

**RURAL POVERTY IN BULGARIA:  
CHARACTERISTICS AND TRENDS**

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## Introduction

The purpose of this paper is to explore the characteristics and determinants of rural poverty in Bulgaria. The recent poverty profile from Bulgaria has identified the persistence of rural poverty as representing a serious challenge facing policy-makers, with levels of welfare falling significantly behind those in urban areas. We will therefore investigate not just the nature of rural poverty, but focus on the role of agriculture, the labor market and government action, particularly through social protection, in contributing to poverty alleviation efforts. We also examine household and individual behaviors in terms of coping strategies, and thereby try to distinguish the characteristics that help households avoid falling into poverty.

### Why focus on rural poverty?

Figure 1 shows the cumulative density function for per capita expenditures in Bulgaria in 1995, 1997, and 2001.<sup>1</sup> The story that it tells is well known: between 1995 and 1997, living standards declined sharply. No matter where we set the poverty line in terms of expenditures per capita, there were many more Bulgarians living below that line in 1997 than in 1995. For example, at a poverty line of 83.8 Lev (2001 prices), 13 percent of Bulgarians were poor in 1995, but 56 percent were poor in 1997. Figure 1 also shows a substantial improvement in living standards between 1997 and 2001. But that recovery is incomplete: in general, living standards had not recovered to their 1995 levels by 2001. At the same poverty line of 83.8 Lev, 21 percent of Bulgarians were poor in 2001.

Figure 2 shows comparable cumulative density functions for urban areas only in Bulgaria. While living standards fell sharply between 1995 and 1997, they increased by more from 1997 to 2001 in urban areas. Especially at the poorer end of the expenditure distribution, the recovery is almost complete.

For rural households, however, the recovery has been far less satisfactory. Figure 3 shows the same dramatic shift in the cumulative density function found in urban areas for 1995 to 1997, but the 2001 curve shifts much less to the right for the rural sample, especially at the lower end of the expenditure distribution. Thus, in addition to the standard observation that rural residents are poorer than urban residents (Carletto and Fuji, 2002), something which is true in virtually every developing or transition economy, there is a sense in which rural residents are falling further behind in Bulgaria. Even though everyone suffered greatly from the 1996 crisis, urban residents have recovered, while rural residents are worse off.

### Decomposing Poverty into Growth and Distribution Components

Poverty can fall for two reasons: the entire distribution of expenditures can shift up, leaving fewer people below the poverty line, or inequality can fall – the distribution shrinks in towards its mean – again leaving fewer people below the poverty line. Datt and Ravallion (1992) formalize this distinction and show how to decompose an increase or decrease in poverty into a

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<sup>1</sup> The cumulative density function shows, on the y-axis, the share of the population below a given level of per capita expenditures (on the x-axis). Curves that are higher show greater poverty, because a larger share of the population falls below any given expenditure level.

growth component and a redistribution component. (See Box 1, Decomposing Changes in Poverty Over Time.) Between 1995 and 1997, average expenditures per capita fell from 164 to 88 Lev per person per month in urban areas, and 146 to 86 Lev per person per month in rural areas.<sup>2</sup> Not surprisingly, this negative growth had a substantial effect on poverty in this period. At the same time, the gini coefficient for per capita expenditures increased from 0.28 to 0.30 in urban areas and from 0.28 to 0.32 in rural areas. This increased inequality also contributed to higher poverty, by spreading out the expenditure distribution to the left. But overall, the enormous growth (or contraction) effect was more important, accounting for 87 and 85 percent of the overall increase in poverty between 1995 and 1997 in urban and rural areas, respectively.

**Table 1 – Decomposition of Changes in Poverty into Growth and Redistribution Component**

Years		Change in Poverty Headcount Index	Share Attributable to:		
			Growth	Redistribution	Residual
			% Contribution		
1995-1997	Rural	0.309	84.6	16.9	-1.6
	Urban	0.260	86.9	9.1	4.0
1997-2001	Rural	-0.147	100.2	-24.8	24.6
	Urban	-0.246	88.5	9.0	2.5
1995-2001	Rural	0.162	45.4	39.9	14.7
	Urban	0.014	58.0	13.9	28.1

Source: BIHS 1995, 1997, and 2001

Between 1997 and 2001, average per capita expenditures rose from 88 to 152 Lev per person per month in urban areas, and 86 to 114 Lev per person per month in rural areas, contributing to an overall decline in poverty. In urban areas, the inequality of expenditures for households below the poverty line also declined, so that the improved equality of income also contributed to a reduction in urban poverty.<sup>3</sup> So on both growth and inequality fronts, the deterioration between 1995 and 1997 was reversed. In rural areas, however, inequality below the poverty line continued to worsen, even as per capita expenditures recovered. Indeed, the growth component in rural areas accounted for 100 percent of the decline in poverty over the latter period, while worsening inequality between 1997 and 2001 detracted from that improvement by 25 percent.

<sup>2</sup> All figures in 2001 Lev.

<sup>3</sup> The gini coefficients actually remained constant in both areas. This apparent contradiction is resolved by noting that the Datt-Ravallion decomposition measures the dispersion of expenditures for households below the poverty line, while the gini measures the dispersion of all households' expenditures.

## Income Components

To begin to understand the nature of these changes, Table 2 presents various components of income for 1995 and 2001 for households in these samples, on a per capita basis.<sup>4</sup> For both urban and rural households, the most important sources of income are pensions, wages, and agricultural income. Asset income is also important for urban households. For urban households, asset income rose sharply, and pension receipts per capita increased slightly from 1995 to 2001, while wages decreased slightly, although for the subset of urban households receiving wages, there is no change. Average net agricultural income from sales and home consumption declined from 16 Lev per capita to 11 Lev per capita for all urban households in the samples.

### Box 1 – Decomposing Changes in Poverty Over Time

Datt and Ravallion (1992) develop methods to differentiate the extent to which changes in poverty over time are due to a change in mean expenditures and to changes in the distribution of expenditures. The method decomposes the total change in poverty between period  $t$  and  $t+n$  as follows:

$$P_{t+n} - P_t = G(t, t+n; r) + D(t, t+n; r) + R(t, t+n; r)$$

growth  
component

redistribution  
component

residual

The growth component is defined as the change in poverty due to a change in the mean of the distribution, while holding the Lorenz curve constant at that of the reference year  $r$ :

$$G(t, t+n; r) \equiv P(z, \mu_{t+n}, L_r) - P(z, \mu_t, L_r).$$

The redistribution component is defined as the change in poverty due to any change in the Lorenz curve while keeping the mean of the distribution constant at that of the reference year  $r$ :

$$D(t, t+n; r) \equiv P(z, \mu_r, L_{t+n}) - P(z, \mu_r, L_t).$$

As Datt and Ravallion (1992) point out, the residual  $R(\ )$  is present whenever a change in the poverty measure due to changes in the mean (distribution) also depends on the precise distribution (mean) (i.e., when the poverty measure is not additively separable in  $\mu$  and  $L$ ).

Although the residual can be forced to disappear by averaging the components using the initial and final years as reference year, we do not do so to avoid arbitrarily apportioning this effect to either the growth or redistribution components.

<sup>4</sup> Income data for 1997 are absurdly low – only 10 percent of 2001 for urban areas and 27 percent for rural. There are clearly fundamental problems with both general price deflation -- perhaps because of recall periods in the survey, or because Laspeyres indices can overstate inflation dramatically in high inflations (Escobal and Castillo, 1994) – and with relative prices, because, for example, agricultural incomes are far less understated than wage incomes.

For rural households, the changes are more dramatic. Per capita wage income fell by 21 percent (15 percent for households receiving wages) for rural households, pensions fell only slightly, but agricultural income declined considerably. Average net agricultural income from sales and home consumption declined by more than half, from 79 Lev per capita to 37 Lev per capita for all rural households in the samples. Thus, even though rural households were losing ground on several fronts, it seems clear that agricultural incomes are responsible for most of the relative decline of incomes in rural areas during this period.<sup>5</sup>

To highlight the importance of declining agricultural and wage incomes for rural households, Table 3 recalculates FGT poverty measures for rural households assuming that per capita net agricultural income stayed the same from 1995 to 2001, and also by assuming that both per capita net agricultural income and wages stayed the same of this period.<sup>6</sup> The poverty line is set at 83.8 lev for this calculation. The results show that the decline in agricultural incomes are by far the most important. After increasing them to 1995 levels, the rural headcount falls by nine points, to 27.7 percent. Inflating 2001 wage incomes to 1995 levels reduces the headcount another 2.6 percent. Still, even after the adjustments, the headcount for rural Bulgaria would be 25.1 percent in 2001, far above the 1995 rate of 17.3 percent.

**Table 3 – Recalculation of 2001 FGT poverty measures for rural Bulgaria**

	FGT poverty measure		
	p0	p1	p2
Observed expenditure	0.370	0.139	0.072
with augmented agricultural income	0.277	0.110	0.059
with augmented agricultural and wage income	0.251	0.103	0.055

Source: BIHS 1995, 2001 and authors' calculations

Broadly speaking, the incomes in Table 2 could decline for two reasons: either the unit return to an activity (wage, pension per person, etc.) fell, or the number of people living in households that earn or receive such income fell.<sup>7</sup> For that reason, the table also includes a column for the share of the sample living in households that received each type of income, and the means and medians for those households only. While there are declines in the number of rural residents benefiting from wage income and from agricultural income, the change is not as dramatic as the decline in the wage rate and in the agricultural earnings among households engaged in that activity.

<sup>5</sup> An important concern that arises from Table 2 is the varying degree of under-reporting of income across time and place. In 1995, reported urban incomes are significantly below expenditures, while income and expenditure are reasonably close in rural areas. This produces the anomalous result that average income per capita was higher in rural than urban areas in 1995. In 2001, however, it is rural areas that have a high degree of income under-reporting when compared to expenditures, while the two values are similar for urban areas. Since much of the decline in rural incomes is coming from agricultural income, which is difficult to measure, we are left with the doubt that these changes may simply reflect errors in the data.

<sup>6</sup> We do this by calculating the ratio of 1995 to 2001 average per capita incomes for these sources over all households (including those that do not receive this type of income), then multiplying that ratio times actual 2001 agricultural and wage incomes (separately), and then adding the difference to total 2001 expenditures. In sum, we raise everyone's 2001 agricultural and wage income in proportion to their actual income received, and by a proportion that makes the modified agricultural and wage income in 2001 equal to that observed in 1995.

<sup>7</sup> There is a further possibility: that households receiving (say) wage income had fewer hours worked, possibly because of unemployment of secondary wage earners, but still not zero hours.

**Table 2 - Value of Earnings by Source in Bulgaria, 2001**

	Urban					Rural				
	All		Recipients Only			All		Recipients Only		
	Mean	Median	Mean	Median	(share)	Mean	Median	Mean	Median	(share)
2001										
Net ag income, marketed	2.38	0.00	15.14	0.00	0.16	11.81	0.00	18.39	0.71	0.64
Net ag income, home cons	8.79	4.19	13.40	8.73	0.66	25.09	18.42	28.57	22.36	0.88
Gross ag income	17.37	0.00	86.32	5.55	0.20	20.48	4.34	28.51	9.65	0.72
Ag home cons 1 (inc)	14.15	0.00	82.23	6.00	0.17	6.03	2.29	9.59	6.13	0.63
Ag home cons 2 (inc)	0.03	0.00	6.78	4.55	0.01	0.32	0.00	8.76	2.44	0.04
Ag home cons 3 (inc)	0.72	0.00	26.27	4.03	0.03	1.51	0.00	6.94	3.45	0.22
Ag costs	0.98	0.00	5.73	1.84	0.17	4.63	0.92	7.26	2.99	0.64
Pensions	22.45	0.00	52.58	41.52	0.43	27.14	15.00	46.62	32.83	0.58
Social insurance	6.54	2.13	11.58	4.69	0.56	6.41	2.31	11.16	6.37	0.57
Unemployment	2.07	0.00	17.90	14.85	0.12	2.17	0.00	12.69	9.21	0.17
Wages	68.54	56.44	98.69	82.60	0.69	30.50	0.00	66.09	51.34	0.46
Self-employment	12.29	0.00	137.84	100.77	0.09	5.06	0.00	137.43	75.08	0.04
Net remittances	3.85	0.00	16.56	13.24	0.23	-1.14	0.00	-6.16	-3.30	0.19
Other income	0.70	0.00	69.24	22.13	0.01	0.12	0.00	58.42	86.24	0.00
Asset income	23.62	0.00	89.51	20.44	0.26	6.36	0.00	20.48	4.32	0.31
Total income	156.44	111.79	157.65	112.77	0.99	92.47	75.12	93.33	76.45	0.99
Total expenditure	152.67	134.91	152.67	134.91	1.00	114.08	102.31	114.08	102.31	1.00

**Table 2 (continued)** - Value of Earnings by Source in Bulgaria, 2001

	Urban					Rural				
	All		Recipients Only			All		Recipients Only		
	Mean	Median	Mean	Median	(share)	Mean	Median	Mean	Median	(share)
1995										
Net ag income, marketed	5.40	0.00	27.03	0.35	0.20	37.84	0.21	55.22	3.90	0.69
Net ag income, home cons	10.89	1.73	19.48	11.78	0.56	41.53	35.05	45.87	40.34	0.91
Gross ag income	11.15	0.00	42.38	16.82	0.26	79.50	33.68	96.59	47.18	0.82
Ag home cons 1 (inc)	3.50	0.00	16.13	9.55	0.22	24.19	11.45	36.53	21.82	0.66
Ag home cons 2 (inc)	1.53	0.00	12.81	10.61	0.12	9.67	4.29	15.81	11.02	0.61
Ag home cons 3 (inc)	0.94	0.00	7.26	4.42	0.13	6.66	3.41	9.35	6.34	0.71
Ag costs	1.68	0.00	9.40	3.08	0.18	10.71	1.74	16.99	6.16	0.63
Pensions	17.84	0.00	44.84	36.09	0.40	29.04	16.64	47.28	39.21	0.61
Social insurance	6.29	1.38	12.43	7.02	0.51	5.86	0.00	14.17	7.67	0.41
Unemployment	0.47	0.00	8.67	7.11	0.05	0.73	0.00	10.04	7.14	0.07
Wages	71.00	63.69	98.22	83.20	0.72	37.00	0.00	75.91	65.43	0.49
Self-employment	6.44	0.00	107.28	74.54	0.06	5.10	0.00	95.84	62.09	0.05
Net remittances	3.04	0.00	10.47	10.56	0.29	-3.64	0.00	-15.48	-15.04	0.23
Other income	2.36	0.00	29.42	10.10	0.08	1.07	0.00	20.60	10.51	0.05
Asset income	5.64	0.00	28.55	15.58	0.20	5.95	0.00	22.15	7.52	0.27
Total income	122.54	101.91	124.97	103.95	0.98	149.89	110.05	153.85	111.26	0.97
Total expenditure	163.65	143.46	163.65	143.46	1.00	146.35	133.06	146.35	133.06	1.00

Source: BIHS 1995, 2001

## Agricultural Incomes

Table 4 looks at the variation in the quantities and unit prices used to calculate agriculture income in the BIHS surveys. While there is no clear pattern in real crop prices across the surveys, physical production fell for almost all major crops that households produced in Bulgaria. Unfortunately, it is difficult to explain this decline from the survey data. Input data were not collected in the same way in 1995 and 2001, but it appears that, if anything, use of pesticides and purchased seeds increased over the period. For fertilizer, there was a 15 percent decline in use if we assume that respondents reported only *chemical* fertilizers in 1995, but even at this extreme, the decline is nothing like the drop in output.

Of course, labor and land are likely to be the most important inputs to household agricultural production. The 2001 survey asks about labor inputs in the agriculture section (6.6), but the 1995 survey does not, so we cannot make a comparison there. Both surveys do ask about work in agriculture in the labor market section (6.1), but these data are inconsistent with section 6.6, especially in 2001. Section 6.1 asks the following question about agricultural activity: “Did \_\_\_ spend any time on any agricultural activities during the past 12 months?” Overall, far fewer people answered “yes” to this question in 2001 than in 1995: 1285 vs. 388, for comparable sample sizes. This might indicate a decline in labor dedicated to own agriculture. However, a much larger number of people who did not answer this question at all lived in households reporting agricultural income in 2001 than in 1995, suggesting that the change in labor input was not as dramatic as the difference in the “yes” responses indicates. Overall, the number of people in households with agricultural income was 20 percent *higher* in 2001 than in 1995.

Table 5 shows responses to the question “How much total land is available for farming use by household members?” The most striking feature is the extraordinary variation in crop land in use by households between years.<sup>8</sup> Pasture land also fell of between 1997 and 2001. If these data are an accurate representation, then there was an enormous decline in household agriculture between 1995 and 2001, even stronger than the decline in production reported in Table 4. Many households seem to have withdrawn from agricultural activity.

**Table 5** – Household agricultural land use among BIHS households, decares

	Orchard	Pasture	Crop
1995	932	882	6472
1997	1070	781	9404
2001	835	552	3766

Source: BIHS 1995, 1997, 2001

Another interesting finding is the role of home production in household incomes. Our results indicate that there is a marked increase in the value of home consumption across the expenditure quintiles; and the lowest share of home consumption income is in the bottom expenditure quintile (Table 6). In fact, the rate of increase in home consumption income across the quintiles is more rapid than other major sources of income, such as pensions and wages. By

<sup>8</sup> All three surveys have comparable numbers of households.



implication, it seems that one of the important characteristics that distinguish the poorest household in rural Bulgaria is their inability to engage in own-account agriculture for their own consumption. This is consistent with the results presented elsewhere that a combination of land and labor constraints hold back the poorest households and contribute to the low level of earnings.

In sum, while the decline in rural agricultural incomes is provocative, we are unable to make firm conclusions as to the cause of this decline. There is only very weak evidence that labor inputs declined, and other variable inputs seem to have increased. It would be interesting to estimate production functions at different points in time to see if the productivity of different factors has changed dramatically. But the BIHS data do not lend themselves to such an exercise. Input data were not collected on a crop-by-crop basis, and the key labor input is missing in 1995. Certainly, this is an important area for future research on Bulgaria's rural economy.

**Table 4 – Median Harvest and Median Price for Important Crops, Bulgaria, 1995 and 2001**

Crop	Median (Kg)			Total harvest (kg)			Median (Lev/Kg)		
	2001	1995	ratio	2001	1995	ratio	2001	1995	ratio
Wheat	800	600	1.333	71,160	97,670	0.729	0.15	1.88	0.080
Rye	375	300	1.250	3,170	7,780	0.407	0.96	0.38	2.550
Barley	475	400	1.188	25,772	33,010	0.781	0.15	0.56	0.257
Maize	300	800	0.375	101,225	313,026	0.323	0.18	0.15	1.162
Sunflower	380	200	1.900	20,958	15,060	1.392	0.59	9.60	0.061
Forage Plants	500	500	1.000	24,267	40,980	0.592	0.25	0.00	
Beetroot	200	800	0.250	1,370	6,860	0.200	3.68	0.38	9.768
Beans	10	20	0.500	5,362	14,761	0.363	2.55	2.35	1.084
Potatoes	100	200	0.500	92,061	249,677	0.369	0.40	1.13	0.354
Tomatoes	80	150	0.533	60,625	123,605	0.490	0.45	1.32	0.342
Peppers	40	70	0.571	27,151	39,837	0.682	0.40	1.51	0.266
Cabbages	60	100	0.600	17,734	39,819	0.445	0.30	0.19	1.594
Cucumbers	25	50	0.500	7,344	19,686	0.373	0.50	0.94	0.531
Onions	20	40	0.500	10,949	30,732	0.356	1.30	1.13	1.151
Watermelons	100	200	0.500	15,056	30,120	0.500	0.20	0.34	0.590
Pumpkin, Squash	60	100	0.600	4,187	11,048	0.379	0.41	1.13	0.359
Apples	60	100	0.600	3,348	8,705	0.385	1.27	2.07	0.611
Cherries/Morrelli	30	50	0.600	993	3,863	0.257	1.81	0.43	4.181
Plums	50	70	0.714	3,430	4,470	0.767	0.60	2.26	0.266
Grapes	250	300	0.833	74,370	91,586	0.812	0.35	0.41	0.845
Tobacco	350	520	0.673	9,744	13,280	0.734	3.00	3.71	0.809
Other	20	250	0.080	4,414	40,948	0.108	0.20	0.68	0.295

Source: BIHS 1995 and 2001

**Table 6 – Income by Source and per capita Expenditure Quintile, Bulgaria, 2001**

	Sector	Per Capital Expenditure Quintile				
		1	2	3	4	5
Lev pc/month						
Home Consumption	Rural	9.26	24.70	31.18	35.60	50.70
	Urban	3.37	7.32	9.02	10.22	11.30
Earned Agricultural Income	Rural	12.84	10.42	9.18	10.31	17.34
	Urban	1.52	0.25	0.34	2.74	1.25
Wages	Rural	15.46	26.89	34.29	42.20	60.79
	Urban	27.96	51.23	64.38	76.51	100.67
Pensions	Rural	14.75	30.09	35.16	32.55	40.88
	Urban	18.29	25.80	25.51	21.96	19.56
Social Insurance & Unemployment	Rural	10.3	7.6	6.9	9.7	5.5
	Urban	14.3	9.4	8.7	7.6	5.9

Source: BIHS, 2001

### Wage Income

Even though declines in rural households' wage income per capita are less dramatic than the loss of agricultural income between 1995 and 2001, they are nevertheless significant. Furthermore, as Table 7 shows, the declines were concentrated in the lower end of the expenditure distribution, so they had a larger poverty impact than the simple means or medians suggest. In this section, we look at several characteristics of the labor market to shed light on this aspect of the increase in rural poverty.

**Table 7 – Mean value of household wage income, by quintile and area**

		Quintile				
		1	2	3	4	5
1995						
Urban		37.95	54.54	69.03	79.83	106.10
Rural		26.82	30.36	39.18	38.77	55.95
2001						
Urban		27.96	51.23	64.38	76.51	100.67
Rural		15.46	26.89	34.29	42.20	60.79

Source: BIHS 1995 and 2001

The most notable feature of the Bulgarian labor market is the dramatic rise in unemployment over time.<sup>9</sup> In both urban and rural areas, the unemployment rate nearly doubled between 1995 and 2001 (Table 8). Furthermore, rural unemployment is consistently double that in urban areas. Declines in the share of people working, and increases in the dependency ratio,

<sup>9</sup> We define unemployment in the traditional manner: those without work who are actively looking for work.

are somewhat less severe, softened by increasing labor market participation. Nevertheless, in rural areas, only 24 percent of people older than 15 were working in 2001.

**Table 8** – Labor force status, by urban/rural, 1995, 1997, and 2001

		1995	1997	2001
Unemployment rate/1	Urban	13%	19%	25%
	Rural	25%	37%	46%
Share inactive/2	Urban	40%	43%	42%
	Rural	57%	60%	55%
Share employed/3	Urban	52%	46%	44%
	Rural	32%	25%	24%
Average dependency ratio/4	Urban	1.74	1.85	1.91
	Rural	2.38	2.63	2.54

Source: BIHS 1995, 2001

Notes: /1 Unemployment rate = number of unemployed adults divided by economically active adults

/2 Share inactive = number of adults out of the labor force divided by the total number of adults

/3 Share employed = number of employed adults divided by the total number of adults

/4 Average dependency ratio = Average over all households of the number of non-workers divided

by the number of workers. For households with no workers, a dependency ratio of 3 is assigned.

/5 Adults are all respondents over 15 years of age, including those of retirement age

Table 9 shows the importance of unemployment to poverty. More than one-third of unemployed adult Bulgarians are poor, a far higher percentage than any other labor force status category, including the inactive. In rural areas, 52 percent of unemployed adults are poor. Clearly, unemployment is a large part of the poverty story in Bulgaria, especially in rural areas. Another interesting result in Table 9 is the importance of second job income for poverty reduction. In urban areas, poverty is much lower for workers with one job than it is for the unemployed, but workers that hold a second job (which can include self-employment or agricultural activity) have a poverty rate similar to those with one job. In rural areas, however, while poverty is lower for those with one job, the difference is not as great as in urban areas and, more importantly, the poverty rate continues to decline considerably for workers with two jobs. We will return to this point below when we discuss coping strategies.

**Table 9** – Poverty Headcount for Adults over 15 years old, by Labor Force Status, 2001

	Unemployed	Inactive	One Job	Two Jobs	National
Urban	0.245	0.143	0.068	0.053	0.125
Rural	0.521	0.302	0.280	0.179	0.333
National	0.356	0.204	0.100	0.116	<b>0.192</b>

Source: BIHS 2001

Note: Poverty line set at 83.8 Lev per capita per month

## Determinants of Labor Force Status

The 2001 BIHS survey asks adults about their current employment, but also about the employment in earlier years (1995 and 1998). Given the considerable dislocation of labor due to the profound structural changes in the Bulgarian economy, Table 10 looks at the reason for the change in labor force status for people who are currently not working (inactive or unemployed) but who report having been employed in 1995. The most important reasons, for both urban and rural residents, are lay-offs and retirements. Lay-offs and firings are clearly involuntary job losses, representing an important cause of future unemployment. It would be interesting to know the share of retirements that were voluntary as opposed to being forced by plant closures, etc, but the survey does not ask for this information.

**Table 10** – Reason given in 2001 for not working same job as in 1995

	National	Urban	Rural
Laid off	0.376	0.352	0.426
Fired	0.068	0.069	0.065
New job	0.155	0.186	0.087
Retired	0.331	0.316	0.365
Other	0.070	0.077	0.057

Source: BIHS 2001

Note: Values are shares of respondents reporting a change in labor force status since 1995.

To better understand the determinants of an individual adult's labor force status, Table 11 reports the results of a multinomial logit model for three possible states: out of the labor force (inactive), employed, and unemployed.<sup>10</sup> The table reports regression coefficients and odds ratios. The latter are usually easier to interpret for categorical regressors: they show the probability that someone with one characteristic (say, rural residence) is in a particular category relative to the probability that s/he is in the reference category. Inactive is the reference category in all of these regressions, so an odds ratio less than one for rural residence under the employment option means that, holding all else constant, a rural resident is less likely to be employed than to be inactive.

Several personal and household characteristics have important influences on the probability of being in each of the three labor market states. Education strongly increases the probability of being in the labor market, either employed or unemployed, vs. being inactive. For lower levels of education (primary and middle school graduates, relative to those with no education), the odds ratios are similar across categories: these people are as likely to be unemployed as employed relative to the uneducated. For higher levels of education, however, the odds of being employed are much higher, so that the overall effect of greater education is not only to reduce inactivity, but to increase the probability of employment, dramatically. All adults of non-Bulgarian ethnicity are significantly more likely to be unemployed relative to inactive compared to Bulgarians. Only Roma, however, are significantly less likely to be employed relative to inactive.

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<sup>10</sup> For this and all subsequent tables, we include sub-tables for the regressions run on the urban and rural samples only. In almost all cases, we found few important differences in the models, so our discussion concentrations on the models estimated for the entire sample.

**Table 11** – Multinomial logit for labor force activity status of adults 16 years old and older, BIHS 2001

	Employed vs. Inactive		Unemployed vs. Inactive	
	Estimate	Odds Ratio	Estimate	Odds Ratio
Intercept	-11.284 *		-12.792 *	
Rural	-0.324 *	0.72	0.102	1.11
Gender (female=1)	-0.198	0.82	-0.109	0.90
Age in years	0.654 *	1.92	0.621 *	1.86
Age squared	-0.008 *	0.99	-0.008 *	0.99
Age 16 to 25 dummy	-0.238	0.79	0.457	1.58
Retirement age dummy	0.458 *	1.58	0.443	1.56
Primary graduate	0.378	1.46	0.196	1.22
Middle school graduate	1.035 *	2.82	0.946 *	2.58
Secondary graduate	1.980 *	7.25	1.279 *	3.59
University graduate	2.425 *	11.30	0.970 *	2.64
Disabled	-0.618 *	0.54	-0.587 *	0.56
Spouse of HH head	-0.340 *	0.71	-0.224	0.80
Child of HH head	-0.018	0.98	0.573 *	1.77
Other relation to HH head	0.189	1.21	0.330	1.39
HH head unemployed	0.462 *	1.59	1.142 *	3.13
HH head inactive	-0.351 *	0.70	-0.482 *	0.62
Roma	-0.827 *	0.44	0.850 *	2.34
Turk	0.061	1.06	0.542 *	1.72
Other non-Bulgarian ethnicity	0.227	1.25	0.748 *	2.11
# children 0 to 5 years old	0.336 *	1.40	0.330 *	1.39
# children 0 to 5 X gender	-0.692 *	0.50	-0.596 *	0.55
# children 6 to 15 years old	-0.274 *	0.76	-0.291 *	0.75
# children 6 to 15 X gender	0.053	1.06	-0.044	0.96
# females, 16 to 54 years old	0.166 *	1.18	0.154	1.17
# females 55 and older	0.211	1.24	0.111	1.12
# males 16 to 59 years old	0.058	1.06	0.116	1.12
# males 60 and older	0.286	1.33	0.052	1.05
ln(coop land)	0.264 *	1.30	-0.025	0.98
ln(owned land)	0.005	1.01	-0.009	0.99
ln(restituted land)	-0.003	1.00	0.033	1.03
ln(financial income)	-0.005	1.00	-0.012	0.99
ln(one-off "other" income)	0.026	1.03	-0.021	0.98
ln(remittances received)	-0.040 *	0.96	-0.005	1.00
ln(pensions)	-0.113 *	0.89	-0.076 *	0.93

Notes: 1/ 27 regional dummies not reported here.

2/ Left-out option is inactivity, so each odds ratio is interpreted as the probability that employment or unemployment is observed relative to the probability of inactivity.

3/ A \* indicates significant at the 5% level.

**Table 11r** – Multinomial logit for labor force activity status of adults 16 years old and older, BIHS 2001, Rural only

	Employed vs. Inactive		Unemp vs. Inactive	
	Estimate	Odds Ratio	Estimate	Odds Ratio
Intercept	-16.523		-22.091	
Rural				
Gender (female=1)	-0.300	0.74	0.017	1.02
Age in years	0.664 *	1.94	0.611 *	1.84
Age squared	-0.008 *	0.99	-0.008 *	0.99
Age 16 to 25 dummy	0.198	1.22	0.671	1.96
Retirement age dummy	0.081	1.09	0.267	1.31
Primary graduate	0.384	1.47	-0.307	0.74
Middle school graduate	0.996	2.71	0.430	1.54
Secondary graduate	1.941 *	6.97	1.064 *	2.90
University graduate	2.089 *	8.08	0.297	1.35
Disabled	-1.250 *	0.29	-1.071 *	0.34
Spouse of HH head	-0.158	0.85	-0.260	0.77
Child of HH head	0.420	1.52	0.971 *	2.64
Other relation to HH head	0.436	1.55	0.805 *	2.24
HH head unemployed	0.364	1.44	0.849 *	2.34
HH head inactive	-0.377	0.69	-0.394	0.67
Roma	-1.146 *	0.32	0.780 *	2.18
Turk	0.220	1.25	0.646 *	1.91
Other non-Bulgarian ethnicity	0.126	1.14	1.177 *	3.25
# children 0 to 5 years old	0.545 *	1.72	0.448	1.57
# children 0 to 5 X gender	-0.789 *	0.45	-0.876 *	0.42
# children 6 to 15 years old	-0.282	0.75	-0.377 *	0.69
# children 6 to 15 X gender	-0.038	0.96	-0.142	0.87
# females, 16 to 54 years old	0.351 *	1.42	0.474 *	1.61
# females 55 and older	0.559 *	1.75	0.204	1.23
# males 16 to 59 years old	-0.337 *	0.71	-0.190	0.83
# males 60 and older	0.529	1.70	0.004	1.00
ln(coop land)	0.333 *	1.40	-0.100	0.91
ln(owned land)	-0.004	1.00	-0.020	0.98
ln(restituted land)	-0.001	1.00	0.046	1.05
ln(financial income)	-0.066	0.94	-1.211	0.30
ln(one-off "other" income)	-1.238	0.29	-1.088	0.34
ln(remittances received)	-0.052	0.95	0.005	1.01
ln(pensions)	-0.165 *	0.85	-0.123 *	0.88

Notes: 1/ 27 regional dummies not reported here.

2/ Left-out option is inactivity, so each odds ratio is interpreted as the probability that employment or unemployment is observed relative to the probability of inactivity.

3/ A \* indicates significant at the 5% level.

**Table 11u** – Multinomial logit for labor force activity status of adults 16 years old and older, BIHS 2001, Urban only

	Employed vs. Inactive		Unemployed vs. Inactive	
	Estimate	Odds Ratio	Estimate	Odds Ratio
Intercept	-11.388 *		-13.036 *	
Rural				
Gender (female=1)	-0.205	0.82	-0.211	0.81
Age in years	0.669 *	1.95	0.639 *	1.90
Age squared	-0.009 *	0.99	-0.008 *	0.99
Age 16 to 25 dummy	-0.348	0.71	0.434	1.54
Retirement age dummy	0.684 *	1.98	0.546	1.73
Primary graduate	0.922	2.51	0.725	2.06
Middle school graduate	1.829 *	6.23	1.776 *	5.91
Secondary graduate	2.717 *	15.13	1.845 *	6.33
University graduate	3.189 *	24.27	1.598 *	4.94
Disabled	-0.464 *	0.63	-0.421 *	0.66
Spouse of HH head	-0.384 *	0.68	-0.155	0.86
Child of HH head	-0.139	0.87	0.508 *	1.66
Other relation to HH head	0.141	1.15	0.136	1.15
HH head unemployed	0.374	1.45	1.080 *	2.94
HH head inactive	-0.365 *	0.70	-0.598 *	0.55
Roma	-0.682	0.51	1.118 *	3.06
Turk	-0.033	0.97	0.277	1.32
Other non-Bulgarian ethnicity	-0.022	0.98	-0.159	0.85
# children 0 to 5 years old	0.145	1.16	0.080	1.08
# children 0 to 5 X gender	-0.593 *	0.55	-0.343	0.71
# children 6 to 15 years old	-0.339 *	0.71	-0.341 *	0.71
# children 6 to 15 X gender	0.241	1.27	0.198	1.22
# females, 16 to 54 years old	0.112	1.12	0.030	1.03
# females 55 and older	0.102	1.11	0.105	1.11
# males 16 to 59 years old	0.182	1.20	0.245 *	1.28
# males 60 and older	0.195	1.22	0.172	1.19
ln(coop land)	0.195	1.22	0.066	1.07
ln(owned land)	0.004	1.00	-0.008	0.99
ln(restituted land)	0.008	1.01	0.026	1.03
ln(financial income)	0.021	1.02	0.042	1.04
ln(one-off "other" income)	0.083	1.09	0.090	1.10
ln(remittances received)	-0.035 *	0.97	0.003	1.00
ln(pensions)	-0.098 *	0.91	-0.065 *	0.94

Notes: 1/ 27 regional dummies not reported here.

2/ Left-out option is inactivity, so each odds ratio is interpreted as the probability that employment or unemployment is observed relative to the probability of inactivity.

3/ A \* indicates significant at the 5% level.

Men living in households with children younger than five years-old are more likely to be active, and equally to be unemployed as employed. On the other hand, women living in households with children younger than five years-old are significantly less likely to be active.<sup>11</sup> This pattern is consistent with stereotypical gender roles that assign child care primarily to women. On the other hand, having more children six to fifteen years-old significantly reduces the probability that both men and women work, a result that is difficult to interpret.

Household ownership of land and access to land has no impact on the probability of activity or employment. In particular, owning restitution land does not increase the probability of labor market activity. If an intended consequence of the restitution scheme was to encourage people to work on their own land, that appears to have failed. On the other hand, having access to larger amounts of coop land<sup>12</sup> significantly increases the probability of employment relative to either inactivity or unemployment.

Typically, unearned income tends to reduce the incentive to participate in the labor market by raising the reservation wage. Of the unearned income sources recorded in the survey, having more pension income in one's household significantly decreases the likelihood of labor market activity, especially that of employment.<sup>13</sup>

There are two anomalous results in Table 11. First, People living with a household head who is inactive significantly reduces the probability that one is active, either employed or unemployed. Other things equal, we would expect that the presence of an inactive household member, including the head, would lower reservation wages, encouraging greater, not less, labor force participation. Second, people living with a household head who is unemployed, while more likely to be active, are less likely to be employed than unemployed. Again, we would expect the opposite. One possible explanation for these results is that there are small area effects on employment status. That is, people who live in places where others (including their household head) are unemployed are also likely to be unemployed, and the same for inactivity. Since there is no other variable to capture this locality effect in the model,<sup>14</sup> the household head variables pick it up.

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<sup>11</sup> The effect for women is the sum of the coefficients on the number of children under five in the household and that same variable interacted with gender.

<sup>12</sup> It is not clear to us from the survey whether this land is worked collectively by a coop to which the household belongs, or whether it is coop land that the household may work individually.

<sup>13</sup> This may reflect reverse causality, if one can only claim her/his pension by not working at all.

<sup>14</sup> There are regional dummy variables in the model, but those areas are apparently too large to capture this effect.



**Table 12** – Multinomial logit for labor force activity status of adults 16 years old and older, with cluster fixed effects, BIHS 2001

	Employed vs. Inactive		Unemployed vs. Inactive	
	Estimate	Odds Ratio	Estimate	Odds Ratio
Intercept	-13.770 *		-11.275 *	
Rural	2.886	17.92	-0.177	0.84
Gender (female=1)	-0.257	0.77	-0.234	0.79
Age in years	0.738 *	2.09	0.748 *	2.11
Age squared	-0.009 *	0.99	-0.010 *	0.99
Age 16 to 25 dummy	-0.273	0.76	0.780 *	2.18
Retirement age dummy	0.471 *	1.60	0.392	1.48
Primary graduate	0.220	1.25	-0.191	0.83
Middle school graduate	1.041	2.83	0.782	2.19
Secondary graduate	2.050 *	7.77	1.118 *	3.06
University graduate	2.604 *	13.52	0.806	2.24
Disabled	-1.006 *	0.37	-0.829 *	0.44
Spouse of HH head	-1.115 *	0.33	-0.722 *	0.49
Child of HH head	-1.020 *	0.36	0.044	1.05
Other relation to HH head	-0.715 *	0.49	-0.214	0.81
HH head unemployed	0.917 *	2.50	0.578 *	1.78
HH head inactive	0.612 *	1.84	0.297	1.35
Roma	-1.137 *	0.32	0.966 *	2.63
Turk	-0.369	0.69	0.313	1.37
Other non-Bulgarian ethnicity	-0.105	0.90	1.193	3.30
# children 0 to 5 years old	0.589 *	1.80	0.505 *	1.66
# children 0 to 5 X gender	-1.039 *	0.35	-0.907 *	0.40
# children 6 to 15 years old	-0.230 *	0.80	-0.364 *	0.70
# children 6 to 15 X gender	-0.004	1.00	-0.004	1.00
# females, 16 to 54 years old	-0.012	0.99	0.041	1.04
# females 55 and older	0.330 *	1.39	0.238	1.27
# males 16 to 59 years old	0.137	1.15	0.244 *	1.28
# males 60 and older	0.236	1.27	0.163	1.18
ln(coop land)	0.344 *	1.41	0.028	1.03
ln(owned land)	-0.044 *	0.96	-0.055 *	0.95
ln(restituted land)	0.074 *	1.08	0.095 *	1.10
ln(financial income)	-0.093	0.91	-0.011	0.99
ln(one-off "other" income)	0.075	1.08	-0.015	0.99
ln(remittances received)	-0.071 *	0.93	0.001	1.00
ln(pensions)	-0.199 *	0.82	-0.153 *	0.86

Notes: 1/ 499 cluster dummies not reported here.

2/ Left-out option is inactivity, so each odds ratio is interpreted as the probability that employment or unemployment is observed relative to the probability of inactivity.

3/ A \* indicates significant at the 5% level.

**Table 12r** – Multinomial logit for labor force activity status of adults 16 years old and older, BIHS 2001, with cluster fixed effects, Rural only

	Employed vs. Inactive		Unemp vs. Inactive	
	Estimate	Odds Ratio	Estimate	Odds Ratio
Intercept	-15.850		-19.349	
Rural				
Gender (female=1)	-0.777 *	0.46	-0.402	0.67
Age in years	0.758 *	2.14	0.736 *	2.09
Age squared	-0.010 *	0.99	-0.009 *	0.99
Age 16 to 25 dummy	0.398	1.49	0.963	2.62
Retirement age dummy	-0.112	0.89	0.045	1.05
Primary graduate	-0.336	0.72	-0.767	0.46
Middle school graduate	0.915	2.50	0.279	1.32
Secondary graduate	1.774 *	5.90	0.704	2.02
University graduate	1.719 *	5.58	-0.904	0.41
Disabled	-1.673 *	0.19	-1.388 *	0.25
Spouse of HH head	-0.934 *	0.39	-0.856 *	0.43
Child of HH head	-0.794	0.45	0.387	1.47
Other relation to HH head	-0.697	0.50	0.031	1.03
HH head unemployed	0.839 *	2.31	0.329	1.39
HH head inactive	0.724 *	2.06	0.495	1.64
Roma	-0.470	0.63	0.916	2.50
Turk	-0.028	0.97	0.935	2.55
Other non-Bulgarian ethnicity	-0.184	0.83	1.919	6.82
# children 0 to 5 years old	0.701 *	2.02	0.952 *	2.59
# children 0 to 5 X gender	-1.118 *	0.33	-1.296 *	0.27
# children 6 to 15 years old	-0.194	0.82	-0.455 *	0.64
# children 6 to 15 X gender	-0.175	0.84	-0.160	0.85
# females, 16 to 54 years old	-0.012	0.99	0.174	1.19
# females 55 and older	0.522	1.69	0.169	1.18
# males 16 to 59 years old	0.091	1.10	0.318	1.38
# males 60 and older	0.487	1.63	0.663	1.94
ln(coop land)	0.339 *	1.40	0.030	1.03
ln(owned land)	-0.029	0.97	-0.142 *	0.87
ln(restituted land)	0.070	1.07	0.162 *	1.18
ln(financial income)	-0.022	0.98	-0.961	0.38
ln(one-off "other" income)	-0.901	0.41	-0.759	0.47
ln(remittances received)	-0.062	0.94	-0.009	0.99
ln(pensions)	-0.234 *	0.79	-0.231 *	0.79

Notes: 1/ 499 cluster dummies not reported here.

2/ Left-out option is inactivity, so each odds ratio is interpreted as the probability that employment or unemployment is observed relative to the probability of inactivity.

3/ A \* indicates significant at the 5% level.

**Table 12u** – Multinomial logit for labor force activity status of adults 16 years old and older, BIHS 2001, with cluster fixed effects, Urban only

	Employed vs. Inactive		Unemployed vs. Inactive	
	Estimate	Odds Ratio	Estimate	Odds Ratio
Intercept	-11.176*		-27.158	
Rural				
Gender (female=1)	-0.177	0.84	-0.261	0.77
Age in years	0.741*	2.10	0.750*	2.12
Age squared	-0.010*	0.99	-0.010*	0.99
Age 16 to 25 dummy	-0.450	0.64	0.612	1.84
Retirement age dummy	0.690*	1.99	0.552	1.74
Primary graduate	1.433	4.19	1.186	3.27
Middle school graduate	1.699	5.47	2.043*	7.71
Secondary graduate	2.765*	15.87	2.221*	9.22
University graduate	3.368*	29.03	2.039*	7.69
Disabled	-0.828*	0.44	-0.611*	0.54
Spouse of HH head	-1.156*	0.32	-0.580*	0.56
Child of HH head	-1.123*	0.33	-0.093	0.91
Other relation to HH head	-0.678*	0.51	-0.256	0.77
HH head unemployed	0.894*	2.45	0.636*	1.89
HH head inactive	0.633*	1.88	0.219	1.25
Roma	-1.976*	0.14	0.964	2.62
Turk	-0.604	0.55	0.003	1.00
Other non-Bulgarian ethnicity	-0.292	0.75	-0.008	0.99
# children 0 to 5 years old	0.280	1.32	-0.189	0.83
# children 0 to 5 X gender	-0.933*	0.39	-0.593	0.55
# children 6 to 15 years old	-0.367*	0.69	-0.517*	0.60
# children 6 to 15 X gender	0.204	1.23	0.229	1.26
# females, 16 to 54 years old	-0.032	0.97	-0.017	0.98
# females 55 and older	0.271	1.31	0.297	1.35
# males 16 to 59 years old	0.153	1.17	0.168	1.18
# males 60 and older	0.053	1.05	-0.119	0.89
ln(coop land)	0.257	1.29	0.023	1.02
ln(owned land)	-0.043	0.96	-0.020	0.98
ln(restituted land)	0.073	1.08	0.047	1.05
ln(financial income)	-0.100	0.91	-0.007	0.99
ln(one-off "other" income)	0.116	1.12	0.070	1.07
ln(remittances received)	-0.067*	0.94	0.008	1.01
ln(pensions)	-0.193*	0.83	-0.132*	0.88

Notes: 1/ 499 cluster dummies not reported here.

2/ Left-out option is inactivity, so each odds ratio is interpreted as the probability that employment or unemployment is observed relative to the probability of inactivity.

3/ A \* indicates significant at the 5% level.

To check this hypothesis, we re-run the model in Table 11 including cluster fixed effects (Table 12). Because of the large number of clusters in the survey (500 for a sample of 2500 households), this technique adds an enormous number of regressors to the model, making the estimation difficult. Nevertheless, many of the coefficients common to the models are similar. The main exceptions are those variables that relate to area (rural residence) and to the household head's characteristics. As hypothesized, the living with a household head who is inactive or unemployed now significantly increases the probability of being active in the labor market, and both characteristics increase the odds of employment by more than the odds of unemployment. Thus, we conclude that there are important small area effects on labor market status in Bulgaria.

Note also that in this model, while coop land continues to increase the probability of employment, owned land reduces it significantly. At the same time, owning restituted land increases the probability of labor market activity, both employment and unemployment, putting this program in a better light than the results in Table 11.<sup>15</sup> Finally, spouses of the household head are less likely to be active, and other relations to the household head are less likely to be employed, than are household heads.

### **Determinants of Multiple Job Holding at Individual and Household Level**

We have seen that poverty is significantly lower for individual adults holding two jobs than it is for those holding only one, especially in rural areas. Thus, it is relevant to expand our analysis of labor force status by including an extra state: employed in two jobs. Table 13 presents such results, which are comparable to Table 11, without cluster fixed effects.<sup>16</sup> One interesting finding in this regression is the effect of education on multiple job holdings. As in Table 11, higher levels of education significantly increase the probability of participating in the labor market and of employment. But what is really striking are the very high odds ratios for secondary and university graduates for second job holdings: secondary graduates are 11 times more likely to hold two jobs than to be inactive as compared to those with no education, and university graduates are 18 times more likely to do so. Secondary and university graduates are also twice as likely (11.51/5.05 and 18.37/7.87 respectively) to hold two jobs rather than one.

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<sup>15</sup> The owned land variable is all owned land, including restituted land. Thus, the total effect of restituted land is the sum of the coefficient on owned land and restituted land. The coefficient on restituted land alone indicates any difference in the impact of restituted land relative to other types of owned land.

<sup>16</sup> If all of the members of a cluster or group of clusters fall into a specific category, a linear combination of those clusters is a perfect predictor of that category in the sample, even though this is not true in the population. This biases the estimates, or impedes convergence of the maximum likelihood routine. Because second job holding is a rare state, this problem occurred when estimating a cluster fixed effects version of this model, so we cannot report any results for that model. Based on the results for the three choice model, this suggests that the estimates for household head's labor force status may be biased in Table 13, as might other variables relative to location and position in the household.

**Table 13** – Multinomial logit for labor force activity status of adults 16 years old and older, with second job option, BIHS 2001

	Unemployed		Employed		Two jobs	
	Estimate	Odds ratio	Estimate	Odds ratio	Estimate	Odds ratio
Intercept	-12.630*		-10.673*		-23.422	
Rural	0.093	1.10	-0.630*	0.53	0.702*	2.017
Gender (female=1)	-0.106	0.90	-0.162	0.85	-0.426	0.653
Age in years	0.620*	1.86	0.635*	1.89	0.798*	2.221
Age squared	-0.008*	0.99	-0.008*	0.99	-0.010*	0.990
Age 16 to 25 dummy	0.462*	1.59	-0.257	0.77	-0.222	0.801
Retirement age dummy	0.432	1.54	0.471*	1.60	0.376	1.456
Middle school graduate	0.812*	2.25	0.587*	1.80	1.679*	5.358
Secondary graduate	1.141*	3.13	1.618*	5.05	2.443*	11.511
University graduate	0.836*	2.31	2.063*	7.87	2.911*	18.373
Disabled	-0.594*	0.55	-0.612*	0.54	-0.645*	0.525
Spouse of HH head	-0.226	0.80	-0.339*	0.71	-0.371	0.690
Child of HH head	0.559*	1.75	0.011	1.01	-0.170	0.844
Other relation to HH head	0.324	1.38	0.262	1.30	-0.029	0.971
HH head unemployed	1.139*	3.13	0.447*	1.56	0.447	1.564
HH head inactive	-0.484*	0.62	-0.245	0.78	-0.863*	0.422
Roma	0.856*	2.36	-0.656*	0.52	-2.087*	0.124
Turk	0.550*	1.73	0.076	1.08	0.275	1.316
Other non-Bulgarian ethnicity	0.738*	2.09	0.472	1.60	-0.591	0.554
# children 0 to 5 years old	0.337*	1.40	0.345*	1.41	0.449*	1.567
# children 0 to 5 X gender	-0.600*	0.55	-0.719*	0.49	-0.584	0.558
# children 6 to 15 years old	-0.289*	0.75	-0.243*	0.78	-0.358*	0.699
# children 6 to 15 X gender	-0.047	0.95	0.026	1.03	0.231	1.260
# females, 16 to 54 years old	0.150	1.16	0.189*	1.21	0.035	1.036
# females 55 and older	0.102	1.11	0.190	1.21	0.251	1.286
# males 16 to 59 years old	0.117	1.12	0.018	1.02	0.260*	1.296
# males 60 and older	0.049	1.05	0.235	1.26	0.572	1.771
ln(coop land)	-0.027	0.97	0.262*	1.30	0.339*	1.403
ln(owned land)	-0.006	0.99	-0.028	0.97	0.142*	1.153
ln(restituted land)	0.033	1.03	-0.013	0.99	0.011	1.011
ln(financial income)	-0.013	0.99	0.001	1.00	-0.007	0.993
ln(one-off "other" income)	-0.015	0.99	0.035	1.04	-1.190	0.304
ln(remittances received)	-0.004	1.00	-0.045*	0.96	-0.019	0.981
ln(pensions)	-0.076*	0.93	-0.100*	0.90	-0.171*	0.843

Notes: 1/ 27 regional dummies not reported here.

2/ Left-out option is inactivity, so each odds ratio is interpreted as the probability that employment or unemployment is observed relative to the probability of inactivity.

3/ A \* indicates significant at the 5% level.

**Table 13r** – Multinomial logit for labor force activity status of adults 16 years old and older, with second job option, Rural only, BIHS 2001

	Unemployed		Employed		Two jobs	
	Estimate	Odds ratio	Estimate	Odds ratio	Estimate	Odds ratio
Intercept	-21.740		-14.673		-26.423	
Rural						
Gender (female=1)	0.015	1.015	-0.575	0.563	0.215	1.239
Age in years	0.609*	1.838	0.568*	1.765	0.902*	2.463
Age squared	-0.008*	0.992	-0.007*	0.993	-0.011*	0.989
Age 16 to 25 dummy	0.623	1.864	0.011	1.011	0.505	1.657
Retirement age dummy	0.282	1.325	-0.296	0.744	0.642	1.901
Middle school graduate	0.623*	1.865	0.415*	1.515	1.571*	4.813
Secondary graduate	1.247*	3.478	1.499*	4.476	2.308*	10.054
University graduate	0.504	1.655	1.906	6.727	1.945	6.993
Disabled	-1.070*	0.343	-1.182*	0.307	-1.288*	0.276
Spouse of HH head	-0.228	0.796	0.161	1.175	-0.691	0.501
Child of HH head	1.000*	2.717	0.564*	1.757	0.239*	1.269
Other relation to HH head	0.841*	2.319	0.780*	2.182	-0.102*	0.903
HH head unemployed	0.877*	2.404	0.212*	1.236	0.794*	2.213
HH head inactive	-0.404	0.668	-0.196	0.822	-0.694	0.500
Roma	0.734*	2.084	-1.249*	0.287	-1.858*	0.156
Turk	0.619*	1.856	0.063*	1.065	0.549*	1.732
Other non-Bulgarian ethnicity	1.158*	3.182	0.684*	1.982	-0.776*	0.460
# children 0 to 5 years old	0.454	1.575	0.471	1.602	0.737	2.090
# children 0 to 5 X gender	-0.879*	0.415	-0.810*	0.445	-0.710*	0.492
# children 6 to 15 years old	-0.378*	0.685	-0.219*	0.803	-0.356*	0.701
# children 6 to 15 X gender	-0.144	0.866	-0.021	0.979	-0.051	0.950
# females, 16 to 54 years old	0.461*	1.586	0.365*	1.441	0.376*	1.456
# females 55 and older	0.182	1.199	0.505	1.658	0.718	2.050
# males 16 to 59 years old	-0.182	0.833	-0.153	0.858	-0.746	0.474
# males 60 and older	-0.005	0.995	0.533	1.704	0.700	2.014
ln(coop land)	-0.107	0.899	0.313	1.367	0.415	1.515
ln(owned land)	-0.021	0.979	-0.088	0.916	0.135	1.144
ln(restituted land)	0.049	1.050	0.002	1.002	-0.003	0.997
ln(financial income)	-1.185	0.306	-0.007	0.993	-1.228	0.293
ln(one-off "other" income)	-1.004	0.366	-1.141	0.320	-1.073	0.342
ln(remittances received)	0.006	1.006	-0.073	0.930	-0.034	0.967
ln(pensions)	-0.120*	0.887	-0.131*	0.877	-0.214*	0.807

Notes: 1/ 27 regional dummies not reported here.

2/ Left-out option is inactivity, so each odds ratio is interpreted as the probability that employment or unemployment is observed relative to the probability of inactivity.

3/ A \* indicates significant at the 5% level.

**Table 13u** – Multinomial logit for labor force activity status of adults 16 years old and older, with second job option, Urban only, BIHS 2001

	Unemployed		Employed		Two jobs	
	Estimate	Odds ratio	Estimate	Odds ratio	Estimate	Odds ratio
Intercept	-12.506*		-10.959*		-29.358*	
Rural						
Gender (female=1)	-0.212	0.809	-0.150	0.861	-0.881	0.414
Age in years	0.639*	1.895	0.668*	1.950	0.719*	2.052
Age squared	-0.008*	0.992	-0.009*	0.991	-0.009*	0.991
Age 16 to 25 dummy	0.437	1.547	-0.318	0.727	-1.118	0.327
Retirement age dummy	0.544	1.722	0.744	2.105	0.241	1.273
Middle school graduate	1.253*	3.500	1.112*	3.041	10.445*	
Secondary graduate	1.327*	3.770	1.999*	7.379	11.359*	
University graduate	1.074*	2.928	2.455*	11.644	11.986*	
Disabled	-0.429*	0.651	-0.486*	0.615	-0.410*	0.664
Spouse of HH head	-0.150	0.861	-0.396	0.673	-0.159	0.853
Child of HH head	0.504*	1.656	-0.127*	0.881	-0.311*	0.733
Other relation to HH head	0.140	1.150	0.153	1.165	0.155	1.167
HH head unemployed	1.069*	2.911	0.391*	1.478	-0.072*	0.930
HH head inactive	-0.603*	0.547	-0.313*	0.731	-1.115*	0.328
Roma	1.142*	3.132	-0.563*	0.570	-12.013*	0.001
Turk	0.278	1.320	-0.045	0.956	0.055	1.057
Other non-Bulgarian ethnicity	-0.166	0.847	-0.021	0.979	0.089	1.093
# children 0 to 5 years old	0.077	1.080	0.141	1.151	0.180	1.197
# children 0 to 5 X gender	-0.333	0.717	-0.590	0.555	-0.574	0.563
# children 6 to 15 years old	-0.345*	0.708	-0.328*	0.721	-0.497*	0.608
# children 6 to 15 X gender	0.198	1.218	0.204	1.226	0.643	1.903
# females, 16 to 54 years old	0.031	1.031	0.121	1.129	-0.046	0.955
# females 55 and older	0.108	1.114	0.122	1.129	-0.212	0.809
# males 16 to 59 years old	0.240*	1.271	0.108*	1.114	0.841*	2.318
# males 60 and older	0.177	1.193	0.142	1.153	0.649	1.913
ln(coop land)	0.072	1.075	0.164	1.178	0.301	1.351
ln(owned land)	-0.007	0.993	-0.018	0.983	0.152	1.164
ln(restituted land)	0.025	1.025	-0.002	0.998	0.076	1.079
ln(financial income)	0.039	1.039	0.017	1.017	0.061	1.063
ln(one-off "other" income)	0.086	1.090	0.094	1.099	-1.558	0.211
ln(remittances received)	0.003	1.003	-0.037	0.964	-0.016	0.984
ln(pensions)	-0.065*	0.937	-0.092*	0.912	-0.157*	0.855

Notes: 1/ 27 regional dummies not reported here.

2/ Left-out option is inactivity, so each odds ratio is interpreted as the probability that employment or unemployment is observed relative to the probability of inactivity.

3/ A \* indicates significant at the 5% level.

Another important finding in this regression is that land, both coop and owned, strongly increase the probability that one has two jobs relative to being inactive, even though land holdings do not affect the probability of holding only *one* job. Also, recall that because restituted land is included in total owned land, the fact that the coefficient on restituted land is not different from zero implies that its effect on second job holding is comparable to the effect of land acquired from other sources, i.e. restituted land increases the probability of second job holdings. As we will see in the section on coping strategies below, the vast majority of second jobs in the 2001 BIHS survey are in own-account agriculture, so the importance of land holdings in this regression is perhaps not surprising. But, consistent with the household welfare regressions presented above, it does highlight the policy importance of land holdings for poverty reduction, especially in rural areas and, as in Table 12, sheds a favorable light on the restitution program.

Finally, we note that, subject to the reservation that we have not controlled for cluster fixed effects, rural residents are significantly less likely to hold one job relative to inactivity, but significantly more likely to hold two jobs. Again, the fact that own-account agriculture is the most common form of secondary employment would seem to be behind this.

Tables 10 through 12 focus on the labor market status of individuals, but arguably, the labor market status of all members of a household, determined jointly, is what affects poverty. Table 14 explores the determinants of the number of jobs at the household level. This model is an ordered probit, where the ordering is zero, one, two, and three or more jobs per household.<sup>17</sup> We have changed statistical technique because a multinomial logit model requires that we specify the relevant options for all observations (households, in this case), but those options clearly vary with the number of adults in the household. A one-person household cannot hold three jobs. The ordered probit allows us to consider these options for all households, regardless of size, as long as we control for household size in the regression. The cost of this is a more restrictive functional form.

Fortunately, the results in Table 14 are quite similar to those in the multinomial regression. Higher levels of education in the household increase the probability of a greater number of jobs. Greater numbers of children or people of retirement age reduce the probability of more jobs, after having controlled for overall household size, which strongly increases the probability of more jobs, as expected. From a policy perspective, owning more land and having access to more coop land both increase the probability of more jobs in the household. But in this regression, unlike the previous model, we find that owning restitution land is less likely to increase the number of jobs in a household than other owned land. However, its effect remains positive (the sum of the two coefficients), and significantly greater than zero.

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<sup>17</sup> Very few households have more than three jobs in the 2001 BIHS survey.



**Table 14 - Ordered probit for number of jobs per household, BIHS01**

Parameter	Estimate	Standard Error
Intercept, one job	-2.378 *	0.370
Intercept, two jobs	1.231 *	0.046
Intercept, three or more jobs	2.209 *	0.055
Rural	-0.013	0.069
Household size	0.469 *	0.081
HH No. of primary graduates	0.049	0.072
HH No. of middle school graduates	-0.002	0.074
HH No. of secondary graduates	0.339 *	0.075
HH No. of university graduates	0.462 *	0.078
HH No. of disabled people	-0.001	0.028
Crowding index	-0.019	0.044
Potential dependency ratio	0.335 *	0.065
Roma	-1.327 *	0.154
Turk	-0.190	0.121
Other non-Bulgarian ethnicity	-0.170	0.195
Number of children 0 to 5 years old	-0.570 *	0.099
Number of children 0 to 5 years old	-0.471 *	0.067
Number of women 16 to 54 years old	-0.069	0.059
Number of women older than 55 years	-0.534 *	0.083
Number of men older than 60 years	-0.565 *	0.077
ln(total acreage of cooperative)	0.247 *	0.053
ln(HH's owned land)	0.039 *	0.008
ln(HH's owned land from restitution)	-0.022 *	0.011
ln(financial assets)	0.008	0.041
ln(other one-off income)	0.004	0.049
ln(remittances received)	-0.028 *	0.008
ln(pensions)	-0.094 *	0.011

Notes: 1/ A positive coefficient indicates a higher probability of a higher number of jobs.

2/ A star indicates a significant coefficient at alpha=0.05.

3/ Sample is all households in the 2001 BIHS.

4/ The predicted number of jobs per capita has a 0.41 correlation with per capita expenditures at the household level.

## Determinants of wages

In addition to employment, the other key determinant of wage income is, of course, one's wage rate. Table 15 examines the determinants of wages for working adults in Bulgaria. It is interesting to note that several variables that are important in determining whether one is employed are not significant in this regression, including rural residence and all of the ethnicity dummies. Higher levels of schooling have large effects on wages – secondary and university graduates have wages that are 49 and 79 percent higher than those with no schooling, all else constant – but the standard errors on these variables are large, so that only the university coefficient is significantly different from zero. Greater experience at one's job increases the wage rate for the first 19 years of work, although this effect is largely offset by the negative coefficient on age, which is highly correlated with experience. Workers under 25 years old and those of retirement age also have lower wages, other things equal.

A key finding from Table 15 is that many sectors have higher wages than agriculture.<sup>18</sup> Manufacturing, construction, communications, other production activities, and arts/culture/etc. all have wages that are more than 20 percent higher than agriculture, on average and holding all else constant. Only the trade sector has (slightly) lower wages than agriculture, a difference that is not statistically significant. Obviously, a much higher share of rural workers are found in agriculture.

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<sup>18</sup> Agriculture and forestry is the left-out sector in the regression, so the coefficients show the average percentage difference between the reported sector and agriculture.

**Table 15 - Wage regressions for working adults, BIHS 2001**

Variable	OLS		Heckman correction	
	Parameter Estimate	t Value	Parameter Estimate	t Value
	R-Square	0.1876	R-Square	0.1917
	Adj R-Sq	0.1619	Adj R-Sq	0.1657
Intercept	-0.16069	-0.39	0.0812	0.2
Rural	-0.05197	-1.33	-0.02797	-0.7
Gender	-0.23799	-7.8	-0.22061	-7.12
Age in years	-0.01831	-1.25	-0.03117	-2.05
Age squared	0.00023	1.29	0.000394	2.11
Under 25 years old	-0.17141	-2.29	-0.1021	-1.3
Retirement age (55/F, 60M)	-0.14041	-1.73	-0.14431	-1.78
Experience, current job	0.01818	3.55	0.01757	3.44
Experience squared	-0.00048	-3.13	-0.00047	-3.04
Primary graduate	0.11432	0.35	0.15626	0.48
Middle school graduate	0.3484	1.2	0.39794	1.37
Secondary graduate	0.48715	1.68	0.49316	1.71
University graduate	0.78619	2.7	0.77589	2.67
Roma	-0.13369	-1.18	-0.04279	-0.37
Turk	0.04284	0.57	0.04072	0.54
Other non-Bulgarian ethnicity	-0.02383	-0.2	-0.02188	-0.19
Manufacturing/Industry	0.22664	3.12	0.23966	3.3
Construction	0.21491	2.31	0.23153	2.49
Transportation	0.07706	0.95	0.08579	1.06
Communications	0.28531	2.61	0.30181	2.76
Trade	-0.00307	-0.04	0.00452	0.06
Commercial services	0.0123	0.14	0.02458	0.28
Other production activities	0.23247	2.67	0.24623	2.83
Science/Education	0.12489	1.48	0.13696	1.62
Arts/Culture/Sports/Tourism/Army/Police	0.20103	2.36	0.21307	2.5
Health care	-0.06036	-0.69	-0.0386	-0.44
Finance/Credit/Management/Administration	0.16961	1.78	0.17425	1.83
All other sectors	0.09092	1.04	0.09726	1.12

**Table 15 - Wage regressions for working adults, BIHS 2001 (continued)**

Varna	-0.00528	-0.08	-0.03351	-0.5
Veliko Tarnovo	0.04427	0.7	0.03827	0.6
Vidin	0.05274	0.82	0.05273	0.82
Vratza	-0.03377	-0.41	-0.01771	-0.21
Gabrovo	-0.13913	-1.01	-0.07587	-0.55
Kardjali	0.00592	0.06	0.02619	0.28
Kiustendil	-0.13446	-1.36	-0.14927	-1.51
Lovech	-0.24271	-2.17	-0.25891	-2.32
Montana	0.11312	1.28	0.1015	1.15
Pazardjik	0.06256	0.62	0.05018	0.5
Pernik	-0.11571	-1.32	-0.12135	-1.39
Pleven	-0.1153	-1.25	-0.10069	-1.09
Plovdiv	-0.10539	-0.92	-0.0695	-0.61
Razgrad	-0.15392	-2.1	-0.1529	-2.09
Rousse	-0.08351	-1.55	-0.08358	-1.55
Silistra	-0.06603	-0.54	-0.07372	-0.61
Sliven	-0.12619	-1.45	-0.12356	-1.43
Smolian	-0.33617	-2.37	-0.32592	-2.31
Sofia-city	-0.14083	-1.38	-0.13118	-1.29
Sofia-district	-0.45095	-3.76	-0.45581	-3.81
Stara Zagora	-0.00735	-0.09	-0.018	-0.23
Dobrich	-0.11042	-1.32	-0.09279	-1.11
Targovishte	0.00249	0.03	0.00182	0.02
Haskovo	-0.17732	-1.55	-0.14151	-1.24
Shumen	-0.03022	-0.39	-0.04372	-0.57
Yambol	-0.30088	-3.14	-0.26861	-2.79
Varna	-0.07325	-0.67	-0.06229	-0.57
Inverse Mills ratio			-0.14737	-2.94

Note: 1/ Left-out industry is agriculture and forestry.

2/ Left-out region is Sofia city.

**Table 15r - Wage regressions for working adults, Rural only, BIHS 2001**

Variable	OLS		Heckman correction	
	R-Square	0.1876	R-Square	0.1917
	Adj R-Sq	0.1619	Adj R-Sq	0.1657
	Parameter Estimate	t Value	Parameter Estimate	t Value
Intercept	-0.90403	-1.01	-0.59256	-0.64
Rural				
Gender	-0.15217	-1.94	-0.13663	-1.73
Age in years	0.01218	0.31	-0.00418	-0.1
Age squared	-0.00024	-0.49	-3E-05	-0.06
Under 25 years old	0.0701	0.32	0.09525	0.44
Retirement age (55/F, 60M)	0.16191	0.85	0.13643	0.71
Experience, current job	0.02321	1.71	0.02248	1.66
Experience squared	-0.00043	-1.04	-0.00042	-1.01
Primary graduate	0.39334	0.98	0.44395	1.1
Middle school graduate	0.45174	1.2	0.51771	1.37
Secondary graduate	0.51272	1.36	0.54035	1.43
University graduate	0.67389	1.68	0.67425	1.69
Roma	-0.26263	-1.27	-0.17706	-0.83
Turk	-0.14606	-1.02	-0.14025	-0.98
Other non-Bulgarian ethnicity	-0.09053	-0.47	-0.07097	-0.37
Manufacturing/Industry	0.43026	3.76	0.44635	3.89
Construction	0.40159	2.09	0.4214	2.2
Transportation	0.11289	0.72	0.10632	0.68
Communications	0.28619	1.26	0.30583	1.34
Trade	0.10989	0.68	0.11701	0.72
Commercial services	-0.19732	-1.35	-0.17883	-1.22
Other production activities	0.296	1.81	0.30395	1.86
Science/Education	0.24909	1.27	0.26263	1.34
Arts/Culture/Sports/Tourism/Army/Police	0.00907	0.04	0.01	0.05
Health care	-0.10514	-0.5	-0.06972	-0.33
Finance/Credit/Management/Administration	0.39282	1.92	0.39679	1.94
All other sectors	-0.17041	-0.91	-0.17524	-0.94

**Table 15r - Wage regressions for working adults, Rural only (continued)**

Varna	-0.02165	-0.11	-0.05936	-0.3
Veliko Tarnovo	0.065	0.31	0.06129	0.29
Vidin	0.12755	0.47	0.12651	0.47
Vratza	0.0095	0.04	0.02321	0.1
Gabrovo	-0.07716	-0.23	0.01788	0.05
Kardjali	-0.12297	-0.47	-0.1145	-0.44
Kiustendil	0.32081	0.68	0.26592	0.56
Lovech	0.02794	0.11	-0.02014	-0.08
Montana	0.43485	2.02	0.42193	1.96
Pazardjik	0.55758	2.12	0.53091	2.02
Pernik	-0.06125	-0.25	-0.04888	-0.2
Pleven	-0.1631	-0.69	-0.14799	-0.63
Plovdiv	-0.23278	-0.77	-0.21001	-0.69
Razgrad	0.04251	0.19	0.05292	0.24
Rousse	-0.11929	-0.6	-0.11455	-0.57
Silistra	0.50863	1.77	0.48416	1.68
Sliven	0.03243	0.11	0.01975	0.06
Smolian	-0.15633	-0.24	-0.21168	-0.32
Sofia-city	0.20353	0.75	0.21405	0.79
Sofia-district	-0.44359	-1.84	-0.45516	-1.89
Stara Zagora	0.04139	0.18	0.04153	0.18
Dobrich	-0.00641	-0.02	0.01918	0.07
Targovishte	-0.11321	-0.36	-0.1584	-0.5
Haskovo	-0.34733	-0.95	-0.23354	-0.63
Shumen	-0.14318	-0.54	-0.17727	-0.67
Yambol	-0.32014	-1.1	-0.30354	-1.04
Varna	0.04858	0.15	0.08852	0.28
Inverse Mills ratio			-0.12844	-1.46

Note: 1/ Left-out industry is agriculture and forestry.

2/ Left-out region is Sofia city.

**Table 15u - Wage regressions for working adults, Urban only BIHS 2001**

Variable	OLS		Heckman correction	
	R-Square	0.1876	R-Square	0.1917
	Adj R-Sq	0.1619	Adj R-Sq	0.1657
	Parameter Estimate	t Value	Parameter Estimate	t Value
Intercept	0.61989	0.95	0.898	1.36
Rural				
Gender	-0.25669	-7.75	-0.24051	-7.1
Age in years	-0.02485	-1.56	-0.03671	-2.19
Age squared	0.000326	1.67	0.000478	2.32
Under 25 years old	-0.20874	-2.62	-0.13155	-1.52
Retirement age (55/F, 60M)	-0.21038	-2.3	-0.21068	-2.31
Experience, current job	0.0177	3.18	0.01709	3.07
Experience squared	-0.00048	-2.83	-0.00046	-2.76
Primary graduate	-0.87533	-1.09	-0.89826	-1.12
Middle school graduate	-0.35264	-0.63	-0.36405	-0.65
Secondary graduate	-0.18087	-0.32	-0.23183	-0.41
University graduate	0.13405	0.24	0.06784	0.12
Roma	0.1564	0.95	0.24231	1.44
Turk	0.1662	1.68	0.1561	1.58
Other non-Bulgarian ethnicity	0.04298	0.26	0.03829	0.23
Manufacturing/Industry	0.17095	1.28	0.18522	1.38
Construction	0.17391	1.17	0.19031	1.28
Transportation	0.07186	0.52	0.08437	0.61
Communications	0.29839	1.85	0.31034	1.92
Trade	-0.01084	-0.08	-0.00209	-0.02
Commercial services	0.10996	0.74	0.12123	0.82
Other production activities	0.2125	1.48	0.23138	1.61
Science/Education	0.12361	0.89	0.13714	0.98
Arts/Culture/Sports/Tourism/Army/Police	0.21831	1.56	0.23247	1.66
Health care	-0.06002	-0.42	-0.03776	-0.27
Finance/Credit/Management/Administration	0.13825	0.93	0.14558	0.98
All other sectors	0.117	0.82	0.12492	0.88

**Table 15u - Wage regressions for working adults, Urban only (continued)**

Varna	0.000673	0.01	-0.01727	-0.22
Veliko Tarnovo	0.10992	1.58	0.10238	1.47
Vidin	0.04926	0.75	0.04908	0.75
Vratza	-0.0156	-0.17	-0.00022	0
Gabrovo	-0.07555	-0.48	-0.02934	-0.18
Kardjali	0.09569	0.92	0.11608	1.11
Kiustendil	-0.14337	-1.45	-0.15554	-1.57
Lovech	-0.34423	-2.36	-0.33156	-2.27
Montana	-0.05426	-0.49	-0.06377	-0.58
Pazardjik	-0.07348	-0.64	-0.08031	-0.7
Pernik	-0.09276	-0.94	-0.10521	-1.06
Pleven	-0.05201	-0.48	-0.0431	-0.39
Plovdiv	-0.07884	-0.63	-0.04193	-0.33
Razgrad	-0.15003	-1.86	-0.15508	-1.92
Rousse	-0.05563	-0.98	-0.05678	-1
Silistra	-0.27287	-1.92	-0.2737	-1.93
Sliven	-0.13683	-1.52	-0.13105	-1.46
Smolian	-0.30206	-2.11	-0.2872	-2.01
Sofia-city	-0.21466	-1.86	-0.20408	-1.77
Sofia-district	-0.45624	-2.79	-0.45396	-2.78
Stara Zagora	-0.01979	-0.23	-0.03056	-0.36
Dobrich	-0.11706	-1.29	-0.10529	-1.16
Targovishte	0.08191	0.78	0.09103	0.87
Haskovo	-0.11878	-0.99	-0.10082	-0.84
Shumen	0.0186	0.23	0.00893	0.11
Yambol	-0.26881	-2.63	-0.23332	-2.26
Varna	-0.07933	-0.67	-0.07957	-0.67
Inverse Mills ratio			-0.14757	-2.24

Note: 1/ Left-out industry is agriculture and forestry.

2/ Left-out region is Sofia city.



## A Reduced Form Approach to the Determinants of Rural Poverty

The previous section examines the potential determinants of poverty component by component. While such detailed information can be instructive, it is open to the criticism that it does not capture the totality of determinants, or the correlations between them. An alternative strategy is to simply regress per capita expenditure on a variety of structural and policy variables that determine a household's living standard. Table 16 presents one such regression for rural households in Bulgaria. Our primary concern was to examine the impact that landholdings and agricultural assets have on household welfare, so the regression includes all of the possible land use and ownership variables that the BIHS survey permits, by type and source. Only a few of these land variables are significant in their own right: cropland that is inherited, rented land that is cultivated, and non-use coop land that is controlled by the household. One reason for the low levels of significance of individual land variables may be the small number of households that own many of these types of land, and the potential multicollinearity between them. We therefore run joint significance tests on land holdings. The results, shown in Table 16, indicate that the following grouping of landholdings all have significant benefits for household welfare: restituted land; inherited land; cropland, coop land, and land rented in. In contrast, we are unable to reject the null of non-significance for land rented out, orchard and pasture land, as well as the other land type category.

Among the asset variables, while we find that non-agricultural assets have positive effects on household welfare, non-land agricultural assets do not.<sup>19</sup> Assuming that animals are a form of assets, we find that ownership of livestock raises household welfare, with this effect being twice as strong for cattle as for sheep. Poultry have an even smaller effect on household per capita expenditures.

In terms of other covariates in the model, we observe that as education increases, so does per capita expenditures. For example, a household whose head has secondary education can expect to have a level of per capita expenditure more than 36 percent greater than a household whose head has not completed primary school.

Households where the head suffered an unwanted or unanticipated job loss also have six percent lower expenditures per capita, although this variable is not statistically significant at standard levels, contradicting our expectations about the effect of unemployment on welfare. Ethnicity has important effects on living standards. Particularly pronounced is the negative effect of being Roma, and to a lesser extent, being of Turkish origin. Households that report that the head is female do not have any difference in expenditures than when the head is male. Among the household demographic variables, the number of children less than five years old and the number of elderly, have negative and significant effects on household per capita expenditure levels.

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<sup>19</sup> There is a valid argument that unlike in Africa or Asia, livestock are not correctly considered assets, but instead, are more of a consumption good that is effected by household expenditure levels. To the extent that this is the case, caution is warranted in interpreting these coefficients.

**Table 16** – Reduced form welfare regression

Variable	Parameter	
	Estimate	t Value
Intercept	4.62093	18.32
Bourgass	-0.12587	-1
Varna	-0.12642	-0.99
Lovetch	-0.05765	-0.46
Montana	0.000855	0.01
Plovdiv	-0.05939	-0.49
Rousse	-0.06176	-0.49
Sofia Region	-0.08904	-0.73
Haskovo	-0.00816	-0.06
Household size	-0.01944	-1.4
No. of children (0-5)	-0.15106	-3.23
No. of Elderly (65+)	-0.08293	-2.57
Age of HH head	0.000608	0.08
Age of HH head squared	-1.2E-05	-0.18
Female HH headship	0.06349	0.56
Single HH headship	0.0735	1.22
Single Female HH headship	-0.16319	-1.22
Education of HH head – Primary	0.14744	1.51
Education of HH head – Middle School	0.19432	2.01
Education of HH head – Secondary	0.35614	3.39
Education of HH head – University	0.4458	3.55
Ethnicity – Turkish	-0.27825	-4.5
Ethnicity – Roma	-0.70085	-9.76
Other Ethnicity	-0.11428	-1.15
Fired or Laid-Off from 1995 Job	-0.06412	-1.2
Retired from 1995 Job	0.04926	0.81
<i>Variables With Per Capita Scaling:</i>		
Public and Private Pensions	0.000442	0.66
Disability and Survivor Pensions	-0.00061	-0.32
Social Benefits	0.00375	0.97
Non-Agricultural Assets	3.51E-05	6.21
Agricultural Assets	6.21E-08	0.51
No. of Cattle Owned	0.06556	1.21
No. of Sheep Owned	0.03429	2.61
No. of Goats and Pigs Owned	0.01142	0.76
No. of Poultry Owned	0.01059	2.79
Restituted Orchard and Pasture Land	-0.02821	-1.47
Restituted Crop Land	0.01477	1.49
Inherited Orchard and Pasture Land	0.0056	1.44
Inherited Crop Land	0.02548	2.49
Other Orchard and Pasture Land	-0.00567	-0.06

**Table 16 – Reduced form welfare regression (continued)**

Other Crop Land	0.00289	0.04
Coop Orchard and Pasture Land	-0.68635	-0.7
Coop Crop Land	0.10306	1.27
Rented Orchards and Pasture Land	0.59271	3.2
Rented Crop Land	-0.05142	-0.96
Restituted Non-Use Ag Land – Rented	0.03157	1.5
Restituted Non-Use Ag Land – Not Rented	0.00214	0.22
Inherited Non-Use Ag Land – Rented	-0.24864	-1.26
Inherited Non-Use Ag Land – Not Rented	0.00423	0.74
Other Non-Use Ag Land – Not Rented	0.70628	0.52
Restituted Non-Use Coop Land	0.00913	2.9
Inherited Non-Use Coop Land	0.000993	0.35
Other Non-Use Coop Land	0.02505	1.61

Source: BIHS 2001

Note: Omitted variables include the city of Sofia, an indicator that the household head has no education, and the Bulgarian ethnicity. In addition, the primary method of land acquisition for the “Other” land category is purchases, although additional methods include “Given by Government”, “Free”, and “Other”.

## Coping strategies

Bulgarian households have suffered a series of shocks to their welfare over the past twelve years. How have they dealt with these shocks? In this section, we look at five typical coping strategies, three private and two public, that households use when faced with substantial income loss.

### Migration of one household member

A common response to a localized shock such as a plant closure is for one or more household members to migrate to a place with higher employment probability, and then to remit money to support his/her family. The 2001 BIHS survey has information on household members away from home, and on remittances. Table 17 shows that 5.4 percent of household members were away from home at the time of the survey, but only 1.6 percent of these were away to work. Thus, this strategy seems to be of limited importance for Bulgarians. Urban residents are somewhat more likely to migrate abroad to work, while rural residents are more likely to move to another location within the country.

**Table 17** – Reason for an absence at time of survey, share of household members

	Urban	Rural	National
For work abroad	0.007	0.011	0.008
For work in Bulgaria	0.009	0.007	0.008
Other reason	0.042	0.029	0.038

Source: BIHS 2001

### Migration of entire households

Table 18 shows that only 4.3% of all people in the 2001 BIHS sample have moved since 1995, and 5.4 % since 1990, suggesting that migration of entire households is also not a major coping strategy in Bulgaria. Further, it is interesting to note that there is no clear dominance of rural-to-urban flows – significant shares of both urban and rural residents move to rural areas. Thus, unlike other developing countries, rural-to-urban migration does not seem to be an important phenomenon in Bulgaria, particularly when considering the size of the income declines observed in rural areas.

**Table 18** – Migration to/from urban/rural areas since 1995, share of household members

		2001	
		Urban	Rural
1995	Urban	0.025	0.020
	Rural	0.023	0.016

Source: BIHS 2001

### Remittances

Table 19 shows the weight of remittance income as a share of total household expenditures, in urban and rural areas and across the expenditure quintiles. On average, the

monetary values are small, a few Lev per person per month, which amounts to only two or three percent of expenditures per capita. Note also that rural households are net remitters (senders) rather than net recipients of remittances on average, although this is not true for rural households in the poorest two quintiles. Given the small amounts involved, it is not surprising that remittances have a minor impact on poverty in both urban and rural areas. If we remove net remittances from households' per capita expenditure, the poverty headcount would increase by 0.013 nationwide, and by 0.024 and -0.008 in urban and rural areas, respectively (Table 20).<sup>20 21</sup>

**Table 19** – Lev value and share of net remittances in total expenditures, by quintile and area

	Quintile					
	1	2	3	4	5	All
<b>Mean</b>						
Urban	2.01	2.91	3.42	5.50	4.51	3.85
Rural	0.89	2.22	-4.94	-1.05	-7.61	-1.14
<b>Share</b>						
Urban	0.022	0.027	0.028	0.036	0.019	0.027
Rural	0.014	0.020	-0.039	-0.007	-0.036	-0.003

Source: BIHS 2001

**Table 20** – Poverty impact of remittances in Bulgaria

	National	Urban	Rural
<b>Recipient Households</b>			
Observed expenditures	0.105	0.067	0.279
Without gross remittances	0.274	0.246	0.402
<b>Recipient or Sending Households</b>			
Observed expenditures	0.111	0.053	0.262
Without net remittances	0.220	0.192	0.293
<b>All Households</b>			
Observed expenditures	0.210	0.132	0.370
without remittances:			
gross	0.202	0.133	0.345
net	0.223	0.156	0.362

Source: BIHS 2001

However, if we consider the poverty impact of remittances on only those households that receive them (Table 20), it is substantial. Removing gross remittance income from all recipient

<sup>20</sup> In making the calculations in this and the following tables, we remove the income in question from each household, and we then add back an amount equal to the total amount of income in the sample to each household *in proportion to that household's share in total expenditures*, thus keeping total expenditures for the sample constant. The idea behind such an experiment is that government reduces a certain benefit, say pensions, and also reduces taxes that are proportional to consumption (say, the VAT) to keep its overall fiscal balance unchanged.

<sup>21</sup> The negative number for rural households reflects the fact that they are net remitters, so that they would receive more from a proportional increase in consumption than they do from net remittances.

households in the 2001 BIHS would increase the headcount by 0.169, with a somewhat larger impact on urban as compared to rural households. Removing net remittances from all recipient or sending households would increase the headcount by 0.109, with a much stronger effect in urban areas (0.139) than rural (0.031) because, as we saw above, rural households tend to remit more than urban. Overall then, remittances affect relatively few households, and therefore have a minor impact on poverty nationally, but remittances reduce the poverty of households that actually receive them substantially.

## Second job holding

Another coping strategy for impoverished households is to seek more work. Table 21 shows 6.3 percent of adults in Bulgaria hold second jobs, with the share being more than twice as high in rural areas (9.7 percent) than urban (4.6 percent). In addition, the vast majority of secondary jobs are in own-account agriculture.

**Table 21** – Second job holdings, by area and type

	None	Wage work	Self-employ	Farming
Urban	0.954	0.005	0.004	0.037
Rural	0.903	0.004	0.004	0.090
National	0.938	0.005	0.004	0.054

Source: BIHS 2001

Because so few people hold second jobs, their poverty impact is small. Table 22 shows that removing second job income from households would increase poverty by 0.002 in rural areas and would actually decrease poverty in urban areas by  $-0.020$ .<sup>22</sup> However, as with remittances, the impact of second jobs on the poverty of households who have a second job holder is substantial. Nationwide, poverty would rise by 0.095 in the absence of this income among recipient households, with a much stronger effect in rural areas (0.118) than urban (0.036). Thus, second job holding seems to be an effective coping strategy, but one that is rarely used, and one that is more common in rural areas than urban.

**Table 22** – Poverty impact of second job holding

	National	Urban	Rural
<b>Recipient Households</b>			
Observed expenditures	0.159	0.060	0.225
Without second job income	0.244	0.096	0.343
<b>All Households</b>			
Observed expenditures	0.210	0.132	0.370
Without second job income	0.197	0.112	0.372

Source: BIHS2001

<sup>22</sup> This latter result is possible because many urban residents who have no second job would benefit from the proportional redistribution of this income, and some would thus climb out of poverty.

## Unemployment compensation

In addition to the private strategies reviewed above, the public sector also provides assistance to cope with adverse income shocks. Unemployment compensation is designed to soften the blow of job loss, and thus reduce (temporary) poverty. Table 23 shows the poverty impact of income from unemployment compensation. First, note that the unemployed are extremely poor even after accounting for their benefits: 41 percent of recipient households nationwide are poor, and 55 percent of recipient households in rural areas are poor. These poverty rates are much higher than those for any of the other groups that we consider in this paper. That said, unemployment compensation has a moderate impact on poverty reduction. Nationally, the headcount would be 0.074 higher with unemployment benefits for recipient households, with a stronger effect in urban areas (0.090) than rural (0.053). More striking is the fact that the impact of unemployment benefits on poverty for all households is very small, only 0.002. This is because so few households actually receive unemployment benefits, despite Bulgaria's high unemployment rate.

**Table 23** – Poverty impact of unemployment benefits

	National	Urban	Rural
<b>Recipient Households</b>			
Observed expenditures	0.407	0.305	0.548
Without unemployment comp	0.481	0.395	0.601
<b>All Households</b>			
Observed expenditures	0.210	0.132	0.370
Without unemployment comp	0.212	0.136	0.369

Source: BIHS 2001

## Other social benefits

Bulgarians enjoy a host of social insurance benefits, including child allowances, disability pensions, maternity benefits, and transport allowances. The total value of these many benefits, however, is modest, and their poverty impact is consequently limited. For all households, the headcount would be only 0.018 higher in the absence of such social insurance, and even for recipient households, the impact is only 0.044, being twice as high in urban (0.053) as compared to rural (0.023) areas.

**Table 24** – Poverty impact of other social benefits

	National	Urban	Rural
<b>Recipient Households</b>			
Observed expenditures	0.254	0.158	0.451
Without social benefits	0.298	0.211	0.474
<b>All Households</b>			
Observed expenditures	0.210	0.132	0.370
Without social benefits	0.228	0.158	0.374

Source: BIHS 2001

## Pensions

Pensions are by far the largest transfer payment scheme in Bulgaria, and poverty reducing would be much higher in their absence. For all households, the headcount would be 0.069 higher in the absence of pension income, with roughly comparable impacts in urban and rural areas. For recipient households, the effect is even more dramatic: the headcount for pensioners would rise by 0.198 if they were to lose their pension income. As with the recipients of unemployment benefits, pensioners are quite poor *ex ante*, especially in rural areas.

**Table 25** – Poverty impact of pensions

	National	Urban	Rural
<b>Recipient Households</b>			
Observed expenditures	0.191	0.123	0.294
Without pensions	0.389	0.331	0.477
<b>All Households</b>			
Observed expenditures	0.210	0.132	0.370
Without pensions	0.279	0.198	0.445

Source: BIHS 2001

## Agricultural Input and Product Markets

Beyond our discussion of rural employment and wage determination (including in agriculture), the role of agriculture in household income, and the impact of agricultural assets, including land, as a determinant of household welfare, we have devoted considerable time to understanding own-account agriculture in Bulgaria. Our focus is on understanding structural change in agricultural, and more specifically, how the evolution in product and factor markets have contributed to welfare changes.

Unfortunately, our efforts in this regard have not yielded much of interest. The fundamental problem is that only a small share of agriculture in Bulgaria is carried out by family farmers. Instead, the vast majority of land, and related agricultural inputs and outputs, are used on large-scale cooperative and commercial farms (Sarris, 1999). This presents a problem for our work since we rely on the analysis of the household survey data, not an agricultural enterprise survey. In the household survey, the agricultural activities are almost exclusively limited to small scale, own-account agricultural, much of it for home consumption.

This fact is well illustrated in Table 26, which shows land usage by type of land – restituted, inherited, other, cooperative and rented. Aggregating across all households in the survey, cropland represents the major use of land in the survey (3628 decares), with less than one-quarter as much land devoted to orchards, and one-seventh as much to pasture. Note, however, that land owned by households, but not being used or rented by the household, represents a considerably larger share of total landholdings. Non-use agricultural land consists of 6841 decares. Most of this is acquired from “other” sources.



**Table 26 – Land use and ownership of Bulgarian households, 2001**

<b>Land Usage (Decares)</b>							
	<b>Orchard</b>	<b>Pasture</b>	<b>Crop</b>	<b>NU Ag R</b>	<b>NU Ag NR</b>	<b>Coop (9.2)</b>	<b>Total</b>
<b>Restituted</b>	97	314	1500	205	249	3231	5596
<b>Inherited</b>	577	199	1333	42	562	5716	8429
<b>Other</b>	142	10	351	0	6030	128	6661
<b>Coop (6.5)</b>	2	2	118				122
<b>Rented</b>	17	27	444				488
<b>Total (w/o Coop)</b>	833	550	3628	247	6841	9075	
<b>Total Irrig. (w/o Coop)</b>	528	63	375				
<b>Share Irrigated</b>	63	11	10				

  

<b>Population Extrapolation (Hectares)</b>							
	<b>Orchard</b>	<b>Pasture</b>	<b>Crop</b>	<b>NU Ag R</b>	<b>NU Ag NR</b>	<b>Coop (9.2)</b>	<b>Total</b>
<b>Restituted</b>	10594	34294	163823	22389	27195	352874	611167
<b>Inherited</b>	63017	21734	145584	4587	61379	624273	920573
<b>Other</b>	15509	1092	38334	0	658566	13980	727481
<b>Coop (6.5)</b>	218	218	12887				13324
<b>Rented</b>	1857	2949	48491				53297
<b>Total (w/o Coop)</b>	90976	60068	396232	26976	747140	991126	
<b>Total Irrig. (w/o Coop)</b>	57666	6881	40956				

Source: BIHS 2001

The final column in the table represents cooperative land, or in other words, land owned by the household, but which is under the control and use of the cooperative, not the household that owns the land. Most of this land was inherited, but over a third of it, or 3231 decares, is restituted. Thus, the coops are using over half of the restituted land in the survey. Similarly, most of the inherited land has been allocated for use by coops. Only a small share of land owned by households, 247 decares, is actually rented out to private individuals or farm enterprises.

These land use figures, when added together, comprise a very small fraction of overall cultivated land in Bulgaria. Specifically, if we take all cropland under private cultivation, whether owned or rented (3628 decares), and add that to coop land under crops, we arrive at the total cropland cultivated and accounted for in the survey. Assuming that 75% of the coop land is for crops (undoubtedly an overestimate), and converting to hectares, we arrive at a total of 1.5 million hectares of cropland accounted for in the survey. This does not compare favorably with the estimates of total land under crop cultivation in Bulgaria of over 3 million hectares (Sarris 1999).

Using a similar methodology we can, for example, compute the amount of inputs used (such as fertilizer) and land under irrigation, as calculated by inflating the data from the survey, and comparing them to those reported in other sources of agricultural statistics. We similarly get large discrepancies. For example, according to the survey, total chemical fertilizer was 39.5

thousand metric tons, compared to the amount reported in Sarris (1999) of 117.4 thousand metric tons.

The difficulty with this low level of coverage or representativity is that it makes it all but impossible to learn anything meaningful in the survey about input and product markets in agriculture. Quite simply, the survey captures on a small percentage of input use and product sales in the sector. By implication, the BIHS survey is not an appropriate data source to discuss or examine issues of the functioning of land or inputs markets. This point is further evidenced by the fact that in the case of land, there is no land transaction data provided. Indeed, while there is some information on the source of land, crucial data such as the price paid, and likewise, price received for sales is absent.

## **Conclusion**

In this paper we have attempted to better understand the nature and determinants of rural poverty in Bulgaria. There is no doubt that poverty is not only worse in rural than urban areas, but that rural households have fallen further behind their urban counterparts in the past decade. While there has been considerable economic recovery in urban areas, the rural poor have not fully participated in such a process. This reflects the falling level of overall rural incomes, as well as the fact that the distribution has worsened in rural areas since the beginning of the crisis.

Our effort to understand the role of agriculture in the context of economic stagnation and continued impoverishment of a large share of the rural population has been largely thwarted by the data problems in the household surveys we have examined. Agriculture is not an endeavor of family farms in Bulgaria, but of larger commercial or cooperative operations. Most land and output are under the control of commercial enterprises, not the household farms that the BIHS surveys capture. This being said, most households that report being engaged in agriculture can be best portrayed as tending their gardens for their own consumption, perhaps selling a modest surplus to earn small sums of money that is complementary to other more important income sources. Thus, to talk about the role of product and factor markets in agriculture, and particularly how the functioning and characteristics of these markets affect poverty, requires use of agricultural survey and census data, and the development of appropriate econometric and/or sectoral models to examine these questions.

With this constraint in mind, we nevertheless have identified the crucial role that own-account agriculture plays in preventing poverty. First, we find that the decline in small-scale agricultural enterprises is, along with declining wage earnings, largely responsible for the increase in poverty since the mid 1990s. There is strong evidence that the non-poor realize that status in large measure through their access to, and use of small-scale holdings. The work on the household plots is rarely the primary source of earnings for the household, or workers therein. However, the second and third job that people and household engage in as small scale “farmers” is clearly crucial to preventing poverty and enabling households to cope with the economic stress of the incomplete recovery of the rural economy in the wake of Bulgaria’s economic transition.

In terms of the determinants of who has second and third jobs, access to land is only one important factor. So too are the human capital endowments of the household. These same

factors, particularly education, are also important determinants of wage employment and wage earnings in Bulgaria. We also examine a number of other factors that contribute to the probability of being a wage worker in rural areas, as well as the low level of wages in rural Bulgaria. A wide number of contributing factors are identified, ranging from ethnicity to the fact that wage employment in agriculture pays less than other sectors of the economy. While we also find that unearned income, and particularly receiving a pension, reduces the probability of working, there is also little doubt that pensions and other forms of social assistance and insurance play a crucial role in keeping poverty from being a markedly worse problem than it already is. Ex ante, pensioners, like the unemployed, are especially poor in rural areas.

In the final analysis, there is little question that poverty reduction in rural Bulgaria is going to be driven primarily by a reversal of the declining wage employment opportunities and falling productivity that presumably underlies the falling real wage payments to those working. Agriculture will play a crucial role in this process. First, it will continue to be a source of complementary livelihood and opportunity that enables households to cope with poor economic prospects in the formal sector. But second, presumably there are large forward and backward linkages from agricultural, and that revitalizing this sector, like others, will help generate new opportunities for those that have been especially hard hit by Bulgaria's economic crisis.

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