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POVERTY IN PRE-REFORM UZBEKISTAN: WHAT DO OFFICIAL DATA REALLY REVEAL?

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Using 1989 household survey data, we investigate large differences in poverty measured with a conventional all-Union per capita income line between Uzbekistan, the largest Central Asian republic of the former U.S.S.R., and Ukraine as an example of a European republic. We show that (i) differences between the two countries in the distribution of household size is not the main explanation, (ii) undervaluation of agricultural income in kind understates the welfare of rural households, something of particular importance in Uzbekistan, and (iii) indicators of food consumption provide important additional information. Lessons are drawn for the measurement of poverty in post-Union Uzbekistan.

1. INTRODUCTION

A common view of living standards in the former U.S.S.R. is that the Central Asian republics were considerably poorer than other republics. Through much of the Soviet era this view was based largely on anecdotal reports and published figures on mean per capita income by republic. At the end of the 1980s it appeared to be substantiated by data on the distribution of income by republic, based on household surveys, published by the U.S.S.R. central statistical office, Goskomstat. The period of *glasnost* permitted renewed interest in the measurement of poverty in the Soviet Union. Commenting on the 1989 budget survey results, Goskomstat noted "it is customary to count families with an average per capita income of below 75 rubles per month as poor" (1990, p. 4, our translation); Figure 1 shows the proportion of individuals in each republic in the 1989 data with per capita income beneath this level. The figures for all four core Central Asian republics of Kyrgyzstan, Turkmenistan, Uzbekistan and Tajikistan exceed 30 percent and are notably higher than for all other republics (with the exception of Azerbaidzhan); they show a far greater section of the Central Asian population in poverty (on the above definition) than in the European republics. These data have attracted considerable attention from international organisations concerned with the transition process. For example, the study of the Soviet economy published in 1991 by the IMF, World Bank, OECD and EBRD, provides the same information as in our Figure 1 in a table referring explicitly to poverty levels by republic (IMF *et al.*, 1991, Table IV.6.14).

In this paper we focus on poverty in Uzbekistan. With 20 million inhabitants in 1990 it is (in terms of population) the largest of the Central Asian republics and the third largest republic of the former Union. The population is predominantly rural, some 60 percent in 1990, and there is a consequently high share of

Note: We are grateful for comments to participants at a workshop on wages and incomes in the former U.S.S.R. organised by the Department of Economics at the University of Göteborg, and to two referees.

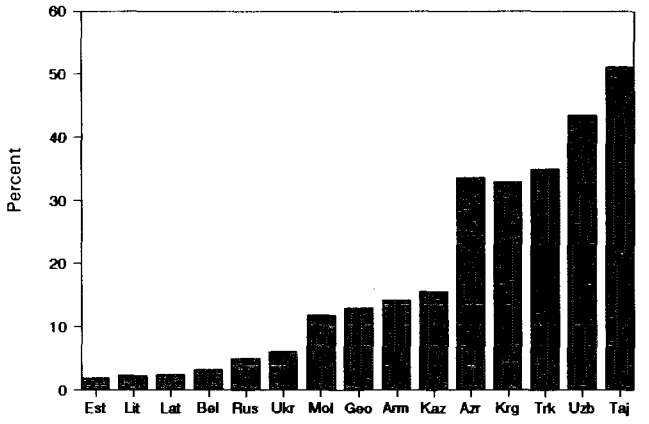

Figure 1. Proportion of Individuals with Monthly Income Less than 75 Rubles Per Capita, U.S.S.R. Republics, 1989

Note:

Est: Estonia	Ukr: Ukraine	Azr: Azerbaidzhan
Lit: Lithuania	Mol: Moldavia	Krg: Kyrgyzstan
Lat: Latvia	Geo: Georgia	Trk: Turkmenistan
Bel: Belarus	Arm: Armenia	Uzb: Uzbekistan
Rus: Russia	Kaz: Kazakhstan	Taj: Tajikistan

Source: FBS 1989 Report, Vol. I, p. 13 and Vol. II, p. 3.

total employment that is in agriculture—over one-third of all formal employment—much of which is devoted to cotton production on irrigated land (although the bulk of the country is semi-desert). The age structure is very young, with over 40 percent of the population beneath the age of 15 in 1990—the result of rapid population growth, which averaged 2.6 percent per year between 1979 and 1989.[1]

With these characteristics, the apparently high incidence of low incomes in Uzbekistan relative to much of the former Union may be no surprise. The republic has a socio-economic profile of a less-developed country quite different from the European republics. Figure 1 shows the proportion of persons in Uzbekistan with incomes beneath the 75 rubles per capita level in 1989 as being 44 percent, second only to that in Tajikistan. The individuals concerned represented 28 percent of all individuals in the former Union with per capita income beneath this level, the single largest concentration of low incomes in the U.S.S.R (Atkinson and Micklewright, 1989, Figure 8.10).

At the same time, the comparison of poverty in the Central Asian republics with that in the European republics is a more complex task than a casual inspection of Figure 1. We investigate some of the issues using the household survey data from 1989 on which Figure 1 is based, taking Ukraine as an example of a European republic.[2] Although there is historical interest in considering differences by republic in living standards, the break-up of the U.S.S.R. means that these differences no longer have relevance for such issues as redistribution of income across the Union. Our use of the data aims to serve two other purposes. First, the

[1]Data taken from World Bank (1992, pp. 418-419).

[2]We choose Ukraine in preference to the Russian Federation due to the heterogeneity of the latter associated with its huge size.

comparison of Uzbekistan with Ukraine at a time when they formed part of the same country with common currency and data sheds light on problems of measuring poverty in Central Asia, and we focus on issues that are of continuing interest following the collapse of the Union. Second, in analysing the data for 1989 we are laying down evidence on living standards against which the impact of economic reform in Uzbekistan can be judged.

Our principal source, described in section II, is the Soviet Family Budget Survey (FBS). This has been subject to extensive criticism, which we summarise, but it remains the only source of information on most aspects of household incomes and consumption in the individual republics at the time of the break-up of the Union. Although we do not have access to the survey micro-data, we are able to draw on extensive tabulations in the published report for 1989 that until now have been largely unused both in Russian language and Western reports. Taking the FBS on its own terms with all its defects, there is still, in our view, a considerable amount that we can learn from the data, both about the pre-reform situation and about methodological issues for the measurement of living standards during transition.

In section III we consider the implications for poverty measurement of the large household sizes in Uzbekistan. The use of a per capita poverty line as in Figure 1 makes no allowance for economies of scale in the household and (other things equal) this will have resulted in higher estimates of poverty in republics of the former Union with larger average household sizes.

The rural nature of the Central Asian republics implies that agricultural income in kind is likely to be important for living standards. The disequilibrium in the pre-reform goods market means that the Goskomstat practice of valuing such income in the FBS at official state prices may have resulted in substantial undervaluation. In section IV we examine the data in the FBS on the importance of agricultural income in kind for different household types and at different points in the income distribution.

Section V moves away from measuring living standards by income and looks at food consumption. We start with food shares, a commonly used indicator in less-developed countries, and we analyse tabulations in the survey report that give distributions of food share by per capita income group. We then look at the data on nutritional value of food consumed, which avoids problems of pricing (unlike both income and food share measures).[3] Section VI concludes the paper.

II. Survey Data in Uzbekistan

Our data come from two household surveys of the U.S.S.R. relating to 1989.[4] The first, which we make more use of, is the Family Budget Survey (FBS). This operated continuously from the early 1950s, collecting information from households on their incomes, expenditures, consumption, durable ownership and other

[3]A still broader analysis might include other indicators of living standards computed with aggregate data, such as infant mortality. [McAuley (1992) considers such aggregate measures for Uzbekistan and other Central Asian republics and makes a comparison with Iran and Turkey.]

[4]We draw on more detailed descriptions given in Atkinson and Micklewright (1992, Chapter 3 and Sources and Methods).

characteristics. Some 90,000 households in the Union were interviewed for the FBS in 1989. The second, the March Survey, was conducted only periodically. It collected information on socio-economic characteristics, incomes and durable ownership from a sample of 310,000 households, but did not cover expenditure or consumption.[5]

The operation of the FBS was shrouded in secrecy for many years but sufficient information was known for it to be the subject of considerable criticism both inside and outside the Union. The main reason for this was the sample design, which left much to be desired. The survey was a quota sample of households of persons working in the state sector and on collective farms, plus pensioner households. This meant that a household's probability of selection increased with the number of working members. The quotas favoured heavy industry, probably under-represented pensioners, and did not achieve full geographic coverage (although a 50 percent increase in sample size in 1988 was intended to reduce these problems). The survey was a panel, but this feature of the design does not appear to have been exploited. There was no organised rotation of households and respondents were pressured to participate indefinitely.

These defects are substantial and undoubtedly imply that the FBS is a far from satisfactory source for the study of living standards. The sample design suggests that households with low incomes may well be under-represented, which has serious implications for any analysis of poverty with the data.[6] There is much that should be done to improve the survey so as to monitor living standards adequately in the transition period and beyond. However, as far as the pre-reform period in Central Asia is concerned, the researcher is faced with a choice of using the FBS and March Survey data in the form that they were collected or of doing nothing, and it is in this spirit that we use the data here. Even if results cannot be seen as truly representative, we believe that the general picture presented by the data and the issues raised by their analysis are of value.[7]

In 1989 the FBS collected information from a total of 3,005 households in Uzbekistan, of which two-thirds were households of "workers or employees" in state sector enterprises (we refer to these as worker/employees), and one-third were households of collective farm workers. The 1989 sample in Ukraine, the European republic we use for comparison, was substantially larger—nearly 17,000 households—again about one-third of which were collective farm households.

We do not have access to the individual household level micro-data from the survey and this severely restricts our analysis. The results we present are based on analysis of tables in the survey report, which was published in two volumes—

[5]Although the March Survey report provides numerous tables analysing household characteristics by the same ruble income classes as the FBS, the number of households or individuals in each class is never given. In principle we could recover this information by solving sets of linear equations implied by the data, for example from data on the composition of each income class by household size. However, inversion of the relevant matrices did not yield sensible results (e.g. some household sizes were estimated to have negative weights). We therefore focus on the FBS where the distribution of individuals across income classes is given.

[6]The sample design of the March Survey was similar but was not a panel.

[7]Other sources of information do exist on household living standards in the U.S.S.R., notably surveys of Jewish emigres e.g. Ofer and Vinokur (1992). Besides being restricted to a particular socio-economic group these data do not provide adequate samples at the republic level. The Ofer and Vinokur data relate to 1,250 urban households from the European republics only.

one for worker/employee households and one for collective farm households (Goskomstat, 1990). Table 1 gives the fullest information we have available on income distribution for Uzbekistan and Ukraine for 1989. Income is gross of taxes and is given in the report in terms of the monthly equivalent of annual incomes, information on incomes being collected regularly throughout the year through repeated interviewing. In principle, income from all sources was included, including income from non-state sources, although the surveying effort made by Goskomstat may have varied with the income source (as may the veracity of respondents' replies).[8] Notably, given our focus on a rural republic, income in kind from agriculture was included, valued at official state prices.

The bottom part of the table shows the income distribution separately for worker/employee and collective farm households. The latter were heavily oversampled in both Uzbekistan and Ukraine. There appears to have been adjustment for this in the tables in the published report, which presents figures grossed-up to population level. The more rural nature of the Uzbekistan population is reflected in the greater proportion of all individuals in collective farm households in the grossed-up figures, relative to Ukraine. Note that worker/employee households are far from being exclusively urban and the definition of this group includes households of employees on state farms. The report of the 1989 March Survey records a third of worker/employee households in Uzbekistan living in rural areas (Goskomstat, 1990a, pp. 20–22).

In the case of Uzbekistan there is a notable difference between the two types of household in the incidence of low income, defined as income beneath 75 rubles per capita—57 percent of individuals in collective farm households compared to 39 percent of individuals in worker/employee households. The top part of the table combines the data for the two types of household and we have interpolated within income classes to obtain summary measures of income inequality. These measures indicate substantially higher per capita income inequality in Uzbekistan.[9]

The 75 ruble per capita low income threshold is close to the all-Union subsistence income level calculated by Goskomstat for 1989 (Atkinson and Micklewright, 1992, Table UP2). Does it make sense to use the same income line across the whole Union, given variations in prices, climate, preferences and average living standards? This sort of question is relevant to any large political unit. The official poverty line in the U.S. is the same throughout the country. Measurement of poverty by the European Commission in the looser confederation of the EC applies a different poverty line (in money terms) in each member state—50 percent of national average income (more recently, expenditure). Table 1 shows that the 75 ruble threshold was almost exactly equal to 50 percent of average per capita income in 1989 in Ukraine, while in Uzbekistan 50 percent of the national average was less than 50 rubles. Moving to the measure used by the European Commission

[8]Information on earnings given by respondents was substantiated from employer records.

[9]The availability of the mean income levels within each income class increases the accuracy of the estimates of inequality indices. The use of the means, together with a split of the 0–75 ruble class into two classes, implies that the results are considerably more accurate than those given in Atkinson and Micklewright (1992, Table UI3), where neither of these pieces of information was used. Gini coefficients for comparably defined distributions for the late 1980s are estimated by Atkinson and Micklewright (*ibid.*, Table 5.5) as 0.20 in Czechoslovakia (1988), 0.24 in Hungary (1987), and 0.27 in Poland (1989).

TABLE 1

INCOME DISTRIBUTION DATA FROM FAMILY BUDGET SURVEY, 1989

Uzbekistan All Households					Ukraine All Households				
Rubles Per Month Per Capita	Numbers (millions)	Percent Individuals	Average Per Cap. Monthly Income	Average Household Size	Rubles Per Month Per Capita	Numbers (millions)	Percent Individuals	Average Per Cap. Monthly Income	Average Household Size
0–50	3.196	16.0	37.40	7.62	0–50	0.258	0.5	45.73	4.15
50–75	5.541	27.7	61.28	6.52	50–75	2.833	5.5	65.25	4.03
75–100	4.546	22.7	85.89	5.46	75–100	7.315	14.2	89.06	3.82
100–125	2.825	14.1	111.84	4.40	100–125	9.787	19.0	113.59	3.53
125–150	1.670	8.3	135.90	3.84	125–150	9.363	18.2	137.30	3.35
150–175	0.937	4.7	162.59	3.22	150–175	7.415	14.4	161.60	3.02
175–200	0.535	2.7	186.11	3.06	175–200	5.190	10.1	186.49	2.82
200–225	0.311	1.6			200–250	5.777	11.2	257.89	2.12
225–250	0.178	0.9	257.40	2.10	250+	3.562	6.9		
250+	0.277	1.4							
Total	20.017	100.0	92.01		Total	51.500	100.0	151.84	
Note: Gini coefficient = 0.287			Decile ratio = 3.68		*Note*: Gini coefficient = 0.225			Decile ratio = 2.73	

Uzbekistan									
Worker/Employees					Collective Farms				
0–50	1.987	13.8	36.36	7.59	0–50	1.209	21.3	39.11	7.66
50–75	3.539	24.7	60.91	6.21	50–75	2.002	35.3	61.92	7.08
75–100	3.230	22.5	86.10	5.03	75–100	1.317	23.2	85.39	6.53
100–125	2.172	15.1	112.30	3.97	100–125	0.653	11.5	110.32	5.83
125–150	1.390	9.7	135.39	3.61	125–150	0.280	4.9	138.45	5.00
150–175	0.820	5.7	162.39	3.02	150–175	0.117	2.1	163.98	4.62
175–200	0.486	3.4	185.77	2.91	175–200	0.049	0.9	189.55	4.56
200–225	0.290	2.0			200–225	0.022	0.4		
225–250	0.169	1.2	258.12	1.98	225–250	0.009	0.2	243.69	4.45
250+	0.270	1.9			250+	0.008	0.1		
Total	14.352	100.0	98.20		Total	5.665	100.0	76.30	

Ukraine									
Worker/Employees					Collective Farms				
0–50	0.214	0.5	46.06	3.83	0–50	0.044	0.4	44.14	5.72
50–75	2.351	5.7	65.32	3.89	50–75	0.483	4.8	64.94	4.74
75–100	5.997	14.5	89.19	3.70	75–100	1.318	13.0	88.45	4.38
100–125	7.941	19.2	113.76	3.47	100–125	1.845	18.2	112.85	3.80
125–150	7.528	18.2	137.30	3.32	125–150	1.835	18.1	137.30	3.47
150–175	5.914	14.3	161.58	3.03	150–175	1.501	14.8	161.71	2.99
175–200	4.095	9.9	186.44	2.82	175–200	1.095	10.8	186.71	2.81
200–250	4.550	11.0	256.73	2.08	200–250	1.227	12.1	262.07	2.25
250+	2.771	6.7			250+	0.791	7.8		
Total	41.360	100.0	150.72		Total	10.140	100.0	156.43	

Sources: (1) FBS 1989 Report Vol. I, pp. 13, 37, 43, Vol. II pp. 3, 23, 35, (2) *Kommunist Uzbekistana* No. 11, 1990, (3) *Solsial'noe razvitie SSSR 1989*, p. 119.

Notes:

1. Despite distinguishing separately the 0–50 and 50–75 rubles classes in many tables, the FBS report, source (1), combines the two in the tables giving the numbers of individuals in each class (Vol. I, p. 13, and Vol. II, p. 3). In the case of Uzbekistan, we have been able to find this information for both worker/employee and collective farm households in source (2) which also gives the numbers separately for 200–225 and 225–250 rubles. For Ukraine, we found information for the number of individuals in the 0–50 and 50–75 ruble ranges only for the two types of household combined [source (3)] and we have assumed that the same relative proportions apply for both household types.

2. Figures for mean per capita income in each range are not published and we have estimated them by dividing mean total income in each range by mean household size. Note that these means are not given separately for the 200–250 and 250+ ranges.

3. Inequality indices for the overall distributions were estimated using the INEQ package written by Frank Cowell, LSE. Grouping assumption was Pareto (or reverse Pareto) and the top interval was also assumed Pareto; preliminary estimates without using the class means were made to obtain an estimate of the means of the 200–225 and 225–250 ranges (200–250 in the case of Ukraine). The mean for the unbounded range 250+ was then estimated using these preliminary estimates and the mean calculated from the published figures as described above for the whole 200+ interval. These estimates were then treated as data (along with the other calculated means) when estimating the inequality indices (to obtain convergence the lower bound of the data had to be set to 5 rubles for Ukraine).

would imply income poverty to be about three times higher in Uzbekistan than in Ukraine rather than the seven times indicated by the application of the 75 ruble level in both republics. As this illustrates, the choice of income threshold would be of considerable importance in any study having the primary aim of making conclusions about differences in poverty across the former Union. However, our interest in comparing Uzbekistan with Ukraine is largely methodological and for this purpose the 75 ruble line serves well enough.

III. Household Size and Composition

The 75 ruble low income threshold is a per capita line that makes no allowance for economies of scale with household size. This implies that large household sizes can be expected to be found near the bottom of the income distribution, other things being equal. This is confirmed by the information in Table 1 on average household size by income class. The table also shows the much larger average household sizes in Uzbekistan—4.9 overall compared to 3.0 in Ukraine—a result of the high rate of population growth and consequent age structure of the population noted earlier. Figure 2 shows the distributions of household sizes in Uzbekistan and Ukraine (the information in this instance is taken from the March Survey).

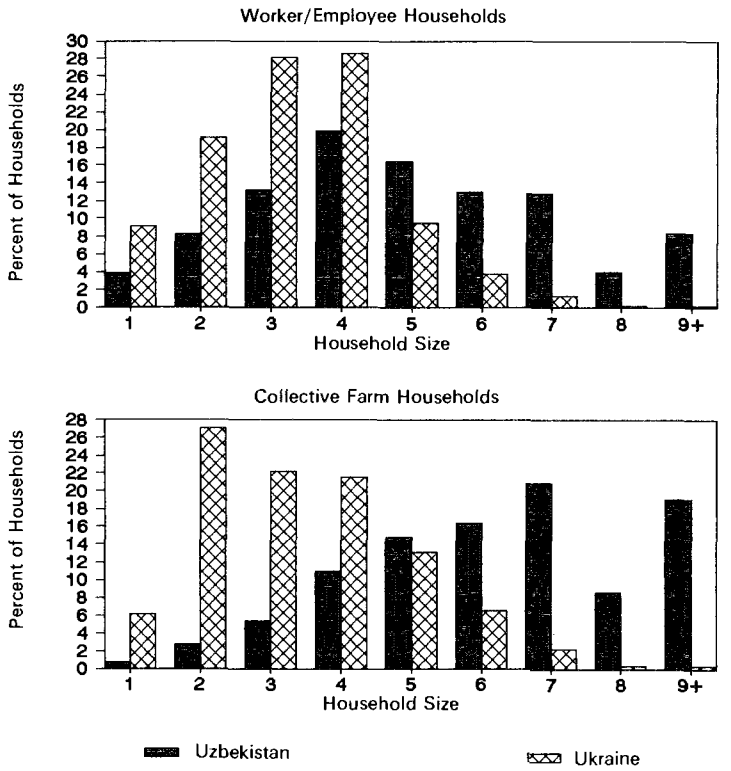

Figure 2. Distribution of Household Size
Source: March Survey 1989 Report, pp. 138,141 and 445–446.

The differences are striking, particularly for the collective farm households where the modal size in Ukraine is 2 persons but is 7 in Uzbekistan.

The use of a per capita threshold means that holding income constant we will find more people beneath the threshold in Uzbekistan with its large household sizes than in Ukraine where household sizes are smaller. Is this the explanation for the apparently much higher incidence of poverty in Uzbekistan? In a similar comparison of Uzbekistan with the Russian Federation, the IMF and other international organisations opined that differences in household size and composition between the republics were indeed the main factor (IMF *et al.*, 1991, Vol. II, p. 155).

Although access to the micro-data is necessary to fully explore this issue, the tables in the published FBS report do allow some investigation. The report provides information on the distribution of income by household size. If we hold household size constant, does the incidence of low incomes in Uzbekistan and Ukraine become quite similar? Unfortunately, the tables combine all households of size 6 or more into one group, which Figure 2 indicates is about two-fifths of all worker/employee households in Uzbekistan and two-thirds of collective farm households. So we can hold household size constant only for the smaller households. (No information on incidence of low income by household size is given in the March Survey report.) Figure 3 shows that for these households at least, the answer to the question just posed is in general negative. The incidence of low incomes (per capita income less than 75 rubles per month) rises with household size in both republics, as one would expect given the per capita adjustment. However, it rises much faster in Uzbekistan where the incidence is markedly higher than that in Ukraine for every household size greater than 2 in the case of the

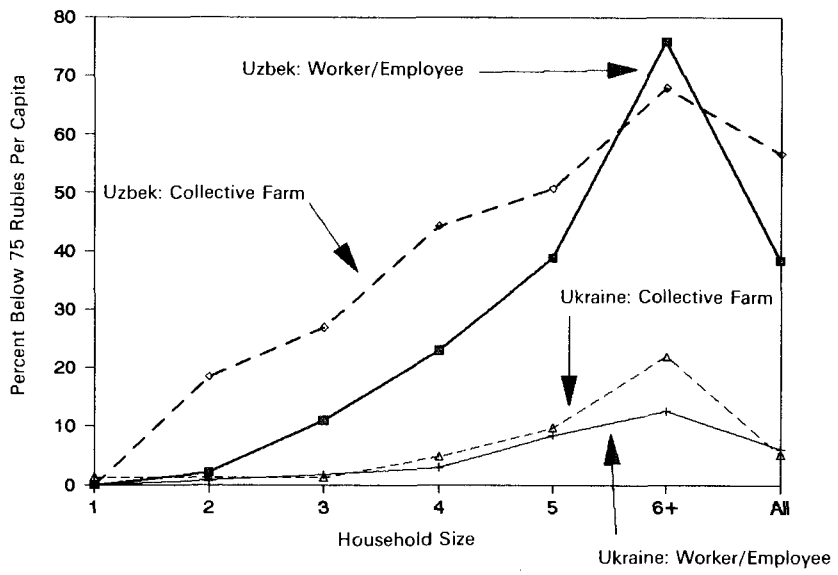

Figure 3. Incidence of Low Incomes by Household Size
Source: FBS 1989 Report, Vol. I, p. 21, Vol. II, p. 11.

TABLE 2

ACCOUNTING FOR THE EFFECT OF DIFFERENCES IN THE DISTRIBUTION OF HOUSEHOLD SIZE

(Percent of individuals of each household type with per capita income beneath 75 rubles per month)

	Worker/Employee	Collective Farm	All
Uzbekistan	38.5	56.6	43.6
Ukraine	6.2	5.2	6.0
Uzbekistan with Ukraine distribution of household sizes	24.9	41.6	29.6

Source: The figures in first two lines are taken from Table 1. The figures in the last line are calculated using the "low income" (less than 75 rubles) incidence rates of Figure 3 for Uzbekistan and the distributions of household size for Ukraine in Figure 2 (together with information on the average household size of households with 9 or more members taken from the March Survey pp. 77 and 414).

worker/employee households and for all sizes greater than 1 for the collective farm households.

The differences in the distributions of household size between the two republics do have some impact however on the relative incidence of low incomes. This is shown by Table 2 where in the final line we estimate what would have been the incidence of low incomes in Uzbekistan had the distribution of household size in the republic been the same as that in Ukraine. (We apply the incidence rates by household size for Uzbekistan given in Figure 3 to the Ukraine distributions of household size given in Figure 2.) The overall incidence of low incomes in Uzbekistan falls by about one-third.[10]

The other part of the IMF *et al.* thesis was that differences in household composition are important. One aspect of composition is the number of wage earners. This could be expected to be important in Uzbekistan due to the impact of population growth on working opportunities. Population growth was not matched pre-reform by growth in jobs and Central Asia came to be viewed within the U.S.S.R. as an area of "labour surplus" (e.g. Marnie, 1992). Lack of employment opportunities may be one reason for the relatively low participation rate of women of working age in Uzbekistan in state sector and collective farm employment—60 percent in 1989, compared to 80 percent in Ukraine—although cultural factors and family responsibilities may be other factors (Marnie, 1992, p. 171).

Given this evidence one would expect to see lower average number of workers per household recorded in the 1989 survey data for Uzbekistan than for Ukraine, holding household size constant. ("Workers" here include both worker/employees

[10]In these estimates we are applying to all Ukraine households sizes of 6+ the average Uzbekistan incidence rates for households of size 6+, a calculation that may be particularly affected by the rates for the larger household sizes within the 6+ group. However, the discrepancy introduced as a result in the overall incidence rates in line 3 of Table 2 is small since relatively few individuals in Ukraine live in households of size 6+.

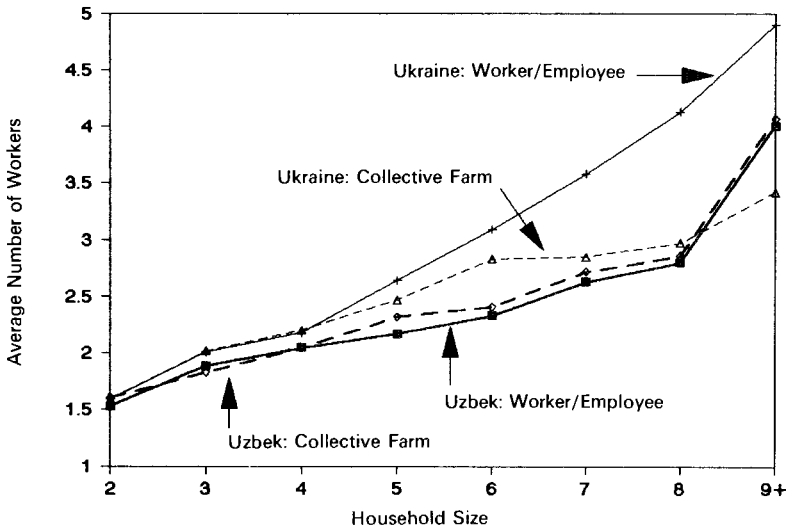

Figure 4. Average Number of Workers by Household Size
Source: March Survey 1989 Report, pp. 77, 83, 414, 416.

and collective farm workers.) Figure 4 confirms this to be the case but the differences are not great and appear insufficient to explain the markedly higher incidence in Figure 3 of low per capita incomes in Uzbekistan holding constant household size. (It should be remembered that large household sizes, where the differences in the average number of workers are large for worker/employee households, are rare in Ukraine.) When we do not control for differences in household size the average number of workers per household is in fact higher in Uzbekistan, especially for collective farm households, due to the differences in the distributions of household size illustrated in Figure 2.[11]

The treatment of household size and composition is of obvious importance for future measurement of poverty in Uzbekistan, particularly in view of the shape of the distribution of household size. Low fixed costs of housing pre-reform may have reduced economies of scale in large households, but many would argue that the lack of any allowance for scale economies is going too far. If scale economies do exist, the per capita adjustment will not only exaggerate the number of persons considered poor, but it will also result in the composition of the poor being biased towards larger household sizes.[12] This will have implications for the design of a "safety net" aimed at protecting the living standards of those with low incomes

[11]Among other explanations for differences in the incidence of lower incomes between Uzbekistan and Ukraine are wage levels. The 1989 March Survey data show 20 percent of individuals working in the state sector in Uzbekistan earning less than 90 rubles a month compared to 8 percent in Ukraine (Atkinson and Micklewright 1992, Table UE6). Since our interest in comparing Uzbekistan and Ukraine is largely methodological we do not consider such factors further.

[12]The March Survey report shows that households with 6 or more members made up half of urban worker/employee households in Uzbekistan beneath the 75 ruble per capita line in 1989, 2 in 3 of rural worker/employee households in the same position and 7 in 10 of collective farm households (Goskomstat, 1990a, pp. 141, 142, 446).

during economic reform (Atkinson, 1992). For example, family benefits for households with large numbers of children could get a disproportionate amount of attention from policy-makers in Uzbekistan.

IV. Income in Kind from Agricultural Plots

The importance of the private agricultural plot to household living standards and to total agricultural output is something that repeatedly concerned scholars of Soviet life. Cultivation of the plot was a form of private enterprise that was tolerated by the state. Individuals were able to sell produce in markets relatively free from controls or to keep and consume it within the household. Rumer (1989, pp. 125–126) reported private plots to have accounted for 46 percent of meat production in Uzbekistan in 1982 and 40 percent of milk and vegetable production. Lubin (1984, pp. 185–186) reports even higher figures, which also suggest private agriculture to have been substantially more important in Uzbekistan than in other parts of the Union. At the same time, data on the importance of private agriculture to individual households has been hard to come by; Matthews (1986), in his account of poverty in the U.S.S.R., referred to the "mystery of the private plot" (p. 42).

This section considers what the FBS and March Survey data suggest about the importance of private plots to household incomes in Uzbekistan. The March Survey shows the proportion of collective farm households and of rural worker/employee households with plots to be very high, 97 percent and 83 percent respectively (no figure is given for urban worker/employee households). (At the same time, almost identical proportions are found in the Ukraine data.) Income in kind from plots was included in the annual income concept that is behind the monthly income figures presented in the published FBS report. One reason for considering the data on plots in more detail is that Goskomstat valued plot production consumed within the household at official list prices in state retail outlets. There is widespread anecdotal evidence concerning shortages of food products in state retail outlets in the Soviet economy pre-reform, including evidence from Uzbekistan (Lubin, 1984). This often resulted in much higher prices in other types of outlets, including legal collective farm markets in which collective farm households could sell produce from their private plots. The correct valuation of produce consumed within the household is the opportunity cost of consumption, which in this case could be viewed as the prices ruling in collective farm markets.[13] This suggests that there may have been considerable undervaluation of this form of income in the FBS, although the problem will not have affected uniformly the data for all households with plot produce.

[13]The valuation is in practice more complicated since some goods were unobtainable even on collective farm markets. Lubin (1984, pp. 187–188) also points to the problem of valuing bartered produce.

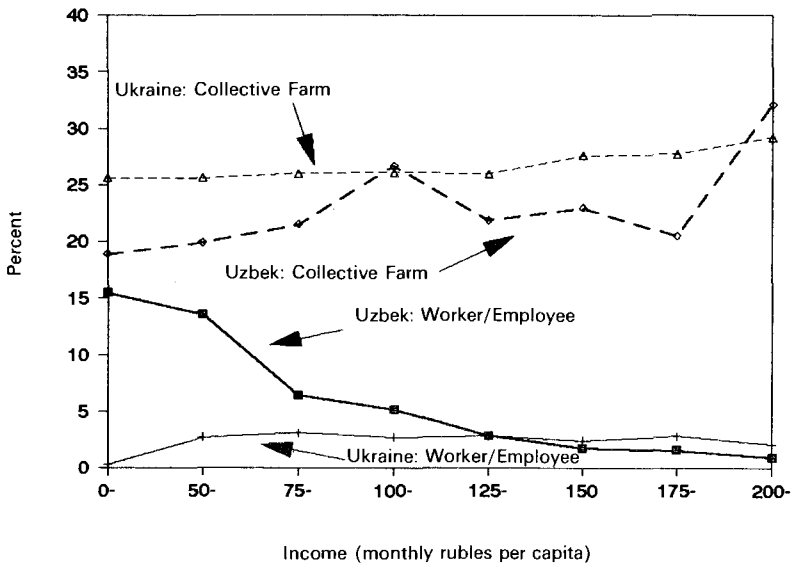

Figure 5. Proportion of Income from Private Agricultural Plots
Source: FBS 1989 Report, Vol. I, pp. 43, vol. II, p. 35.

Figure 5 shows by income range the average share of total recorded income in the FBS accounted for by the cash value of all plot produce. (This includes both produce that is sold as well as that consumed within the household, but the survey report shows that the latter is far more important.) The importance of plot income for collective farm households is striking and broadly similar in all income classes, around 20 percent in Uzbekistan and 25 percent in Ukraine. (The figures for collective farm households in Uzbekistan in the upper income ranges should be treated with caution as they must be based on only a handful of households.) A rather different picture emerges for worker/employee households. Plot income is less important in the aggregate since it reflects the lower incidence of ownership (and smaller plot sizes). However, whereas less than 5 percent of income is recorded as coming from plots for all income classes in Ukraine and for higher income classes in Uzbekistan, it is notable that about 15 percent of income is from this source for the low income group of 0–75 rubles in Uzbekistan, an income class that contains nearly two-fifths of the population in worker/employee households.[14]

What impact would under-valuation of plot produce have on the income data? Assume that all plot income was under-valued by Goskomstat by 50 percent. If this were the case, mean income of individuals in collective farm households in the 50–75 ruble range would rise from the figures of 62 and 65 rubles respectively for Uzbekistan and Ukraine given in Table 1 to 78 and 80 rubles. Considerable numbers of individuals in the 50–75 ruble range would no longer be classified as "low income". Undervaluation of plot income may have significantly exaggerated

[14]Evidence on variation in the share of private plots in total income in other former socialist economies is given in Milanovic (1992).

the picture of poverty in Uzbekistan among collective farm households (applying the conventional poverty line), and to a lesser extent among worker/employee households as well, especially those in rural areas with access to plots. (A further implication is that poverty among worker/employee households to Uzbekistan relative to that in Ukraine was overstated.) Poverty may be less concentrated on rural households than the data seem to suggest. This appears to confirm the first-hand anecdotal evidence on living standards of writers such as Lubin (1984) who have noted the relatively advantageous position of many rural households in Uzbekistan.

These findings have implications for measurement of living standards in Uzbekistan and for the design of social policy. The importance of recorded income in kind from agriculture, even when undervalued, suggests that the survey effort made in the past to monitor this source should certainly continue (we have drawn on only a small fraction of the FBS tables relating to private plots). However, that effort should be concentrated more than in the past on obtaining a reasonable valuation of income in kind, something that requires better monitoring of actual consumer prices than occurred in the pre-reform period. The importance of plot production may increase sharply as falling average living standards lead to increased reliance on home-production of food, something found in several other former socialist countries in transition (Rose and Tikhomirov, 1993). In addition, government policy in Uzbekistan during 1989–91 is said to have led to substantial increases in the number and size of private plots (Mamatkazin, 1991). Social policy needs to recognise the difficulty of targeting support via a means-test when a substantial proportion of the population, including those outside formal agriculture as a primary occupation, have income in kind that is difficult to measure and seasonal by nature. Correct measurement of such income is necessary not only to allocate resources at the individual household level, but also to get the broad picture of which sectors of the population have the most need for support.

V. Food Consumption

To this point we have considered whether adjustment of recorded income would alter the picture of the amount of poverty defined on an income basis. In this section we turn to different indicators of living standards based on food consumption. We start with the share of food expenditure in total income. This is a commonly used (inverse) indicator in less developed countries and an assumed value of the food share is one of the key elements in a popular method of calculating a subsistence minimum income level. Although subject to criticism, the food share seems a worthwhile measure to consider in the case of Uzbekistan, not least so as to record the pre-reform levels of household welfare that it indicates.

One reason for expecting some difference between food share and per capita income as indicators of living standards is the evidence from other countries that suggests a household's food share to be a decreasing function of household size, when controlling for per capita income (e.g. Deaton, 1981). If this is the case, a food share measure of living standards allows for some economies of scale unlike the per capita income measure we have discussed to data.

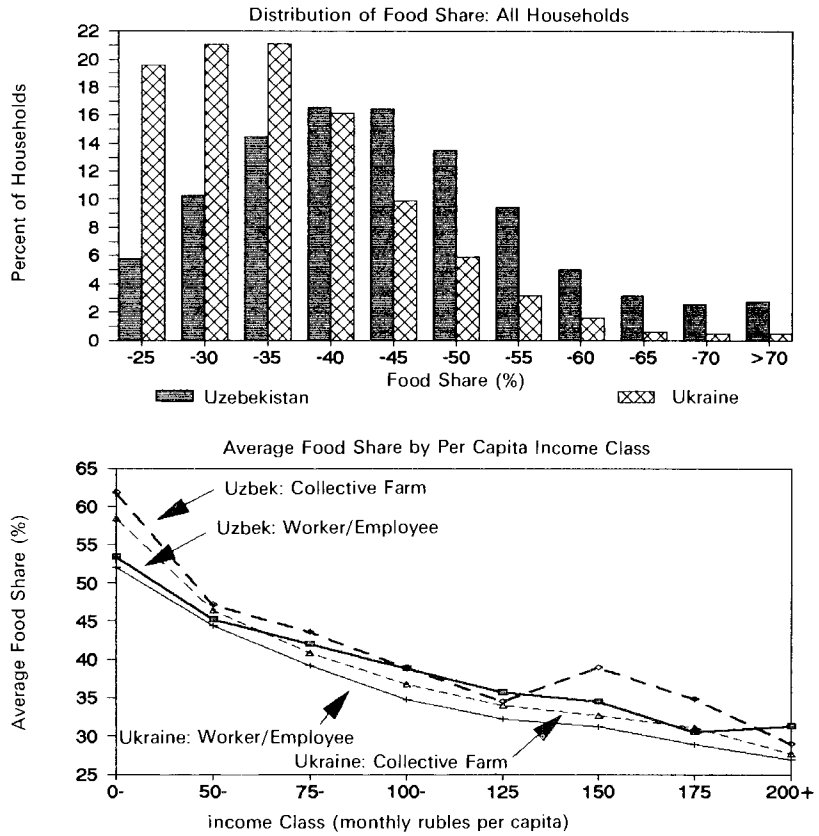

Figure 6. Distribution of Food Shares and Average Food Shares by Income Class
Source: Tables 1 and 4, and FBS 1989 Report Vol. I, pp. 60–61, Vol. II, p. 53.

The top half of Figure 6 shows the distribution of food shares recorded in the FBS for 1989, taking worker/employee and collective farm households together. (These are distributions of households, not of individuals.) The shares relate to expenditures on food as a percentage of *money* income and thus neither numerator nor denominator take account of plot produce consumed within the household. The distributions for Uzbekistan and Ukraine are rather different; high food shares are much more common in Uzbekistan, which would seem to be clear confirmation of lower living standards in that republic. Nearly a quarter of households in Uzbekistan had a food share exceeding 50 percent compared with little more than 5 percent in Ukraine. The median food share lies in the range 40–50 percent in Uzbekistan, but in the range 30–35 percent in Ukraine.

The bottom half of the figure shows the average food share in each per capita income class in the two republics. As one would expect, food appears to have an income elasticity less than unity—the average shares decline with per capita income. For example, the mean share for worker/employee households in Uzbekistan falls from 45 percent for the income class 50–75 rubles to 35 percent in the

class 150–175 rubles. Despite the large differences between Uzbekistan and Ukraine in the overall distribution of the food share shown in the top of the figure, the mean food shares by income class are very similar. This suggests that the large differences in per capita income between the two republics explains in great part the differences in the food share distributions.

Does low income always imply high food share? Besides giving the mean shares, the FBS report also provides information on the distribution of food share

TABLE 3

DISTRIBUTION OF FOOD SHARES BY INCOME CLASS IN UZBEKISTAN

Income (rubles per capita)	Worker/Employee Households Food Share greater than or equal to (%)									
	25	30	35	40	45	50	55	60	65	70
0–50	99.0	99.0	95.9	90.5	80.1	66.5	36.2	26.1	14.6	8.0
50–75	99.7	98.3	81.8	68.1	50.0	33.6	18.0	9.8	6.1	2.3
75–100	99.0	91.8	78.7	60.5	38.0	20.3	12.2	6.3	2.8	1.1
100–125	91.8	84.0	70.2	49.6	27.9	13.0	4.6	1.4	1.4	1.0
125–150	92.5	75.0	54.3	30.1	17.4	5.4	3.5	2.0	1.7	0.6
150–175	90.0	65.0	48.3	31.3	18.5	6.3	5.2	3.3	2.1	0.0
175–200	77.8	53.5	32.8	12.0	4.5	4.5	3.8	0.7	0.7	0.0
200+	83.8	57.8	35.0	21.6	9.1	4.7	2.4	0.9	0.9	0.0
All	93.5	82.0	66.3	49.3	32.7	19.6	10.7	6.0	3.6	1.5
0–75	99.5	98.5	86.2	75.2	59.5	44.0	23.7	14.9	8.8	4.1
75+	91.4	76.3	59.4	40.3	23.3	11.1	6.1	2.9	1.8	0.6
Income (rubles per capita)	Collective Farm Households Food Share greater than or equal to (%)									
	25	30	35	40	45	50	55	60	65	70
0–50	95.1	94.7	92.9	90.7	83.1	68.8	55.8	48.2	36.5	25.3
50–75	98.9	97.0	89.8	72.9	56.7	41.8	25.8	17.6	9.6	5.9
75–100	99.0	92.1	83.7	65.0	43.9	24.2	15.8	9.4	5.5	2.5
100–125	94.7	85.1	65.8	45.8	30.9	14.2	6.3	4.5	3.6	1.8
125–150	94.7	76.3	50.0	26.3	10.5	5.2	5.2	2.6	2.6	0.0
150–175	100.0	80.0	64.0	60.0	36.0	20.0	8.0	0.0	0.0	0.0
175–200	83.3	75.0	50.0	33.3	25.0	25.0	0.0	0.0	0.0	0.0
200+	66.6	33.3	22.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	96.9	91.1	81.2	66.1	50.6	35.3	24.0	17.7	11.9	7.4
0–75	97.5	96.2	90.9	79.3	66.2	51.5	36.5	28.6	19.2	12.9
75+	96.2	85.7	70.9	52.1	34.0	18.2	10.6	6.1	4.0	1.7

Source: FBS 1989 Report, Vol. I, pp. 96–97 and Vol. II, pp. 90–91.
Note: The distributions in this table are of households, not individuals.

by income class, and we show this in Table 3 for the Uzbekistan households. There is substantial variation around the mean values within each class. For example, nearly a fifth of worker/employee households in Uzbekistan with per capita income of 50–75 rubles have food shares of less than 35 percent—close to the mean value for the 150–175 ruble class—while another fifth have shares of 55 percent or more—in excess of the mean for the 0–50 ruble class.

To further illustrate the variation of food share within income class, we define a food share of 50 percent or more as "high." The choice is arbitrary but it is close in both republics to the mean share for households with income less

than 75 rubles per capita, the commonly taken low income poverty line. Table 4 cross-classifies the Uzbekistan households by high food share and low income (less than 75 rubles per capita). Forty-four percent of low income worker/employee households and 52 percent of low income collective farm households have high food shares. Among the households with high food shares, 42 percent of worker/employee households and 25 percent of collective farm households are not classified as having low income. Not surprisingly a chi-squared test overwhelmingly rejects independence of high food share and low income and the degree of overlap between the two is sensitive to the definitions of these categories. Nevertheless, the general message of Table 4 is that the alternative indicator of living standards offered by the food share may lead to a significant change in the composition of the group of households considered poor. This suggests caution before basing the design of the safety net during economic reform on a single indicator of living standards.

One surprising feature of the food share data is that even when we control for income class, the collective farm households often have somewhat higher shares than the worker/employee households. For example, Table 3 shows that the proportion of collective farm households with high food shares (50 percent or more) is greater in the four income classes up to and including 100–125 rubles (classes that contain nearly 90 percent of all collective farm households). There are two reasons why this is the reverse of what one might expect. First, if the food share is indeed a declining function of household size (conditional on per capita income) then the larger sizes of collective farm households should result in lower food shares. Second, the exclusion of plot produce consumed within the household from both numerator and denominator pushes downwards the recorded food shares for households with plots. Given their greater use of plots, this should affect the collective farm households more. One can speculate that the lower recorded food shares for the worker/employees may reflect worse access to food in the conditions of shortage prevailing pre-reform. This suggests that the usual interpretation of high food shares implying lower welfare may need to be qualified for collective farm households.

Many of the problems of using either food shares or nominal income per capita as measures of living standards stem from the problems of interpretation that arise when prices are not uniform across households. One may attempt to avoid such problems by considering information on food consumption, which is free of monetary units. (While consumption of non-food goods and services are also of interest, we have seen that food constituted a large share of total expenditure in Uzbekistan pre-reform and falling real incomes during transition can be expected to have further reinforced the importance of food in household budgets.)

What matters at the end of the day is the nutritional value of food consumed. The FBS report for 1989 contains tables on per capita calorie and protein equivalents of food consumed by the household. These equivalents were calculated by Goskomstat from the recorded data on consumption at the level of each individual food item (e.g. one kilo of rye bread was assumed to equal x calories etc.). The resulting data are no doubt subject to error, but they do provide summary statistics for each household that conveniently aggregate the consumption of many different

TABLE 4

HIGH FOOD SHARES VERSUS LOW INCOME, UZBEKISTAN

High Food Share: 50% or more of household income spent on food
Low Income: monthly household income less than 75 rubles per capital

Thousands of Households
Row %
Column %

		Worker/Employee Households		
		High Food Share		
		No	Yes	All
Low Income	No	2,116 88.9% *82.0%*	264 11.1% *41.9%*	2,380 100.0% *74.1%*
	Yes	466 56.0% *18.0%*	366 44.0% *58.1%*	832 100.0% *25.9%*
	All	2,582 80.4% *100.0%*	630 19.6% *100.0%*	3,212 100.0% *100.0%*

		Collective Farm Households		
		High Food Share		
		No	Yes	All
Low Income	No	339 81.8% *61.3%*	75 18.2% *24.8%*	414 100.0% *48.5%*
	Yes	214 48.5% *38.7%*	227 51.5% *75.2%*	441 100.0% *51.5%*
	All	553 64.7% *100.0%*	302 35.3% *100.0%*	855 100.0% *100.0%*

Source: Tables 1 and 3.

Note: The distributions in this table are of households, not individuals. The distribution of income by households is derived from Table 1 by dividing the number of individuals in each income class by the class average household size.

food items. Moreover, they cover consumption of *all* food in the household irrespective of how it was obtained, so the problem of under-valuation of plot produce that affects other measures of living standards is avoided.

Figure 7 shows average recorded daily calorie and protein "intake" per capita by income class. In both Uzbekistan and Ukraine, calorie and protein intakes in all income groups are notably higher in collective farm households. (The very few Uzbek households in the highest income groups should be borne in mind.) For example, in the two "low income" groups beneath 75 rubles per capita, the collective farm households in Uzbekistan have recorded calorie intakes 26 percent (0–50 rubles) and 18 percent (50–75 rubles) above their worker/employee counterparts. This may be due to a combination of factors. If better access to food for collective farm households and lower food prices in rural areas are the explanation,

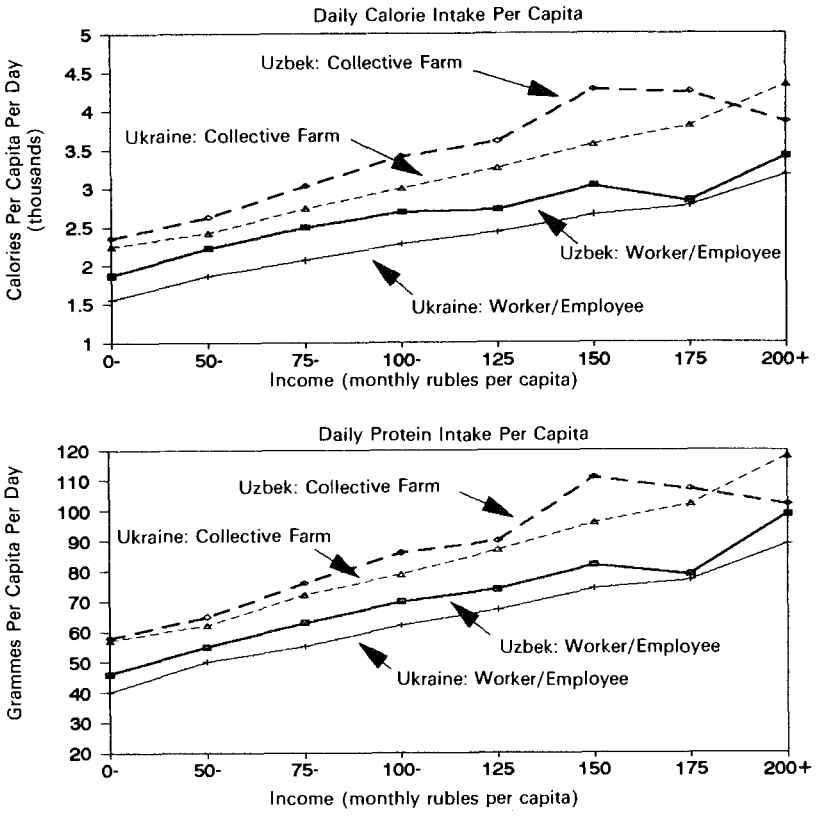

Figure 7. Average Nutritional Intake by Income Class
Source: FBS 1989 Report, Vol. I, p. 191, Vol. II, p. 185.

Figure 7 seems to provide further evidence that the FBS income measure understates the welfare of the collective farm households. It is also the case that in both types of household, calorie and protein intake is recorded as being higher in Uzbekistan than Ukraine when holding income class constant, this being particularly notable for worker/employee households. Calorie intake per capita is about 20 percent higher in each of the bottom four income groups of worker/employee households in Uzbekistan, which is in line with their higher plot income shown in Figure 5. This again suggests the need for caution when interpreting income data from the FBS.

The absolute levels of the recorded calorie and protein intake are also of interest in their role as "base-line" pre-reform indicators of household welfare. Cornia (1994) notes that under-nutrition did not generally represent a problem in pre-reform Eastern Europe and the U.S.S.R., taking World Health Organisation norms of around 2,300–2,500 calories and 65–70 grammes of protein per day (although he emphasises that dietary imbalance leading to nutritionally-related health problems was a serious issue). However, using the same yardsticks, we can see that the calorie and protein intake for the lowest income group of worker-employee households in Uzbekistan might already be judged as a cause for concern

in 1989 (and even more so for the same group in Ukraine) assuming that there was accurate measurement. The 14 percent of individuals with per capita income below 50 rubles per capita are recorded as having on average only 1,870 calories per day and 46 grammes of protein.[15]

VI. Conclusions

Was Uzbekistan indeed characterised by high poverty pre-reform, relative to European republics of the Union, as suggested by data on the distribution of per capita income? Evidence from the 1989 Family Budget Survey (FBS) that we have presented in general supports this view. The use of a per capita adjustment in a republic with large household sizes does not seem to be the principal factor in explaining the higher incidence of measured low income in Uzbekistan. With the Ukraine distribution of households sizes, the overall number of low income individuals in Uzbekistan would have fallen by a third but the apparent poverty rate would have remained much higher in the Central Asian republic. Food shares were considerably higher on average in Uzbekistan than in Ukraine.

The substantive question of relative poverty rates in Uzbekistan and Ukraine has occupied us less than the methodological issues surrounding the use of the FBS data to measure living standards. Our use of the data was restricted to published tabulations and analysis could be extended considerably by access to the survey microdata. Proposing further use of the data supposes that they are of sufficient value to merit analysis. Future analysis, as well as that undertaken in this paper, may be questioned on account of the unsatisfactory nature of the pre-reform FBS design. One of our aims has been to air some of the issues relevant to design of household surveys that can more appropriately monitor the reform process. A proper geographic basis for sampling so as to include all household types irrespective of the number of working members is a high priority. In particular, adequate representation of the unemployed and the retired must be ensured. We have also drawn attention to the valuation of agricultural production consumed within the household. Price reform may eventually mean that the distinction between state and free-market prices no longer applies, but the importance of this type of income source in a largely rural republic demands that there be careful surveying and valuation. Finally, we note that for all its faults, the pre-reform FBS was a panel survey (albeit with no planned rotation of household), and this aspect of its design seems never to have been exploited. Who gains and who loses from economic reform are important questions and panel data have much to offer when seeking the answers.

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[15]These figures are for per capita intakes and of course are compatible with an actual distribution within the household that may provide some or all individuals with intakes appropriate to their age and activity.

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