the social policy in the communal services sphere.

Access rates to other utilities, while exhibiting some regional variation, are also quite high, with the capital city and the regions with heavy prior industrialisation leading in terms of access.

Regression analysis of the connection rates to the centralised gas and sewerage, via both OLS and the instrumental variables approach, indicates that individuals in the receipt of the utility subsidy, owners of a dwelling and the inhabitants of larger settlements tend to have more access. Access rates are also positively related to household expenditure – which we use as a proxy for household income - although with a decreasing marginal effect. A two-fold increase in the annual per capita expenditure from its mean of UAH 4673 would increase connection rates to the centralised gas by 5 per cent, and to sewerage – by around 9 per cent. Accumulation of payment arrears is negatively associated with connection rates to both utilities.

Regional effects show that mostly economically backward and underdeveloped regions (Sumskaya, Kirovogradskaya and Luganskaya oblasts), as well as regions severely affected by the Chernobyl disaster (Volynskaya oblast), have connection rates dramatically lower than those in the capital city and the main industrial centers. Interestingly, a highly industrialised and relatively economically well-off Donetskaya oblast also falls into this category.

A related important policy variable under consideration here is the affordability (gross and net) of the utility payments. We note that the affordability ratios lie, *on average*, in the range of 7 - 15 per cent and are the highest in the first two deciles of per capita expenditure distribution (10-14 per cent) and also for high access rates as well as for poorest regions.

Available data on the recipients of the housing subsidy allows us not only to compute the net (of a subsidy) affordability rate, but also to compare it with the target affordability rate and to evaluate the effectiveness of the targeting of the utility subsidy.

Comparison of the gross affordability ratios to the net affordability ratios of those in receipt of a subsidy and those who do not get it shows that the housing subsidy pushes the families in receipt of it below the average level of gross affordability, which is surprising given that the original purpose of subsidising communal payments is to bring gross affordability to the target level of 20 per cent. Moreover, the magnitudes are such that the subsidy lowers gross affordability by half.

Another relevant policy variable in this context is the gross affordability rate net of utility arrears. Again, it would be interesting to see whether households with arrears have gross affordability ratios in the top deciles of the distribution. Indeed, this conjecture is confirmed by the data. We also look at the affordability ratio net of arrears and subsidy. Non-payment reduces the median subsidy by 10 per cent, however, it does not significantly change the mean. There are ninety-six households in the sample that have utility arrears and receive a housing subsidy at the same time. We try and check if they are clustered in a particular region, i.e., whether the authorities in certain regions are more lenient toward the non-payment of utility bills when considering a household's eligibility for receipt a subsidy. However, it does not appear to be the case as there are such households in all regions.

Regression analysis of affordability indicates that gross affordability ratios decrease with

income, although with an increasing marginal effect. At the mean income per capita, an increase of 1000 UAH a year reduces gross affordability by 1.3 per cent. Larger households have lower affordability, which could be due to economies of scale within a household (e.g., using only one TV per family). Pensioners have lower affordability ratios, possibly because of their saving habit.
Of particular interest here are the contributions of individual utilities to the affordability ratio. We find that connection to the centralised gas increases the affordability ratio by 3.3 per cent, access to sewerage – by 1.1 per cent, connection to cold water – by 1.4 per cent, connection to hot water – by 1.9 per cent, and access to central heating – by 1 per cent. Although the contribution of the central heating connection appears rather low, it could be explained by the reference period of this wave of the ULMS survey, which is June-September 2004.
The regional effects from the regression estimation follow to a large extent regional distribution of the gross affordability ratios, with the highest regional gross affordability ratios in the range of 10-14 per cent. Overall, Western Ukraine appears to have higher affordability ratios, controlling for other characteristics. Western regions with officially low income per capita (Zakarpatskaya, Ternopolskaya, Volynskaya) have the highest affordability ratios.

As a next step, we try and analyse the effectiveness of the utility subsidy targeting, using the gross affordability ratios computed in this paper and estimating a probit regression with the regional and town type dummies, age and gender of the first respondent, labour market status, the size of the household, and the receipt of other subsidies (such as dirty fuel and transportation subsidies). To test for the effectiveness of subsidy targeting, we first introduce a subsidy eligibility indicator, which is a dummy variable equal to one if the household's gross affordability ratio is greater than 20 per cent. Efficient targeting would imply that the probability to get a subsidy should be explained by this indicator alone. However, we find that the eligibility dummy is insignificant. When replaced by the gross affordability ratio variable itself, it is positive significant. The corresponding elasticity indicates that a 100 per cent increase in the gross affordability from its mean of 9 per cent would lead to 16 per cent increase in the probability of getting a subsidy. This result implies under-subsidising eligible households.
The cross-tabulation of the eligibility dummy and subsidy receipt dummy also points at the inefficient targeting of the housing subsidy.
As for the impact of other controls, our results indicate that age strongly positively affects the probability of getting a subsidy, and that families in medium-sized and large towns are 5 per cent more likely (as compared to villages) to receive a subsidy, while small towns and town-type settlements do not differ from villages in this respect.
Dirty fuel subsidy recipients are 18 per cent more likely to get housing subsidy. Households in receipt of a transportation subsidy are 11 per cent less likely to be eligible for a housing subsidy, which could be due to the fact that they live in areas with low connection rates.
As for regional influences, households in Volynskaya oblast are 20 per cent more likely to get a subsidy, while residents of Zakarpatye region are 10 per cent less likely to do so.

We then turn to the analysis of non-payment, which is subdivided into three categories: existence of arrears, stock of arrears and flow of arrears.
Regional-level summary statistics exhibit significant variation with respect to all three variables.
Areas that have accumulated a large stock of arrears (in excess of twelve months) in 2004 are mostly industrialised regions in the Central and Eastern Ukraine, such as Kiev city, with 23-42 per cent of households having arrears in excess of twelve months, and one industrialised region in the West: Hmelnickaya oblast (19 per cent).
Except for Kiev city, none of them demonstrate positive repayment flow.

Regions with high repayment rates are concentrated mostly in the Western and Southern parts. Chernovickaya oblast (W) leads in terms of repayment, with 78 per cent of households in arrears paying off their debt between 2003 and 2004.

It is interesting that high repayment rates are observed both in the well-off regions like Kiev

city, but also in the relatively poor areas such as Volynskaya oblat. Repayment in the latter type of regions is attributed to the active collection policies on the part of the utility providers and regional administrations.

In the analysis that follows, we interpret the coefficients on the regional dummies as an indicator of the efficiency of the local utility providers (assuming that the efficient utility provider would not tolerate large arrears).

We first estimate the instrumented probit equation for the existence of arrears, however, the estimation does not converge. We then use two-stage least squares (TSLS) and compare it to the probit results.

We find that access to the centralised gas is negatively correlated with non-payment, while access to sewerage affects it positively. Strong negative correlation in the former case suggests improved discipline in disconnecting, while in the case of non-payments for sewerage (cold water) it may be harder to do so. Subsidy is negatively correlated with arrears, but the significance is weak. Per capita expenditure and wage arrears are insignificant. Non-payment is significantly higher (relative to Kiev city) primarily in the areas with high connection rates (except Ivano-Frankovskaya and Chernovickaya oblasts) - Kievskaya, Dnepropetrovskaya, Ivano-Frankovskaya, Lvovskaya, Poltavskaya, Ternopolskaya, Harkovskaya and Chernovickaya oblasts. It is lower in Vinnickaya, Kirovogradskaya and Cherkasskaya oblasts, where most arrears are short-term, and in Doneckaya oblast. Probability to have arrears is also higher in the medium-sized and large towns and in the cities relative to villages, which could be explained by these types of settlements having more residential flat buildings than separate houses. The latter are easier to disconnect.

Larger households have higher probability of non-payment.

Results from the non-instrumented probit indicate that as before, access to sewerage is positively linked to non-payment (it increases the probability of non-payment by 35 per cent). Wage arrears are positively related to non-payment as well, which could be due primarily to psychological reasons. Arrears are negatively influenced by income, but with a positive marginal effect (there are rich non-payers). Regional effects largely coincide with those from the instrumental variables estimation. Families in the settlements of the town type, medium-sized towns, and those in the large and capital cities are more likely to have utility payments outstanding. Again, this could be explained by the relative easiness of the disconnection process in villages, where most families live in detached or semi-detached houses. Families with older members are more likely to have arrears, as are households where a woman is the first respondent.

Both OLS and IV estimations of the stock of arrears give similar results. The stock of arrears is negatively significantly correlated with the presence of wage arrears, which is in line with the fact that wage and pension arrears could be cancelled out with utility arrears by law. Instrumental variables estimation shows that Vinnickaya, Kirovogradskaya, Rovenskaya and Hersonskaya oblasts are significantly below Kiev city in terms of accumulation of arrears, controlling for other socio-economic characterisitics. The results of the OLS estimation add four more oblasts: Rovenskaya, Sumskaya, Chernigovskaya and Ternopolskaya to the regions with the stock of arrears significantly below that in the Kiev city. This is consistent with the descripitive statistics on the stock of arrears for 2004.

Per capita expenditure, which we use as a proxy for income, exhibits the U-shaped pattern, implying that the stock of arrears is decreasing in per capita expenditure, but with a positive marginal effect. The latter indicates existence of rich non-payers for communal services. In fact, in Vinnitsa, Dnepropetrovsk and Makiivka (Donetsk oblast), to increase customer consciousness, the utility providers addressed the city Rada deputies, city executive committee officials, representatives of state administrations, prosecutor's office employees and enterprise managers with a request that all deputies pay off their utility debts.

As for the flow of arrears, instrumental variables estimation suggests that Dnepropetrovskaya and Zaporozhskaya oblasts exhibit higher *accumulation* of arrears compared to Kiev city, while other regional dummies are not significant. Conclusions from the OLS estimation are

similar, with an additional result of small towns having higher *repayment* than villages, and wage arrears being negatively correlated with utility arrears accumulation.

Whether the *receipt of the housing subsidy* affects accumulation of arrears could be of particular interest to policy-makers. Our estimation shows that for both stock and flow of arrears, the receipt of a subsidy is negatively correlated with the dependent variable (i.e., families in receipt of a subsidy tend to accumulate less arrears, ceteris paribus, as that could affect their eligibility for the subsidy), but it is not significant at conventional levels.

Overall, our main findings are three-fold. First, access rates to most utilities in Ukraine are universally high and policies related to the communal payments should aim at keeping them at this level. Second, while gross affordability ratios in our data set are below the target 20 per cent level for a majority of households, the housing subsidy for the ones with the higher than 20 per cent reported gross affordability is being inefficiently targeted, providing the subsidy to non-eligible households as well as under-subsidising the eligible ones. Third, the accumulation and repayment of the utility arrears vary significantly by region, with the former taking place in mostly poor Western Ukrainian or heavily industrialised Eastern Ukrainian regions, and the latter being observed in Kiev city and areas with strict collection enforcement by the local utility providers.

Analysing changes to the housing subsidy targeting scheme to increase its efficiency, combined with improved collection of utility payments provides exciting avenues for new policy research.

6. REFERENCES

A. Abrashkevich, Gashchenko I. and Mavrodiy A. (2004?), "Subsidy on Housing Facilities in Ukraine", EERC annual conference, Kiev, Ukraine.

A. Deaton and S. Zaidi (2006), "Guidelines for Constructing Consumption Aggregates for Welfare Analysis", the World Bank.

EBRD (2003), "Can the Poor Pay for Power? The Affordability of Electricity in South East Europe", London.

S. Fankhauser and S. Tepic (2006). Can Poor Consumers Pay for Energy and Water? An Affordability Analysis for Transition Countries, in: *Energy Policy*, forthcoming. Also available as EBRD Working Paper 92.

IPA Energy (2003), "Can the poor pay for power? The affordability of electricity in South-east Europe". Available online at ww.ebrd.com/country/sector/energyef/about/powersee.pdf.

D. Kennedy (2005), "Lifelines in Europe and Central Asia. Infrastructure transition in Europe and Central Asia, Refocusing the infrastructure transition agenda", draft, February, World Bank, Washington DC.

N. Kravchenko, Levitsky A. and Sviatotska V. (2002), "Payment Collection for Housing and Communal Services: The Experian of Ukrainian Cities", PADCO International, Kiev , Ukraine.

J. Lampieti, A. Kolb, S. Gulyani and V. Avenesyan (2001), "Utility pricing and the poor, Lessons from Armenia", World Bank Technical Paper No. 497, Washington DC.

J. Lampieti and A. Meyer (2002), "Coping with the cold, heating strategies for Eastern Europe and Central Asia's urban poor", World Bank Technical Paper No. 529, Washington DC.

L. Lovei, E. Gurenko, M. Haney, P. O'Keefe and M. Shkaratan (2000), "Maintaining utility services for the poor, policies and practices in central and eastern Europe and the former Soviet Union", May, World Bank, Washington DC.

A. Norets (2002), "Household Arrears in Ukraine: Microeconometric Evidence", Master's thesis, Kiev -Mohyla Academy University, Ukraine.

OECD (2005), "Water Supply and Sanitation Sector Reform: Financing Water Services and the Social Implications on Tariff Reform", June.

OECD (2003), "Social issues in the provision and pricing of water services", OECD, Paris.

R. J. Vaughan (1995), "A History and Overview of Ukraine's Housing Subsidy Program", PADCO International, Kiev, Ukraine.

Vecherniy Nikolaev newspaper (2006), "O Predostavlenii Zhilischnyh Subsidiy v Usloviyah Povysheniya Zen I Tarifov na Zhilischno-Kommunal'nye Uslugi", July 1st.

M. Velody, M. Cain and M. Philips (2003), "A regional review of social safety net approaches in support of energy sector reform", mimeo, USAID, October.

World Bank (2005), "Ukraine: Poverty Assessment. Poverty and Inequality in a Growing Economy", December, Washington, DC.

APPENDIX

Table A. 1. Main socio-economic indicators for Ukrainian regions.

Macroregion	Region	Average monthly wage per worker, June 2004	Wage growth, Jan-July 2004 as per cent to prev.yr	ILO UE rate, 2003	Income p. c., 2004, UAH	Population, Jan 1 2005, thsds	Fresh water consn p.c., thsds.cub.m
C	**Cherkasskaya**	479.2	129	11.5	3793.4	1357.1	175.4
C	**Chernigovskaya**	460.1	123.2	9.5	4061.9	1187.7	130.5
CE	**Dnepropetrovskaya**	666.9	124.1	6.3	4792.5	3476.2	424.3
C	**Kiev city**	**1,009.8**	**129.5**	**4.8**	**7395.6**	**2666.4**	**321.0**
C	**Kievskaya**	616.3	122.5	8.3	4187.2	1778.9	441.8
C	**Kirovogradskaya**	464.6	121.4	11	3824.8	1083.9	52.6
C	**Vinnickaya**	445.8	128.6	8	3914.5	1720.1	70.3
CE	**Zaporozhskaya**	678.5	121	8	5031.4	1877.2	598.2
CW	**Zhitomirskaya**	462.5	125.9	11.2	3863.5	1345.3	75.1
E	**Doneckaya**	712.4	123.2	7.3	4951.1	4671.9	340.1
E	**Harkovskaya**	586.1	119	7.9	4386.2	2848.4	131.0
E	**Luganskaya**	587.9	120.6	9.2	4093.7	2440.3	109.8
E	**Poltavskaya**	567.8	124.8	7.4	4568.8	1572.5	139.9
E	**Sumskaya**	477.4	119.8	10.5	4010.2	1243.9	87.6
S	**Crimea**	549.2	125.4	6.9	3722.9	1994.3	343.5
S	**Hersonskaya**	457.1	124.4	10.7	3700.1	1138.2	376.0
S	**Nikolaevskaya**	576.0	118.8	10.7	4049.2	1229.5	144.8
S	**Odesskaya**	563.6	124	6.9	4099.8	2415.7	129.2
W	**Chernovickaya**	466.3	130.4	12.2	3424.2	911.5	70.2
W	**Hmelnickaya**	438.7	124	11.1	3915.6	1388	73.5
W	**Ivano-frankovskaya**	532.3	128.4	10.2	3724.3	1393.6	70.3
W	**Lvovskaya**	545.7	126.8	10	4196.9	2588	80.8
W	**Rovenskaya**	497.8	123.6	12.5	3657.3	1160.7	128.4
W	**Ternopolskaya**	432.5	128.5	11.9	3434	1119.6	65.2
W	**Volynskaya**	425.3	128.3	10.8	3684.1	1044.8	76.6
W	**Zakarpatskaya**	503.4	128.3	8.2	3428.3	1248.5	38.4
	MEAN	**601.5**	**125.2**	**8.6**	**4353.8**	**47280.8**	210.9
	STD. DEV.	123.7	3.4	2.0	791.3	886.6	150.8
	MEDIAN	517.8	124.3	9.8	3962.9	1390.8	128.8

Sources:
For average monthly wage and wage growth rate:
http://www.ukrstat.gov.ua/operativ/operativ2004/gdn/zp/zp_e/zp072004_e.htm

For other statistics: EBRD data

Table A.2. ULMS numbering of Ukrainian regions

Crimea republic	1	Zaporozhskaya	10	Sumskaya	19
Kiev city	2	Ivano-frankovskaya	11	Ternopolskaya	20
Kievskaya	3	Kirovogradskaya	12	Harkovskaya	21
Vinnickaya	4	Luganskaya	13	Hersonskaya	22
Volynskaya	5	Lvovskaya	14	Hmelnickaya	23
Dnepropetrovskaya	6	Nikolaevskaya	15	Cherkasskaya	24
Doneckaya	7	Odesskaya	16	Chernovickaya	25
Zhitomirskaya	8	Poltavskaya	17	Chernigovskaya	26
Zakarpatskaya	9	Rovenskaya	18		

Table A.3. Brief descripition of the socio-economic situation in Ukrainian regions

		Remarks	Main specialization
Crimea republic	1	Heavily subsidized	Food-processing (wine, tobacco, grapes, rice), fishing, ship-building, ship-building, machine-building, metallurgy (Kerch district); Tourism and recreation- not subsidized.
Kiev city	2	See below	
Kievskaya	3	25 of Kiev enterprises are running at a loss; **but region has lower unemployment and higher salaries than elsewhere in Ukraine.**	Food-processing (sugar), machine-building, metallurgy and chemical manufacture. Car and aeroplane production, tourism, manufacture of construction materials, clothing and paper. Cattle-farming and pig-farming are a major source of income in the region. Main crops grown are wheat, rye and barley. Also has millet, oats, sugar beet, sunflowers, hops and vegetables.
Vinnickaya	4	Region is rich in natural resources. Economy is 37 a/c and 40 industrial.	The main industries are food-processing (sugar), energy production, machine-building, metallurgy and manufacture of chemicals and petrochemicals.
Volynskaya	5	40 of population work in industry, 33 in industry, and the rest – mostly in transport and construction. **Unemployment is very high.**	Volyn coalfields have been exhausted. There are gas resources, but extraction infrastructure has not been created. Other natural resources include peat, copper, lead, phosphates, sapropel and basalt. Main industries are food-processing, production of chemicals, plastic, construction materials, footwear, furniture and fabrics. Agriculture is very important in the region (flax), but equipment is outdated and infrastructure poor. Other main crops are potatoes, sugar beet and grain. The region is famous for its beef cattle.
Dnepropetrovskaya	6	Contributes to 9 of Ukrainian GDP; one of the most heavily industrialized regions in the country.	Main industries: mining, machine-building, metallurgy and food-processing; Rich in mineral resources (manganese deposits). United Energy Systems company has virtually monopolised oil and gas trade with Russia. Agriculture (*chernozem*) accounts for around 12 per cent of the total output.

Doneckaya	7	Most densely populated region.	Main industries are coal-mining, food-processing, iron production, steel, chemicals, machinery and electrical equipment. Ranks first in Ukraine in terms of industrial output (20.1 per cent), but production has fallen by 50 per cent since 1991.
Zhitomirskaya	8	One of the areas of Ukraine most contaminated by the Chernobyl accident. **As a result of people moving away from the region, its population has dropped by nearly 30,000 in the last ten years.**	The city of Zhytomyr is a major transport hub. Main industries are machine-building, forestry and manufacture of chemicals, optical equipment, fabrics and porcelain. The area is rich in mineral deposits including iron ore, zircon and diamonds, and has one of the world's richest deposits of titanium. **Area is predominantly agricultural**; main crops are wheat, potatoes, flax, hops, and sugar-beet. There are a number of spas holidays resorts and game reserves. However, a/c and tourism sectors have been devastated by Chernobyl disaster.
Zakarpatskaya	9	**High level of unemployment.** Many locals cross into Hungary, Romania and Slovakia in search of work. Region has the lowest industrial output in all Ukraine.	Main industries are food-processing, machine-building, metal-working and manufacture and of chemicals and paper. Region has favourable conditions for agriculture. Main grapes are grapes, vegetables, winter grain and corn. Also has cattle and sheep rearing. Has well-developed tourism and recreation sector. Region is rich in mineral deposits (black coal, iron and copper ores, barites and rock salt).
Zaporozhskaya	10	One of the most important in Ukraine in terms of industrial output, producing 9.2 of GNP. Local authorities are reform-minded, and the region is second to Odessa in the success of privatisation.	Major local industries: Avtovaz (the only Ukrainian car manufacturer, employs 20,000 people), Zaporozhya dam hydroelectric power station, the metallurgy complex (including Zapororozhstal – one of Ukraine's top-earning companies). Main crops are grain and pulses. Has the largest nuclear power station in Europe, which has been plagued by safety problems.
Ivano-frankovskaya	11	Region is underdeveloped and reliant on exploitation of its natural resources. Decline in output in IF has been greater than in other regions.	Major industry is a huge chemical plant at Kalush, which supplies many CIS states. Region has reserves of gas, oil, gold, manganese and brown coal. Also, wood-processing and furniture-manufacture. A high proportion of population is engaged in agriculture, forestry and food-processing.

Kirovogradskaya	12	Industry and a/c in the region under-developed. Incomes are generally below the national average. **A third of working population are currently on unpaid leave.**	Industry provides 41 of the region's income. Main industries are food-processing, engineering, energy-production, building materials, and non-ferrous metallurgy. Also has exploitable deposits of graphite, coal, nickel, iron-ore, gold, clay, kaolin, oil shale. Also has mineral water springs and 170 hectares of forest. Rich in chernozem. Main crops are winter wheat, barley, corn, buck-wheat and millet, sunflower and sugar beet. Also has extensive dairy herds.
Luganskaya	13	Economy hit hard by collapse of USSR. **Many strikes in recent years in the coal industry because of wage arrears.** Region is second in Ukraine in terms of industrial output.	Major industrial centre. Coal-mining, machine-building (railroad and mining equipment), metallurgy and the chemical industry account for 87per cent of Luhansk economic activity. 13 per cent is based on agriculture and food-processing. Coal mining and locomotive industry hit hard by transition. Other enterprises (steel) are more successful (subsidized and receive state orders).
Lvovskaya	14		Important transport and industrial centre. Has a large power plant, oil refinery, and LAZ bus factory; other industries include manufacture of electronic equipment, a/c machinery, chemicals and textiles. Tourism is also important. Main crops grown in the region are wheat, sugar beat and sunflowers. Food-processing and cattle-breeding are also present.
Nikolaevskaya	15	Large military ship-building centre.	Important industrial centre. **Aluminium factory is one of the biggest in Europe is one of Ukraine's highest earning industries.** Other industries include machine-building (construction and a/c machinery), metallurgy, food-processing and manufacture of clothes and glass. Main crops are wheat and sugar beet. Dairy cattle and poultry also important to a/c sector.
Odesskaya	16	Odessa – third largest city + biggest commercial port. Living standards are relatively high.	Main industries: machine-building, metallurgy, oil-refining, food-processing, manufacture of plastics, pharmaceuticals and clothing. 80 of land in the region is used for agriculture. The region has high quality chernozem, but needs extensive irrigation. Main crops are wheat, barley, rye, oats, maize, soya, sugar beet, sunflowers, tomatoes, soft fruit, grapes, vegetables; also has livestock and dairy produce.

Poltavskaya	17	One of the biggest industrial centres + important transport centre. **One of the most successful regions in Ukraine carrying out farm privatisation.**	Main industries include machine-building (locomotives), oil and gas, metalworking, manufacture of building materials, fabric and clothes. Main crops are wheat, sunflowers, vegetables and tobacco. The area is also famous for cattle- and pig-breeding.
Rovenskaya	18	Major industrial centre. The region is part of the fertile chernozem area, but a/c production has been badly affected by Chernobyl disaster.	Main industries – machine-building and food-processing. Electrical equipment, tractors, chemicals, concrete and linen are also manufactured. Region has extensive mineral resources (one of the largest basalt deposits in Europe as well as construction and facing stones, amber and phosphates). A/c production includes sugar beet, hops, flax, wheat and potatoes.
Sumskaya	19	Has a well-developed a/c sector. **Region has suffered an economic and commercial recession since the break-up of the Soviet union.**	Main crops are orchard fruit, wheat and sugar beet. Region is also famous for cattle-breeding. Main industries are machine-building, manufacture of chemicals, pumps, electrical equipment and electronic microscopes; the region has potentially lucrative oil and gas deposits.
Ternopolskaya	20	Part of the chernozem region. Ternopil is the largest producer of consumer goods in Ukraine.	Main crops: sugar beet, wheat, tobacco. Main industry: food-processing, machine building, manufacture of electrical fittings, car parts, china, artificial leather and textiles.
Harkovskaya	21	Heavily industrialised and is the main economic centre and transport hub of north-eastern Ukraine. Industry was hit hard by economic decline. High unemployment rate.	Famous for manufacture of tractors, turbines and engines. Also, tanks, coal-mining machinery, sugar-refining equipment, and wind farm equipment. Also makes equipment for construction and agriculture. Has a famous Antonov aircraft factory.
Hersonskaya	22		**Major industry is ship-building, which suffered greatly since Ukrainian independence.** Other major industries are oil- and gas-refining, machine-building (combine harvesters), food-processing (jam, fruit juices), manufacture of paper and fabrics.

Hmelnickaya	23		Food-processing (sugar), machine-building, wood-processing and clothing manufacture. Has fertile chernozem. Main crops are sugar beets, wheat and peas. Forestry in the northern part.
Cherkasskaya	24	City – a large industrial centre	Machine-building, food-processing, manufacture of man-made fibres, nitrous fertiliser and furniture. Tourist resorts near Kremenchug reservoir. Outside capital, mainly agriculture (fruit and sugar beet, dairy cattle breeding).
Chernovickaya	25	Economy is primarily agricultural	Food-processing, machine-building, and the manufacture of chemicals and textiles. Several big military-industrial enterprises. Main industries are livestock breeding and grain, followed by fruit, sugar-production and timber-processing.
Chernigovskaya	26	One of the poorest areas of the country	Agriculture, forestry and livestock-breeding were mainstays of the economy, but significant decline after Chernobyl disaster. Main industries are food-processing, oil and gas extraction, machine-building and wool-production, mineral water spas and health resorts. Also, region is rich in mineral resources.

Table A.4. Regression results for the access to centralised gas

	Biprobit		**TSLS**		
Predicted value	0.76		0.67		
	Marginal effects	SE	Coefficient	SE	**Mean**
Independent variable					
Subsidy (yes/no)	**0.13**	0.02	0.12	0.20	0.12
Owner	**0.14**	0.02	**0.18**	0.06	0.86
Owner_house	-0.01	0.02	-0.06	0.04	0.55
Per capita expenditure	**0.00001**	0.00	**0.00002**	0.00	4672.90
P.c. expenditure sq.	**-3*E(-9)**	0.00	**-3*E(-9)**	0.00	38000000.00
Town type settlement	**0.05**	0.02	-0.02	0.05	0.14
Small town	**0.12**	0.04	0.07	0.11	0.02
Medium town	**0.23**	0.01	**0.13**	0.06	0.13
Large town	**0.31**	0.01	**0.18**	0.07	0.22
Capital city	**0.33**	0.01	**0.20**	0.07	0.21
Crimea	**-0.28**	0.09	**-0.23**	0.12	0.05
Kievskaya	**0.19**	0.03	**0.15**	0.09	0.03
Vinnickaya	**-0.55**	0.07	**-0.31**	0.08	0.04
Volynskaya	**-0.47**	0.09	**-0.30**	0.14	0.02
Dnepropetrovskaya	**-0.19**	0.09	-0.07	0.08	0.07
Doneckaya	**-0.63**	0.06	**-0.33**	0.08	0.11
Zhitomirskaya	**-0.24**	0.10	0.01	0.13	0.03
Zakarpatskaya	**-0.11**	0.09	0.04	0.11	0.02
Zaporozhskaya	**-0.53**	0.07	**-0.22**	0.08	0.04
Ivano-frankovskaya	0.03	0.07	-0.06	0.13	0.03

Kirovogradskaya	**-0.66**	0.05	**-0.36**	0.10	0.03
Luganskaya	**-0.63**	0.06	**-0.39**	0.09	0.05
Lvovskaya	**0.27**	0.01	**0.24**	0.08	0.05
Nikolaevskaya	0.03	0.12	0.00	0.11	0.01
Odesskaya	**-0.38**	0.09	**-0.14**	0.08	0.06
Poltavskaya	0.01	0.07	0.14	0.11	0.03
Rovenskaya	**-0.29**	0.10	-0.10	0.10	0.03
Sumskaya	**-0.38**	0.09	-0.08	0.09	0.03
Ternopolskaya	**0.13**	0.05	0.10	0.12	0.02
Harkovskaya	**-0.26**	0.09	-0.12	0.08	0.07
Hersonskaya	**-0.20**	0.10	-0.02	0.11	0.03
Hmelnickaya	**-0.24**	0.09	-0.08	0.11	0.03
Cherkasskaya	**-0.53**	0.07	**-0.39**	0.08	0.03
Chernovickaya	-0.03	0.09	0.12	0.11	0.01
Chernigovskaya	**-0.23**	0.10	-0.08	0.11	0.03
Arrears (yes/no)	**0.06**	0.02	**0.66**	0.26	
N obs			2873		
R-sq			0.09		
Robust standard errors, clustered on households					
NOTE: Change in arrears and stock of arrears are highly correlated (0.88)					

Table A.5. Regression results for the access to sewerage.

	Biprobit		TSLS	
Predicted value	0.53		0.46	
	Marginal effect	SE	Coefficient	SE
Independent variable				
Subsidy (yes/no)	**0.07**	0.02	0.39	0.35
Owner	n/a	0.00	n/a	
Owner_house	n/a	0.00	n/a	
Per capita expenditure	**0.00002**	0.00	**0.00004**	0.00
P.c. expenditure sq.	**-1*E(-9)**	0.00	**-1*E(-9)**	0.00
Town type settlement	**0.23**	0.02	-0.09	0.09
Small town	**0.23**	0.06	-0.04	0.26
Medium town	**0.37**	0.02	0.02	0.10
Large town	**0.53**	0.02	-0.05	0.13
Capital city	**0.60**	0.02	0.05	0.14
Crimea	**-0.53**	0.08	**-0.49**	0.24
Kievskaya	**-0.44**	0.14	-0.15	0.24
Vinnickaya	**-0.55**	0.06	-0.15	0.19
Volynskaya	**-0.50**	0.08	-0.42	0.30
Dnepropetrovskaya	**-0.60**	0.05	**-0.55**	0.19
Doneckaya	**-0.64**	0.05	-0.26	0.17
Zhitomirskaya	**-0.47**	0.11	**0.40**	0.21
Zakarpatskaya	**-0.52**	0.05	0.01	0.21
Zaporozhskaya	**-0.55**	0.05	-0.27	0.19
Ivano-frankovskaya	**-0.56**	0.03	**-1.01**	0.29
Kirovogradskaya	**-0.57**	0.03	-0.09	0.18
Luganskaya	**-0.58**	0.05	**-0.40**	0.20
Lvovskaya	**-0.51**	0.09	-0.19	0.19
Nikolaevskaya	**-0.47**	0.10	-0.24	0.32
Odesskaya	**-0.54**	0.08	-0.11	0.19
Poltavskaya	**-0.54**	0.05	-0.20	0.24
Rovenskaya	**-0.47**	0.11	-0.07	0.23
Sumskaya	**-0.56**	0.03	-0.28	0.23
Ternopolskaya	**-0.50**	0.08	**-0.46**	0.28
Harkovskaya	**-0.57**	0.06	**-0.58**	0.20
Hersonskaya	**-0.48**	0.11	-0.23	0.27
Hmelnickaya	**-0.54**	0.05	-0.30	0.28
Cherkasskaya	**-0.56**	0.04	-0.27	0.19
Chernovickaya	**-0.54**	0.03	-0.26	0.25
Chernigovskaya	**-0.55**	0.03	-0.32	0.21
Arrears (yes/no)	**0.16**	0.02	**2.36**	**0.37**
N obs			2873	
R-sq			n/a	
Robust standard errors, clustered on households				
Note: Change in arrears and stock of arrears are highly correlated (0.88)				

Table A.6. Regression results for the access to the centralised gas and sewerage with the change in arrears.

	Seemingly Unrelated Regression			
	Coefficient	SE	Coefficient	SE
Independent variable				
Subsidy (yes/no)	0.06	0.04	**-0.13**	0.04
Owner	**0.13**	0.03		
Owner_house	-0.01	0.03		
Per capita expenditure	**0.00002**	0.00	**0.00003**	0.00
P.c. expenditure sq.	**-1*E(-9)**	0.00	**-1*E(-9)**	0.00
Town type settlement	-0.04	0.05	**0.25**	0.05
Small town	**-0.32**	0.13	**0.32**	0.14
Medium town	**0.17**	0.05	**0.55**	0.05
Large town	**0.25**	0.04	**0.60**	0.04
Capital city	**0.09**	0.05	**0.65**	0.05
Crimea	**-0.50**	0.08	0.05	0.09
Kievskaya	-0.03	0.12	0.13	0.13
Vinnickaya	**-0.42**	0.09	0.03	0.10
Volynskaya	**-0.45**	0.11	0.01	0.12
Dnepropetrovskaya	-0.08	0.06	**-0.15**	0.07
Doneckaya	**-0.52**	0.07	**-0.35**	0.08
Zhitomirskaya	0.00	0.13	**0.35**	0.14
Zakarpatskaya	-0.40	0.26	-0.18	0.28
Zaporozhskaya	0.01	0.07	0.06	0.08
Ivano-frankovskaya	-0.10	0.08	**-0.23**	0.09
Kirovogradskaya	-0.31	0.13	0.15	0.15
Luganskaya	**-0.66**	0.08	-0.13	0.08
Lvovskaya	-0.05	0.08	-0.05	0.09
Nikolaevskaya	**-0.17**	0.10	0.08	0.11
Odesskaya	**-0.23**	0.09	**-0.17**	0.09
Poltavskaya	**-0.30**	0.09	**-0.21**	0.10
Rovenskaya	**-0.26**	0.10	-0.01	0.11
Sumskaya	**-0.16**	0.10	-0.09	0.11
Ternopolskaya	-0.05	0.10	0.02	0.11
Harkovskaya	-0.09	0.06	-0.10	0.07
Hersonskaya	**-0.27**	0.09	-0.05	0.10
Hmelnickaya	**-0.26**	0.09	**-0.28**	0.10
Cherkasskaya	**-0.48**	0.10	-0.06	0.11
Chernovickaya	**-0.26**	0.13	**-0.33**	0.14
Chernigovskaya	-0.06	0.11	-0.01	0.12
Change in arrears	**-0.002**	0.00	**-0.001**	0.00
N obs	1040		1040	
R-sq	0.3		0.34	

NOTE: Biprobit estimation did not converge. Coefficients in bold significant at least at 10%.

Table A.7. Regression results for the existence of utility arrears.

	Probit		**TSLS**	
Predicted value	0.21			
	Elasticity	SE	Coefficient	SE
Independent variable				
Wage arrears	**0.46**	**0.17**	0.04	0.10
Subsidy (yes/no)	-0.02	0.02	*-0.89*	*0.60*
Access to centralised gas	0.09	0.11	**-2.58**	**1.29**
Access to sewerage	**0.35**	**0.08**	**0.91**	**0.36**
Per capita expenditure	**-0.26**	**0.13**	0.00	0.00
Per capita expenditure squared	0.03	0.03	0.00	0.00
Crimea	**0.04**	**0.02**	-0.05	0.25
Kievskaya	0.02	0.01	**0.65**	**0.33**
Vinnickaya	0.00	0.02	**-0.56**	**0.36**
Volynskaya	**0.01**	**0.01**	-0.20	0.43
Dnepropetrovskaya	**0.06**	**0.03**	**0.41**	**0.18**
Doneckaya	0.02	0.03	**-0.64**	**0.40**
Zhitomirskaya	**-0.03**	**0.02**	-0.40	0.33
Zakarpatskaya	-0.01	0.01	0.05	0.27
Zaporozhskaya	0.01	0.01	-0.30	0.28
Ivano-frankovskaya	**0.04**	**0.01**	**0.83**	**0.32**
Kirovogradskaya	-0.02	0.01	**-0.84**	**0.47**
Luganskaya	0.03	0.02	-0.63	0.44
Lvovskaya	0.01	0.02	**0.84**	**0.40**
Nikolaevskaya	0.01	0.01	0.27	0.23
Odesskaya	0.00	0.02	-0.25	0.24
Poltavskaya	0.01	0.01	**0.59**	**0.31**
Rovenskaya	0.00	0.01	-0.08	0.26
Sumskaya	0.00	0.01	0.10	0.24
Ternopolskaya	**0.01**	**0.01**	**0.98**	**0.44**
Harkovskaya	**0.06**	**0.02**	**0.35**	**0.16**
Hersonskaya	0.02	0.01	0.20	0.22
Hmelnickaya	0.01	0.01	0.10	0.20
Cherkasskaya	0.01	0.01	**-0.75**	**0.47**
Chernovickaya	0.00	0.01	**0.68**	**0.39**
Chernigovskaya	0.01	0.01	0.19	0.28
Town type settlement	**0.09**	**0.03**	0.15	0.12
Small town	0.01	0.01	0.42	0.32
Medium town	**0.08**	**0.03**	**0.51**	**0.26**
Large town	**0.23**	**0.05**	**0.77**	**0.37**
Capital city	**0.24**	**0.06**	**0.67**	**0.34**
Gender (male = 1, female = 2)	**0.74**	**0.25**	0.02	0.09
Age	**-0.66**	**0.19**	0.00	0.00
Household size	0.11	0.17	**0.07**	**0.04**

Robust standard errors, clustered on HH.				
N obs	2837		2837	
R-squared (or pseudo R-sq.)	0.1314		n/a	

Note: IVProbit estimation did not converge. Coefficients in bold significant at least at 10%.

Table A.8. Regression results for the stock of utility arrears, ULMS 2004.

	OLS		IV	
	Coefficient	SE	Coefficient	SE
Wage arrears	**-3.51**	**1.62**	**-4.07**	**2.40**
Subsidy (yes/no)	-2.58	1.99	-12.81	17.66
Access to centralised gas	0.31	2.14	-15.94	21.27
Access to sewerage	-0.96	1.98	3.95	6.95
Per capita expenditure	***-0.00098***	***0.00***	0.00	0.00
Per capita expenditure squared	***0.00000005***	***0.00***	0.00	0.00
Crimea	-0.25	4.96	-7.81	11.06
Kievskaya	-2.10	3.70	-2.20	4.47
Vinnickaya	**-7.76**	**4.86**	**-11.89**	**7.33**
Volynskaya	-5.11	3.91	-12.35	11.69
Dnepropetrovskaya	1.42	3.87	1.79	4.56
Doneckaya	0.50	4.72	-6.22	8.74
Zhitomirskaya	2.95	4.38	8.48	9.09
Zakarpatskaya	-5.58	4.02	-7.41	5.25
Zaporozhskaya	0.19	3.13	0.75	3.53
Ivano-frankovskaya	3.21	5.19	0.71	6.71
Kirovogradskaya	**-7.55**	**4.19**	**-17.28**	**10.81**
Luganskaya	-1.23	4.22	-9.94	10.11
Lvovskaya	-4.76	3.38	-6.19	4.95
Nikolaevskaya	-4.82	3.82	-7.05	5.17
Odesskaya	5.47	5.78	3.22	7.39
Poltavskaya	-2.17	5.00	-6.43	6.15
Rovenskaya	**-7.47**	**3.83**	**-10.21**	**5.39**
Sumskaya	**-7.86**	**3.68**	-5.26	5.54
Ternopolskaya	**-8.23**	**3.72**	-6.58	6.09
Harkovskaya	-2.77	3.68	-3.36	3.97
Hersonskaya	**-7.40**	**3.86**	**-9.58**	**5.29**
Hmelnickaya	-5.36	4.68	-11.73	7.70
Cherkasskaya	-5.47	4.30	-11.97	9.39
Chernovickaya	-4.50	5.36	-7.09	7.36
Chernigovskaya	**-6.41**	**3.54**	-0.66	6.01
Town type settlement	3.17	3.53	0.56	5.61
Small town	-5.09	3.88	-5.92	11.41
Medium town	-2.61	2.81	-2.39	3.95
Large town	2.20	2.56	2.62	4.55
Capital city	0.76	3.94	-2.12	5.31
Gender (male = 1, female = 2)	1.26	1.38	1.43	1.69
Age	0.05	0.05	*0.11*	*0.07*
Household size	0.44	0.83	1.55	1.03

N obs	642		642	
R-squared	0.15		n/a	

Note: Robust standard errors, clustered on households. Coefficients in bold significant at least at 10%.

Table A.9. Regression results for the flow of utility arrears, ULMS 2004.

	OLS		**IV**	
	Coefficient	SE	Coefficient	SE
Wage arrears	**-3.12**	**1.86**	-4.16	3.92
Subsidy (yes/no)	-1.12	2.61	-37.58	35.17
Access to centralised gas	-0.97	2.65	-12.09	28.97
Access to sewerage	-1.49	2.40	-0.32	12.40
Per capita expenditure	0.00	0.00	0.00	0.00
Per capita expenditure squared	0.00	0.00	0.00	0.00
Crimea	0.54	7.87	-6.08	23.46
Kievskaya	-2.84	6.79	-5.25	7.26
Vinnickaya	-1.26	6.40	-3.49	11.81
Volynskaya	-0.57	5.91	4.09	23.52
Dnepropetrovskaya	**10.17**	**4.93**	**10.76**	**5.33**
Doneckaya	7.04	5.64	1.18	13.86
Zhitomirskaya	**12.16**	**5.27**	32.68	24.35
Zakarpatskaya	-1.79	6.13	-4.05	7.74
Zaporozhskaya	**9.42**	**4.30**	**13.97**	**6.65**
Ivano-frankovskaya	7.19	7.03	3.12	8.05
Kirovogradskaya	0.46	4.90	-8.88	15.83
Luganskaya	5.62	5.47	-3.29	16.35
Lvovskaya	3.31	4.76	-0.10	6.28
Nikolaevskaya	-1.07	5.53	-5.20	7.40
Odesskaya	6.06	9.66	3.62	10.66
Poltavskaya	4.88	5.95	-2.32	9.04
Rovenskaya	-4.27	5.32	-9.42	7.29
Sumskaya	-1.27	5.24	5.58	12.45
Ternopolskaya	-3.53	5.35	4.18	12.37
Harkovskaya	6.41	4.71	7.25	6.50
Hersonskaya	-5.14	5.25	-10.00	8.84
Hmelnickaya	1.60	6.51	-7.18	12.41
Cherkasskaya	-0.05	5.77	-2.93	17.97
Chernovickaya	-1.51	8.08	-9.67	11.16
Chernigovskaya	2.63	4.93	18.55	17.63
Town type settlement	-2.18	4.62	-3.33	6.91
Small town	**-8.93**	**4.80**	-16.01	11.64
Medium town	-3.40	3.84	1.50	8.30
Large town	1.30	3.80	6.38	8.17
Capital city	-2.64	4.91	-3.72	8.20
Gender (male = 1, female = 2)	0.89	1.72	-0.13	2.51
Age	0.02	0.08	0.12	0.12

Household size	0.78	1.06	**2.26**	**1.28**
N obs	545		545	
R-squared	0.12		n/a	
Robust standard errors, clustered on households				


Ukrainian Angels
BELORUS
RUSSIA
POLAND
SLOVAKIA
HUNGARY
ROMANIA
MOLDAVIA
CHERNIHIV
SUMY
LUTS'K
RIVNE
ZHYTOMYR
KYIV
KHARKIV
L'VIV
POLTAVA
KHMEL'NYTS'KYI
TERNOPIL'
CHERKASY
VINNYTSYA
LUHANS'K
IVANO-FRANKIVS'K
UZHHOROD
TRANSCARPATHIA
DNIPROPETROVS'K
KIROVOHRAD
DONETS'K
CHERNIVTSI
ZAPORIZHZHYA
MYKOLAYIV
ODESSA
KHERSON
SEA OF AZOV
CRIMEA
SIMFEROPOL'
BLACK SEA
UKRAINE
REGIONS
50 0 50 100 150 miles
50 0 50 100 150 200 km.

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