Serbian LSMS (Household Poverty Survey): Basic Results of the Joint Analysis.

This note summarizes the key findings of the joint analysis of data by the Ministry of Social Affairs of Serbia and the World Bank team. It is based on the results and agreements reached during the joint workshop in mid-October at the World Bank and follow up data analysis by SMMRI staff completed jointly on November, 9 2002. These findings are now under review by the Ministry and they will feed into the final decision on methodological principles.

Definition of welfare.

Household material welfare is defined as comprehensive consumption aggregate. Consumption (per equivalent unit) is our preferred measure of living standards, as we believe it is better declared and is less subject to short-term fluctuations. In addition to consumption we also use income by itself or in combination with consumption to check and validate consumption based results. Consumption it is a comprehensive aggregate of current consumption expenditures (investment type and productive expenditures are excluded), in-kind consumption of own production, value of gifts and transfers received in kind, imputed value of owner occupied housing, and value of flow of services from durables owned by the household. To get as accurate ranking of households as possible, we correct for differences in needs by age groups, for the economies of scale in the household, and for regional price differences (details are given below).

Definition of poverty.

We define poverty in absolute terms. The value of poverty line is the minimum cost of food and non-food goods and services at which basic nutritional requirements are fully met. It is anchored in the cost of minimum food basket and in actual consumption structure of the population (details are given below). As an alternative and a cross check we also apply commonly used absolute poverty lines, such as Republican Statistical Office, Federal Statistical office (planned), and WFP poverty line, as well as subjective poverty line based on this survey. We also use a simple definition of food poor, and compare it to the value of food consumption only. The poor belong to households whose current consumption (or income) per equivalent unit (SR scale) is below the value of the poverty line.

Incidence of poverty and different poverty lines.

Table 1 : Basic Poverty Definitions and Poverty Rates, Various Assumptions

Poverty line/definition	Family of 4, Din/month	POVERTY
Baseline: consumption, absol. line, SR scale	**15,634**	**10.7%**
Total income, absol. line, SR scale	15,634	17.8%
Both consumption AND income, SR scale	15,634	5.9%
Expenditures (w/o rent), WFP line, per capita scale	7,020	4.2%
Income (w/o rent), Rep. Office line, SR scale	9,800	11.2%
Income and Subjective line, OECD scale	24,000	58.1%
Food cons only, min food basket, nutritional scale	7,605	15%

The basic Table 1 reports poverty lines (in Dinars per month) for a family of 4 with different definitions of poverty, and corresponding percentages of the poor population.

We apply a variety of other approaches (not reported in the table), but consistently get three major findings:
1. once poverty is measured in the most restrictive terms (lower lines, or simultaneous deprivation in all welfare indicators – e.g. income and consumption), we get that 5 percent of the population is in poverty – this is *extreme* poverty;
2. once defined as an absolute standard and measured with comprehensive and consistent welfare measure, we get between 10 and 18 percent poverty incidence – this is *absolute* poverty;
3. when we apply a higher standard (subjective, or 50% higher absolute poverty line), we get close to 50% poverty incidence – this is *"near-poor"*.

Application of baseline poverty methodology – absolute poverty line and consumption per equivalent unit - allow to identify the poor in a most accurate way and get statistically robust results. It also sets realistic targets for developing of poverty alleviation strategy.

Regional aspects of poverty.

Our measure of poverty and LSMS survey sample make possible accurate comparisons across strata (regional groupings), as we explicitly correct for regional price differences and apply the same real standard to households in all parts of the country. The results with basic definition of poverty (total consumption/income/both per Serbian equivalence scale, absolute poverty line), are listed below. It is clear that there are significant differences in poverty incidence across regions, with Belgrade relatively better off, and South East Serbia worse off, but it is important to note that poverty is found everywhere.

Table 2. Percent of the population below the poverty line by region and settlement types, baseline poverty

Region	Consumption poor			Income poor			Both income and consumption poor		
	Urban	Rural	*Total*	Urban	Rural	*Total*	Urban	Rural	*Total*
Belgrade	6.7%	13.8%	*8.0%*	15.7%	12.9%	*15.1%*	4.2%	6.9%	*4.7%*
Vojvodina	6.2%	11.8%	*8.6%*	14.6%	18.9%	*16.5%*	4.0%	7.7%	*5.6%*
West Serbia	12.7%	14.4%	*13.8%*	26.6%	15.7%	*19.9%*	8.2%	7.7%	*7.9%*
Central	7.6%	13.4%	*10.5%*	22.3%	14.6%	*18.4%*	5.7%	5.5%	*5.6%*
East Serbia	8.3%	11.3%	*9.9%*	19.5%	17.1%	*18.2%*	5.6%	6.9%	*6.3%*
South-East	10.6%	22.7%	*16.9%*	23.0%	20.3%	*21.6%*	4.2%	8.8%	*6.6%*
Total	**7.7%**	**14.5%**	***10.7%***	**18.4%**	**17.0%**	***17.8%***	**4.8%**	**7.3%**	***5.9%***

The work on finalization of the poverty measurement methodology is on-going. Once completed, the analysis of poverty correlates will start immediately by the Ministry of Social Affairs working group. The Poverty Assessment will use same basic baseline approach and would keep consistency to these joint findings.

The set of detailed comments aims to document critical aspects of the methodology applied to the dataset produced by the survey: definition of the welfare aggregate, definition of the poverty line, correction for regional price differences, and equivalence scale.

Detailed Comment 1: Welfare Aggregate.

Household income and consumption are main welfare variables; income includes both cash and non-cash (in-kind); consumption is defined as current consumption expenditures plus in-kind components (as in income). Table below lists all components of the income and consumption with references to section and question number in the survey instrument and the methodology for imputation based on the survey information.

Table 3. Components of consumption and income aggregates (with reference to questionnaire sections and question numbers)

INCOME	CONSUMPTION
2. HOUSING AND ASSETS	
	S13 (rent)
S16_1-3 discount & humanitarian aid in fuel (it refers to the whole year) & S15 arrears - both treated as new variable transfer in kind for utilities (comm_t) - Imputation: for communal discounts includes a fixed discount of the bill subject to no arrears condition): if s16_1=1 & s15_2=0 => impute comm_t=s14_3*(.25/.75) - For electricity: if s16_2=1 & s15_3=0 => impute comm_t= s14_4*(.3/.7) - For humanitarian aid impute fixed amount (G.M.) / 12 months For arrears – impute comm_t = monthly amounts due based on S15 value/months	S14 (1-6; utilities) S16_1-3 discount & humanitarian aid in fuel (it refers to the whole year) & S15 arrears - both treated as new variable transfer in kind for utilities (comm_t) - Imputation: for communal discounts includes a fixed discount of the bill subject to no arrears condition): if s16_1=1 & s15_2=0 => impute comm_t=s14_3*(.25/.75) - For electricity: if s16_2=1 & s15_3=0 => impute comm_t= s14_4*(.3/.7) - For humanitarian aid impute fixed amount (G.M.) / 12 months For arrears – impute comm_t = monthly amounts due based on S15 value/months
Imputation for rent - source- Regional (19 regions) database of real estate agencies and housing transactions to get an average market value by type of house/apartment (+number of rooms) for 24 regions (urban/rural) and assuming 2% per year depreciation impute the annual flow of services for owner occupied dwellings - secondary residence imputations ignored in the rent income	Imputation for rent - source- Regional (19 regions) database of real estate agencies and housing transactions to get an average market value by type of house/apartment (+number of rooms) for 24 regions (urban/rural) and assuming 2% per year depreciation impute the annual flow of services for owner occupied dwellings - secondary residence included in expenditures (S25 – see below), but ignored in the rental values
	S17.3 (wood and coal; annually) + S17.5 (oil, etc., annually) + S19 (repairs) (DO NOT INCLUDE S21 because it is about investments)
Income from weekend house: S25 (expenses for a secondary residence, utilities, etc.) - it is used as a proxy for rental value income (similar to imputed rent for main residence)	S25 (Expenses for a secondary residence, utilities, etc.)
3. AGRICULTURE	
AG3-2 (income from land renting)	
AG14 (income from machine renting)	
A Total of agricultural income: AG4 (income from selling agricultural products.) + AG8 (income from selling fresh products)	
B Total of agricultural expenses: AG5 (expenses for production materials) + AG3-3 (land rent) + AG11 (costs for hiring labor force) + AG13 (machines' renting) + AG15 (energy sources) + [estimated machines` depreciation from AG12]	
Total of income from cattle-raising: [AG7-C sail of cattle; decrease of the capital; only capital income should be considered, but we do not know its value.] Net y = (sale) – (value for the previous year) – (expenses: AG9, veterinarian + AG10, stock-cattle food) RESULT: take everything from (**C**) AG7-C (all sale is to be consider as income) –	

(**D**) expenses (AG9, veterinarian – AG10, stock-cattle food).	
(Net) Cash income from agriculture and cattle raising (F) is equal to F= **A** - B + C – D + dyz	
Control: AG16 (estimated net income). Final results: take max (F, AG16,0).	
Control: AG17 (income from cadastre)	
4. HEALTH	
HR 2 (health aid; transfer in cash)	Physician: HD4 (1-8) drugs, etc. + HD4 (9-10) medical services
Compensation of the insurance (always item number 11) by all physicians, dentists, etc.	Dentist: HZ4 (1-8) (dentist services) + HZ (9-10) payment for dentist
	Private physician: HP4 (2-8) (private treatment)
	Private dentist: HS4 (1-8) (expenses)
	HA1-HA3 (treatment at one's own initiative)
	State hospital: HB4 (1-8a) [expenses] + HB(9-10a) [physicians]
	Private hospital and treatment abroad : HD11 + HD12 (private medical treatment) + HD 14 (1 +8) medical treatment abroad
5.1 FOOD, BEVERAGE, TOBACCO (daily and weekly)	
Sub totals for in kind and gifts (food): In-kind income from agriculture: own production: all from 1 to 11 : Own production of food (code 2) Gifts (transfers in kind of food): All from 1 to 11 (code 3) For in-kind and gifts sometimes only quantities are reported, to get values these quantities are multiplied by the strata average prices by item.	All from 1 to 11 (make distinction between: bought 1, 2: in kind, and 3. gifts), but do sum up everything – total from diary, Sub totals: - own production (code 2) - gifts (code 3) For in-kind and gifts sometimes only quantities are reported, to get values these quantities are multiplied by the strata average prices by item.
5.2 NON-FOOD EXPENDITURES (MONTHLY) AND MONTHLY INCOMES	

[no number] Income: 1 (interests) + 4 insurance + 5 lotto + 7 dividends
[DO NOT INCLUDE: 2-3, money from savings and bonds, 5, sale of shares]
 	
Sub Totals in kind and gifts - non food (to sum with food subtotals in 5.1 to obtain total in-kind income from own production and gifts):
  -    Own production :
            Table 1 (clothes): col 3
            Table 2 (footwear) col 3
            Table 4 (textile) col 3
            Table 5 (sport) col 3
            Table 7 (vehicle excl.1) col 3
            Table 8 (jewelry) col3
 	
  -    Gifts (transfers in kind):
            Table 1 (clothes): col 4
            Table 2 (footwear) col 4
             Table 3 hygiene col 3
            Table 4 (tex+HH) col 4
            Table 5 (sport) col 4
            Table 7 (vehicle excl.1) col4
            Table 8 (jewelry) col 4
	ALL from 1 to 6 (make distinction between bought things and received as gifts, but sum up everything) – compute monthly amounts.
	
	[IMPUTATION in case there is no price, estimate based on existing prices form the Survey]
	
	Sub Totals (to sum with subtotals in 5.1) to obtain in-kind consumption and gifts:
	  - Own production :
	            Table 1 (clothes): col 3
	            Table 2 (footwear) col 3
	            Table 4 (textile) col 3
	            Table 5 (sport) col 3
	            Table 7 (vehicle excl.1) col 3
	            Table 8 (jewelry) col 3
	
	  - Gifts (transfers in kind):
	            Table 1 (clothes): col 4
	            Table 2 (footwear) col 4
	            Table 3 hygiene col 3
	            Table 4 (textile+HH) col 4
	            Table 5 (sport) col 4
	            Table 7 (vehicle excl.1) col4
	            Table 8 (jewelry) col 4

Aid and gifts (9-11) [DO NOT INCLUDE 8, inheritance]	7 (maintaining of vehicles) (2 to 10) [DO NOT INCLUDE: 7.1 buying of vehicles]
12 and 14 (renting of premises) + 21 (renting of movables) + 22 (other income) DO NOT INCLUDE ANY INCOME FROM SALES (i.e. items 13,15,17-20) (rented land is item 16; but it has already been included, SO DO NOT CALCULATE IT) – Only for non-agricultural households!!!!	8 (jewelry) make distinction between bought objects and given as a gift
	9. Payment of insurance (1 to 6)
	10. taxes and contributions (1 to 8) + 11 (membership fees) + 13 (birthdays) + 14 (alimony) + 17 (informal payments) [DO NOT INCLUDE 9 and 10—paying off loans and borrowings; 12 savings, 16 paying of shares]
	11 transport and communications (1 to 3)

	12. All
6. EDUCATION	
S14 (1-5) [support received in expenses for education]	D5+D8+D9 (child care)
	D11 (private lessons)
	S5 (expenses for primary and secondary education) [sum everything]
	S7 (private lessons)
	S10+S11+S13 (expenses for students)
7. LABOR MARKET	

7.3: D10: 1-13 everything is consider as income (maintain separately all sources of income)
For those who work, but do not declare income (missing in D:
  -   for farmers, registered unemployed working in agriculture, and helping family members – do nothing – set missing to zero;
  -   for regular workers, unregistered workers and registered unemployed working outside agriculture – impute the values for wages using a pooled regression of log of sum D10.1-9 as dependant on a set of dummies (regions, education, registered/nonregistered, tenure, experience, sector, branch) – an issue is that private sector workers seem to report lower premium than in LFS (recent)
  - for employers, self employed and others use a random matching (i.e. randomly assign reported values to those who did not) of those who declared to predict values for those who did to declared separately for each group, - i.e. for employers, self-employed, others.	

E8 (unemployment benefit) - E12, severance payment, (IMPUTED average unemployment benefit from the Survey] - impute flat amount based on the fact that severance pay is a lump-sum transfer – 3800 DIN month to all recipients. – this is the average UB from the survey	
8. SOCIAL PROGRAMS	
SP1, all1-10	

9. IMPUTATION OF CONSUMER FLOW (IN-KIND INCOME) FROM DURABLES OWNED BY THE HH
flow of services of consumer durables The current value V at period t is
    $V_t = V_o (1+r)^t$
    Or in a continuous case
    $V_t = V_o e^{(rt)}$,
Where r is depreciation. To estimate it we run regression using S28 and S30:
    $Ln V_t = ln V_o + r t$, and expect r<0.
The flow of services is then $V_t(r+.1)$, where .1 is assumed real interest rate (10% p.a.)
For multiple durables of the same type owned by the same household, for the second, third etc expected values for values and age used (i.e. actual for the first plus one std for age and minus std for value)
	9. IMPUTATION OF CONSUMER FLOW (IN-KIND INCOME) FROM DURABLES OWNED BY THE HH
	flow of services of consumer durables The current value V at period t is
	    $V_t = V_o (1+r)^t$
	    or in a continuous case
	    $V_t = V_o e^{(rt)}$,
	where r is depreciation. To estimate it we run regression using S28 and S30:
	    $ln V_t = ln V_o + r t$, and expect r<0.
	The flow of services is then $V_t(r+.1)$, where .1 is assumed real interest rate (10% p.a.)
	For multiple durables of the same type owned by the same household, for the second, third etc expected values for values and age used (i.e. actual for the first plus one std for age and minus std for value)

Always included are things bought, own production and gifts, corresponding aggeregates shown separately.

Thus the consumption aggeregate includes monthly amounts for both monetary and in-kind components measured at the local prices. A special attention was given to include all in-kind transfers received by the housheold in diffreent forms (including trageted discounts) into its consumption flow. It is evident that the consumption uses mostly monthly amounts, and thus some of the seasonality will be present (for example, almost no heating expenditures is incurred in May, the reference month for the survey). In order to conduct such season-related expenditures one may use a special part of the questionnaire with aims at capturing the expenditures per season, or use the next round of the survey (panel) which is expected to be fielded amidst the Winter.

Detailed Comment 2: Minimum Food Basket

Table 4. Minimum Food basket from LSMS, Federal Statistical Office (FSO) and
Republican Statistical Office, and WFP basket, kg/family of 4/month

	LSMS min	min basket Republican	WFP basket, of 4	FSO
White bread	**15.7**	33.0	31.4	26.0
Semi-white bread	**10.5**	0.0	0.0	0.0
Whole meal, rye, integral bread	**4.1**	0.0	0.0	0.0
Baked goods	**1.4**	0.0	0.0	1.0
Other kinds of bread	**0.3**	0.0	0.0	0.5
Wheat and rye flour and semolina	**6.9**	5.0	10.2	4.0
Maize flour and maize	**0.6**	0.0	1.8	0.0
Flour products and paste prod.	**1.1**	1.0	0.7	1.5
Rice	**1.1**	1.0	0.7	0.0
Frozen pastry	**0.1**	0.0	0.0	0.5
Potatoes	**12.2**	15.0	9.5	14.5
Beans, dried peas, broad bean and lentil	**3.0**	1.0	1.1	1.0
Onions, garlic and leek	**4.0**	3.1	2.6	3.5
Carrot, greens, celery, beet	**1.3**	2.1	1.5	2.0
Cabbage, kale, escarole, broccoli	**4.5**	3.5	2.2	5.0
Spinach, mangle fresh and frozen	**0.9**	0.0	4.4	1.0
Cucumber	**2.8**	3.0	0.0	4.0
Tomatoes (fresh(	**2.1**	4.0	1.1	4.0
Peppers (fresh and frozen)	**1.3**	2.0	1.8	4.0
Lettuce	**0.0**	0.0	1.1	3.0
Peas, string beans, fresh and frozen	**2.0**	2.5	1.5	6.5
Mushrooms	**0.2**	0.0	0.0	0.0
Other fresh vegetables	**0.3**	0.0	1.5	4.0
Pickled vegetables	**0.5**	0.0	0.0	1.5
Manufactured (ketchup, canned)	**0.3**	0.0	0.0	0.3
Apples	**1.5**	0.0	1.5	8.0
Pear	**0.0**	0.0	0.4	2.0
Plum	**0.0**	0.0	0.0	0.5
Grapes	**0.0**	0.0	0.0	2.0
Other fresh fruit	**1.1**	3.0	0.0	2.0
Orange, lemon, tangerine	**0.4**	0.3	0.4	2.0
Other citrus fruit, bananas,pineapple	**0.3**	2.4	0.0	1.0
Walnut, hazelnut and almond	**0.0**	0.0	0.0	0.8
Jam, stewed fruit, marmalade	**1.0**	1.0	0.0	1.5
Beef (with and without bones)	**0.1**	0.0	0.7	0.0
Baby beef (with and without bones)	**0.4**	0.8	0.0	1.5
Pork (with and without bones)	**1.5**	2.0	1.8	2.5
Mutton, lamb and goat	**0.2**	0.0	0.0	0.5
Poultry	**3.9**	4.0	2.6	4.0
Other fresh meat and offals	**0.2**	2.0	0.0	1.0
Dried and cooked bacon	**0.4**	0.0	0.4	0.0
Dried meat	**0.7**	0.0	0.0	0.0
Salami and sausages –various kinds	**0.7**	0.8	0.4	2.0
Hot dogs, bratwurst	**0.2**	0.0	0.0	0.5
Other sausage products	**0.2**	1.0	0.0	0.0
Canned meat and meat products	**0.1**	0.0	0.0	0.0
Fresh and frozen freshwater fish	**0.3**	1.0	0.4	1.0
Fresh and frozen salt-water fish	**0.1**	0.0	0.0	0.0
Fish products	**0.2**	0.0	0.0	0.0
Pig fats, leaf fat, suet	**1.3**	0.0	2.2	2.0
Edible oil	**3.6**	5.0	1.8	2.5
Margarine	**0.3**	0.5	0.0	0.0
Fresh milk	**19.2**	20.0	20.1	31.0
Sour milk and yogurt	**2.8**	4.0	1.5	15.0
Home-made cheese (all kinds)	**2.4**	2.0	1.8	2.5
Other cheeses (caciocavallo)	**0.2**	0.0	0.0	2.0
Butter	**0.0**	0.0	0.0	0.5
"Kajmak", cream, sour cream	**0.3**	0.0	0.0	0.0
Ice-cream	**0.2**	0.0	0.0	0.0
Eggs (chicken and other)	**88.9**	90.0	41.2	90.0
Sugar (refined, lump sugar, icing)	**3.0**	3.0	2.6	4.0
Salt	**0.8**	0.3	0.0	0.5
Honey	**0.1**	0.0	0.0	0.5
Chocolate – all kinds	**0.2**	0.0	0.0	0.5
-Cookies, biscuits	**0.2**	1.0	0.4	1.0
Coffee (green, roasted, ground)	**1.0**	0.6	0.7	1.0
Spices	**0.2**	0.3	0.0	0.2
Mayonnaise, mustard, ketchup	**0.2**	0.0	0.0	0.1
Instant pudding, Creams	**0.5**	0.0	0.0	0.0
Wine	**0.4**	0.0	0.0	0.0
Beer	**2.9**	2.0	0.0	0.0
Other alcoholic drinks	**0.0**	0.0	0.0	0.0
Mineral water, carbonated/non-carbonated	**3.0**	3.0	0.0	15.0
Carbonated and non-carbonated soft drinks	**2.9**	0.0	0.0	0.0
Natural fruit juices (from concentrate)	**1.8**	1.5	0.0	1.5

The absolute poverty line is based on the minimum food basket. The survey
allowed the development of the minimum food basket that meets the basic nutritional
requirements at 100 (or more) percent and has the minimum cost at actual prevailing

prices. It also reflects the actual consumption structure in Serbia, as its composition by items was set to be at least equal to the consumption in the lowest decile. The comparison to other minimum food baskets in use shows that it has adequate variety and specificity, and has the advantage of being very up-to-date. Its costs for a standard family of 4 (one male of working age, one female of working age, one male child below 6 and female child 11-13) is 7,605 dinars per month in the average Serbian prices for May-June 2002.

The table below lists basic results in terms of meeting food requirements for different baskets. LSMS reference basket is the actual average basket in the lowest two deciles.

Table 5. Nutritional Assessment of Various Baskets

	LSMS min	FSO Min.	Repub. Min
Energy	99%	106%	98%
Protein	140%	156%	137%
Fat (to maximum safe intake)	99%	116%	98%
Iron	166%	147%	156%
Vitamin A	152%	227%	188%
Thiamine	197%	203%	219%
Riboflavin	133%	169%	159%
Niacin	133%	132%	141%
Folate	265%	284%	302%
Vitamin C	229%	389%	434%

Source for information on Norms in UN FAO, for nutritional composition by food item USDA.

The cost of LSMS basket is substantially lower than the cost of the minimum food basket used by the Federal Stat. Office (11,732 dinars per family of 4 per month). This is not surprising, given a rather "generous" composition of the FSO basket, which remains almost unchanged for 10 years. This definitely makes the measurement less accurate, as the basket can no longer be regarded as "minimal", but starts including an element of "norm" or "rational" consumption.

Republican revised basket in closer to the minimum, but surprisingly the cost of the LSMS minimum basket comes to a higher value than the Republican basket (which for corresponding period was 6,680 dinars monthly for a family of 4). This is due mostly to a price of bread which is set at a very low level in the republican basket (15 dinars per loaf, or 19 dinars per kilogram – not available on the market in many regions), whereas LSMS basket takes actual average purchase prices for each item from the survey (and thus uses price of around 30 dinars per kilo). It is also problematic that the republican office revises the composition of the basket every month to reflect seasonal variations in consumption, using *only calories* criteria, and including or excluding entirely some items and changing the quantities of other items. This process is highly arbitrary and makes the minimum basket unsuitable as the appropriate nutritional minimum.

Thus our LSMS basket is the preferred and the most accurate minimum.   It uses the nutritional equivalence scale (based on FAO norms) differentiated by 19 age/gender groups.

Detailed Comment 3: Regional Price Differences

We use actual price (median) per strata (12 strata are listed below) to get the local value of the minimum food basket. This indicator is used to compare the actual food consumption with the minimum.

To get a sense of the variation in non-food prices, we make two assumptions. We take the structure of consumption of whose around the poverty line to weight food and non-food components for the overall regional price index. We do not have any regional price information for the non-food expenditures. But the indirect evidence suggest that these are small. We therefore assume all non-food prices equal.

We can nevertheless control for regional prices differences in housing prices, especially imputed rent. We compute the average imputed cost for a fixed amount of housing of average quality by strata. These are listed in the Table 5 below.

We assume that the rest of the prices are the same across the country, and we take their share among the poor to weigh all price components and to arrive at the overall regional price index given in the last row of the table. This price index is used to compare the actual consumption to the poverty line.

Table 6. Components of the regional price index.
(for an average household of 4 members with food consumption near subsistence minimum)

	Belgrade		Vojvodina		West Serbia		Central Serbia		East Serbia		South-East Serbia		Serbia
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	
Food													
Cost of Food basket	**8017**	**8060**	**7421**	**7302**	**7292**	**7082**	**7376**	**7064**	**7374**	**7345**	**7214**	**6951**	7605
Food price index	1.05	1.06	0.98	0.96	0.96	0.93	0.97	0.93	0.97	0.97	0.95	0.91	1.00
Housing													
Sq m price, DM	1366	347	589	197	674	283	756	272	528	233	658	208	465
Useful floor space of (m2)	41	49	61	60	50	57	52	51	55	59	57	57	**55**
Monthly imputed rent of the fixed amount	**3754**	**953**	**1620**	**541**	**1851**	**777**	**2077**	**747**	**1450**	**639**	**1809**	**571**	1277
Housing price index	2.94	0.75	1.27	0.42	1.45	0.61	1.63	0.59	1.14	0.50	1.42	0.45	1.00
Other (fixed %)	**9040**	**9089**	**8368**	**8234**	**8223**	**7986**	**8318**	**7966**	**8315**	**8282**	**8135**	**7839**	
Other non food price index	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Overall Weighted Price Index	1.19	1.04	1.00	0.92	0.99	0.91	1.02	0.90	0.98	0.93	0.98	0.88	1.00

Detailed Comment 4: Derivation and Composition of the Full Absolute Poverty Line

To get the value of the full absolute poverty line per equivalent unit, we estimate the level of consumption at which the minimum food requirements can be met. In order to do this, we estimate the Engel curve for food and we find the value of consumption (for average prices) at which a household is expected to spend as much on food that is necessary to meet its basic food needs (cost of the minimum food basket, average prices).

Graph below gives the actual derivation of the full absolute poverty line for equivalent adult (for Serbian equivalence scale and average prices).

Poverty line pfsr : 4333.645478620492
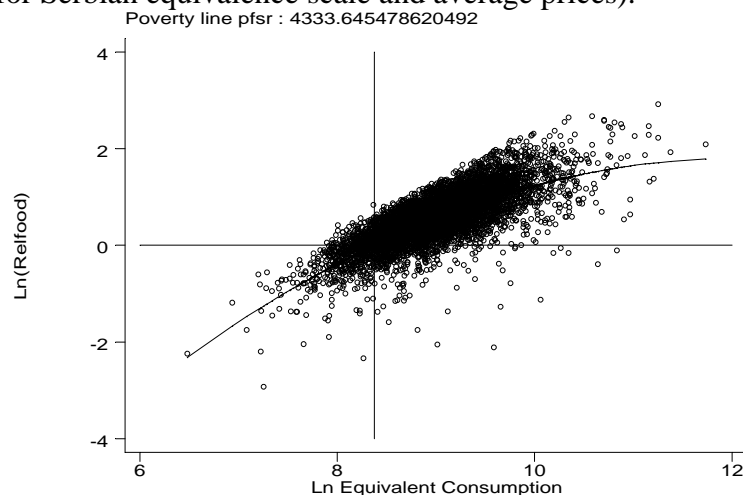
The vertical axis gives actual food consumption of a household relative to cost of the minimum basket: it is zero when the HH spends exactly as much as needed. Horizontal axis is the consumption per equivalent unit. Each dot is a HH in LSMS. Intersections of three lines (Engel curve, minimum food requirements, and level of consumption gives the poverty line).

It is important to see whether this line implies enough to spend on non-food, as it is not explicitly based on fixed allowances. Table 7 below for a family of 4 and a single person. It looks like the amounts left for basic non-food needs are adequate. The Republican Statistical office new basket includes explicit allowances for non food spending with accounted in June 2002 to 3122 Dinars/month for a family of 4, which is below amounts listed in the table for any region in our proposed poverty line.

Table 7. Composition of the poverty line for a family of 4 and for a single person
by food and non-food components, by strata, Dinars/month.

	Food		Imputed rent		Everything else		Total per family of 4	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Family of 4								
Belgrade	8500	8500	6400	1400	4900	5000	19600	14900
Vojvodina	7800	7700	1400	500	4800	4000	14000	12200
West Serbia	7600	7700	2100	800	4200	3600	13900	12100
Central	7800	7400	2100	600	4700	3600	14600	11600
East Serbia	7800	7800	1400	500	4600	4100	13800	12400
South-East	7600	7600	1500	200	4400	3500	13500	11300
Single person								
	Food		Imputed rent		Everything else		Total for single adult	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Belgrade	2200	2200	1300	500	1600	1700	5100	4400
Vojvodina	2000	2000	700	300	1600	1600	4300	3900
West Serbia	2000	1900	900	400	1400	1600	4300	3900
Central	2000	1900	1000	400	1400	1600	4400	3900
East Serbia	2000	2000	600	300	1600	1700	4200	4000
South-East	2000	1900	800	300	1400	1600	4200	3800

Note: rounded, unlike table 5 assumes (actual) differences in floor space between regions.

Table 8. Structure of Poverty Basket for families with Different composition (Dinars per month, average Serbian Prices)

	Minimum Food Costs, Din/ Month	Minimum Non-Food , Din/Month, and %	Total Poverty Line, Din/Month
Single adult person	1806	2528 (58%)	4334
Couple of adults	3847	4521 (54%)	8625
Single adult with 1 child	3842	3841 (50%)	7683
Couple of adults with 2 children	7851	7783 (49%)	15634
Four adults with three children	12655	11770 (48%)	24425

Detailed Comment 5: Equivalence Scales and Subjective Poverty Lines

Household expenditures need to be adjusted for household size and composition in order to be a useful measure of material well-being. Clearly, a one-person household spending YUD 15,000 per month is materially better off than a five-person household living of YUD 15,000 per month. A simple solution is to divide by the number of household members. But most people would agree that a five-person household with YUD 25,000 per month is better off than a single person having to live on YUD 5,000 per month because of economies of scale. Economies of scale arise in many ways; for example, by sharing certain expenditures such as expenditures on heating, other communal services, ability to buy in bulk with discount, or sharing of children's cloths.

The adjustment for household size and composition is done by dividing total household expenditure by *the equivalent household size*. For example, a household with an equivalent size of 3.5 needs to spend 3.5 times as much as a single adult in order to be equally well off as the single adult.

A number of methods is used regularly but each has major drawbacks. We estimate equivalence scales using the Engel technique. This technique assumes well-being can be measured by the fraction of expenditures spent on food. Second, we estimated equivalence scales using the subjective approach. This approach uses households' answers to the question "what level of monthly income is necessary for covering the basic needs and expenditures of the household?" Finally, we use standard conventional equivalence scales (such as OECD, or per capita).

Conventional scales: The Organization for Economic Development and Cooperation has used the following equivalence scale ("OECD-I, or Old EU scale "):

$$Equivalent\ Size = 0.3 + 0.7 * Adults + 0.5 * Kids$$

Presently, the OECD uses a scale with stronger scale economies ("OECD-II"):

$$Equivalent\ Size = 0.5 + 0.5 * Adults + 0.3 * Kids$$

Engel Method Results. The crucial assumption of the Engel method is that there is an inverse and monotonic relationship between a household's well-being and the share of expenditure spent on food. Hence, this assumption implies that two households are

10

equally well-off if and only if the food share in their expenditure is equal. This assumption is questionable, and consequently, experts have advised against using this method. Hence, any estimates by this method should not be taken as definitive, but rather as one piece of information that can aid the selection of an equivalence scale.

Based on this method, we rejected the per capita scale, and the OECD scales as contradictory to the assumption of the Engel law. We developed a special scale that fits best the survey data. It is in its full form: ((number of adults+.52*number of children below 7) +.93*(number of children from 7 to 18 y.o.))^.95. To avoid complex arithmetic, this scale can be used in the simplified (OECD – style) format: 1+.9*each additional adult+.5* number of children below 7 +.8* number of children under 15.

Subjective scale method. A second method of estimating the equivalence scale relies on household's subjective perception of necessary income to attain a minimal standard of living.

Because the question in the survey does not specify clearly what basic needs are, respondents may have had liberal definitions of basic needs. For example, 64% of the respondents report that needed income is higher than actual income, but it is probably not realistic to infer that 2/3 of the population in Serbia cannot afford basic needs. Similarly, we find that households with a *higher level of actual income* also report a *higher level of needed income*. To get a meaningful estimate of the change in need with each additional member, for each family type (number of adults and children, by location) we construct the *threshold value* at which on average the needed income is equal to the actual reported family income (using regression of needed income on actual income). This is the subjective poverty line for each family type: if the actual income is greater than this value, an average family of that type is not subjectively poor, if it is below, it is subjectively poor. To construct the scale from the set of lines, we simply compare the subjective poverty lines for each type of family and average across. For example comparing subjective line for a couple with one child with a couple with 2 children, 3 children, 4 children etc. we get a subjective estimate of the additional child "costs". Results are listed below:

Table 9. Subjective Poverty Lines and Subjective Equivalence Scale.

	Urban		Rural	
	Din/month	Scale	Din/month	Scale
First adult in the HH	12,410	1.00	8,382	1.00
Each additional adult	6,505	0.52	4,411	0.53
Each child below 15	4,329	0.35	2,968	0.35

It is very clear that the subjective scale is remarkably consistent across type of location and similar to OECD-II. This result contradicts the "objective" Engel curve method. Unfortunately, there is no fully objective way to determine the appropriate equivalence scale for Serbia. Results of different methods differ. Therefore we will have to use several equivalence scales and tests results for robustness with respect to the application of a particular scale.

Detailed Comment 6: Robustness and Precision of Results.

The list below shows different lines, with using different parts of the sample (all versus poorest half or poorest quarter) and poverty rates with alternative assumptions about economies of scale. It is remarkably consistent.

Table 10. Full Poverty lines in Dinars per equivalent adults and corresponding poverty rates for different equivalence scales and reference groups.

```
         Engel        lowest 100%   50%    25% ||
                         OECD scale

     For eqoecd:          6080    6032    6036
     Frac.Poor:           9.54    9.30    9.30
                        Serbian scale
     For eqsr:            4334    4304    4311
     Frac.Poor:           10.68   10.44   10.51
                     Per capita scale
     For eq100100:        3892    3850    3855
     Frac.Poor:           10.81   10.44   10.48
               Simplified Serbian scale
     For eqsrsim:         4384    4364    4366
     Frac.Poor:           10.58   10.47   10.48
                       Old OECD scale
     For eqoldeu:         5114    5066    5081
     Frac.Poor:           10.51   10.18   10.31
```

It is important while discussing the results to remember about precision. The survey is a stratified sample, and we have calculated appropriate standard errors for basic poverty line and also the 95% confidence intervals for poverty rates. The table is self-explanatory:

Table 11. Confidence intervals and standard errors for baseline poverty line by strata

		Poor	s.e.	95% lower bound	95% upper bound
Belgrade	City	0.067	0.010	5%	9%
Belgrade	Other	0.138	0.040	6%	22%
Vojvodin	City	0.062	0.012	4%	9%
Vojvodin	Other	0.118	0.017	8%	15%
West_Ser	City	0.127	0.039	5%	20%
West_Ser	Other	0.144	0.039	7%	22%
Central	City	0.076	0.015	5%	11%
Central	Other	0.134	0.023	9%	18%
East_Ser	City	0.083	0.023	4%	13%
East_Ser	Other	0.113	0.027	6%	17%
South-Ea	City	0.106	0.031	5%	17%
South-Ea	Other	0.227	0.031	17%	29%
Country as a whole					
Serbia		0.1067786	0.0064387	9.4%	11 .9%
Svy command in Stata					