POVERTY IN POLAND DURING THE 1990s:
ARE THE RESULTS ROBUST?

by Adam Szulc*

Institute of Statistics and Demography, Warsaw School of Economics

This study examines the robustness of poverty measures for Poland in the 1990s to employed methods. At least two definitions or techniques of estimation are applied to each of the following components of poverty measures: (1) household well-being; (2) poverty line; (3) equivalence scales; and (4) poverty index. Furthermore, groups at risk of poverty are selected by means of decomposition of the poverty incidence and by estimation of the probit model. Relatively robust conclusions can be reached for trends in absolute poverty incidence, which show an inverted U-shape with rapidly increasing poverty rates in 1993–1995 and declining rates since, but with continued increases in relative poverty. Some robust correlates of high poverty (low education, unemployment, rural residence, large number of children) are also found.

1. Introduction

Questions about poverty usually have no unique answers, even if the area of interest is confined to incidence of poverty and monetary indicators of well-being. Some responses in the Polish media to the 1994 World Bank study on poverty in Poland (World Bank, 1994) are good examples of how the conditional nature of poverty can be misunderstood. According to this study, about 14 percent of individuals in the first half of 1993 were reported as poor. At the same time, the Central Statistical Office of Poland found that about 50 percent of the people were poor.[1] The difference was due to the different poverty lines applied by those institutions. To avoid misinterpretation, a more precise description of the term "poverty" is necessary. This paper aims to check the sensitivity of poverty measures to several alternative methods. They capture: (1) household well-being, measured by income or consumption and supplemented by household assets and subjective income evaluations; (2) absolute and relative poverty lines; (3) normative and empirical (econometric) equivalence scales; and (4) five different poverty indices. Furthermore, groups that are at high risk of poverty are selected by means of two methods: (1) decomposition of the national poverty rate; and (2) estimation of a probit model of poverty.

The remaining part of the paper is organized as follows. Section 2 presents the database. The next four sections are devoted to concepts and definitions of: household well-being; poverty line; equivalence scale; and poverty index. Section 7 reports trends in financial (monetary) poverty under various methods of

[1]This result was not published officially.

measurement, while Section 8 combines financial and non-financial measures of poverty. Section 9 examines the distribution of poverty among various socio-demographic groups. Section 10 concludes the paper.

2. The Database

The core dataset employed for this paper comes from the annual Household Budget Survey (HBS), which was carried out by the Central Statistical Office (CSO) in Poland. The CSO collects information on household incomes and expenditures, assets, demographic and socio-economic attributes, as well as answers to subjective income-related questions. In the period 1990–91 the survey captured around 28,000 households and almost 90,000 persons. In 1992 the number of households in the sample dropped to 10,000 and the number of persons to 30,000. Since 1993, the yearly samples have increased to around 32,000 households and 100,000 persons. In that year two important methodological changes were introduced. First, two new economic groups were added: self-employed not in agriculture, and social welfare recipients. The HBS therefore now covers all typical socio-economic groups. Until 1993 the CSO estimated that approximately 15 percent of the population had not been covered by the survey. Besides the two aforementioned groups, military personnel and related workers were also excluded from the sample. A second important methodological modification has to do with the household rotation, which was changed from quarterly to monthly. There is reason to believe that those changes had a large impact on the poverty estimates. Keane and Prasad (2002) and Szulc (2000) both claimed that those changes increased nominal inequality and, consequently, poverty. Unfortunately, data collected using both methods were not available for any year, so it is likely that only a portion of that impact can be estimated. One more important methodological modification to the HBS took place in 1997. Following Eurostat standards, the CSO changed the definition of "household disposable income" by removing some revenues earned through the sale of assets. Therefore, most of the results for 1997 are reported twice in the present study, using both the "old" and the "new" definitions of disposable income.

The HBS sampling technique employed in Poland in the 1990s was standard. A two-stage scheme was applied. Former administrative regions ("voivodships"), split into urban and rural areas, were the first stage sampling units from which primary sampling units (dwellings) were drawn. There were 98 strata from 1350 to 1450 primary sampling units. Moreover, a system of weights was applied to handle non-response. More details may be found in Kordos (1996) and Kordos *et al.* (2002). The impact of sample design on poverty measures is analyzed in the Appendix, in which the design effects (defined as ratios of variance calculated under the actual sample design to those that would have been obtained under simple random sampling[2]), corrected standard errors, and confidence intervals for household poverty rates are presented.

[2]For more details see Deaton (1998) and Howes and Lanjouw (1998).

3. Household Well-Being Measures

Equivalent income and consumption-related expenditure (the equivalence scales are presented in Section 5) are natural indicators of household well-being. The definitions of the measures applied in the present study were intended to be kept stable over the investigated period. Therefore, they are not necessarily consistent with those being applied in the CSO publications. "Expenditures" are defined as a sum of all consumption-related expenses, including durables plus consumption from one's own household's production.[3] Net disposable income includes four principal components: labor income, social transfers (including pensions), income from self-employment and capital income. It does not include loans or dissavings.

Household assets, like durables and dwelling conditions, may be also a valuable measure of well-being. Unlike the previous ones, such a measure is quite robust to short-term economic fluctuations. Combining current and lasting material resources seems especially interesting for countries undergoing rapid economic transformation. For instance, improving or maintaining current living standards may be possible by selling durables or real estate. This might have been an issue in Poland in the 1990s (see Okrasa, 2000). Moreover, due to the impact of a second economy, household well-being in developing countries is probably underestimated when one looks exclusively at current income.

Following Townsend's (1979) seminal paper, including household assets has become a standard practice in the European Union studies on poverty (see, e.g. Förster *et al.*, 2001; Layte *et al.*, 2001; Atkinson *et al.*, 2002). Lack of some household facilities (washing machine, refrigerator, hot running water etc) or deficient housing conditions in developed countries is regarded as another type of poverty and is referred to as deprivation. However, the present study is not aimed at measuring deprivation itself. Instead the aim is to detect inconsistencies in poverty measures, for example which households have low current incomes and/or expenditures but also have a sufficient standard of living in terms of household assets. As it is not obvious what a "sufficient standard" precisely means, it should be higher than any realistic "deprivation threshold" to ensure a reasonable margin of error. Furthermore, subjective income evaluations are used as a supplementary indicator of standard of living.

Extending well-being measures beyond monetary indicators suits the idea that poverty is multidimensional by nature. As poverty encompasses cumulative resources, the fact that an individual has a low income or level of expenditure in one month (or even longer periods) does not prove that he/she is poor, as poverty also encompasses cumulative resources.[4] Nevertheless, financial poverty represents the core indicator in most studies, whereas other dimensions are only supplementary. In the present study household assets constitute an element of a "double check" system. In other words, regardless of their resources, individuals with

---

[3]The presence of durables may have an impact on the evaluation of trends in consumption due to the development of credit purchases over the 1990s. For instance, Keane and Prasad (2002) excluded durables from most of their analyses.

[4]On the other hand, it is not obvious that people possessing expensive cars (jewelry, art, high quality home cinema sets etc.) but suffering from temporal drops in current income and consumption should be considered non-poor.

incomes or expenditures above the poverty threshold are not considered poor. Subjective incomeevaluations are another supplementary tool. Their importance is in covering additional aspects of well-being that are absent in the household budget survey, such as regional price variation or health status.

4. Poverty Lines

The poverty line is the most important and also the most controversial element of any poverty research. Both absolute and relative poverty lines are widely used, and there are pros and cons for both of them. In the case of economies undergoing rapid transformation, a standard of living fixed over the entire period of observation seems to be the preferable choice. Nonetheless, relative poverty lines can also be useful in evaluating changes in low income or low expenditure populations, and there is no reason to stop providing this type of supplementary information. The variability of this type of threshold may be considered both an advantage and a disadvantage. It is an advantage because it follows changes in the mean or median standard of living. It is a disadvantage because relative poverty incidence is affected by changes in well-being distribution but may remain stable despite huge increases in the average well-being.[5] One could mention, however, that an absolute poverty line is also relative to some extent, as it should be considered in light of actual circumstances.

In accordance with the general idea of this study, several poverty line concepts have been applied. The absolute poverty threshold used here relies on the Social Minimum (SM) which is calculated by the Institute of Labour and Social Affairs (ILSS) in Warsaw. It is defined as the current monetary value[6] of a bundle of goods that is supposed to satisfy the minimum biological and "social" needs. Therefore, it is by definition much higher than any reasonable subsistence minimum. Since incorrect indexation has been applied by the ILSS, the SM is not stable in real terms and cannot be applied directly to poverty comparisons over longer periods. For instance, the 1990 SM represents a standard lower than the 1995 SM by approximately 20 percent. The main reason for this instability has to do with the fact that there are huge differences between expenditure shares imposed in the SM and the actual expenditure shares, which characterize households with total expenditures close to, for example, the 1990 SM. The "corrected minimum" applied in the present study makes the poverty line more pragmatic. For 1990, it is equal to the original SM, which has been used as a benchmark.[7] It is then adjusted by the consumer price indices calculated with the use of the actual budget shares of the households with expenditures belonging to the 10 percent interval around the 1990 SM in real terms. More details may be found in Szulc (2000).

---

[5]Ireland is a good example of such a case.

[6]This is evaluated at current mean national prices. Using national prices instead of locally-specific ones may also cause overestimation of poverty incidence if the latter is negatively correlated with price levels. This is at least the case when type of household residence is considered. Rural areas and small cites are usually characterized by higher than average poverty incidence and lower consumer prices. However, this issue is not examined in this study due to lack of appropriate price data.

[7]As this study is aimed at comparisons over time rather than at providing a single indicator for a particular year, a prospective critique of the SM may be relaxed at this point.

Relative poverty lines are defined as certain proportions of median or mean equivalent income or expenditure. As there is no ground for setting these proportions at any particular level, three poverty lines are employed here: 50 percent, 60 percent and 70 percent of median and mean equivalent income/expenditure. In the economic literature median-based poverty lines are usually preferred over those based on means, as they are more robust to under/over-estimation of extreme values of well-being. Nevertheless, it may be interesting to check whether trends in poverty based on means and medians are similar, applying both types of threshold.

As mentioned above, current incomes or expenditures below the poverty line do not necessarily signify that an individual is poor. Some households reporting low current incomes or consumption may in fact reach quite high standards of living. This can be deduced from the fact that they have a relatively high concentration of household assets (exceeding—informally speaking—the "affluence line") and/or subjective satisfaction based on obtained income. Taking into account all the preceding factors, a somewhat rigorous, multi-dimensional definition of poverty is employed. To be considered poor, the individual cannot exceed the "affluence line" nor be satisfied with his/her level of income. The details of this non-financial poverty concept are provided in Section 8, wherein empirical results are reported.

5. Comparing Well-Being Between Households: The Equivalence Scale Problem

Equivalence scales (i.e. deflators allowing for the evaluation of the impact of demographic attributes on household well-being) represent another key element of studies on poverty and inequality.[8] The number of recent papers devoted to the estimation of these parameters is huge and many of them are based on sophisticated econometric techniques and advanced economic theories. Nevertheless, in most studies aimed at producing empirical poverty and inequality measures, the authors employ the simplest solutions, among which the OECD equivalence scales have gained the widest recognition. They are also used in the present study as an alternative option. The 70/50 formula seems to be more appropriate for less developed countries than the modified 50/30 formula.[9] Such opinions may be justified by relatively high expenditures on food (characterized by low economy of scale) and relatively low expenditures on housing (characterized by high economy of scale). Nonetheless, normative universal scales could only ever fit consumer patterns in a particular country as a result of chance. Empirical equivalence scales may be a better choice as they are based on actual data and are therefore responsive to certain patterns of consumer behavior.[10] It should be noted, however, that examining the sensitivity of the results to a wide range of scales is not the goal of this study. Rather, the goal is to compare measures obtained by means of stable

[8]Slesnick's (1993) research demonstrates how significantly changing scales can modify conclusions on trends in poverty in the U.S.

[9]The 70/50 formula gives weight 1 to the first adult, 0.7 to any other person aged over 14 and 0.5 to remaining ones. For the 50/30 formula, the respective weights are 0.5 and 0.3.

[10]For example, empirical scales attached to the elderly in Poland are higher than those attached to remaining age groups (see Szulc, 2000, 2003a). This is not necessarily true for other post-communist countries.

(OECD) scales and those following actual consumer patterns. The empirical differences between both types of scales are discussed at the beginning of Section 7.2.

The scales employed in the present study are based on the so-called "quasi-exact" formula introduced by Szulc (1992). The equivalence scale (m) comparing the cost of living between the k-th and r-th households is calculated by means of the following equation:

$$(1) \qquad \ln m(A_k, A_r) = \frac{1}{2} \sum_{l=1}^{m} \sum_{i=1}^{n} [m_{il}(w_{ik} + w_{ir})] \ln \frac{A_{lk}}{A_{lr}}$$

where A_{lt} is the l-th demographic attribute[11] of the t-th ($t = k, r$) household, w_{it} stands for the i-th budget share for the t-th household, and m_{il} denotes the parameter representing interaction between the i-th budget share and the l-th demographic attribute. The latter ones are estimated within the translogarithmic complete demand system with demographic variables (for details, see Szulc, 1995; and for a further discussion, see Szulc, 2003a). Unlike other ones, because it is a function of its budget shares, the "quasi-exact" scale may be attached individually to any single household. Equation (1) provides a formal explanation for why equivalence scales for households with higher than average food consumption are, in general, higher than the average scales for households of the same demographic type: since parameter m_i takes the highest value for food, the higher the associated w_i, the higher the scale. The capacity to follow changes in consumer patterns is especially important when countries are undergoing huge economic alterations.[12] Poverty indices were calculated twice, using OECD and empirical equivalence scales (see Section 7.2). Moreover, poverty distribution among socio-demographic groups (or, in other words, groups at high risk of poverty) will be examined in Section 9 using the two aforementioned types of scales.

6. Aggregation of Individual Poverty Measures: Construction of Indices

The proportion of poor individuals (referred to as the poverty incidence index or head-count ratio) represents the most common aggregate poverty measure. Its value, however, says nothing about the poverty depth. It is the same irrespective of the mean well-being level of the poor; it does not matter whether it is close to the poverty line or close to zero. For this reason, in many studies poverty depth is also calculated to provide a more comprehensive picture. The index applied in the present research takes the following (Dalton) form:

$$(2) \qquad D = \frac{z - \bar{y}_P^*}{z}$$

---

[11]For binary variables, it takes values 1 and e. Therefore, its logarithm is the 0/1 variable.
[12]For instance, mean food share decreased in Poland from 0.506 in 1990 to 0.345 in 1999, while relative housing expenses (including expenditures on energy) increased from 0.139 to 0.204 over the same period.

where $\bar{y}_P^*$ stands for the mean well-being of the poor weighted by the household equivalence scales, while z is the poverty line. D shows the minimum proportion of the poverty line the average well-being of the poor should be increased to in order to eliminate poverty.

Many authors supplement indices of poverty depth and incidence with other formulas aimed at the assessment of other aspects of poverty. Aside from poverty incidence and depth, the so-called severity of poverty takes inequality among the poor into account. The first formula applied here belongs to the class defined by Foster *et al.* (1984):

$$(3) \qquad P_\alpha = \frac{1}{n} \sum_{i=1}^{q} \left(\frac{z - y_i^*}{z} \right)^\alpha$$

where n is the sample size, q is the number of the poor, y_i^* stands for the i-th household equivalent income or expenditures, and α is an arbitrary parameter representing aversion to inequality among the poor (in the economic literature this is also referred to as the transfer sensitivity parameter). One can easily find that for $\alpha = 0$, the index defined by equation (3) becomes a head-count ratio. For the purpose of this study, the index is also calculated for $\alpha = 1$ (this yields a joint measure of poverty incidence and depth) and for $\alpha = 2$ (this yields a measure of severity of poverty).

The second formula employed here for the measurement of severity of poverty was proposed by Sen (1976):

$$(4) \qquad S = H[I' + (1 - I') \cdot G_P]$$

where H stands for head-count ratio, G_P denotes the Gini index calculated for the poor, and I' is an index similar to the poverty gap defined by equation (2) but without weighting individual well-being measures.

7. TRENDS IN FINANCIAL POVERTY IN THE 1990s

The Institute of Labour and Social Studies publishes poverty rates that may be described as the official ones. They are based on their own two absolute poverty lines: the social minimum (see Section 4) and the subsistence minimum (calculated from the mid-1990s), which represents a much lower consumption level. As these thresholds do not represent a fixed standard of living, the ILSS calculations yield seriously biased trends in poverty. It is not surprising that the recent rates obtained by means of the social minimum are almost twice as high as those of 1990. These calculations give cause for the very pessimistic evaluations of poverty-related changes in many sociological studies and popular media. Nevertheless, research based on stable poverty lines (e.g. Milanovic, 1997; Panek, 1998; Szulc, 2000), which covers selected years in the 1990s, changes this picture dramatically. A broader review of the literature on poverty in Poland may be found in Szulc (2005).

7.1. *The Impact of Poverty Line on Trends in Poverty Incidence*

The corrected social minimum is selected here as the absolute (fixed in real terms) poverty line. Using those values, head-count ratios for households and persons from 1990 to 1999 were calculated. The general picture of poverty in Poland based on the social minimum and empirical equivalence scales (see Table 1) does not support popular beliefs about large poverty expansion over the 1990s. Only 1993 and, to a lesser extent, 1994 and 1995 (for expenditures) were characterized by relatively high increases in the rates of poor individuals. Nevertheless, income poverty and expenditure poverty incidence started to decrease after 1994 and 1995, respectively, reaching levels much below the 1990 values by the end of the decade. Trends in poverty incidence for persons are less optimistic than those observed for the households. Increases in 1993 and 1994 are steeper and further drops are less substantial. This is due to the relative deterioration of the well-being of large households, especially those with children. The last finding is consistent with the results of an analysis of risk of poverty for various socio-demographic groups reported in Section 9. For all measures, 1999 absolute poverty incidence was virtually unchanged compared to 1998. Further research (Szulc, 2005), however, has revealed increases in monetary poverty rates.

The conclusions about absolute poverty in the 1990s could be even more optimistic if the impact of the change in data collection was taken into account. For that reason, 1993 poverty rates were also calculated excluding households of non-farmer self-employed and social welfare recipients. Moreover, changes in the collection of data increased average household size and this also contributed to the increase of nominal poverty rates. As estimated by Szulc (2000), to remove the impact of both aforementioned changes, 1993 poverty rates should be reduced by 1.7 percentage points for both income and expenditure (simulated estimates for that year are reported in Table 1). However, it was impossible to quantify the impact of the change in households' rotation from quarterly to monthly, which most likely pushed up indices of inequality and poverty. This is especially true for the households which do not receive their incomes on a permanent basis. Both the steepest increase of group inequality among farmers and the lowest increase observed for pensioners support this hypothesis.

Relative poverty rates for households based on 50, 60 and 70 percent respective median and mean poverty lines (see Table 2) lead to different conclusions compared to absolute poverty rates. This observation is consistent with the fact that head-count ratios based on relative poverty lines are in fact inequality measures (though not very good ones as the relative measures are not sensitive to transfers from the poor to the rich and also may remain unchanged after transfers from the rich to the poor if they do not raise them above the poverty line). Moreover, changes in the distribution of incomes and expenditures also modified relations between the absolute and relative poverty lines over time. As average values and inequality both increased over the observed period during which the corrected social minimum remained fixed, the latter represented a lesser portion of mean and median income or expenditure. In 1993 the social minimum constituted

TABLE 1

CHANGES IN ABSOLUTE INCOME AND EXPENDITURE POVERTY: 1990–99 (EMPIRICAL AND OECD$_{70/50}$ EQUIVALENCE SCALES)

| Year | % Below the Social Minimum, Empirical Scale | | % Below the Social Minimum, OECD$_{70/50}$ Scale | | Mean Scale | |
	Households	Persons	Households	Persons	Empirical	OECD
Income						
1990	23.8	21.5	23.2	22.5	2.19	2.29
1991	19.3	17.9	18.6	19.4	2.15	2.28
1992	21.9	21.0	23.5	25.4	2.15	2.29
1993^S	26.3	29.3	28.6	33.8	2.27	2.39
1993^A	28.0	31.0	30.6	35.6	2.28	2.41
1994	28.7	31.8	32.6	38.5	2.22	2.40
1995	28.7	31.5	32.2	38.3	2.18	2.40
1996	23.3	26.5	27.0	32.9	2.19	2.37
1997°	20.9	23.8	24.7	30.6		
1997^N	21.3	24.4	24.8	30.9	2.19	2.39
1998	18.2	21.2	21.9	27.8	2.15	2.36
1999	17.5	20.8	21.1	27.2	2.15	2.38
Expenditure						
1990	34.6	34.4	36.0	37.8	2.19	2.29
1991	26.4	27.0	28.5	32.3	2.15	2.28
1992	27.7	30.2	30.8	36.5	2.15	2.29
1993^S	29.4	33.5	32.1	38.3	2.27	2.39
1993^A	31.1	35.2	33.9	40.0	2.28	2.41
1994	33.2	36.9	37.7	44.2	2.22	2.40
1995	34.8	38.3	38.9	45.7	2.18	2.40
1996	30.1	33.8	34.5	41.2	2.19	2.37
1997	28.0	31.4	32.6	39.1	2.19	2.39
1998	23.8	27.5	28.4	35.2	2.15	2.36
1999	23.5	27.6	28.6	36.0	2.15	2.38

Notes:
The social minimum has been corrected, as described in Section 4. This correction applies to all results displayed in remaining tables.
Expenditures include durables and natural consumption.
Empirical equivalence scales are estimated by means of equation (1).
1993^S: simulated rates (impact of changes in data collection partly removed; see Section 7.1).
1993^A: actual rates.
1997°: "old" definition of disposable income.
1997^N: "new" definition of disposable income (some revenues earned by the sale of assets excluded).
Source: Author's calculations based on the HBS data.

TABLE 2

CHANGES IN RELATIVE INCOME AND EXPENDITURE POVERTY
(EMPIRICAL EQUIVALENCE SCALES)

	% of Households Below:						
	50%	60%	70%	50%	60%	70%	
Year	of Median			of Mean			Gini Index
Income							
1990	5.4	12.5	22.1	9.1	19.2	30.1	25.6
1991	4.8	11.2	20.3	7.7	16.6	27.7	24.3
1992	5.8	12.2	20.7	9.1	17.8	28.4	25.2
1993	6.9	13.7	21.8	12.3	21.8	32.9	29.5
1994	8.3	14.4	22.4	13.9	23.5	34.3	30.9
1995	7.5	13.6	21.5	12.7	22.3	33.4	30.1
1996	7.1	12.8	21.1	12.6	22.6	34.1	30.6
1997[O]	8.1	14.2	22.3	14.4	24.5	35.8	31.7
1997[N]	7.7	13.9	21.8	12.2	21.0	32.3	29.2
1998	7.8	14.0	22.3	12.5	21.6	32.4	29.0
1999	8.4	14.4	22.0	13.0	21.6	32.4	29.4
Expenditure							
1990	7.2	14.2	22.9	12.1	21.8	32.4	27.9
1991	4.0	10.3	18.9	8.0	17.2	29.0	25.3
1992	4.3	10.5	19.4	7.7	17.1	27.5	24.8
1993	6.1	13.1	21.6	11.9	22.1	33.7	29.2
1994	7.8	14.6	22.9	14.4	24.5	35.4	30.6
1995	6.7	13.6	22.2	12.8	22.7	33.8	29.2
1996	6.8	13.6	21.9	13.5	23.7	35.4	30.3
1997	7.7	14.7	23.1	15.0	25.4	36.6	31.4
1998	8.1	15.0	23.5	15.0	25.2	36.1	32.1
1999	8.4	15.3	23.6	15.9	26.0	37.0	31.8

Notes:
1997[O]: "old" definition of disposable income.
1997[N]: "new" definition of disposable income (some revenues earned by the sale of assets excluded).
Source: Author's calculations based on the HBS data.

80 percent of median and 68 percent of mean incomes. In 1999 those percentages decreased to 66 percent and 57 percent, respectively. The analogous percentages for expenditures were 84 percent and 71 percent in 1993 and 73 percent and 61 percent in 1999.

The lowest relative poverty incidence was observed in either 1991 or 1992, while the highest was observed at the end of the decade. Consequently, values for 1999 are much above 1990 levels, though this observation should remain tentative due to data discontinuity. Increases in relative poverty demonstrate that the mean and median well-being were growing at a faster pace than those characterizing the poor, but this does not necessarily prove deterioration of the absolute well-being of the poor. A moderate increase in inequality (Gini indices are displayed in the last column of Table 2), accompanied by quite a large increase of poverty depth (see Table 4) suggests the existence of a relatively small group of extremely poor people. Absolute and relative poverty rates are summarized in Figure 1.
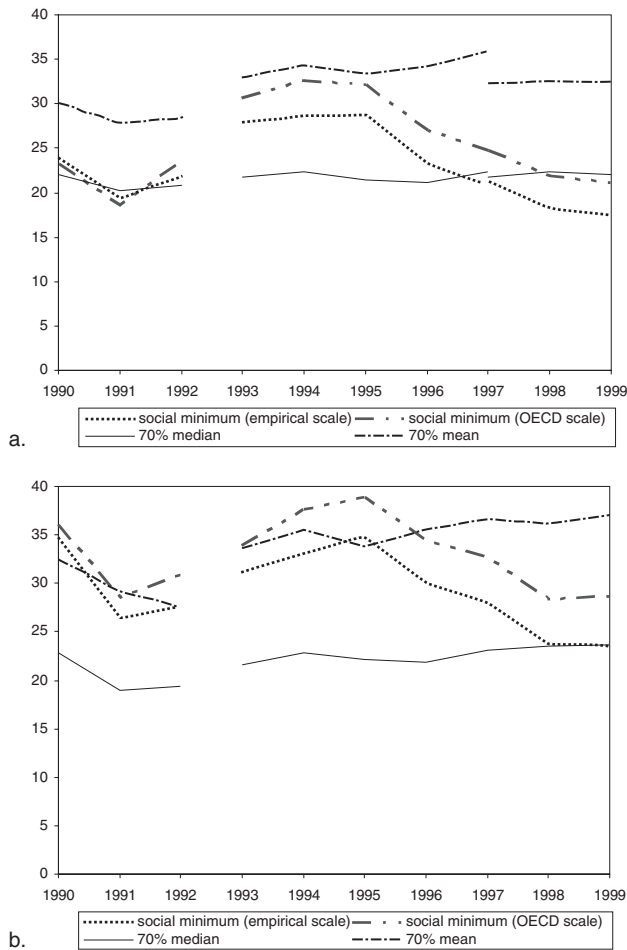
Figure 1. a. Household Poverty Rates, Income (%); b. Household Poverty Rates, Expenditure (%)
   Source: Author's calculations based on the HBS data.

Results on the Gini index demonstrate that Polish inequality does not vary much from inequality in many countries of the European Union. Similar or higher values may be found in Italy, Spain, Ireland, and United Kingdom (see the Luxembourg Income Study website). Much greater inequality may be observed in Russia and several other former Soviet Union republics. The relation between income and expenditure inequality presented in Table 2 seems to be a unique feature of the Polish well-being distribution. For some years, Gini indices for expenditures were higher than those calculated for incomes. This may be due in part to the removal of some capital revenues from household income after 1996, resulting in the nominal equalizing of disposable incomes. Similar atypical differences observed in 1990 and 1991 may make sense in light of the consumption

TABLE 3

MEAN EMPIRICAL AND OECD$_{70/50}$ EQUIVALENCE SCALES FOR SELECTED TYPES OF HOUSEHOLDS IN
1990 AND 1999

	Household Attributes					
	No. of Persons		Head's Age			
No. of Persons	0–9 yr	10–15 yr	Below 30	Above 59	Empirical 1990/1999	OECD
1	0	0	0	0	1.00	1.00
2	0	0	0	0	1.673 1.619	1.70
3	0	0	0	0	2.256 2.148	2.40
4	0	0	0	0	2.789 2.629	3.10
5	0	0	0	0	3.300 3.100	3.80
6	0	0	0	0	3.754 3.566	4.50
2	1	0	0	0	1.604 1.565	1.50
2	0	1	0	0	1.601 1.536	1.50
3	1	0	0	0	2.173 2.067	2.20
3	0	1	0	0	2.174 2.042	2.20
4	1	1	0	0	2.617 2.433	2.70
1	0	0	1	0	0.933 0.931	1.00
1	0	0	0	1	1.059 1.112	1.00

Note: The reference household is a single adult aged 30–59 years.
Source: Author's calculations based on the HBS data.

"boom" that occurred in Poland when shortage was no longer an issue in the Polish market.[13]

7.2. *The Impact of Equivalence Scales on the Trends*

As is shown in the last two columns of Table 1, estimates of the empirical (econometric) equivalence scales from this study do not vary much from the OECD 70/50 scales as far as whole sample mean values are concerned. However, the differences between scales increase with respect to household size. Table 3 presents the results of estimation for 13 types of households based on 1990 and 1999 budget shares. For instance, the OECD scale of 3.8 assigned to a household of five adults is higher than the empirical scale of 3.6 for six adults. Some differences also arise with respect to the age of household members. The empirical scales

[13] I thank Daniel Hamermesh for suggesting this hypothesis during the seminar at the University of Texas at Austin.

attribute a higher cost of living to children than do the OECD scales. An important feature of empirical ("quasi-exact") equivalence scales is that they take the age of the head of the household into account. Much higher than average costs of living are estimated for households headed by the elderly (at least 60 years of age) and much lower are estimated for those headed by persons under 30. The impact of the age of children is much lower. Surprisingly, children below 10 years of age were slightly more expensive to care for than older ones in 1990 and in 1999, but this is not necessarily true for every year.

The impact of equivalence scales on absolute poverty is relatively high in some years though the trends obtained by means of empirical and OECD scales reveal similar patterns (see Figure 1). The proportion of persons with incomes below the poverty line in 1999 was considerably higher than in 1990, despite the fact that the initial values were close to each other. At least two explanations for those differences can be found. First, as already mentioned, in that period the standard of living for large households worsened in comparison to smaller ones. This phenomenon was reinforced by lower economies of scale in the OECD formula. Second, due to substantial decreases in food shares, empirical scales also decreased while OECD ones remained stable.

7.3. *Trends in the Depth and Severity of Poverty*

Table 4 displays the values of four alternative poverty indices. The Dalton index, defined by equation (2), represents a measure of poverty depth while FGT of rank 1 combines information on poverty depth and incidence. FGT of rank 2 and the Sen index both combine FGT_1 and a measure of severity of inequality among the poor. Trends in poverty depth are quite different from trends in poverty incidence. In 1993 the Dalton index jumped coming from a relatively low level of 20 percent[14] and then stabilized at or slightly above 0.25 for income and slightly below this value (except for 1994 and 1995) for expenditures. Changes in the three remaining indices are more consistent with trends in poverty incidence. All were quite low in 1991 due to the lowest poverty gaps and inequalities accompanying moderate poverty incidence, and peaked in 1994 (incomes) or 1995 (expenditures). The FGT and Sen indices reached low levels again at the end of the decade; usually lower than those of 1990. Employing OECD equivalence scales (the results are not displayed in this paper) only changes those indices slightly and did not alter the trends.

7.4. *Income Poverty Versus Consumption Poverty*

Discrepancies between income and consumption poverty are common, especially if households are being observed during one month only. Table 5 displays the results of comparisons between the shares of households that are poor in terms of both aforementioned measures, taken separately and jointly. The comparisons cover the years 1993, 1996, and 1999. The rates of households with incomes below the absolute poverty line and expenditures above it were stable, ranging from 27 to 28 percent of the income poor (e.g., 7.8% out of 28.2% for 1993). The opposite case

---

[14]Data problems reported in Section 3 might be relevant.

TABLE 4

ALTERNATIVE POVERTY INDICES (SOCIAL MINIMUM AND EMPIRICAL EQUIVALENCE SCALES)

Year	Dalton	FGT_1	FGT_2	Sen
Income				
1990	20.6	4.8	1.6	6.8
1991	19.9	3.7	1.2	5.3
1992	22.0	4.7	1.6	6.6
1993	25.3	7.1	2.9	10.1
1994	27.3	7.7	3.3	11.0
1995	25.0	7.1	2.8	10.1
1996	25.1	5.7	2.3	8.2
1997[O]	25.5	5.3	2.2	7.6
1997[N]	26.2	5.3	2.2	7.6
1998	25.5	4.4	1.7	6.3
1999	26.9	4.5	1.9	6.5
Expenditure				
1990	25.1	8.7	3.0	11.9
1991	21.7	5.2	1.5	7.3
1992	21.9	5.8	1.8	8.1
1993	24.0	7.2	2.4	10
1994	26.1	8.3	3.0	11.5
1995	25.5	8.6	3.1	11.9
1996	24.2	7.0	2.4	9.8
1997	24.8	6.7	2.4	9.3
1998	24.2	5.6	1.9	7.8
1999	24.8	5.6	2.0	7.8

Notes:
FGT_1, FGT_2: Foster–Greer–Thorbecke indices of rank 1 and 2, respectively. See equations (2)–(4) for the definitions of displayed indices.
1997[O]: "old" definition of disposable income.
1997[N]: "new" definition of disposable income (some revenues earned by the sale of assets excluded).
Source: Author's calculations based on the HBS data.

TABLE 5

INCOME VERSUS EXPENDITURE POVERTY INCIDENCE: SOCIAL MINIMUM, EMPIRICAL EQUIVALENCE SCALES, HOUSEHOLDS

	1993		
Non-Poor: Income	61.2%	10.6%	71.8%
Poor: Income	7.8%	20.4%	28.2%
Total	68.9%	31.1%	100%
	1996		
Non-Poor: Income	63.5%	13.2%	76.7%
Poor: Income	6.4%	16.9%	23.3%
Total	70.0%	30.0%	100%
	1999		
Non-Poor: Income	71.6%	10.9%	82.5%
Poor: Income	4.9%	12.6%	17.5%
Total	76.5%	23.5%	100%

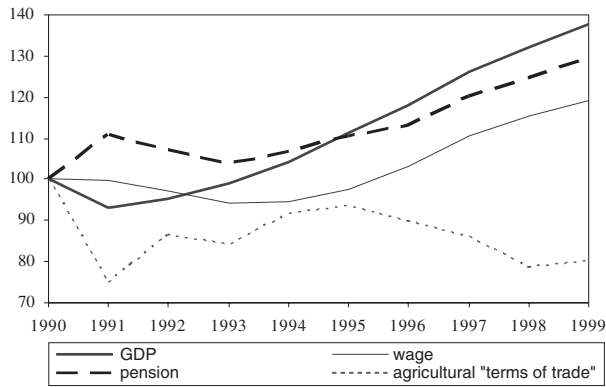*Source*: Author's calculations based on the HBS data.

Figure 2. Changes in GDP, Mean Real Wage and Retirement Pension, and Agricultural "Terms of Trade", 1990 = 100

Source: Central Statistical Office of Poland.

(expenditures below and incomes above the poverty line) was far more frequent, and these rates increased between 1993 and 1999 from 34 (10.6% out of 31.1%) to 46 (10.9% out of 23.5%) percent. The rates of households with both income and expenditures below the poverty line were, of course, smaller than those based on a single measure, but the declining trend was similar.

As consumption trends are smoother than current income trends, modification of the data collection method described in Section 2 most likely altered incomes more than expenditures. This methodological change might have contributed to the more substantial increases in income poverty in 1993. Differences between trends observed for both measures at the end of the 1990s may also be attributed to the tightening of the monetary policy of the Central Bank in 1999. In 1997 and 1998 the interest rates declined quite substantially, resulting in an expansion of credit purchases. On the other hand, its impact on expenditure poverty was not very strong because consumer credits were hardly available for the poor. Rather, consumption of the non-poor increased to a higher extent, the result of which was that the Gini expenditure indices were higher than the Gini income indices (see Table 2).

7.5. *Some Factors Behind the Changes in Poverty*

Some drops in poverty observed between 1990 and 1992 may be at least partly attributed to the enlargement of social transfers, of which pensions constitute the largest portion (at the same time, real wages declined by 3 percent, see Figure 2). Their share in Poland's GDP was the highest among all post-communist countries at that time; it grew from 10.6 percent in 1990 to 17.3 percent in 1991 and 20.4 percent in 1993 (see Keane and Prasad, 2002).[15] Moreover, several studies claim quite good targeting of social transfers in Poland during this period (Grootaert, 1995; Keane and Prasad, 2002; Szulc, 2003b). It was not sufficient, however, to

[15]Increases in the state budget deficit (up to more than 6 percent of GDP in 1991 and 1992 and reduced further on to 3 percent) and rising taxes were other effects of that policy.

prevent poverty growth in 1993 and 1994, which can be mainly attributed to an increase of inequality (see Szulc, 2000, for a decomposition of poverty changes into a growth and redistribution component). It should also be noted that changes in transfers did not affect all socio-economic groups to the same degree. While the pensioners definitely profited, some other types of benefits underwent serious reductions. This is especially true for family and maternity benefits, as well as for child product subsidies (for more details, see MONEE Project, 2001). As a result, the relative position of households with children deteriorated over the reported period, though their absolute poverty rates also declined.

Decreases in absolute poverty observed after 1994–95 resulted mainly from economic progress (see Figure 2). In the 1990s Poland was a leader in terms of GDP growth (with a 4.4 percent annual rate) among the post-communist countries. This development stimulated increases in households' mean per capita incomes (by 19.5 percent from 1990 to 1999 and by 26.2 percent from 1994 to 1999) and expenditures (by 23.6 percent and 21.1 percent, respectively). Naturally, those increases were not uniform. The relative position of farmers worsened to the highest degree during the observed period. This was true for both the 1990–92 and the 1993–99 periods, so this conclusion was probably not affected by the 1993 data problems. Changes in price relations are primarily responsible for that result. Over the 1990s, the ratio of the mean prices of products sold by farmers to the mean prices of the products purchased decreased by 21.5 percent (see Figure 2 for changes in agricultural "terms of trade"). On the other hand, those changes were favorable for most non-farmers, as food prices were rising at a much slower pace than prices of other items (the 1990–99 inflation rate was 884.6 percent, while food prices increased by 659.7 percent).

Figure 3 documents changes in the mean incomes and expenditures for six major socio-economic groups between 1993 and 1999. The employees and social welfare recipients were major gainers, whereas increases observed for the
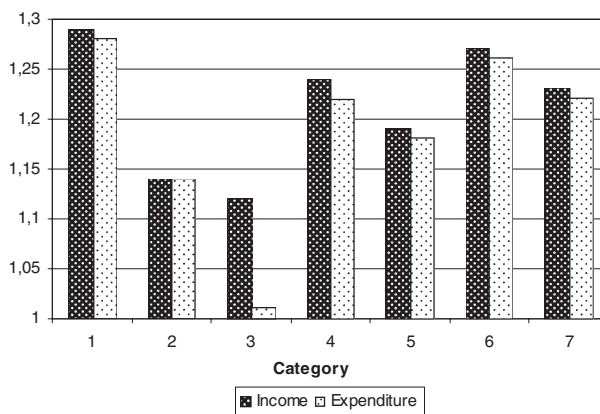

Figure 3. Changes in Well-Being by Source of Income: 1993–1999 (1993 = 1)

Source: Author's calculations based on the HBS data.
Legend: 1, Employee; 2, Farmer-employee; 3, Farmer; 4, Self-employed; 5, Pensioner; 6, Social welfare recipient; 7, Total.

pensioners are smaller than one would expect, considering the data on mean pension displayed in Figure 2. This happens because this group also comprises those receiving invalid pensions for which increases were much more moderate. The rise in income of farmers was the lowest though still relatively large, considering the decline in (national) agricultural "terms of trade." The increase in food exports (by more than 50 percent between 1995 and 1999) may provide a reason for this phenomenon. One should note, however, that there was only a marginal increase in farmers' mean expenditure.

8. Financial Poverty Versus Deprivation and Subjective Income Evaluations

In this section the definition of poverty is extended to include consideration of household assets and subjective income evaluations. Some households that are in financial poverty are excluded from the poverty zone for not qualifying for a more rigorous definition of poverty. This approach is much more robust to households' rotation and underreporting than that based on current monetary indicators only. To attach a sufficient weight to financial poverty, and to ensure a reasonable margin of error, the "deprivation line" should not be too low. Hence, it should rather be considered a type of "affluence threshold."

The following attributes have been selected as components of household asset affluence: dwelling size, and owning a car, dacha (cottage), computer, electric dishwasher, cable or satellite TV, and video recorder. The threshold for a dwelling size is set at mean value plus one standard deviation. Since this variable differs to a large degree across some demographic attributes, these thresholds are calculated separately for rural and urban households, as well as for households with one, two, and three or more people. A household is classified as non-poor in terms of its assets if at least one of the following is true:

- The household owns a car and one of the aforementioned durables or a dacha.
- The household resides in a large dwelling and owns at least one of the aforementioned durables, including a car or a dacha.
- The household owns at least three of the aforementioned durables, including a car.

Households finding their income levels satisfactory were selected according to their answers to two questions: (1) "What is your general income position?" (possible answers include: poor, rather poor, fair, rather good, and good); and (2) "What monthly income do you find: very poor, insufficient, scarcely enough, good, and very good?" To be considered non-poor in subjective terms, households should find their income at least "fair" (first question) and report that their monthly income is at least "scarcely enough" (second question).

Tables 6 displays shares of households in financial poverty but non-poor in terms of assets and/or income self-evaluations. The rates of households that are below the financial poverty line but reach "asset affluence" range from 16 to 25 percent, depending on the year and type of monetary measure applied. There is no apparent common trend and the 1999 rates are close to those of 1993. This suggests that, in order to maintain their material status, poor households were generally not

TABLE 6

POVERTY MEASURES OF HOUSEHOLDS IN FINANCIAL POVERTY ABOVE AFFLUENCE THRESHOLD AND
SATISFIED WITH THEIR INCOME

Year	Percentage of Households Above Affluence Threshold Among the Income and Expenditure Poor		
1993	24.2	24.7	20.6
1995	19.8	19.6	16.4
1997[O]	21.5	22.1	17.6
1997[N]	23.1		18.2
1999	22.8	24.8	19.0

Year	Percentage of Households Satisfied With Their Incomes Among the Income and Expenditure Poor		
1993	35.0	41.9	31.8
1995	28.2	42.8	27.5
1997[O]	23.3	40.6	23.2
1997[N]	26.5		24.3
1999	16.8	34.3	16.4

Year	Percentage of Households Above Affluence Threshold and Satisfied With Their Incomes Among the Income and Expenditure Poor		
1993	12.3	14.0	9.7
1995	6.9	14.4	6.0
1997[O]	4.9	11.7	3.3
1997[N]	6.3		3.5
1999	5.3	8.9	4.5

Notes:
1997[O]: "old" definition of disposable income.
1997[N]: "new" definition of disposable income (some revenues earned by the sale of assets excluded).
Source: Author's calculations based on the HBS data.

selling their assets. Discrepancies between monetary and subjective indicators are much higher, ranging from 16 to 43 percent of poor (in financial terms) households, though they are decreasing over time, especially where income poverty is concerned. In other words, it is likely that in 1999 the poor were less optimistic than the poor in previous years. This can be explained by some macroeconomic factors (decreases in the GDP growth rates in 1998 and 1999, a tightening monetary policy), as well as changes in the "moods" of popular media preceding the economic stagnation in succeeding years.

Table 7 reports results on "overlapping poverty" (in the literature this is also referred to as "core poverty"). Poverty rates presented in the three last columns contain at least two definitions of poverty, including the financial one. Those in the last column, qualifying for all definitions described above, refer to the households which are poor almost without a doubt. The decline in the rate of such households taking place between 1993 and 1999 is relatively small (from 11.7 to 9.8 percent) if compared to other changes revealed in Table 7. This happens because of the impact of subjective poverty, especially between 1997 and 1999, when the number of households satisfied with their incomes decreased noticeably. Nevertheless, even for 1999, the rates of "overlapping poverty" are around half of the rate of households with low expenditures or low incomes.

TABLE 7

INCOME AND EXPENDITURE POVERTY, HOUSEHOLD ASSETS AND SELF-ASSESSMENTS OF INCOMES

	% of Households at Financial Poverty:		Low Incomes and Expenditures, and:		
Year	Income	Expenditure	Income and Expenditure	Below Affluence Threshold	Bad Self-Assessment	Below Affluence and Bad Self-Assessment
1993	28.2	31.1	20.4	16.2	13.9	11.7
1995	28.7	34.8	21.5	17.9	15.6	13.3
1997°	21.1	27.8	15.2	12.4	11.6	9.9
1997^N	21.3	27.8	15.1	12.3	11.4	9.7
1999	17.5	23.6	12.8	10.3	10.7	9.8

Notes:
Some discrepancies between poverty rates displayed in this table and in Table 1 result from deleting from the sample several hundred households which did not answer the subjective income questions.
1997°: "old" definition of disposable income.
1997^N: "new" definition of disposable income (some revenues earned by the sale of assets excluded).
Source: Author's calculations based on the HBS data.

The aforementioned results demonstrate that one type of poverty does not necessary imply another type(s). It should be noted however, that large discrepancies between financial and asset well-being may be somewhat suspicious due to a lack of information on quality or age of durables and facilities. Moreover, influence of the rationing of consumer goods under the previous regime may still be relevant. Conflicting results obtained by means of "objective" and subjective measures are more difficult to rationalize as the latter are at least partially determined by psychological factors. More detailed analysis revealed some groups for which discrepancies between financial and subjective poverty are especially high. For example, households headed by women are characterized by relatively low financial poverty and high subjective poverty. The opposite observations may be found for rural households. In the latter case, it should be noted that lower price levels were not included in the study due to lack of data. But the long-term poor, many of which live in rural areas, may also have failed to recognize their poverty because they have adapted their perceptions according to the actual circumstances.

9. The Distribution of Poverty Among Socio-Demographic Groups

A common method of selecting groups at risk of poverty is based on a calculation of poverty indices (usually head-count ratios) for various types of households. If, for example, poverty incidence is higher for rural households than for urban ones, the previous group is assumed to be exposed to higher than average risk of poverty, provided type of residence is a grouping category. Groups with higher than average poverty incidence are typically considered to be at high risk of poverty. However, this technique cannot estimate a "pure" effect that demographic variables have on the well-being of households. For instance, rural households are on average comprised of more children than urban ones, and they are usually headed by less educated people. As both of these attributes are likely to be significant correlates of poverty, it would be impossible to prove by simple disaggregation of a national index whether a rural location itself increases risk of poverty. Probit (and also logit) models allow estimation of "pure" (or "conditional") effects of household attributes. Formally, a probit model is defined as follows:

$$\Pr\left(y_i^* < z \,|\, A_i\right) = \Phi(\alpha + A_i\beta)$$

where y_i^* stands for the i-th household's equivalent income or expenditure, A_i is a vector of demographic attributes, Φ is the cumulative standard normal density function, and α and β represent the intercept and slope vector, respectively. The positive estimate of a slope coefficient indicates risk of poverty attributed to a corresponding type of household that is higher than the risk for the supplementary type of household.

The choice of sub-groups for which risk of poverty is examined by means of probit regression is based on several Polish and worldwide studies addressing the issue of poverty correlates. Table 8 displays types of households which have exceeded national poverty rates at least once (in 1993, 1996 or 1999 separately

for income and expenditures). Households of farmers, farmer-employees (bi-occupational ones), households with at least three children with one or more unemployed, and those headed by poorly educated people were the least privileged. Their poverty rates have exceeded the national poverty rates by more than 50 percent at least once (in most cases for all years and measures). As the remaining groups included in Table 8 experienced higher than national poverty rates in at least four cases (out of six), none of them can be considered "accidentally poor" in financial terms.

The results of the probit estimations with the use of empirical equivalence scales are reported in Table 9. For each category of household comprising more than two groups (source of income and number of children are such categories), probit regressions were run separately for each group, controlling for remaining variables. Thus, pensioners could be compared to non-pensioners, farmers to non-farmers etc, instead of being compared with the reference group (i.e. that excluded from the model) which would be the same for all types of households within the category. If the latter method was employed, the positive and significant estimates would not necessarily be evidence of a higher than average risk of poverty.

The estimates reported in Table 9 are in some cases inconsistent with the correlates of poverty that might be deduced from Table 8. Certainly, different impacts on poverty have been found for two types of household. First, for households of farmer-employees estimates appeared to be negative and statistically

TABLE 8

POVERTY INCIDENCE FOR HOUSEHOLDS WITH POVERTY RATES ABOVE THE NATIONAL MEANS
(EMPIRICAL EQUIVALENCE SCALES)

Household Type	Income			Expenditure		
	1993	1996	1999	1993	1996	1999
Category: Main source of income						
Farmer	46.9	45.7	40.2	38.4	44.2	40.7
Farmer-employee	29.9	26.9	24.7	38.4	37.7	33.4
Pensioner	30.2	23.8	17.8	31.9	31.7	24.4
Welfare	75.1	68.4	58.4	66.5	65.9	55.2
Category: Number of children						
2 children	35.4	30.7	23.1	38.9	37.1	30.1
3 children	49.4	47.3	37.7	51.5	51.2	46.2
More than 3 children	66.6	60.1	51.4	67.1	63.6	57.5
Category: Household's head attributes (binary variables)						
Age 60+	29.7	22.3	15.4	31.9	31.3	23.7
Female	32.1	26.2	19.8	33.3	31.5	24.4
Low education	36.6	31.4	29.0	40.0	39.6	37.5
Category: Other household attributes (binary variables)						
Single parent	41.5	37.1	27.1	37.5	34.7	29.1
Rural	39.0	35.2	29.4	41.1	43.2	36.9
Size: 6+	46.8	31.3	37.2	53.9	52.4	47.5
Unemployed (1+)	48.4	43.0	42.9	58.0	52.0	48.1
Total	28.0	25.0	17.5	31.1	31.0	23.6

Note: Bold type indicates the household for which high risk of poverty was confirmed by means of all methods and for all years.

Source: Author's calculations based on the HBS data.

TABLE 9

Estimates of Probit Model of Risk of Poverty (empirical equivalence scales)

Household Type	Income			Expenditure		
	1993	1996	1999	1993	1996	1999
Category: Main source of income						
Farmer	0.3634	0.4289	0.5892	−0.0683	0.0718	0.0359
Farmer-employee	−0.2605	−0.2549	−0.1079	−0.0735	−0.1289	0.0099!!
Pensioner	0.2390	0.2231	0.2242	0.1443	0.1857	0.1373
Welfare	0.9939	0.9209	0.8790	0.6193	0.6303	0.5858
Category: Number of children						
2 children	0.2988	0.2597	0.2314	0.2926	0.2411	0.2426
3 children	0.4586	0.5599	0.4575	0.3884	0.4312	0.4574
4 or more children	0.7503	0.6411	0.5520	0.5040	0.4268	0.3939
Category: Household's head attributes (binary variables)						
Head's age: 60+	0.0087!!	−0.0914	−0.3161	0.0600	0.0279!!	−0.1008
Female head	0.3125	0.2983	0.1837	0.2268	0.2012	0.0690
Low education	0.5952	0.5848	0.4497	0.6380	0.6083	0.4835
Category: Other household attributes (binary variables)						
Single parent	0.1794	0.1069!!	−0.0439!!	0.0600!!	−0.0506!!	−0.0046!!
Rural	0.2286	0.3083	0.4546	0.2293	0.3494	0.4183
Size: 6+	−0.1346	−0.1516	−0.0278	0.1283	0.0612!	0.1454
Unemployed (1+)	0.5143	0.4298	0.6534	0.4766	0.4367	0.5776

Notes:
!! estimate non-significant below 0.1.
! estimate non-significant below 0.05, significant below 0.1.
Bold type indicates the household for which high risk of poverty was confirmed by means of all methods and for all years.
Source: Author's calculations based on the HBS data.

significant in all but one case. Second, only one estimate for a single-parent household is positive and statistically significant. Both types of household were characterized by a much higher than average incidence of poverty, regardless of the year and well-being measure. A less noticeable discrepancy has been found for households with six or more people: only two estimates are positive and significant despite the much higher than average poverty rates in six cases. The occurrence of such discrepancies suggests that none of the respective household attributes are themselves determinants of poverty. High poverty results from the impact of other highly correlated factors (e.g. lower than average education level for farmer-employee households or higher than the average number of children in large households) which are controlled for in the regression models.

The following types of households were characterized by positive, statistically significant estimates for each year and the well-being measure: households of social welfare recipients, those with at least one adult unemployed, those with at least two children, rural households headed by women or low educated people, and households of pensioners. Occurrence of the latter two types may come as a surprise as poverty rates for these two groups only slightly exceed national averages. For pensioners, this may be explained by the elimination of two factors that have a positive effect on their well-being in the probit model: a very low average number of children and a low proportion of unemployed people. It would be rather difficult to find a similar rationale for the estimates obtained for female-headed households.

TABLE 10

Estimates of Probit Model of Risk of Poverty (OECD$_{70/50}$ equivalence scales)

Household Type	Income			Expenditure		
	1993	1996	1999	1993	1996	1999
Category: Main source of income						
Farmer	−0.2112	−0.01783	0.4538	−0.0697	0.0443!!	0.1520
Farmer-employee	0.3059	0.3488	−0.0805	−0.1073	−0.0769!!	0.0214!!
Pensioner	0.1822	0.1792	0.1520	0.7080	0.0844	0.0398!!
Welfare	0.9042	0.8292	0.8662	0.5378	0.5542	0.5130
Category: Number of children						
2 children	0.2749	0.3014	0.2607	0.2552	0.2805	0.2814
3 children	0.4576	0.5838	0.5510	0.3670	0.4662	0.5162
4 or more children	0.6277	0.5391	0.5484	0.3611	0.3385	0.3518
Category: Household's head attributes (binary variables)						
Head's age: 60+	−0.1772	−0.3720	−0.5968	−0.0933	−0.1805	−0.3379
Female head	0.2641	0.2248	0.1057	0.1807	0.1484	0.0264!!
Low education	0.6013	0.5925	0.4462	0.6402	0.6238	0.4698
Category: Other household attributes (binary variables)						
Single parent	−0.0252!!	−0.0668!!	−0.2060	−0.1642	−0.2184	−0.1905
Rural	0.2179	0.2856	0.4484	0.2429	0.3258	0.4179
Size: 6+	0.1115	0.3191	0.2239	0.3819	0.3412	0.4823
Unemployed (1+)	0.5679	0.5414	0.7179	0.5582	0.5003	0.6657

Notes:

!! estimate non-significant below 0.1.

Bold type indicates the household for which high risk of poverty was confirmed by means of all methods and for all years.

Source: Author's calculations based on the HBS data.

Since equivalence scales are very likely to have an impact on the results, estimations of the probit model were repeated using OECD scales (see Table 10). This slightly altered the distribution of poverty. The most important change occurred for large households, for which all six estimates became positive and significant which can be easily explained by the lower economies of scale. Decline in the number of positive and significant estimates of risk of poverty arise in the case of farmers (three times), female headed households (once), and pensioners (once). Increases in the number of significant positive estimates occur for households of farmer-employees (twice) and for those headed by people with 60 or more years of age (once). The latter result, along with the low reduction of risk of poverty observed for the pensioners, is surprising because the OECD 70/50 equivalence scale for that type of a household is on average lower than the empirical one. These effects may be partially explained by the fact that poverty affects invalid pensioners much more frequently than old age pensioners.

10. Concluding Remarks

In spite of the large variety of applied methods, some relatively robust conclusions on poverty in Poland during the 1990s may be drawn from this study. First, the trends in absolute poverty only partially confirm popular beliefs about large-scale poverty expansion in Poland during the 1990s. However, the precise shape of trends is more ambiguous and depends on the methods used. The most

optimistic picture can be seen through the observation of the shares of households with incomes and expenditures below the absolute poverty line. After temporal increases between 1992 and 1994 (incomes) or 1995 (expenditures), poverty rates declined, in the end reaching much lower levels than those in 1990. Moreover, it should be noted that changes in the HBS data collection contributed considerably to increases in poverty and inequality measures in 1993. A more pessimistic portrait of absolute poverty is obtained by means of the head-count ratio calculated for persons, especially when using OECD equivalence scales instead of the empirical ones that fit the actual household budget shares. Nevertheless, even in that case, poverty rates dropped significantly during the second half of the decade. Unlike absolute poverty, relative poverty increased noticeably between 1993 and 1999 (the conclusions concerning the whole period are more ambiguous due to data discontinuity). However, this finding should not be regarded as opposed to the previous one. Growth in the number of households below the relative poverty line(s) results from the rise in mean and median well-being rather than from general deterioration of lower incomes or expenditures. On the other hand, joint evaluation of inequality and poverty depth suggests the existence of a relatively small but growing group of the extremely poor. This is consistent with the fact that poverty gaps increased over the decade.

The extension of the definition of poverty to include consideration of household assets did not change the trends in poverty described above but it considerably reduced poverty rates for each year.[16] This is because of a large and relatively stable proportion of the monetary poor who reached "asset affluence." Adding self-assessments of household incomes yields a slightly different picture due to the downturn in subjective income evaluations at the end of the 1990s. The rate of those satisfied with their incomes among the monetary poor went seriously down at the same time. This kept the rate of "overlapping poverty" in 1999 at the 1997 level, despite noticeable declines in the other two types of poverty measures.

The distribution of poverty was examined by means of the decomposition of the national head-count ratios and by estimation of probit models. Households with unemployed people, with at least two children, those headed by low educated people or social welfare recipients, and rural households all face higher than average risk of poverty regardless of the method applied. Using more adequate probit regression does not claim some types of household, indicated by simple decomposition of the national rates, as groups at high risk of poverty. Households of farmer-employees or single parents, as well as large households with a small number of children are characterized by much higher than average poverty rates and negative or non-significant estimates of risk of poverty.

APPENDIX: THE IMPACT OF SAMPLE DESIGN ON POVERTY MEASURES

Standard errors are calculated for household poverty rates, H (using empirical equivalence scales), making corrections for stratification, clustering and weighting. The importance of such corrections is measured by the design effect, which is defined as the following ratio:

---

[16]It should be noted, however, that two important issues were not examined due to lack of data: quality of durables and households' debts.

$$\text{deff} = \frac{\text{Var}(H)}{\text{Var}_0(H)}$$

where $\text{Var}(H)$ is a variance calculated under actual sample design and $\text{Var}_0(H)$ stands for the variance that would have been obtained under simple random sampling. Moreover, 95 percent confidence intervals are presented based on corrected standard errors.

TABLE A1

HOUSEHOLD POVERTY RATES, SAMPLE DESIGN EFFECTS, AND CONFIDENCE INTERVALS

Year	Poverty Rate	Standard Error	Design Effect	95% Confidence Interval
Income				
1993	28.0	0.3358	1.78	[27.34; 28.66]
1994	28.7	0.3367	1.77	[28.04; 29.36]
1995	28.7	0.3347	1.87	[28.04; 29.36]
1996	23.3	0.3546	2.24	[22.60; 24.00]
1997	21.3	0.3160	1.91	[20.68; 21.92]
1998	18.2	0.2975	1.89	[17.62; 18.78]
1999	17.5	0.2968	1.88	[16.92; 18.08]
Expenditure				
1993	31.1	0.3656	2.00	[30.38; 31.82]
1994	33.2	0.3714	2.00	[32.83; 33.57]
1995	34.8	0.3686	2.01	[34.08; 35.52]
1996	30.1	0.3915	2.33	[29.33; 30.87]
1997	28.0	0.3852	2.34	[27.25; 28.75]
1998	23.8	0.3560	2.19	[23.10; 24.50]
1999	23.5	0.3595	2.26	[22.80; 24.20]

Note: For 1997 only "new" income definition is applied.
Source: Author's calculations based on the HBS data.

REFERENCES

Atkinson, T., B. Cantillon, E. Marlier, and B. Nolan, *Social Indicators: The EU and Social Inclusion*, Oxford University Press, Oxford, 2002.
Deaton, A., *The Analysis of Household Surveys; A Microeconometric Approach to Development Policy*, The Johns Hopkins University Press, Baltimore and London, 1998.
Foster, J. E., J. Greer, and E. Thorbecke, "A Class of Decomposable Poverty Measures," *Econometrica*, 52, 761–6, 1984.
Förster, M. F., J. Redl, U. Tentschert, and M. Till, *Dimensions of Poverty in Austria in the Late 1990s*, European Centre for Social Welfare Policy and Research, Eurosocial 69/01, Vienna, 2001.
Grootaert, C., "Poverty and Social Transfers in Poland," *Policy Research Working Paper 1440*, The World Bank, Washington, DC, 1995.
Howes, S. and J. O. Lanjouw, "Does Sample Design Matter for Poverty Rate Comparisons?" *Review of Income and Wealth*, 44, 99–109, 1998.
Keane, M. and E. Prasad, "Inequality, Transfers and Growth: New Evidence from the Economic Transition in Poland," *Review of Economics and Statistics*, 84, 324–41, 2002.
Kordos, J., "Forty Years of the Household Budget Surveys in Poland," *Statistics in Transition*, 2, 1119–38, 1996.
Kordos, J., B. Lednicki, and M. Zyra, "The Household Sample Surveys in Poland," *Statistics in Transition*, 5, 555–89, 2002 (http://www.stat.gov.pl/english/sit/sit5_4/Kordos1.doc).
Layte, R., B. Maitre, B. Nolan, and C. T. Whelan, "Persistent and Consistent Poverty in the 1994 and 1995 Waves of the European Community Household Panel Study," *Review of Income and Wealth*, 43, 427–49, 2001.

Luxembourg Income Study website. *LIS Key Figures* (http://www.lisproject.org/keyfigures/ineqtable.htm)

Milanovic, B., *Income, Inequality, and Poverty during the Transition from Planned to Market Economy*, The World Bank, Washington, DC, 1997.

MONEE Project, "A Decade of Transition," *Regional Monitoring Report*, 8, Innocenti Research Centre, Florence, 2001.

Okrasa, W., "Who Are Poland's Long-Term Poor? Household Risk-Managing Capabilities According to Panel Data 1993–96," *Statistics in Transition*, 4, 841–82, 2000.

Panek, T., "A Multidimensional Analysis of the Poverty in Poland in 1995 and 1996," *Statistics in Transition*, 3, 979–1001, 1998.

Sen, A., "Poverty: An Ordinal Approach to Measurement," *Econometrica*, 44, 219–31, 1976.

Slesnick, D. T., "Gaining Ground: Poverty in the Postwar United States," *Journal of Political Economy*, 101, 1–38, 1993.

Szulc, A., "Quasi-Exact Equivalence Scales Estimation," *Przegląd Statystyczny (Statistical Review)*, 39, 302–7, 1992.

———, "An Equivalence Scale Exercise for Poland: Towards a Balanced Consumer Market," Paper presented at the 7th World Congress of the Econometric Society, Tokyo, August 22–29, 1995.

———, "Economic Transition, Poverty, and Inequality: Poland in the 1990s," *Statistics in Transition*, 4, 997–1017, 2000 (http://www.stat.gov.pl/english/sit/sit6/szulc.doc).

———, "Is It Possible to Estimate Reliable Equivalence Scales?" *Statistics in Transition*, 2, 589–611, 2003a (http://www.stat.gov.pl/english/sit/sit64/szulc.doc).

———, "Inequality during the Economic Transition in Poland: 1993–1999 Evidence," Paper presented at the Wider International Conference on Inequality, Poverty and Human Well-Being, Helsinki, May 30–31, 2003b (http://www.wider.unu.edu/conference/conference-2003-2/conference2003-2.htm).

———, "Checking the Consistency of Poverty in Poland: 1997–2003 Evidence," Paper presented at the UNDP conference on The Many Dimensions of Poverty, Brasilia, August 29–31, 2005 (http://www.undp-povertycentre.org/md%2Dpoverty/papers/Adam%20Szulc_.pdf).

Townsend, P., *Poverty in the United Kingdom*, Allen Lane, Harmondsworth, 1979.

World Bank, "Poverty in Poland," World Bank Report 13501-PO, Washington, DC, 1994.