International Conference

The many dimensions of poverty

Brasilia, Brazil – 29-31 August 2005
Carlton Hotel

Checking the Consistency of Poverty in Poland: 1997 - 2003 Evidence

Conference paper

Adam Szulc
Warsaw School of Economics/ Institute of Statistics and Demography – Poland

DFID Department for International Development
BID
ipea Institute for Applied Economic Research
International Poverty centre United Nations Development Programme
UNDP

Adam Szulc
Warsaw School of Economics
Institute of Statistics and Demography[1]

CHECKING THE CONSISTENCY OF POVERTY IN POLAND: 1997 - 2003 EVIDENCE.

Abstract

This study investigates relationships between various types of poverty in Poland. Monetary poverty is examined together with a subjective one and with a deprivation, conceived as a lack of particular resources. The results reveal quite important discrepancies between those three types of poverty. Though income and expenditure poverty incidence generally decreased over investigated period, the rate of persons living in subjective poverty was higher in 2003 than in 1997, while deprivation substantially decreased. Moreover, quite large discrepancies at the individual levels could be observed. Some conflicting results were found between correlates of poverty of three aforementioned types as well.

[1] Al. Niepodległości 162, 02-554 Warszawa, Poland
fax: +48-22-646 6138, e-mail: aszulc@sgh.waw.pl

1. Introduction

The question "how much poverty?" hardly be can answered unambiguously. Its first part ("how much?") produces a debate about the way how poverty should be aggregated or, in other words, questions about poverty indices. The last term raises problem of how individual poverty should be defined, i. e. which aspects of welfare it captures and what is (are) the poverty threshold(s). Poverty indices and poverty lines applied in the present study are based on standard solutions. The focus is on analysis of various dimension of poverty. The main question is: is it possible to reach similar conclusions on poverty in Poland and what are the relations between those dimensions?

The most common definition of poverty is based on well-being conceived as an equivalent income and/or consumer expenditures and is present in virtually all studies of this topic. Since seminal paper by Townsend (1979), including other non-monetary indicators into poverty research has gained wider recognition. More precisely, poverty in a broader sense covers also deprivation, i. e. lack or shortage of some particular items or resources, like hot meal every day, hot running water, decent living space etc. There is one more aspect of such an approach: the individuals reported as poor in terms of income or expenditures may reach more than enough level of in terms of their assets and vice versa. In countries like Poland, undergoing rapid changes due to economic transition started in 1989, merging resources and monetary indicators representing current flows may be especially interesting. Subjective evaluations of well-being represent another dimension of poverty research. Like in the previous case, they may differ from the results obtained by means of "objective" measures. Those issues, which may be referred to as poverty consistency and inconsistency, represent the main focus of the present study.

As pointed out by Ravallion (1994), poverty measures are mainly relative in their nature. In other words, those measures are in fact comparisons in time and in space. Nevertheless, comparing results obtained by means of different definitions of poverty is possible also for one year and one country (region). In this study all aforementioned types of comparisons are present. Trends in monetary poverty are reported for all years from 1997 to 2003, using both absolute and relative poverty lines. Poverty incidence and depth measures are supplemented by inequality indices. Comparisons between various aspects of poverty and well-being are performed for three years representing the beginning, the midpoint (2000) and the end of the

investigated period. The resulting indices may be said to report inconsistencies and consistencies of poverty. The first class of poverty measures indicates rates of individuals that are poor in accord with one definition and non-poor in accord with another one. Alternatively, inconsistency of poverty is gauged by observing presence of individuals that can be said well-off in terms of one standard among those poor in terms of another one. Consistent poverty is indicated by rates of those facing deprivation and subjective poverty among the monetary poor. The rates of "entirely poor", i. e. those passing more than one definition of poverty, are also produced.

Distribution of poverty among socio-economic groups is another topic of interest. It is usually evaluated by means of decomposition of country average rates and observing for which groups those rates exceed significantly country means. Alternatively, probit or logit regressions may be used to indicate household attributes correlated with high probability of being poor. Both abovementioned methods are utilized in the present study. Probit models are also employed also to find household attributes significantly correlated with appearance of inconsistencies between various types of poverty. Finally, the impact of compositional changes in population between 1997 and 2003 on various types of poverty is examined.

2. Country overview: from communism to the European Union.

Poland is a mean sized country, both in terms of the population and the territory. With 38.175 mln. inhabitant in 2004 it is ranked as eighth country in Europe. Its PKB per capita (10,560 PPP dollars in 2002[2]) places Poland below the European average (47% of the mean value for the European Union), though still well above the poorest countries in Europe. Two events have had the most important impact on the recent history of Poland. In 1989 the first after the World War II non-communist government was established, launching the so-called transition, including democratisation and pro-market reforms. In 2004 Poland joined the European Union together with 9 other countries, most of which were post-communist ones.

The literature documenting changes between 1989 and 2004, including socio-economic ones, is relatively large[3]. Nevertheless, the conclusions on poverty and inequality are not clear. In accord with popular beliefs, in 1990 they started almost continuous increases, reaching the

[2] Source: Human Development Report.
[3] For a brief summary see http://lnweb18.worldbank.org/eca/eca.nsf/General/D902E8CAF401B76E85256B410081DF03?OpenDocument

European top levels. On the other hand, some scientific research demonstrate less dramatic increases in inequality and relative poverty and substantial drops in absolute poverty in the second half of 1990s. These issues are discussed in more details in the next section.

Among less disputable phenomena the high unemployment seem to be the major damaging effects of political and economic changes started in 1989. The increase from 0,3% in January 1990 to 19,5%[4] in January 2005 was one of the highest in the whole Europe and the recent value is the highest in the EU. Losing an economic position against some neighbour and Asian countries, increase of bureaucracy, corruption, lack of transparency in political life, might be added to the list of other negative consequences of the Polish transition. Relatively high growth of GDP (60% between 1990 and 2004), extensive increases of the rate of participation in tertiary education (from 13% in 1990/1991 to 46 % in 2002/2003) and considerable growth of longevity represent a brighter side of the Polish reforms. Consequently, Poland's position in Human Development Index ranking improved from in 0.802 1990 to 0.850 in 2002. Table 1 reports some macroeconomic and social indicators from 1990 till recently.

Table 1. Selected economic and social indicators for Poland in 1990 - 2004

Indicator	1990	1995	2000	2001	2002	2003	2004
GDP change, 1990=100	100	111.4	143.1	144.5	146.5	152.1	160.2
Unemployment rate (December)	6.5	14.9	15.1	17.5	18.0[1] / 20.0[2]	20.0	19.1
Gross participation in tertiary education	12.9	22.3	40.7	43.6	46.2	-	-
Life expectancy at birth	70.8	72.0	-	74.2		74.7	-
Human Development Index	0.802	0.816	0.843	-	0.850	-	-

[1] Old definition of unemployment
[2] New definition of unemployment

Source: Statistical Yearbooks (CSO), Human Development Reports (UNDP).

3. Research on poverty in Poland: a review[5].

There are two sources of poverty indicators in Poland that may be described as official ones. Both are based on the annual household budget survey being collected by the Central

[4] In 2002 the definition of the unemployed was changed. It added two percentage points to the 2002 rate calculated in accord with the previous definition.
[5] Only the papers available in English are included into this presentation.

Statistical Office. Starting from the early 1990s the Institute of Labour and Social Studies (ILSS) in Warsaw publishes poverty rates based on its own two poverty lines. Both lines are absolute and are being published quarterly as the so called social minimum (originated in the beginning of the 1980s) that is relatively generous and as the subsistence minimum (being calculated from the mid 1990s), representing much lower consumption level. Nevertheless, those calculations yield seriously biased trends in poverty, as none of the aforementioned poverty lines represents fixed standards of living. It was demonstrated by Szulc (2000) that in 1995 the rate of households with expenditures below the real 1990 social minimum was overestimated by 56% or 1995 social minimum was in real terms by 26% higher than that of 1990. It is not surprising therefore that the ILSS's calculations provide very pessimistic picture of changes in poverty after that date. Recent rates obtained by means of this methods are almost twice higher than initial ones. Fixing the social minimum at the 1990 level in real terms would revise those trends dramatically. Starting from the mid 1990s income and expenditure poverty rates decreased substantially and recent values are much below 1990 levels. On the other hand, all time series covering longer periods are biased due to changes in data collection (in 1993, see Keane and Prasad, 2002 and Szulc, 2002) and in income definition (in 1997, see Szulc, 2002).

Another source of poverty monitoring is motivated by 2004 access to the European Union. Like all member countries, Poland is obliged to prepare the so called indicators of social inclusion (referred to as Laeken indicators, see Atkinson et al, 2002 and Atkinson et al. 2004), for which income poverty indicators establish a core element. They are calculated in relative or fixed-relative terms, with a rate of persons with equivalent income below 60% of median as a leading poverty measure. The indices are broken down by means of several socio-economic variables. To distinct monetary poverty from its other features, those indices are referred to as risk-of-poverty indicators, as low current income does not necessary results in falling into poverty in a broader sense. All indicators for member countries are defined in the same or very similar way, therefore they may be compared between those countries.

Poverty in Poland was investigated by several international institutions, including the World Bank (1994, 2000, 2004), the United Nations Development Programme (Rumińska-Zimny, 1997, Topińska, 1997), the International Monetary Fund (Keane and Prasad, 2002) and the EUROSTAT (Dennis and Guio, 2004, Guio and Marlier, 2004). This topic was also included into several international projects on poverty measurement covering selected post-communist

countries (MONEE Project, 2001, World Bank, 2000, Kuhl and Topińska, 2003). The number of studies made by academic researchers is also quite large. They include multilateral comparisons (e. g. Atkinson and Micklewright, 1992, Milanovic, 1998, Szulc, 1998, Förster and Tóth, 1998) but many studies focus strictly on Poland. Papers by Kordos (1991), Milanovic (1992) and Szulc (1995) display trends and distribution of poverty over the 1980s, i. e. refer to the last decade of the communist regime. All of aforementioned studies focus on monetary poverty and usually are based on absolute poverty lines. Further studies are more diversified. Though many of them are still based on the modified social or subsistence minimum, subjective poverty lines were also explored. Podgórski (Błaszczak-Przybycińska et. al, 1999) for selected years calculated poverty rates using Leyden poverty lines, while Kot (1997) developed his own concept of subjective poverty measurement (the so-called Cracow method, based in individual questionnaires). Numerous studies were included in proceedings of the international conference on poverty that was held in 1991 in Warsaw (*Poverty Measurement* ..., 1992)

Polish studies on poverty rarely examine income or expenditure mobility of individuals, mainly for the data restrictions. The household budget survey do not contain panel data on a regular basis. Nevertheless, some studies utilising occasional panel data exist: Błaszczak-Przybycińska et al, 1999, Okrasa, 2000, Okrasa, ?).

Multidimensional analyses of poverty are not developed in Poland to a large extent. Though some of them, mainly of sociological type, combine observations on monetary poverty with other aspects of a social life (including deprivation and social exclusion), they present results in a form of simple, descriptive statistics. In Błaszczak-Przybycińska et al (1999) more formal analyses of monetary poverty, including calculations of Foster-Greer-Thorbecke indices were matched with numerous questions about deprivation, subjective evaluations and financial situation. Szulc (2002) examined consistency of various dimensions of poverty, including incomes and expenditures, deprivation and subjective evaluations. He also produced indices of “total” poverty, i. e. poverty holding all aforementioned definitions of poverty in a broad sense. The present study is partly based on similar concepts.

Analyses by Panek (1998) play a special role in the Polish research on multidimensional poverty[6]. He employed the fuzzy sets approach, combining various dimensions of poverty in one measure. The idea of fuzzy sets application stands in opposition to a dichotomous approach in which individuals may be only poor or non-poor. In the fuzzy sets approach a third category, namely "partly poor" individuals, is created. For such individuals degree of poverty is gauged by means of a so called membership function that evaluate a degree of multidimensional poverty. The latter may be aggregated over individuals to produce national and group-specific poverty indicators. In Panek (1998) the broadest set of poverty components could be applied, due to the generous data set obtained in the Central Statistical Office and the Warsaw School of Economics project, capturing households for four months from May 1995 to November 1996. The following aspects of poverty were comprised: income, nutrition, household assets and durables, living conditions, health care, education of children, culture and recreation, and subjective evaluations of income position. The study revealed some conflicting results on poverty changes over the investigated period, though the general picture was definitely optimistic[7]. Similar studies on multidimensional poverty in Poland were conducted also by Błaszczak-Przybycińska (1992) and Cheli et al. (1994). The results of all multidimensional studies of poverty in Poland over 1990s and beginning of the next decade provide quite clear picture. As stated by Panek (1998, p. 992): "... poverty viewed by household income does not always coincide with poverty as seen by other non-income related characteristics ...". Housing conditions and household assets represent the area in which almost permanent improvement was made. Subjective evaluations are characterised by an opposite tendency. For many years in which incomes improved, subjective poverty was increasing.

4. Elements of the present study.

4 a. Well being and poverty.

Household equivalent income and expenditures on consumption (OECD 70/50[8] equivalence scales are applied) are indicators of household well-being. Though pros and cons might be pronounced for both measures, there are no reasons for resigning from any of them, especially when various aspects of poverty are being considered. Income and expenditure poverty are analysed separately and simultaneously.

[6] Several other papers in Polish are also available.
[7] One should note, however, that the rates of GDP growth, and consequently of households incomes and consumption, in 1995 and 1996 were the highest since 1990 till recently.
[8] Numerical values of these scales coincide with some econometric estimations for Poland (see Szulc, 2003).

Household assets, durables and facilities are alternative measures of households' material status. There are two ways of including them into poverty measurement in this study. First, as direct measures of deprivation conceived as a lack of some basic facilities like hot bath or flushing toilet at home. Second, the households reporting low incomes and/or expenditures are matched with those with a more than sufficient standard of living in terms of household assets, in order to indicate conflicting indications. Furthermore, subjective income evaluations are used as an additional indicators of standards of living.

4b. The poverty lines

Indicators of monetary poverty are based on both absolute (the leading one) and relative poverty lines. The first type is especially relevant in a case of transition countries undergoing huge alterations in well-being distribution. In the present study it is based on the social minimum (see first paragraph of the previous section) corrected by Szulc (2000) to make it stable in real terms. Three relative poverty lines are median-based and range from 50% to 70% of this value. Apart from poverty thresholds, an opposite measure is embedded into this research in order to indicate those individuals whose reached high level of living in terms of one measure and are poor in terms of another one. One could name this concept a "prosperity line". It is created for all three aspects of poverty. Monetary "prosperity" is defined as higher than double of median equivalent total expenditures on clothing, health care, transportation and communication, culture and recreation, and education.

"Deprivation poverty line" is defined in terms of household basic facilities, namely as lacking of at least one of the following: bath or shower, inside toilet, running hot water, adequate heating (for instance not with a fire basket). Such a definition of deprivation allows ranking its degree from one (i. e. lack of one item) to four. The "prosperity (or "affluence") line" is defined as an occurrence in a household of particular combinations of the following: large living area (at least double of the median), own passenger car, summer house (dacha), some luxury durables. Details may be found in Appendix A.

Definition of a subjective poverty is based on two income questions: i/ what is your general income position (possible answers: poor, rather poor, fair, rather good, and good), and ii/ what monthly income will you find: very poor, insufficient, scarcely enough, good, and very good.

To be considered poor in subjective terms a household should find its income less than "fair" (first question) and reach less than "scarcely enough" monthly income (second question). The subjective "prosperity line" was defined by an answer at least "rather good" to the first question and by reaching at least "good" income in the sense of the second).

4c The poverty and inequality indices.

The set of applied formulas is rather standard. Poverty rates are calculated for persons (all calculations) and for households (monetary poverty, absolute poverty line only). The poverty gap index utilises the measure proposed by Atkinson et al (2002) as the Laeken indicator of monetary poverty depth. It is defined as a difference between a poverty line and median income of the poor divided by the poverty line value:

$$D = \frac{z - Me(inc_p)}{z} \qquad (1)$$

where z stands for a poverty line and inc_p is an individual income of the poor. In other words, this index indicate how poor the poor are. In the present study such an index is calculated by means of the absolute poverty line and: i/income, ii/expenditures, and iii/ income and expenditures simultaneously. To combine income and expenditure in one indicator, some modification should be introduced to (1). First, for income and expenditures two poverty gaps are calculated:

$$D_{inc} = \frac{z - Me(inc_{p,ie})}{z} \quad \text{and} \quad D_{\exp} = \frac{z - Me(\exp_{p,ie})}{z} \qquad (2)$$

where $inc_{p,ie}$ and $exp_{p,ie}$ stand for income and expenditures, respectively, of persons whose both incomes and expenditures are below the poverty line. The combined income and expenditure poverty gap is an arithmetic mean of both indices defined above.

Poverty indices are supplemented by inequality measures: Gini and upper and bottom quintile ratio. They are calculated for incomes and expenditures separately and for average values of these two measures.

4d Poverty distribution among socio-economic groups.

In order to indicate the groups of high risk (probability) of poverty, national indices may be disaggregated by means of several key variables (see section 7c for the list). However, such a type of decomposition can provide a biased set of poverty correlates. For instance, rural households include, on average, more children than urban ones and are usually headed by less educated persons. As both these attributes are likely to be significant correlates of poverty, it would be impossible to check by means of simple decomposition whether rural location itself is a "determinant" of poverty. Probit (or logit) models allow estimation of, informally speaking, pure effects of household attributes, as the regression is run on all variables simultaneously. Probit models of four types of poverty (monetary, subjective, deprivation of lowest degree, deprivation of highest degree[9]) are estimated to provide marginal effects of various household's or person's attributes on demographic composition, location, main source of income etc.

Probit regression is also utilised to find correlates of inconsistencies in poverty, conceived as holding one definition of poverty, while another one is not passed. Thus, an independent variable is binary, however using a standard probit regression for the poor individuals may result in biased estimates due to self-selected sample (some determinants of monetary poverty may be also determinants of inconsistency) which results in correlation between the residual of the regression and selection equation. To obtain unbiased estimates, Heckman selection model may be used. The procedure consists in simultaneous estimation of two equations:

$$MP = f_1(X_1) \quad \textit{selection equation}$$
$$IP = f_2(X_2), \quad \mathrm{X}_2 \neq X_1 \quad \textit{inconsistency of poverty equation}$$

where *MP* stands for monetary poverty, *IP* represents inconsistent poverty in the sense of any definition employed in this study (see section 7d), while X_1 and X_2 are sets of attributes supposed to affect monetary poverty and inconsistency of poverty, respectively.

4e Impact of changes in population on poverty

Some portion of changes in various types of poverty may be explained by changes in population like improving education attainments or increases in unemployment. Impact of those changes is evaluated by means of decomposition of the overall poverty rates into

[9] Respectively, one item missing and four items missing. For more details see section 6.

changes in sub-group poverty rates and changes in the shares of these groups. A change in a poverty rate P (and in each decomposable poverty index) between period (say) 0 and t may presented in the following manner:

$$\Delta P_t = \sum_{i=1}^{k} \Delta P_{it} \cdot \Delta S_{it} \qquad (3)$$

where ΔP_{it} is a change in i-th sub-group poverty rate and ΔS_{it} stands for a change in i-th group share. Fixing shares at initial levels and using group poverty rates of t-th period one can calculate counterfactual poverty rates

$$P_{t0} = \sum_{i=1}^{k} P_{it} \cdot S_{i0} \qquad (4)$$

Comparing them with the actual ones, obtained for *t-th* period, allows evaluation of impact of compositional changes on poverty.

5. The data

The data employed in this research come from the annual household budget survey (HBS) mentioned at the beginning of section 3. It covers information on household incomes and expenditures, assets, durables, living conditions, demographic and socio-economic attributes, and answers to subjective income questions. Since 1993 till recently the yearly samples cover approximately 32,000 households and 100,000 persons. The reference period of observation is month. The HBS sampling technique is rather standard. Two-stage scheme is being applied. Former administrative regions (voivodships) split into urban and rural areas are the first stage sampling units, from which primary sampling units (dwellings) are being drawn. Recently, panel data are not available, though they were collected in some two- and four year periods till 2001. More details on Polish HBS may be found in Kordos et al (2002).

6. Trends in monetary poverty.

Table 2 reports absolute and relative (70% median) poverty lines for 1997 – 2003, together with changes in median equivalent income and expenditures. After serious increases in 1998 real incomes and expenditures stagnated (this may be partly explained by slowdown in GDP growth, increases of unemployment and tightening monetary policy of the Central Bank after

inflation growth in 1999). Nevertheless, median incomes and expenditures in 2003 were above the initial levels in real terms.

Table 2 Absolute and relative poverty lines and changes in median well-being

Year	Corrected social minimum[1]	70% of median (persons)		Real growth of median	
		Incomes	Expenditures	Incomes	Expenditures
1997	404.0	362.6	328.3	-	-
1998	451.3	425.1	386.0	1.045	1.048
1999	472.4	449.0	402.8	99.2	98.0
2000	520.1	484.0	442.2	99.6	99.6
2001	548.7	513.7	466.4	99.9	99.3
2002	559.1	518.9	467.1	99.4	98.6
2003	563.6	526.9	475.1	1.01	1.01

[1] In zloty per month per single person (in 2003 1 USD = 3.93 złoty and 1 Euro=4.44 zł)

Source: 1990 social minimum by ILSS and own calculations based on the HBS

Indices of monetary poverty obtained with the use of absolute poverty line (corrected social minimum) are reported in Table 3. The changes in poverty incidence based on three types of well-being (equivalent incomes and expenditures taken separately and simultaneously) did not differ much. For all of them, irrespectively whether for persons or households, the highest values are observed for 1997. Bottom values for expenditures were reached in 1998 for expenditures and in 1999 for incomes. Unlike in the previous years (see Szulc, 2002) indices calculated for persons[10] were changing at the pace similar to that calculated for households. Trends in poverty gaps were characterised by similar shapes, however 2003 values were well above 1997 levels. It means that 2003 poor were more poor than 1997 poor, though less numerous. Expenditure poverty gaps were on average higher than income gaps. Nevertheless, the highest poverty depth was indicated when income and expenditures are combined. This hardly surprises, as these measures were calculated using more restrictive definition of poverty, therefore those poor accordingly to one definition only were excluded from the poverty zone.

[10] Incomes and expenditures attributed to persons are obtained by dividing household's values by the equivalence scale.

Table 3. Monetary poverty rates and gaps for absolute poverty line

Year	Poverty rate		Poverty depth	
	Persons	Households	Persons	Households
Expenditures				
1997	38.1	31.5	24.2	23.8
1998	34.3	27.4	23.4	23.0
1999	35.1	27.7	24.0	23.6
2000	35.3	28.4	24.6	24.2
2001	35.6	28.2	24.6	24.3
2002	36.9	29.2	25.8	25.3
2003	36.7	29.0	26.5	26.1
Incomes				
1997	30.1	23.9	23.6	23.1
1998	27.1	21.2	22.7	22.3
1999	26.3	20.3	24.6	24.2
2000	29.0	22.9	24.8	24.5
2001	28.7	22.3	24.7	24.2
2002	29.5	22.8	26.1	25.7
2003	29.6	22.9	25.4	25.2
Incomes and expenditures				
1997	23.4	17.8	28.1	27.8
1998	20.7	15.4	27.6	27.3
1999	20.8	15.3	29.0	28.6
2000	22.6	17.0	29.2	28.9
2001	23.1	17.2	29.1	28.8
2002	24.0	17.8	30.3	30.0
2003	24.0	17.9	30.4	30.2

Table 4. Monetary poverty rates for relative poverty lines and inequality measures

Year	% of persons below given percentage of the median			Gini index	Quintile ratio
	50%	60%	70%		
Expenditures					
1997	7.7	14.6	23.3	30.6	2.32
1998	7.8	15.0	23.7	31.0	2.35
1999	8.4	15.6	24.2	31.1	2.41
2000	8.6	15.8	24.5	31.7	2.41
2001	9.2	16.2	24.8	31.5	2.43
2002	9.6	16.5	24.9	32.5	2.49
2003	10.0	17.5	26.0	33.4	2.58
Incomes					
1997	9.0	15.4	23.2	21.9	2.26
1998	8.9	15.3	23.4	29.4	2.25
1999	9.7	16.0	23.4	29.8	2.29
2000	10.4	17.0	24.4	31.2	2.36
2001	10.7	16.8	24.7	31.0	2.38
2002	11.1	17.5	25.2	31.8	2.45
2003	10.9	17.9	25.5	32.2	2.50
Incomes and expenditures					
1997	6.7	13.5	21.9	28.3	2.19
1998	7.1	13.8	22.2	28.4	2.22
1999	7.9	14.6	22.6	28.7	2.26
2000	8.3	15.1	23.5	29.8	2.30
2001	8.7	15.5	23.9	29.7	2.33
2002	9.1	16.0	24.0	30.6	2.39
2003	9.2	16.1	24.6	31.3	2.44

Legend: Quintile ratio is a ratio of fifth to first quintile

Table 4 displays changes in relative monetary poverty. Like previously, the indices were calculated for three types of monetary well-being measures. The poverty lines were calculated as 50%, 60% and 70% median equivalent income and expenditures. Combined

measure was defined as an arithmetic mean of individual's income and expenditures. For all poverty lines and well-being definitions virtually permanent increase in poverty incidence occurred. Increases observed for expenditures were slightly more intense. Trends in relative poverty coincide with those observed for inequality measures. This stands in opposition to some discrepancies observed in the previous years (see Szulc, 2002). All calculations are for persons only. This applies to all the results reported in succeeding parts of this paper

Correspondence of trends in income and expenditure poverty does not necessary mean their identity at individual levels. As rates of poverty of the first type are significantly lower, it is obvious that some persons considered poor in terms of expenditures are not income poor. Nevertheless, the scale of such inconsistencies is much higher than would result from those differences only. The inconsistencies were checked for 1997, 2000 and 2003. The proportion of the expenditure poor among those who are not income poor ranged from 34,6% (in 2003) to 38,8% (in 1997). At the same time, proportion of the income poor among the expenditure non-poor ranged from 18,8% (2003) to 22,4% (1997). Thus, the inconsistency between income and expenditure poverty decreased between 1997 and 2003 but remained relatively high. Moreover, these results demonstrate how misleading in identification of poor individuals may be using one measure only, even if a research is aimed solely at monetary poverty.

7. Monetary poverty versus other aspects of poverty.

7a. Consistency of poverty at individual levels.

Two other dimensions of poverty (see section 4b for the definitions) were examined for 1997, 2000 and 2003. The respective national rates are displayed in Table 5 (in parentheses). Conclusions on changes are rather conflicting. Subjective poverty rate in 2003 was considerably higher than that in 1997 though it peaked in 2000. On contrary, deprivation rates dropped significantly over investigated period. The extent of those drops was similar, irrespectively of degree of deprivation (that ranges from one to four).

Table 5. Subjective poverty and deprivation rates: among the monetary poor and average.

Year	Subjective poverty	Deprivation of degree:			
		One	Two	Three	Four
1997	57.1 (27.5)	51.8 (31.5)	35.5 (18.7)	27.9 (14.1)	21.0 (10.3)
2000	66.9 (33.4)	51.9 (28.2)	32.1 (15.0)	24.6 (11.3)	18.1 (8.1)
2003	65.0 (32.3)	42.7 (22.8)	26.2 (12.3)	19.1 (8.8)	13.7 (6.3)

National averages in parentheses

Consistency and inconsistency of three dimensions of poverty at individual levels is examined in two ways. First, rates of the subjectively poor and the deprived among those passing definition of monetary poverty are calculated. The latter is based on combined income and expenditures. Second, rates of persons above the "prosperity lines" (see section 4b) are calculated for the monetary poor and are displayed in Table 6. The results reported in Table 5 demonstrate how many poor in accord with one definition are poor in accord with another one. The proportion of the subjectively poor among the monetary poor varied from 57,1% in 1997 to 66,9% in 2000. These changes resulted mainly from changes in overall subjective poverty rate, while the ratio of the rate of subjectively poor among the monetary poor to the overall rate of the subjectively poor was quite stable (from 2.0 in 2000 and 2003 to 2.1 in 1997; the higher ratio means the higher consistency). The proportion of deprived persons among the monetary poor is lower, even when overall rate of deprivation is higher than the rate of subjective poverty (1997, deprivation of degree one). The ratio of deprivation rate among the monetary poor to overall rate of deprivation is less stable than respective ratio obtained for subjective poverty but the mean value is also around two.

Table 6. Asset, subjective and expenditure prosperity: among the monetary poor and average.

Year	Monetary poverty and:			Expenditure poverty and subjective prosperity	Income poverty and expenditure prosperity
	asset prosperity	subjective prosperity	expenditure prosperity		
1997	11.4 (31.2)	1.0 (9.7)	0.1 (20.6)	2.7	4.2
2000	15.2 (36.3)	0.8 (8.7)	1.4 (22.8)	2.1	6.3
2003	18.1 (40.8)	0.7 (9.9)	1.9 (24.6)	2.0	6.1

National averages in parentheses

Table 6 displays how many among the monetary poor reached prosperity in accord with another standard. There are three definitions of the "prosperity line" (see section 4 b), each one associated with a particular dimension of poverty. All those thresholds are set at reasonably high levels, to ensure a secure margin of error. The proportion of persons living in households with luxury (in Poland) assets and durables was relatively high and increased considerably over investigated period (from 11% to 18%). That increase was caused not only by overall increase of this type of prosperity (by 31%) but also by increase of proportion of "prosperous households" among the monetary poor. This increasing inconsistency stands in opposition to increases in consistency of poverty based on monetary poverty and deprivation, as reported in Table 5. The results demonstrated in next two columns of Table 6 are rather inconclusive, due to very small numbers (below 2%). This may be explained by definitions of monetary poverty and of respective types of "prosperity". The previous covers both income and expenditures and the latter ones also cover income (subjective income questions) and expenditures. Therefore, matching subjective "prosperity" with expenditure poverty only and expenditure "prosperity" with income poverty seems to be a better solution. The rates of "prosperous poor" defined in that way are much higher but still relatively low. On the other hand, the serious increase of the rate of "expenditure prosperity" among the income poor (by 45-50%) can be observed for 2000 and 2003, as compared to 1997.

7b. Trends in consistent poverty

The individuals passing more than one definition of poverty can be described as consistently poor (or as being in "overlapping poverty"). Degree of such a poverty may vary, depending on a number of definitions passed. Provided number of possible combinations, it is necessary to introduce a hierarchy of various types of poverty and "prosperity" which is to some extent arbitrary. The following definitions of consistent poverty are applied:

- monetary poverty without a "prosperity" defined in the previous sub-section,
- monetary poverty and deprivation of degree one and four,
- monetary and subjective poverty,
- subjective poverty and deprivation of degree one and four,
- monetary and subjective poverty together with deprivation of degree one and four.

Table 7.Overlapping poverty.

Year	Monetary poverty and:				Subjective poverty and:		Subjective and monetary poverty, and:	
	lack of prosperity	deprivation of degree 1	deprivation of degree 4	subjective poverty	deprivation of degree 1	deprivation of degree 4	deprivation of degree 1	deprivation of degree 4
1997	20.5	12.1	4.9	13.3	12.6	5.2	7.6	3.3
2000	18.7	11.7	4.1	15.1	14.5	4.8	8.7	3.2
2003	19.2	10.2	3.3	15.6	11.7	3.7	7.5	2.6

For 1997, 2000 and 2003 the aforementioned indices are presented in Table 7. The results hardly surprise, provided trends in separated types of poverty. All measures incorporating deprivation (columns 3 - 4 and 6 - 9) display optimistic trends. On contrary, increase of subjective poverty between 1997 and 2003 overwhelmed modest drops of monetary poverty for those years (column 3). The last column reports rates of the poor in accord with all definitions, including the highest degree of deprivation. They appeared to be very low - from 3,3% in 1997 to 2,6% in 2003 and were decreasing permanently between 1997 and 2003.

7c Poverty distribution.

In this section correlates (sometimes also referred to as determinants) of various types of poverty are examined by means of probit regression. Probability of poverty is an independent variable. The explanatory (dummy) variables, representing a set of prospective poverty correlates, are as follows[11]:

age60 - household head aged over 59

age30 - household head aged below30

kids1 - number of kids equal 1

kids2 - number of kids equal 2

kids3 - number of kids equal 3

kids4 - number of kids equal at least 4

sinpar - single parent household

rural - rural residence

femhe - female household head

farm – farmer household

faremp - bi-occupational household (farmer/employee)

pens - pensioner[12] household

benef - welfare beneficiary household

enterp - self-employed[13] household

pers6 - household of at least 6 persons

edlow - primary or lower education of the head

Positive and statistically significant estimates of the parameters indicate higher probability of poverty, as compared to the reference household. For instance, rural households

[11] Names of these variables are used in Appendix B tables reporting the results of estimations.

[12] Retirement, invalid or survivor pension.

[13] This type of household is unlikely to be a positive correlate of poverty but was included in order to restrict the reference group of households to those headed by employees.

are compared with urban ones or households with female heads are compared with those headed by males. However, such interpretation of estimates is not very useful when the breakdown yields more than two groups, e. g. when individuals are disaggregated by a number of children or by a main source of income. Those estimates may be compared to a reference types only (here: persons living in childless households and in households of employees, respectively). To make the estimates more illustrative marginal effects[14] were displayed instead of estimates of regression parameters. They may be interpreted as estimates of changes in probability of poverty due to change in explanatory variables The marginal effects were calculated using mean values of explanatory variables, so the estimates are not perfectly comparable. Nevertheless, using mean values for each type of household separately would not change the general conclusion, as the differences are not large. The full set of results is reported for 2000 only[15].

It is worth to be mentioned that some estimates do not correspond to the results obtained by a simple decomposition of the overall poverty indices. For instance, persons living in households headed by farmers and farmer-employees as well as in single-parent households are characterised by higher than average monetary poverty rates. On contrary, probit estimates of respective parameters are negative (for farmers it is not significant). This means that higher than average poverty rates are caused by other reasons, e. g. lower education or rural residence (farmers and farmer-employees) or by larger number of children (single parents). Opposite event may be observed for persons living in pensioner households – probit estimate is positive and significant while the poverty rate is below the country average. The latter result is caused mainly by much lower number of children and beneficiaries of the welfare state. The respective variables are included into the probit model and then their effects are separated from the effect of being a pensioner.

The set of positive correlates of subjective poverty is similar to that obtained for monetary poverty, with one exception. The estimate for single-parent households is positive. This may be caused to some extent by psychological reasons, though the sign remains positive when deprivation is taken into consideration. In the case of the latter type of poverty more changes of the signs appear, as compared to monetary poverty. A presence of one child reduces probability of deprivation of degree one and four, as compared to childless households. Presence of two children also reduced relative probability of deprivation of degree four.

[14] See Greene (1997, pp. 910 - 911) for econometric details.
[15] Estimates for 1997 and 2003 available upon request.

Those results, that are conflicting with the results on correlates of monetary poverty, may suggest diverse allocation of incomes by the households with children. They prefer investments in a household's facilities rather than in a current consumption. In other words, even if they cannot evade monetary poverty, they are more likely to avoid a deprivation.

To produce one set of multidimensional poverty correlates an ordered probit regression was applied. An independent variable is ordinal in the sense that higher value means higher concentration poverty. Value 0 means absence of poverty of any type. Higher values (from 1 to 7) are obtained by adding successively further types of poverty, namely: i/ income or expenditure poverty, ii/ income and expenditure poverty, iii/ subjective poverty, and iv-viii/ four degrees of deprivation. For most of the variables listed above estimates were positive and significant. Negative and significant estimates were obtained for persons living in households of the following type: headed by the person at 60 and more, self-employed, farmer-employee, and single-parent household. In 1997 also the estimate for farmer's households was negative.

7d Correlates of inconsistent poverty.

Four forms of inconsistent poverty are analysed in the present study. They are defined by matching monetary poverty with the following forms of absence of poverty:

- "prosperity" in terms of household assets and durables, subjective evaluations and expenditures on non-food items (see sections 4b and 7a),
- lack of subjective poverty,
- lack of deprivation of degree one
- lack of deprivation of degree four.

For all definitions standard probit regression on censored sample (i. e. for the monetary poor only) and Heckman probit regressions were run. For the first and third type of inconsistency correlations between the residuals of the regression and selection equations were significant, therefore Heckman regression appeared to be more appropriate. For two remaining definitions estimates were obtained by means of standard probit regression[16].

The results demonstrate that inconsistencies between different sorts of poverty hardly can be associated with the households' attributes on regular basis. Only the number of persons in the households (but not squared number) is positive and significant in all estimations. Number of

[16] The estimates are not reported in this paper to save the space. They are available from the author upon request.

estimates that are all negative and significant is higher. The following attributes of the household's head decrease probability of inconsistency in poverty: blue collar worker, female, pensioner and welfare state beneficiary. A positive estimate may suggest higher ability to evade one type of poverty in spite of facing other form. A negative estimate may be interpreted as a lower ability to manage a poverty.

8. Some remarks on policy implications.

Poverty was not officially recognised in Poland before launching the reforms in 1989, though some scientific research in this area was made (see Kordos, 1992 for a review). Many studies in this area were performed after this date, however they rarely were linked to the social policy system. As a new EU member Poland have begun to monitor poverty officially, nevertheless institutional relations between such statistics and social policy are at the initial phase of creation yet. They are outlined in the National Action Plan on Social Inclusion prepared by the Ministry of Social Policy (2004). Some objectives of the Council of the European Union relevant to anti-poverty policy may be found in Górniak (2004). In the reports by Golinowska et al (2003) and Wóycicka (2004) evaluations of the social policy in Poland in pre-accession period were made.

Though anti-poverty policy is one of key elements of declarations being made by the EU and the member countries leaders, some indirect actions might be more effective as a social policy tool in Poland. They should be aimed at some determinants of poverty rather than in poverty itself. Estimates of poverty correlates reported in section 7c may be helpful in understanding poverty, however many of them, like demographic factors, cannot or should not be changed. Nevertheless two of important poverty determinants are subject to some change by an rational policy. Unemployment is a strong, positive correlate of poverty. Though there is no direct measure of unemployment in the utilised variables (since lack of a stable definition), the dummy indicating beneficiaries of welfare state may be used as a proxy variable. Education appears to be one of the best anti- poverty investments[17]. Both of those factors changed seriously between 1997 and 2003 (see Table 1). To check whether these changes have had effects on various types of poverty rates, the simulation described in section 4e is applied. Simulated poverty rates were calculated for 2003 using 1997 shares for two grouping categories: main source of income of the households and educational attainments of the head.

[17] Naturally, these variables are mutually correlated, i. e. well-being has an impact on education as well.

Poverty rates were calculated for monetary and subjective poverty as well as for deprivation of degree one and four. If simulated poverty rate is higher than actual one, the changes in shares have declined poverty and vice versa. The results are displayed in Table 8.

Table 8. Simulated poverty rates assuming 1997 shares and 2003 group poverty rates

Grouping categories:	Simulated rates:			
	Monetary poverty	Subjective poverty	deprivation of degree 1	deprivation of degree 4
main source of income	23.6	31.3	22.4	6.2
education of the hh's head	25.2	33.5	24.4	6.9
Actual rate	24.0	32.3	22.8	6.3

Changes in the shares of groups in source of income category pushed up all poverty rates, however only the change in subjective poverty was non-negligible (by 1 percentage point). This may by explained by increases of the share of welfare beneficiaries (from 3,7% to 6,1%) and pensioners (from 25% to 27%), i. e. groups characterised by higher than average poverty rates. The impact of improvement of educational attainments was larger and pulled poverty rates down. The highest improvement (by 1,6 percentage points) was for deprivation of degree one.

9. Conclusions.

The study revealed relatively large discrepancies between the results obtained with the use of various definitions of poverty. If the household is considered poor by means of indicator of given type it does not necessary imply poverty of other types. The highest discrepancies may be observed between monetary poverty and deprivation (for some years less than half of the monetary poor suffer deprivation), though those between income and expenditure poverty are also relatively wide. The differences at individual levels results in significant differences between trends in various types of poverty. Monetary poverty, after sharp drop in 1998 reached almost initial level in 2003. Subjective poverty increased over investigated period while deprivation at the same time declined substantially. The latter change may be at least partly explained by the tax policy encouraging investments in households facilities and by development of grey economy in relevant sectors. Changes in monetary poverty are related to

changes in average incomes and expenditures (following the GDP and unemployment changes) and increases in inequality. It seems that changes in subjective poverty hardly can be explained by economic factors, as they are mainly of psychological nature.

Analysis of poverty correlates by means of probit regression at micro level produced similar sets of variables for all types of poverty, with two important exceptions. Living in a single-parent household reduces probability of monetary poverty but increases probability of subjective poverty and deprivation. Opposite relations may be observed for the impact of children on poverty. Their presence increases probability of monetary and subjective poverty, as compared to persons living in childless households. However, presence of one or two children reduces relative probability of deprivation. This result suggests that having children may be a strong motivation for more rational allocation of current incomes, i. e. preferring investments rather than current consumption.

Conflicting conclusions derived from analyses of various aspects of poverty can be embarrassing for social policy makers, nevertheless they represent an optimistic feature of Polish poverty. The number of persons which may be considered "entirely poor", i. e. those passing all definitions of poverty is very small. This means that the poor in accord with one definition can evade other types of poverty. Therefore, indicators of inconsistency of poverty may be considered a type of measure of mobility in a broad sense, which is applicable also under absence of panel data. This supposition is supported by the observation that the variables increasing probability of "overlapping poverty"[18] are very likely to be also negative correlates of economic mobility.

[18] The following household's head attributes: blue collar worker, female, pensioner and welfare state beneficiary.

REFERENCES

Atkinson, A., B. and Micklewright, J. (1992), *Economic Transformation in Eastern Europe and the Distribution of Income*, Cambridge University Press, Cambridge.

Atkinson, T., Cantillon, B., Marlier, E. and Nolan, B. (2002). *Social Indicators: The EU and Social Inclusion*, Oxford, Oxford University Press.

Atkinson, T., Marlier, E., and Nolan, B (2004), Indicators and targets for social inclusion in the EU, *Journal of Common Market Studies*, No. 1, pp. 47-75.

Błaszczak-Przybycińska, I. (1991), Multidimensional statistical analysis of poverty in Poland, in *Poverty Measurement for Economies in Transition in Eastern European Countries. International Scientific Conference, Warsaw, 7-9 October, 1991*). Polish Statistical Association, Warsaw, pp. 307 – 327.

Błaszczak-Przybycińska, I. , Kotowska, I. E. , Panek, T., Podgórski, J., Rytelewska, G., and Szulc, A. (1999), Monitoring Household Living Conditions in Poland: 1995-1996, SOCO Project Paper No. 60, Institut für die Wissenschaften vom Menschen, Vienna. http://www.univie.ac.at/iwm/publ/soco60pp.pdf

Cheli, B., Ghellini, A., Lemmi, A., and Pannuzi, N. (1994), "Measuring Poverty in the Countries in Transition via TFR Method: The Case of Poland in 1990-1991", *Statistics in Transition* nr. 3, pp. 585-636.

Dennis I. and Guio A.-C. (2003), "Monetary poverty in EU acceding and candidate countries", *Statistics in Focus*, Theme 3 - 21/2003, Office for Official Publications of the European Communities, Luxembourg

Förster, M. F. and Tóth, G. (1998), The effects of changing labour markets and social policies on income inequality and poverty: Hungary and other Visegrad countries compared, *Luxembourg Income Study Working Paper* no. 177, CEPS/INSTEAD, Luxembourg.

Golinowska, S., Pietka, K., Sowada, C. and Zukowski, M, (2003), *Study on the Social Protection Systems in the 13 Applicant Countries. Poland. Country Study*. http://europa.eu.int/comm/employment_social/social_protection/docs/poland_final.pdf

Górniak, J. (2004), MDG and Laeken Indicators at Work for Poverty Policy in Poland and other Central and East European Countries, *Emergo - Journal of Transforming Economies and Societies*, no. 2, pp. 49 – 67.

Guio, A-C. and Marlier, E. (2004), The Laeken Indicators: Some Results and Methodological Issues in New EU Member States and Candidate Countries, *Emergo - Journal of Transforming Economies and Societies*, no. 2, pp. 21 – 48.

Keane, M. and Prasad, E. (2002). 'Inequality, transfers and growth: new evidence from the economic transition in Poland', *Review of Economics and Statistics*, 84, pp. 324-341.

Kordos (1992), Poverty Measurement in Poland, in *Poverty Measurement for Economies in Transition in Eastern European Countries. International Scientific Conference, Warsaw, 7-9 October, 1991*. Polish Statistical Association, Warsaw, pp. 41 – 63.

Kordos, J., Lednicki, B. and Zyra, M. (2002). 'The household sample surveys in Poland', *Statistics in Transition*, nr. 5, pp. 555-589.

Kot . S.M.(1997): The Cracow Poverty Line., *Folia Oeconomica Cracoviensia*, Vol. XXXIX-XL, pp. 113-128.

Kuhl, K. and Topińska, I. (2003), Poverty in Poland. Profile 2001 and Changes 1994 -2001, background report (World Bank project *LSA 2003 Poland*), on CD in: *Growth, Employment and Living Standards in pre-accession Poland*, the World Bank, May 2004.

Milanovic, B. (1992), Poverty in Poland, 1978-88, *Review of Income and Wealth*, No. 3, pp. 329-340.

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

Milanovic, B. (1998), Income, Inequality, and Poverty during the Transition from Planned to Market Economy. The World Bank, Washington, D.C.

Ministry of Social Policy (2004), *National Action Plan on Social Inclusion. Poland*, Warsaw. http://www.mps.gov.pl/integracja/pliki/nap_incl_2004_final_eng.pdf

MONEE Project (2001). 'A Decade of Transition', Regional Monitoring Report, 8, Innocenti Research Centre, Florence.

Okrasa, W. (?), The Dynamics of Poverty and the Effectiveness of Poland's Safety Net (1993-96), The World Bank. http://siteresources.worldbank.org/INTPOLAND/Resources/okrasa.pdf

Okrasa, W. (2000). 'Who are Poland's long-term poor? Household risk-managing capabilities according to panel data 1993-96', *Statistics in Transition*, nr. 4, pp. 841-882.

Paci, P., Sasin, M. J. and Verbeek, J. (2004), Economic Growth, Income Distribution and Poverty in Poland during Transition, The World Bank mimeo. http://siteresources.worldbank.org/INTISPMA/Resources/Training-Events-and-Materials/paci_sasin_verbeek_prw.pdf

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

Panek, T. (1999), Determinants of the Poverty Sphere in Poland, *Statistics in Transition*, nr. 3, pp. 229 – 243.

Poverty Measurement for Economies in Transition in Eastern European Countries. International Scientific Conference, Warsaw, 7-9 October, 1991 (1992). Polish Statistical Association, Warsaw.

Ravallion, M. (1994), *Poverty Comparisons. A Guide to Concepts and Methods*, Living Standards Measurement Study, Working Paper No. 88, The World Bank, Washington, D.C.

Rumińska-Zimny, E., (1997), Human Poverty in Transition Economies: Regional Overview for HDR 1997, Human Development Report Office, *Occasional Paper No. 28*.

Szulc, A, (1995), Measurement of Poverty: Poland in the 1980s, *Review of Income and Wealth*, No. 2, pp. 191-205.

Szulc, A. (1998), Economic Transition and Poverty - the Case of the Visegrad Countries, *Statistics in Transition*, nr. 3, 1998, pp. 545 – 567.

Szulc, A. (2000). 'Economic Transition, Poverty, and Inequality: Poland in the 1990s', *Statistics in Transition*, nr. 4, pp. 997 - 1017.

Szulc, A. (2002), Poverty in Poland during the 1990s: Does the Method Matter?", *RECESS Research Bulletin*, Research Center for Economic and Statistical Studies, nr. 2, pp. 25-44.

Szulc, A. (2003), Is It Possible to Estimate Reliable Equivalence Scales?, *Statistics in Transition*, nr. 2, pp. 589 - 611.

Topińska, I. (1997), Transition to the Market and Poverty Alleviation Strategies: Bulgaria, Hungary, Poland, Romania, A Case Study for the UNDP Project GLO/96/510 *Monitoring and Improving Poverty Reduction*.
www.undp.org/poverty/publications/case

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

The World Bank (1994). 'Poverty in Poland', World Bank Report 13501-PO, Washington, D.C.

The World Bank (2000), *Making Transition Work for Everyone. Poverty and Inequality in Europe and Central Asia*, Washington, D. C.

Wóycicka, I. (2004), The Fight against Poverty and Social Exclusion, *The Gdansk Institute for Market Economics mimeo*, Warsaw.
http://europa.eu.int/comm/employment_social/social_inclusion/docs/pl_network_en.pdf

APPENDIX A. DEFINITION OF HOUSEHOLD'S ASSET AFFLUENCE.

The following items are selected as components of household assets and durables set being used as an indicator of well-being supplementary to the monetary ones: dwelling size, possessing a car, dacha (cottage), computer with an access to the internet in 2000 and 2003 or with a printer in 1997, electric dish washer, cable or satellite TV, and video recorder. The threshold for a dwelling size is set at double of the median value. Since large variation of this variable with respect to the household size and type of residence, the thresholds are calculated separately for rural as well as for urban households and for households with one, two, and three or more persons. A household is classified as affluent in terms of its assets if at least one of the following conditions is held:

- owning a car and dacha,
- owning at least three of the following: car, computer plus internet or printer, dish washer, cable or satellite TV, and video recorder,
- owning a car and living in a large dwelling,
- living in a large dwelling and owning at least three of the following: computer plus internet or printer, dish washer, cable or satellite TV, and video recorder

APPENDIX B. PROBIT ESTIMATES OF POVERTY CORRELATES

Table B.1. Probit marginal effects for household attributes in 2000.
Dependent variable: monetary poverty

```
Probit estimates                                        Number of obs = 113540
                                                        LR chi2(16)   =24150.32
                                                        Prob > chi2   = 0.0000
Log likelihood = -49271.006                             Pseudo R2     = 0.1968

------------------------------------------------------------------------------
 Poverty |      dF/dx   Std. Err.      z    P>|z|     x-bar  [    95% C.I.   ]
---------+--------------------------------------------------------------------
   age60 |  -.1183654   .0032476   -29.80   0.000   .161661  -.124731    -.112
   age30 |   .0064358   .0042093     1.54   0.123   .100643  -.001814  .014686
   kids1 |   .1044224    .003929    28.28   0.000   .244927   .096722  .112123
   kids2 |   .1663383   .0045043    40.43   0.000   .204307    .15751  .175166
   kids3 |   .2789736   .0066836    47.21   0.000   .083257   .265874  .292073
   kids4 |   .3901677   .0096505    44.19   0.000   .047358   .371253  .409082
  sinpar |  -.1031589   .0057533   -13.38   0.000   .017307  -.114435 -.091883
   rural |   .1048447   .0030179    35.67   0.000   .393253    .09893   .11076
   femhe |   .0904449   .0031181    30.33   0.000   .299903   .084334  .096556
    farm |  -.0041601   .0050885    -0.81   0.417    .05953  -.014133  .005813
  faremp |  -.0417301   .0037575   -10.44   0.000   .116514  -.049095 -.034365
  enterp |  -.0931142   .0039007   -19.47   0.000    .07666  -.100759 -.085469
    pens |   .1281919   .0048367    28.50   0.000   .254624   .118712  .137672
   benef |   .3541329   .0081725    48.38   0.000   .046812   .338115  .370151
   pers6 |   .0973094   .0045543    23.20   0.000   .155337   .088383  .106236
   edlow |   .1753989   .0024258    64.98   0.000   .607759   .170644  .180153
---------+--------------------------------------------------------------------
```

Table B.2. Probit marginal effects for household attributes in 2000.
Dependent variable: subjective poverty.

```
Probit estimates                                        Number of obs = 113540
                                                        LR chi2(16)   =15922.60
                                                        Prob > chi2   = 0.0000
Log likelihood = -64366.142                             Pseudo R2     = 0.1101

------------------------------------------------------------------------------
 Poverty |      dF/dx   Std. Err.      z    P>|z|     x-bar  [    95% C.I.   ]
---------+--------------------------------------------------------------------
   age60 |  -.1374101   .0045693   -27.25   0.000   .161661  -.146366 -.128454
   age30 |   .0026864   .0049725     0.54   0.589   .100643   -.00706  .012432
   kids1 |   .0430755   .0040709    10.71   0.000   .244927   .035097  .051054
   kids2 |   .0688511   .0045202    15.55   0.000   .204307   .059992  .077711
   kids3 |   .1262014   .0065111    20.11   0.000   .083257    .11344  .138963
   kids4 |   .2719541   .0094037    29.14   0.000   .047358   .253523  .290385
  sinpar |   .0368867   .0120294     3.13   0.002   .017307    .01331  .060464
   rural |   .0303943   .0035107     8.69   0.000   .393253   .023513  .037275
   femhe |   .1439968   .0034548    42.46   0.000   .299903   .137225  .150768
    farm |  -.0305623   .0063457    -4.72   0.000    .05953     -.043 -.018125
  faremp |  -.0788152   .0047775   -15.63   0.000   .116514  -.088179 -.069452
  enterp |  -.1870548   .0045571   -32.60   0.000    .07666  -.195987 -.178123
    pens |   .1630372   .0052568    31.78   0.000   .254624   .152734   .17334
   benef |   .3713972   .0075429    46.21   0.000   .046812   .356613  .386181
   pers6 |   .0343776   .0051642     6.75   0.000   .155337   .024256  .044499
   edlow |   .1920937   .0029591    61.37   0.000   .607759   .186294  .197893
---------+--------------------------------------------------------------------
```

Table B.3. Probit marginal effects for household attributes in 2000.
Dependent variable: deprivation of degree one.

```
Probit estimates                                  Number of obs = 113540
                                                  LR chi2(16)   =17288.61
                                                  Prob > chi2   = 0.0000
Log likelihood = -59085.223                       Pseudo R2     = 0.1276

------------------------------------------------------------------------------
 Poverty |      dF/dx   Std. Err.      z    P>|z|     x-bar  [    95% C.I.   ]
---------+--------------------------------------------------------------------
   age60 |   .0677474   .0054734    12.85   0.000   .161661    .05702  .078475
   age30 |   .1019236   .0050758    21.23   0.000   .100643   .091975  .111872
   kids1 |  -.0150889   .0037045    -4.04   0.000   .244927  -.022349 -.007828
   kids2 |   .0131994   .0041248     3.22   0.001   .204307   .005115  .021284
   kids3 |   .0697805    .006032    12.11   0.000   .083257   .057958  .081603
   kids4 |   .2099437   .0094433    23.96   0.000   .047358   .191435  .228452
  sinpar |   .0634863   .0116047     5.74   0.000   .017307   .040742  .086231
   rural |   .1783757   .0033014    54.91   0.000   .393253   .171905  .184846
   femhe |   .0738211   .0032704    23.12   0.000   .299903   .067411  .080231
    farm |   .0296998   .0061667     4.93   0.000    .05953   .017613  .041786
  faremp |  -.0107141   .0046814    -2.27   0.023   .116514  -.019889 -.001539
  enterp |  -.0875665   .0050433   -15.56   0.000    .07666  -.097451 -.077682
    pens |   .0568956   .0049614    11.74   0.000   .254624   .047172   .06662
   benef |   .1745428   .0076667    24.57   0.000   .046812   .159516  .189569
   pers6 |  -.0282369   .0044386    -6.22   0.000   .155337  -.036936 -.019537
   edlow |   .2012665   .0026969    68.51   0.000   .607759   .195981  .206552
---------+--------------------------------------------------------------------
```

Table B.4. Probit marginal effects for household attributes in 2000.
Dependent variable: deprivation of degree four.

```
Probit estimates                                  Number of obs = 113540
                                                  LR chi2(16)   =10773.81
                                                  Prob > chi2   = 0.0000
Log likelihood = -26041.327                       Pseudo R2     = 0.1714

------------------------------------------------------------------------------
 Poverty |      dF/dx   Std. Err.      z    P>|z|     x-bar  [    95% C.I.   ]
---------+--------------------------------------------------------------------
   age60 |   .0272838   .0026563    11.83   0.000   .161661   .022077   .03249
   age30 |    .039343   .0028168    16.98   0.000   .100643   .033822  .044864
   kids1 |  -.0123292   .0014577    -7.95   0.000   .244927  -.015186 -.009472
   kids2 |  -.0088598   .0016012    -5.26   0.000   .204307  -.011998 -.005722
   kids3 |   .0064325    .002452     2.75   0.006   .083257   .001627  .011238
   kids4 |   .0450243   .0048766    11.73   0.000   .047358   .035466  .054582
  sinpar |    .015506   .0052448     3.31   0.001   .017307   .005226  .025786
   rural |   .0808866   .0018244    51.56   0.000   .393253   .077311  .084462
   femhe |   .0257186   .0015316    18.35   0.000   .299903   .022717   .02872
    farm |   .0405866   .0034101    14.79   0.000    .05953   .033903   .04727
  faremp |   .0175689   .0023218     8.37   0.000   .116514   .013018  .022119
  enterp |  -.0179131   .0023351    -6.38   0.000    .07666   -.02249 -.013336
    pens |   .0228506   .0024532    10.19   0.000   .254624   .018042  .027659
   benef |   .0711987    .004759    20.33   0.000   .046812   .061871  .080526
   pers6 |  -.0094375   .0016516    -5.36   0.000   .155337  -.012675   -.0062
   edlow |   .0590167   .0012826    40.66   0.000   .607759   .056503  .061531
---------+--------------------------------------------------------------------
```

Table B.5. Ordered probit estimates on household attributes in 2000.
Dependent variable: concentration of poverty (from 0 to 7).

```
Ordered probit estimates                          Number of obs   =     113540
                                                  LR chi2(16)     =   33700.61
                                                  Prob > chi2     =     0.0000
Log likelihood = -134838.13                       Pseudo R2       =     0.1111

------------------------------------------------------------------------------
     Poverty |      Coef.   Std. Err.       z     P>|z|       [95% Conf. Interval]
-------------+----------------------------------------------------------------
       age60 |  -.4369445   .0138705    -31.502   0.000      -.4641303   -.4097587
       age30 |   .0898792   .0119694      7.509   0.000       .0664197    .1133387
       kids1 |   .3211198   .0099157     32.385   0.000       .3016853    .3405543
       kids2 |   .4882932   .0106021     46.056   0.000       .4675134     .509073
       kids3 |   .7136614   .0140577     50.767   0.000       .6861089     .741214
       kids4 |   .9612105   .0196138     49.007   0.000       .9227681    .9996529
      sinpar |  -.3153834   .0279857    -11.269   0.000      -.3702344   -.2605325
       rural |   .4203836   .0084144     49.960   0.000       .4038916    .4368755
       femhe |   .3011722   .0082165     36.655   0.000       .2850681    .3172763
        farm |   .0663919   .0154514      4.297   0.000       .0361077    .0966761
      faremp |  -.1163698   .0125235     -9.292   0.000      -.1409153   -.0918242
      enterp |  -.4109661   .0158371    -25.950   0.000      -.4420063   -.3799259
        pens |   .3853006   .0122893     31.353   0.000       .3612141    .4093871
       benef |   .9175889   .0162196     56.573   0.000       .8857991    .9493786
       pers6 |   .2821454   .0115633     24.400   0.000       .2594818    .3048089
       edlow |   .7051554   .0082527     85.446   0.000       .6889805    .7213303
-------------+----------------------------------------------------------------
```

International Poverty Centre
SBS – Ed. BNDES, 10º andar
70076-900 Brasilia DF
Brazil

povertycentre@undp-povertycentre.org
www.undp.org/povertycentre
Telephone +55 61 2105 5000